

**Business and Health Administration Association  
Division of MBAA International  
2019 Meeting  
Chicago, Illinois**

# **ABSTRACT AND PAPER PROCEEDINGS**



**BHAA President – Marcy Butler  
Program Chair – Hanadi Hamadi  
Proceedings Editors- Dan Friesner & Kelly Haugen**

# **PROCEEDINGS**

**of the**

## **BUSINESS AND HEALTH ADMINISTRATION ASSOCIATION**

**CHICAGO, IL  
March 27th-March 29th, 2019**

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Fargo, ND**

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North Dakota State University  
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## Letter from the BHAA 2019 President



**Marcy Butler**

Clayton State University

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Dear BHAA Colleagues,

I would like to welcome you to the 2019 Business and Health Administration Association (BHAA) Conference at the Palmer House in Chicago, Illinois!

Whether this is your first time attending this conference or a conference alum; I hope that you will enjoy the presentations. We have a wonderful array of papers and abstracts from various disciplines again this year, so I hope that you will take the time to attend as many presentations as possible. I personally want to express my gratitude for all the efforts you have put into your submissions.

I have been attending this conference since 2013, and this is one of my favorites. I have met many wonderful individuals that I consider as friends and colleagues. I look forward to meeting many of you for the first time as well as reconnecting.

It has been my privilege serving as your President for this year's BHAA. I would like to express my gratitude to the leadership of Program Chair Hanadi Hamadi, the tireless work of our Proceedings Editors, Kelly Haugen and Dan Friesner, as well as many of the past presidents, for their support and guidance throughout this year. Peter Fitzpatrick and Ashish Chandra are my mentors here and I am eternally grateful.

Again, thank you for your participation in this year's BHAA conference. I hope that you will have a wonderful learning experience and will have an opportunity to enjoy the city of Chicago.

Sincerely,  
Marcy Butler  
President-BHAA 2018/2019

## Letter from the BHAA 2019 Conference Chairperson



**Hanadi Hamadi**

University of North Florida

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Dear BHAA Colleagues,

Welcome and greetings to the 2019 BHAA Annual Conference at the Palmer House in Chicago, Illinois!

I want to thank you for your exceptional efforts that you have put forth into your submissions and the presentations. I highly recommend that you attend as many of the presentations as you can, as they provide a great opportunity to share experiences and connect with others in your field.

This is will be my fourth year attending and presenting at the BHAA conference. This is one of my favorite annual conferences because you are able to network in depth with new colleagues from other colleges local and national. I look forward to meeting many of you in March.

It has been my privilege serving as your Conference Chair for this year's BHAA conference. I would like to acknowledge the leadership provided by President March Butler. In addition, I would like to recognize Kelly Haugen and Dan Friesner for compiling the proceedings manual. I would also like to thank Ashish Chandra, Kent Willis, and Zack Hill for their support.

Again, thank you for your participation in this year's BHAA conference. I hope that you will have a wonderful learning experience and will have an opportunity to enjoy the city of Chicago.

Sincerely,  
Hanadi Hamadi  
Program Chair-BHAA 2018/2019

## Letter from the BHAA 2019 Proceedings Editors



**Kelly Haugen**

North Dakota State University



**Dan Friesner**

North Dakota State University

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Dear BHAA Colleagues,

Thank you for participating in the 2019 Business and Health Administration Association (BHAA) meetings, and more generally in the 2019 MBAA International Meetings in Chicago!

The BHAA meetings are a truly unique experience. Few other health administration conferences in the United States offers an integral (through the MBAA International) tie to other business disciplines as well as a unique mix of business and health-related research. The BHAA meetings are large enough to offer research in all major areas of health administration, yet small enough so that it is possible to network with all of the conference's participants. Perhaps most importantly, the BHAA is a very welcoming environment! It is a conference where one can present research that is either fully complete or in its infancy, and in all cases receive very encouraging and detailed feedback on your work. This is a major reason why we choose to return to present our work at the BHAA meetings each year.

We appreciate the opportunity to serve as Proceedings Editors for this year's meetings. We are especially grateful to President Marcy Buler and Program Chair Hanadi Hamadi for their leadership.

Thank you again for participating in the 2019 BHAA meetings, and for being a part of these proceedings. We hope that it is an enriching experience!

Sincerely,  
Kelly Haugen and Dan Friesner  
Proceedings Editors-BHAA 2018/2019

## Best Paper Awards

### BHAA BEST PAPER AWARD

#### TRACK: HEALTHCARE EDUCATION

*How Emotions Influence the Decision Making of Mothers of Toddlers to Vaccinate*

Lucia Ludvig Cintulova and Libusa Radkova

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#### TRACK: CORPORATE HEALTHCARE

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*Perception of Universal Healthcare among College Students, Faculty, and Staff at the University of Evansville*

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*Personal Health Record Interoperability*

Manal Alghamdi, Courtney Stanley, William “Kent” Willis, and Alberto Coustasse-Hencke

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**CORPORATE HEALTHCARE**

# IMPLICATIONS OF UPCODING ON MEDICARE

Katrina Cremeans, RN, SRNA  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[cremeans64@live.marshall.edu](mailto:cremeans64@live.marshall.edu)

Samantha Marcum, RN, SRNA  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[marcum100@live.marshall.edu](mailto:marcum100@live.marshall.edu)

Carli Followay, RN, SRNA  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[followay@live.marshall.edu](mailto:followay@live.marshall.edu)

Jessica Oldaker, RN, SRNA  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[oldaker34@live.marshall.edu](mailto:oldaker34@live.marshall.edu)

Alberto Coustasse DR.PH., MD, MBA, MPH – CONTACT AUTHOR  
Healthcare Administration Program  
Professor  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
304-746-1968 [coustassehen@marshall.edu](mailto:coustassehen@marshall.edu)

# IMPLICATIONS OF UPCODING ON MEDICARE

*Katrina Cremeans, Marshall University*  
*Samantha Marcum, Marshall University*  
*Carli Followay, Marshall University*  
*Jessica Oldaker, Marshall University*  
*Alberto Coustasse, Marshall University*

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## ABSTRACT

*The complexity of and amount of funds involved in Medicare has led to a significant increase in the incidence of Medicare fraud. A type of Medicare fraud, upcoding, has contributed to excessive and unnecessary health care spending. Upcoding has been an illegal strategy that some providers have used to increase their Medicare reimbursement for certain conditions. This is accomplished by coding a provided service as a more expensive service than what was actually performed. With the proliferation of upcoding, there has been an astonishing \$12.5 billion in fraudulent Medicare charges since 2007. The fraudulent strategy of upcoding to increase Medicare reimbursement for organizational financial gain has been a common occurrence and has resulted in substantial Medicare overpayments. While solving the problem of upcoding will not eliminate the myriad contributing factors to this enormous healthcare expenditure, it certainly would be a start.*

**Key Words:** Claims, expenditures, Medicare fraud, physician upcoding

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## INTRODUCTION

Medicare Fraud as defined by Centers for Medicare and Medicaid Services (CMS) has included the following: the submission of false claims or misrepresenting facts to obtain a payment that would not have been paid in any other circumstance, soliciting or receiving payments for inducing rewards for referral of Medicare patients, or generating referrals to certain health services (CMS, 2017). There are four types of Medicare: Part A, B, C, and D. Part A covers the hospitalization of members and Part B covers the outpatient care. Part C has become a little more complicated in that it falls under the Medicare Advantage plan, and it has commonly been a Health Management Organization that contracted to providers for health care needs (Lankford, 2018). There have been many ways that Medicare fraud has been initiated, which can include billing for services or supplies never provided, billing for missed appointments, altering the claim form to receive a larger payment, using a recipient's information for insurance coverage, offering Medicare Part D drug plan not approved, and giving deceptive information on a health care plan so they have participate in it (Berwick, 2015). Medicare Advantage Plans have formulated risk adjustment processes to help to place these patients in a certain class of health risk depending on each patient (William, 2017).

The Prospective Payment System's providers have been reimbursed a fixed payment for each Medicare patient for a particular Diagnosis Related Group (DRG) regardless of how much the hospital actually has spent to treat the patient. The fixed payment, however, has varied by medical diagnosis/DRG, and sometimes CMS has raised the price for certain DRGs. Since the process of assigning codes to patients with the DRG's has become the hospital's responsibility, there could be room for fraud when hospitals can benefit from upcoding (Evbayiro, 2011).

CMS has been established to create and implement Medicare and Medicaid guidelines, and all commercial insurance plans have to follow the guidelines that have been set up for reimbursement of Medicare claims (Boulton, 2006). Medicare claims have been set up and processed based mainly on a fee-for-service basis with the provider offering the service (Daily Herald, 2013). Depending on the severity of policy holder condition, services provided and geographic market have been the factors that determine the amount paid to the provider (Health and Beauty, 2010). Due to the fact that there have been so many Medicare claims going through the processing center, Medicare has 30

days to make a decision on these claims and payments processed to providers. This has led to an increase in the incidence of Medicare fraud and abuse in this payment system (Daily Herald, 2013). It has been estimated that approximately 3% of \$1.7 trillion of health care spending has been fraudulently obtained (Boulton, 2006). In 2008, the federal government stated that improper payments racked up an overwhelming cost of the U.S. Treasury of approximately \$72 billion (Iglehart, 2009).

The Health Care Fraud Prevention Enforcement Action Team (HEAT), formed by the Department of Health and Human Services (DHHS) Secretary, and the US Attorney General have been cracking down on finding solutions to prevent fraudulent billing activities with the use of specialized technology (Health and Beauty, 2010). Also, the Department of Justice and the HHS created a team called the Medicare Fraud Strike Force that began in 2007. This team alone has detected an astonishing \$12.5 billion in fraudulent Medicare charges (United States Department of Justice, 2018).

The purpose of this paper was to assess Medicare fraud and abuse, and determine if strategic upcoding by organizations and physicians would lead to increased Medicare reimbursements, as well as its financial impact of upcoding on the Medicare system.

## METHODOLOGY

The methodology of this study consisted of a qualitative literature review. Appropriate research articles and peer-reviewed literatures were located through Marshall University's Ebscohost, CINAHL, PubMed, ProQuest and Google Scholar research databases. The Google search engine was also used to research government and private associate websites such as CMS, HEAT, United States Department of Justice and DHHS.

Key words used in this study for research purposes included 'Medicare fraud' OR 'upcoding' OR 'fraud' AND 'claims' OR 'physician upcoding' OR 'HEAT' OR 'expenditures'. Research articles were searched of articles published between the year(s) of 2005 through 2018. A total of 22 research articles and sources pertaining to Medicare fraud was utilized thus far in the English language for this study. The primary research was completed by JO, KC, SM, and CN and was reviewed by AC who acted as the second reviewer and verified that references met inclusion criteria.

## RESULTS

A study by Bastani and colleagues demonstrated that 10,000 out of 60,000 annual reimbursed claims for infections that were Present On Admission (POA) were actually hospital acquired infections that were upcoded to POA in order to avoid financial penalties and actually claim reimbursement (Bastani, Goh, & Bayati, 2015). These researchers reported that this upcoding costed Medicare \$200 million, and concluded that weakly-regulated providers upcode and over-report POAs, leading to a reimbursement burden for Medicare.

Dafny (2005) explored hospital reaction to price increases for a particular DRG; specifically, would hospitals abuse the Medicare system by giving patients higher-paying diagnoses without altering treatment plans (Dafny, 2005). The study confirmed that coding responded to changes in code reimbursement by Medicare for inpatient hospital stays. The author uncovered that hospitals gained an extra \$330 to \$425 million in reimbursement when responded to price changes in the DRG classification system by upcoding patients to DRG codes associated with large reimbursement increases (Dafny, 2005). This study also revealed that while all of the hospitals within the study upcoded in response to the changes in the DRG system, for-profit organizations took advantage of the perceived opportunity to the greatest extent (Dafny, 2005).

Nie, Mattke, Predmore and Hangsheng (2016) conducted a study to ascertain if there was a trend showing an increased use of anesthesia services for outpatient gastrointestinal procedures, and if so, was it truly based on higher patient risk, or was it fraudulent upcoding. The researchers also examined fixed effects into the model using data from 2010 to 2013 to test changes with time in coding practices of the same physicians. It was concluded that coding practices for anesthesia services changed with time, and there was evidence of potential upcoding of patient anesthesia risk. It was found that the proportion of cases with ASA coding increased from 2.9% in 2005 to 13.2% in 2013 (Nie et al., 2016). The proportion of patients coded as having a high risk increased from 11.6% in 2005 to 18.9% in 2013. Their results indicated the potential for upcoding after demonstrating that the predicted probability of being coded as

having a high risk of anesthesia more than doubled for all conditions from 2005 to 2013. The researchers found patterns that revealed the probability for patients with certain medical conditions increased over the specified time frame with no supporting evidence as to why other than monetary gain through upcoding. It was also demonstrated that the odds of patients with similar characteristics being coded as high risk in 2011 were double those in 2010. Further, the changes in coding for anesthesia risk became more evident when the same physicians were examined over time leading the authors to conclude that the physicians used their clinical discretion to systematically change coding practices (Nie et al., 2016).

Geruso and Layton (2015) conducted a research study in which they constructed a model to assess the effects of upcoding in a setting where private health plans compete for enrollees against a public option, and to determine if one individual could generate a different risk score under two insurers, ultimately changing the amount of reimbursement. The number of consumers enrolled in a diagnosis-based market where an insurer's payment is based on diagnoses and risk scores increased from none to 50 million from 2003 to 2014, including enrollees in Medicare (Geruso & Layton, 2015). It was determined that diagnosis coding has led to billions in annual overpayments by the federal government (Geruso & Layton, 2015). The researchers found that their estimates implied excess payments of around \$10.2 billion to Medicare Advantage plans annually, or about \$650 per Medicare enrollee per year (Geruso & Layton, 2015).

A study done by Brunt and Bowlblis (2011) suggested that Skilled Nursing Facilities (SNFs) upcode by using more therapy minutes to increase their Medicare reimbursement. The authors estimated that this upcoding tactic created \$8.6 to \$63.2 million in fraudulent Medicare costs, and ultimately wasteful spending by Medicare (Brunt & Bowlblis, 2011). This was equated with \$32.22 to \$237.88 per admission at 266,000 admissions in 2005 (Brunt & Bowlblis, 2011). It was also determined that SNFs in higher wage index areas had a greater incentive to upcode.

Goates (2010) studied the relationship between upcoding and types of diseases in the hospital, as well as upcoding and the insurance type. This study included higher or lower reimbursing diseases, and Medicare's PPS or non-Medicare patients. The findings indicated that there was a higher probability in being diagnosed into a higher DRG when the patient was enrolled in Medicare's PPS (Goates, 2010). The evidence proved that a 10% increase in Medicare patients at a hospital escalated the probability of being diagnosed into a higher reimbursing diagnosis by 1.1% (Goates, 2010).

A study by Hebert and colleagues (2005) used the Medicare Provider Analysis and Review (MedPar) files, where each file contained a hospital stay by a Medicare beneficiary. These files were then analyzed for upcoding due to the primary diagnosis of pneumonia or influenza, versus receiving a primary diagnosis with a lower DRG code (Hebert, McBean, & Kane, 2005). It was found that there was a five percent increase in pneumonia and influenza hospitalizations due to upcoding, and that physicians were upcoding to a staphylococcus aureus or pseudomonas pneumonia code rather than an unspecified bacterial pneumonia code to receive the higher DRG (Hebert et al., 2005). Further, the authors revealed that physicians were even going as far as to code aspiration pneumonia when there was only pneumonia listed in the patient's chart (Hebert et al., 2005).

In 2007, it was found that 3.6% of total Medicare part B spending on physician's services was due to unnecessary upcoding by physicians (Brunt, 2011). The author analyzed the outcomes of Medicare part B fee differentials on the upcoding of office visits. It was found that the Medicare part B fee differentials made a largely persuaded physician's Current Procedural Terminology (CPT) coding, and that Medicare's expenses caused by upcoding amounted to 15% of total expenditures for general office visits (Brunt, 2011). In addition, the author determined that the greater the marginal revenue, the higher the probability that a physician chose to use a higher payment code (Brunt, 2011).

Schonberger and colleagues (2016) studied the relationship between American Society of Anesthesiologists (ASA) physical status scores with age to determine if patients received a higher ASA physical status score when age 65 or greater when having hip, femur, or lower leg fracture repair (Schonberger, Dutton, & Dai, 2016). Ultimately, it was determined that there was not a notable increase in ASA physical status score, only a 2% increase, with being 65 or older (Schonberger et al., 2016).

Seiber (2007) investigated South Carolina's Medicare and its state employee's health plan and claimed that its physician office visit expenses had been increasing annually due to upcoding. It was found that upcoding increased billing at a rate of 2.2% each year for both of the programs (Seiber, 2007). In addition, the author determined that the methods of physician billing altered between the two programs, where Medicare visits averaged 1.3% less costly than per visit than the state employee's health plan (Seiber, 2007).

## DISCUSSION

The primary purpose of this paper was to assess Medicare fraud and abuse, and determine if strategic upcoding by organizations and physicians would lead to increased Medicare reimbursements, as well as its financial impact on the Medicare system. After reviewing the literature and research studies, the authors of this review conclude that this hypothesis was indeed proven true. Upcoding in the health care field has drastically increased the amount of Medicare reimbursement for those health care organizations and providers that take part in it.

One form of fraud by upcoding occurs when a healthcare organization reports a patient condition as Present On Admission (POA) rather than a hospital acquired complication. CMS has instructed hospitals to self-report these conditions as one or the other, making it possible for them to misreport (Bastani, Goh, & Bayati, 2015). The incentive for hospitals to misreport has been based on the premise that POA conditions have been considered comorbidities, and eligible for reimbursement through Medicare. However, if a hospital would report a condition as hospital acquired, the facility would not be reimbursed for the cost of treatment, and would actually face penalties.

Likewise, from a public relations standpoint, losing money from hospital acquired infections could potentially be detrimental to a hospital's status and reputation. Not only would a hospital or provider risk their reputation by reporting the hospital acquired infection as they should, but they would also lose money in return by Medicare withholding their reimbursement. Many times, hospitals and providers obtain clients from word of mouth, so reputation holds extreme importance in the health care field. Therefore, there would be a great deal at stake for correctly reporting events and illnesses as they occur, which would give hospitals or providers incentive to commit fraudulent upcoding.

In addition to upcoding to avoid penalties, results have shown that it has been up to the physician to classify the patients' status within the coding system. This has led to an increase of upcoding a patient's status to high risk in order to receive more money from Medicare, and has proved to be true when dealing with anesthesia providers (Nie et al., 2016). Within this particular study, it was indeed suggested that upcoding tendencies tend to fall within the same physicians who practice anesthesia (Nie et al., 2016). One could speculate that this has held true to all provider specialties including the Emergency Department (Pitts, 2012). Harsher punishments and increased scrutinization for physicians had been suggested as a result of inappropriate billing and upcoding in the Emergency Department (Pitts, 2012).

Furthermore, the motivation to upcode has seemed to spread amongst all areas of the health care field. The CMS system was put in place to help improve quality and value of care, however, with the large sums of money riding on one simple selection of a code, the temptations have proven too great for many providers to unquestionably become greedy. In one study, physicians have gone so far as to code a patient as having staphylococcus aureus or pseudomonas pneumonia rather than simply coding as pneumonia (Hebert et al., 2005). Also, the study found that there was a five percent increase in pneumonia and influenza admission rates due to the act of upcoding (Hebert et al., 2005). Additionally, in another study it was found that the use of diagnosis coding has led to billions of dollars in annual overpayments by the federal government (Geruso & Layton, 2015).

With these implications, there would be no wonder as to why the U.S. has a national health care debt of more than \$3 trillion dollars. With the utilization of the PPS and the use of DRGs, there has been a decrease of HIPAA violations, and the organization increased drastically in the health care industry. However, flaws such as upcoding have been able to fall through the cracks and spread like wildfire within the system creating billions of dollars' worth of debt. Although HEAT and other Medicare justice services are in place to catch Medicare fraud, the importance of staying vigilant in the fight against upcoding remains paramount. Appropriate education for proper billing and coding should be implemented within the health care industry and offered to providers and hospitals in order to stay up-to-date with the evolving health care industry (Pitts, 2012). Limitations of this study included a lack of access to credible databases and only the utilization of eight total databases. Also, with upcoding being a more recent discovery of

Medicare fraud, there continues to be a lack of information on upcoding in the health care field. There were also researchers and publication biases within the studies obtained for this particular analysis.

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**TRACK**  
**ETHICAL AND LEGAL ISSUES IN**  
**HEALTHCARE**

# PROVIDER EXCLUSIONS IN HEALTH INSURANCE CONTRACTS

*Michael M. Costello, University of Scranton*

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## **ABSTRACT**

*Two Wall Street Journal articles published in the Fall of 2018 (September 9, 2018 p.1 and October 11, p.3) addressed the issue of health insurance provider contracts that act to exclude specific systems and providers from health plan networks. Inevitably, the question arises: Are such agreements illegal restraints of trade actionable under federal and state antitrust laws?*

*A long-standing tenet of antitrust law is that it exists to protect competition not competitors. Excluding providers may be a legitimate outgrowth of the contracting process and therefore legal. However, an examination of the contracting process may reveal anticompetitive intent to restrain trade. The specific facts surrounding provider exclusion must be analyzed carefully in an effort to determine if there is illegal restraint of trade.*

*This presentation will examine the factors that would enable provider exclusion facilitated through a health insurance contract as well as those situations under which such exclusions might be deemed an illegal restraint of trade.*

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Michael M. Costello, JD, MBA  
Department of Health Administration & Human Resources  
The University of Scranton (PA)  
Room 217 McGurkin Hall  
The University of Scranton  
Scranton, Pennsylvania 18510  
(570)947-7766  
[michael.costello@scranton.edu](mailto:michael.costello@scranton.edu)

# **THE GENERAL DATA PROTECTION REGULATION (GDPR) AND THE INTERSECTION OF HUMAN SUBJECT RESEARCH IN THE UNITED STATES**

Terrisita Barrett, PhD, CIPM, CIPP/G/US, FIP – CONTACT AUTHOR

IRB Vice-Chair

Information Privacy and Security

Oregon Health & Science University

3181 S.W. Sam Jackson Park Road

Portland, OR 97239

(503) 494-7773

[barrette@ohsu.edu](mailto:barrette@ohsu.edu)

# THE GENERAL DATA PROTECTION REGULATION (GDPR) AND THE INTERSECTION OF HUMAN SUBJECT RESEARCH IN THE UNITED STATES

Terrisita Barrett, Oregon Health & Science University

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## ABSTRACT

*The replacement of the outdated Data Protection Directive from 1995 to the General Data Protection Regulation (GDPR) was in response to demands for compliance in the protection of personal data. The GDPR provides fixes for general rules applying to any kind of personal data processing and specific rules applying to the processing of special categories of personal data such as health data taking place in the context of scientific research. This paper present an overview of the new rules and how these rules will intersect with human subject research in the United States.*

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## INTRODUCTION

The gold standard for protecting data has been the European Union (EU) Data Protection Directive (DPD) since its adoption in 1995. Since then, technology has transformed our way of life in ways that we could not have imaged (Lynskey, 2015). According to Fuller (2015) and Lynskey (2015) the ever growing number of devices connected allow organizations to collect and store rich data about their users. Therefore, new data protection laws was needed. The European Commission began planning data protection reform across the European Union to ensure Europe was ready for the digital age. In the spring of 2018, the General Data Protection Regulation (GDPR) replaced the European Union Data Protection Directive. GDPR imposes new obligations on organizations that process the personal data of European Union residents (Ec.europa.eu, 2017).

According to Forbes.com (2017), GDPR will also affect organizations in the United States. Organizations such as hospitality, travel, software services and e-commerce. The GDPR may possibly impact clinical and other scientific research activities of academic medical centers and other research organizations in the United States if the research involves Personal Data about individuals located in Europe regardless of the individuals' citizenship status in the countries. However, will not affect personal data collected from individuals residing in the United States.

## METHODOLOGY

This paper was an exploration of what is GDPR, identifying the GDPR requirements, how GDPR defines research and how GDPR will interact with research in the United States. The methodology for this paper was a literature review of the idea behind the GDPR and the important aspects of the GDPR. This is done to get a better understanding of the regulations and its possible impacts.

## BACKGROUND

*What is GDPR?*

The GDPR was a response to the rapid technological advancement (Gilbert, 2016). Additionally, as the capacity to process and store huge sources of data, the need for updated protection laws was needed.

*“Technology has transformed both the economy and social life, and should further facilitate the free flow of personal data within the Union and the transfer to third countries and inter-national organizations, while ensuring a high level of the protection of personal data.” - (Regulation 2016/679/EU Recital 6, EUR-Lex, 2016)*

As noted in the introduction, the GDPR comes out of the DPD from 1995. Beginning May 25, 2018, the European Union (EU) began enforcing new regulations to protect the personal data and privacy of EU citizens called the General Data Protection Regulation. The primary purpose is to give EU citizens more control over their personal information. The new requirements are for any organization that tracks or handles personal patient data. This only pertains to organizations working with sites and patients in the European Union. GDPR will set a new standard focusing on consumer rights regarding their data. Organizations will need to put systems and processes in place to comply with the new regulations (Lynskey, 2015).

The following EU countries under the scope of the GDPR are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. The European Economic Area (EEA) countries are Iceland, Liechtenstein, and Norway (Regulation 2016/679/EU Recital 6, EUR-Lex, 2016)

According to Gilbert (2016) the GDPR will be regulative versus directive. This means that there will be no discretion between member states. The purpose is to ensure the law is consistent throughout the European Union (Lynkey, 2015). However, interpretation and adoption of some parts of the law will be left with member states. So all the rules will not be the same throughout Europe. Therefore, data controllers will need to be careful not to consider the GDPR as consistent in all states and need to look into how the legislation is adopted for them (Gilbert, 2016).

#### *How GDPR Define Personal Data*

In the GDPR (Article 4) Personal Data “...means any information relating to an identified or identifiable natural person (data subject). The identifiers listed in Article 4 include name, identification number, location data, other identifying factors, such as physical, mental, and cultural, among others. These identifiers represent a broad scope of personal data. However, not all data collected or process by an organization is considered personal in nature (Regulation 2016/679/EU art.11, EUR-Lex, 2016).

#### *What are the new GDPR requirements?*

The GDPR provides specific requirements that organizations are responsible for following to ensure the privacy and protection of personal data (Regulation 2016/679/EU art.11, EUR-Lex, 2016). The following are a summary of the GDPR key requirements:

1. **Data processing.** Organizations that process personal data will need to ensure they are processing personal data in a lawful, fair and transparent manner.
2. **Limitation of purpose, data and storage.** Organizations will not be able to process personal data outside the legitimate purpose for which the personal data was collected. Request only personal data that is necessary. Delete personal data once the legitimate purpose for which it was collected is completed. Be required to limit the processing and collect only what is needed.
3. **Data subjects rights.** Data subjects have the right to ask organizations what information it has about them, and what the organization does with the information. Data subjects can also ask for correction, object to processing, submit a complaint or ask for the deletion or transfer of his or her personal data.
4. **Consent.** A clear and explicit consent must be obtained from the data subject. Once collected, the consent must be documented and the data subject allowed to withdraw their consent at any time. When processing children's data, GDPR requires explicit consent of the parents (or guardian) if the child's age is under 16.
5. **Breach notification.** GDPR has a new breach notification requirement that did not exist in the DPD. Organizations will have to notify data authorities within 72 hours after a breach of personal data has been

discovered. Impacted individuals will only be notified if their data poses a “high risk to their rights and freedoms”.

6. **Privacy by Design (PbD).** PbD has always been incorporated within EU data regulations. However, with the new regulations PbD will become more formalized.
7. **Data Protection Impact Assessments (DPIA).** Prior to processing a person’s specific data, organization must first analyze the risks to their privacy.
8. **Data Transfers.** The data controller has the accountability to ensure that personal data is protected and GDPR requirements are followed, even if the data processing is done by a third party. This also means that the data controller is responsible for any data that is transferred outside the organization, to a third party and or other departments within the same organization.
9. **Data Protection Officer (DPO).** The organization will need to assign a DPO when there is a significant amount of data processing of personal data. The DPO has the responsibility for ensuring compliance with GDPR requirements.
10. **Awareness and training.** Organizations must create awareness among employees about key GDPR requirements, and conduct regular trainings to ensure that employees remain aware of their responsibilities with regard to the protection of personal data and identification of personal data breaches as soon as possible.

This summary provides a glimpse into the significant number of GDPR requirements. It is vital that organizations are aware of the requirements and their implication if non-compliant. Adjusting data processes and complying with new laws is no small feat. According to Bulgurcu et al. (2010), the weakest link when handling data is humans; hence it is of importance to have policies that guides the employee. The authors suggests infusing compliance into the organization along with making sure the employees are properly training and understand why compliance is important.

#### *What does the GDPR say about Research?*

The GDPR adopts a “broad” definition of research, which include the activities of public and private organizations. In the age of big data, where the data analytics activities of many organizations may qualify as research it is unclear exactly how far the GDPR’s research exemption will extend. One thing is for sure, GDPR aims to encourage innovation, as long as organizations implement the appropriate safeguards (Regulation 2016/679/EU art.11, EUR-Lex, 2016).

According to the regulations, research will continue to occupy an honored position within the GDPR. Organizations that process personal data for research purposes will be able to avoid restrictions on secondary processing and on processing sensitive categories of data. This can occur as long as they implement appropriate safeguards. These organizations also may override a data subject’s right to object to processing and to seek the erasure of personal data. Additionally, the GDPR may permit organizations to process personal data for research purposes without the data subject’s consent. In isolated cases, these organizations may be able to transfer personal data to third countries for research purposes, without any other transfer mechanism in place (Regulation 2016/679/EU art.11, EUR-Lex, 2016).

### **THE INTERSECTION OF GDPR AND HUMAN RESEARCH IN THE UNITED STATES (U.S.)**

As previously discussed, the primary objective of GDPR is to protect the fundamental rights and freedoms of data subjects and formalize requirements regarding covered data processing activities. Although the GDPR has implemented data protection laws, the GDPR is not a complete departure from existing principles. Many of the obligations outlined in the GDPR are not new for many organizations in the area of human subject research. However, the territorial scope of the new regulation has expanded and will impact U.S. organizations, including universities and academic medical centers. Thus, the GDPR will apply to human research such as interventional trials, non-interventional trials, registry studies, and student research, involving personal data as defined within the territorial scope of the regulation (Proffitt, 2017).

How will the GDPR intersect with research activities within an academic setting? GDPR may apply to a broad range of research activities. For example, when a university acts as a sponsor of research occurring in EEA

member states; when a university acts as a core data facility or lead site for a multi-national research study with EEA-based sites; and when a university conducts research in the U.S. in which participant data are transmitted to sponsors, servers, or data core facilities in the EEA. Research studies that collect data online from EEA residents may also be subject to the GDPR (Proffitt, 2017).

The GDPR looks at research key-codes data differently from the U.S. According to the GDPR, key-coded data is considered personal data and refers to it as pseudonymized data. This is in contrast to what occurs under U.S. research and privacy laws (Common Rule and HIPAA). Pseudonymized data are regarded as identifiable personal data and therefore remain subject to the GDPR's protections, even when in the hands of a person who lacks the key needed to link the data to the data subject's identity. The GDPR does not apply to data that have been "anonymized." However, for data to be anonymized, the GDPR requires that there be no key to re-identify the data (Regulation 2016/679/EU art. 4, EUR-Lex, 2016).

In general, GDPR will impact research in several ways. First, it will establish circumstances under which it is lawful to collect, use, disclose, destroy, or otherwise process personal data. Second, it will ensure certain rights of individuals in the EEA, including rights to access, amendment, and erasure (right to be forgotten). Third, it will require researchers to implement appropriate technical and organizational security measures to ensure a level of data security that is appropriate to the risk of the data. Finally, it will require notification to data protection authorities and affected individuals within 72 hours following the discovery of a personal data breach, which is a security breach leading to the accidental or unlawful destruction, loss, alteration, unauthorized disclosure of, or access to, personal data transmitted, stored, or otherwise processed (Regulation 2016/679/EU art. 4, EUR-Lex, 2016).

## CONCLUSION

The GDPR establishes a balance act between the necessity of effectively protecting data subjects' rights in a digitalized and globalized world while at the same time allows the processing of personal data, including sensitive data, for scientific research. It reinforces compliance duties and transparency between those who process data and those with supervisory authorities for ensuring data protection governance. While the GDPR adopts new specific provisions to ensure adapted data protection in research, the field remains widely regulated at national level, in particular, regarding the application of research participants' rights, which some could regret. For research organizations that are already compliant with the DPD, it will not be a huge effort to comply with GDPR.

On the other hand, for U.S. research organizations that were not subject to DPD before, the process for getting compliant will be more complicated. For example, the U.S. and the EU do not have the same approach of personal data protection and there will be a privacy "cultural gap" to overcome. However, research organizations are already used to a regulated environment and the new rules will mean mainly more work for those in charge of regulatory or compliance areas (Cavalier & Muyl, 2017). Those in authority may want to conduct a thorough assessment to ensure they are in compliance. This assessment will need to also take into account further conditions, including limitations, with regard to the processing of genetic data, biometric data or data concerning health.

One area that Institutional Review Boards may need to look at is if they need to comply with the GDPR consent to clinical trials regulations. Basically, the IRB would review and confirm that the information provided regarding the use of personal data is understandable and not redundant with existing language regarding the use of study information. However, it is unclear how reasonable it is to expect a US IRB to understand and evaluate the sufficiency of GDPR elements, nor on what authority the IRB could assert that such language does or does not meet GDPR standards (Cavalier & Muyl, 2017).

Will future privacy laws for research be impacted by GDPR? It's possible we'll see a GDPR-like regulatory framework emerge here in the U.S. In any event, research organizations should review the GDPR regulations as a guidance tool. GDPR offers important guiding principles for those in authority with responsibility for addressing privacy and data risks. Additionally, the GDPR opens new possibilities for going ahead in the structuring of data sharing in scientific research with measures encouraging self-regulation development.

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# THE SOCIO-POLITICAL OPIOID CRISIS IN AMERICA

*Michael F. Peters, Baker College*

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## ABSTRACT

*The opioid crisis continues to grow in the United States. Opioid abuse kills approximately 90 Americans every day. In fact, the rate of addiction has risen 493 percent in the last 15 years. Pain has been seen as the fifth vital sign and pharmaceutical companies told physicians that patients would not become addicted to opioids with long-term use. Many key articles appeared claiming no addiction was evident. Did the government help bring the opioid crisis to fruition? Drug companies pumped 106 million dollars into lobbying Congress on legislation that literally tied the hands of the Drug Enforcement Agency who was given the power to investigate distribution of these drugs. We must introduce solutions to the problems of overprescribing, the influx of cheap heroin, and the emergence of fentanyl, a synthetic opioid 50 times more potent than heroin. We are challenged with researching the possibility of controlling prescriptions, expanding access to medication-assisted treatment, making overdose antidotes more accessible, creating drug check-in services, and implementing supervised injection sites. This presentation will address how the crises began and the growing tide of prescription drug abuse. Included in the presentation will be facts regarding the social and political impact of the crisis, why it has gotten worse in recent years, who profits from the opioid crisis, and alternative solutions to do something about it.*

*Topics addressed in the presentation include:*

- I. Introduction*
    - *Statistical nightmare*
    - *Types of opioids*
    - *Beginning of the crisis*
    - *Recent legislation*
  - II. Social impact of opioid abuse*
    - *Demographic breakdown*
    - *What we know about the opioid crisis*
    - *Root causes of societal overuse*
  - III. Political fuel for the opioid crisis*
    - *Manufacturers, distributors, and dispensers*
    - *Role of the DEA*
    - *Congress interference*
    - *Estimated national cost of the opioid crisis*
    - *Cost to government, businesses, hospitals*
    - *New York City lawsuit*
  - IV. Innovative solutions to the problem*
    - *Health and Human Services*
    - *Controlling prescriptions*
    - *Lower cost of an overdose antidote*
    - *Naloxone*
    - *Expanding access to medication-assisted treatment*
    - *Drug check-in services*
    - *Heal Program*
    - *Supervised injection sites*
    - *Billboards*
  - V. Call for continued discussion*
- 

Michael F. Peters, Ph.D., M.B.A., MT(ASCP)  
Department Chair and Professor – Health Care Management

MBA Program  
Baker College  
Center for Graduate Studies  
1116 W. Bristol Road  
Flint, MI 48507  
Email Address: [michael.peters@baker.edu](mailto:michael.peters@baker.edu)  
Office Telephone: (810) 766-4349  
Home Telephone: (810) 603-2291

**TRACK**  
**HEALTH AND WELLNESS**

# PERCEPTION OF UNIVERSAL HEALTHCARE AMONG COLLEGE STUDENTS, FACULTY, AND STAFF AT THE UNIVERSITY OF EVANSVILLE

Sarah Harness, MPH  
School of Health Sciences  
University of Evansville  
1800 Lincoln Ave  
Evansville, IN 47722  
(812) 488-2000  
[sh287@evansville.edu](mailto:sh287@evansville.edu)

Dane Turner, MPH  
School of Health Sciences  
University of Evansville  
1800 Lincoln Ave  
Evansville, IN 47722  
(812) 488-2000  
[dt108@evansville.edu](mailto:dt108@evansville.edu)

Anthony Chastain, MPH  
School of Health Sciences  
University of Evansville  
1800 Lincoln Ave  
Evansville, IN 47722  
(812) 488-2000  
[ac378@evansville.edu](mailto:ac378@evansville.edu)

Payal Patel-Dovlatabadi, DrPH  
School of Health Sciences  
University of Evansville  
1800 Lincoln Ave  
Evansville, IN 47722  
(812) 488-2210  
[pp42@evansville.edu](mailto:pp42@evansville.edu)

# PERCEPTION OF UNIVERSAL HEALTHCARE AMONG COLLEGE STUDENTS, FACULTY, AND STAFF AT THE UNIVERSITY OF EVANSVILLE

*Sarah Harness, University of Evansville*  
*Dane Turner, University of Evansville*  
*Anthony Chastain, University of Evansville*  
*Payal Patel-Dovlatabadi, University of Evansville*

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## ABSTRACT

*The U.S. is a country founded on freedoms protected by our constitution. A debate rages currently about whether healthcare is a human right. We conducted a survey at the University of Evansville with regards to perceptions of Universal Healthcare amongst students, faculty, and staff in the College of Education and Health Sciences. Over ninety percent of those who responded agreed that healthcare is a human right. This indicates a strong need for better policy discussion that includes the voices of the everyday person.*

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## INTRODUCTION

Universal Healthcare might not be a foreign concept in other countries, but since the idea was first introduced in the U.S. over 100 years ago, the topic has been highly controversial, and often reflected the politics that are currently at play. The World Health Organization stated in 2005 that everyone should have access to the health services they need without risk of financial ruin or impoverishment, and then reaffirmed this stand in 2012 (Campbell et al., 2013). As of 2015, 28.6 million Americans of all ages are without health insurance coverage (Center for Disease Control and Prevention, 2016). While majority of the country is familiar with Medicare, multiple studies have shown that the general population may be confused and biased against specific implementations of universal healthcare. This is illustrated in a study conducted by the Kaiser Family Foundation comparing Medicare-for-All and Single Payer (Altman, 2016). While the opposition to Universal Healthcare has been examined and attempts have been made to explain why some people are opposed, a growing number of Americans have been found to support proposals to establish a system in the U.S.

Approximately 8.8% of the U.S. population do not have health insurance (Berchick, Hood, and Barnett, 2018). When examining developed countries, the U.S. is one of the very few that does not ensure access to Universal Healthcare for the population. Nations such as the United Kingdom and Canada have very well-known types of universal healthcare. The measure of success for such a system should be the health outcomes of the population. Such examples include infant mortality, maternal mortality and cancer survival rates among other outcomes. Further, public perception of universal healthcare varies with economic fluctuations. This indicates a firm need for informed policy development. Citizens that are uninformed may hinder their own health outcomes if they do not understand the options that are available.

While the perceptions and attitudes of the general adult population towards universal healthcare are studied and documented, there seems to be a gap in how college students view the movement. The Kaiser Family Foundation regularly polls those in the U.S. to find a baseline support/not support level on various Universal Healthcare proposals, and these polls are reported regularly. Despite this, our searches could only find a 2010 study by the University of Toledo College Of Medicine that focused specifically on college students. This study, while expansive in studying 12 different undergraduate institutions, only focused on the broad subject of students and their insurance coverage. The issue of universal healthcare was largely a second thought, and was not the primary intention of the study (Price et al., 2010). Identifying perceptions of the younger generation is essential as this is the next cohort that will be entering into the workforce and many are covered by their parents' insurance so they may not be aware of the intricate nature of universal healthcare.

Given that the perceptions and attitudes of the younger population on Universal Healthcare have not been well-researched, we decided to examine this at a higher education institute. The University of Evansville College of Education and Health Sciences, located in Evansville, IN, offers multiple areas of study in health sciences, including Public Health, Exercise Science, Nursing, and Physical Therapy. With over 800 students, including those in undergraduate and graduate programs and just under 60 faculty and staff, the College offers a unique viewpoint to study the perceptions and opinions regarding Universal Healthcare in the U.S. We chose to focus solely on health-related areas of study as these are the students that would have had exposure to universal healthcare within the classroom and are the future health care professionals. Further, faculty and staff perceptions would provide a good comparative measure within this study. Given that the literature is very limited in this area, the present study was conducted with hopes to fill a gap with respect to perceptions of universal healthcare.

## METHODOLOGY

The current study was a cross-sectional study involving primary data collection. The data were collected through an online survey provider, SelectSurvey.net. The subjects were identified as students, faculty, and staff in the College of Education and Health Sciences at the University of Evansville. After distinguishing their role at UE, the survey directed the respondents to questions tailored to their identification. These questions were formatted to determine their respective disciplines within the College, and then the survey asked questions relating to healthcare and insurance. Questions regarding familiarity and support of a universal healthcare system, as well as questions about the current state of the U.S. healthcare system were included. These questions allowed us to evaluate and determine the general support level for Universal Healthcare with students, faculty, and staff in the College of Education and Health Sciences.

Tables 1- 4 show how all the variables used in the study were coded. Most variables were classified as categorical while a few were classified as ordinal such as age, year of study, level of income, and support for Universal Healthcare. The level of income and satisfaction with out-of-pocket costs were only asked of participants who selected staff or faculty. Year of study, discipline of study, and how their education has affected their perceptions of universal health care was only asked of those who were identified as student.

**Student Demographics (Table 1)**

| Variable                 | Level of Measurement | Coding/Description                                                                               |
|--------------------------|----------------------|--------------------------------------------------------------------------------------------------|
| Age                      | Ordinal              | 1=18-24<br>2=25-34<br>3=35-44<br>4=45-54<br>5=55-64<br>6=65-74<br>7=75+                          |
| Gender                   | Categorical          | 1=Male<br>2=Female                                                                               |
| Race/Ethnicity           | Categorical          | 1=White/Caucasian<br>2=African American<br>3=Asian<br>4=Latino<br>5=Native/Indigenous<br>6=Other |
| Status at the University | Categorical          | 1=Student<br>2=Faculty<br>3=Staff                                                                |
| Year of Study            | Ordinal              | 1=Freshman<br>2=Sophomore<br>3=Junior<br>4=Senior                                                |

|                     |             |                                                                                                                                                                                                                                                                  |
|---------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |             | 5=Graduate                                                                                                                                                                                                                                                       |
| Discipline of Study | Categorical | 1=Exercise Science<br>2=Public Health<br>3=Athletic Training<br>4=Health Service Administration<br>5=Nursing<br>6=Physical Therapy<br>7=Physical Therapy Assistant<br>8=Physician Assistant Science<br>9=Education<br>10=Clinical Laboratory Science<br>11=Other |

**Faculty and Staff Demographics (Table 2)**

| Variable                 | Level of Measurement | Coding/Description                                                                              |
|--------------------------|----------------------|-------------------------------------------------------------------------------------------------|
| Age                      | Ordinal              | 1=18-24<br>2=25-34<br>3=35-44<br>4=45-54<br>5=55-64<br>6=65-74<br>7=75+                         |
| Gender                   | Categorical          | 1=Male<br>2=Female                                                                              |
| Race/Ethnicity           | Categorical          | 1=White/Caucasian<br>2=African American<br>3= Asian<br>4=Latino; 5=Native/Indigenous<br>6=Other |
| Status at the University | Categorical          | 1=Student<br>2=Faculty<br>3=Staff                                                               |
| Level of Income          | Ordinal              | 1=Under \$49,999<br>2=\$50,000-\$74,999<br>3=\$75,000-\$99,999<br>4=Over \$100,000              |

**Student Perceptions of Universal Healthcare (Table 3)**

| Variable                                     | Level of Measurement | Coding/Description                                                                      |
|----------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|
| Currently have health insurance              | Categorical          | 1=Yes<br>2=No                                                                           |
| Type of health insurance                     | Categorical          | 1=Through Employer 2=Spouse's or Parent's Policy<br>3=Medicaid<br>4=Medicare<br>5=Other |
| Familiarity with Universal Healthcare system | Categorical          | 1=Familiar<br>2=Not familiar                                                            |
| Support for Universal Healthcare system      | Ordinal              | 1=Strongly support<br>2=Support<br>3= Neutral<br>4=Oppose                               |

|                                                      |             |                                  |
|------------------------------------------------------|-------------|----------------------------------|
|                                                      |             | 5=Strong oppose                  |
| Universal Healthcare discussed in classroom          | Categorical | 1=Yes<br>2=No<br>3=I do not know |
| Healthcare is a human right                          | Categorical | 1=Yes<br>2=No                    |
| Government obligation to protect healthcare          | Categorical | 1=Yes<br>2=No<br>3=I do not know |
| Changes need to be made to current healthcare system | Categorical | 1=Yes<br>2=No                    |
| Insurance required for those older than 26           | Categorical | 1=Yes<br>2=No                    |
| Financial penalty for those without health insurance | Categorical | 1=Yes<br>2=No                    |

**Faculty/Staff Perceptions of Universal Healthcare (Table 4)**

| Variable                                             | Level of Measurement | Coding/Description                                                                      |
|------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------|
| Currently have health insurance                      | Categorical          | 1=Yes<br>2=No                                                                           |
| Type of health insurance                             | Categorical          | 1=Through Employer 2=Spouse's or Parent's Policy<br>3=Medicaid<br>4=Medicare<br>5=Other |
| Satisfaction with current out-of-pocket expenses     | Categorical          | 1=Satisfied<br>2=Not Satisfied                                                          |
| Familiarity with Universal Healthcare system         | Categorical          | 1=Familiar<br>2=Not familiar                                                            |
| Support for Universal Healthcare system              | Ordinal              | 1=Strongly support<br>2=Support<br>3= Neutral<br>4=Oppose<br>5=Strong oppose            |
| Universal Healthcare discussed in classroom          | Categorical          | 1=Yes<br>2=No                                                                           |
| Healthcare is a human right                          | Categorical          | 1=Yes<br>2=No                                                                           |
| Government obligation to protect healthcare          | Categorical          | 1=Yes<br>2=No<br>3=I do not know                                                        |
| Changes need to be made to current healthcare system | Categorical          | 1=Yes<br>2=No                                                                           |
| Insurance required for those older than 26           | Categorical          | 1=Yes<br>2=No                                                                           |
| Financial penalty for those without health insurance | Categorical          | 1=Yes<br>2=No                                                                           |

An initial survey was sent to students, faculty, and staff along with two follow-up reminders. As for response rates, the goal was a 25% response rate after the initial survey, a 33% response rate after the second attempts, and a 45% response rate after the third attempt.

Institutional ethical committee clearance was obtained. A database was created in MS Excel and descriptive statistical analysis was performed.

## RESULTS

Descriptive analyses are presented in Table 5. According to these analyses, approximately 95% of the participants indicated that they currently have health insurance and the majority of them (83%) have it through their spouse or parent's policy. This is not surprising since 90.7% of participants were identified as students and 83.7% between the ages of 18-24 years, meaning they are still qualified to be on their parent's insurance policy. The findings also show that there is an equal amount of familiarity regarding Universal Healthcare, 51.2% are familiar and 48.8% are not familiar. The majority (40.5%) of the participants have a neutral support for Universal Healthcare. The remaining participants are leaning more towards supporting (31%) and strongly supporting (14.4) Universal Healthcare.

Regarding demographics, gender was drastically skewed, with nearly 84% of responses identifying as female. 91% of participants indicated that they came from a white/Caucasian background, with 2% responding African American, 4% Asian, 1% latino, and 1% identifying as other, with no respondents identifying as Native/Indigenous. The ages of participants was predictably skewed towards the younger side of the scale, with 84% aged 18-24. This is not surprising, seeing as just under 91% of participants were students, who typically fall in the 18-24 age category. Regarding students, the breakdown of area of study was pretty equal, with the leading categories; exercise science, nursing, and physical therapy each making up around 20%, education around 14%, and the rest split up among the other areas of study. Regarding year of study, freshman and graduates made up around 25% of responses each, with the other 50% split equally between sophomores, juniors, and seniors.

**Frequency Table (Table 5)**

| Variable                        | Frequency | Proportions (%) |
|---------------------------------|-----------|-----------------|
| <i>Age</i>                      |           |                 |
| 18-24 years                     | 244       | 83.6            |
| 25-34 years                     | 13        | 4.5             |
| 35-44 years                     | 10        | 3.4             |
| 45-54 years                     | 14        | 4.8             |
| 55-64 years                     | 7         | 2.4             |
| 65-74 years                     | 4         | 1.4             |
| 75+ years                       | 0         | 0.0             |
| <i>Gender</i>                   |           |                 |
| Male                            | 48        | 16.5            |
| Female                          | 243       | 83.5            |
| <i>Race</i>                     |           |                 |
| White/Caucasian                 | 263       | 91.0            |
| African America                 | 6         | 2.0             |
| Asian                           | 12        | 4.2             |
| Latino                          | 4         | 1.4             |
| Native/Indigenous               | 0         | 0.0             |
| Other                           | 4         | 1.4             |
| <i>Status at the University</i> |           |                 |
| Student                         | 262       | 90.7            |
| Faculty                         | 19        | 6.6             |
| Staff                           | 8         | 2.8             |
| <i>Year of Study</i>            |           |                 |
| Freshman                        | 64        | 24.4            |
| Sophomore                       | 44        | 16.8            |
| Junior                          | 43        | 16.4            |
| Senior                          | 44        | 16.8            |
| Graduate                        | 67        | 25.6            |

|                                                             |     |      |
|-------------------------------------------------------------|-----|------|
| <i>Discipline of Study</i>                                  |     |      |
| Exercise Science                                            | 52  | 20.0 |
| Public Health                                               | 15  | 5.8  |
| Athletic Training                                           | 24  | 9.2  |
| Health Service Administration                               | 10  | 3.9  |
| Nursing                                                     | 46  | 17.7 |
| Physical Therapy                                            | 45  | 17.3 |
| Physical Therapy Assistant                                  | 5   | 1.9  |
| Physician Assistant Science                                 | 16  | 6.2  |
| Education                                                   | 35  | 13.5 |
| Clinical Laboratory Science                                 | 0   | 0.0  |
| Other                                                       | 12  | 4.6  |
| <i>Currently have health insurance</i>                      |     |      |
| Yes                                                         | 273 | 94.5 |
| No                                                          | 8   | 2.8  |
| I do not know                                               | 8   | 2.8  |
| <i>Type of health insurance</i>                             |     |      |
| Through employer                                            | 22  | 8.1  |
| Spouse or parent's policy                                   | 224 | 82.7 |
| Medicaid                                                    | 13  | 4.8  |
| Medicare                                                    | 2   | 0.7  |
| Other                                                       | 10  | 3.7  |
| <i>Familiarity with universal health care</i>               |     |      |
| Familiar                                                    | 147 | 51.2 |
| Not familiar                                                | 140 | 48.8 |
| <i>Support for universal health care</i>                    |     |      |
| Strongly Support                                            | 41  | 14.4 |
| Support                                                     | 88  | 31.0 |
| Neutral                                                     | 115 | 40.5 |
| Oppose                                                      | 31  | 10.9 |
| Strongly Oppose                                             | 9   | 3.2  |
| <i>Universal healthcare discussed in classroom</i>          |     |      |
| Yes                                                         | 86  | 31.4 |
| No                                                          | 154 | 56.2 |
| I do not know                                               | 34  | 12.4 |
| <i>Healthcare is a human right</i>                          |     |      |
| Yes                                                         | 255 | 91.1 |
| No                                                          | 25  | 8.9  |
| <i>Government obligation to protect healthcare</i>          |     |      |
| Yes                                                         | 205 | 80.7 |
| No                                                          | 15  | 5.9  |
| I do not know                                               | 34  | 13.4 |
| <i>Changes need to be made to current healthcare system</i> |     |      |
| Yes                                                         | 267 | 96.0 |
| No                                                          | 11  | 4.0  |
| <i>Insurance required for those older than 26</i>           |     |      |
| Yes                                                         | 197 | 71.1 |
| No                                                          | 80  | 28.9 |
| <i>Financial penalty for those without health insurance</i> |     |      |
| Yes                                                         | 74  | 27.0 |
| No                                                          | 200 | 73.0 |
| <i>Level of Income</i>                                      |     |      |
| Under \$49,999                                              | 6   | 23.1 |
| \$50,000-\$74,999                                           | 10  | 38.5 |

|                                              |    |      |
|----------------------------------------------|----|------|
| \$75,000-\$99,999                            | 4  | 15.4 |
| Over \$100,000                               | 6  | 23.1 |
| <i>Satisfaction with out-of-pocket costs</i> |    |      |
| Satisfied                                    | 18 | 66.7 |
| Not satisfied                                | 9  | 33.3 |

Students had the opportunity to discuss how their education has changed their perception on Universal Healthcare. Table 6 highlights 20 of the 165 responses received. Many students stated that their education has shown them that Universal Healthcare works in other countries. They have also discussed the struggles with the current healthcare system.

#### Student Education Perception (Table 6)

|                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| How has your education changed your perception on Universal Healthcare?                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>It has made me more aware of those that struggle with health care rights and the children especially in school systems who do not have access to healthcare.</li> </ul>                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>My education allows me to see the effects of why universal healthcare should be implemented. People shouldn't have to pay for their basic human right to the proper care and medical attention they need and require.</li> </ul>                                                                                                        |
| <ul style="list-style-type: none"> <li>It has opened my eyes to different health care systems across the globe that seem to be more successful and accessible to all people than the U.S system</li> </ul>                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>My education helped me understand that all people, even those who are young and healthy, need to have health insurance because it spreads the burden of cost among the entire population rather than just those who are very sick.</li> </ul>                                                                                           |
| <ul style="list-style-type: none"> <li>I have learned more about how health insurance works in my first Health Service Administration class and it has made me realize healthcare is not accessible to everyone</li> </ul>                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Helped me realize that implementing it requires compromises.</li> </ul>                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"> <li>My education has made me realize the broken health care system and how much money healthcare consumes on our national GDP. A universal health care system might be expensive, but some of the best countries for healthcare follow a universal healthcare system, such as Japan.</li> </ul>                                             |
| <ul style="list-style-type: none"> <li>It changed it from being against universal health care to being neutral and being able to understand the benefits.</li> </ul>                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>I believe that everyone should have insurance, regardless of their education. My education has encouraged me to find a career that offers a health insurance plan.</li> </ul>                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>It's made me realize that everyone deserves the right to a healthy life, so they should have access to healthcare without the fear of financial burdens (or other factors) affecting their lifestyle.</li> </ul>                                                                                                                        |
| <ul style="list-style-type: none"> <li>My education has opened my mind up to all the possibilities of health insurance. I am more educated and exposed to all sides of the health care system in addition to other policies from other countries. I am able to see the pros and cons to each system.</li> </ul>                                                                |
| <ul style="list-style-type: none"> <li>Universal healthcare sounds great but I believe that it has its own slew of issues that accompany it</li> </ul>                                                                                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>I believe that everyone has the right to free healthcare and it's the government responsibility to protect that right. My education taught me that healthcare isn't cheap and some people find it cheaper to pay the fine then to get insurance.</li> </ul>                                                                             |
| <ul style="list-style-type: none"> <li>I worked in a universal healthcare system in another country for class and have seen the negatives to it. I used to think it was great but the way I saw it ran, was not great. Was more scary</li> </ul>                                                                                                                               |
| <ul style="list-style-type: none"> <li>It has definitely highlighted the difficulty and the challenges that will be faced to be able to implement universal healthcare in the United States. It has also illustrated both the benefits and drawbacks of a universal healthcare system. I think my perception has not changed a lot but I have become more informed.</li> </ul> |
| <ul style="list-style-type: none"> <li>My education has made me think more about how we need to make changes. We need to be more fair to all levels of income. All people should have access to healthcare.</li> </ul>                                                                                                                                                         |
| <ul style="list-style-type: none"> <li>My education in the DPT program has taught me that all patients require individualized care. Universal healthcare has the potential to not allow individualized care. Insurance companies currently have too</li> </ul>                                                                                                                 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| much control over patient care and I fear that if universal healthcare exists patients will not get the individualized care they deserve due to stricter regulations and guidelines.                                                                                                                                                                                                                                                                                                                                  |
| <ul style="list-style-type: none"> <li>• In studying abroad, I have had the opportunity to speak with people all over the globe about the health care system in their home country. Before this, I never would have known that people of India have a Universal Health care system or even what a universal health care system is. Finland and other Nordic countries also have a universal health care system because of their heavier taxes. This is more along the lines of how it should be in the US.</li> </ul> |
| <ul style="list-style-type: none"> <li>• Our healthcare system is lacking compared to other countries. We spend way more money than other countries but have about the same results. We wait till the problem is bad then try to fix it rather than trying to prevent it in the first place.</li> </ul>                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li>• Simply learning in Global Health Issues that the United States is one of the only developed countries that don't consider health a citizen's right fully changed my perspective. It doesn't make sense to me why it wouldn't be if we have the rights to speech, religion, owning property, etc... It should be a necessary component of each citizen's life and the government should control that and help its citizens out.</li> </ul>                                    |

The students were also given an opportunity to provide any additional comments. A sample of the responses are shown in Table 7. A total of 44 responses were provided.

#### Student Open-ended Responses (Table 7)

|                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Additional Comments?                                                                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>• I think the U.S. system needs a major transformation because it doesn't treat health care as a universal right.</li> </ul>                                                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>• Extraordinary wait times, triage of patients based on tax paying abilities, distance from hospitals, lack of preventative medicine, lack of follow up care, lack of electronic medical records, lack of patient centered care are some of the major flaws I have seen first hand in a universal healthcare system</li> </ul>                                                   |
| <ul style="list-style-type: none"> <li>• I do feel that the United States healthcare system needs modification. Many Americans are not educated well enough on what all factors into the system.</li> </ul>                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>• Everyone needs healthcare. The difficulty is how to obtain in. I think insurance companies are one of the problems with healthcare. They have added to the cost of healthcare and they seem to care about their bottom line not what is best for the patient. There are so many factors that go into this. It starts with people taking charge of their own health.</li> </ul> |
| <ul style="list-style-type: none"> <li>• I don't think universal healthcare is a good idea. Just because other countries do it doesn't mean America should.</li> </ul>                                                                                                                                                                                                                                                  |

Similarly, at the end of the survey, the faculty and staff had the opportunity to provide any additional comments. Table 8 indicates a sample of the 8 comments provided.

#### Faculty/Staff Open-ended Responses (Table 8)

|                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Additional Comments?                                                                                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>• The best thing that could happen to America would be a universal health care system.</li> </ul>                                                                                                                                                                                                                                                                            |
| <ul style="list-style-type: none"> <li>• I think greed on the part of insurers/pharmaceutical companies/hospital systems has led to unethical practices, which have skyrocketed costs. It is not ethical, nor should it be standard practice, for any entity to charge exorbitant costs for life-saving treatments and interventions. True medicine is healing and gives without thought of self-profit.</li> </ul> |
| <ul style="list-style-type: none"> <li>• Universal health care sounds like a wonderful thing until you see what can happen with long waits for services, rationing services, limiting service areas to wider regional areas or using ageism as reasons to withhold services. Spend time in England and one will see that universal health care is not perfect either.</li> </ul>                                    |
| <ul style="list-style-type: none"> <li>• I think for starters that Medicare age requirements could be lowered from 65 to 55.</li> </ul>                                                                                                                                                                                                                                                                             |

## DISCUSSION

Our survey was based on our hypothesis that students, faculty, and staff in the College of Education and Health Sciences would support Universal Healthcare. Based on our results, we can conclude that our primary hypothesis is supported, with 85.9% of the participants indicating that they were either neutral, supportive, or strongly supportive of a Universal Healthcare system. This indicates that at the policy level leaders should start discussing how to go about creating such a system. At the local community level, grass root initiatives should create focus groups to engage local politicians and the community. With many participants supporting Universal Healthcare, discussion on the topic needs to be discussed more in the classroom.

Furthermore, majority of the participants believed changes need to be made to our current healthcare system. From the open-ended questions, some remarks were, “I believe that everyone has the right to free healthcare and it's the government responsibility to protect that right” and “My education has made me think more about how we need to make changes. We need to be more fair to all levels of income. All people should have access to healthcare.” Much of our current political climate is focused on eliminating or protecting the Affordable Care Act when in reality there should be a focus on ways it can be improved and be more efficient. Current leaders should examine how other countries with a Universal Healthcare system have found success considering the limitations and drawbacks of such a system. The U.S. has a unique position in the world and what has been implemented in other countries might not necessarily be ideal for the population. Therefore, a tailored system is needed for the U.S. that draws inspiration from other countries with Universal Healthcare.

The findings also show that there is an equal amount of familiarity regarding Universal Healthcare, 51.2% are familiar and 48.8% are not familiar, which is not unexpected because of the exposure the media has provided. This indicates that people need to become more informed. The media is not the appropriate platform for providing this information. Leaders across the spectrum need to formulate a plan to educate people on what exactly Universal Healthcare can be. Biased news sources will not allow for such information. One particular aspect of the data shows that the single biggest category for support was actually the neutral option. Coupling this with familiarity, human right, government protection, and the need for change responses give a clear picture of confusion. The familiarity response demonstrates the most pertinent need to address Universal Healthcare with policy through community action.

It is interesting to see that the majority of the participants said that those older than 26 should be required to have health insurance yet they said there should not be a financial penalty for those without health insurance. This is surprising since it is typically those who are 26 that do not have health insurance. A majority of the respondents strongly support the basic tenets of Universal Healthcare. These tenets being it is a human right and the government should protect this right. They all greatly support a change to the current system, yet do not want any consequences if they chose not to have health insurance. This brings it back to a need for a change in the current U.S. healthcare system.

Many of the open-ended responses for students, faculty, and staff indicate common misconceptions about universal healthcare. For example, long wait times are indicated by some as a reason against such a system. In many of the responses people indicate support, but a difficulty in how to implement Universal Healthcare. Some students acknowledge how their education has impacted their perceptions of healthcare. Some respondents indicated a change in opinion towards systems of universal healthcare when traveling to other countries with these systems.

## **CONCLUSION**

Overall, the perceptions of universal healthcare lean towards supporting this concept. It has never been more pertinent than now to address healthcare reform. Surveying future healthcare professionals has allowed a better understanding of where to start the discussion of universal healthcare. As the U.S. population ages the healthcare system will only become more burdened. In turn, we will see a higher demand of Medicare. This inevitable fact will require significant changes to the healthcare system that only an open and honest discussion will provide. The sooner we address the issues with our current healthcare system the sooner more lives will be improved.

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# BLOCKCHAIN TECHNOLOGY ADOPTION IN HEALTHCARE: OPPORTUNITIES AND CHALLENGES

Anuradha Rangarajan, MS, MBA - CONTACT AUTHOR

College of Technology  
Indiana State University  
101 North Sixth Street  
Terre Haute, IN 47809  
(312)423-7893

[arangarajan@sycamores.indstate.edu](mailto:arangarajan@sycamores.indstate.edu)

David Batts, EdD

Associate Professor

Department of Technology Systems  
College of Engineering and Technology  
Science and Technology Building  
East Carolina University  
Greenville, NC 27858-4353

(252) 328-9673

[dbatts@ecu.edu](mailto:dbatts@ecu.edu)

Carolyn K. Dunn, PhD

Assistant Professor

Department of Technology Systems  
College of Engineering and Technology  
Science and Technology Building  
East Carolina University  
Greenville, NC 27858-4353

(252) 328-9661

[dunnca@ecu.edu](mailto:dunnca@ecu.edu)

# BLOCKCHAIN TECHNOLOGY ADOPTION IN HEALTHCARE: OPPORTUNITIES AND CHALLENGES

Anuradha Rangarajan, Indiana State University

David Batts, East Carolina University

Carolyn K. Dunn, East Carolina University

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## ABSTRACT

*Blockchain technology is being increasingly adopted in healthcare. This paper provides an overview of blockchain followed by a literature survey of its current state of adoption in healthcare. The key use cases identified from the survey include Electronic Health Record sharing, claims processing and healthcare research acceleration. There are both social and technical challenges that have to be overcome to leverage the potential of this technology. This paper discusses the current state of the technology and suggests areas for future research. In addition, it provides guidance to the practitioner on leveraging the technology for building robust Health Information Technology solutions through a conceptual blockchain adoption maturity model, to meet both functional and privacy and security needs of the future.*

**Keywords:** *electronic health records, technology, blockchain*

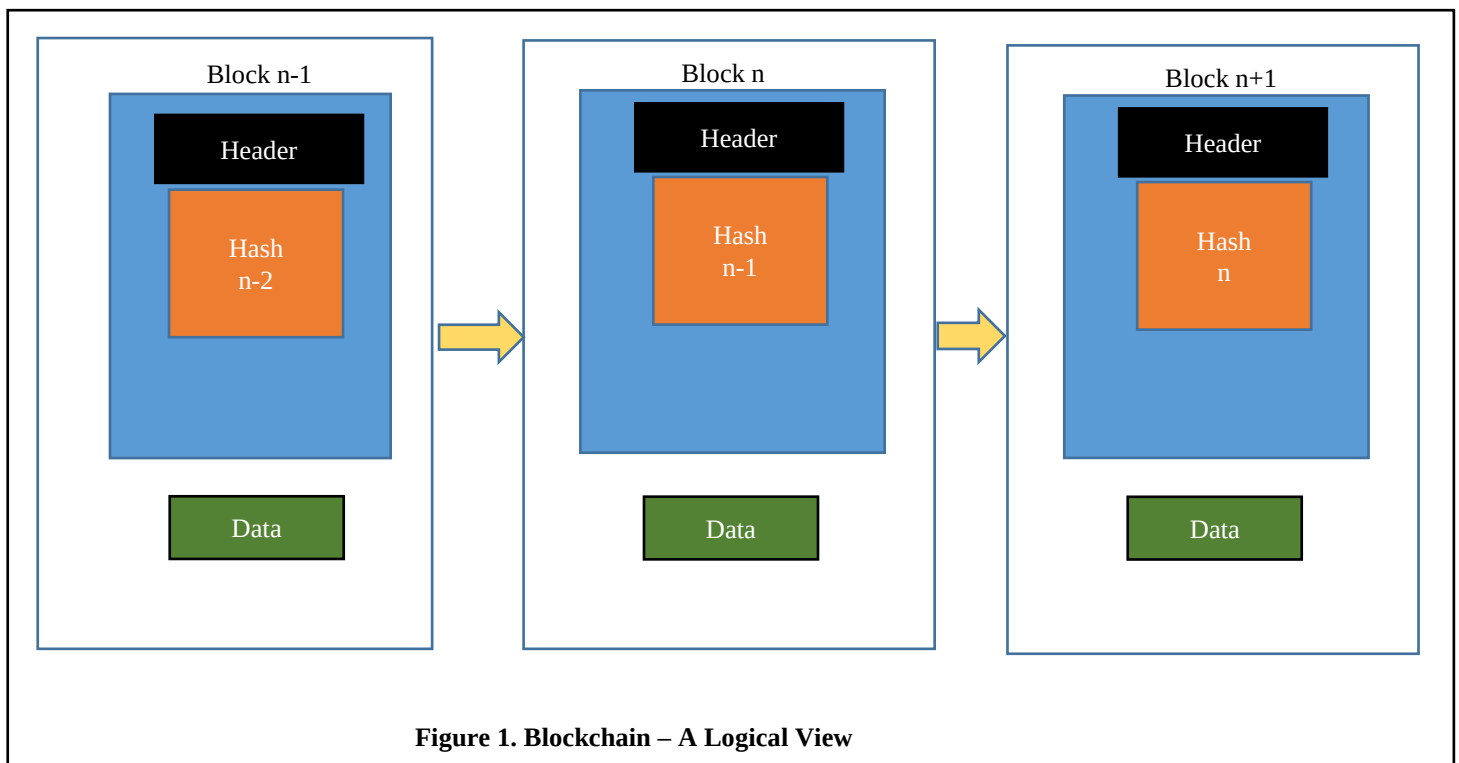
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## INTRODUCTION

Blockchain originated as the underlying technology for Bitcoin, a crypto currency for use in the financial services industry. Nakamoto (2008) first introduced the notion of Bitcoin in a research proposal as a way to distribute electronic transactions rather than maintaining centralized financial institutions for transactions. Wild, Arnold and Stafford (2015) in their publication in Financial Times define blockchain as “network of computers, all of which must approve a transaction has taken place before it is recorded, in a ‘chain’ of computer code. The details of the transfer are recorded on a ledger that anyone on the network can see.” As of this writing, blockchain has an \$115T market cap (“Market Capitalization”, 2018). It has seen rapid adoption in other industries since its first application in the financial services domain.

### *Technology overview*

In technical terms, a blockchain is a data structure consisting of an ordered sequence of batched entries, termed blocks (Patel, 2018). The blocks within a chain are ordered in a way such that each has a cryptographic hash of the immediate prior block in the chain. Figure 1 depicts a logical view of the blockchain. Because the hash function is irreversible, it serves to verify the prior block’s integrity, thereby providing a powerful security audit trail from an immutability standpoint. The blockchain is built and maintained by a set of computing nodes that do not possess a pre-existing trust relationship but are connected via a peer-to-peer network. Due to this, it is imperative that all nodes in the participating network agree on who the next valid block in the chain must be. There are a few widely adopted algorithms to accomplish this – Proof-of-Work, Proof-of-Stake, Proof-of-Burn.



*Proof-of-Work (POW):* In this model, nodes compete to generate subsequent blocks by performing computation to solve a mathematical problem. The first node to arrive and broadcast the solution to the network becomes part of the chain after the solution is acknowledged by other nodes in the network. This method typically requires high power consumption and the need for expensive hardware devices.

*Proof-of-Stake (POS):* This algorithm randomly generates a subset of nodes that are provided the opportunity to produce the subsequent block. A weighted sum probability is used to determine which of these nodes is selected to become part of the network, proportionate to the respective miner's stake held in network.

*Proof-of-Burn (POB):* This algorithm attempts to address the energy consumption problem of Proof-of-Work. In this algorithm, the network applies algorithms to ensure nodes agree on the valid state of the blockchain. Some computational power is spent sending to an "eater address" (i.e.) an unspendable address to ensure the network remains active. These transactions are also recorded to ensure respective miners are awarded.

*Smart contract* is the term used to encode arbitrary state transition functions allowing users to create systems with different functionalities by transforming the logic of the system into code (Dubovitskaya et al., 2018). Essentially, they are pieces of code that can automatically execute based on predefined triggers within the blockchain. This is at the heart of many blockchain implementations that automate analysis and actions to be taken in response to changes to business logic.

#### *Blockchain implementations*

One of the main distinctions on the various blockchain implementations is based on how the notion of a User is defined within the network. They are summarized next.

*Permissionless blockchain:* In this model users are identified via pseudonyms, or may even choose to remain anonymous. All blockchain data is public in this system. Ethereum is an implementation of the

Permissionless model. MedRec based on Ethereum developed by Massachusetts Institute of Technology, aims to provide a viable and secure exchange of Electronic Health Record (EHR) data amongst patients, providers and healthcare organizations. It leverages smart contracts to link patients and providers to the pointer or address of existing medical records ("What is Medrec", n.d.). While it does not store the EHR directly, it encodes metadata about the EHR that allows it to be accessed. Conceptually, the idea behind MedRec is to allow patients to define permissions via a set of smart contracts that specify the terms and conditions under which someone has remote data access to the patient's records (Mertz, 2018). MedRec 1.0 was piloted in August 2016 at the Beth Israel Desconess Medical Centre. While modeled on Ethereum, it was not built on the live Ethereum network, but on a small-scale private blockchain. MedRec 2.0 is being developed with several underlying technical architectural enhancements based on lessons-learned from its predecessor implementation.

*Permissioned blockchain:* In a permissioned system, every user's identity is controlled by an entity known as the Identity Provider. This entity serves as a Gatekeeper wherein it maintains access control within the network. Hyperledger Fabric is an example of a permissioned blockchain implementation established as a project of the Linux Foundation in 2016 with over 50 members including International Business Machine (IBM). It is an open-source distributed ledger framework whose goal is to create an industry-agnostic platform for distributed ledgers (Cachin, 2016). The distinction between validating and non-validating peer of nodes within the network makes for a closed system that ensures access to the network is only obtained after appropriately validating credentials of the requester. provides additional features such as membership and chaincode services.

*Public Permissioned blockchain:* In this model, write-access is restricted to those that identify themselves uniquely within the network, while read access is open to a much broader audience for auditability purposes. *Exonum* is an example of an open-source blockchain with wide read access to the blockchain data (Mamoshina et al., 2018).

## LITERATURE REVIEW METHODOLOGY

A systematic literature review was conducted on *PubMed*. Since the emphasis was on the most current trends, the search criteria included peer reviewed articles published during the years 2015, 2016 and 2017 that contained the keywords ("blockchain") AND ("delivery of health care" OR ("delivery" AND "health" AND "care") OR "delivery of health care" OR "healthcare"). This produced 28 articles. Of these, articles that only had a peripheral reference to the keywords were excluded resulting in a subset that were germane to the study. Findings are reviewed in subsequent sections.

## DISCUSSION - HEALTHCARE OPPORTUNITIES AND CHALLENGES

### *Remote patient monitoring*

Griggs et al. (2018) have proposed leveraging the smart contracts feature of blockchain to remotely monitor patients and deliver medical interventions in a manner that is secure and insulated from malicious attacks. Data from a patient-worn medical device (e.g. blood pressure monitor) is sent to a smart device such as a tablet or smartphone. Data is formatted and forwarded to the corresponding smart contract for analysis. The contract evaluates the fed data and decisions on alerting both the patient and healthcare provider. They emphasize that no confidential data is recorded on the blockchain but only the fact that a certain event has occurred. The blockchain transaction itself can be linked to patient's EHR record. One important aspect of this implementation is that only private and consortium-led blockchain is used so only authorized viewers can read the blocks and execute smart contracts. The authors have implemented a proof-of-concept system using the Ethereum coding language, Solidity. The inherently sophisticated security features and ensuring protocols such as Practical Byzantine Fault Tolerance (PBFT) are used to ensure no rogue nodes are introduced in the network, make this a more robust solution, according to the authors.

### *Healthcare directory services*

Tyndall and Tyndall (2018) have proposed an improved healthcare directory service using blockchain technology for Health Information Technology (HIE) systems. They have designed a portable Data Provenance Toolkit that can validate data origin against a blockchain record and creates standardized provenance that moves along with data. It is implemented using FHIR (Fast Healthcare Interoperability Resources) specification and

dataset. They believe that standardized Application Programming Interfaces (APIs) with extensibility to integrate with existing internal databases can enable information exchange in a secure and usable manner.

#### *Electronic Health Records sharing*

Securely sharing EHR data is both a vital and risk-laden activity. While the prospect of using blockchain for healthcare data management continues to garner research interest, there is currently only one functioning prototype of a system – MedRec (“What is Medrec”, n.d.). Against this backdrop, Dubovitskaya et al. (2017) have proposed a framework for sharing this data for cancer patient care utilizing the permissioned blockchain implementation. This is a critical aspect, since it opens the possibility for using state machine replication algorithm such as PBFT as a consensus mechanism instead of POW as used in the permissionless implementation. The framework is comprised of *Membership service* that registers various actors that participate in the network. Specifically when registering a patient, a symmetric encryption key is generated that is used to encrypt and decrypt data corresponding to the patient. When the patient chooses to share their data with a doctor, they share this key using the encryption public key of the corresponding clinician thereby ensuring protected information exchange. *Nodes* manage the consensus process. *Chaincode service* provides a secure way to execute smart contracts on validating node. Smart contracts are used to encode arbitrary state transition functions which allows users to create systems with varied functionalities by transforming logic into code. A custom chaincode is deployed on every node which acts as a Hyperledger validating peer. All actors submit their transaction to it via APIs. One node, selected as a leader organizes transactions within a block, initiates the consensus protocol. All nodes subsequently execute transactions per the implemented chaincode Logic. Verification of access to patient data stored in the *Database* component is done via Logic of a chaincode. The authors argue that patient-driven fine-grained access control, coupled with encryption and the use of PBFT consensus protocol provide for privacy, security and scalability aspects of the model.

Along these lines, Patel (2018) has proposed the electronic sharing of medical imaging data by utilizing blockchain as a distributed data store of radiological studies with patient-defined access permissions. Patel cites inadequacies in the current Image Share Network (ISN) standards developed by the Radiological Society of North America (RSNA) which requires the use of additional entities such as the Clearinghouse - as an impetus for a decentralized framework that enables widespread adoption of the image sharing network. This framework leverages POS method for developing consensus among peer nodes. Patel contends that this is a much more viable mechanism imposing minimal computational, energy or monetary burden on participants. The actual images are not stored on the blockchain, instead, only the list of key owners that are permitted to access each image for study are. Any request for an image requires that the request first be authenticated by digitally signing the transaction using the private key corresponding to the public key that was previously granted access by the patient. The actual image transmission is done when the recipient sends a digitally signed request to the location of the imaging source (e.g. hospital). Upon receiving this request, the source verifies the signature and validates via the blockchain that the patient has indeed granted the requester access to these images. Upon successful verification, the source then returns the image document(s). Patel cautions that explicit steps need be taken to ensure patient anonymity is not compromised when transacting with public keys linked at a patient-level.

Exchanging healthcare data amongst providers has several barriers including lack of trust relationships between healthcare entities, security and privacy concerns, scalability concerns for large-scale dataset exchanges and lack of enforcement of interoperable data standards (Zhang et al., 2018). To solve for this they have proposed an *FHIRChain* framework, built on the HL7 *Fast Healthcare Interoperability Resources* (FHIR) standard. Building on the requirements of the Office of the National Coordinator for Health Information Technology (ONC) they propose an architecture that leverages blockchain for meeting these requirements. For instance, to address the requirement to verify identity and authenticate all participants, they propose the use of digital health identity (i.e.) the public key in a digital certificate exchange that is recorded in the blockchain for tamper proofing. To address storing and exchanging data securely, they offer the storage of pointers to the actual data within FHIRChain. To appropriately permission access to said data sources, they have incorporated a token-based permission model where access to patient data amongst providers is only available if they possess the correct digital identity private key to decrypt the content. To solve for consistency in data formats, FHIRChain enforces the use of FHIR standards by validating if the generated reference pointers to the data following the FHIR application programming interface. To support the requirement for maintaining modularity the system is built on the Model-View-Controller (MVC) software

architecture pattern. They have developed a prototype application built on these requirements and based on lessons learned from this case study, are confident that FHIRChain can be utilized as part of the solution to the healthcare data interoperability problem.

#### *Research acceleration*

Mamoshina et al. (2018) tackle the issue of preserving privacy and audit-trail of healthcare data used in research. They introduce the novel concept of patient-controlled data access whereby patients can store and sell their biomedical data in a secure, block-chained enabled marketplace. They propose an ecosystem comprising of four components - the blockchain, data storage, users and public instances. Users include patients who wish to share their data with organizations in a secure and anonymous manner, customers who have a need to procure well-defined data samples and data validators who can check for data quality prior to customer's purchasing it. Interactions amongst these actors is registered via blockchain transactions. Encrypted data storage on a Cloud platform provides for off-chain data storage, as biomedical data can typically reach up to several Megabytes per file. The public instance provides cryptographic proof for users to guarantee the marketplace's functioning correctness. What is unique about this framework is the application of Artificial Intelligence (AI) paradigms to research data to enable a "tier model" of data based on time-value of the data. The authors contend that such a model provides for a more appropriate cost factor for using a specific data-combination. Biomedical data is seen as a triplet combination of *type*, *time* and *quality*. Type stands for the *dynamic* nature (state of a particular medical at a given point in time) vs. static nature (e.g. fingerprint), time being a sampling time with respect to patient's age when a biomedical record was captured and quality being a non-negative number reflecting the record's quality. The quality factor plays an important role, according to the authors, since a record's relevance for research is directly associated with it. By leveraging Deep Neural Networks (DNNs) to ingest the multi-modal data they can be used to extract only those features that are most implicated in aging for specific diseases of research interest. Data-sets that is thoroughly "cleansed" for these factors can be used for rated for relative "cost" of use in the healthcare information exchange enabled via the secure blockchain. By exploiting the powerful combination of these technologies, the authors believe that a richer ecosystem for meaningful health data exchange is born.

Till et al. have proposed combining two essential aspects of blockchain – cryptocurrencies and data immutability to solve for the global problem of financing universal health coverage for low and middle-income countries (LMIC) as well as advancing open markets for healthcare data for research discovery and innovation. They foresee a future where health data is traded within a networked, yet open and free market much as the Futures for oil, corn and precious metals. As with Mamoshina et al. (2018), the authors believe that value of health data would be driven by the time component, along with the current burden of the disease impacting society and related ongoing research. Patients would be at the center of this network where researchers would need to obtain explicit approval from them prior to using their anonymized data, enabled via blockchain audit trail. This model would benefit LMIC countries' governments by promoting investments in health systems in exchange for this data at a national level, in turn leading to national health data for research and innovation. This would in-turn infuse newer forms of healthcare financing for LIMCs as potential investors would now have access to more data regarding quality of care and see a more meaningful correlation between their contributions and meaningful health impacts. They caution that that the path to this destination is not without obstacles including setting regulatory guidelines, keeping the blockchain technology an open-source, yet secure paradigm and last but certainly not least, identifying the optimal size of health data that is stored within the blockchain.

#### *Claim process improvement*

Kuo, Kim and Ohno-Machado (2017) highlight the use case where healthcare claims transaction processing and verification can be enhanced due to blockchain's inherent characteristics, and they have cited several studies to this effect. Claims auditing and fraud detection can be improved due to the immutability aspects of blockchain. The primary obstacle claims administrators face today is the highly distributed nature and variety of records that have to be validated. Data provenance enables record-verification for claim qualification. This, coupled with the security, privacy and increased accessibility of patient-related data all make for a promising improvement.

#### *Complementary technology integration*

Internet of Things (IoT) technology is fast continuing to find its place in households in enabling a "smart" lifestyle across multiple domains. This is made possible by generating and transmitting large amounts of geospatial

data across the Internet. Today, several of these “smart” lifestyle options require the presence of a middleman or service provider who controls this data – for example, the next-generation taxi cab services by provider Uber. Boulos, Wilson and Clauson (2018) propose a technology use case by introducing blockchain in this context, whereby this geospatial data can become a truly public and open data source, eliminating the need for hefty service fee for providers replaced by some form of tokens to data contributors.

As complementary technologies have matured, research has progressed on the network protocols capable of supporting the integrity of a distributed ledger while facilitating high throughputs and zero transaction fees (Brogan, Baskaran, & Ramachandran, 2018); Internet of Things Algorand (IOTA) being one of them. IOTA does not utilize the concept of blocks or miners. Instead it utilizes the notion of a tangle and any transactions needing to be added to the tangle need solve for a low-cost computational puzzle. This tangle is maintained by a network of nodes Brogan et al. propose utilizing the Masked Authenticated Messaging (MAM) extension from the IOTA protocol to use a distributed ledger to broadcast and receive authenticated, encrypted activity data from a wearable device. In this ecosystem, sensors that monitor psychological statistics are embedded in an IoT device. MAM clients running on these IoT devices in the application layer process data from sensors. While these IoT devices are capable of performing POW, they cannot process the entire ledger. To complement for this, full nodes called *fabric* are capable of storing and processing the current state of the ledger. This fabric provides for an immutable audit trail of activity data broadcasted from wearable devices. What sets this model apart is the flexibility of empowering patients with granular controls over how their data is exchanged between participants in the healthcare ecosystem. The tangle establishes an added layer of trust that the data has not been altered. While the use of distributed ledger in this context may seem counter intuitive since all nodes in the IOTA network need maintain a copy of the ledger’s current state, the patient-driven granular access control make for a robust solution, the authors argue.

In addition, commercial technology vendors continue to integrate blockchain based technology for end-to-end healthcare technology delivery. For example, IBM Watson Health has announced a research initiative with the U.S. Food and Drug Administration (FDA) aimed at applying blockchain applications towards public health advancement (Kang et al., 2018).

#### *Socio-Technical aspects*

Wong et al. (2018) contend that blockchain’s successful adoption in healthcare will lie in large part on arriving at a combination of “value.” For example, in the financial domain, “value” is the monetary value of the transaction among trusted parties. So, what would or should be considered as “value” from a patient and healthcare provider’s perspective? It could range from symptoms, diagnosis and treatment to results of laboratory tests and analysis.

A second related challenge is determining what aspects of patient health information need to be placed on the blockchain. While several researchers shy away from placing actual patient records for anonymity purposes, there is the likelihood for records to be traced back to a patient due to publicly available transaction information on the network.

The transaction time of blockchain can potentially be long depending on the protocol, thereby limiting scalability of the applications running on it (Kuo et al., 2018). The computational maximum is set for each protocol and the theoretical maximum transaction speed achievable may not suit all forms of healthcare transactions.

Another challenge is the threat of a 51% attack, which can happen when there are just enough malicious nodes beyond honest nodes in the entire blockchain network whereby the entire network is taken over by malicious attackers (Kuo et al., 2018).

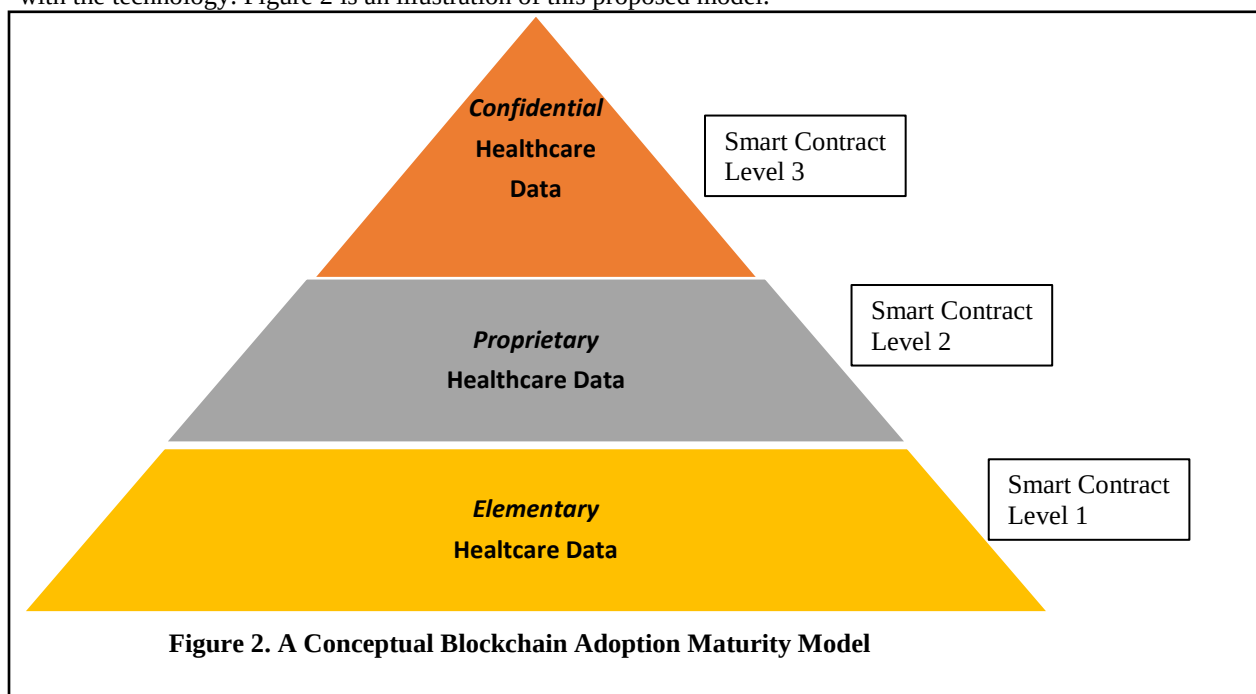
### **CONCEPTUAL MODEL**

The discussion of current-state blockchain adoption model in healthcare has highlighted the critical aspect of trust. The distributed nature of blockchain processing requires that data encrypted and stored in the ledger be trusted in the “hands” of the nodes in the network. This trust needs to be stronger in the case of *permissionless* blockchain model. Since healthcare data is extremely sensitive it is vital that all precautions be taken not only on the

kind of data stored in the blockchain, but also the level of data abstraction. Inspired by the current literature, the authors propose a blockchain adoption maturity model framework. This model is intended to provide a stair-step view of utilizing blockchain for storing data of increasing levels of sensitivity, as well as a more restrictive set of “actors” intended to act on this data. This model seeks to provide a roadmap for blockchain adoption to address two aspects highlighted in the literature review 1) inherent levels of risk by leveraging the blockchain technology and 2) impact of potential data breaches from making healthcare related data available via blockchain.

#### *Elementary healthcare data*

For healthcare organizations wanting to “test the waters” with this technology, the first foray into blockchain can conceivably include data or *pointers* to data. Examples include information on physician and nurse training, education and specialization, health plan information and basic de-identified data such as resource utilizations (number of days in hospital to treat a specific ailment), patient diagnostic and treatment information. In addition, de-identified data for research purposes can be shared amongst healthcare organizations. The corresponding smart contract rules would embed in it, the appropriate level of authentication and authorization needed to access this data. Sharing these types of data on the blockchain can provide a preliminary comfort level with the technology. Figure 2 is an illustration of this proposed model.



#### *Proprietary healthcare data*

Over time, healthcare organizations can be motivated to share data that is slightly more sensitive and administrative in nature (i.e.) proprietary data or *pointers* to data including, but not limited to amounts reimbursed by healthcare insurance, claims processing information codes for primary and secondary diagnoses and in some cases, demographic information for billing [purpose](#) (Glikih, Dreyer, & Leavy, 2014). The corresponding blockchain contracts would need to be set up with additional levels of security validation and access levels for the various actors to read and write this information.

#### *Confidential healthcare data*

The next level of data sharing via blockchain could logically contain data or pointers to data that is patient-generated. Data generated distinct from clinical settings including patient health and treatment history, biometric data, symptoms and lifestyle [choices](#) like blood glucose monitoring, exercise and diet-tracking using wearable devices are considered patient-generated health data (“What are patient-generated health data?”, n.d.). Patients are primarily responsible for capturing and recording this data and they decide how to distribute this data to healthcare providers. This level introduces the patient as one of the actors, and smart contracts are set up in such a way to provide patients granular access control to their data.

## CONCLUSION

Blockchain technology is nascent and the use cases for leveraging it continue to evolve. There tends to be intense interest surrounding newer technology and blockchain is no different. Healthcare organizations need to weigh the risks of overuse or incorrect use of blockchain, against potential gains that can be derived through several healthcare contexts. This paper presented various perspectives in this regard. In addition, this paper presented a framework that should help to guide potential adopters of blockchain. There is scope for future research in terms of expanding the model presented with additional use cases and parameters to qualify levels of data based on sensitivity and scope of use.

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# INNOVATION CAPABILITY AND ELECTRONIC MEDICAL RECORD IMPLEMENTATION SUCCESS

*Rangarajan Parthasarathy, University of Illinois at Urbana-Champaign*

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## **ABSTRACT**

*Electronic medical record is a technology innovation per academic and practitioner literature. The innovation implementation capability in organizations has been studied from various perspectives and is considered critical for organizational growth and success. Research literature asserts a positive association between organizational learning and success in implementing product and process innovations. Organizational learning from past innovation successes should assist in making future innovation implementations successful. This is because based on successful implementations of innovations in the past, the stimulators and inhibitors of innovation implementation success would likely have been studied and understood by the implementers which should help with successfully implementing innovations in the future. Based on the above, this study proposes to examine the association between organizational learning, innovation capability, and electronic medical record implementation success.*

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Rangarajan Parthasarathy Ph.D., MBA  
University of Illinois at Urbana-Champaign  
Champaign, IL 61820  
[Rpartha463@gmail.com](mailto:Rpartha463@gmail.com), [Rparth2@illinois.edu](mailto:Rparth2@illinois.edu)

# PERSONAL HEALTH RECORD INTEROPERABILITY

Manal Alghamdi, MSHA, Alumni  
Graduate Health Care Administration Program  
Lewis College of Business – Graduate College  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303

Courtney Stanley, MSHA, Alumni  
Graduate Health Care Administration Program  
Lewis College of Business – Graduate College  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303

William “Kent” Willis, Dr.PH, MSHA  
Assistant Professor Health Care Administration  
Lewis College of Business – Graduate College  
Marshall University  
One John Marshall Drive  
Huntington, WV 25755-2076  
[willis23@marshall.edu](mailto:willis23@marshall.edu)

Alberto Coustasse-Hencke, Dr.PH. MD, MBA, MPH – **CONTACT AUTHOR**  
Professor Health Care Administration  
Lewis College of Business – Graduate College  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
304-746-1968  
[coustassehen@marshall.edu](mailto:coustassehen@marshall.edu)

# PERSONAL HEALTH RECORD INTEROPERABILITY

*Manal Alghamdi, Marshall University*  
*Courtney Stanley, Marshall University*  
*William “Kent” Willis, Marshall University*  
*Alberto Coustasse, Marshall University*

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## ABSTRACT

*Personal Health Records (PHRs) is a software application that allows patients to review their medical information remotely through a secure domain. There are four forms of PHRs which are; 1) self-contained Electronic Health Record (EHR), 2) self-contained EHR, 3) PHRs integrated care EHR controlled by health provider and partially by the patient/consumer, 4) PHRs integrated care EHR controlled by the patient/consumer. The methodology for this study was a literature review and semi-structure interview with a specialist in health information technology. Electronic databases used included PubMed, Academic Search Premier, EBSCOhost, LexisNexis and Google Scholar. A total of 38 sources were referenced. Currently, most PHRs are not integrated with other systems. Interoperability exists and has continued to grow steadily, but few individuals perceive the potential benefits of a PHR system including cost and quality of care. Regardless, the review has shown increased PHR use as well as MU adoption. Based on previous literature PHRs, although there has been imported accesses for patient portal as well as major saving for health care providers, the success rate of adoption is still low. The information gathered through semi-structure interview identified PHRs lack of interoperability in the nation and interoperability will not be achieved until the implementation of MU stage 3 by 2019. PHR interoperability has been presented to have significant ability to transform the way individuals have been able to access their PHRs and allowed for increased patient autonomy in the US.*

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## INTRODUCTION

Personal Health Records (PHRs) are applications that have enabled patients to access personal health information remotely, in a secured domain and permit them to engage in their own health management (Yamin, et al, 2011). The PHR has been considered in at least four different forms: 1) self-contained Electronic Health Record (EHR) maintained and controlled by the patient/consumer, 2) self-contained EHR maintained by a third party such as a web service provider, 3) a component of an integrated care EHR maintained by a health provider and controlled at least partially by the patient/consumer, 4) component of an integrated care EHR but maintained and controlled by the patient/consumer (Maloney & Wright, 2010).

The PHRs has two main models: the stand-alone and the tethered ([HealthIT.gov](http://HealthIT.gov), 2016). The stand-alone models main characteristics have been that information has been filled by a patient and data exchange between external sources, such as other providers and laboratory, and the patient had the autonomy to add and share the information with providers ([HealthIT.gov](http://HealthIT.gov), 2016). A tethered, or connected, PHR has been linked to a specific health care organization's EHR system or to a health plan's information system ([HealthIT.gov](http://HealthIT.gov), 2016).

The Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH) core purposes focused on quality, safety, and efficiency of healthcare information exchange through support of technical providers and staff training to ensure proper operations ([HealthIT](http://HealthIT.gov), 2014). The major goal of HITECH has been promoted to providers and healthcare institution to adopt the EHR through Meaningful Use (MU) (CMS, 2010b). The HITECH act has offered reimbursement incentives through Medicare and Medicaid to enhance this adoption and in 2012, only 72% of physicians who had implemented the basic EHR system met the requirements of the MU stage 1 (Hsiao & Hing, 2012).

The Centers for Medicare and Medicaid Services (CMS), took the lead to create the principals of patient portals under MU, which has been an incentive program. Meaningful use created a specific characteristic of patient

portal functions which included a summary of outpatient visits, exchange information with a provider in a safe domain, patient's ability to download and transfer health data, provided educational material for patient and alert system for preventative services and order medication (Irizarry, Dabbs & Curran, 2015). Additionally, MU has evolved in three stages in a five-year timeframe, starting 2011-2012 for stage 1, which have been the year of capturing and sharing the data. The criterion for stage 1 was to automate the health information data collection to improve the coordination process among providers and engage the patient and patient's family in the healthcare process (HealthIT, 2013). In 2014, performance measures data showed over 50% of patients who visited Eligible Professionals (EP) were able to access health information within 4 days and over 50% of discharged patients found health information within 36 hours of discharge (IHS, 2014).

MU stage 2 was scheduled in 2014 with the focus on clinical procedure advancements which included Health Information Exchange (HIE), expanded e-prescription requirements, and increased exchange information between providers and patients (HealthIT, 2013). In 2013, only 10.4% of hospitals had provided online access for the patient to view, download and transmit information. Among those functions, the most used one was the view of health information by 39.3% hospital adoption (Adler-Milstein, *et. al.*, 2014).

In 2017, the requirement of stage 3 has been the EHRs incentive program to promote interoperability. In addition, CMS has selected specific metrics to evaluate the performance of providers based on quality and Health Information Technology (O'Neill, 2015). The providers and health institution that have been participating in MU stage 3 had the option of 90-days reporting period per CMS. However, reporting for a full year started by 2018 for providers unless it was the first year of joining the Medicaid incentive program (HIMSS, 2018).

The interoperability has consisted of three-level known as foundational, structural and semantic (HIMSS, 2013). The foundational level is where data is exchanged between different systems within a secured domain. At the structural level, information of a similar format is exchanged without any alterations. Lastly, the semantic level has been the highest level of interoperability that is fully structured with the ability to exchange data from more than one system and grant data interpretation (HIMSS, 2013).

The purpose of this research was to evaluate the PHRs to determine if the implementations of PHRs had assisted in achieving interoperability as well as the benefits and challenges of adoption focusing on implementation of MU.

## METHODOLOGY

The primary hypothesis of this study was the implementation and process involved in using PHRs for health information exchange has increased patient autonomy in the US.

The methodology for this study was a literature review and semi-structure interview with a specialist in health information technology. The interview was approved through IRB and was conducted by the authors and recorded. Majority of the information obtained during the interview was used in the result and discussion section of the paper. The research followed a systematic search approach conducted in stages. The research approach and conceptual framework is illustrated in Figure 1 and followed the framework implemented by Yao, Chu, & Li (2010). The current study's use of this conceptual framework is appropriate because its original application was to explore how PHR achieved interoperability of information exchange. The framework elucidates the issues of transition and view of information between providers and patients, which suffer from lack of interoperability.

The suggested solution is the adoption of PHRs, a system that integrates information from EHRs. There has been significant need for health information integration which will assist to recognize benefits and challenges that exist. The process of this study consisted of a development method which defines the problem, determines the needs, and finally implements the solution.

The search was conducted by utilizing the online databases such as EBSCO host, PubMed, LexisNexis, Academic Search Premier, and Google Scholar. Keywords searched were "PHR" and "Meaningful Use" and "Interoperability" OR "HIE" OR "Autonomy" OR "Benefit" OR "Adoption" and "U.S.". This literature review yielded 38 articles which were significant resources for this research. To ensure the utilization of current material,

all sources referenced were articles published between 2008 and 2018 in English. Further, a semi-structured, face-to-face interview with an expert in information systems and well versed in the utilization of PHRs added to the data collected.

The results were categorized in the following research subheadings: *Implementation of PHR Interoperability, HIEs and Patient Autonomy, Benefits of Adoption, PHR Adoption Rate, Meaningful Use and PHRs, and PHR Challenges.*

## RESULTS

### *Implementation of PHR Interoperability*

Adoption of national standards has been a necessity as it is crucial for interoperability, transportability, and security, features that would likely be mandated by legislation (Jones, Selden, Shipman & Plaut, 2010). Interoperability has referred to the standards that have made it possible for diverse EHR systems to work compatibly (AHIMA Work Group, 2013). To drive interoperability, the adoption of standards has been primarily driven by regulation (AHIMA Work Group, 2013).

The Center for Information Technology Leadership (CITL) reported that PHR could result in an annual net value of \$19 billion, for direct cost savings to healthcare providers and payers, based on a 10-year implementation period and an 80% adoption rate by the US population (Jones, *et. al.*, 2010). Another study integrated a 10-year roll-out period into their analysis and found that all PHRs demonstrated initial net negative value, as shown in Figure 2 (Kaelber & Pan, 2008). Figure 3 has shown the steady state net value and the minimum number of patients per PHR installation to obtain a steady state net positive value (Kaelber & Pan, 2008). Figure 3 also indicated that interoperable PHRs have had the earliest breakeven point. According to the expert interview, the cost of PHR implementation has varied between \$15,000, for smaller systems, and \$100,000, for the larger systems.

Another factor that has driven interoperability challenges have included the fact that the different medical device and health IT manufacturers each had their own proprietary interface technology, so there has been no way to connect the disparate part. Also, there has been no overarching architecture for creating interoperability (CMI, 2016). Architecture has been the key for identifying standards and facilitated sessions to achieve the requisite degree of interoperability (TOGAF, 2015).

### *HIEs and Patient Autonomy in PHRs*

According to one survey reviewed, amongst 117 respondents, the majority supported physicians' use of HIE (83%) or expressed interest in potentially using PHRs (76%) (Patel, Dhopeswarkar, Edwards, Barrón, Sparenborg, & Kaushal, 2010). Consumers' comfort sending personal information electronically over the Internet and their perceptions regarding the potential benefits of HIE were independently associated with their support for HIE (Patel, *et. al.*, 2010). Individuals with higher levels of ability to manage their own health (self-determination) are more likely to adopt PHR systems since they have more positive perceptions regarding the use of such systems (Assadi & Hassanein, 2017). Further, such self-determination is fueled by autonomy support from consumers' physicians as well as the consumers' personality trait of autonomy orientation (Assadi & Hassanein, 2017).

Fifty-six percent of PHR users stated they knew more about their own health because they had used these tools, 40% said they had asked a question they would not otherwise ask, 38% had felt more connected to their physicians, and 32% had taken measures to improve their health (CHCF, 2010). However, in three other studies, communication between providers and patients were examined and no improvements were reported in patient satisfaction with communication or with information provided to patients (Archer, *et. al.*, 2011).

### *Benefits of PHR Adoption in the US*

According to Dimick (2008), The CITL proposed that based on a 10-year roll-out of infrastructure, the interoperable PHR could save \$19 billion annually in healthcare costs. Based on another study reviewed, the annual benefits of the PHRs functions ranged from \$9 million for the entire medication lists to \$7.9 billion for complete test results (Kaelber & Pan, 2008). Overall, the projected annual savings for interoperable PHRs has been \$21 billion (Dimick, 2008).

Furthermore, most participants wanted to view immunization records (89%), a list of providers visited (88%), lab test results (87%), history of prior medical visits and surgeries (87%), and medication history information (87%); another interest had been the possibility to access family member's healthcare information (71%) (Pushpangadan & Seckman, 2015). E-visits, replacing face-to-face visits, have had the potential to address a wide range of chronic and acute (non-emergent) healthcare issues, and therefore represent a large area of potential PHR benefit (Kaelber & Pan, 2008).

#### *PHR Adoption Rate in the US*

Approximately 8 million individuals had been using the two basic PHR functionalities, which included storing data on the Internet and communicating electronically with a clinical provider, in 2008 (Joshi, Thorpe, & Waldron, 2019). In 2013, PHR users exceeded 31 million (Joshi, *et al.*, 2019). Despite the increased adoption rates, studies reported low PHR usage among providers and routine, monthly use among patients had been generally well below 10% of users who had access to a PHR (Kaelber, Jha, Johnston, Middleton, & Bates, 2008).

The PHRs used by the low-income elderly have been limited due to poor technical skills and low physical/cognitive abilities (Kim & Kim, 2010). The younger and affluent populations have used the web-based PHR system, which is much easier and efficiently compared to the older and low-income group (Kim & Kim, 2010). The best-performing model has been estimated to show PHR adoption exceeding 75% by 2020 (Jones, *et al.*, 2010).

#### *Meaningful Use and PHRs*

According to Bates, *et al.*, (2013), in May 2012, a total of 62,226 EPs had attested to MU under the Medicare program. To qualify for Stage 1 MU incentive payments as of 2012, EPs must have had completed 15 core objectives, 5 objectives out of 10 from menu set and 6 total clinical quality measures (CMS, 2010). Two of the new core criteria addressed patient engagement: providing patients with online access to their health information and providing secure messaging between patients and providers (Rowley, 2012).

Meaningful use required 5% of patients to use patient engagement tools for Stage 2 MU and 10% for Stage 3 MU (Ford, Hesse, & Huerta, 2016). Stage 3 MU recommendations, originally scheduled for implementation in 2017 but under policy reconsideration in 2016, stated that patients should be able to communicate electronically using secure messaging, access patient education materials on the Internet, generate health data into their providers' EHRs, and view, download, and transmit their provider-managed EHRs (Ford, *et al.*, 2016). According to these authors, the PHR products available as of 2014 had been likely to meet and exceed MU stage 3 targets before 2020 without any incentive.

Stage 2 of MU required that at least 5% of a practice's patients actually signed in and used their PHR at least once during the measured year (Rowley, 2014). Approximately 58,000 EPs had attested to meaningful use of a certified EHR in 2011 through the Medicare EHR Incentive program (ONCHIT, 2014). Of the 16% of providers that skipped their second year (2012), 43% returned to the program in 2013. Nine percent of the initial cohort skipped both 2012 and 2013 (ONCHIT, 2014).

#### *PHR Challenges*

In 2010, a national survey by the CHCF found that 75% of adults without PHRs had been concerned about the privacy of their health information if it were in a PHR (Kim & Nahm, 2012). Furthermore, a 2007 national survey commissioned by the Institute of Medicine found that only one percent of respondents had been comfortable having their health and medical information freely used by researchers without their consent (Detmer, *et al.*, 2008). Another study had stated the omission of an assurance of security in a privacy statement may cause users to think that their personal data were susceptible to potential abuse, and this could discourage them from supplying the personal data needed to complete an online transaction (Señor, Fernández-Alemán, & Toval, 2012).

Additionally, some patient populations had been at a disadvantage when it comes to broadband access; this disparity had been referred to as the "digital divide" (Pirtle & Chandra, 2011). Non-Hispanic black population less likely compared to white people, 56% vs. 67% respectively have had used the internet or have had a home PC (Pirtle & Chandra, 2011). Eighty-seven percent of households with an income greater than \$75,000 had broadband internet access while fewer than 47% of households with an income less than \$30,000 had (Pirtle & Chandra, 2011).

Overall, challenges of PHRs had often been linked to little consumer involvement during planning, design, and implementation (Archer, Fevrier-Thomas, Lokker, Mckibbon, & Straus, 2011). Lack of trust in the provider has been an additional barrier, as have been poor computer and internet skills, fear of technology, inadequate access, low health literacy, and limited physical and cognitive abilities (Archer, *et. al.*, 2011).

## DISCUSSION

The purpose of this research has been to examine the implementation and process involved in PHR interoperability and MU and whether it has improved patient autonomy. The literature review supported increased access to PHRs for consumers, by allowing e-visits to replace face-to-face visits for example, as well as significant savings for providers, but with the little research that has been done on PHR interoperability, there has not been much evidence of a success rate of adoption.

Perhaps the most significant information received was from the semi-structured interview with an expert in the field. This expert reinforced the lack of interoperability in the nation and also pointed out the potential drawbacks identified in the research. He, in fact, identified PHR interoperability as the wave of the future in healthcare. Meaningful use adoption had shown to be fruitful; however, interoperability will not be achievable until the implementation of Stage 3, taking place in 2019.

Based on the interviewee interpretation the percentage of PHR adoption nationwide has been 15% and this value has been minimal. This is because the PHR integration leaders in the country have included the Mayo Clinic, Cleveland Clinic and John Hopkins; who have made patient integration a part of their culture. However, for most institutions such as Cabell Huntington Hospital in West Virginia, they have not been there yet. The implementations of MU Stage 3, MIPS and MACRA in 2019 will allow PHR interoperability to thrive throughout the upcoming years. Additional research has been needed on the use of PHRs by consumer, family and caregivers; cost-effectiveness of PHRs use for consumers; and use of PHRs by consumers of different ages, cultural backgrounds, and health and computer literacy levels (Kim & Nahm, 2012).

The limitation of the research included the limited access to data as the paper was written based on studies from limited number of database and research papers as well as the search process by which the data was obtained. Also, there is a possibility of bias as the papers referred to have been evaluated to determine information that is relevant to the study being conducted.

## CONCLUSION

This literature review has indicated that the adoption and implementation of PHR interoperability, as well as the effects it has had on patient autonomy, has been steady paced but has seen little value through limited amounts of research. However, the review has also shown increased PHR use, MU adoption, and indicated that the future is bright for PHR interoperability; thus, supporting the primary hypothesis introduced.

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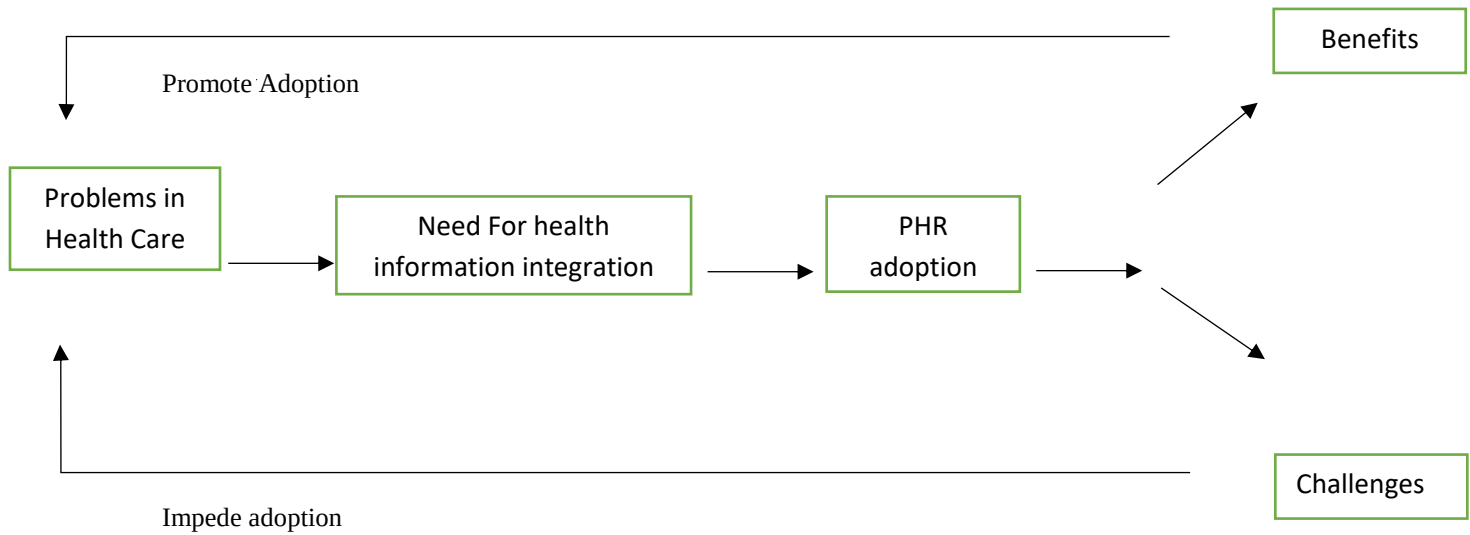
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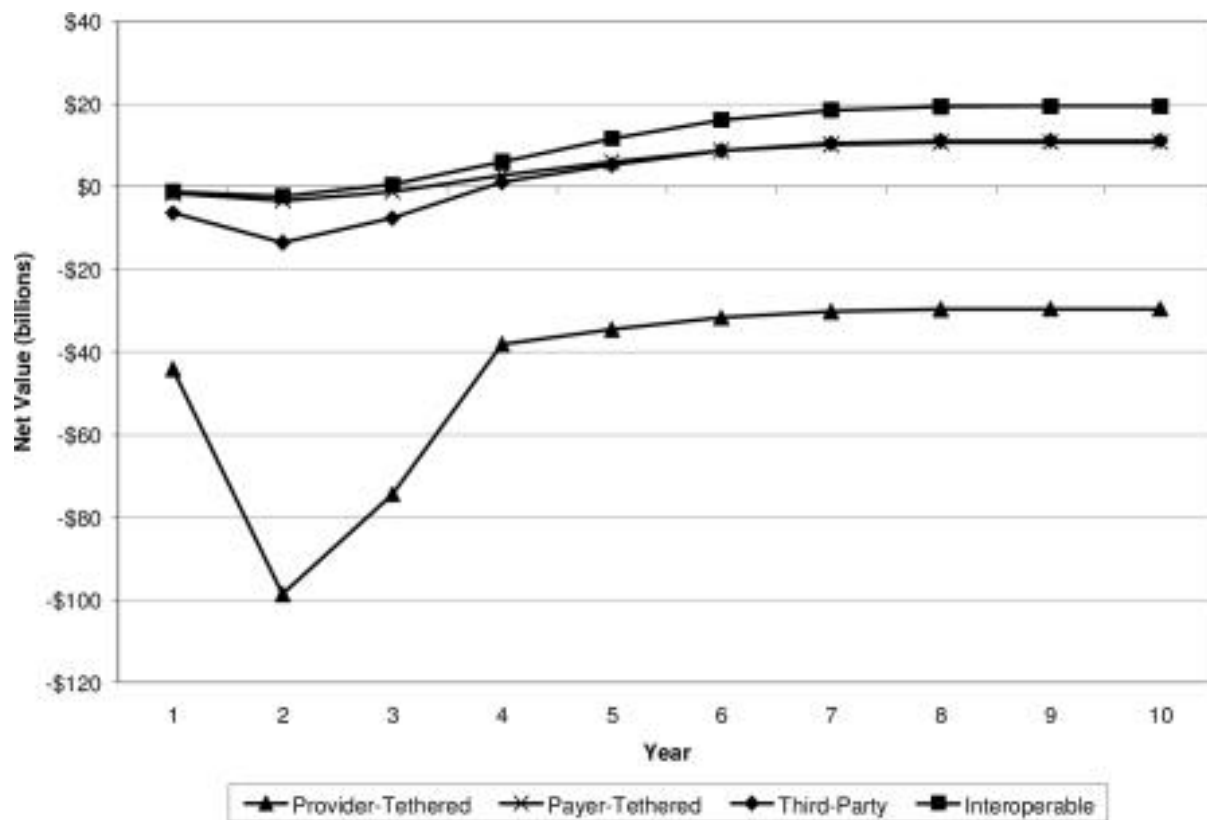
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**Figure 1.** Conceptual Framework



Source: Adopted from Yao, Chu, & Li (2010).

**Figure 2.** Annual net value over 10-year roll-out period



Source: Adopted from Kaelber & Pan (2008).

**Figure 3.** Annual steady state value PHR by architecture

| PHR Architecture  | Steady State Net Value (\$/yr, billion) | # of Users Per Single PHR Installation to Break Even |
|-------------------|-----------------------------------------|------------------------------------------------------|
| Provider-Tethered | -29                                     | 59,000                                               |
| Payer-Tethered    | 11                                      | 62,000                                               |
| Third-Party       | 11                                      | 47,000,000                                           |
| Interoperable     | 19                                      | 52,000                                               |

Source: Adopted from Kaelber & Pan (2008).

### **Interview Questions**

1. What is the cost of PHR implementation and how do they qualify for the federal incentives?
2. Has PHR improved efficiency of information exchanged between provider and patient? Why? Or Why not?
3. Is there any data that confirm PHR had shorten the outpatient visits? if not why?
4. How the information patient added in PHR integrated with EMR?
5. As part of Meaningful Use requirement of data exchange between health care provider and patient, does it reduce medical error specifically medication? Why?
6. What were the challenges that institution faced prior and thorough implementation of PHR? Why?
7. What do you find most beneficial from PHR use?
8. Are the users of PHR tracked for your organization? If so, how and how many users do you have thus far? Why?
9. How is security and privacy handled in terms of PHR usage? Why?

# **SHARECARE, INC.: HOW MUCH DATA DO YOU SHARE?**

Isaac G. Reynoso  
Maharishi University of Management  
[isaac.levi510@gmail.com](mailto:isaac.levi510@gmail.com)  
(925) 517-3288

# SHARECARE, INC.: HOW MUCH DATA DO YOU SHARE?

*Isaac G. Reynoso, Maharishi University of Management*

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## ABSTRACT

*Looking through the lense of social responsibility it seems that Sharecare, Inc. is leading the industry in terms of consumerism based health information services, but is not doing much more than what is required by outdated statutes to proactively address the growing concerns of data privacy and security. This research report attempts to address where Sharecare, Inc. thrives and where it can come higher with specific regards to modern day sustainable business practices.*

**Keywords:** Sharecare, HIPAA, Sustainability

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## ABOUT SHARECARE: PRODUCTS AND SERVICES



Sharecare, Inc. provides an online health and wellness engagement platform that gives consumers with a personal results-oriented experience by connecting them to health resources and programs. According to Bloomberg:

The company offers YOU, a software platform that provides healthcare providers, educators, students, and patients visual context to discuss and simulate healthy organ and system function, as well as disease, and therapy...Its platform allows people to ask, learn, and act upon the questions of various health and wellness issues in the areas of allergy and immunology, cardiology, dentistry, dermatology, otolaryngology, emergency medicine, family medicine, gastroenterology, internal medicine, nephrology, neurology, obstetrics and gynecology, oncology, ophthalmology, orthopedic surgery, pediatric rheumatology, pediatrics, plastic surgery, psychiatry, surgery, and urology (Bloomberg, 2018).

Sharecare was incorporated in 2009 and is based in Atlanta, Georgia. They operate as a subsidiary of Discovery Communications, Inc. In 2016 their net revenue was nearly \$30 million (NetAdvantage, 2017). They currently employ over 2,000 people in the U.S. alone. Their number of users was difficult to locate, however their

website boasts that over 45 million people have taken their app's flagship feature, the RealAge test (Sharecare, 2017). The RealAge test is a fascinating questionnaire that asks a series of 100 or so questions about an individual's health history, which is then aggregated and used to populate personalized content, such as highly targeted ads.

#### *Vision, mission, and long-term objectives*

Sharecare's mission is to, "help you on every point in your health journey, from the exam room to the living room... I consider it a privilege to empower our viewers to take control of their health, and help them save precious time and money in the process" (Sharecare, 2015).

Sharecare's vision is to build, "a comprehensive digital health and wellness engagement platform that provides people with personalized resources to help them live their healthiest lives" (Sharecare, 2015).

Their business strategy is to embed health related advertisements into the app. Their goal is to disrupt but not disenfranchise the incumbent health system. According Sharecare's CEO Jeff Arnold wants to partner with the established healthcare organizations in order to incorporate them into Sharecare's business model.

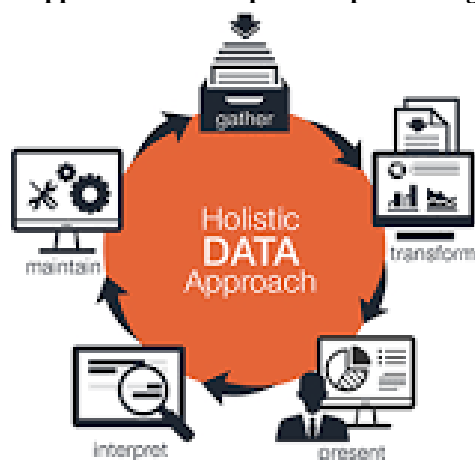
#### *Core competencies that give company competitive advantage*

One definite core competency that Sharecare has is tech savviness with specific regard to health data collection via their app. To date, according to their website:

Nearly 40 million people have shared more than 5 billion data points about their health status and habits with Sharecare, which uses that information to create a comprehensive health profile allowing users to access all of their health resources in one place, and dynamically connect to the knowledge, evidence-based programs and health professionals they need. Created by Jeff Arnold and Dr. Mehmet Oz in 2010, Sharecare's predictive and personalized platform is accessed daily by millions of consumers, including viewers of The Dr. Oz Show, patient populations of the country's leading hospital systems and every Soldier in the United States Army (Sharecare, 2015).

Sharecare's competitive advantages include their engaging platform and experienced leadership. Health insurance companies and health care centers have online digital portals that are notoriously cumbersome by comparison. Their advantage in leadership is with their CEO Jeff Arnold is the former CEO of one of the top healthcare websites WebMD. His rich experience in internet and healthcare helps bring extremely valuable past industry know-how to Sharecare. Nonetheless, by far Sharecare's biggest competitive advantage remains their partnerships with the established big health organizations. Sharecare CEO Jeff Arnold was quoting on Bloomberg saying they are partnering by, "helping them come into the consumerism age" [Bloomberg Markets and Finance] 2018.

### Diagram of LCA and opportunities to improve impacts and gain business benefits



(Walsh, Excella, 2015)

Due to the nature of Sharecare's flagship mobile being a software application, their product (Sharecare App) did not fit the traditional life cycle assessment (LCA) model. Therefore, this paper is evaluating Sharecare through the lens of their "Holistic Data Approach", which is a model proposed by the Washington D.C. based data analytics company Excella. Since Sharecare's business model mainly consists of data collection and advertising this paper will proceed to assess their sustainability practices through this model.

CEO Jeff Arnold has expressed building working relationships with the incumbent health organizations by implying that the Sharecare platform and its data can be used by traditional healthcare organizations as well, given the permission is granted from the user. That being said, a socially responsible question remains, "What protective measures are Sharecare implementing to ensure the safety of its users' information; particularly its users' Personal Health Information (PHI)?" According to Sharecare's privacy statement users' PHI is, "protected under the U.S. Health Insurance Portability and Accountability Act of 1996 (HIPAA). HIPAA and other laws closely regulate how Sharecare may handle, protect, and share your PHI" (Sharecare, Privacy, 2018). That sounds all well and good, and in most cases will lead one to believe that HIPAA Laws Cover Privacy and Security for All Medical Records, however if one digs a little deeper and extracts the actual verbiage of the aforementioned HIPAA document, the "Health INSURANCE Portability and Accountability Act" one soon realizes that, in short, Sharecare is NOT an insurance company. In many ways this document written in 1996 does not sufficiently bind an entity like Sharecare to abide completely to these statutes as much as, say, an insurance provider would be required to. Afterall, Sharecare is an online health and wellness engagement platform, NOT an insurance company. Much like Uber is not so much a taxi service, but a ridesharing platform.

According to the government's Human Health Services website, the HIPAA applies specifically to, "Health plans, Health care clearinghouse, and Health care providers who conduct certain financial and administrative transactions electronically" (hhs.gov, 2002). This is where it gets tricky in terms of legalities, definitions, and semantics (aka lawyer-nese). What exactly is a Healthcare Clearinghouse? And what are their functions? According to HealthCarePro.com a Healthcare Clearinghouse is:

a public or private entity, including a billing service, repricing company, community health management information system or community health information system, as well as "value-added" networks"... [A healthcare clearing house] Processes or facilitates the processing of health information received from another entity in a nonstandard format or containing nonstandard data content into standard data elements or a standard transaction ... Receives a standard transaction from another entity and processes or facilitates the processing of health information into nonstandard format or nonstandard data content for the receiving entity. (hcpro.com, 2005)

Now, Sharecare for all intensive purposes “can” perform many of those functions, however that does not necessarily constitute Sharecare “as” that type of entity. In other words, it seems that due to the nature of the outdated law Sharecare has wiggle room to “switch hats” so to speak to declare itself to be what it chooses to identify itself as, regardless of the fact that it can perform much better data analytics and data collection than some entities who were created to perform just that. Think AirBnB and the hotel industry. Is AirBnB a hotel service? Debatable. AirBnB is predominantly an online marketplace for home-sharing and hospitality services. It operates outside of current legislative jurisdictions. The same is true currently with Sharecare. Sharecare can function as a clearing house, but it’s predominantly a health and wellness platform.

The solution I recommend is transparency. A little honesty goes a long way. Instead of leading the public to believe in a false sense of security, simply admit to users the fact that the current laws are in fact outdated and that Sharecare is committed to privacy and data protection by exceeding the government requirements for privacy and protection by proving it via documentation. To reach the Gen Z demographic I would recommend packaging this whole transparency spiel in a 2 min animated video to boot. The bottom line being honesty and second of all speaking the language of their customers (i.e. short infotaining animations).

*External factors which are important for strategic planning*

#### 5G and A.I.

With 5G right around the corner and artificial intelligence getting smarter by the second it will be interesting to see the leaps and bounds that Sharecare and likeminded companies will be able to do in terms of data mining Personal Health Information. This may perhaps spark a slew of copycat companies with a better business model and/or faster growth strategy.

#### Public Health

Although there are some signs of slowing, the Obesity epidemic is still on the rise. With a good “villain” like a obesity, there will always be a demand for a health promoting hero like Sharecare, or the like.

#### Data Security

Securing against a data breach should be top priority for Sharecare. According to entrepreneur.com the FBI has reported that there are on average 4,000 cyber attacks, in particular ransomware attacks, that happen on a daily basis (Rey, Entrepreneur, 2016). Ransomware being the malicious kind of cyber attack that blocks access to a computer system until a ransom is paid. For the sake of its customers SHarecare must have a solid grip on this area of their business.

#### Mishandling PHI

Selling off customers’ personal data without clear consent to advertisers is not a very savvy business move, just ask Mark Zuckerberg. That act is very unappealing to say the least. The dips in FB stock price explain the story better than most can. Properly overcommunicating company intentions to customers seems to be the best route. There is an ancient scripture that says, “For everything that is hidden will eventually be brought into the open, and every secret will be brought to light”. (The Bible, NLT). In short, being upfront and forthright goes a long way, even more so the younger the demographic becomes. Ask a Gen Z.

#### Dr. Oz’s Reputation

One of the most important intangibles Sharecare has is its reputation. One of the things to consider in regards to customer care is the advice Dr. Oz gives on his show. His persona is so closely linked to the company that I believe any riff in PR could cause a ripple effect on the health of the company. In 2016 a high profile lawsuit was filed against reporting that Dr. Oz misrepresented the effectiveness of a weight-loss supplement. \$5.25 million was used to settle the case (Bucher, Top Class Actions, 2018). I agree it may be difficult to fill a daytime television show for an hour a day, 5 days a week, however Dr. Oz needs to make sure that the content and recommendations he is offering is accurate, useful, and far from misleading. Otherwise his customers will begin to turn away from his show, business, and the products he endorses.

#### **Three strategies responses for value creation**

| Generic Strategic Responses           | Current action of the company                                                                                                                                                                                                                                                    | Business Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reducing Energy, Waste, and Materials | <ul style="list-style-type: none"> <li>● Minimizing impact on the environment</li> <li>● Appropriate use of natural resources</li> <li>● Seeking opportunities to contribute to improving environment</li> <li>● Encouraging the replenishment of renewable resources</li> </ul> | <ul style="list-style-type: none"> <li>● Sharecare <b>plants five trees for every one they use.</b> Sharecare Health Data Services has <b>planted over 61,000 trees. The benefit that Sharecare receives is positive goodwill.</b></li> </ul>  <p><b>The Eden Projects</b><br/>Partnering with <u>The Eden Projects</u> increases Sharecare's social value in the perception of its stakeholders</p> |
| Differentiating Products              | <p>RealAge Test:</p> <ul style="list-style-type: none"> <li>● Comprehensive health survey</li> <li>● In depth big data health information comparison</li> <li>● Accurate longevity indicator/estimator of health w/ regards to average death records</li> </ul>                  | <ul style="list-style-type: none"> <li>● 45 million people have taken the test thus far</li> <li>● 5 million data points of individual health that are used to build individual 1:1 profiles which can be used to help advertise products or assist in health related processes.</li> </ul>                                                                                                                                                                                             |
| Protecting and Enhancing Brand        | <p>The Dr. Oz Show</p> <ul style="list-style-type: none"> <li>● 2016 lawsuit for misleading claims about weight-loss supplements</li> </ul>                                                                                                                                      | <ul style="list-style-type: none"> <li>● 2017 The Dr. Oz show hit an all time low in terms of ratings</li> <li>● 2018 \$5.25 million settlement for misleading claims</li> </ul>                                                                                                                                                                                                                                                                                                        |

**Suggestions for sustainable value innovations the company could do.**

| Generic Strategic Responses | Suggested action for the company                                                                                                                                                                                                                                                                                                                          | Expected Business Results                                                                                                                                                                                          |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Differentiating Products    | <ul style="list-style-type: none"> <li>● Acquire a health &amp; wellness social platform that engages the overlooked Gen Z demographic</li> </ul>                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>● Higher level engagement</li> <li>● Virability</li> </ul>                                                                                                                  |
| Business Context            | <ul style="list-style-type: none"> <li>● Create data privacy &amp; safety policies that exceed above and beyond government mandated regulations and industry standards and <b>promote industry-wide adoption</b></li> <li>● Produce an animated short explaining the core values and attributes of superior safety and data security standards</li> </ul> | <ul style="list-style-type: none"> <li>● More trust and engagement from audience</li> <li>● Reputation for leading the market in safety</li> <li>● Increase in stakeholder perceptions of social impact</li> </ul> |

### *Blue ocean or disruptive innovation strategy*

One idea that would put Sharecare in a blue ocean would be an innovative and gamified health & fitness application that engages the up and coming Z generation. It will encourage users to exercise and expose them to healthy habits in a way that is mutually edifying and not obtrusive or preachy. An application that engages its users in healthy habit formation without the user realizing it. The app should infortainlighten (inform, entertain, and enlighten) its users and create sustainable value through honest and transparency with special regard to how sensitive information is being managed, used, and protected.

Integrating this gamified approach alongside their already established health data services portion of their business would establish a channel that can deliver a product to consumers that is engaging, and information to trusted businesses with tremendous value.

### *Company's current sustainability initiatives. "bolt-on" or "embedded"*

Bolt-on sustainability are measures that company can undertake in an effort to reap some of the low hanging fruit of sustainability (i.e. LED lighting, solar panels, recycling, increase philanthropy), however these measures nearly scratch the surface and quite honestly don't cut it anymore. In this light, Sharecare picks off the low hanging fruit of eco-efficiencies and philanthropies with ease.

In terms of "embedded" or "bolt on" I would say that Sharecare has embedded values of sustainability to an extent. I would say that their "embeddedness" reaches the Customer Level and does not go much past that in terms sustainability value creation. On the Customer Level Sharecare excels by offering much "smarter" solutions to access to health information without a tradeoff. However their embeddedness stops shortly thereafter due to the nature of a technological value chain which is mostly determined by the security and ethical management of personal information. This paper has mentioned it before, however it bears repeating: thus far Sharecare has only agreed to closely adhere to existing regulations, which as we know are over 20 years old and are due for an update. <https://hds.sharecare.com/about-us/sharing-care/>

### *ES-cloud. Where is company now, and where can it move?*

Currently I would say that Sharecare is on the top left hand blue ocean side of the cloud. I would rank high them substantially high in change (i.e. disruption), however in terms of solving global problems they have yet to breakthrough in that sense. That being said Sharecare has massive potential to solve some of the world's pervasive health issues especially in third world countries where "the rising billion" are not coming online right around the same time as the release of 5G and the advancements in A.I.. Specifically, in terms of non-invasive and non-pharmaceutical preventative health recommendations and alternatives. I think the possibilities and potential for Sharecare to impact the world is there, however it has yet to be proven in that sense.

### *Focus one or more strategic choices faced by the business.*

The strategy to partner with existing and established healthcare organizations.

### **Table showing the criteria used to select among alternative strategies**

**(y-axis) Shareholder Value**  
**(x-axis) Stakeholder Value**

+

|                                                                                |                                                                            |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Partnering with healthcare organizations and withholding access to data</b> | <b>Partnering with healthcare organization and allowing access to data</b> |
| <b>Not partnering and not licensing intellectual property</b>                  | <b>Not partnering and licensing intellectual property</b>                  |

|  |  |
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*Implementing Change: Investigating Sharecare's developed relationships with stakeholder groups. How are top executives involved in sustainability efforts?*

Sharecare has developed valuable working relationships with the existing healthcare organizational paradigm. They are working closely with the incumbent system allowing them to see the value of consumerism based data collection. Top executives are involved in charitable events and fundraisers.

*Validating Results: Environmental and social responsibility reporting. How do these results compare with competitors and industry norms?*

Due to the nature of their business (i.e. software and data analytics) there is not much to summarize on their environmental responsibility reporting other than their planted of 61,000 trees (5 trees for every 1 tree they consume).

The evidence for their social responsibility reporting is taken from their own website and heralds that they are active in philanthropy and have shown commitment through partnerships with organizations like The Eden Projects which is an organization that aims to bring agricultural workers out from poverty and has the ambitious goal of planting millions of trees.

Comparatively, given the industry this level of sustainability seems to be at the threshold level, meaning it is expected of companies to have some kind of sustainability aspect to their business. It is becoming increasingly evident that the public is expecting more from companies and it is interesting to see how Sharecare chooses whether to improve upon their sustainability actions incrementally or drastically.

*Grade the company as A, B, C, or F.*

Criteria:

- Compliance Level To Regulatory Statutes
- Mitigating Risk
- Reducing Energy, Waste, and Materials
- Differentiating Products
- Entering New Markets

Comparing Sharecare to its health information tech industry, which is relatively new, I would give them a C+ based mostly on their bare minimum compliance level that they are currently adhering to with regards to the HIPAA. To be a true leader in the field Sharecare should be leading the pack in exceeding specific and related industry standards. They have the potential to be radically innovative in this arena, however to date they have not shown more than mere compliance and lip service. Also, the amount of untapped potential that is lying dormant in their data systems is another reason for the average grade.

With regard to mitigating risk they do a great deal better than most older companies mostly due to the nature of Sharecare's business being a strictly digital platform (i.e. no physical product). In terms of reducing energy, waste, and materials they do a fantastic job. Infact, in this regard they excel due to their initiative to plant 5 trees for every 1 tree of paper they use, which brings up the question, "How much paper do they actually use?" Thus far they've planted 61,000 trees so perhaps they do use quite a bit of paper (Sharecare Health Data Services, Sustainability, 2018). 12,000 trees of paper use to date. Then again, it's only fair to mention, again, that the nature of their business is a paperless software based platform.

In terms of differentiating products they do exceptionally well with their RealAge test. This test asks close to 100 health questions ranging from age, to smoking habits, to emotional well-being. Talk about data points. In terms of the Market Level Sharecare is leading the way in terms of innovation by pioneering a software app version of the traditional, slow, and outdated health information paper based system. They seem to be positioning themselves as the Uber or Netflix of the health information industry.

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# TECHNOLOGY STRATEGIES TO IMPROVE STUDENT LEARNING OF HEALTHCARE REIMBURSEMENT

Suresh Chalasani, University of Wisconsin - Parkside

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## ABSTRACT

Healthcare reimbursement is a significant component of the healthcare revenue cycle management processes. Many healthcare management programs both at the undergraduate and graduate levels include competencies and outcomes related to healthcare reimbursement. An example healthcare-reimbursement competency is “Manage the use of clinical data required by various payment and reimbursement systems.” To effectively teach this competency, educators need to emphasize both the detailed processes and the computational methods for reimbursement. Teaching these concepts is also complex because of the number of different processes used by the Center for Medicare and Medicaid Services (CMS) for reimbursement. For example, the reimbursement processes for Inpatient Prospective Payment System (IPPS) are different from those of Inpatient Psychiatric Facility Prospective Payment System (IPFPPS) and End-Stage Renal Disease Prospective Payment System (ESRDPPS).

Many healthcare processes including reimbursement have been significantly transformed by technology in recent years. In this paper, we will discuss technology tools that can help improve student learning of healthcare reimbursement processes. In the Health Information Management and Technology program offered by the University of Wisconsin System, we have been teaching healthcare reimbursement and related courses since 2013. This program is an online program, and initially the courses utilized technologies such as spreadsheets and databases only to a limited extent. However, over the years we introduced technological tools to a significant extent. We found that technological tools for reimbursement processes and computations help students gain a better perspective and understanding of these concepts.

We discuss various technological tools to improve student learning. These technological tools range from spreadsheet techniques (formulae, pivot tables) to databases (queries, reports), instructional videos specifically tailored for reimbursement, practice assessments, and video feedback. We gathered assessment results since 2013 and evaluated how well students progressed in satisfactorily mastering the healthcare reimbursement competency as we introduced more and more technological tools in teaching methods. We will share assessment results in learning outcomes related to healthcare reimbursement processes such as Inpatient Prospective Payment System (IPPS), Inpatient Psychiatric Facility Prospective Payment System (IPFPPS), and End-Stage Renal Disease Prospective Payment System (ESRDPPS). We will first present assessment results from student work when technological tools were not used extensively to teach healthcare reimbursement and compare them to the assessment results after we introduced technological tools. We classify our technological intervention on a scale of 1 to 3 (1=low technological use; 2=medium; 3=high technological use) and provide a statistical analysis of student learning of healthcare reimbursement with respect to technological intervention.

The main emphasis of this presentation will be how to effectively use technologies for automating and facilitating healthcare reimbursement processes. This paper will be applicable to both faculty working in healthcare management/administration programs as well as practitioners responsible for revenue cycle management and related processes at healthcare facilities such as hospitals, clinics and skilled nursing facilities.

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Suresh Chalasani, PhD  
Health Information Technology & Management and Business Programs  
University of Wisconsin-Parkside  
Kenosha, WI 53141-2000  
[chalasan@uwp.edu](mailto:chalasan@uwp.edu)

# THE USE OF BIG DATA BY MANAGED CARE ORGANIZATIONS

Bojing Wang, MS  
Healthcare Administration Program  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[wang151@live.marshall.edu](mailto:wang151@live.marshall.edu)

Xiaoying Liu, MS  
Alumni  
Healthcare Administration Program  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
(304) 746-2063 FAX  
[liu74@live.marshall.edu](mailto:liu74@live.marshall.edu)

Alberto Coustasse DR.PH., MD, MBA, MPH – CONTACT AUTHOR  
Healthcare Administration Program  
Professor (full)  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
304-746-1968 [coustassehen@marshall.edu](mailto:coustassehen@marshall.edu)

# THE USE OF BIG DATA BY MANAGED CARE ORGANIZATIONS

*Bojing Wang, Marshall University*  
*Xiaoying Liu, Marshall University*  
*Alberto Coustasse, Marshall University*

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## ABSTRACT

*Big data have become available in all kinds of healthcare organizations. The application of big data analytics in Managed Care Organizations (MCOs) has the potential to improve health care, lower costs, save lives, and help to make better-informed decisions. The study illustrated the implication of big data in MCOs. Big data can help MCOs reduce patients' relevance, analyze specific diseases such as asthma and diabetes. Big data also could help MCOs to reduce cost after collecting data and determined the specific patients' situation. Meanwhile, big data could help to predict patients' mortality. The implication of big data has benefited MCOs in reducing costs, improving the quality of healthcare care. Interview content, limitation, and practical implication of this study are further discussed.*

**Keywords:** *Big data, data analytics, managed care, costs, quality, diabetes, influenza*

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## INTRODUCTION

“Big Data” is a term used to describe massive data sets which have more varied, large and complex structure and are not able to be stored, analyzed and visualized or cannot be processed efficiently by traditional data management tools (Sagiroglu & Sinanc, 2013). The core features of big data could be summarized as the five Vs., which are Volume, Variety, Velocity, Veracity, and Value (Demchenko, Grosso, De Laat, & Membrey, 2013). Managed Care Organizations (MCOs) have been defined as systems that integrated the financing, insurance, and delivery of healthcare services (Ridic, Gleason, & Ridic, 2012). It was created to furnish the health care services to covered individuals, establish selection criteria for health care providers, create programs for processing utilization review and quality assurance, and encourage members to use providers and procedures which were associated with their plans by financial incentives (Shmueli, Stam, Wasem, & Trottmann, 2015). Big data have become available in all kinds of healthcare organizations and has become necessary as deriving insights to improve healthcare delivery and reduce waste (Sun & Reddy, 2013).

According to Konstvedt (2015), managed care has gradually replaced fee-for-service and other traditional health care plans from 27% in 1988 to 80% in 2013. Although the rate of managed care has started to decrease from 95% in 2003 because of the appearance of High-Deductible Health Plans with Savings Option (Konstved, 2015). Also, Preferred Provider Organizations (PPOs) with 57% and Health Maintenance Organizations (HMOs) with 14% have been the most prevalent types of MCOs in U.S. healthcare systems (Claxton et al., 2013).

IBM has indicated that 2.5 exabytes ( $10^{18}$  bytes) of data are created every day, and 90% of the data produced in the last two years (Bhagat, 2015). In 2012, digital world of data was expanded to 2.72 zettabytes ( $10^{21}$  bytes), and it would spend about 20 billion personal computers to store the data around the world (Sagiroglu & Sinanc, 2013). Data from U.S. healthcare systems reached 150 exabytes in 2011, and at this rate of growth, the number would soon reach the zettabyte (1021 gigabytes) scale, even the yottabyte (1024 gigabytes) (Cottle, Kanwal, Kohn, Strome, & Treister, 2013).

Big data has become a trendy topic in healthcare, and the term primarily referred to the vast and growing volumes of computerized medical information, such as drug and disease monitoring registries, Electronic Health Records (EHRs), and administrative or health claims data (Trifirò, Sultana, & Bate, 2017). Big data in healthcare generally has been collected through clinical practice and administration processing by different healthcare professionals, such as pharmacists registering prescriptions, and physicians recording the drug prescriptions, medical

history, or medical claims of their patients (Trifirò et al., 2017). The study from Futrel (2014) predicted that the share of data for medical use would be a fourfold increase from 2012 to 2020, but healthcare as one of the largest data producers, it has been the least prepared industries to handle the remarkably increasing data. Also, big data has been collected without being used which should be fully recognized by health care organizations for a long time (Trifirò et al., 2017).

Accountable Care Organizations (ACOs) have been using big data technologies to reduce healthcare costs and improve the quality of healthcare; in addition, ACOs have established Big Data warehouses to optimize health care services (Tomar, Chaudhari, Bhadoria, & Deka, 2016)

A study from Frakt and Pizer (2016) have suggested that big data would rapidly improve healthcare delivery. Big data analytics have the potential to improve health care, lower costs and save lives, and the application of big data analytics in MCOs and ACOs could help to make better-informed decisions (Dembosky, 2012). Driven by mandatory requirements and the potential to improve the quality of healthcare delivery as well as reducing the costs, these massive quantities of data hold the promise of supporting a wide range of medical and healthcare functions, including clinical decision support, disease surveillance, and population health management (Dembosky, 2012). Institutions and organizations might get benefits from big data analytics for their future directions, development, decisions, investments, and challenges with predictive as well as descriptive analytics, such as healthcare systems, user behavior analysis, decision support systems, personalized systems, and market analysis (Sinanc, Demirezen, & Sagiroglu, 2016).

The purpose of the research was to determine whether big data and data analytics could reduce the costs of health care, improve the quality of care, and control overutilization within MCOs.

## METHODOLOGY

The primary hypothesis of this paper was that big data would be helpful for reducing unnecessary health care costs and improving the quality of healthcare within MCOs. The secondary hypothesis of this research was that big data and data analytics would play an essential role in reducing patients' prevalence and analyzing specific disease such as diabetes for MCOs. The methodology of this study was a literature review which could be separated into three steps: (1) identifying literature and collecting data, (2) establishing criteria for the literature analysis and evaluation, (3) categorizing literature. Also, a semi-structured interview would be done via telephone for this research. Eight questions such as the interviewee's work experience, facts, and opinions about big data, and how her organization uses big data would be chosen for this interview. Also, the interview would be recorded.

### *Step 1: Literature Identification and Data Collection*

The key terms used for literature identification were "big data" OR "data analytics" AND "managed care" OR "managed care organizations" OR "PPOs" OR "HMO" OR "health care" AND "costs" OR "quality" OR "diabetes" OR "mortality", such as Academic Search Premier, PubMed, ProQuest, ScienceDirect, and Google Scholar. Reputable websites such as the Agency for Healthcare Research and Quality, Health Affairs, American Telemedicine Association, and CDC were also used in the search. Citations and abstracts of articles were assessed to identify whether they could satisfy the requirement of this study.

### *Step 2: Literature Analysis and Evaluation*

The identified literature for the study was limited to big data and managed care. The abstracts of academic articles and studies were reviewed first to examine the relationship of their content with the topic. If the abstracts were found to be appropriate to the topic, the articles would be analyzed. To stay with current trends to the topic, articles only published from 2007 to 2018 were chosen in this research, (except for two articles used for comparison). The literature evaluation and analysis were limited to the articles which were written in the English language and full texts, and a total of 35 references were used in this study. W.B. and L.X. did the literature search, and it was validated by A.C. who acted as the second reader and double-checked whether all the references met the inclusion criteria of the research study.

### *Step 3: Literature Categorization*

After analyzing the articles, useful articles were selected and categorized into four sections based on the findings, which included the application of big data for reducing patients' prevalence, application of big data for analyzing special diseases, application of big data for reducing healthcare costs, and application of big data for predicting patients' mortality.

## RESULTS

The application of big data can help MCOs improve their service quality and reduce costs by analyzing specific disease and high-risk people. Meanwhile, big data can help MCOs to decrease rates of patients' prevalence. The primary studies showing the application of big data in MCOs were classified by the purpose and the outcomes and summarized in Table 1 (Table 1).

### *Application of Big Data for Reducing Patients' Prevalence*

In the report from Grohskopf et al. (2016), big data was used to preventing influenza. According to the data collected by ACIP from more than 30,000 patients, the vaccine HD-IIV3 seemed to be efficient to adults elder than 65 years old; and RIV4 was more effective compared to IIV4. According to a study of the effectiveness of RIV4 and IIV4 from 2014 to 2015, 4,303 patients accepted RIV4 and 4,301 patients accepted IIV4, the result showed RIV4 was 36% effective and IIV4 was 4% effective. In another study from 2009 to 2010 in 6,107 patients with HD-IIV3 and 3,051 patients with vaccine SD-IIV3, this kind of vaccine was not effective against patients elder than 65 suffered from pdm09 (Grohskopf et al., 2016). Since viruses such as A/Michigan/45/2015 (H1N1) pdm09-like virus should be included in the vaccines from 2017 to 2018, FluMist Quadrivalent (LAIV4; MedImmune, Maryland) should not be applied in 2017 and 2018 since this kind of vaccine seemed not effective against A(H1N1) pdm09 viruses (Table 1).

Glanz et al. (2013) conducted a study with eight MCOs investigating the vaccination by using big data collected from more than 400,000 children born between 2004 and 2008. The results of this study indicated that nearly 50% of these children were under-vaccinated before 24 months. Compared to unvaccinated children, vaccinated children had a 95% lower outpatient visit rate compared to unvaccinated children (Glanz et al., 2013). Also, by reviewing the big data collected from more than 1,000 medical records from more than 150,000 children, the researchers also found that most nonmedical reasons came from the parents' rejection (Glanz et al., 2013). The results of this study showed the essentialness of children before 24 months accepting vaccines (Table 1).

Other studies such as Hechter's study found that Hepatitis B can be effectively reduced by using the vaccine. Less than half of the patients in more than 15,000 patients suffered from Hepatitis B after the accepted vaccine (Hechter et al., 2014). While in Abara, Qaseem, Schillie, McMahon, and Harris (2017) study, they use big data to give suggestions to avoid suffering from Hepatitis B. Bayen, Jacquemot, Netscher, Agrawal, Noyce, and Bayen (2017) conducted a study analyzing falls' threat. According to this study carried out in a Californian memory care organization, both fatal and nonfatal injuries may happen to people elder than 65 because of the falls. Falls has resulted in the costs of \$637.2 million for fatal falls and \$31.3 billion for nonfatal falls every year. So, avoiding falls for older adults was helpful to avoid injuries (Bayen et al., 2017).

### *Application of Big Data for Analyzing Specific Diseases*

Big data has played an important role recently in treating asthma (Barrett et al., 2013). Barrett, Humblet, Hiatt, and Adler (2013) found that more than 25 million Americans were suffering from asthma. According to a study conducted by Farber, Batsell, Silveira, Calhoun, and Giardino (2014), the possibility of patients whose mother is a smoker to suffer asthma increased by 95% in more than 22,000 patients. The result of this study showed tobacco had a significant influence to increase the possibility for children to suffer asthma (Table 1). In another study analyzing asthma, patients' condition was better after their controlling to asthma improving from 38% to 75% in the period of study (Sickle, Maenner, Barrett, & Marcus, 2013).

Two articles from Lawrence et al. (2014) and Falen, Noblin, Russell, and Santiago (2018) both mentioned the implication of big data in MCOs. In Lawrence's study, EHRs provided by MCOs can offer an efficient source of data while analyzing childhood diabetes surveillance. According to Lawrence et al. (2014), among nearly 800,000 young people, 77.2% of them were type 1 diabetes, and 22.2% were type 2 diabetes (Table 1). In another study,

EHRs could allow monitoring or surveillance to prevent postoperatively and to reduce the numbers of postoperative infections like superficial incisional surgical site infections and deep incisional surgical site infections (Falen et al., 2018).

#### *Application of Big Data for Reducing Healthcare Cost*

The adoption of EHRs has facilitated the application of big data. Researchers have found that EHRs and big data can offer MCOs the potential for cost savings (Bates, Saria, Ohno-Machado, Shah, & Escobar, 2014; Raghupathi & Raghupathi, 2014). A predictive system based on big data could identify practical use cases such as high-cost patients, triage, adverse events, and diseases with the treatment influenced by multiple organ systems (Bates et al., 2014). In the example listed by Raghupathi & Raghupathi (2014), big data was used to reduce nearly \$7 billion in healthcare spending (Raghupathi & Raghupathi, 2014).

Spyropoulos & Lin (2007) calculated the cost of patients with deep vein thrombosis and pulmonary embolism. Nearly 1,500 patients in 30 MCOs participated in this study. The rate of readmission for patients who were primarily diagnosed with a deep vein thrombosis or pulmonary embolism was more than five percent. The rate of the readmission for those who were secondly diagnosed with a deep vein thrombosis or pulmonary embolism was nearly 15% in a year (Spyropoulos & Lin, 2007). Totally, more than 50% of all hospital readmissions for deep vein thrombosis and nearly 60% for pulmonary embolism happened in the first 90 days after the initial event. As for the cost, the total cost of readmission for patients with a deep vein thrombosis was more than \$2,000 staying in hospital for 7.7 to 8.7 days; the total cost of readmission for patients with pulmonary embolism was nearly \$15,000 with a staying in hospital last for 7.4 to 7.6 days (Spyropoulos & Lin, 2007). By using these big data to analyze the possibility of readmission for patients with deep vein thrombosis or pulmonary embolism, it was possible for these MCOs to predict and save their cost (Table 1).

Other researchers also have used big data to analyze the cost of MCOs for some specific diseases. Kim, Lin, Hussein, Kreilick, and Battleman (2009) of atrial fibrillation in the hospital should be changed since it made a heavy burden on MCOs. According to Kim et al. (2009), inpatient cost for primary atrial fibrillation more than 11 thousand dollars while outpatient costs were \$2826.78 in a year. For hospitalized patients with secondary atrial fibrillation, the total cost was more than \$6557.

#### *Application of Big Data for predicting mortality*

Another important application of big data is in predicting mortality (Schneeweiss, 2014). The method of collecting the amount of data and applied it to predict patients' outcomes has already existed years ago. According to some articles in the past, severity of illness (SOI), Acute Physiology and Chronic Health Evaluation (APACHE), and Simplified Acute Physiology Score were all the examples of collecting data and implementing it (Knaus, Zimmerman, Wagner, Draper, & Lawrence, 1981; Le Gall, Loirat, & Alperovitch, 1983). However, instead of relying on static models manually collecting from patient datasets, collecting personalized information in big health data from electronic medical records (EMRs) and other monitoring devices seemed more helpful in predicting patients' outcome (Lee, Maslove, & Dubin, 2015).

Lee, Maslove, and Dubin (2015) conducted a study to measure the relationship between predictive performance and the number of patients collected in the data. According to their study, which based on 29,149 adults at the Beth Israel Deaconess Medical Center (BIDMC) in Boston, the predictive performance increased with the increasing of patients but declined after the peak point. By calculating the area under the receiver operating characteristic curve (ROC) and the area under the precision-recall curve (PRC), the peak was achieved while the data collected from 6,000 patients were used (the most significant area under ROC was 0.83, and the largest area under PRC was 0.47). After that point, these two characters were declined while the number of patients was increasing (Lee et al., 2015). They concluded that the mortality prediction performance would be better if big data collected from similar patients rather than a more significant number of patients were used.

In another study conducted to measure the predictive mortality performance in hospital emergency department, there were more than 4,000 visits in the derivation group, and 5% of these patients died during hospitalization; while in the validation group, 4.7% of 1,056 patients died (Taylor et al., 2016). The area under the

curve (AUC) was used to measure the mortality predictive performance. Compared to traditional methods, random forest model performed best with a 0.860 AUC, while MEDS score got 0.705, REMS score got 0.717, and CART model got the smallest area under the curve with the number of 0.693 (Taylor et al., 2016). As a result, the random forest model driven by big data performed better than other traditional analytic models in predicting in-hospital mortality (Taylor et al., 2016).

Researchers in other countries also found that big data can help to predict mortality. In Spain, some researcher concerned older adults' mortality with big data (Pinzon et al., 2016). They analyzed 142,028 women and 58,011 men, whose average age was 80 years. They found that women's death risk is 38% less than men; nursing home care increased mortality more than a half compared to home-based care. Meanwhile, the activities of the daily living level, age, and chronic obstructive would also influence the risk of death.

#### *Application of Big Data for predicting mortality*

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Table 1: The Summarize of Articles on Big Data Application in Managed Care Organizations

| Application of Big Data | Author/Year | Key Findings |
|-------------------------|-------------|--------------|
|                         |             |              |

|                                  |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The effectiveness of the vaccine | Glanz et al. (2013)      | <ul style="list-style-type: none"> <li>● The vaccine was effective for children before two years' old</li> <li>● Most common reason for unvaccinated children was parent's rejection</li> <li>● Nearly 50% of 400,00 children were under-vaccinated before 24 months</li> <li>● Vaccinated children had a 95% lower outpatient visit rate compared to unvaccinated children</li> </ul>                                                                                                                                                                                                                                                       |
|                                  | Grohskopf et al. (2016)  | <ul style="list-style-type: none"> <li>● RIV4 was 36% effectiveness, and IIV4 was 4% effectiveness in totally 8.600 patients</li> <li>● Pregnant women should accept the specific vaccine</li> <li>● RIV4 was more effective than IIV4 for people older than 65 in treating H1N1.</li> <li>● Vaccines in treating A/Michigan/45/2015 (H1N1) pdm09 should be included from 2017 to 2018</li> </ul>                                                                                                                                                                                                                                            |
| Analyzing diseases               | Farber et al. (2014)     | <ul style="list-style-type: none"> <li>● the possibility of patients whose mother is a smoker to suffer asthma increased by 95% in more than 22,000 patients</li> <li>● tobacco could increase the possibility for children to suffer asthma</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |
|                                  | Lawrence et al. (2014)   | <ul style="list-style-type: none"> <li>● 77.2% of young people were type 1 diabetes, and 22.2% were type 2 diabetes in nearly 800 thousand young people</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Reducing cost                    | Spyropoulos & Lin (2007) | <ul style="list-style-type: none"> <li>● Patients diagnosed with a deep vein thrombosis or pulmonary embolism were more than five percent in 1.5 thousand patients</li> <li>● The rate of the readmission for patients secondly diagnosed with a deep vein thrombosis or pulmonary embolism was nearly 15% in a year</li> <li>● The extra cost caused by readmission was nearly \$15,000 with a staying in hospital last for 7.4 to 7.6 days</li> <li>● Totally, more than 50% of all hospital readmissions for deep vein thrombosis and nearly 60% for pulmonary embolism happened in the first 90 days after the initial event.</li> </ul> |
|                                  | Kim et al. (2009)        | <ul style="list-style-type: none"> <li>● Big data could help MCOs organizations in substantial saving.</li> <li>● Inpatient cost for primary atrial fibrillation was more than 11,000 dollars, and outpatient costs were \$2826.78 per year.</li> <li>● For hospitalized patients with secondary atrial fibrillation, the total cost was more than \$6557.</li> </ul>                                                                                                                                                                                                                                                                        |
| Predicting mortality             | Lee & Yoon (2017)        | <ul style="list-style-type: none"> <li>● mortality prediction performance would be better if big data collected from similar patients rather than a larger number of patients was used</li> <li>● the mortality prediction performance was increasing with the number of similar patients, but after the peak point, it declined</li> </ul>                                                                                                                                                                                                                                                                                                  |
|                                  | Taylor (2016)            | <ul style="list-style-type: none"> <li>● random forest model performed better than other methods with a 0.860 AUC, while MEDS score got 0.705, REMS score got 0.717</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## DISCUSSION

This article proposed to state and clarified the implication of big data in MCOs. The hypothesizes of this paper can be divided into two parts: big data would be helpful to reduce unnecessary health care costs and improve

the quality of healthcare within MCOs, and big data and data analytics would play an essential role in reducing patients' prevalence and analyzing specific disease such as diabetes for MCOs.

The results of this paper can be concluded into four parts. The literature review showed that big data could be helpful in reducing patients' prevalence, analyzing specific disease, reducing healthcare costs, and predicting patients' mortality.

However, without the right information technology infrastructure, workflows, analytic tools, and visualization approaches, the insights provided by big data might be limited (Roski, Bo-Linn, & Andrews, 2014). To guarantee the application of big data by MCOs, many current practices and policies related to data use, access, sharing, privacy, and stewardship need to be revised.

#### *Study limitation*

This literature review was limited since the limitation of the search strategy used, such as the number of articles searched, the number of databases available. Meanwhile, the publication and the researcher bias may have influenced the quality and the opinions of these articles. Furthermore, although the studies and articles used in this article are concerned about the use of big data in MCOs, not many studies described the process of big data's collection, which resulted in the lack of description of data collecting in this article.

#### *Practical Implication*

Big data has the potential to create significant value in healthcare (Lee & Yoon, 2017). The benefits of using big data by MCOs are improving the quality of healthcare, analyzing some chronic diseases, and reducing unnecessary healthcare costs as well as the patients' prevalence. Also, MCOs might make a better decision by big data analytics because they can review the results of big data analytics more directly and immediately.

### **CONCLUSION**

Big data has been widely implemented in MCOs, and the main three advantages of using big data within MCOs were reducing patients' prevalence, analyzing specific diseases, reduce the organization's cost, and predict the mortality.

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# THE USE OF TELEHEALTH AND PATIENT-CENTERED MEDICAL HOMES

*Rose Carboni, University of Scranton*  
*Steven J. Szydlowski, University of Scranton*

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## ABSTRACT

*This presentation is a review of telehealth services in patient-centered medical homes. The presenters define telehealth and patient-centered medical homes and discuss the prevalence and specific areas of specialty when provided. The presentation focuses on the strengths and weaknesses of implementing this telemedicine in patient-centered medical homes. The presenters discuss the challenges and some strategies. A brief overview of the impact of telehealth on patient-centered medical home health outcomes is provided. Long term benefits of implementing telehealth services within patient-centered medical homes is discussed. Conclusions and recommendations are made on the most appropriate use of telehealth in patient-centered medical homes, technology requirements, and team-based care coordination requirements.*

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Rose Carboni  
University of Scranton  
Scranton, PA 18510  
[rose.carboni@scranton.edu](mailto:rose.carboni@scranton.edu)

Steven J. Szydlowski, DHA, MBA, MHA  
University of Scranton  
Scranton, PA 18510  
570 941 4367  
[steven.szydlowski@scranton.edu](mailto:steven.szydlowski@scranton.edu)

**TRACK**  
**HEALTHCARE ECONOMICS AND FINANCE**

# A MODEL FOR SUSTAINING HEALTH AT THE PRIMARY CARE LEVEL

*Alyssa Sanderson, University of Scranton  
Daniel J. West Jr., University of Scranton*

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## ABSTRACT

*The presentation proposes a model outlining an example of how individualistic care can be assembled and achieved in the Patient Center Medical Home (PCMH) with the primary care physician (PCP) as the main coordinator of care to sustain patient health. As the healthcare industry in the United States is changing from a fee-for-service to a value-based system, the need for a shift in how patients are treated is evident. The presentation will address the need for a team-based approach as well as coordination of care to improve patient outcomes. The development of the proposed model will be outlined as well as the implementation and use of the model to coordinate patient care. Projected outcomes produced by the use of the model will be explored and analyzed.*

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Alyssa Sanderson  
Graduate Student MHA Program  
The University of Scranton  
102 Meadow Lane  
Archbald, PA 18403  
Tele: 570 862 7280  
[alyssa.sanderson@scranton.edu](mailto:alyssa.sanderson@scranton.edu)

Dr. Daniel J. West Jr., P.h.D, FACHE  
Chairman and Professor  
University of Scranton  
4<sup>th</sup> Floor McGurkin Hall  
Scranton, PA 18510  
Tele: 570 941 4350  
[daniel.west@scranton.edu](mailto:daniel.west@scranton.edu)

# **FEMALE ENTREPRENEURS IN FRONTIER ECONOMIES: PRIVATE COMMUNITY PHARMACY ENTREPRENEURSHIP IN THE DEMOCRATIC REPUBLIC OF CONGO**

*Ngoyi K. Zacharie Zacharie Bukonda, Wichita State University*

*Nsuadi Manga Francine, Université de Kinshasa*

*Memvanga Patrick, Université de Kinshasa*

*Masud Chand, Wichita State University*

*Emmanuel Kabengela Mpinga, University of Geneva*

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## **ABSTRACT**

In this paper, we examine the similarities and differences between male and female entrepreneurs in frontier economies as to how they start and operate their health-care businesses in challenging environments where gender inequality is high (as predicted by the gender inequality index – GII). We will elaborate on issues such as how male and female entrepreneurs are similar and different in their financing of startups, the number of employees that they have, the educational and family background that they have, and the type of services that their businesses offer. We will plan to integrate our findings with the existing literature on entrepreneurship in frontier markets, and add to the theoretical conversation on how male and female entrepreneurs differ in their financing and operating of new ventures.

We use entrepreneurs in the private community pharmacy sector in the Democratic Republic of Congo (DRC) to study this phenomenon. The DRC – with its population of nearly 75 million, is the seventeenth most populous nation in the world and the fourth most populous nation in Africa, as well as the most populous officially Francophone country. The government and development stakeholders are keenly interested in improving the healthcare sector in the DRC where life expectancy at birth is less than 60, one of the lowest in the world and ranked 160 out of 183 across all countries (World Health Organization, 2015). The DRC also has one of the lowest levels of gender equality in the world, with a GII value of 0.663. This ranking places it at 153 out of 159 countries in the 2015 index. In the DRC, 8.2 % of parliamentary seats are held by women, and 14.5 % of adult women have reached at least a secondary level of education compared to 35.0 % of their male counterparts.

The paper is based on primary data that one of the authors collected from 146 owners of private community pharmacies (PCPs) in Kinshasa, the Capital City of the DRC in the summer of 2016. We used SPSS (Version 23) to complete a preliminary data analysis. About two thirds of the respondents were both owners and managers, while one third were owners, but not managers. 62% were male and 38% female. 70% of the respondents were below 45. The most represented professional category among the owners was pharmacist (n= 51 or 36.4%), followed by nurses (32.1%), then physicians (8.9%) and lay business people (9.8%).

Our preliminary findings suggest interesting similarities and differences between men and women. Overall, men and women have similar levels of education, start-up capital, capital received from a bank, inventory stock outs, and amount of additional capital needed to finance their operations. There were interesting differences as well: A higher proportion of men are married (66.7%) as compared to 61% of women. A higher proportion of women work full-time (78%) as compared to 53% of men. Women also devote more hours to the business than their male counterparts. However, women have started their business much more recently than their male counterparts and received a greater amount of start-up capital from family members.

When it comes to starting and operating businesses, entrepreneurs in sub-Saharan Africa rely on strong family and community ties (Khavul, Burton, & Wood, 2009). Most entrepreneurs have to rely on their own or family's savings to start a business, and access to capital continues to be a severe challenge (Kiggundu, 2002). Most of them do not meet the requirements of commercial loans, and those that do find them very costly (Gray, Cooley, & Lutabingwa,

1997). This points to the importance of sub-Saharan African entrepreneurs accessing financing through ‘bootstrapping’ strategies, which are often easier to acquire, perceived as less expensive, and can be an important source of capital when traditional sources are unavailable (Neeley & Van Auken, 2009).

The study adds value to the health-care entrepreneurship literature since it is one of the very few studies that is set in the institutional environment in sub-Saharan Africa, and the only one to our knowledge that specifically looks at gender differences in business creation and operation in this challenging setting. Historically Sub-Saharan Africa has not been very conducive to the fostering of entrepreneurship, even though its health-care infrastructure needs significant amounts of investment to meet the needs of the people. Problems of corruption, poor infrastructure, excessive regulations and red tape have often acted to stunt the growth of business and discourage foreign and local investors. According to Transparency International’s (2017) corruption perceptions index, 16 of the 30 most corrupt countries in the world are in sub-Saharan Africa. According to the Doing Business 2017 report commissioned jointly by the IMF and the World Bank, Sub-Saharan Africa has the lowest ease of business ranking among all regions in the world, and includes 20 of the 30 lowest ranked countries (World Bank, 2017).

The promotion of females in the various sectors of economic and political life is increasingly an important item on the agenda of many national and international stakeholders in Sub-Saharan Africa. According to the African Development Bank (2017), “... women are held back from fulfilling their potential by many constraints, whether as leaders in public life, in the boardroom, or in growing their businesses.” This points to the importance of studying the challenges that they face in starting, owning, and operating their businesses, a gap that our paper tries to partly fulfill. Given the poor state of the government run health care sector in the DRC, it is increasingly important to understand the role that private health care services can play in helping improve health care access. This can be addressed partially by the the creation and operation of well-located, adequately funded, and competently staffed PCPs. Our study helps assess women’s access to startup funds and their success in growing trained human capital and serving an important clientele in frontier economies. This information can also help devise relevant and effective strategies to empower women to succeed as entrepreneurs in the private community pharmacy in Sub-Saharan Africa.

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Ngoyi K. Zacharie Zacharie Bukonda, PhD, MPH  
Department of Public Health Sciences  
Wichita State University  
1845 Fairmount St.  
Wichita, Kansas 67260  
E-mail: [Ngoyi.Bukonda@Wichita.edu](mailto:Ngoyi.Bukonda@Wichita.edu)

Nsuadi Manga Francine. PhD  
Département de Pharmacologie et Thérapeutique  
Université de Kinshas,  
Democratic Republic of the Congo

Memvanga Patrick, PhD  
Département de Pharmacologie et Thérapeutique  
Université de Kinshasa  
Democratic Republic of the Congo

Masud Chand  
Associate Professor of International Business  
W. Frank Barton School of Business  
Wichita State University  
1845 Fairmount St.  
Wichita, Kansas 67260  
Email: [masud.chand@wichita.edu](mailto:masud.chand@wichita.edu)

Emmanuel Kabengela Mpinga, PhD, MPH  
Global Health and Human Rights Division,  
Medical School  
University of Geneva  
Geneva, Switzerland

# COLLABORATIVE PANEL SESSION WITH THE ACADEMY OF BUSINESS ECONOMICS: INCORPORATING ETHICS AND FAITH INTO HEALTH ECONOMIC EVALUATIONS – SUCCESSES, FAILURES, OPPORTUNITIES, AND CHALLENGES

*Dan Friesner, North Dakota State University*  
*William Stroube, University of Evansville*  
*Tim Schibik, University of Southern Indiana*  
*Donald Hackney, Gonzaga University*  
*Sahand Rahnema-Moghadam, Indiana University*  
*Mrisa Sahai, Indiana University*

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## ABSTRACT

*The provision of health care is becoming more complex (as patients' health care needs are more complex), more inter-professional (as roles traditionally performed by physicians are delegated to other providers), and more reliant on information technology (including, but not limited to telemedicine and electronic medical records). With these changes, health care is becoming more costly, necessitating reliance on health insurance to share the risks and distribute the burden of health care costs across larger populations. This, in turn, creates a shift in the balance of power in the provision of care. Clinical interventions that are not covered (or, in some cases such as birth control, are covered) by a patient's third party payer are not (or must be) provided to patients. Where clinicians historically worked with their patients to determine the best treatment paths, those decisions become subject to constraints imposed by insurers. Ever conscious of their bottom lines, insurers constantly re-evaluate payments to providers to ensure that reimbursements are consistent with the value of services provided to patients enrolled on those insurance plans. Health care providers (and the clinicians who practice within these organizations) must also use data and other empirical information to demonstrate to external stakeholders (patients, insurers, etc.) that the care they provide to patients is of acceptable "quality" if they wish to retain those patients and be reimbursed for the care they provide at levels that sustain the viability of the practice.*

*A critical, yet often overlooked, issue in this debate is the nature of the theoretical and empirical tools that are used to evaluate clinical decisions. The vast majority of these tools are drawn from standard (neoclassical) economics. Under a neoclassical paradigm, the objective is atomistic and utilitarian (or profit maximizing) in nature. Constraints focus on resources and time. The result is a general decision rule that equates marginal benefits to marginal costs, and compares a chosen alternative to its opportunity cost. Within the context of exercise, for example, an individual seeking to make an "efficient" choice about how much time to spend exercising - perhaps walking - would walk just enough so that, during the last minute of walking, the extra benefit accrued from that activity (the marginal benefit of walking, or MB) equaled the costs associated with that last minute spent walking (the marginal cost of walking, or MC). If the marginal benefits of walking the extra minute exceed (is less than) the marginal cost, the individual will choose to walk more (less) because there will be a net gain (loss) in doing so. Virtually all neoclassical economic evaluations in health care rely on this simple principle, and these evaluations are evaluated using empirical data to conduct what is commonly known as "evidence-based medicine". A clinician will evaluate the marginal benefits and marginal costs of current clinical practices (customary and usual care) and compare that ratio to the marginal benefit/marginal cost ratio of an alternative/new approach to care, to evaluate the difference in the two ratios. If the new/alternative approach to care yields a higher ratio, the principles of evidence based medicine suggest that the new/alternative approach becomes the new standard of care. The old*

*approach becomes the “opportunity cost” or the value of the next most preferred alternative to care not offered to the patient.*

*To practicing clinicians, such evaluations are both too simple and too complex to truly evaluate clinical care. Implementing an economic evaluation using any of the above techniques requires a background in experimental design and statistics (in addition to clinical knowledge) that exceeds the training of the clinician. Costs and benefits are not easily measured, requiring substantial time and monetary commitments. In some cases, outcomes are measured using both clinical and humanistic measures, which often conflict.*

*Those with a background in ethics and moral reasoning recognize numerous possible conceptual and practical limitations of the aforementioned methodology. Perhaps most important is that defining a person’s objective function in terms of utility fails to account for that fact that humans are fundamentally social and spiritual creatures. Our objectives depend on social interconnections with others (i.e., our utility is dependent on others’ utilities) and spiritual connections (with a divine being, as well as expressions of creativity that reflect being made on the divine being’s image) that do not correlate with material provisioning.*

*These improper theoretical underpinnings subsequently bias evidence based evaluations of clinical care. Measures of cost neglect the impact of a change in a patient’s therapy on the family, simply because they are too difficult to measure within a neoclassical economic framework. Measures of benefits, even clinical benefits, neglect the impact of the therapy on a patient’s ability to express their creativity and engage in relationships. This essentially calls into question many of the evidence based economic evaluations that have been driving health care reform. The evidence is misleading (or possibly misinterpreted) and the decisions made are often incorrect from an ethical perspective. Clearly, a more holistic approach to health economic evaluations is required to address these limitations. The purpose of this panel discussion is to identify 1) the most obvious areas in health economic evaluations that must, out of necessity, better incorporate faith and ethical reasoning into these evaluations; and 2) to discuss some possible avenues for future research to more appropriately incorporate faith and ethical reasoning into health economic evaluations.*

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Dan Friesner, Ph.D.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-9509  
Fax: 701-231-7606  
[Daniel.Friesner@ndsu.edu](mailto:Daniel.Friesner@ndsu.edu)

William B. Stroube, Ph.D.  
University of Evansville  
1800 Lincoln Avenue  
Evansville, IN 47722 USA  
812-488-2870  
[bs52@evansville.edu](mailto:bs52@evansville.edu)

Tim Schibik, Ph.D.  
Romain College of Business  
University of Southern Indiana  
Tel: 812-464-1880  
[tschibik@usi.edu](mailto:tschibik@usi.edu)

Donald Hackney, J.D., M.B.A.

School of Business  
Gonzaga University  
Tel: 509-313-7043  
[hackney@gonzaga.edu](mailto:hackney@gonzaga.edu)

Sahand Rahnema-Moghadam, M.D.  
School of Medicine  
Indiana University  
Tel: 317-274-7705  
[sahandazeez@gmail.com](mailto:sahandazeez@gmail.com)

Mrisa Sahai, M.D.  
School of Medicine  
Indiana University  
Tel: 317-274-0678  
[mrisasahai@gmail.com](mailto:mrisasahai@gmail.com)

# POTENTIAL SAVINGS FROM CONSUMER-DRIVEN HEALTH PLANS

Jessica McNair  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
[mcnair8@live.marshall.edu](mailto:mcnair8@live.marshall.edu)

Brittany White  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
[Bdwhite2011@outlook.com](mailto:Bdwhite2011@outlook.com)

Christopher Miller  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
[Chamiller33@gmail.com](mailto:Chamiller33@gmail.com)

William Ferguson  
Marshall University  
Lewis College of Business  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
[Coreyferguson57@gmail.com](mailto:Coreyferguson57@gmail.com)

Alberto Coustasse DR. PH., MD, MBA, MPH – CONTACT AUTHOR  
Healthcare Administration Program  
Professor (full)  
Lewis College of Business  
Marshall University  
100 Angus E. Peyton Drive  
South Charleston, WV 25303  
(304) 746-1968  
[coustassehen@marshall.edu](mailto:coustassehen@marshall.edu)

# POTENTIAL SAVINGS FROM CONSUMER-DRIVEN HEALTH PLANS

*Jessica McNair, Marshall University*  
*Brittany White, Marshall University*  
*Christopher Miller, Marshall University*  
*William Ferguson, Marshall University*  
*Alberto Coustasse, Marshall University*

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## ABSTRACT

*Consumer Driven Health Plans (CDHPs) have been identified as a high-deductible insurance option that has increased consumer responsibility while health care expenditures have decreased. Anticipated savings through the use of CDHPs have drawn increased interest of employers and policymakers. The increased need to control healthcare costs as well as healthcare utilization have also fostered the development of increased use of CDHPs. As the use of CDHPs have expanded, educated consumers have become more engaged in their healthcare services and have increased demands for transparency of healthcare costs. Healthcare costs, utilization, and moral hazard of this study are further discussed.*

**Keywords:** *Consumer driven health plans, consumer engagement, cost, financial savings, healthcare spending, moral hazard, transparency*

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## INTRODUCTION

Consumer Driven Health Plans (CDHPs) are a type of high-deductible health plan with lower premium rates paired with higher minimum deductibles and higher out-of-pocket limits (Lo Sasso, Shah, & Frogner, 2010). CDHPs were first introduced to the United States (U.S.) through e-commerce ventures in the late 1990's (Parente, 2006). CDHPs have been described as a three-tier payment system for health insurance comprised of a savings account, out-of-pocket payments, and an insurance plan. (Yi, 2010). This three-tier system consists of: Tier 1) pre-tax dollars being invested into a health savings account (HSA) contributed by the enrollee or their employer which is used for insurance plan deductibles, Tier 2) the coverage gap between current amount in an individual's pre-tax account and the deductible with the insured being responsible for any amount not covered, Tier 3) when health care expenses surmounts the deductible, then the high-deductible health insurance plan becomes a more traditional health insurance plan with the insured paying a coinsurance amount for benefits until an out-of-pocket maximum is met (Yi, 2010). CDHPs have gained popularity: due to the need to create conscientious consumers who are informed users of healthcare while also reducing utilization has made CDHPs appealing to insurance companies as well as employers (Hibbard, Greene, & Tusler, 2008).

The original purpose of CDHPs were to decrease the rising cost of health insurance, premiums increased 73% over a period of 5 years, that employers were responsible for by making the consumer have a higher level of cost sharing and increased their awareness of their healthcare spending (Fronstin & Collins, 2005; Jordan, 2016). CDHPs have continued to hold the attention of policymakers, employers, as well as consumers due to the potential of decreased health care costs; those enrolled in a CDHP spent 6%-9% less than those enrolled in a traditional health care plan (Lo Sasso, et al., 2010). Consumer engagement through the use of pre-taxed savings accounts such as Health Reimbursement Accounts, HSA, Flexible Spending Accounts, and high-deductible insurance policies have reduced expenditures for employers, estimates are 20%-25% savings for employers (Buntin et al., 2006; Davis, 2008). When consumers planned and coordinated funds allotted to them for their health care services, deductibles for a single person were \$1,050 and deductibles for a family were more than \$2,700, they were exposed to the financial responsibilities of their healthcare expenditures (Jordan, 2016; Leung & Escarce, 2017, Lo

Sasso, et al., 2010). Kavanagh (2007) found that the estimated costs for a family who participated in a CDHP was \$11,000 per year.

Enrollment in high-deductible health plans has increased from 26.3% in 2011 to almost 40% in 2016 compared to only 4% in 2006 (Claxton, et al., 2008; Cohen & Zammitti, 2016). The leading proponents in this increase in CDHPs have attributed to providing the consumers more control of their health care spending and effectively could be considered more control of their overall health care needs (Barry, Cullen, Galusha, Slade, & Busch, 2008). Buntin et al. (2006) found that CDHPs were associated with lower costs of health care, estimates of 10%-25% savings, yet the effects on quality were mixed and a need for evidence regarding prices, treatment choices, and quality was identified.

The debate over the efficiency of CDHPs has been controversial with proponents of CDHPs insisting that consumers were able to make more cost-effective decisions, while critics of CDHPs have stated that higher cost sharing would force enrollees to forgo needed medical treatment resulting in worse health outcomes and thus increase in healthcare expenditures (Greene, Hibbard, Murray, Teutsch, & Berger, 2008). A 2005 survey performed by the Employee Benefit Research Institute found that those enrolled in CDHPs were less satisfied with their health plan compared to those in a comprehensive health plan, CDHPs created higher-out of pocket costs---31% of those participating in a CDHP spent 5% or more of their income on health care, and those enrolled in a CDHP were more likely to avoid, skip, or delay medical care (Fronstin & Collins, 2005).

Lack of transparency has been described as a major issue for the consumers of healthcare in the U.S. (Betzebe, 2016). CDHPs have been touted as bringing a revolution to transparency in healthcare (Hilsenrath, Eakin, and Fischer, 2015). Transparency can be described as the results of the cost and quality of healthcare being delivered with this information accessible to be used by the consumer for an informed decision (Wetzell, 2014). According to Collins (2006), transparency of cost and quality of care have improved healthcare by three key reasons: 1) it has helped providers improve their benchmarking of performance against other providers, 2) it has encouraged private insurers and public programs to have a higher importance in quality and efficiency, and 3) it has allowed patients to make informed choices about their care. Improved transparency has also benefitted employers by informing their public policy agenda, supported improved benefit design strategies, stimulated competition based on value of health plans, and advanced provider payment reform (Wetzell, 2014).

An argument against CDHPs has been that it would dramatically decrease the moral hazard of the consumer resulting in the consumer not seeking medical care when necessary (Dixon, Greene, Hibbard, 2008). Moral hazard can be described as the shift in economic behavior when individuals are protected or insured against risks and losses because another party is carrying all of the responsibility of the behaviors (Mendoza, 2016). In the healthcare arena, moral hazard has been typically shifted from the consumer to the insurer or provider, but with CDHPs it has been hypothesized that all of the burden of cost has fallen upon the consumer thus decreasing consumer moral hazard and patients would no longer seek medical direction in fear of cost (Geyman, 2007).

The purpose of this research study was to determine if CDHPs have created financial savings by increasing transparency of healthcare cost and decreasing moral hazard.

## **METHODOLOGY**

The hypothesis of this research was the use of CDHPs have increased financial savings to the consumer by increasing transparency of cost in healthcare.

The methodology for this study was a literature review. Electronic databases used included Ebscohost, CINAHL, Academic Search Premier, Alt HealthWatch, Health Source: Consumer Edition, Health Source: Nursing/Academic Edition, MEDLINE, and Primary Search which were provided by Marshall University's online library. Google search engine as well as Google Scholar were also exhausted in a search using keywords when articles could not be located from previously mentioned databases. Key words employed for literature recovery included "consumer driven health plans" or "consumer engagement" and "financial savings" and "cost" or "transparency" or "health spending" or "moral hazard". Research results were limited to articles written in the

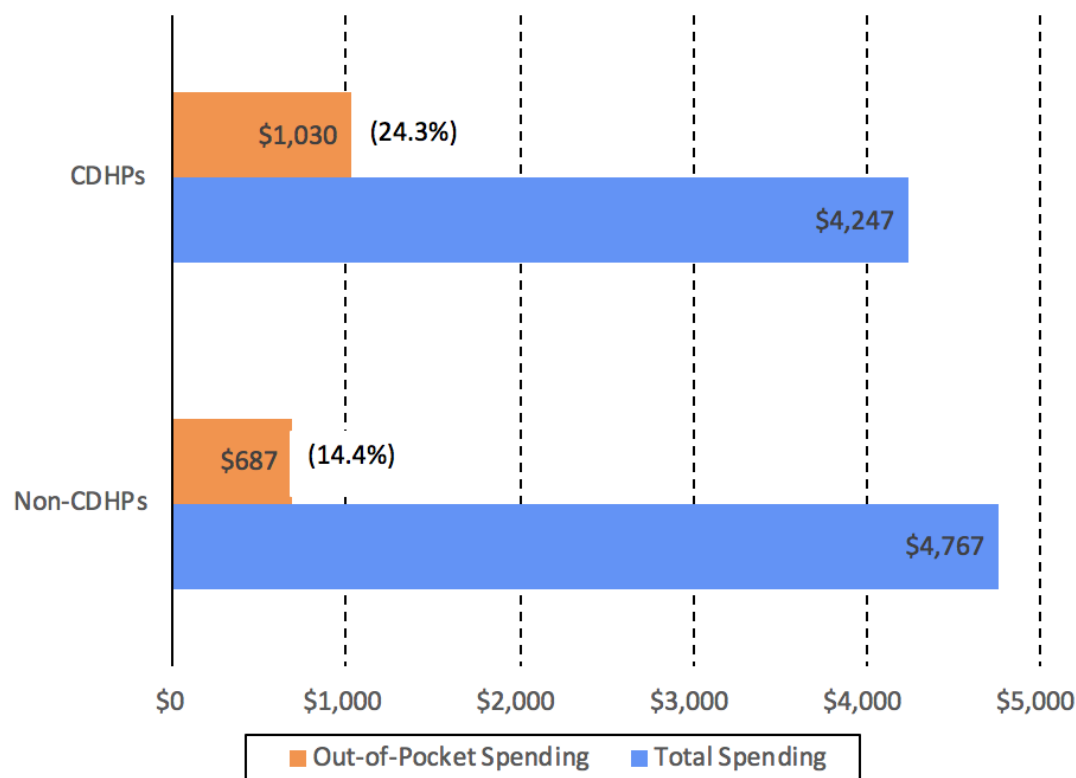
English language and published between 2005 to 2018. A total of 34 resources were selected for this research after a review of content deemed them relevant; 11 of these were utilized in the results of this study. The literature search was performed by CF, CM, JM, and BW with validation by AC who also acted as a second reader and verified literature met inclusion criteria.

## RESULTS

### *Expenditures and Utilization*

According to Bundorf (2016), CDHPs have reduced total yearly health care expenditures by approximately 5%–15% compared to similar plans consisting of lower deductibles and no health spending accounts. A study by Frost and Kennedy (2016), found that the CDHPs population spent \$659 less overall than the non-CDHPs population; yet CDHPs population had a higher out-of-pocket cost, \$1,030 for CDHPs compared to \$687 for non-CDHPs as depicted by Figure 1. Figure 1 illustrates the average spending of different health care plans over a period of five years.

Figure 1. 2010-2014 Average Annual Total Spending Per Capita, Out-of-Pocket Spending Per Capita, and Share of Cost, by Plan Type



Source: Frost, A., & Kennedy, K. (2016)

Additionally, it was found that increasing the market share of employer-sponsored CDHPs to 50% from the current level of 13% had the potential to reduce health care spending by about \$57 billion annually (Haviland, Marquis, McDevitt, & Sood, 2012). A decrease of this magnitude would be the equivalent of a four percent reduction in total health care spending for the consumers under the age of 65 (Haviland, et al., 2012).

Prior statements regarding enrollees underutilizing healthcare have proven to be debatable. An analysis by Rowe, Brown-Stenson, Downey, and Newhouse (2008) found that when comparing CDHPs and preferred provider organizations (PPOs) those enrolled in a CDHP utilized preventative services 29.1% compared to those engaged in PPOs utilized the same services 23.8% which is depicted in Table 1. Table 1 depicts preventative care utilization of a CDHP population versus a PPO.

Table 1. Preventive Care Visits Per Thousand Members Per Year, Nonelderly Health Reimbursement Arrangement (HRA) And Preferred Provider Organization (PPO) Enrollees, 2003–2005

|      | HRA (n=17,411) | PPO (n=128,444) |
|------|----------------|-----------------|
| 2003 | 315            | 260             |
| 2004 | 280            | 228             |
| 2005 | 279            | 226             |

Source: Rowe, J. W., Brown-Stevenson, T., Downey, R. L., & Newhouse, J. P. (2008)

While the study performed by Rowe, et al. (2008) found that CDHP participants utilized preventative care; in juxtaposition, a survey performed by Reed, Graetz, Fung, Newhouse, and Hsu (2012) found that enrollees with CDHPs, fewer than one in five understood they were exempt from the cost of preventative care visits and medical tests.

Medicine price information mechanisms, such as medicine objectives, target audiences, sources, and volumes, have been directly related to the need for increased medicine price transparency (Hinsch, Kaddar, and Schmitt, 2014). In a retrospective insurance claim analysis performed by Parente, Feldman, and Chen (2008) from an employer that offered CDHPs, a Point of Service (POS), and a PPO plan, the CDHP pharmaceutical expenditure was \$240 lower than those in the PPO plan thus it created a cost neutral or cost saving to the employer and consumer.

### *Transparency*

The cost sharing associated with high-deductible health plans has placed increased attention on the lack of transparency in the U.S. healthcare system (Winfield, 2018). Health Care Organizations (HCO) have been able to position and fight for their consumers when greater transparency was available thus decreasing the cost to the consumer while increasing quality of care (Winfield, 2018). Charge transparency interventions displayed to physicians alone modified their ordering practices and prescribing behaviors (Goetz, Rotman, Hartoularos, and Bishop, 2015). When residents were exposed to the transparent cost of tests, they were found to spend less; disclosed price \$1,297 versus undisclosed price of \$2,205 (Goetz, et al., 2015). HCOs have become more transparent through CDHPs which have made pharmaceutical sales more transparent as well, thus decreasing cost. According to Goetz, et al. (2015) when medication choices were displayed with the price, physicians trended to choose generic medication options to reduce cost and the use of expensive antibiotics dropped from 38% to 18%.

According to a study performed by Wilson, et al. (2009), the potential for increased financial responsibility in CDHPs did not deter the consumer in pursuing necessary care when compared to a comprehensive major medical plan (CMM). Furthermore, Wilson et al. (2009), found through Healthcare Effectiveness Data and Information Set enrollees in CDHPs received higher quality of care than CMM enrollees related to lower back pain and better than or equal care when consumers had chronic conditions. The CDHPs population were responsible for 24% of healthcare costs compared to 14% for the non-CDHP population (Frost & Kennedy, 2016). Westover, Arredondo, Chapa, Cole, and Campbell (2014) found that when CDHPs were offered to uninsured, non-Medicaid eligible adults with incomes under 200% of the federal poverty line and compared that to a consumer with a Medicaid plan or

commercially insured health plan that the cost sharing aspect of CDHPs did not sway the low-income CDHP enrollee from seeking or receiving appropriate medical care.

The majority of CDHP enrollees tended to portray a higher education level, especially regarding their health status and wellbeing (Bundorf, 2016). As a result, CDHP participants frequently utilized their healthcare coverage frequently, properly, and efficiently (Bundorf, 2016). This researcher found CDHPs enrollment and utilization to be directly proportional to income level and education level.

## **DISCUSSION**

The purpose of this literature review was to determine if CDHPs had an effect on transparency in healthcare, created financial savings, and affected the moral hazard of the consumer. The results of this research indicated that CDHPs created an improved price transparency in healthcare as well as decreased health care expenditures. The outcome of this literature review supported the use of CDHPs in an effort to control healthcare expenditures and utilization.

### *Limitations*

This literature review was limited by the data available for research, databases used, as well as research bias of the studies selected for review. Limited quantitative data was found regarding consumer healthcare premiums and out-of-pocket spending for consumers; and it was noted that the quantitative data utilized may have been skewed by confounding factors. Minimal data was found regarding transparent healthcare cost and consumer cost sharing.

### *Implications*

Healthcare expenditures in the U.S. have skyrocketed to exponential amounts, in 1990 the gross domestic product of healthcare was 5.98 billion dollars and rose to 18.03 billion dollars in 2015 (CDC, 2016), and efforts made by the U.S. government to control these costs have been futile or only slightly effective. However, the utilization of CDHPs has been an effective solution for cost control as well as appropriate utilization. CDHPs have placed an increased amount of responsibility on the healthcare consumer and the result has been the creation of more conscientious users of healthcare. Increased responsibility has created a beneficial effect on utilization of healthcare services as well as transparency of healthcare costs; while not deterring the healthcare consumer from accessing care when needed. As consumers of CDHPs have been burdened with a larger portion of their healthcare costs initially, they have increased the demand for transparency in the cost of healthcare services.

The research conducted showed the demand for increased transparency had an effect on how physicians created treatment plans for their patients. As prices were revealed, physicians were less likely to order unnecessary medical tests and procedures; and patients were more likely to question the need for these services.

It was noted that those who participated in CDHPs were more conscientious users of healthcare. CDHPs encouraged an appropriate use of healthcare services, thus decreasing over utilization of unnecessary healthcare benefits. The necessity to make diligent decisions regarding healthcare forced participants to become better educated regarding healthcare needs. As participants were better informed, they sought out cost effective services. Even though concerns regarding the underutilization of healthcare services were noted, participants in CDHPs were identified as being higher users of preventative services compared to those in other healthcare models. The use of preventive healthcare services has been linked to healthier consumers and decreased healthcare cost (CDC, 2017).

### *Recommendations*

CDHPs have been a valid alternative healthcare model for those who were willing to be educated, conscientious consumers. CDHPs have allowed consumers to have greater control of their healthcare services through negotiations and price transparency, but this model has not been identified as a feasible option for all consumers. According to the results, there have been conflicting reports on consumer satisfaction of CDHPs. This has been attributed to how the consumer utilized CDHPs. When a consumer utilized HSA and assessed cost comparison of services, CDHPs were an appropriate insurance option. If the consumer failed to save for HSA and used healthcare services frivolously, then CDHPs were not appropriate for that consumer.

## CONCLUSION

When healthcare consumers chose CDHPs they experienced decreased healthcare costs and improved transparency in healthcare. Participants in CDHPs were more educated, conscientious users of healthcare than participants in other health plan models. This literature review did support the hypothesis of these researchers; yet in order to make a better-informed conclusion, more recent quantitative studies should be performed with concentration placed on the use of preventative services, consumer cost sharing expenses, and transparency of healthcare prices.

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# **PRESCRIBING PATTERNS OF ANTIHYPERTENSIVE MEDICATIONS IN US AMBULATORY CARE SETTINGS**

ATEEQUR RAHMAN, MBA, PH.D. – Contact Author

Associate Professor  
College of Pharmacy  
Rosalind Franklin University  
North Chicago, IL, 60064  
[ateequr.rahman@rosalindfranklin.edu](mailto:ateequr.rahman@rosalindfranklin.edu)  
Phone: 847-578-3278

Yeleena Sahakian  
Pharm.D. Student  
College of Pharmacy  
Rosalind Franklin University  
North Chicago, IL, 60064  
[yelena.sahakian@rosalindfranklin.edu](mailto:yelena.sahakian@rosalindfranklin.edu)

Rahul Deshmukh, Ph.D.  
Assistant Professor  
College of Pharmacy  
Rosalind Franklin University  
North Chicago, IL, 60064  
[rahul.deshmukh@rosalindfranklin.edu](mailto:rahul.deshmukh@rosalindfranklin.edu)  
Phone: 847-578-3233

# **PRESCRIBING PATTERNS OF ANTIHYPERTENSIVE MEDICATIONS IN US AMBULATORY CARE SETTINGS**

*Ateequr Rahman, Rosalind Franklin University  
Yeleena Sahakian, Rosalind Franklin University  
Rahul Deshmukh, Rosalind Franklin University*

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## **ABSTRACT**

*The study investigates the prescribing patterns for antihypertensive medications in US ambulatory care setting for patients with primary diagnosis of hypertension. Most patients are being prescribed non-first-line agents for treating patients with primary diagnosis of hypertension. Data from 2015 NAMCS was used in the study. Patients with primary diagnoses of essential hypertension were extracted from the data. Patient age, sex, race, as well as the source of payment, and the provider type were among the operational factors used in data analysis. Data analysis was performed using SPSS software for descriptive data analyses and statistical coding. Analysis of variance and logistic regression were performed. The definition of prescribing appropriateness was determined by 2017 AHA/ACC guidelines. Thiazides, ACE inhibitors, ARBs and CCBs were defined as first-line and appropriate treatment agents, whereas loop diuretics, beta blockers, direct renin inhibitor, alpha-1 blockers, direct vasodilators, central alpha-1 agonists and other centrally acting drugs were defined as non-first line agents. Fifty-one-point four percent of prescriptions were non-first-line prescriptions. Binary logistic regression analysis of provider specialty, type of payment, age and gender all did not show a statistical correlation to prescribing pattern. South and West regions had more cases of non-first-line prescribing which corresponds the published literature that healthcare accessibility and appropriateness correlates with socioeconomic factors. Adherence to hypertension guidelines promotes optimum therapy and better outcomes. Inappropriate prescribing could potentially lead to undesirable health effects, lower quality of life and an increased direct, indirect and societal economic cost.*

**Key words:** *prescribing patterns, antihypertensive medications, hypertension, first-line treatment*

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## **INTRODUCTION**

About 74 million Americans or one in three adults have high blood pressure. Hypertension is a silent disease that doesn't show symptoms until it has caused a permanent damage to the heart, brain, kidneys or eyes. (Ong, Cheung, Man, Lau, & Lam, 2007; Ostchega, Yoon, Hughes, & Louis, 2005) Unfortunately, about a quarter of people with high blood pressure don't know they have the condition. Half of people being treated for the disease gradually increase the dose to reach the target blood pressure, which is 140/90 mmHg for patients with no clinical CVD and having a less than 10% 10-year ASCVD risk, and 130/80 mmHg for patients with diabetes, chronic kidney disease, or any type of atherosclerosis, such as peripheral artery disease, aortic aneurysm, coronary artery disease. ("Treating hypertension: Are two meds better than one?," 2010; Whelton, Carey, & Aronow, 2017)

Control of hypertension is one of the most important health care priorities and is expected to increase with aging population and increasing burden of obesity and other risk factors related to lifestyle. Hypertension is primarily managed in ambulatory settings accounting for an estimated 79% of primary care visits. (David M Margolius & Thomas Bodenheimer, 2010) Better hypertension control can positively impact cardiovascular health. (Moran et al., 2015; Psaty et al., 1997) Recent studies have identified increased use of antihypertensive agents with coincides with increased control over blood pressure both in younger and older populations and decreased cardiovascular mortality, myocardial infarction and stroke rates. (Egan, Zhao, & Axon, 2010; Q. Gu, Burt, Dillon, & Yoon, 2012; Guo, He, Zhang, & Walton, 2012)

Appropriate antihypertensive therapy in outpatient care is important for optimal treatment outcomes. According to recent guidelines, there are different blood pressure goals using age cutoff of 50 years. NAMCS data analysis for the years of 2003 to 2010 revealed antihypertensive medication prescription increased from 69.2% in 2003-2004 to 78.8% in 2009 to 2010 ( $P=0.001$ ) with increased blood pressure control from 39.1% to 48.8% ( $P<0.001$ ). The trend was consistent in patients younger, as well as older than 60. Prescription for beta blocker has increased from 25.4% to 34.7% while ARB prescription increased 17% to 22.1. African American patients, those with other comorbidities, insufficient insurance coverage and younger patients are less likely to control their blood pressure. Adults aged 18-39 have the lowest hypertension control rates among adults with hypertension in the US. (Johnson, Warner, Bartels, & LaMantia, 2017) Surprisingly, older patients are more likely to control their blood pressure than younger population, which may be due to lack of disease awareness and management or resistance to initiation and escalation of antihypertensive therapy. (A. Gu, Yue, & Argulian, 2016)

The goal of this study is to determine prescribing patterns for patients with hypertension for the year of 2015 and determine if they are being prescribed first-line therapy and evaluate the adherence of prescribers to current guidelines.

NAMCS data analysis reports that antihypertensive medication prescribing has increased for the years of 2003 to 2010 with a better blood pressure control. The prescribing pattern is different among different age groups, but a rise in the use of beta blockers in older patients and those without other compelling indications raises concerns because these class of agents are inferior to other agents in treating hypertension. This suggests the importance of provider education for best hypertension treatment outcomes. HCTZ remained the drug of choice among diuretics despite absence of data. ACEI and thiazide combination were prescribed just as much as ACEI and CCB combination without any change after ACCOMPLISH trial.(A. Gu et al., 2016) A meta-analysis of 10,968 patients revealed that low dose combination therapy is five times more effective than doubling the dose of one drug, which translates into better health outcomes, such as prevention four heart attacks or strokes resulting from doubling the dose of the single drug. In addition, the risk of side effects from a low dose combination of 2 agent is lower than that of a single high dose agent. ARBs, however, were not included in the meta-analysis, because of them being new. Four additional studies show that ARBs work well when combined with a thiazide or CCB. (“Treating hypertension: Are two meds better than one?,” 2010)

NAMCS 2006-2010 data analysis showed that Medicaid patients at community health clinics (CHC) were as likely as private insurance holders to receive a new medication for uncontrolled hypertension, whereas Medicaid patients at private physicians’ offices were less likely to receive a new medication. Increase in the use of combinations drugs may be helpful in improving hypertension control at community health clinics where the rates of uncontrolled hypertension are higher. (Fontil, Bibbins-Domingo, Nguyen, Guzman, & Goldman, 2017)

Blood pressure management starts from healthy life style, such as reducing sodium intake to less than 2 g per day, reduce intake of animal fat and processed foods, increasing consumption of fruits, vegetables, whole grains, and non-fat or low-fat dairy products. Moderate exercise, in the form of 30 minutes a day, weight control, and light to moderate drinking, defined as limitation to 2 drinks for men and 1 drink for women daily, along with stress control, are all components of healthy lifestyle. (“Treating hypertension: Are two meds better than one?,” 2010) National Health and Nutrition Examination Survey (NHANES) reports that patients younger than 40 years and Hispanics are less likely to be treated for hypertension. African Americans and women older than 60 years are less likely to achieve control when treated. (Hajjar & Kotchen, 2003; Ong et al., 2007) Male gender, older age, non-white race was associated with receiving antihypertensive agents in general or first-line antihypertensive treatment, defined as ARB, beta blockers, thiazide diuretics or calcium channel blockers.(Axon, Nietert, & Egan, 2010; D. M. Lloyd-Jones et al., 2000) Obesity is also a risk factor for increased diastolic blood pressure; blood pressure of obese patients is one third less controlled compared to lean patients.(D. M. Lloyd-Jones, Evans, Larson, O’Donnell, & Levy, 1999)

20-35% of patients have a resistant hypertension which is defined in 2017 AHA/ACC guidelines as blood pressure that remains above 130/80 mmHg or using antihypertensive agents from three different classes, one of which is diuretic, and all reached their maximum tolerated doses, or, a blood pressure above 130/80 mmHg despite using 4 or more antihypertensive agents. (Calhoun et al., 2008; Whelton et al., 2017) Risk factors of having a resistant hypertension are obesity and CKD, stage 3 or higher. (Calhoun et al., 2008)

According to AHA, the estimated direct and indirect cost of hypertension in the US was 76.6 billion dollars in 2010. (D. Lloyd-Jones et al., 2010) The direct medical costs of CV disease may be substantially higher than this estimate since it includes secondary hospitalizations, which accounts for 18,953 dollars per patient annually as direct medical costs. Additionally, patients with secondary hospitalizations cost 4.5 times higher than those with no hospitalizations. (Nichols, Bell, Pedula, & O’Keeffe-Rosetti, 2009)

## METHODOLOGY

Data from 2015 NAMCS was used in the study. Patients with primary diagnoses of essential hypertension were extracted from the data using ICD-9 code “401”. A total of 595 patients were found which represented the study sample. Patient age, sex, race, as well as the source of payment, and the provider type were among the operational factors used in data analysis. Sources of payment was defined as coverage through either private insurance, Medicaid, Medicare, or other state-based programs, self-pay, work compensation, and charity. All variables were categorized as “patient” or “physician” factors. Geographic region was the only variable categorized as both patient and physician.

Data analysis was performed using SPSS software for descriptive data analyses and statistical coding. Analysis of variance and logistic regression were performed at an alpha level of 0.05. The extracted data set was checked for integrity, equality and distribution of number of records in every phase of analysis. The hypothesis focused on physician variables to determine whether the number of non-first-line antihypertensive agents prescribed was related to physician’s specialty, geographic region and other demographic variables, such as age, gender, race and payment type. The definition of prescribing appropriateness was determined by 2017 AHA/ACC guidelines. Thiazides, ACE inhibitors, ARBs and CCBs were defined as first-line and appropriate treatment agents, whereas loop diuretics, beta blockers, direct renin inhibitor, alpha-1 blockers, direct vasodilators, central alpha-1 agonists and other centrally acting drugs were defined as non-first line agents.

## RESULTS

Females and white patients represented over half of the sample. Patients aged 65 and older represented half of the sample, followed by those aged 45-64. 45% were Medicare patients, and 39.3 were private insurance holders. General doctors (34.8%), cardiovascular specialists (32.1) and internal medicine physicians (21.8%) were the majority. Most of the visits occurred in the South (36.5%) and Midwest (26.9%). (Table 1) After analyzing the data, 51.4% of prescriptions turned out to be non-first-line prescriptions. (Table 2)

Female patients ( $X^2=0.376$ ) and those aged 65 and older ( $X^2=0.073$ ) received more non-first-line agents. White, African American patients ( $X^2=0.208$ ) as well as Medicare and private insurance holders ( $X^2=0.145$ ) were prescribed more non-first-line antihypertensive agents. Chi-square analysis showed that South and Midwest received more non-adherent prescriptions ( $X^2=0.023$ ). Cardiovascular specialists, family doctors and internal medicine specialists prescribed more non-first-line agents ( $X^2=0.222$ ). (Table 3)

Binary logistic regression analysis was performed to evaluate interaction between independent variables and prescription pattern. Provider specialty, type of payment, age range and gender did not show a statistical correlation to prescribing pattern. However, a correlation was found between prescribing pattern and geographic region; South and West regions had more cases of non-first-line prescribing which corresponds to the published literature that healthcare accessibility and appropriateness correlates with socioeconomic factors. (Table 4)

## DISCUSSION

Female and white patients received most of non-first-line treatment because of representing the majority of the sample, so did the patients 65 and older. Since this population represented half of the sample, they also represented the subgroup having Medicare. South and West had more cases of non-first-line prescribing pattern due to being the majority ( $X^2=0.023$ ). This corresponds to data from other studies about South being one of the geographical areas with poor health and wellness.

Cardiovascular specialists and general doctors who were the most common provider seen by the patients, were also one of the provider specialties prescribing the majority of non-first-line agents, which corresponds to hypertension being a cardiovascular condition.

The data analysis showed that half of the antihypertensive prescriptions are not first-line agents, which can imply less effective drug therapy and worse clinical outcomes. This is where the issue of medication non-adherence comes into play to ensure the effectiveness of first-line therapy if there are no contraindications, to avoid side effects associated with non-first-line agents, such as beta blockers and loop diuretics and to reach a better blood pressure control.

Over 25% of people prescribed antihypertensive medications stop taking them 6 months of after initiation of therapy. Medication adherence is influenced by physician communication and medical management skills even though they can be improved by educational and practice interventions. (Perreault et al., 2005) The risk of non-adherence can be reduced with better medical management, communication skills, early therapy changes, more follow-up visits, and lastly, starting therapy with nondiuretic agents. A study by Tamblyn et. al found that medical management can reduce non-adherence by 15.8%. (Tamblyn et al., 2010) Understanding barriers to hypertension management will inform the development of interventions to control blood pressure in young adult population. Such barriers include altered self-identity, greater blood pressure variability, possible side effects initiating a medication, gender differences among young adults were also barriers to follow-up and new hypertension medication initiation. The pressure of having an effective motivational interview with productive outcomes, cost of the medication and the lack of motivation from the patient to schedule a follow-up visit can make hypertension management even harder. Thus, taking measures directed to young adults are essential for improve hypertension care in this population. (Johnson et al., 2017)

Conn et. al suggest that habit-focused interventions reduce blood pressure more effectively because they examine participants' daily routines and incorporate medication administration to routine events. Such interventions improve clinical outcomes by improving adherence. Habit-based interventions can also be tailored into a patient's daily routine to enhance healthy lifestyle, which in turn will positively impact blood pressure control. Interventions delivered by pharmacists were found to be most effective, as patients see them as experts in medication therapy and are very receptive to their recommendations. (Conn, Ruppard, & Chase, 2016)

The study was limited by the operational definitions of the study variables and the data collection period. Another limitation is the number of ambulatory care visits during the year of 2015. The variable selection was based on the available NAMCS database. In addition, the patients were assumed to have an initial diagnosis of hypertension, rather than a recurrent visit. No allergy information was available, and the patients not given the first-line agent because of the allergy, were not identified. Lastly, treatments consisted of agents other than ACEI, thiazides, CCBs, ARB or a combination of any of the above agents along with the treatments with a primary diagnosis of hypertension and not receiving any therapy were considered non-first-line.

## CONCLUSION

Hypertension is a silent disease that doesn't show symptoms until it has caused a permanent damage to the heart, brain, kidneys or eyes.<sup>1</sup> It is primarily managed in ambulatory care settings accounting for the majority of primary care visits. Better hypertension control can positively impact cardiovascular health.<sup>3</sup> Adherence to hypertension

guidelines promotes optimum therapy and better outcomes. Inappropriate prescribing could potentially lead to undesirable health effects, lower quality of life and an increased direct, indirect and societal economic cost. Appropriate prescribing can be influenced by geographic region. The findings in this study was in accordance with similar studies showing that South region is more likely to prescribe non-first-line agents due to healthcare accessibility issues and socioeconomic factors.

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| Demographic Variables                           | Frequency | Percentage |
|-------------------------------------------------|-----------|------------|
| <b>Table 1</b>                                  |           |            |
| Gender                                          |           |            |
| Female                                          | 324       | 54.5       |
| Male                                            | 271       | 45.5       |
| Age Range                                       |           |            |
| 15-24 years                                     | 6         | 1          |
| 25-44 years                                     | 44        | 7.4        |
| 45-64 years                                     | 245       | 41.2       |
| 65-74 years                                     | 156       | 26.2       |
| 75 and older                                    | 144       | 24.2       |
| Race                                            |           |            |
| Blank                                           | 103       | 17.3       |
| White                                           | 347       | 58.3       |
| African American                                | 124       | 20.8       |
| Asian                                           | 17        | 2.9        |
| Native Hawaiian/Oth Pac<br>Isl Only             | 2         | 0.3        |
| American Indian/Alaska<br>Native                | 2         | 0.3        |
| Type of Payment                                 |           |            |
| Blank                                           | 15        | 2.5        |
| Unknown                                         | 23        | 3.9        |
| Private Insurance                               | 234       | 39.3       |
| Medicare                                        | 268       | 45         |
| Medicaid, CHIP or other<br>state-based programs | 38        | 6.4        |
| Self-pay                                        |           |            |

|                           |     |      |
|---------------------------|-----|------|
| No charge/charity         | 14  | 2.4  |
| Other                     | 1   | 0.2  |
|                           | 2   | 0.3  |
| Physician Specialty       |     |      |
| General/Family practice   | 207 | 34.8 |
| Internal medicine         | 130 | 21.8 |
| Pediatrics                | 3   | 0.5  |
| General surgery           | 3   | 0.5  |
| Obstetrics and gynecology | 1   | 0.2  |
| Cardiovascular diseases   |     |      |
| Urology                   | 191 | 32.1 |
| Neurology                 | 6   | 1    |
| Ophthalmology             | 5   | 0.8  |
| Otolaryngology            | 9   | 1.5  |
| Other specialties         | 2   | 0.3  |
| Physician assistant       | 15  | 2.5  |
| Nurse practitioner        | 15  | 2.5  |
|                           | 8   | 1.3  |
| Region                    |     |      |
| Northeast                 | 102 | 17.1 |
| Midwest                   | 160 | 26.9 |
| South                     | 217 | 36.5 |
| West                      | 116 | 19.5 |

|                                                |                  |                |
|------------------------------------------------|------------------|----------------|
| <b>General prescribing pattern<br/>Table 2</b> | <b>Frequency</b> | <b>Percent</b> |
|------------------------------------------------|------------------|----------------|

|                         |     |      |
|-------------------------|-----|------|
| First-line therapy      | 289 | 48.6 |
| Non-first- line therapy | 306 | 51.4 |

| <b>Prescribing Pattern Based on Independent Variables</b> | <b>First-line therapy</b> | <b>Non-first- line therapy</b> | <b>Significance (P)</b> |
|-----------------------------------------------------------|---------------------------|--------------------------------|-------------------------|
| <b>Table 3</b>                                            |                           |                                |                         |
| Gender                                                    |                           |                                | 0.376                   |
| Female                                                    | 172                       | 152                            |                         |
| Male                                                      | 134                       | 137                            |                         |
| Age                                                       |                           |                                | 0.073                   |
| 15-24                                                     | 5                         | 1                              |                         |
| 25-44                                                     | 15                        | 29                             |                         |
| 45-64                                                     | 130                       | 115                            |                         |
| 65-74                                                     | 78                        | 78                             |                         |
| 75 and older                                              | 78                        | 66                             |                         |
| Race                                                      |                           |                                | 0.208                   |
| Blank                                                     | 53                        | 50                             |                         |
| White Only                                                | 175                       | 172                            |                         |
| African American                                          | 70                        | 54                             |                         |
| Asian                                                     | 6                         | 11                             |                         |
| Native Hawaiian/Oth Pac Isl                               | 0                         | 2                              |                         |
| American Indian                                           | 2                         | 0                              |                         |
| Insurance type                                            |                           |                                | 0.145                   |
| Blank                                                     | 7                         | 8                              |                         |
| Unknown                                                   | 8                         | 15                             |                         |
| Private                                                   | 119                       | 115                            |                         |

|                                              |     |     |       |
|----------------------------------------------|-----|-----|-------|
| Medicare                                     | 145 | 123 |       |
| Medicaid, CHIP and other state-based program | 15  | 23  |       |
| Self-pay                                     | 10  | 4   |       |
| Charity/No Charge                            | 0   | 1   |       |
| Other                                        | 2   | 0   |       |
| Region                                       |     |     | 0.023 |
| Northwest                                    | 55  | 47  |       |
| Midwest                                      | 90  | 70  |       |
| South                                        | 116 | 101 |       |
| West                                         | 45  | 71  |       |
| Physician                                    |     |     | 0.222 |
| General/Family                               | 95  | 112 |       |
| Internal                                     | 65  | 65  |       |
| Pediatrics                                   | 1   | 2   |       |
| General Surgery                              | 3   | 0   |       |
| Obstetrics and gynecology                    | 1   | 0   |       |
| Cardiovascular diseases                      | 112 | 79  |       |
| Urology                                      | 3   | 3   |       |
| neurology                                    | 2   | 3   |       |
| Ophthalmology                                | 6   | 3   |       |
| Otolaryngology                               | 1   | 1   |       |
| Other Specialties                            | 9   | 6   |       |
| Physician Assistant                          | 6   | 9   |       |
| Nurse Practitioner                           | 2   | 6   |       |

| <b>Combined Variables vs<br/>prescribing pattern</b> | <b>Nagelkerke R<sup>2</sup></b> |
|------------------------------------------------------|---------------------------------|
| <b>Table 4</b>                                       |                                 |
| Provider specialty and type of<br>payment            | 0.010                           |
| Provider specialty and age range                     | 0.005                           |
| Provider specialty and gender                        | 0.006                           |

**TRACK**  
**HEALTHCARE EDUCATION**

# **A PHYSICAL ACTIVITY PRE AND POST INTERVENTION EVALUATING THE EFFECTS OF KNOWLEDGE, SELF-REGULATION, AND SOCIAL FACILIAATION FOR AFRICAN AMERICAN WOMEN: RATIONALE, DESIGN, AND METHODS**

*Elicia Collins, Georgia State University  
Joan Cranford, Georgia State University  
Martha Polovich, Georgia State University  
Megan A. McCrory, Boston University  
Susan W. Buchholz, Rush University College of Nursing*

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## **ABSTRACT**

*Low participation in physical activity is rapidly becoming a global health concern. Among the 7.3 million people worldwide, 31% (2.3 billion) are physically inactive and 3.2 million die annually because of a lack of physical activity. Because African American women have been identified as the least active demographic group, and have the highest overweight and obesity rates among all other groups they are at significant risk for health problems associated with low physical activity.*

*The purpose of this quantitative study is to examine the effect of knowledge, beliefs, self-regulation, and social facilitation on increasing physical activity in African American women through a 6-week, investigator designed intervention. Understanding the effect of knowledge, self-regulation, and social facilitation may provide a broadened clinical understanding of low physical activity in African American women and may lead to sustainable methods and outcomes for increasing physical activity.*

*A two-group pretest/posttest, quasi-experimental design was chosen to frame this 6-week intervention. This design will allow knowledge and beliefs about physical activity and self-regulation and social facilitation to be quantified in order to test differences between the intervention and control groups at baseline and 2 weeks after the intervention ends.*

*Findings from this study may add to the body of literature by providing evidence for interventions that may assist African American women with increasing physical activity.*

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Elicia S. Collins, MSN, RN  
College of Health, School of Nursing  
Clayton State University  
2000 Clayton State Boulevard  
Morrow, Georgia 30260  
Tel: 678-466-4948  
Fax: 678-466-4999  
Email: [eliciacollins@clayton.edu](mailto:eliciacollins@clayton.edu)

Joan Cranford, EdD, RN  
Lewis College of Nursing and Health Professions  
Georgia State University

PO Box 4019  
Atlanta, Georgia 30302  
Tel: 404-413-1195  
Email: [jcranford2@gsu.edu](mailto:jcranford2@gsu.edu)

Martha Polovich, PhD, RN  
Lewis College of Nursing and Health Professions  
Georgia State University  
PO Box 4019  
Atlanta, Georgia 30302  
Tel: 404-413-1171  
Email: [mpolovich2@gsu.edu](mailto:mpolovich2@gsu.edu)

Megan A. McCrory, PhD, FTOS  
Sargent College of Health and Rehabilitation Sciences  
Boston University  
One Silber Way  
Boston, Massachusetts 02215  
Tel: 617-353-2739  
Email: [mamccr@bu.edu](mailto:mamccr@bu.edu)

Susan Weber Buchholz PhD, RN, FAANP  
College of Nursing  
Rush University  
600 South Paulina Street, Suite 1080AAC  
Chicago, IL 60612-3832  
Tel: 312-563-3590  
Email: [Susan\\_Buchholz@rush.edu](mailto:Susan_Buchholz@rush.edu)

# A PILOT STUDY: TST (TEACHERS SUPPORT TEACHERS)

*Rodeen Lechleitner*

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## **ABSTRACT**

*Social support's four accepted principles and two proposed principles were used in this health education pilot study. The researcher developed an educational presentation study entitled, "TST: Teachers Support Teachers" conducted during an in service day. The researcher planned, implemented, and assessed a study designed to create supportive relationships with teachers who are employed in Schuylkill County, PA. The aim of this study was to determine the impact of the program on teacher's perception of social support including the extra constructs the author recommends as a stress reducer.*

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Rodeen Lechleitner  
570-401-0703  
10 Acorn Drive  
Nesquehoning, PA 18240  
[rodeenlechleitner@gmail.com](mailto:rodeenlechleitner@gmail.com)

# DEVELOPMENT OF A SIMPLE MODEL TO IDENTIFY AT-RISK PROFESSIONAL STUDENTS

Dan Friesner, North Dakota State University

Kelly Haugen, North Dakota State University

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## ABSTRACT

*Doctoral-level health professions programs are unique in that they require a significant commitment from both students and the academic institution offering the program. Students must prepare, both academically and professionally, for a rigorous, selective admissions process. This preparation may constitute multiple years of course work at the undergraduate level, investing in health-related work experience, completing multiple high-stakes exams as a part of the admissions process, and committing to a lifestyle commensurate with the ethical and legal expectations of the profession. Once admitted, students must complete a curriculum that is even more rigorous than their pre-professional program of study. Professional and co-curricular expectations also increase in a manner that is more integrated with traditional classroom education. Perhaps more importantly, the tuition students are required to pay to complete the degree increases disproportionately. Concomitantly, faculty and staff implementing these programs must prepare students to pass their licensure and/or registry exams after graduation. They must satisfy accreditation requirements to ensure that students acquire the requisite knowledge, skills and abilities to pass their licensure and/or registry exams in a manner that is integrated both vertically and horizontally throughout the curriculum. Faculty and staff must also provide education in a manner that emphasizes adult learning strategies yet holds students more accountable for unprofessional behaviors. Financially, programs are responsible to accreditors to demonstrate that they are good stewards of their resources, and that the vast majority of students matriculate through the program in a timely manner.*

*As a result of these forces, many accrediting agencies are requiring doctoral-level health professions programs to development and implement a means to identify professional students who are at-risk of not making adequate progress towards the completion of their degree. Once identified, faculty and staff can work with these students to create and implement a remediation plan to ensure timely graduation. The difficulty in this endeavor is that an effective profiling model must be predictive (not reactive), yet satisfy the assumptions of the process that generated the data. Most often, profiling models use either entire student cohorts (i.e., a cross-sectional population) or intentional subsets of a population, and are not randomly collected samples. As such, the application of traditional statistical tools to these data sets is inappropriate. Perhaps more importantly, the profiling models must be easily interpreted and implemented by program personnel, who must justify the appropriateness of the model to external stakeholders (including, but not limited to, accreditors). This often prohibits the use of those few advanced statistical techniques that do exist and can be used to correct for flaws in the sampling design. An additional complicating feature is that students fail to progress through their professional programs for a variety of different reasons. Hence the profiling models themselves tend to be complex in that they involve multiple predictors and outcome/student success measures.*

*The purpose of this paper is to develop a simple, yet powerful, profiling model that can be used to identify at-risk students. We utilize spreadsheet modelling techniques, and most notably an application of maximum correlation analysis (MCA), to build this model (Tofalis, 2001; Murphy, Rosenman, McPherson, and Friesner, 2011). As a descriptive data analysis technique, MCA has been used extensively in the management science/operations research literature to analyze datasets with non-standard statistical properties. MCA can also accommodate multiple predictors and student outcome metrics. Most importantly, MCA can be implemented using standard spreadsheet software packages such as Microsoft Excel, and its models can be interpreted as weighted averages. Thus, the model is easily interpreted by those with limited statistical backgrounds.*

*We implement the profiling model using data collected from North Dakota State University (NDSU)'s Doctor of Pharmacy (Pharm.D.) program. To make the model tractable, we focus on building a model that can identify at-risk students in their first year in the professional program – the time frame in which they are model likely to fail to*

*progress through their required coursework. MCA is first applied to a cohort of professional students who are in their third year of the professional pharmacy program during the 2018-2019 academic year, to build the MCA model. This cohort effectively serves as a training data set. The utility of the model is assessed by using the model to predict at-risk behaviors for students who would (in the absence of poor performance) be second year professional pharmacy students in the program during the 2018-2019 academic year.*

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Dan Friesner, Ph.D.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-9509  
Fax: 701-231-7606  
[Daniel.Friesner@ndsu.edu](mailto:Daniel.Friesner@ndsu.edu)

Kelly Haugen, M.S., M.L.S., C.H.T.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-7789  
Fax: 701-231-7606  
[Kelly.Haugen@ndsu.edu](mailto:Kelly.Haugen@ndsu.edu)

# DO SPECIFIC BEHAVIORAL PATTERNS IN HIGH STAKES ONLINE TESTING ENVIRONMENTS LEAD TO BETTER TEST OUTCOMES? EMPIRICAL EVIDENCE FROM A DOCTOR OF PHARMACY PROGRAM

Dan Cernusca, North Dakota State University  
Daniel Friesner, North Dakota State University

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## ABSTRACT

*Health professions programs are required by accrediting bodies to set up admissions criteria, admissions processes, and professional curricula that not only allow for students to progress through the professional program on a timely basis, but also prepare the student for licensure and/or certification exams. Because licensure and certification exams are high stakes assessments, many course-level assessments are also high stakes activities to prepare students for their registry exams. While all students need to develop testing skills and implement testing strategies that allow them to perform adequately on high stakes exams, the types of testing skills learned and strategies employed differs from student to student. The difficulty that arises is that while students tend to “learn” test-taking strategies from their peers, especially the ones that are in higher level courses, they do not always identify or adopt optimal test taking practices from their peers. Thus, students take an individual-specific evolutionary approach to developing their high stakes testing skills and practices. This leads to considerable variation in the skills and strategies used, as well as varying degrees of success in high stakes testing environments. Unfortunately, very little literature in the health sciences exists that correlates specific test taking skills and strategies.*

*The purpose of this study is to provide empirical evidence describing potential relationships between student approaches to high stakes exam taking and performance on the exam. Rather than attempt to identify and empirically characterize specific high stakes testing strategies and skills, this analysis takes a more rudimentary approach and focuses on actual behaviors that students utilize during high stakes online exams. In doing so, this analysis forms a critical first step in understanding which specific skills and strategies are most useful in high stakes online testing environments, in this case ExamSoft® testing platform. The study’s research questions are twofold. First, do differences in test taking patterns exist between students who score highly on a high stakes exam, relative to their peers who score much lower on the same exam, as reflected by the ExamSoft individual exam logs? Second, among highly successful students, are there differences in test taking patterns, as reflected by the Examsoft individual exam logs, between correctly and incorrectly solved exam questions?*

*The study is operationalized in the Doctor of Pharmacy program at North Dakota State University. As noted above, the program uses the ExamSoft software platform to administer high stakes exams. ExamSoft allows us to track both the course in which an exam is administered, as well as very specific student behaviors during the exam. The authors first identified two specific courses in the Doctor of Pharmacy (Pharm.D.) curriculum that require high stakes exams as a major component of overall course grading. Within each of these courses, the authors selected exams that were deemed comparable in overall performance. For each exam, groups of 8-10 academically successful students (as characterized by the 8-10 highest overall scores for a given exam) were identified, as well as 8-10 less academically successful students (again, as measured by the 8-10 lowest overall exam scores). The overall performance for each exam was used to characterize the success of each student included in the analysis. De-identified individual exam logs recorded in ExamSoft were used to identify test taking patterns. Each log contains time-stamped behavioral actions taken by the student, such as question number, task completed (view, recorded an answer, changed an answer) from the start to the end of the exam. Each major type of behavioral action was quantified using descriptive elements such as frequency of occurrence or frequency of change across the examination period. Descriptive empirical analysis (i.e., parametric and non-parametric correlations) and inferential analysis (e.g. multivariate regression) were used to explore the potential relationships between specific*

*high stakes testing behaviors and exam performance. To account for exam and student-specific characteristics that may confound the results, the analysis was replicated up to 5 times (each time using a different exam, possibly drawn from a different course in the professional pharmacy curriculum), each time selecting 8-10 high performing, and 8-10 low performing students for each exam. As student performance on exams vary, there is no a priori reason to expect that the same students would consistently be present in each replication.*

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Dan Cernusca, Ph.D.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-7729  
Fax: 701-231-7606  
[Dan.Cernusca@ndsu.edu](mailto:Dan.Cernusca@ndsu.edu)

Daniel Friesner, Ph.D.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-9509  
Fax: 701-231-7606  
[Daniel.Friesner@ndsu.edu](mailto:Daniel.Friesner@ndsu.edu)

# GLOBALIZATION & THE MAGNA CHARTA OBSERVATORY; FUTURE OPPORTUNITIES IN HEALTH MANAGEMENT EDUCATION

*Dr. Daniel J. West, Jr., University of Scranton*

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## ABSTRACT

*The Rectors of European Universities created the Magna Charta Universitatum 30 years ago in 1988. We live in an international academic community and our future depends on scientific and technical developments. This session examines why U.S.A. universities and health management education programs should consider applying for recognition with the Magna Charta Observatory (MCO). Fundamental principles are examined as well as opportunities for cooperation and collaboration. Goals have been established that are relevant to all universities. Elements of the MCO strategic plan are discussed as well as future challenges.*

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Dr. Daniel J. West, Jr., Ph.D., FACHE, FACMPE  
Professor and Chairman  
Department of Health Administration & Human Resources  
The University of Scranton  
417 McGurkin Hall  
Scranton, Pennsylvania 18510  
Telephone: (570) 941-4126  
FAX: (570) 941-5882  
Email: [daniel.west@scranton.edu](mailto:daniel.west@scranton.edu)

# HEALTHCARE KNOWLEDGE SURVEY

William F. Miller, University of Scranton  
Michaela L. Dolde, University of Scranton  
Priya Patel, University of Scranton  
Farrah F. Qadri, University of Scranton  
Christie N. Ulbricht, University of Scranton

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## ABSTRACT

*This research is the third step in a larger plan of study. College campuses offer a variety of services that aim not only to improve student health outcomes, but also to educate students on the importance of primary care, prevention, and personal wellness. However, students are not formally prepared to navigate the complex US healthcare system. Students in their last year of on-campus study (n=258) were surveyed to determine their knowledge and understanding of the current healthcare system. Post-test analysis revealed a higher than anticipated mean knowledge score, a weak yet significant correlation between age and knowledge score, and significant differences in mean scores based on participant college, gender, and level (undergraduate or graduate). Participant suggestions for proposed solutions for improving student healthcare knowledge include developing a seminar or course, providing information electronically, and disseminating pamphlets and brochures.*

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William F. Miller, Ph.D., MHA  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
Telephone: 570-941-4527  
Fax: 570-941-5882  
[william.miller2@scranton.edu](mailto:william.miller2@scranton.edu)

Michaela L. Dolde, Master of Health Administration Student  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[michaela.dolde@scranton.edu](mailto:michaela.dolde@scranton.edu)

Priya Patel, Master of Health Administration Student  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[priyaben.patel@scranton.edu](mailto:priyaben.patel@scranton.edu)

Farrah F. Qadri, Master of Health Administration Student  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[farrah.qadri@scranton.edu](mailto:farrah.qadri@scranton.edu)

Christie N. Ulbricht, Master of Health Administration Student  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[christie.ulbricht@scranton.edu](mailto:christie.ulbricht@scranton.edu)

# **HOW EMOTIONS INFLUENCE THE DECISION MAKING OF MOTHERS OF TODDLERS TO VACCINATE**

Lucia Ludvig Cintulova, Ph.D.  
Department of Social Work  
St. Elisabeth University of Health and Social Work  
Namestie 1. Maja 1, P.O. Box 104  
810 00 Bratislava  
Slovakia  
luciacin83@gmail.com

Libusa Radkova, Ph.D.  
Department of Social Work  
St. Elisabeth University of Health and Social Work  
Namestie 1. Maja 1, P.O. Box 104  
810 00 Bratislava  
Slovakia  
libusa.radkova@gmail.com

# HOW EMOTIONS INFLUENCE THE DECISION MAKING OF MOTHERS OF TODDLERS TO VACCINATE

*Lucia Ludvig Cintulova, St. Elisabeth University, of Health and Social Care, Bratislava, Slovakia*  
*Libusa Radkova, St. Elisabeth University, of Health and Social Care, Bratislava, Slovakia*

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## ABSTRACT

*Vaccination campaigns have faced significant negative impacts from some parents who have refused to vaccinate. This is in spite of the fact that life-threatening diseases have been greatly reduced due to mandatory vaccination programs through the years in Slovakia. The data analysed the attitudes of 875 mothers who have two-year old children. However, their fears, based upon something bad happening to their children, have impacted their willingness to get vaccinated. We wanted to know the affects, of their emotional beliefs on decision-making about getting their children vaccinated.*

**Keywords:** vaccination, mothers, decision making

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## INTRODUCTION

Professionals who are advocating universal vaccinations have very different notions about community health than those parents who hesitate to vaccinate their children. We wanted to understand the inconsistencies and differences of opinions between the professionals and parents. We wanted to understand the feelings about ethical dilemmas that they face. Thus, we can learn their confusion, their fears and their mistrust in the compulsory vaccination system. It is more difficult to look for the solutions when the general population of parents are making their decisions based upon their emotions. Rumours spread, often through sources available on the internet. Anti-vaccination campaigns provide diverging information and negative stories and narratives about the vaccine risks. These sources then influence the parents whether they want to have their children vaccinated at all.

The parents complain that the quality of information that is provided by the national health authorities about the benefits and risks of vaccination is not very well presented. It is not persuasive enough that the benefits of vaccination are worth it. Instead they decide that not to vaccinate is the better option. Their decisions are based upon stories that they hear about. They decide without the full resource of verified facts about the benefits.

### *Emotions and vaccination*

It is increasingly possible to research health related information on the internet. Research has shown that information provided through stories and narratives influences how people decide what kind of treatment they will get. The stories that they read about on the internet influence their decisions often times more than the statistics and facts that are provided by the medical authorities. There is an inverse relation between the number of narratives reporting something bad after the vaccinations and the parents' decision to vaccination. These stories increase the perceived risks of vaccinating. The study emphasizes that there is a stronger influence of the narratives versus the actual statistical information that shows benefits versus risks. The results are that the highly emotional narratives had a greater impact on the perceptions of vaccination (**Betsch, Ulshöfer, Renkewitz, and Betsch, 2011**) There is a differential impact of the message connected to vaccination aspects that influence the degree of perceived risk associated with childhood vaccination. Research has shown that when people begin to believe the broad spectrum of information and stories from internet that vaccination can or will cause the possible bad consequences of avaccination, then they are less willing to go through the vaccination program.. The decision making is not made on rational thinking but on emotions. The fear of a bad outcome affects how a person chooses what to do in a given situation (**Ferguson, Bibby, and Leaviss, 2003**). Based on this evidence, due to the recent controversies regarding

vaccine side-effects, MMR immunization is being perceived as a ‘solution’ that also produces other health problems **(Bellaby, P., 2003)**. Rothman and Salovey **(Rothman, Salovey, Antone, Keough, and Martin, 1993)**. It has also shown that the value that people place in the treatments are very important when people respond to it according to their feelings.

Another study looks at the interaction between the content of the treatment and how it is formatted. This determines how the audience receives the message. Audiences using a peripheral route (pictures of someone after a vaccination) to persuasion are more likely to agree with the message. When the source in their opinion, is trustworthy the message carries a lot of weight. This is true even if the argument itself is weak. Strong arguments presented in the public service announcement will effectively appeal to emotions **(Kang, Cappella, and Fishbein, 2006)**.

The de Martino study **(De Martino, Kumaran, Seymour, and Dolan, 2006)** highlights the importance of including emotional processes. This study reveals how the brain can adapt the effect of these biasing influences in order to fit with their own rationality. This so-called “framing effect” that was specifically associated with amygdala activity, suggests a key role for an emotional system in processing their biases when making a decision. Humans include a range of additional emotional data into their process of decision-making **(De Martino, Kumaran, Seymour, and Dolan, 2006)**. Kahneman and Tversky originally described this deviation from rational decision making **(Kahneman, Tversky, 1979; Kahneman, 1981)**. They called it the framing effect, a key aspect of prospect theory. The framing effect looks at the influence of emotions on how one makes a decision. For example, we describe the framing effect in regards on the vaccination for cervical cancer. In a positive and negative frame, model A and model B are identical. But they are presented in a different way.

Table 1 Framing effect model

| Frame    | Model A                                        | Model B                                        |
|----------|------------------------------------------------|------------------------------------------------|
| Positive | Vaccine saved about 1,5 million women per year | 44% - saved lives<br>56% - no women were saved |
| Negative | 2 million women died                           | 44% - nobody died<br>55% - of all women died   |

Abhyankar presents the impact of framing on the willingness to vaccinate a child **(Abhyankar, O’Connor, and Lawton, 2008)**. He sees that the negative frame effect is more persuasive than the positive one. Pointing out the risks from the disease more effectively influences people to vaccinate. Describing potential dangers put individuals into the “domain of losses.” This makes them more tolerant of perceived risks than messages about the benefits of vaccines. The acceptance to vaccinate increased when the parents received information about the negative model if they did not vaccinate. These are the perceived risk of HPV infection, the perceived safety and effectiveness of HPV vaccines, the perceived encouragement from their physician to vaccinate, and their previous health behaviour. **(Gerend, Shepherd, 2007)**.

Some characteristics of how the message is presented may catch people’s attention without their awareness. For example, attention to the message is not forced when pictures would show damages caused by vaccination. This creates a negative perception that vaccination is dangerous **(Frey, Eagly, 1993)**. None of the pro-vaccination messages created by public health authorities increased anyone’s intentions to vaccinate with MMR. They targeted a national sample of parents who have children 17 years old or younger. Information was given to correct misperceptions about the vaccine/autism. Nevertheless, it only decreased intentions to vaccinate among parents who already had the least favourable attitudes toward vaccines. Images of children who have MMR and a story about a child who had measles actually increased beliefs in serious vaccine side effects **(Nyhan, Reifler, Richey, and Freed, 2014)**. The study emphasises the strong emotional impact of public information about vaccine

on the parental decision-making about vaccination for toddlers (Nyhan, Reifler, Richey, and Freed, 2014; Marsh, Malik, Shapiro, Omer, and Frew, 2013).

Our study was inspired by research of Nyhan (Nyhan, Reifler, Richey, and Freed, 2014) which focused on analysing the effect of 4 different types of information about vaccination and how it influenced decision making of parents to vaccinate their children. This was with a research group of 1759 parents. The results showed the high impact of emotions when presenting information toward the desire to get a child vaccinated. Our study is aimed at analysing the impact of emotional feelings on the parental decisions to reject vaccination. It includes a questionnaire with different levels of emotional perceptions.

## METHODOLOGY

The study was designed as the quantitative research based on the standardized questionnaire adopted from the Slovak public health institution (RÚVZ SR). It was modified to analyse attitudes of mothers toward childhood vaccination. The sample was 875 mothers of toddlers. A three-part survey was used to collect data from January to May 2018 including the sample criteria a) the age of mother from 20 until 40 years, b) the age of children – mothers of toddlers, c) the counselling visits at the paediatrician – minimum once per three months; d) taking care of a child for at least 18 months. e) agreement with participation in the research study; f) marriage. 875 mothers were recruited and data were collected by 1. making direct contact at paediatrician offices, at the offices of medical specialists that are visited by toddlers and at Maternity Care Centres and 2. using online tools and social network - Forum for health, Blue Horse, Facebook, Montessori Groups.

The research study is based on the 3 domains analysing the impact of the various factors and emotionality on the decision-making about the compulsory and optional vaccination of toddlers.

### 1. Demographic factors influencing the attitudes to vaccination

We looked at the impact of demographic indicators on the willingness of parents to get children vaccinated. We looked at the research of others, e.g (Smith, Chu, and Barker, 2004) – there should be positive correlation between willingness to get a child vaccinated and the level of education of their mothers. On the other hand – the age of the mothers, the number of children that they had, and whether the parents were married should have a negative correlation with their attitude about vaccinating their child.

### 2. Attitudes of mothers to vaccination and subjective perceptions of vaccine risks

There are many factors influencing the decision making of mothers to get a child vaccinated. e.g. Nyhan (Nyhan, Reifler, Richey, and Freed, 2014), Rothman and Salovey (Rothman, Salovey, Antone, Keough, and Martin, 1993), and Kahneman (Kahneman, 1981).

### 3. Effect of emotionality on attitudes to vaccination and decision making

Based on the research, highly emotional narratives had a greater impact on the perceptions of vaccine risks (Betsch, Ulshöfer, Renkewitz, and Betsch, 2011). The di Martino study shows that humans use a broad range of additional emotional information in their decision making process (De Martino, Kumaran, Seymour, and Dolan, 2006).

**Hypothesis 1:** There is a significant relation between demographic variables and the attitudes to childhood vaccination identified by the study.

**Hypothesis 2:** There are various attitudes about vaccination in regards to the refusal to vaccinate their children.

**Hypothesis 3:** There is the significant relationship between the emotionality that influences decision-making about vaccination.

Coding and statistical analyses of data were done by using the SPSS 7.0 package program. Percentages were used to evaluate the parameters of age, marriage, educational, occupational status, the geographic location, and the number of children that mothers have-

The *t* test was applied to determine differences between the mean attitude to vaccination and emotionality scores according to how many children mothers are raising

The Pearson correlation analysis was used to detect the relationship between attitudes to vaccination, emotional domains and decision making. The significance in all statistical analyses was defined as  $p < 0.05$ .

## RESULTS

The research is based on the analysing the attitudes of mothers to the vaccination programmes including vaccine Infanrix hexa and synflorix/prevenar13 + MMR vaccine and exploring the relationship between emotional feelings and decision-making about childhood vaccination.

Using Multivariate Analysis of Variance, which was designed to compare the levels of qualitative variables in several groups in which the base set is decomposed into multiple nominal-type variables, we have identified the following:

**Completed education** (56.3% with university degree: 43.7% of secondary education) has no impact on attitude to childhood vaccination. Limits: Achieved education does not have to reflect correctly the educational level, in view of the possible high number of mothers who do not have health education or medical degree, they have lay information about vaccination.

**Parenting.** All of the respondents, if they had already take care of children at the time of enrolment, are referred to as “mothers of toddlers”. Only mothers with one and more children were included in the research. A positive correlation between mothers' willingness to vaccinate children and the number of children in the family has been identified. Mothers with at least two children have a more positive attitude towards vaccinations compared to mothers of firstborns. These had a significantly lower willingness to vaccinate. ( $p = 0.0435$ ): Mothers with only one child are less willing to vaccinate children compared to other mothers. It should be noted that fathers were not included in the research. This is due to the most part that the care is on the shoulders of mothers. These were the ones who visited paediatrician offices or mother care centres and also social networks such as Blue Horse, Montessori Groups. That's why fathers were not involved in the recruitment of the sample due to places preferred by women. There is also a significant relationship between the **age** and the mother's attitudes toward childhood vaccination ( $p = 0.0372$ ). Younger mothers up to 35 years-old are more willing to risk to **not** vaccinate. They have a higher negative attitude about vaccinating. Their children are less often vaccinated, or not vaccinated at all, compared to older mothers over 35. The older mothers prefer not to face the risks of non-vaccination. Younger mothers prefer to pursue healthy lifestyles, with the hopes that they build immunity through a natural pathway. They prefer not to use artificial resistance by vaccinations. Older women prefer to build collective immunity by nationwide vaccination ( $p = 0.0341$ ).

**Place of residence and region.** The place of residence doesn't influence the variable of attitudes to vaccination ( $p = 0.257$ ). Whether the mothers live in the village or in the city it has not showed significant differences in attitudes towards vaccination. The region where the mothers come from ( $p = 0.0274$ ), Bratislava (24%) and Banská Bystrica (21%) have the highest negative attitudes towards vaccinations compared to others. The most positive attitudes were expressed by mothers living in Prešov region (28%) and Košice region (25%). Limits. The sample was fairly evenly divided into 8 Slovak regions. A common event is that the many of the Slovak inhabitants move from the east regions of the country to Bratislava. And that can influence the outcomes of the research.

**Social status.** The study has not showed a correlation between job-placement and attitude to vaccination. A strong sample consisted of women on parental leave and women working part-time ( $p = 0.269$ ). Limits. We did not focus on the specific professions of the sample due the most of them were on maternity or parental leave. It would be interesting to consider this variable as well.

Table 2 Demographic factors of the sample

| Variables/<br>demographic<br>characteristics | Ambulances<br>and mother<br>n=386 | for mothers care<br>centres | Online<br>Recruitment | Social network<br>n=489 |
|----------------------------------------------|-----------------------------------|-----------------------------|-----------------------|-------------------------|
|----------------------------------------------|-----------------------------------|-----------------------------|-----------------------|-------------------------|

|                               | N (%)       | Mean | N (%)       | Mean | P      |
|-------------------------------|-------------|------|-------------|------|--------|
| <b>Education</b>              |             | 1.0  |             | 2.0  | < .231 |
| University                    | 229 (59.32) |      | 207 (42.33) |      |        |
| High School                   | 157 (40.67) |      | 282 (57.66) |      |        |
| <b>Age</b>                    |             | 29.4 |             | 31.3 | < .034 |
| 22-24 years                   | 91 (23.57)  |      | 92 (18.81)  |      |        |
| 25-29 years                   | 152 (39.37) |      | 133 (27.19) |      | < .026 |
| 30-34 years                   | 76 (19.69)  |      | 157 (32.10) |      |        |
| Over 35 years                 | 67 (17.35)  |      | 107 (21.88) |      |        |
| <b>Residence</b>              |             | 2.0  |             | 2.0  | < .164 |
| Village                       | 155 (40.15) |      | 93 (19.01)  |      |        |
| City                          | 231 (59.85) |      | 296 (60.53) |      |        |
| <b>Marriage</b>               |             | 1.0  |             | 2.0  | < .073 |
| Get Married                   | 204 (52.84) |      | 198 (38.65) |      |        |
| Engaged<br>(common household) | 161 (41.70) |      | 279 (57.05) |      | < .048 |
| Divorced                      | 21 (5.44)   |      | 12 (2.45)   |      |        |
| <b>Parenting</b>              |             |      |             |      | < .065 |
| One child                     | 151 (39.11) |      | 254 (51.94) |      | < .041 |
| 2 children                    | 235 (60.88) |      | 217 (44.37) |      | < .037 |
| More than 2                   | 23 (4.70)   |      | 18 (3.68)   |      |        |
| <b>Social status</b>          |             |      |             |      | < .235 |
| Maternity leave               | 106 (27.46) | 2.0  | 111 (22.70) | 2.0  |        |
| Parental leave                | 167 (43.26) |      | 203 (41.51) |      |        |
| Part-time job                 | 82 (21.24)  |      | 136 (27.81) |      |        |
| Unemployed                    | 31 (8.03)   |      | 39 (7.98)   |      |        |

| Awareness of vaccination | 2.0         | 1.0         | < .044 |
|--------------------------|-------------|-------------|--------|
| Good                     | 102 (26.42) | 222 (45.39) |        |
| Low                      | 181 (46.89) | 162 (33.12) |        |
| Poor                     | 103 (26.68) | 105 (21.47) |        |

**H1:** There is the significant relationship between demographic variables and the attitudes to childhood vaccination identified by the study.

The results figured out the correlation between attitudes to vaccination and demographic variables such as age ( $p=0.034$ ), parenting ( $p=0.037$ ), social status ( $p=0.235$ ), vaccination awareness ( $p=0.044$ ) and marriage ( $p=0.048$ ).

Our findings suggest a necessity of increasing of vaccination awareness in order to overcome the false myths about vaccines and to reduce the influence of anti-vaccination campaigns that are based upon such myths. These campaigns based on myths are breaking the system of vaccination immunization. Study of Betsch and Wicker (**Betsch, Wicker, 2012**) showed that healthcare professionals lack awareness about national guidelines and lack of knowledge about vaccines (both specific attributes including beliefs about contraindications, as well as beliefs about vaccine-related health damages). Their lack of awareness of these issues leads to a decreasing number of vaccinated children and increasing number of parents who refuse to let their children get vaccinated.

#### *The attitudes of mothers to vaccination of toddlers*

**H2:** *There are various attitudes to vaccination in the relation to the refusal to vaccinate children.*

The results show three types of attitudes toward childhood vaccination. 1. Positive attitude to vaccination. This includes completing the compulsory vaccination programme for toddlers that is valid in Slovakia. It includes agreeing with importance of collective immunity. 2. Negative attitude to vaccination characterized by parental refusal of vaccination. It means the fear of the risks of getting vaccinated and the fears of the side effects of vaccinations. It means a preference toward the natural immunity process. 3. Neutral attitude presenting the willingness to re-vaccinate a child in the future and dual approach to vaccine risks.

Research findings suggest the positive pro-vaccine approach to information is not very effective. Pro-vaccine intervention does not increase intent to vaccinate among mothers of toddlers who are the least favourable toward vaccines. The effectiveness of those messages may vary depending on parental attitudes toward vaccines. There is a correlation in emotional perception about information about risks and vaccination side effects and the mothers' decision-making about vaccination.

20 items measuring beliefs and attitudes identified 8 factors, or sub-scales, were used in subsequent analyses. These factors included normative beliefs, or emotional beliefs influencing the decision-making (two items,  $p=0.129$ ), barriers to vaccination related to vaccination side effects and risks (three items,  $p=0.032$ ), practical barriers related to vaccination (two items,  $p=0.076$ ), barriers related to insufficient knowledge about childhood vaccination (two items,  $p=0.079$ ), benefits of vaccination related to health and safety (two items,  $p=0.042$ ), benefits of vaccination related to protection of population (two items,  $p=0.034$ ), prevention of related disease (one item,  $p=0.025$ ), fear of shots in general (two items,  $p=0.179$ ). We also included a scale assessing MMR-related stigma, which we developed previously (8 items,  $p=0.78$ ). Cronbach's alpha for the two-item scale measuring future attitudes to vaccination and willingness of re-vaccination was  $p=0.026$  and believe in the change of vaccination programme to optional ( $p=0.014$ ).

Table 3 Mothers attitudes to toddlers' vaccination

|                 |            |           |
|-----------------|------------|-----------|
| Decision-making | 1 Strongly | 4 Totally |
| Statement       | agree      | disagree  |

|                                                      |        |         |
|------------------------------------------------------|--------|---------|
| Vaccination is dangerous                             | 0.0325 | -0.214  |
| Vaccination is a business                            | 0.1294 | 0.0874  |
| Vaccination doesn't have a real sense                | 0.0753 | -0.0358 |
| Encourage collective immunity                        | 0.0346 | 0.0023  |
| Prevention against serious diseases                  | 0.0257 | 0.2562  |
| Vaccination saves lives                              | 0.0421 | 0.3487  |
| No re-vaccination in the future                      | 0.0267 | 0.2496  |
| Obligatory vaccination should be changed to optional | 0.014  | 0.2148  |

There are many factors influencing the decision making of mothers to vaccinate, as showed by research results in the basis of completed age. Our research findings provide a model of the most frequently held beliefs and the factors underlying a mother's decision about toddlers vaccination. The less willingness to vaccinate a child is linked with general side effects/safety concerns (relationship observed in 24%  $p=0.0226$ ), lack of perceptions of vaccine effectiveness and importance (17%;  $p=0.0583$ ), belief that vaccine causes autism (7%,  $p=0.1151$ ), own and others' experiences of vaccines (26%,  $p=0.0257$ ) and vaccine adverse events (22%,  $p=0.0341$ ), belief anti-vaccination campaigns with the emotional basis and arguments (23%,  $p = 0.0325$ ), belief in a danger of immune overload (8%,  $p>.05$ ), thinking about vaccine as a business (5%,  $p = 0.148$ ) and belief that children receive too many shots (3%  $p=0.2174$ ).

The strong findings is the correlation between attitudes to vaccination and emotionality, respectively the level of emotional power of the vaccination information appeared ( $p = 0.0325$ ).

The emotionality has been monitored on 4 levels: 1. I am more easily influenced by the opinions of others (family, friends, co-workers) - the presented story raises my strong emotions; 2. I am mainly influenced by expert arguments. In other words, the expert can convince me of the harmfulness of vaccination; 3. My experiences in life are my guide; 4. I make my decision based upon my convictions.

The study figured out the relationship between the level of emotionality identified by the sample on the scale from 1 to 4 and attitudes to children vaccination (table4)

Many mothers are not entirely polarised in their opinions of vaccination. Usually they have a mixed view and beliefs of vaccination. They hold a diverse profile of attitudes to vaccination and combine the multifactorial aspects of the decision making in the relation to the emotionality. There is a high relation with neutral attitude and decision-making about vaccination ( $p=0.0382$ )

On the other hand, the strong emotional feelings affect the decision itself on vaccination mainly in the first phase of decision-making. However, it ultimately does not play a key role. It is rationality under the influence of emotions. Mothers are more compelled to look for more detailed information about vaccination and relevant facts that would refute their beliefs or their attitude. There is an example how emotionality can negatively influence the attitudes to vaccination. For example, the statement: "Increased cases of autism observed over the past two decades is a result of the combined MMR vaccine, which overwhelms the immune system with three simultaneous viral infections. These therefore cause increased gut permeability to neurotoxins, thereby causing irreversible brain damage leading to autism" (**Wakefield, Murch, Anthony, Linnell, Casson, et al., 1998**). This statement is strong enough to encourage parents to refuse MMR vaccines. In fact it can nurture further misunderstandings and doubts about vaccination in a general.

Table 4 presents the levels of emotionality influencing the decision making about childhood vaccination. These can be multifactorial and based on the power of spread out information, the temperament of the mothers and their value system, associated with amygdala activity and emotional system.

Table 4 Effect of emotionality on attitudes to vaccination

| <b>Negative frame / level of emotionality</b>                                                      | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> |
|----------------------------------------------------------------------------------------------------|----------|----------|----------|----------|
| Real stories about the relation between vaccination and harmful effects e.g. Autism                | 0.044    | 0.041    | 0.158    | 0.087    |
| The amount of undesirable effects of vaccines and possible negative consequences after vaccination | 0.021    | 0.028    | 0.137    | 0.049    |
| Negative personal experiences are stronger than the willingness to toddlers vaccination            | 0.159    | 0.033    | 0.027    | 0.172    |
| Frightening stories of children with permanent consequences after vaccination                      | 0.011    | 0.162    | 0.138    | 0.015    |
| I always do according to my conviction                                                             | 0.164    | 0.154    | 0.032    | 0.005    |
| <b>Positive frame / level of emotionality</b>                                                      | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> |
| False myth about vaccinations and autism                                                           | 0.129    | 0.114    | 0.036    | 0.012    |
| Dangerous risks and outcomes in case of non-vaccination                                            | 0.145    | 0.069    | 0.038    | 0.034    |
| Symptoms of infected children diseases showed in media                                             | 0.025    | 0.072    | 0.063    | 0.026    |
| Scared stories infected children                                                                   | 0.157    | 0.048    | 0.578    | 0.162    |
| I always do according to my conviction                                                             | 0.186    | 0.050    | 0.814    | 0.135    |
| <b>Neutral frame / level of emotionality</b>                                                       | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> |
| Vaccination should be on free choice of everyone                                                   | 0.148    | 0.136    | 0.043    | 0.076    |
| Vaccination has a positive and negative aspects                                                    | 0.008    | 0.034    | 0.084    | 0.095    |
| Vaccination is not for everybody                                                                   | 0.143    | 0.038    | 0.027    | 0.165    |

The study figured out the relationship between the level of emotionality identified by the sample and attitudes to vaccination (table 4,  $p=0.014$ ). Those who are easily influenced prefer the negative frame to others. They are more likely to see the side effects of vaccinations rather than positive aspects (e.g. children with permanent damage after MMR vaccine,  $p=0.011$ ). People with positive frame and with strong own convictions are less likely to refuse the vaccination due to symptoms of diseases ( $p=0.026$ ) and non-vaccination risks ( $p=0.034$ ). People facing personal experience with vaccination totally agreed with the following statement: Negative personal experiences are stronger than the willingness to get toddlers vaccinated ( $p=0.027$ ).

There is a fear and conviction that vaccines themselves may cause those diseases against which they are made or at least cause serious complications. That gives room for anti-vaccination movements based on the negative emotions, fear and lack of trust. The mothers speak about violations of their human rights by making Slovak

vaccination programme obligatory. They call for a change and freedom in choice (31.5%). There are also neutral attitudes presenting mothers opinions: Vaccination is not for everybody (11.4%) and vaccination brings positive and negative aspects in itself (17.6%). 39.5% of the sample think the vaccination programme should stay compulsory in order to prevent and reduce diseases, to save lives and to built collective immunity. If vaccinations decision is based on free will, then many Slovaks would definitely not vaccinate. This would lead to an infectious disaster. That statement is agreed upon by 40% of mothers.

**H3:** There is the significant relation between the emotionality that influences decision-making about vaccination ( $p=0,035$ ).

Those who can be easily persuaded are more likely to take on an anti-vaccination philosophy and totally refuse the childhood vaccination. They do not have medical education and they are easily influenced by the internet information that perpetuates mistrust about vaccination. They prefer emotionality to rationality in decision-making. They would believe more about the dangerous of vaccination, the side effects of vaccination, the risks that come with powerful vaccine shots. They will argue that natural immunization is better than vaccination.

Information specifically covering vaccine efficacy trials, vaccination coverage, and institutional vaccine policy doesn't have any impact on the positive decision-making about vaccination. On the other hand, websites that are critical of vaccinations resonate more. Thus anti-vaccination strategies circulate more quickly across social networks. The framig of the message strongly influences the emotionality and decision-making process that can lead to parental refusal of vaccination.

## DISCUSSION

The study evaluated the association between mothers' beliefs and vaccines attitudes, the association between emotionality and their decision to delay or refuse vaccines for their toddlers. Our research results have shown that the most of those who were made decision on the emotional base, they did not coverage immunization program of two-years old children.

This study explored what factors are important in refusal of childhood vaccination by mothers of toddlers. Similar to the Sporton study (**Sporton, Francis, 2001**), our research has found that the most refusals of vaccination are based on deliberate decision-making of parents. Our results show that this decision is based on multiple factors, such as the lifestyle of parents, perceptions about the body and the immune system of the child, risk perception of diseases and vaccination side effects, perceived vaccine effectiveness, perceived advantages of experiencing the disease, personal negative experience with vaccination, and parents' social environment. In addition, this study shows that the use of online focus groups is an effective qualitative research method resulting in meaningful data.

The refusal to vaccinate children may be influenced by concerns about vaccination in general. These are things like low perceived likelihood and severity of the infectious diseases, and a trusting relationship with a natural healer or another respected person who doubts vaccination safety and effectiveness [16]. Hilton et al. [17] showed that some parents fear an overload of the immune system caused by combination vaccines. Additionally, the perception that vaccination is more risky than non-immunization (**Smailbegovic, Laing, Bedford, 2003**) and issues of harm, distrust and access might play a role in refusing childhood vaccination (**Mills, Jadad, Ross, Wilson, 2005**). Our findings support an important role of negative frame effects on the attitudes to childhood vaccination. Mothers with stronger emotionality about vaccination issues are less likely to get a toddler vaccinated. They prefer not to go through with the vaccination programme that is compulsory in Slovakia ( $p=0,018$ ).

According to Sporton et al. (**Sporton, Francis, 2001**), parents who refused vaccination made a well-considered decision based on an assessment of the benefits and the risks of vaccination, the child's susceptibility to the potential disease, and the acceptance of responsibility for that decision. Our research confirmed correlation between decision making and assessment of benefits and risk of vaccinations for toddlers ( $p=0,027$ ).

We have found that emotionality has an impact on decision-making about vaccination, and this effect, or the very presence of this influence, depends on the type of information message on which emotional manipulation is performed. To get deeper into the nature of this impact and more explicit interpretation, further study of this would be appropriate.

Besides the perceived risk of disease versus vaccination, our findings as well as those of Hilton et al. suggest that parents' fear of the immune system in infancy is not adequately developed for a good response to vaccination

(Gerend,, Shepherd, 2007). They apparently have not received enough information about the influence of vaccines on the immune system of their child. Their resulting doubts cause them to refuse vaccination. Mothers in this study indicated that when they start searching for information, it is hard to find reliable information. So it is difficult for them to make a choice from the information they have found. Mothers also face a lot of ethical dilemmas linked to childhood vaccination that can lead to refusal Blume asks, “Isn't a critical stance towards vaccination a logical consequence of this ideological shift [towards encouraging individual rights]?” (Blume, 2006).

The implication for those seeking to create active demand for vaccination by articulating the common good is that they are likely to continue encountering tension from efforts to encourage individual rights. Building active demand at the community level may be even more challenging than building active demand at the individual level.

#### *Research limitations*

There are some limitations of this study to be considered when interpreting the data. First, the intentional selection process of the participants and smaller sample size implicates that the study sample may not be representative of all mothers of toddlers. In addition, focusing on the female attitudes to vaccination and not including fathers in the study may be a limitation. Secondly, emotionality and its impacts can be analysing from different points of views, we could not cover all of them due to our own personal capacities to do this research. We had no financial support and a limited time-schedule to complete the research.

### **CONCLUSION**

Despite an enormous success of the vaccination program in the Slovakia and decreasing number of infected people by dangerous diseases or rate of preventable diseases because of the vaccine, the thinking of importance of vaccination has changed from a tool of encouraging collective immunity to compulsory tool of state to support the pharmaceutical business. There are increasing numbers of parents who refuse to vaccinate their children. Fear of potentially deadly diseases has been replaced by the fear of real and, more often, imaginary side effects of vaccination. This is only encouraged by emotional feelings of parents and emotional arguments against vaccination not based on the long-term studies.

Our findings show the great impact of negative frame effect on attitudes to childhood vaccination. It is not easy to find solutions to this problem. However, most important is to continue public education and increasing awareness about the side effects of vaccination. Addressing those who refuse to vaccinate with respectful listening to parental concerns is highly important. This study learned that highlighting the risks from non-vaccinated diseases is more effective than promoting the safety of vaccines and its positive rates.

#### *Conflict of interests*

The author has no conflicts of interest to declare. The manuscript is original and has not been previously published anywhere else, and it is not being considered for publication in another journal.

#### *Ethical considerations*

All repondents - mothers involved in the research were informed about the study goals before the data collection. It was emphasized that participation is voluntary and anonymous. If they fullfill the questionnaire they agree with the participation in the research automatically. The study was approved by the St. Elisabeth University of Health and Social Work in Bratislava.

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# THE IMPACT OF TRAINING PROGRAMS ON VIOLENCE TOWARDS HEALTHCARE PROFESSIONALS

Nashat Zuraikat, Indiana University of Pennsylvania  
Liana Marmolejos, Indiana University of Pennsylvania

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## ABSTRACT

*A substantial amount of research has been dedicated to health care workers experiences with workplace violence. Nurses are especially impacted by workplace violence and the scope of the problem is not limited to the United States but worldwide. The issue of workplace violence and its prevalence in nursing and health care workers also is well-documented in international studies. Scholars have concluded that workplace violence negatively affects nurses work performance, level of job satisfaction, and quality of life. Several risk factors for workplace violence have been identified in the literature, including patient substance use and insufficient training. Despite the awareness that nurses are more susceptible to workplace violence, little has been done to resolve the inconsistent approaches to preventing or deescalating violent occurrences. The purpose of this study is to identify best practices for reducing violence against healthcare workers. Using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database, relevant literature from January 2000 to December 2017 was organized into a matrix and analyzed to identify evidence-based practices for address workplace violence. The final analysis included a sample of 51 articles. The analysis found that actuarial instruments to predict violence, organizational policy and procedures mandating reporting of incidences of violence, and therapeutic communication and de-escalation techniques showed promise in reducing violence and improving nurses and health care workers perceptions of preparedness. The results of the study suggest that the issue of workplace violence should address using a systemic approach that emphasizes prevention through educational programs rather than de-escalation. In addition, the findings underline the need for more uniformed training programs for nurses and health care providers to reduce the incidence of violence in workplace.*

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Nashat Zuraikat, PhD, RN  
Professor of Nursing  
1011 South Drive  
Indiana University of Pennsylvania,  
Indiana, PA 15705

Liana Marmolejos, MA  
Graduate assistant  
1011 South Drive  
Indiana University of Pennsylvania,  
Indiana, PA 15705

**TRACK**  
**HEALTHCARE MANAGEMENT**

# A COMPARATIVE REVIEW OF TELEHEALTH AND PATIENT-CENTERED MEDICAL HOMES

Rose Carboni, University of Scranton  
Steven J. Szydlowski, University of Scranton

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## ABSTRACT

*This presentation is a comparative review of telehealth services in the healthcare setting of patient-centered medical homes. The presentation focuses on the strengths and weaknesses of implementing this type of technology. The presenters also discuss the challenges faced when implementing telehealth services and some strategies to overcome them. A brief overview of the impact of telehealth on patient-centered medical homes is provided. A literature review is used to gather and organize common attributes and trends that suggest evidence supporting the benefits of implementing telehealth services. Specific keywords related to telehealth, patient-centered medical homes, and accountable care organizations are defined and databases used to retrieve the articles are identified. Recommendations and conclusion are provided as well as areas for future research.*

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Rose Carboni  
University of Scranton  
Scranton, PA 18510  
[rose.carboni@scranton.edu](mailto:rose.carboni@scranton.edu)

Steven J. Szydlowski, DHA, MBA, MHA  
University of Scranton  
Scranton, PA 18510  
570 941 4367  
[steven.szydlowski@scranton.edu](mailto:steven.szydlowski@scranton.edu)

# DETERMINANTS OF MOBILITY OF HEALTHCARE PROVIDERS FROM TECHNICAL WORK TO ADMINISTRATIVE WORK IN SAUDI ARABIA

*Faisal Alshammri, Saudi Red Crescent Authority, Majmaah University  
Majed Alamri, Majmaah University*

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## ABSTRACT

*The purpose of this exploratory descriptive study is to determine the factors that influence healthcare providers' mobility from working as technicians to administrative work in governmental hospitals in Saudi Arabia. The determinants will be examined by developing a questionnaire, and structured interviews. This study will examine Saudi Arabian healthcare providers who are moved from clinical work to administrative work within the last ten years. A convenience sample will be recruited in the northern region of Saudi Arabia.*

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Faisal Alshammri  
College of Business Administration, Majmaah University, Graduate student  
Saudi Red Crescent Authority  
Majmaah University, Kingdom of Saudi Arabia  
[f.anaa@hotmail.com](mailto:f.anaa@hotmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

# DOES COMMUNITY DIVERSITY IMPACT AVAILABILITY OF TRAUMA CERTIFIED HOSPITALS IN THE UNITED STATES

*Hanadi Hamadi, University of North Florida  
Aurora Tafili, University of North Florida  
Emma Apatu, McMaster University  
Aaron Spaulding, Mayo Clinic*

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## ABSTRACT

*This study is focused on examining the relationship between community diversity in a Hospital Referral Region (HRR), and United States-based hospitals' attainment of trauma certification and trauma levels. We conducted a cross-sectional analysis of data from the 2016 American Hospital Association (AHA) Annual Survey database, census dataset, and the Dartmouth Atlas Hospital Referral Region dataset. Poisson regression was used to estimate the association between hospitals' attainment of trauma certification and trauma levels, and population factors.*

*We analyzed community health services of 6,000 hospitals across approximately 303 HRRs. Our primary dependent variables were hospitals with trauma certification and hospitals with trauma level I or II. Our primary independent variable was the level of diversity of an HRR operationalized by estimating an entropy index score for each county—aggregated to the HRR level—that is comprised of the proportions of the 6 ethnic groups: 1. Non-Hispanic White, 2. Black 3. Hispanic, 4. Asian, 5. American Indian or Alaskan Native, 6. Native Hawaiian or other Pacific Islander. A greater score is indicative of a more diverse HRR.*

*Diverse well-populated areas that rank higher in education attainment have an increased number of hospitals with trauma I or II. Hospitals designated as teaching hospitals are more likely to have trauma certification or level I or II centers within its campus. HRRs with an increased number of small hospitals with less than 100 beds are more likely to have more trauma certification centers and less likely to have a large number of hospitals with trauma I or II. An increased number in hospital Medicare percentage results in a 2.57 times of an increase in the number of trauma I or II hospitals. Lastly, HRRs with high competitive markets have about 2 to 2.5 times the likelihood of having an increased number of hospitals with both trauma certifications or level I or II. Prior studies indicate that certain hospital attributes influence higher percentages of minority patient volume, and that increases in minority patient volume may impact hospital performance. When controlling for hospital-level factors and community-level factors using a propensity score analysis, the findings remained consistent. Diverse communities were at a higher risk of lower availability of hospitals with trauma certification and hospitals with trauma I or II.*

*Hospitals may be using these services to provide greater access to care, however, the care provided is typically urgent care or after hour care. The strong relationship between both hospital factors and community factors indicate the importance of examining hospital communities as a predictor of hospital resource and utilization. Additional research is needed to determine whether resource allocation and reimbursements distribution from Medicaid Disproportionate Share Hospital impacts trauma center availability.*

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Hanadi Hamadi, Ph.D.  
Health Administration Program  
Brooks College of Health  
University of North Florida  
1 UNF Drive  
Jacksonville, FL 32258  
(904) 620-5314

(904) 620-1035 FAX  
[h.hamadi@unf.edu](mailto:h.hamadi@unf.edu)

Aurora Tafili – CONTACT AUTHOR  
Health Administration Program  
Brooks College of Health  
University of North Florida  
1 UNF Drive  
Jacksonville, FL 32224  
(904) 614-3189  
[aurora.tafili@unf.edu](mailto:aurora.tafili@unf.edu)

Emma Apatu, DrPH  
Department of Health Research Methods, Evidence, and Impact  
Faculty of Health Sciences  
McMaster University  
1280 Main Street West  
Hamilton, Ontario, L8S 4K1, Canada  
(905) 525-9140 ext. 26428  
[apatue@mcmaster.ca](mailto:apatue@mcmaster.ca)

Aaron Spaulding, Ph.D.  
Associate Consultant I  
Department of Health Sciences Research  
Division of Health Care Policy and Research  
Mayo Clinic Robert D. and Patricia E. Kern  
Center for the Science of Health Care Delivery  
4500 San Pablo Road  
Jacksonville, FL 32224  
(904) 953-0671  
[spaulding.aaron@mayo.edu](mailto:spaulding.aaron@mayo.edu)

# **HOSPITAL ADMINISTRATION: HELP OR HINDRANCE IN THE OPIOD CRISIS**

Dennis Emmet  
Professor of Management  
Lewis College of Business  
Marshall University  
One John Marshall Drive  
Huntington, WV 25755-2076  
[demmett@marshall.edu](mailto:demmett@marshall.edu)

# HOSPITAL ADMINISTRATION: HELP OR HINDRANCE IN THE OPIOID CRISIS

*Dennis Emmett, Marshall University*

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## ABSTRACT

*This paper discusses how hospital administration rules and policies can help or hinder opioid usage. Several hospitals have not authorized non-opioid analgesics in surgery due to a higher cost. Until recently, many hospitals would not authorize the use of IV acetaminophen (Tylenol) for surgical procedures due to the higher cost. This may lead to more individuals using and abusing opioids.*

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## INTRODUCTION

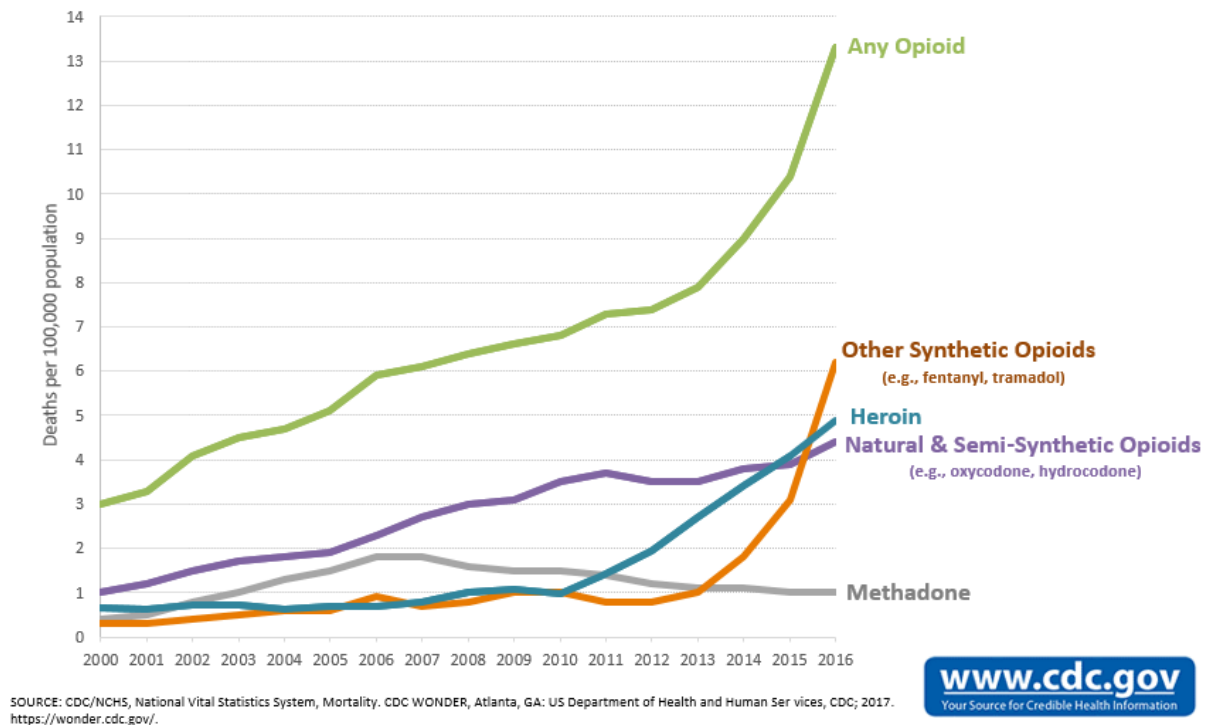
The opioid crisis is real and getting worse. The chart below shows the deaths per 100,000 population for the years from 2000-2016 (Center for Disease Control, 2017). The number of death is spiraling out of control. The number of deaths from Other Synthetic Opioids is increasing at the fastest rate. One of the opioids mentioned is fentanyl. Fentanyl is around 50 times more powerful than morphine. It is used frequently by anesthesia providers in pain management. Here it is used by specially trained professionals. Today, one of the major problems is that fentanyl is being combined with heroin and sold to unsuspecting users. The power of the fentanyl causes death from an overdose.

One of the major causes of the epidemic is the misuse of prescription medications. Between 4-6% of people who misuse prescription opioids turn to heroin. In addition, 80% of heroin addicts began by abusing prescription opioids (National Institute on Drug Abuse, 2017). The government has attempted to crack down on pharmacists and doctors who were over-prescribing opioids (Economist, 2017). An unintended consequence is that individuals switched to heroin, a significantly more potent but cheaper opioid (Caldwell, 2017).

Deaths from overdoses is a serious health concern and a drain on public funds as first responders spend a great deal of time trying to revive these individuals and using expensive agents like Narcan. The government and other agencies have attempted to provide solutions to this problem with little success. If one of the reasons for this epidemic is the misuse of prescription medicines, then one solution is to try to eliminate this cause. Nash (2016) argues that we have mobilized task forces and implemented policy change in an attempt to reverse the trend. Nash further states

“The resulting initiatives—mandates for abuse-deterrent formulations, more stringent prescription monitoring programs, widespread availability of naloxone to reverse the effects of overdose, and greater emphasis on addiction recovery and rehabilitation services—have been crucial for combatting the crisis. However, these approaches fail to address the underlying issue (i.e., they assume a continuing influx of opioids into our communities, working *reactively* to make these drugs more difficult to abuse, to “scam” from the health care system, to become dependent upon, and to die from). Getting to the crux of the problem will require a *proactive* approach that minimizes the introduction of opioids into general circulation by reducing or eliminating avoidable exposure. This presents a formidable challenge because it entails a reappraisal of well-entrenched prescribing practices.”

## Overdose Deaths Involving Opioids, by Type of Opioid, United States, 2000-2016



One of the more serious consequences of surgery is postsurgical pain. Most often this pain has been controlled by the use of opioids. There are two consequences of this practice. First, patients may become addicted to these drugs. This can lead to long-term addiction and switching to other opioids. Second, recent restrictions on the physician's ability to prescribe over the telephone have led to prescribing larger amounts just in case the patient needs them. This may lead to these excess drugs ending up on the street. Two third of individuals abusing opioids are taking someone else's prescription medicine surplus (Nash, 2016).

### WHAT HAS BEEN DONE

Several steps have been taken to help with the addiction problems resulting from use of opioids during and after surgery. One small step in the right direction was the passing by Congress of "Jessie's Law". The bill is intended to give full disclosure to physicians concerning past addiction history of the patient. This is done with consent (Kim, 2016). The bill was named after Jessica Grubb who had a seven-year battle with heroin addiction. She was sober for six months, when she had an injury from running. She went to the hospital to have surgery. Before the surgery, the physicians were told of the past addiction problem, but they still sent her home with a prescription for 50 oxycodone pills and an IV port to pump antibiotics into her arm. She was soon found dead from an overdose. Could this have been prevented? That is quite possible had some other type of analgesic been prescribed.

In addition, we have instituted policies and procedures that are helpful when first responders reach the scene of an overdose. In most areas, first responders are provided with Narcan. Narcan Nasal Spray counteracts the life-threatening effects of an opioid overdose. Since most accidental overdoses occur in a home setting, it was developed for first responders, as well as family, friends, and caregivers—with no medical training required. This is

an important tool to battle death, but does little to prevent addiction from occurring. The thought is that as long as a person lives there is hope for recovery.

There are many treatments methods available to patients. Some are in-patient long-term stays and some are outpatient treatment centers. Experts believe that the more treatment and services received by the recovering addict, the better the chances for success. The treatment centers and services are expensive. This does not address the issue of preventing addiction.

Education has been used as a tool in deterring individuals from using illicit drugs. The education has primarily been targeted to the youth. Different types of program have been instituted to fight the addiction epidemic. It is difficult to assess their success. One can only hope that they have kept some individuals from using drugs. Past attempts with similar problems, e.g., smoking, drunk driving, have not had great success. It is necessary to continue the campaign, but the results may not be overwhelming.

One consequence of drug usage is run-ins with the law. Many addicts sell drugs to pay for their habit. When arrested, they are sentenced to jail time. This is not rehabilitation but incarceration. Statistics show that addicts just released from prison are among the greatest risk for opioid overdose and death (pennlive.com, 2017). Some states have turned to “Drug Courts”. This allows a non-violent offender the opportunity to get rehabilitation and at the same time to have criminal records expunged. This has been somewhat successful as these individuals are required to receive counseling along with drug testing over a long period. Most of these individuals would be facing prison sentences if this option were not available.

Another method of treatment is the use of other drugs to overcome the addiction. Methadone has been used to help addicts recover from heroin addiction. This treatment has been relatively successful. Critics claim that it is trading one drug for another. Their claim is that true recovery is substance-free. Another relatively new drug is Vivitrol. One injection of this drug is supposed to control opioid cravings for 28 days. While this sounds good, again, this does not prevent addiction.

### **ONE POSSIBLE SOLUTION**

In performing surgeries, anesthesiologists are concerned with pain control. The most common method of controlling pain is with the use of opioids. As stated above, the use of opioids can create numerous problems, including addiction. The hope is that there may be other non-opioid drugs that would be as effective as opioids.

One non-opioid drug that is available is acetaminophen (Tylenol). Oral acetaminophen has been around for a long period of time. The Food and Drug Administration (FDA) approved IV acetaminophen in November, 2010 (Ammar, 2013). It can be used to manage cases of mild-to-moderate pain and moderate-to-severe in conjunction with opioid analgesics (Ammar, 2013). In a variety of studies, the introduction of intravenous acetaminophen showed greater pain relief and a reduction in the amount of opioids consumed. IV Acetaminophen has been shown to decrease the amount of narcotic used for post-operative pain control. (Nwagbologu, Sarangarm, & D'Angio, 2016) Total opioid consumption was lower following hysterectomy when IV acetaminophen was infused. (Herring et al., 2014) IV acetaminophen along with a multimodal approach provided better pain relief for patients undergoing total knee arthroplasty when compared to narcotics alone. (Murata-Ooiwa, Tsukada, & Wakui, 2017) Rescue medication amount and time to request rescue medication were reduced with the use of IV acetaminophen. (R. S. Sinatra et al., 2012) Sinatra also published an original study in 2005 that showed the safety and effectiveness of IV acetaminophen. (M. D. P. D. Raymond S. Sinatra et al., 2005). The pain from laparoscopic surgery can delay discharge or may cause a patient to be admitted for observation. When compared to a placebo, IV acetaminophen provided effective pain relief for minimally invasive laparoscopic abdominal procedures. (Wininger et al., 2010).

In addition, IV acetaminophen has a quick onset of 5-10 minutes. It also lasts for 4-6 hours. The question is why is it not used more often. The easy answer to this question is cost. The cost of an IV regimen is several times higher than oral regimen Ammar, 2013. However, in the operating room, the patient is usually not able to take the

medicine orally. At Cleveland Clinic, IV acetaminophen can only be prescribed by a Staff Physician and it cannot be used as a first-line therapy (Ammar, 2013).

Due to cost considerations, it also is not used in a wide variety of hospitals. This leads to a thorny situation. There is a drug that is effective in reducing pain that is not an opioid, but because of cost is not being used. When one examines this issue from the viewpoint of the hospital or an insurance company, one understands why the cheaper alternative is being utilized. However, from a societal viewpoint, it makes no sense. If the use of a non-opioid can keep one person from becoming addicted to drugs, then the extra cost may be worth it. Remember that 4-6% of people who misuse prescription drugs turn to heroin. For insurance companies, in the long-run not having to pay for drug rehabilitation treatment for an individual may be worth the extra cost.

Given our litigious society, it should not surprise anyone that there may be future cases where individuals sue hospitals and insurance companies for causing them to become drug users. The claim would be that there were other non-opioid drugs available, but due to cost were not used. Ford Motor Company did not fix the Pinto, when they knew that there was a problem with potential explosions if the car was rear-ended. They decided that it was cheaper to pay any lawsuits, then to fix the problem. Again, we are dealing with human life. We should do everything in our power to make sure that we are providing the safest and most effective medical practice. Hopefully, we will find other non-opioid analgesics. This will allow us to drastically reduce the amount of opioids being used in surgeries and being prescribed for after-care.

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# HOSPITAL PARTNERSHIP FOR POPULATION HEALTH

Sinyoung Park, PhD (CONTACT AUTHOR)

Assistant Professor

Department of Health Administration

Brooks College of Health

University of North Florida

(904) 620-5229

[sinyoung.park@unf.edu](mailto:sinyoung.park@unf.edu)

Hanadi Hamadi, PhD

Associate Professor

Department of Health Administration

Brooks College of Health

University of North Florida

(904) 620-5214

[h.hamadi@unf.edu](mailto:h.hamadi@unf.edu)

Emma Apatu, PhD

Associate Professor

Department of Health Research Methods, Evidence, and Impact

McMaster University

[apatue@mcmaster.ca](mailto:apatue@mcmaster.ca)

Aaron C. Spaulding, PhD

Associate Consultant I

Department of Health Sciences Research

Division of Health Care Policy and Research

Mayo Clinic Robert D. and Patricia E. Kern

Center for the Science of Health Care Delivery

[spaulding.aaron@mayo.edu](mailto:spaulding.aaron@mayo.edu)

# HOSPITAL PARTNERSHIP FOR POPULATION HEALTH

*Sinyoung Park, University of North Florida*  
*Hanadi Hamadi, University of North Florida*  
*Emma Apatu, McMaster University*  
*Aaron C. Spaulding, Mayo Clinic*

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## ABSTRACT

*Hospitals are expected to improve population health in the community they serve through Affordable Care Act mandates. Hospitals may achieve this by creating partnerships with diverse organizations. The aim of this study is to examine characteristics of hospitals that developed partnerships on improving population health. Larger hospitals, urban areas, system membership, and higher inpatient days per 1,000 reported stronger partner connections, as was hospital ownership. This study provides an updated look at partnership when looking at commitment to population health and contributes to the literature by stressing the need for support of rural and smaller hospitals in population health outreach.*

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## INTRODUCTION

Overall population health has been emphasized through the Patient Protection and Affordable Care Act (ACA, 2010) and value-based purchasing system. The legislative changes under ACA influences hospitals to reconfigure their strategies, structure, and services to improve the population health of the communities they are serving. In addition, the Institute for Healthcare Improvement (IHI) introduced the Triple Aim, including improvement of population health, patient experience of care, and reduction of per capita cost in 2008 (Berwick, Nolan, and Whittington, 2008). This Triple Aim has become the organizing framework for public and private healthcare organizations, including hospitals. Specifically, hospitals are expected to fulfill their roles in the community by improving the health of the population in the community. In addition to looking at their specific patient's health needs, hospitals need to look at health for a much broader population, such as specific geographic areas, or those groups that are underserved in their population (Hacker and Walker, 2013; Kindig and Isham, 2014).

One way for hospitals to achieve improvement in population health is to have partnerships with diverse organizations, such local public health departments, state/federal agencies, and other healthcare organizations (Hacker and Walker, 2013; Schuttfeld, Prybil, Kelly, and Mays, 2016; Washington, Coye, and Boulware, 2016). Partnerships are voluntary organizations that assemble multiple levels of stakeholders to collaborate on specific health-related issues within a community (D'Aunno, Hearld, and Alexander, 2017; Hearld, Alexander, and Mittler, 2012). A recent example of hospitals' partnerships is to use a collaborative approach for conducting community health needs assessments (CHNAs). The ACA emphasized the role of nonprofit hospitals to evaluate community health needs and develop an implementation report to address the health deficits and needs of the surrounding community at least every 3 years (Laymon, Shah, Leep, Elligers, and Kuman, 2015). To achieve this role, hospitals collect data, including the community they serve, existing healthcare resources, and the priority of community health needs (Stoto, 2013). Collaborating with a local health department and working with a consultant resulted in the improvement of CHNAs and better implementation strategies report compared to the hospitals' previous preparation of CHNAs report independently (Pennel, McLeroy, Burdine, and Matarrita-Cascante, 2015; Ishcomer, Hewlett Noël, and Coffman, 2018).

A number of studies have described several ways to explain the levels of partnership. One study has introduced three categories of partnership for hospitals: formal (contractual), informal, and no partnership and found organizational and market characteristics determined patterns of partnership between hospitals and public health agencies (Halverson, Mays, and Kaluzny, 2000). Formal partnership means that hospitals contract with public health

agencies for collaborations. Public hospitals were more likely to have formal/informal partnerships and for-profit hospitals were less likely to have formal/informal partnership with local public health agencies compared to private not-for-profit hospitals. Competition was also a predictor of formal/informal collaboration. However, there was a negative association with collaboration with local public health agencies. Other previous literature have introduced vertical and horizontal partnership with health care organizations (Buchner, Hinz, and Schreyogg, 2015; Hearld, Carroll, Hearld, and Opoku-Agyeman, 2018). Horizontal partnerships was defined as hospitals with relationships with other hospitals and vertical partnerships if hospitals have partnerships with non-hospital organizations, such as organizations that support hospitals to serve their patients. Government hospitals had higher likelihood to follow a vertical relationship, while for-profit hospital had higher likelihood to pursue a horizontal relationship. Hospitals with higher census count, more community orientation activities, and higher Medicare discharge rates were more likely to have a combined vertical and horizontal partnership (Hearld et al., 2018).

With regards to the impact of partnership at the hospital and community level, partnership brought more economic incentives to hospitals due to sharing of resources and economies of scale and scope, as well as non-economic incentives due to coordinated action and reduction of duplication of effort (Buchner et al., 2015; Mays and Scutchfield, 2010; Zuckerman, Kalunzy, and Ricketts, 1995). In addition, partnership can synergize improvements in community health more effectively than entities working alone by using the diverse skill sets resources of their community partners (Beatty, Wilson, Ciecior, and Stringer, 2015; Hearld, Alexander, and Shi, 2015).

Although there is ample research that looks at the levels or types of partnerships and the impacts of partnerships at the hospital level in general, there is limited research investigating the current trends of hospitals' partnering with other organizations primarily looking at population health improvement. The aim of this study is to examine the characteristics of hospitals that have developed partnerships based on improving population health, in comparison to hospitals that have not. By simultaneously considering multiple levels of partnerships and using the latest American Hospital Association (AHA) population health survey, we believe that this study provides a more systematic and updated consideration of hospitals' partnership for population health improvement.

## METHODS

### *Data Sources*

The 2015 Population Health Survey (PHS), the 2016 American Hospital Association (AHA) Database, and the 2016 Dartmouth Atlas of Health Care. The PHS was conducted May 2015 to AHA member hospitals, and 1,418 hospitals participated in the survey. The survey was voluntary and the sample is over-representative of Midwest, large, teaching, not-for-profit hospitals. The AHA database includes hospital level information on over 6,000 hospitals in the United States. The Dartmouth Atlas of Health Care dataset provides geographic outline for hospital service areas (HSAs). HSAs are local health care markets made up of a group of ZIP codes whose residents receive majority of their hospital care from the hospitals in that area. There are a total of 3,436 HSAs in the United States (The Dartmouth Atlas of Health Care., 2017).

### *Sample*

The sample was limited to general medical and surgical hospitals in the United States (n=1,186). After dataset mergers and deleting hospitals with missing data, which reduced the sample further to 768 and 797 hospitals.

### *Variables*

There were four key dependent variables in our study that measured hospitals' type and level of partnerships. The survey question asked hospitals to describe their hospital's current working relationship with each type of organization (other hospitals or health care systems, local agencies, state agencies, and other agencies). Under other agencies, we operationalized a community agencies variable, which includes organization that supports a community initiative. These organizations were national health associations, federally qualified health centers, community health centers, rural health clinics, free clinics, healthy communities coalition, retail clinics, faith-based organizations, early childhood education, school districts, post-secondary education, chamber of commerce, local businesses, service leagues, neighborhood organizations, United Way or the YMCA/YWCA. Lastly, we developed an overall partnership variable that includes all the above types of agencies/organizations.

Hospitals were asked to indicate their level of partnership on a 6 category likert scale: not involved; funding partnership referring to grant-making capacity only; networking partnership involving the exchange of ideas and information; cooperation partnership including exchange of information and resource sharing; collaboration partnership referring to the exchange of information, resources and capacity enhancement; and alliance partnership indicating a bonding agreement among several organizations with common initiatives. Due to our samples distribution, for each type of organization we consolidated the levels of partnerships from 6 categories into 2 cut-off categories (Linacre, 2002); weak (not involved, funding, or networking) and strong (cooperation, collaboration or alliance) partnerships.

Our hospital level factors included size (small <100 beds, medium > 99 beds and < 200 beds, and large >=200 beds), ownership status (government federal and non-federal, for-profit, and not-for-profit), part of a system, teaching status (teaching and non-teaching), Medicare percentage, Medicaid percentage, location (urban, rural), average length of stay, and inpatient days per 1000.

### Analysis

To analyze the relationship between hospital partnerships and organizational characteristics, we utilized univariate, bivariate, and multivariate regression analysis. Prior to conducting the analysis, the data was examined for normality and multi-collinearity using Skewness/Kurtosis tests and pearson's correlation matrix (all correlations coefficients<0.60). Percentages and frequencies were reported for categorical variables, and means and standard deviations for continuous variables. For the bivariate analysis we used two-sample test with unequal variances or a Pearson chi-square. Logistic regression analysis was conducted to explore the factors impacting hospital partnership level. All analyses were conducted using STATA 14.

## RESULTS

The characteristics of the hospitals are summarized in Table 1. Among the 797 hospitals, most were not-for-profit (71.02%), followed by government-controlled (23.84%) and for-profit hospitals (5.14%). More than half of all hospitals belonged to healthcare system (59.60%), were non-teaching hospitals (64.49%), and were located in urban area (58.22%). The average Medicare and Medicaid percentages were 15% and 27% respectively, and the average length of stay and inpatient days per 1,000 were over 8 and 48 days respectively. In addition, we found that slightly less than half of these hospitals had strong partnerships with other local hospitals (46.48%), local government (48.81%), state agencies (48.94%), and community agencies (49.31%).

TABLE 1  
Descriptive Statistics

|                                                             | Frequency | Percent | N   |
|-------------------------------------------------------------|-----------|---------|-----|
| <b>Size</b>                                                 |           |         | 797 |
| Small                                                       | 349       | 43.79   |     |
| Medium                                                      | 154       | 19.32   |     |
| Large                                                       | 294       | 36.89   |     |
| <b>Ownership</b>                                            |           |         | 797 |
| Government                                                  | 190       | 23.84   |     |
| For-profit                                                  | 41        | 5.14    |     |
| Not-for-profit                                              | 566       | 71.02   |     |
| <b>System</b>                                               |           |         | 797 |
| No                                                          | 322       | 40.40   |     |
| Yes                                                         | 475       | 59.60   |     |
| <b>Teaching</b>                                             |           |         | 797 |
| No                                                          | 514       | 64.49   |     |
| Yes                                                         | 283       | 35.51   |     |
| <b>Rural</b>                                                |           |         | 797 |
| No                                                          | 464       | 58.22   |     |
| Yes                                                         | 333       | 41.78   |     |
| <b>Partnership with local hospitals/health care systems</b> |           |         | 768 |

|                                          |       |       |     |
|------------------------------------------|-------|-------|-----|
| Weak                                     | 411   | 53.52 |     |
| Strong                                   | 357   | 46.48 |     |
| <b>Partnership with local government</b> |       |       |     |
| Weak                                     | 409   | 51.19 | 797 |
| Strong                                   | 390   | 48.81 |     |
| <b>Partnership with state agency</b>     |       |       | 797 |
| Weak                                     | 408   | 51.06 |     |
| Strong                                   | 391   | 48.94 |     |
| <b>Partnership with community agency</b> |       |       | 797 |
| Weak                                     | 405   | 50.69 |     |
| Strong                                   | 394   | 49.31 |     |
| <b>Overall partnership</b>               |       |       | 767 |
| Weak                                     | 384   | 50.07 |     |
| Strong                                   | 383   | 49.93 |     |
| <b>Hospital-Level</b>                    | Mean  | SD    |     |
| Medicare percentage                      | 0.19  | 0.15  | 797 |
| Medicaid percentage                      | 0.52  | 0.27  | 797 |
| Average length of stay                   | 8.90  | 18.29 | 797 |
| Inpatient day per 1000                   | 48.92 | 61.79 | 797 |

The results of bivariate analysis are presented in Table 2. Hospitals that have strong partnerships with any type of organization were more likely to be a larger hospital. Hospitals having strong partnerships with community agencies and with overall partnership also tended to be non-for-profit hospitals relative to hospitals having weak partnerships (78.17% vs. 64.02%;  $p < 0.001$  and 76.50% vs. 64.84%;  $p < 0.01$ ). Hospitals having strong partnerships with local agencies, state agencies, and community agencies were significantly more likely to be system members and hospitals located with urban area. Hospitals partnered with other hospitals or health care, local agencies, state agencies, community agencies, and hospitals with overall strong partnerships were more often teaching-affiliated hospitals compared to weakly partnered hospitals (40.34% vs. 31.46%;  $p < 0.01$ , 41.79% vs. 29.48%, 42.20% vs. 29.06%, 45.18% vs. 26.05, and 44.65% vs. 26.56%;  $p < 0.001$ ). In addition, hospitals with weak partnerships with community agencies and all the types of agencies/organizations were more likely to have longer average length of stay compared to counterparts (9.98 vs. 7.80 and 10.37 vs. 7.65;  $p < 0.05$ ). Hospitals with strong relationships with each type and all types of organizations tend to have higher utilization of inpatient care per 1,000 compared to hospitals with weak relationships (56.00 vs. 43.11;  $p < 0.01$ , 58.93 vs. 39.31, 48.92 vs. 37.46, 64.24 vs. 33.94, and 62.44 vs. 35.80;  $p < 0.001$ ).

TABLE 2  
Bivariate Analysis

|                        | Other Hospitals or Health<br>Care Systems<br>n= 767 |            |     | Local Agencies<br>n= 797 |            |     | State Agencies<br>n= 797 |            |     | Community Agencies<br>n= 797 |            |     | Overall Partnership<br>n= 767 |            |     |
|------------------------|-----------------------------------------------------|------------|-----|--------------------------|------------|-----|--------------------------|------------|-----|------------------------------|------------|-----|-------------------------------|------------|-----|
|                        | Weak (%)                                            | Strong (%) | Sig | Weak (%)                 | Strong (%) | Sig | Weak (%)                 | Strong (%) | Sig | Weak (%)                     | Strong (%) | Sig | Weak (%)                      | Strong (%) | Sig |
| Size                   |                                                     |            | *   |                          |            | **  |                          |            | *** |                              |            | *** |                               |            | *** |
| Small                  | 46.34                                               | 41.46      |     | 49.63                    | 37.69      |     | 50.49                    | 36.83      |     | 55.58                        | 31.73      |     | 52.34                         | 35.77      |     |
| Medium                 | 20.49                                               | 16.81      |     | 17.69                    | 21.03      |     | 19.21                    | 19.44      |     | 17.87                        | 20.81      |     | 18.75                         | 18.80      |     |
| Large                  | 33.17                                               | 41.74      |     | 32.68                    | 41.28      |     | 30.30                    | 43.73      |     | 26.55                        | 47.46      |     | 28.91                         | 45.43      |     |
| Ownership              |                                                     |            |     |                          |            |     |                          |            |     |                              |            |     |                               |            | **  |
| Government             | 24.63                                               | 23.53      |     | 25.06                    | 22.56      |     | 26.85                    | 20.72      |     | 30.52                        | 17.01      |     | 28.91                         | 19.32      |     |
| For-profit             | 6.83                                                | 3.36       |     | 5.41                     | 4.87       |     | 5.17                     | 5.12       |     | 5.46                         | 4.82       |     | 6.25                          | 4.18       |     |
| Not-for-profit         | 68.54                                               | 73.11      |     | 69.53                    | 72.56      |     | 67.98                    | 74.17      |     | 64.02                        | 78.17      |     | 64.84                         | 76.50      |     |
| System                 |                                                     |            |     |                          |            | *   |                          |            | **  |                              |            | *** |                               |            | *** |
| No                     | 41.95                                               | 38.38      |     | 43.73                    | 36.92      |     | 45.32                    | 35.29      |     | 48.88                        | 31.73      |     | 47.40                         | 33.16      |     |
| Yes                    | 58.05                                               | 61.62      |     | 56.27                    | 63.08      |     | 54.68                    | 64.71      |     | 51.12                        | 68.27      |     | 52.60                         | 66.84      |     |
| Teaching               |                                                     |            | **  |                          |            | *** |                          |            | *** |                              |            | *** |                               |            | *** |
| No                     | 68.54                                               | 59.66      |     | 70.52                    | 58.21      |     | 70.94                    | 57.8       |     | 73.95                        | 54.82      |     | 73.44                         | 55.35      |     |
| Yes                    | 31.46                                               | 40.34      |     | 29.48                    | 41.79      |     | 29.06                    | 42.2       |     | 26.05                        | 45.18      |     | 26.56                         | 44.65      |     |
| Rural                  |                                                     |            |     |                          |            | *** |                          |            | *** |                              |            | *** |                               |            | *** |
| No                     | 55.85                                               | 61.06      |     | 51.60                    | 65.13      |     | 50.25                    | 66.50      |     | 46.40                        | 70.30      |     | 48.18                         | 68.41      |     |
| Yes                    | 44.15                                               | 38.94      |     | 48.40                    | 34.87      |     | 49.75                    | 33.50      |     | 53.60                        | 29.70      |     | 51.82                         | 31.59      |     |
|                        | Weak (μ)                                            | Strong (μ) | Sig | Weak (μ)                 | Strong (μ) | Sig | Weak (μ)                 | Strong (μ) | Sig | Weak (μ)                     | Strong (μ) | Sig | Weak (μ)                      | Strong (μ) | Sig |
| Medicare percentage    | 0.19                                                | 0.20       |     | 0.18                     | 0.20       |     | 0.19                     | 0.19       |     | 0.19                         | 0.20       |     | 0.19                          | 0.20       |     |
| Medicaid percentage    | 0.52                                                | 0.52       |     | 0.53                     | 0.51       |     | 0.54                     | 0.52       | *   | 0.53                         | 0.52       |     | 0.52                          | 0.52       |     |
| Average length of stay | 9.30                                                | 8.68       |     | 8.61                     | 9.20       |     | 9.39                     | 9.90       |     | 9.98                         | 7.80       | *   | 10.37                         | 7.65       | *   |
| Inpatient day per 1000 | 43.11                                               | 56.00      | **  | 39.31                    | 58.93      | *** | 37.46                    | 48.92      | *** | 33.94                        | 64.24      | *** | 35.80                         | 62.44      | *** |

Exponentiated coefficients; 95% confidence intervals in brackets: \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Table 3 reflects the results of multivariate logistic regression of select variables on the odds of hospitals reporting strong partnerships with any or all types of organization. Hospitals with system membership had 55% and 53% higher odds of having strong partnership with community agencies and all types of agencies/organizations compared to hospitals without system membership (AOR 1.55 and 1.53, p<0.01). Hospitals located in rural areas were associated with lower odds of strong partnerships with any type (except for other hospitals) and all types of organizations relative to hospitals located in urban areas. In addition, hospitals having higher inpatient days per 1,000 were associated with greater odds of strong partnership with local agencies and all types of organizations (AOR 1.006, p<0.01) and with state agencies and community agencies (AOR 1.005, p<0.05).

TABLE 3 Multivariate Logistic Regression

|                                  | Other Hospitals or<br>Health Care Systems<br>n= 767 |             | Local Agencies<br>n= 797 |             | State Agencies<br>n= 797 |             | Community Agencies<br>n= 797 |             | Overall Partnership<br>n= 767 |             |
|----------------------------------|-----------------------------------------------------|-------------|--------------------------|-------------|--------------------------|-------------|------------------------------|-------------|-------------------------------|-------------|
|                                  | OR                                                  | 95% CI      | OR                       | 95% CI      | OR                       | 95% CI      | OR                           | 95% CI      | OR                            | 95% CI      |
| Size (referent: small)           |                                                     |             |                          |             |                          |             |                              |             |                               |             |
| Medium                           | 0.78                                                | [0.50,1.22] | 1.11                     | [0.72,1.71] | 0.93                     | [0.60,1.45] | 1.25                         | [0.80,1.94] | 0.87                          | [0.56,1.36] |
| Large                            | 0.89                                                | [0.51,1.53] | 0.64                     | [0.37,1.11] | 0.76                     | [0.43,1.33] | 1.08                         | [0.61,1.91] | 0.69                          | [0.39,1.22] |
| Ownership (referent: government) |                                                     |             |                          |             |                          |             |                              |             |                               |             |
| For-profit                       | 0.49                                                | [0.23,1.05] | 0.87                     | [0.43,1.79] | 1.13                     | [0.55,2.33] | 1.15                         | [0.55,2.40] | 0.84                          | [0.40,1.75] |
| Not-for-profit                   | 1.00                                                | [0.69,1.45] | 0.90                     | [0.63,1.31] | 1.11                     | [0.76,1.60] | 1.39                         | [0.95,2.04] | 1.21                          | [0.83,1.77] |
| System (referent: no)            |                                                     |             |                          |             |                          |             |                              |             |                               |             |
| Yes                              | 1.14                                                | [0.83,1.56] | 1.18                     | [0.86,1.61] | 1.27                     | [0.93,1.73] | 1.558**                      | [1.13,2.14] | 1.531**                       | [1.12,2.10] |
| Teaching (referent: no)          |                                                     |             |                          |             |                          |             |                              |             |                               |             |
| Yes                              | 1.23                                                | [0.84,1.80] | 1.30                     | [0.90,1.90] | 1.13                     | [0.77,1.64] | 1.21                         | [0.83,1.77] | 1.38                          | [0.94,2.01] |
| Rural (referent: no)             |                                                     |             |                          |             |                          |             |                              |             |                               |             |
| Yes                              | 0.97                                                | [0.66,1.42] | 0.687*                   | [0.47,1.00] | 0.679*                   | [0.47,0.99] | 0.629*                       | [0.43,0.92] | 0.618*                        | [0.42,0.90] |
| Medicare percentage              | 1.86                                                | [0.57,6.07] | 1.18                     | [0.37,3.80] | 0.62                     | [0.18,2.11] | 1.24                         | [0.37,4.16] | 1.16                          | [0.35,3.91] |
| Medicaid percentage              | 1.13                                                | [0.62,2.06] | 1.04                     | [0.58,1.88] | 0.45                     | [0.18,1.15] | 1.10                         | [0.61,2.01] | 1.04                          | [0.57,1.89] |
| Average length of stay           | 1.00                                                | [0.99,1.01] | 1.00                     | [0.99,1.01] | 1.00                     | [0.99,1.01] | 1.00                         | [0.99,1.01] | 1.00                          | [0.99,1.01] |
| Inpatient day per 1000           | 1.00                                                | [1.00,1.01] | 1.006**                  | [1.00,1.01] | 1.005*                   | [1.00,1.01] | 1.005*                       | [1.00,1.01] | 1.006**                       | [1.00,1.01] |

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

## DISCUSSION

Since the implementation of the ACA it is evident that hospitals across the US are attempting to improve population health through various partnerships with local and federal organizational actors. Previous study of these

partnerships has identified a trend where hospitals that are large, non-for-profit, teaching, and urban are more likely to collaborate with such groups to address outcomes that relate to the social determinants of health (Begun and Potthoff, 2017). To further characterize these relationships we examined the extent to which hospitals rated the strength of these types of collaborations using a cross-section of hospitals that responded to the 2015 American Hospital Association Population Health Survey which showed that the abovementioned hospital characteristics were also related to more favorable report of their partnerships.

One possible suggestion for why larger hospitals report stronger connections with their partners is that they may have more of an incentive for establishing partnerships so that they can obtain a large market share of public goods to services where for smaller hospitals it may be too hard to scale effective partnerships (Grieb, Pichon, Kwon, Yeary, and Tandon, 2017). More specifically, at larger healthcare institutions there could be more resources that may include divisional staff that are solely responsible for fostering relationships between community partners and hospitals where at smaller hospitals staff might be charged with multiple disparate roles that undermine their ability to sustain an effective ongoing relationship with the partnership.

Hospital ownership proved to be another important trait that was associated with stronger partnerships. Previous research has noted that non-for-profit hospitals missions are more aligned with population health improvement than for-profit hospitals (Begun and Potthoff, 2017). Relatedly, in our study we found that hospitals in urban areas were found to more likely to report relationships that were stronger than others. This could be a result of the fact that many urban hospitals experience high utilization rates from poor individuals which creates the need for such hospitals to partner with local organizations to help meet these healthcare demands (Fiscella and Williams, 2004); therefore, overtime this collaboration may help to support stronger relationships.

Our findings add to the body of literature that calls for more national support to minimize the rural-urban gap in healthcare (Douthit, Kiv, Dwolatzky, and Biswas, 2015; Garcia, Faul, Massetti et al., 2017). While our study adds to the existing literature on hospital partnerships for population health improvement it is without its limitations. We used data that had an overrepresentation of Midwest and large hospitals that could have skewed our findings; however, even with these limitations our study contributes to the literature to inform national policies to further support rural and smaller hospitals with their population health outreach activities.

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# MEDICAL ACUPUNCTURE: INTEGRATING HOLISTIC APPROACHES INTO CONVENTIONAL MEDICINE

**Nancy R. Marangelli, University of Scranton**  
**Sarah Finn, University of Scranton**  
**Katherine Loughli, University of Scranton**  
**Steven J. Szydlowski, University of Scranton**

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## ABSTRACT

*This presentation will focus on integrating medical acupuncture into patient care. The use of acupuncture has been believed to be used for over thousands of years with known benefits. However, the popularity of complementary and alternative medical (CAM) therapies, like acupuncture, have presented new challenges towards integrating with conventional medicine. The National Center for Complementary and Integrative Health states that acupuncture may help ease types of pain that are often chronic such as low-back pain, neck pain, and osteoarthritis/knee pain, in addition to reducing the frequency of tension headaches and preventing migraine headaches. The presentation will also offer feedback on the current status, issues and efforts credentialing acupuncturists to meet the needs and interests of patient-centered care.*

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Nancy R. Marangelli  
Graduate Student MHA Program  
The University of Scranton  
817 The DeNaples Center  
Scranton, PA 18510  
Tele: 917-538-2932 nancy.marangelli@scranton.edu

Sarah Finn  
Graduate Student MHA Program  
The University of Scranton  
440 Madison Avenue  
Scranton, PA 18510  
Tele: 908-635-9113 sarah.finn@scranton.edu

Katherine Loughlin  
Graduate Student MHA Program  
The University of Scranton  
10 Campbell Road Court  
Binghamton, NY 13905  
Tele: 607-765-2956  
katherine.loughlin@scranton.edu

Steven J. Szydlowski, MBA, MHA, DHA (Faculty Contact)  
Graduate Health Administration Program Director  
Department of Health Administration & Human Resources  
University of Scranton  
413 McGurrin Hall  
Tele: 570- 941-4367

# SOCIAL PRESCRIPTIONS IN RURAL GEOGRAPHIC LOCATIONS

*Michaela Dolde, University of Scranton*

*Lisa Lech, University of Scranton*

*Sarah Novak, University of Scranton*

*Robert Spinelli, University of Scranton*

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## ABSTRACT

*This research focuses on the role of social prescriptions in rural geographic locations. Through the use of social prescriptions, Primary Care Physicians and other frontline healthcare professionals can refer patients to services in their communities as an alternative to prescribing medicalized solutions. While social prescription programs have become widespread in the United Kingdom, this clinical service has not been openly adopted in the United States. The impact of social prescriptions on clinicians, patients, and communities will be analyzed. Techniques and strategies will be proposed for healthcare managers to effectively improve people's health and wellbeing, especially during the healthcare industry's shift from volume to value-based health care.*

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Michaela Dolde (CONTACT AUTHOR)

Master of Health Administration Student

Department of Health and Human Resources

Panuska College of Professional Studies

University of Scranton

Telephone: 724-984-4259

Fax: 570-941-5882

[michaela.dolde@scranton.edu](mailto:michaela.dolde@scranton.edu)

Lisa Lech

Master of Health Administration Student

Department of Health and Human Resources

Panuska College of Professional Studies

University of Scranton

[lisa.lech@scranton.edu](mailto:lisa.lech@scranton.edu)

Sarah Novak

Master of Health Administration Student

Department of Health and Human Resources

Panuska College of Professional Studies

University of Scranton

[sarah.novak@scranton.edu](mailto:sarah.novak@scranton.edu)

Robert J. Spinelli, MBA, MHA, DBA

Assistant Professor and Program Director

Department of Health Administration & Human Resources

Panuska College of Professional Studies

University of Scranton

**TRACK**  
**HEALTHCARE MARKETING**

# AMENITIES AND MARKETING FOR HEALTH CARE DELIVERY, IS THERE A ROI?

*William “Kent” Willis, Marshall University*

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## ABSTRACT

*Competition among health care delivery facilities and hospitals demonstrate an increase over the two decades. Studies illustrate health care facilities are increasingly becoming interested in offering amenities to assist in driving demand. To what extent amenities do drive demand becomes a question a health care administrator needs to ask in efforts to improve patient volumes and revenues. Are amenities assisting in establishing the sought-after customer relationship where patient satisfaction scores are seen as critical? Will amenities provide a linkage between better quality of care or simply be used as a marketing tool for health care consumer recruitment to increase revenue? What is the ROI for a health care by offering amenities? The offering of amenities needs further research to assist health care delivery facilities as they decide whether or not offering amenities can have positive results.*

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William “Kent” Willis, Dr.PH, MSHA  
Assistant Professor Health Care Administration  
Lewis College of Business – Graduate College  
Marshall University  
One John Marshall Drive  
Huntington, WV 25755-2076  
[willis23@marshall.edu](mailto:willis23@marshall.edu)

**TRACK**  
**HEALTHCARE PROFESSIONALS**

# **LOST IN TRANSLATION - HOW MEDICAL TERMINOLOGY COMMONLY USED FOR ONCOLOGY CAN CREATE MORE FEAR THAN CONFIDENCE AMONG PATIENTS**

Bandar Idris  
MHA/MBA Student  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
[IdrisB0017@UHCL.edu](mailto:IdrisB0017@UHCL.edu)

Ashish Chandra (CONTACT AUTHOR)  
Professor  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
[chandra@uhcl.edu](mailto:chandra@uhcl.edu)  
281-212-1717

Office Address: 2151 W. Holcombe Blvd Suite #120, Houston, TX 77030

# LOST IN TRANSLATION - HOW MEDICAL TERMINOLOGY COMMONLY USED FOR ONCOLOGY CAN CREATE MORE FEAR THAN CONFIDENCE AMONG PATIENTS

*Bandar Idris, Univeristy of Houston – Clear Lake*  
*Ashish Chandra, University of Houston – Clear Lake*

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## ABSTRACT

*Cancer is a worldwide disease attributed to 17.5 million cancer cases and 8.7 million deaths in the year 2015 (Mao & Cohen, 2014). The last ten years have portrayed a 33% increase in the cases and deaths linked to cancer due to the high population growth, behavioral, and environmental aspects (Mao & Cohen, 2014). It is anticipated that in the next two years, the new cases of cancer globally will have risen to 21.7 million with approximately 13 million deaths annually (Mao & Cohen, 2014). Oncology is a particular medical field that deals with the study, management, and treatment of cancer resulting from malignant tumors. Poor communication between patients and oncologists and the magnitude of the terminologies, has acted as a barrier for tackling cancer universally. Statistics of the disease about the perception of the oncology term are also discussed. The role of patient education as a way of bridging the communication gap between patients and caregivers is evaluated.*

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## INTRODUCTION

Oncology is a field of medicine which most people will recognize by the term 'cancer,' and it relates to the study of malignancies of malignant potential (Linnet *et al.*, 2012). This field has obtained much attention in recent times as it depicts cancer which is among the leading causes of death globally. Balogh *et al.* (2011) reveal that in America, 1.5 million people are diagnosed with cancer each year. Mortality rates linked to the disease are bound to escalate if not managed effectively. Management of the disease through treatment has been identified to be a critical approach. In the field of oncology, treatment involves cytotoxic, hormonal, immunological, supportive and targeted therapies. The society's embracement of oncologists and their work varies from country to country because social and economic developments directly relate to the burden of cancer in specific regions (Matthew, 2018). This work comprehensively analyzes how the medical terminologies used in oncology have impacted the delivery of care and management among cancer patients globally.

The success of the treatment process necessitates a coordinated effort between the oncology patients and health care providers. Effective communication between the two parties is thus essential in ensuring supportive care is direct to the patient. Patients utilize communication skills in expressing their condition and providing feedback after a treatment session with the health care providers. On the other hand, healthcare providers depend on communication skills to take medical histories of patients, elaborating procedures to patients, breaking news regarding the progress of the treatment process and explaining informed consent (Farrington, 2011).

It has been noted that, over time, treatment processes of cancer patient have been affected by a breakdown in communication between oncology providers and cancer patients. In particular, medical terminologies commonly used for oncology have been a barrier to the effectiveness of treatment processes (Back A. & Back A., 2006). There is a need to develop an approach to curb the breakdown in the patient-doctor relationship considering the importance of clarity in communication while addressing the medical needs of cancer patients. This paper focuses on the impact of the use of medical terminology on treatment processes including affecting the healthcare status of patients, treatment outcomes, effective care use and ability to determine health costs. It also analyzes the need for patient education to address the effects of miscommunication. It cites the provision of information in manageable levels to patients, including all necessary information in the process, the motivation of patients, combining visual and verbal tools, establishing a health library and involving family members as strategies to improve patient education.

## **MEDICAL TERMINOLOGY COMMONLY USED FOR ONCOLOGY, AND, SUGGESTIONS FOR MODIFYING TERMS TO A SIMPLER LANGUAGE**

Like other fields, the medical profession has unique words. In particular, there are unique terminologies for the oncology field. Relating to the fact that healthcare providers utilize the unique vocabularies rather than plain language in their learning life, they develop the tendency of using them when communicating. Farrington (2011) notes that health care providers may also unknowingly use the terminologies when addressing oncology patients. The treatment process is based on the assumption that oncology patients can understand both written and spoken information for adequate care and provide feedback regarding their condition (Cai *et al.*, 2016). However, most of the patients are not aware of the terminologies used by doctors thus creating a disconnection in communication between them and healthcare providers.

The complexity of oncology-related terms hence difficulties in patient understanding is attributed to the relatively lower levels of education among patients as compared to professional caregivers. Graham and Brookey (2008) reveal that about 50% of the population in America is below the average literacy levels. When health care providers address oncology patients from this group of people using technical terminologies, they have no capacity of comprehending the information directed to them. It is also important to detect that in the remaining half of the United States; the population may have a higher literacy level but have limited knowledge regarding the terminologies used for oncology. Therefore, it is notable that the use of the terminologies is problematic to a considerable part of the United States population.

The terminologies/jargon used for oncology involve terms that can easily relate to patients if a simple language is utilized to address them. For instance, when health professionals use the word "chronic" to refer to a certain condition of a disease (Rimmer, 2014). However, the term chronic which is not well comprehended among people of low literacy levels can be replaced by the term "long-lasting" as both share the same meaning. In communication, a patient can easily understand when the patient condition is stated as being "long-lasting" rather than being "chronic."

Medical terminology used for oncology when combined with simple language can also lead to a breakdown in communication. In particular, the terms may lead to confusion or misinterpretation by the patient. For instance, when an oncology patient is informed that patient biopsy results are negative, the patient is likely to misinterpret the information. The term "negative" can be familiar to the patient, but "biopsy" can be problematic to comprehend (Prabhu, Hansberry, Agarwal, Clump & Heron, 2016). Considering that when the term "negative" is used at most times translates to the fact that a given aspect is not worthwhile. A patient may hence have the interpretation that the condition is deteriorating thus creating more fear than confidence in the treatment process. However, an adverse biopsy outcome as per this set up reveals that a patient's health is trending in the recommended direction.

Confusion in the usage of terminology for oncology may arise due to emerging technology where various equipment and facilities have unique names. For instance, a patient referred for a chest x-ray may fail to have it done as there is no department relating directly to that name. In many facilities, the responsible department is known as "radiology" and has the sign of this name. Due to limited knowledge and failure to use plain language, the patient may not comprehend that he/she is supposed to seek medical attention in that department. It is also essential to observe that oncology patients are in conditions whose terminologies they may not be able to analyze and interpret. Diefenbach et al. (2009) note that expecting the patients to digest the complicated jargon is wrong and translates to poor care delivery. Terms such as mitotic rate, autologous BMT and cytotoxic make the patient more confused and affect Patient confidence regarding treatment outcomes.

### **THE MAGNITUDE OF THE MEDICAL TERMINOLOGY "ONCOLOGY" ON CANCER PATIENT CARE DELIVERY**

The terminologies used for oncology have an adverse impact on the treatment process. The patient is usually the victim of the utilization of the language. As observed earlier, patients are in a condition that they are unable to digest the information directed to them by health care providers. The use of the terminologies adds to the confusion

that the patients have in comprehending the information they receive. There is the likelihood that the patients will be confused by the report. For instance, patients may have the interpretation that their condition is not severe while it is deteriorating (Burstein, Lacchetti & Griggs, 2016). The terms may also lead them to worry more due to their health status while on the contrary, their recovery is progressing well. These observations portray that the terminologies make the patients have limited knowledge regarding their conditions. Graham and Brookey (2008) note that at most times, the treatment process involves the patients taking complex care on their own. Without specific knowledge about their health status, patients may not be able to make sufficient attention to them.

The information provided to the patients is also crucial in making decisions regarding the treatment process. The terminologies used in oncology when addressing the patients make them more confused regarding their health status. Therefore, the patients are bound to make ineffective decisions relating to how they should be treated thus affecting the treatment process. The complexity of terminologies used act as a barrier since patient-provider communication allows the patient to give feedback to the doctor hence get assistance. The treatment process thus becomes affected due to the patient not knowing their actual health status.

### **THE MEDICAL TERMINOLOGIES AFFECT TREATMENT OUTCOMES**

Without the appropriate adherence to the instructions regarding the treatment process, the results are concerned. Effective treatment outcomes are the primary objectives of both the patient and the healthcare provider. The targets become challenging to attain if the patient lacks direction of how to participate in their recovery process due to the use of complex terminologies by the doctors. Doctors expect patients to follow the instructions in taking care of themselves so that the objectives set can be achieved. However, the jargons often confuse them. Patients have trouble comprehending the appropriate time to take medication, reading reminder forms, understanding informed consent, following discharge instructions and using health materials (Lovell et al., 2014). These aspects translate to the fact that the patients will not adhere to the projected medication regimens, fail to seek laboratory tests, miss referral and primary care appointments by the doctors (Graham & Brookey, 2008). They will also lack appropriate self-management. Relating to the importance of these areas in the treatment process, when not accomplished, they adversely affect the outcomes.

The confidence of the patients in the treatment process is another crucial factor that contributes to productive outcomes. The condition of a patient may fail to improve despite taking the appropriate medication if he/she has limited confidence. The terminologies used in oncology reduce confidence levels of patients. For instance, the vocabularies may make the patients have the notion that their conditions are deteriorating. Considering that they have been following the given instructions, they may give up on their health improvement or develop a negative attitude regarding the treatment process. These aspects lower the confidence levels of the patients leading to poor treatment outcomes.

### **MEDICAL TERMINOLOGIES CAN CRIPPLE EFFECTIVE CARE**

As observed earlier, the patient is the most affected party due to the failure to understand the jargon/terminologies used in oncology. The patient is confused such that he does not understand how to proceed with seeking effective care (Graham & Brookey, 2008). As previously noted, personal attention of the patients plays a significant role in contributing to the success of the treatment process. There is a considerable amount of time in the duration of treatment that the patient spends at home. At home, the oncology patient is away from the attention he/she gets in health care facilities. A patient has to take care of himself/herself during such time. He/she also has to depend on family members or close friends for assistance in the provision of care when at home. The patient and family members are likely to have low literacy levels hence fail to understand the instructions from doctors that involve jargon. Therefore, they fail to ensure that sufficient care is provided to the patient.

Cancer is caused by a wide range of factors such as the use of drugs. In the treatment process, and for better health outcomes, the patient is supposed to quit using probable causative substances (Vineis & Wild, 2014). The doctor must comprehensively inform the patient regarding the importance of dropping habits of substance use for improved health. However, when the doctor addresses the patient using terminologies, such crucial information may fail to reach the patient. Therefore, the patient may not heed the appropriate instructions of self-care hence affecting the

effectiveness of the treatment process. There is the likelihood that the patient continues using the substances thus deteriorating their health wellbeing.

### **MEDICAL TERMINOLOGIES CAN IMPAIR THE ABILITY OF A PATIENT TO DETERMINE HEALTH COST**

Treatment of oncology patients requires a given amount of money for its effectiveness. Money is needed to purchase drugs and paying for therapy sessions among other areas. According to Mariotto et al. (2011), the treatment cost varies by the phase of cancer in a patient. The cost of treatment is one of the crucial areas to consider before embarking on the treatment process. Since there are no universal means of determining the value of treatment of each patient, he/she is required to calculate it on their own. The patient mostly relies on health care providers to adequately estimate the cost of their treatment. The process of calculation of the value will be ineffective if the health care provider utilizes jargon that the patient does not comprehend in a conversation. The patient may hence fail to seek the appropriate medical care due to the barrier of calculating health cost created by the use of jargon in communication.

At times, doctors of oncology provide written information to the patients regarding the food that they should take at home or the drugs that they are supposed to purchase. In case the health care provider combines jargon in the instructions, the patient may fail to determine the cost of items needed for improved treatment outcomes. He/she may have the notion that certain commodities, relating to their difficult times are more expensive compared to others thus fearing to purchase them. The patient may also lose assurance in the treatment process due to the thought that it will have a higher cost. These aspects have adverse effects on the success of the treatment process.

### **NEED FOR PATIENT EDUCATION TO CURB THE PROBLEM**

Cancer has been identified to be a challenge in the world. Considering that communication barrier due to the terminologies used for oncology by health care providers hinders the elimination of the problem, there is a need for intervention. Patient education is arguably the most effective approach to intervention. Patient education relates to an integral process that aims at enhancing a patient's knowledge, skills, and attitudes of improving or maintaining health (MacLean, 2010). In the process, the patient is providing with the necessary information regarding their health and care needs.

The reason for the terminologies commonly used for oncology causing a barrier to the treatment process is that there is a wide gap between the respective literacy levels of patients and healthcare providers. The health care providers tend to have an extremely high literacy level regarding health issues. On the other hand, patients have a low literacy level. The circumstance that nearly half of the population in the United States is considered illiterate highlights that most people visiting health care facilities will have difficulties in understanding the information provided to them. Since patient education involves boosting the knowledge of the patients regarding health care, it will be useful in reducing the gap in literacy levels between the two parties (Burstein, Lacchetti & Griggs, 2016). The result is that the patient will be in a position to comprehend the terminologies used for oncology hence having the right interpretation leading to improved treatment outcomes. Given that even those with low literacy levels may also have difficulties understanding the languages used by oncologists, patient education will adequately address their problem.

Healthcare professionals, as highlighted previously, usually use the terminologies in their studies. The vocabularies hence become a part of their language in the sense that they utilize them in their daily conversations. Graham and Brookey (2008) noted that the professionals at most times unknowingly present information to the patients using the terminologies. Addressing the problem by encouraging health care providers to use plain language may hence be ineffective. Despite taking the initiative to use simple words when communicating with oncology, there are instances that they will use jargon. Patient education is the most appropriate to solve the problem. Through the process, there is the assurance that the patients are provided with the knowledge regarding the terms used by the professionals. They will thus easily understand the information provided to them by the professionals even in instances when they use terminologies hence eliminating the barrier to effective treatment.

The aspect of patients being embarrassed to seek more information when they do not understand the terminologies is another factor necessitating patient education. There has been the observation that many patients do

not want to bother health care providers for clarity of information. They are also embarrassed to admit that they do not understand the terminologies used (Graham & Brookey, 2008). There will exist a communication breakdown without the oncologists realizing that the patients do not understand the information provided to them. The treatment process thus becomes affected since there is no coordination between the two parties. Implementing patient education can effectively eliminate the communication barrier. Once the patients are provided with the information required for treatment, the instance where they may feel embarrassed when communicating with the oncologists in seeking clarification will be avoided. The treatment process will be in accordance hence better outcomes.

## **STRATEGIES TO IMPROVE PATIENT EDUCATION & ONCOLOGY RELATED COGNITIVE ABILITIES**

The effectiveness of patient education is dependent on the approach utilized to deliver the necessary information to patients. There are specific strategies that have been observed to be suitable for improving patient education. The plans are elaborated in the section below.

### *Provision of information in manageable levels*

It is notable that the objective of patient education is ensuring that patients are provided with the necessary information to improve their literacy in health care. Providing them with complex or more information than they can understand is not helpful to the group. The report should be delivered to the patients in a moderate sequence. According to Marcus (2014), the group should be provided with information in small increments. In a given session, the patients are expected to be supplied with manageable details in the sense that they can be able to recall it in the following courses. Through this approach, patients can build on the block of information they get during each session. On completion, they can have all the information necessary for interpreting concepts used in health care.

This strategy also involves effectively scheduling the sessions. In the beginning, the sessions should involve simple concepts. Familiarizing the patients with basic terms prepares them to be more motivated to acquire information. The patients may be scared away by the initial sessions when complex concepts are included hence affecting the concentration in the following sessions. It also forms the foundation for the patients to learn about more complex ideas. The sessions for the complex concepts should be introduced in later sessions after the assurance that it is the perfect time for the patients (Marcus, 2014). It is also essential to guarantee that the sessions are scheduled in periods of the day that is convenient for the various patients involved to avoid instances where some may miss information provided in a given day thus affecting the entire process.

### *Involvement in all necessary areas in the process*

Patient education should include all areas that are crucial in helping the patients. As observed in the earlier sections, the breakdown in communication between the patients and healthcare providers can emerge in different areas. Lack of clarity in the interpretation of the details provided to the oncology patients by doctors is common hence hindering the follow up of medical schedules, medications and even the cost of care. According to Blanchard and Cox (2014), the information in the patient education should not compromise on any of the areas necessary for improved treatment outcomes. There should be an appropriate approach to combine and deliver the information before the process commences to ensure that no area will be omitted.

The treatment process for oncology patients also involves many aspects, most of which are sensitive. Before a significant operation or sharing of personal information regarding a patient, he/she has to be informed and provided the freedom to come up with his/her own decision. Such an area is of paramount importance, and the patient education should aim at addressing it comprehensively. Skills are also of crucial importance to patients. They enable them to take sufficient care of their health even in the absence of health care providers. With the necessary skills, there is the assurance of improved treatment outcomes. The process should hence be keen on incorporating sessions relating to acquiring essential skills. Ensuring that patients know all areas regarding health care eliminates instances where they may be confused due to terminologies in oncology. Having the assurance that they are prepared with the necessary information when interacting with oncologists boosts their confidence leading to better adherence to medication hence improved outcomes.

### *The motivation of the patients to acquire information*

In the process of educating patients, the patients should be informed of the importance of receiving information provided to them. They should be made mindful that the information is beneficial to their wellbeing since it leads to better outcomes in the treatment process. It is expected that patients should be keen on acquiring information regarding their treatment. However, they are often not keen on obtaining such information hence the need for motivation. Redman (2007) notes that patients should be thrilled to attend the sessions. They should be treated with empathy leading to better compliance in the process hence gaining more information. Instructors in the different sessions should encourage questions and note-taking. Encouraging questions keeps the patients engaged in an entire course. It increases patients' attentiveness hence being in a position to gain information. Note-taking translates to more effective recall and synthesis of the delivered information. The instructor can emphasize the patients to highlight or bold the concepts that are critical hence directing them on the areas that are worth recalling.

Motivation can also be instilled in the patients through recognizing and acknowledging their efforts towards gaining information. Motivating the patients to make them active partners in the learning process, hence creating a platform for understanding for better understanding the data. With the right motivation, there is the assurance that the patients will receive the information required to guide them in the treatment process (Redman, 2007). These aspects lead to better treatment outcomes. They will not only acquire useful knowledge and essential skills but also boost their confidence that forges a path to an effective treatment process.

#### *Establishment of a health library*

Sessions in the patient education may not offer all the necessary details that patients need to comprehend during the treatment process Marcus (2014), argues that the patients need a stable source where they can get confirmation and guidance about the information given to them during patient education schedules. They can also utilize the source for expounding their knowledge and skills regarding health care. In case they have background knowledge on a given topic through the sources provided, the process of learning will be more straightforward. It can make the patients more focused on the sessions and easily relate to the information provided by the instructors. These aspects portray that there is the need to establish a center or a library where the patients can research and boost their knowledge concerning health care on their own.

The resource center or library should contain features that can effectively facilitate the patients to acquire information. Instructors should carry out thorough research to ensure the resources that the patients may need are available at the library. The instructors should also consider aspects such as accessibility. The difficulties that the patients may experience in seeking information from the facilities must be anticipated and eliminated. The time that the facility is available for use should be specified to ensure that the patients are free to access the information. The resource centers and libraries play a significant role in assisting patients and facilitating the learning process. Patients gain the knowledge they can utilize to comprehend technical terms used by healthcare professionals hence enhancing communication leading to better outcomes.

#### *Combination of verbal education and visual tools*

Patient education is supposed to utilize all the means that can ensure the necessary information reach the patients. At most times, the oral mode of delivery of knowledge in patient education is used. In the past, there has been the incredible discovery of aspects of facilitating delivering information. Instructors are supposed to utilize these means when associating with the patients. Bobek and Tversky (2016) explain that, in particular, combining visual tools with verbal education has been proven to be effective. Visual tools include images, pictures, charts and gap fill. The tools facilitate the learning process in various ways such as helping the patients to understand and recall concepts easily, making the sessions more dynamic and thrilling and providing a touchpoint where the patients can refer back in case they experience difficulties in the meeting. They make the patients more engaged in the learning process hence increasing their concentration levels leading to improved understanding and integration of the information provided.

Advancement in technology in the recent past is an area that instructors are supposed to exploit to improve patient education. There are many channels that the instructors can employ in providing information to the patients. They can use PowerPoint presentation in teaching the patients using a projector. The social media has also produced many platforms where the instructors can reach the patients. Through Facebook, Twitter or Instagram, the instructor can send images or notes that are necessary to the patients where they can view them through their phones or

computers. The instructor needs to identify the most suitable means of reaching the patients. The channels and visual tools enhance the learning process hence improving the patient education.

#### *Involvement of family members and healthcare providers in the process*

As noted earlier, the success of the treatment process is a result of effective collaboration between the patient, health care providers, and family members. The patient is not entirely in healthcare facilities during the treatments process. At times the patient has to receive care when at home. These observations highlight the importance of each party to be knowledgeable about health care. Despite the patient being the primary target of patient education, the other two parties also need to be engaged. Family members, who the patient may be more open to them compared to the oncologists, can be important in assisting him/her in the treatment process where he/she can relay information to them. The health care providers are also essential to attend the sessions as they can understand the level of knowledge of their patients hence being in a position to establish effective communication when addressing them. Their attendance may also contribute to making them reduce the use of excessive medical jargons when discussing the patients.

There are cases where the patient is either too old or young to grasp the information provided in the patient education. According to Boyle (2015), family members are necessary for these instances. They become responsible for making important decisions regarding the treatment process of the patients. The family members should hence be included in the patient education to ensure that they will effectively carry out their responsibilities when required. All the parties increase the avenues for the patient to seek assistance and clarification in the learning process thus facilitating patient education.

### **CONCLUSION**

The field of oncology has advanced due to the research on how to manage and minimize cancer and its outcomes. The effectiveness of oncology faces adverse effects due to the gaps in communication since oncologists use medical terminologies that patients cannot comprehend. There has been the need to establish effective strategies to make patient education better considering the specific negative impact that the terminologies used for oncology have on the treatment process. The breakdown in communication between patients and oncologists has been contributed by the wide gap in literacy level between the two parties. Most Americans portray lower literacy levels on health care matters. The oncologists can also unknowingly use the terms when addressing patients. Comprehension and interpretation of terminologies used by the oncologists such as mitotic rate, autologous BMT, and cytotoxic are problematic to the patients leading to ineffective coordination thus affecting the treatment process. The miscommunication hinders adherence to care gives instructions hence result in medical errors, deaths, disabilities, and higher medical costs. Patient education is an intervention with a capacity to bridge literacy levels of patients and oncologists. The strategies of patient education comprise the provision of information to the patients at manageable levels for better comprehension, the inclusion of all areas of the treatment process in delivering information to patients and motivating the patients to achieve the information. The provided strategy should be implemented by the responsible stakeholders like the government, the World Health Organization, and health institutions for improved outcomes.

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# PRACTICE MANAGEMENT ENTRUSTABLE PROFESSIONAL ACTIVITIES (EPAs): PRELIMINARY EVIDENCE FROM NORTH DAKOTA

David M. Scott, North Dakota State University  
Cynthia Naughton, North Dakota State University  
Natasha Petry, North Dakota State University  
Dan Friesner, North Dakota State University

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## ABSTRACT

*This study quantifies the use of Core Entrustable Practice Activities (EPAs) in contemporary pharmacy practice. Given the large number of Core EPAs, this manuscript focuses only on EPAs and supporting tasks categorized within the Practice Manager domain. A survey was created using the literature, assessing the (self-reported) EPA activities of pharmacists. The survey was administered to all registered pharmacists living and practicing in North Dakota (n=990), and 457 of 990 (46.1%) of pharmacists responded. This manuscript reports on the practice manager domain and the activities and examples of supportive tasks in this domain (n=80). Respondents reported that the “fulfill a medication order” activity was rated the highest EPA overall (mean=9.1, SD=2.7). The “oversee the pharmacy operations for an assigned work shift” activity (mean=7.8, SD=3.9) was also rated highly. For the practice setting, “oversee the pharmacy operations for an assigned work shift” had a significant difference between independent practice settings and all other practice settings. The manager was more likely than other pharmacist positions to report performing 7 of 9 tasks within this EPA. Significant differences in 5 of 9 tasks were found across pharmacies located in rural or more urban communities, including “assist in the evaluation of pharmacy technicians” and “identify pharmacy service problems and/or medication safety issues.” The study’s results suggest that EPAs can be a useful means to assess outcomes in pharmacy education.*

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David M. Scott, Ph.D. M.P.H.  
Department of Pharmacy Practice  
College of Health Professions  
North Dakota State University  
Tel: 701-231-5867  
Fax: 701-231-7606  
[David.Scott@ndsu.edu](mailto:David.Scott@ndsu.edu)

Cynthia Naughton, Pharm.D.  
College of Health Professions  
North Dakota State University  
Tel: 701-231-9489  
Fax: 701-231-7606  
[Cynthia.Naughton@ndsu.edu](mailto:Cynthia.Naughton@ndsu.edu)

Natasha Petry, Pharm.D.  
Department of Pharmacy Practice  
College of Health Professions  
North Dakota State University  
Tel: 701-231-6554  
Fax: 701-231-7606  
[Natasha.Petry@ndsu.edu](mailto:Natasha.Petry@ndsu.edu)

Dan Friesner, Ph.D.

College of Health Professions  
North Dakota State University  
Tel: 701-231-9509  
Fax: 701-231-7606  
[Daniel.Friesner@ndsu.edu](mailto:Daniel.Friesner@ndsu.edu)

# THE IMPACT OF THE AFFORDABLE CARE ACT ON ACCESSIBILITY TO BUPRENORPHINE: INFLUENCE OF STATE POLICIES ON GEOGRAPHIC DISTRIBUTION OF WAIVERED PHYSICIANS

Arielle Zahodnick, University of Scranton  
Steven J. Szydlowski, University of Scranton

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## ABSTRACT

*The Affordable Care Act has significantly increased access to addiction related services such as addiction evaluation, clinic visits, and treatment medication to about 32 million Americans since 2010 (Paying for Rehab with the Affordable Care Act). This Medicaid expansion has lead to an increase in buprenorphine prescriptions, an effective medication prescribed to assist in overcoming opioid abuse. However, each state selects how to implement ACA and health insurance exchanges. This can influence access to waived physicians and treatment clinics. Although opioid addiction and overdose is a major public health issue throughout the country, very few physicians hold waivers that allow for the ability to prescribe treatment medications such as buprenorphine. Waivered physicians are also poorly distributed throughout the United States often leading to disparities for treatment in rural areas. This study examine the role state policies play in the distribution of waived physicians and overall access to buprenorphine. Recommendations and conclusions are provided.*

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Arielle Zahodnick  
University of Scranton  
Scranton, PA 18510

Steven J. Szydlowski, DHA, MBA, MHA  
University of Scranton  
Scranton, PA 18510  
570 941 4367  
[steven.szydlowski@scranton.edu](mailto:steven.szydlowski@scranton.edu)

# THE ROLE OF HEALTHCARE PROFESSIONALS IN IDENTIFYING AND TREATING PATIENTS INVOLVED IN HUMAN TRAFFICKING

Arjita Bhargava, University of Scranton  
Pooja Patel, University of Scranton  
Dr. Daniel J. West, Jr., University of Scranton

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## ABSTRACT

*Human trafficking is a significant public health issue, both domestically and internationally. This paper will address misconceptions about what populations are vulnerable to trafficking, and characteristics of trafficked victims. Human trafficking involves both U.S. citizens and foreigners alike, and has no demographic restrictions. Types of human trafficking discussed in this paper include: forced labor, sexual exploitation, and organ trafficking. The hidden nature of forced labor and trafficking makes it extremely difficult to calculate the actual number of victims. In this paper, types of vulnerable human trafficking victims, training and identification methods for healthcare professionals will be discussed. Healthcare professionals in the Emergency Department, Urgent Care, and Primary Care Centers have a unique ability to identify and interact with trafficked victims while still in captivity. Domestically, the current challenges facing healthcare include gaps in human trafficking education and training for healthcare professionals. An emphasis will be placed on integrating curricula on human trafficking into medical education and residency training. Medical screenings for human trafficking needs to become a standardized process, so that victims are more likely to be identified and treated. A focus will be placed in this paper on early intervention training for healthcare professionals. Legal reforms and enforcement of existing labor and employment protections, which bolster efforts to address trafficking, shall be addressed.*

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Arjita Bhargava, BDS  
The University of Scranton  
220 Linden Street, Unit 706  
Scranton, PA 18503  
Telephone: 215 909 3374  
Email: [arjita.bhargava93@gmail.com](mailto:arjita.bhargava93@gmail.com)

Pooja Patel  
The University of Scranton  
220 Linden Street, Unit 706  
Scranton, PA 18503  
Telephone: 813 992 0648  
Email: [Pooja.Patel4@scranton.edu](mailto:Pooja.Patel4@scranton.edu)

Dr. Daniel J. West, Jr., Ph.D., FACHE, FACMPE  
Professor and Chairman  
Department of Health Administration & Human Resources  
The University of Scranton  
417 McGurkin Hall  
Scranton, Pennsylvania 18510  
Telephone: (570) 941-4126  
FAX: (570) 941-5882  
Email: [daniel.west@scranton.edu](mailto:daniel.west@scranton.edu)

**TRACK**  
**HOSPITALS AND HEALTHCARE  
FACILITIES**

# BRAZIL'S LONG TERM CARE SERVICES AND SYSTEMS

Gunjan Bansal, University of Scranton

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## ABSTRACT

*Brazil, 8th largest economy in the world, is expected to have 32 million seniors by 2025. Brazil's long term care system is fragmented, poorly coordinated and deficient due to cultural and racial heterogeneity amongst different parts of nation, 22% of population being below poverty line, rapid decline in family size and dependence ratios, remarkable rise in working women, mal-distribution of geriatricians etc. As per Ipea, only 1% of elderly people in Brazil were living in long term care institutions (LTCI) in 2017; and there were 3548 LTCIs in 2017 of which 65.2% were philanthropic, 28.2% were private, 6.6% were public or mixed institutions. Furthermore, Brazil's LTCIs accommodate wide variety of residents, ranging from healthier elderly residents to those suffering from Alzheimer's Dementia. Whereas Brazil's nursing home residents have inferior perception of their quality of life, especially autonomy and environmental characteristics; implementation of Family Health System has significantly improved utilization of home care for people aged above 60 in Brazil. This presentation would discuss the current status of Brazil's long term care services, challenges for improving long-term care consumers' quality of life, recommendations for caregivers and healthcare policy implications.*

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Gunjan Bansal  
Health Administration Faculty Specialist  
University of Scranton- Department of Health Administration & Human Resources  
101 Sunset Drive  
Dunmore PA 18512  
Telephone: 570-677-0124  
[gunjan.bansal@scranton.edu](mailto:gunjan.bansal@scranton.edu)

# DOES HEALTH INFORMATION TECHNOLOGY (HIT) IMPROVE HOSPITAL FINANCIAL PERFORMANCE AND QUALITY?

Mei Zhao, PhD

Professor and Chair, Department of Health Administration  
Brooks College of Health (Building 39), Room 4033A  
University of North Florida, 1 UNF Drive, Jacksonville, FL 32224  
Tel: (904)620-1444 Fax: (904)620-1035  
Email: [mzhao@unf.edu](mailto:mzhao@unf.edu)

Hanadi Hamadi, PhD

Associate Professor, Department of Health Administration  
Brooks College of Health (Building 39), Room 4017  
University of North Florida, 1 UNF Drive, Jacksonville, FL 32224-7699  
Phone: 904-620-5314, Fax: 904-620-1035  
E-mail: [h.hamadi@unf.edu](mailto:h.hamadi@unf.edu)

D. Rob Haley PhD, MBA, MHS

Professor and Director, Master of Health Administration Program  
Brooks College of Health (Building 39), Room 4039  
University of North Florida, 1 UNF Drive, Jacksonville, FL 32224-7699  
Phone: 904-620-4016, Fax: 904-620-1035  
E-mail: [rhaley@unf.edu](mailto:rhaley@unf.edu)

Cynthia White-Williams PT, MHS, PhD

Assistant Professor, Department of Health Administration  
Brooks College of Health (Building 39), Room 4019  
University of North Florida, 1 UNF Drive, Jacksonville, FL 32224-7699  
Phone: 904-620-5247, Fax: 904-620-1035  
E-mail: [cynthia.white-williams@unf.edu](mailto:cynthia.white-williams@unf.edu)

Xinliang Liu, PhD

Associate Professor, Department of Health Management and Informatics  
University of Central Florida, 4364 Scorpis St.  
Tel: (407)823-3752, Fax: (407) 823-6138  
Email: [Xinliang.Liu@ucf.edu](mailto:Xinliang.Liu@ucf.edu)

Aaron Spaulding, Ph.D.

Department of Health Sciences Research  
Division of Health Care Policy and Research  
Mayo Clinic Robert D. and Patricia E. Kern  
Center for the Science of Health Care Delivery  
Phone: 904.953.0671  
Email: [spaulding.aaron@mayo.edu](mailto:spaulding.aaron@mayo.edu)

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Mayo Clinic  
4500 San Pablo Rd.  
Jacksonville, FL 32224  
Mayoclinic.org

# DOES HEALTH INFORMATION TECHNOLOGY IMPROVE HOSPITAL FINANCIAL PERFORMANCE AND QUALITY?

*Mei Zhao, University of North Florida*  
*Hanadi Hamadi, University of North Florida*  
*D. Rob Haley, University of North Florida*  
*Cynthia White-Williams, University of North Florida*  
*Xinliang Liu, University of Central Florida*  
*Aaron Spaulding, Mayo Clinic*

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## ABSTRACT

*Hospitals have realized the importance of using health information technology (HIT) to improve quality and patient safety, however, there is a lack of empirical evidence regarding the effect of hospital HIT on financial performance and quality of care. Using a total sample of 3,002 U.S. hospitals, this study indicated that hospitals that adopted HIT tended to report better financial performance. However, there was no significant effect of HIT on quality of care. This analysis concluded that Investment in and utilization of HIT is important to improving hospital financial performance while its impact on quality of care may be limited.*

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## INTRODUCTION

The financial performance of advanced information and communication technologies (ICT) is well studied in other industries. Advanced ICT focuses on the standardization of communications within a digital environment (Irvin, 2007). Advanced ICT has shown to affect positive change in productivity, competitive advantage, and profitability of organizations (Kohli and Tan, 2016). However, the literature is inconclusive about the impact of adoption and implementation of new technology on financial performance in healthcare. While hospitals have realized the importance of using Health Information Technology (HIT) to improve quality and patient safety, they are concerned about the start-up capital and its potential impact on their financial performance. Therefore, this study seeks to address the impact of hospital HIT on financial performance and quality in health care.

Policymakers, payers, and healthcare experts consider HIT a critical part of the transformation experience in the healthcare industry (Boonstra et al., 2014). To support the promulgation of ICT, legislation such as the Health Information Technology for Economic and Clinical Health Act (HITECH) provides financial incentives for the adoption of HIT. The HITECH allocated over \$250 million to support the adoption and meaningful use of electronic health records (EHR) and other e-decision support tools. This initiative represents great efforts by policy makers to affect change in health care. As of 2015, 84% of hospitals report adopting at least a basic EHR system, representing a significant increase since 2008 (Henry et al., 2016). The HIT used in a majority of hospitals within the United States includes auto-generated hospital quality measures by electronic data extract and the use of electronic clinical data from the EHR to support continuous quality improvement process and the monitoring of patient safety (American Hospital Association, 2016). Furthermore, as of 2016, over 95% of eligible hospitals in the Centers for Medicare and Medicaid Services (CMS) EHR incentive program and Critical Access hospitals have established and demonstrated adherence to HIT meaningful use criteria (Centers for Medicare and Medicaid Services, 2016).

The HIT challenges cited by hospitals in a 2017 American Hospital Association (AHA) HIT survey includes the upfront capital costs or lack of capital, on-going costs of maintaining or upgrading systems, and obtaining physician cooperation (American Hospital Association, 2016). Therefore, questions related to financial payoffs and quality improvement associated with HIT implementation become increasingly important. For this

reason, the need to improve clinical outcomes should be considered alongside fiscal performance, otherwise the cost of the investment may complicate agency resources and may result in unsustainable clinical gains(Williams et al., 2016).The need to address fiscal viability is significant, as capital investments in HIT and operating expense could be burdensome(Smith and Coustasse, 2014).

The integration of hospital HIT into patient care, such as the ability to receive and track patients' lab results and tests, has the potential to improve patient quality of care. Prior studies have demonstrated that EHR can improve quality care by reducing 30- and 60-day hospital readmissions among patients with chronic conditions and mitigated clinical risk through early identification of high-risk patients (Bowles et al., 2014; Jamei et al., 2017). Positive outcomes are noted in clinical status, psychosocial well-being, self-care management, and behavioral health. In addition, hospitals with HIT such as automated notes and records, order entry, and clinical decision support had fewer complications, lower mortality rates, and lower costs(Amarasingham et al., 2009). Finally, health information technology could improve patient's safety by reducing medication errors, reducing adverse drug reactions, and improving compliance to practice guidelines (Alotaibi and Federico, 2017; Campbell et al., 2008; Chang, 2009).

Some studies provide evidence that hospital HIT investments are already generating positive financial returns (Wang et al., 2018), however other studies note no association between HIT investments and financial performance (Vest and Simon, 2018). In addition, Collum et al., (2016) found that hospitals were not able to improve their return on assets in 1 or 2 years following EHR adoption. Collum and colleagues (2016) suggested that initial levels of meaningful use criteria were not associated with patient revenues or operating expenses, however EHR adoption affected positive change in total margin due to hospital incentive payments under HITECH. Nevertheless, these results contradict findings from previous studies that indicate otherwise (Amarasingham et al., 2009; Chen et al., 2003). Menachemi et al. (2006) studied 82 Florida hospitals' financial statements and found a positive association between case mix (i.e., inpatient revenue, net patient revenue, hospital expenses, and total expenses) and clinical applications of technology. In addition, Wang, Wang, & McLeod (2018) suggest that HIT investments affect positive change in capital and IT operating expenses; EHR incentive payments increased net income, and thus provide a higher return on assets.

## CONCEPTUAL FRAMEWORK

Because no existing theory specifically explains how HIT processes impact hospitals' financial and quality performance, we adapted Donabedian's model as our conceptual framework. The Donabedian model provides a structure, process and outcomes framework for care evaluation (Donabedian, 1997). Our study design defined structure as hospital characteristics, which includes but not limited to hospital ownership, system status, hospital bed size, teaching status and location. Process is defined in our study as the use of HIT to track and receive laboratory results. Finally, we defined outcome as hospitals' financial performance and quality of care. Financial performance is measured through the use of common financial metrics such as return on asset and operational margin, while quality of care is measured using hospital total performance scores in the value-based purchasing incentive program. Understanding the impact of the processes in place can be critical to determining outcome (Donabedian, 1966; Donabedian, 2003).

In the production of care, hospitals should seek to optimize patient care while minimizing expenditures, thus providing parsimonious care without sacrificing quality (Menachemi et al., 2006; Wang et al., 2018; Williams et al., 2016). By combining quality and financial performance as outcomes, this study provides a comprehensive measure to explicate the value of HIT. Researchers have explored the potential impact of HIT adoption on quality and efficiencies, however, these studies were either used data from before HITECH, or just used one measure of financial performance. With the rapid implementation of EHRs in hospitals, an examination of the impact of contemporary HIT is required. Therefore, the purpose of this study is to examine the impact of hospital HIT on financial performance and quality.

## METHODOLOGY

### *Data Sources, Variables, and Measures*

This study used the following databases: 2017 CMS cost reports data, 2017 American Hospital Association Annual Survey (AHA) database, and two 2017 Hospital Compare datasets-- Hospital Value-Based Purchasing (HVBP) – Total Performance Score and Structural Measures – Hospital. The CMS cost reports provided a consistent source of financial information to construct the financial performance measures. Because of its well-known problems in this dataset, such as missing values and erroneously reported information for some financial elements, this study analyzed individual data elements and made standard corrections to deal with recognized errors (for example, we recoded negative total assets as positive values). In addition, we categorized the top and bottom one percent of both measures as missing data, so that outlier values would not affect the analysis. The American Hospital Association (AHA) Annual Survey provided information on hospitals' organizational characteristics such as bed size, ownership, teaching status, location, and payer mix (American Hospital Association, 2017). The TPS database provides the hospital total performance scores under the HVBP program (Haley et al., 2017; Haley et al., 2016b). The Structural Measures provides a list of hospitals and the structural measures they report. A structural measure reflects the environment in which hospitals care for patients, for example, whether or not a hospital is able to receive lab results electronically and able to track patients' lab results, tests, and referrals electronically between visits. The sample of this study includes about 3,000 acute care hospitals that participated in the HVBP program.

The dependent variables include six financial performance indicators and one hospital quality measure. The first two financial measures are related to profit margins: total margin (TM) and operating margin (OM). The TM provides the hospital's overall financial condition, including all sources of hospital revenue—patient care and nonpatient care such as investment, public appropriations, and donations. The total margin equals all revenues minus all expenses, divided by total revenues. The OM reflects the financial condition of a hospital's primary line of business—patient services. It equals revenues from operating sources minus operating expenses, divided by operating revenues. In addition, the measures of return on assets (ROA), shows the return that a hospital can earn on an important measure of invested fund: assets, and therefore, is also included in this study. ROA was measured as net income divided by total assets. Furthermore, current ratio (CR), the indicator of financial liquidity, which measures the hospital's ability to meet its obligations, was also included in the analysis. The debt ratio (DR), the ratio of total debt to total assets, measures the percentage of total capital provided by the creditors. Finally, profit per discharge, measured by the average profit made on each inpatient stay, measures the financial performance in relation to operations.

The hospital inpatient total performance score (TPS) was selected as the measure of hospital quality. The TPS is a combined single measure that determines the adjustment of reimbursement under Medicare's hospital value-based purchasing (HVBP) program. TPS is derived from 4 domains in FY 2018—25% of clinical care which is comprised of three 30-day mortality measures such as acute myocardial infarction (AMI), heart failure (HF), and pneumonia (PN); 25% of patient- and caregiver-centered experience of care/ care coordination, which is composed of 8 dimensions derived from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey; 25% of safety, which contains 1 AHRQ patient safety measure, 5 healthcare-associated infection measures, and 1 pregnancy and delivery care process measure; and 25% of efficiency and cost reduction, which contains 1 Medicare Spending per Beneficiary measure. The TPS is a continuous variable, which ranges from 0 to 100.

The key independent variable for this study is a dummy variable that indicates whether a hospital is able to receive lab results electronically and able to track patients' lab results, tests, and referrals electronically between visits.

Hospital characteristic variables are included in this study to control for confounding factors. Hospital bed size, defined as large, medium, and small based on the number of staffed hospital beds, may influence hospital financial performance and quality (Foster and Zrull, 2013). The definition of the size is as the following: small (fewer than 100 beds), medium (100-499), and large (500 beds and more). Ownership status, defined as for-profit, not-for-profit, and public, may reflect different objectives, service provision, and ultimate quality and financial performance (Berney et al., 2005). Furthermore, hospital teaching status may be related to financial performance and quality. Hospital located in rural counties, as opposed to urban ones, have fewer resources to provide high quality and of care and less efficient to achieve higher financial performance. Hospital system refers either a multihospital or a diversified single hospital system, which may impact quality and financial performance. Finally, variation in hospital payer mix may reflect differences in patient service needs and thus affect the quality of care (Czypionka et

al., 2014). Hence, Medicaid and Medicare percentages of inpatient days are included in the model to control for this confounding factor.

### Analysis

Both descriptive statistics and multivariate regression analysis were conducted for the study. The multivariate linear regression models examined the relationship between hospital HIT utilization and financial performance and TPS, controlling for other hospital characteristics such as size, ownership, teaching status, rural location, hospital system, and payer mix. All analyses were performed in SPSS, version 25.

## RESULTS

Table 1 highlights the descriptive characteristics and comparisons for all the variables in this study. The six financial measures and the one quality measure (TPS) serve as the dependent variables. For the 3,002 hospitals with complete financial data, about 90% (2,716) were able to receive lab results electronically and able to track patients' lab results, tests, and referrals electronically between visits. Hospitals that were able to track patients' lab results, tests, and referrals electronically between visits also showed significantly better financial performance in terms of operating margin, total margin, return on assets, and profit per discharge. For example, the median total margin for hospitals with HIT was 4.6%, while this number was only 1.7% for hospitals without HIT. Similarly, the median profit per discharge of hospitals with HIT could be as high as \$1,333, while hospitals without HIT could only make \$457. The difference was also observed by comparing other hospital characteristics such as hospital size, ownership, teaching status, rural location, hospitals that belong to a system, and payer mix such as percent of Medicare patients. Hospitals with HIT tended to be larger and medium sized hospitals, fewer for-profit hospitals and more not-for-profit hospitals. They were also more likely to be teaching hospitals and less likely located in rural areas. Finally, hospitals with HIT were more likely to belong to a hospital system.

**Table 1.** Hospital financial performance, quality, hospital characteristics: comparison of hospitals with health information technology (HIT) and hospitals without

| Variables                                 | With HIT<br>N=2716 | Without HIT<br>N=286 | P- value |
|-------------------------------------------|--------------------|----------------------|----------|
| Operating margin                          | -0.004             | -0.029               | 0.000    |
| Total margin                              | 0.046              | 0.017                | 0.000    |
| Return on assets                          | 0.043              | 0.018                | 0.010    |
| Current ratio                             | 2.02               | 1.72                 | 0.517    |
| Debt ratio                                | 0.44               | 0.51                 | 0.585    |
| Profit per discharge (\$)                 | 1,333              | 457                  | 0.041    |
| Total performance score                   | 36.98              | 38.36                | 0.027    |
| Large hospital percentage (>=400 beds)    | 0.14               | 0.05                 | 0.000    |
| Medium hospital percentage (100-399 beds) | 0.51               | 0.39                 | 0.000    |
| Percent of for-profit hospitals           | 0.17               | 0.33                 | 0.000    |
| Percent of not-for-profit hospitals       | 0.66               | 0.48                 | 0.000    |
| Percent of teaching hospitals             | 0.48               | 0.34                 | 0.000    |
| Percent of rural hospitals                | 0.30               | 0.39                 | 0.000    |
| Percent of system owned hospitals         | 0.72               | 0.68                 | 0.001    |
| Medicare percentage                       | 0.52               | 0.54                 | 0.766    |

Table 2 provides the multiple regression results performed on the hospital financial performance and quality of care variables. Hospital HIT indicated a positive effect on five of the six financial performance measures: operating margin, total margin, return on assets, current ratio, and debt ratio, compared to the hospitals that do not have HIT. In fact, hospitals with HIT had significantly higher operating margin, total margin, return on assets,

current ratio, and lower debt ratio. There was no significant effect of HIT on profit per discharge and quality of care measured by total performance scores.

Other hospital characteristics also showed significant impact on hospital financial performance and quality. In comparison to small hospitals, large hospitals tended to have higher total margins, return on assets, current ratio, and lower debt ratio, but no significant effects on the other two financial measures. However, the larger hospitals had significantly lower total performance scores compared to small ones. The medium hospitals showed the similar trend as larger hospitals. Compared to the government owned hospitals, for profit and not profit hospitals had significantly better financial performance in five financial indicators but current ratio. However, they had contrary effect on quality of care. Compared to government owned hospitals, for profit had significantly lower total performance scores, and not for profit hospitals had significantly higher total performance scores, signifying better quality of care. Teaching hospitals had significantly higher total margins and return on assets, but significantly lower total performance scores compared to the non-teaching hospitals. Hospitals located in rural areas had significantly lower operating margin, total margin, return on assets, and debt ratio. However, compared to their urban counterparts, rural hospitals had significantly higher current ratio and total performance scores. Hospitals that belong to a hospital system had significantly higher operating margins and return on assets, however, significantly lower debt ratio and profit per discharge. The system status did not have a significant effect on quality of care. Finally, a higher percentage of Medicare patients resulted in significantly lower total performance scores. However, the Medicare payer mix had no significant impact on any of the financial performance indicators.

## DISCUSSION

Using cross-sectional data from hospitals that participated in the CMS hospital value-based purchasing program, this study explored the association between hospital HIT adoption of a lab tracking system and hospital financial performance and quality of care. Our findings suggest that hospitals that are able to track patients' lab results, tests, and referrals electronically between visits tend to report better financial performance. While the benefits of HIT and financial performance have been widely studied, results have been inconclusive (Wang et al., 2018). The results of our study are consistent with Wang and Biederman (2010) and Mello, et al. (2010) who found that HIT may result in better hospital financial performance for various reasons. These reasons include: higher productivity through the immediate availability of patient medical charts, the lowering of medical liability costs, and decreased back-office administrative office expense (Mello et al., 2010; Wang and Biedermann, 2010).

However, our results are in contrast to other studies that found limited evidence between the adoption of certain HIT capabilities and financial performance (Collum et al., 2016; Kohli and Tan, 2016). Collum et al. (2016) constructed a longitudinal panel using data from the 2007-2010 AHA Annual Survey, the 2007-2010 AHA Annual Survey Technical Supplement, and the 2007-2011 Medicare Cost Reports from the Centers for Medicare and Medicaid Services. Their findings suggested that the adoption of an electronic health record (EHR) was not related to operating margin. They also found that hospitals were not able to improve their return on assets in a mere 1 or 2 years after the adoption of EHRs (Collum et al., 2016). It was suggested that it may be difficult for hospitals to achieve a return on their investment within 1 to 2 years of HIT technology adoption that require a significant investment of funds, such as an EHR. However, they did find that hospital total margin appeared to somewhat improve after 2 years of adopting EHR technology (Collum et al., 2016), which is consistent with the current study. Agha (2014) studied Medicare claims and found that there was no evidence of cost savings attributed to HIT adoption after 5 years in their study of 3,900 hospitals (Agha, 2014).

**Table 2.** The association between HIT and financial performance/quality, n=3002

| Variables                                 | Financial Performance |              |                  |               |            |                  | Quality                 |
|-------------------------------------------|-----------------------|--------------|------------------|---------------|------------|------------------|-------------------------|
|                                           | Operating Margin      | Total Margin | Return on Assets | Current Ratio | Debt Ratio | Profit-Discharge | Total Performance Score |
| <b>HIT</b>                                | 0.045***              | 0.027***     | 0.022**          | 0.315**       | -0.187***  | 1018.992         | -0.701                  |
| Large hospital percentage (>=400 beds)    | 0.007                 | 0.019**      | 0.026**          | 0.509***      | -0.186***  | -2691.552        | -10.456***              |
| Medium hospital percentage (100-399 beds) | 0.014*                | 0.009*       | 0.006            | 0.183*        | -0.161***  | -3128.12**       | -7.068***               |
| Percent of for-profit hospitals           | 0.125***              | 0.05***      | 0.09***          | -0.056        | -0.471***  | 3421.212*        | -1.551**                |
| Percent of not-for-profit hospitals       | 0.075***              | 0.032***     | 0.025***         | -0.089        | -0.022     | 2670.883*        | 2.934***                |
| Percent of teaching hospitals             | 0.003                 | 0.014***     | 0.015**          | -0.056        | -0.063*    | -310.721         | -1.226***               |
| Percent of rural hospitals                | -0.019***             | -0.013**     | -0.018**         | 0.322***      | -0.162***  | -1253.472        | 3.620***                |
| Percent of system owned hospitals         | 0.048***              | 0.008        | 0.022***         | -0.102        | -0.092**   | -2647.7**        | 0.111                   |
| Medicare percentage                       | 0.000                 | 0.000        | 0.000            | 0.002         | -0.001     | -39.948          | -0.110***               |

Notes: \*, \*\*, and \*\*\* indicate significance at the 0.10, 0.05, and 0.01 level, respectively

Our research also found that there was not a significant effect of the adoption of electronic lab tracking functions on hospital quality of care. This finding was unexpected because HIT adoption is believed to improve the quality of care through reduced medical errors and the immediate availability of information, such as medical lab records (Mello et al., 2010). While there is a paucity of empirical research studying the association between the HIT adoption and its effect on hospital quality of care as measured by TPS, our results are consistent with one study that found that hospital HIT adoption was not associated with better outcomes (Agha, 2014). Using Medicare claims data from 1998 to 2005, Agha (2014) analyzed the impact of HIT on the quality measured by 30-day readmission rate, complication rate, and adverse drug events. Their study found that hospital HIT installations made little progress towards improving quality. One potential explanation is that HIT may have been initially designed to improve financial performance through enhanced medical coding and billing capabilities and not specifically for improving quality of care. In addition, Medicare only recently implemented the TPS methodology under the Patient Protection and Affordable Care Act of 2010 (ACA). The TPS methodology was implemented in 2012 and was designed to provide incentives to hospitals that improved their quality of care and reduced the number of unnecessary hospital readmissions (Haley et al., 2016a). As such, HIT technologies may still be evolving and organizational strategies in how they are utilizing the HIT may be developing to allow for more direct impact associated with HIT and TPS quality indicators based upon financial incentives and penalties associated with quality of care.

Hospital characteristics such as size, ownership, teaching status, and system owned all had a significant effect on hospital financial performance and quality of care, however, the most noteworthy is the effect of rural location. Although rural hospitals had significantly worse financial performance, our study found that they had significantly higher quality of care as measured by total performance scores. The results of our study are consistent with Haley and colleagues (2017), who found that patients of smaller and rural hospitals were perceived to have better patient experience compared to larger and urban hospitals. The Patient and Caregiver-Centered Experience of Care/ Care Coordination Domain currently comprises a sizeable twenty-five percent of a hospital's TPS (Centers for Medicare and Medicaid Services, 2017). Rural hospitals are perhaps more likely to be in areas where members of the community are well-known and familiar with the surrounding population. Therefore, it is believed that this familiarity may positively influence hospital patient experience scores within the TPS algorithm (Haley et al., 2017).

Research also indicates that, as a result of the ACA, Medicaid expansion resulted in greater increases in Medicaid revenue among rural hospitals compared to urban hospitals (Kaufman et al., 2016). Thus, providing needed revenue for rural hospitals to invest in resources to improve their quality of care. Similarly, Ibrahim and colleagues (2016) found that there was no significant difference in 30-day mortality and somewhat lower complication rates for rural CAHs compared to non-CAHs for appendectomies, cholecystectomies, colectomies, and hernia repairs (Ibrahim et al., 2016). Alternatively, our results are in contrast with Joynt and colleagues (2011) who found that rural CAHs had a worse process of care and higher mortality rates for patients with congestive heart failure (CHF), acute myocardial infarction (AMI), and pneumonia than non-CHAs (Joynt et al., 2011). More research is needed to better understand the influencing factors of TPS quality of care measures and rural hospitals.

## LIMITATIONS

Although the present study increases our understanding of HIT adoption and hospital financial performance and quality of care, there are several limitations that are important to consider. First, this is a cross-sectional study, which precludes drawing conclusions on causality (Sedgwick, 2014; Maxwell and Cole, 2007). The finding that hospitals equipped with HIT systems have better financial performance is likely the subject to endogeneity bias (Kristensen et al., 2016; Hassan et al., 2010; Norton and Staiger, 1994). For example, it is possible that hospitals with higher profit margins and return on assets were those that could afford to install HIT systems; this favorable selection could overestimate the impact of HIT on financial performance. Conversely, hospitals with poor financial performance in the past may acquire HIT systems as a strategy to revive the business; failure to account for this adverse selection could underestimate the financial impact of HIT adoption (Miller et al., 2005; Payne et al., 2013). Therefore, it is important for future research to explore the potential endogeneity of HIT adoption. A panel analysis with longitudinal data of hospitals may provide a better analysis on the effect of HIT development in the future.

In addition, this study uses data from the following multiple databases; the 2017 CMS cost reports data, 2017 American Hospital Association Annual Survey (AHA) database, and two 2017 Hospital Compare datasets-- Hospital Value-Based Purchasing (HVPB) – Total Performance Score and Structural Measures to study the effect of HIT adoption on financial performance and quality of care. Quality of care indicators are limited to those measured

by TPS. Further research should include quality of care measures beyond that of TPS. Furthermore, this research cannot be generalized to all hospitals in the United States. Hospitals that do not participate in the CMS HVBP may behave differently than those that participate. Future research should include hospitals that do not participate in the CMS HVBP program to better understand if they have similar associations between HIT adoption and hospital financial performance and quality of care.

## CONCLUSIONS

The benefits of HIT have been widely explored, however the impact of hospital HIT on financial performance and quality have been inconclusive. Therefore, this study adds to our understanding of the associations between the adoption of HIT lab tracking functions and its impact on hospital financial performance and quality of care. First, it provides hospital administrators with important empirical insight into the impact of HIT adoption on hospital financial performance. Results of this study demonstrate that hospitals who adopted lab tracking HIT tended to report better financial performance. While our research indicates that the adoption of electronic lab tracking functions was found to be associated with improved financial performance, it was not significantly associated with improved quality of care. Therefore, hospital administrators may want to consider investing in other types of health information technologies which may have a more direct and positive impact on hospital TPS.

This research also provides insight for policymakers. For example, policymakers should consider developing policies that facilitate the exploration and adoption of various hospital HIT capabilities that measurably improves hospital quality of care as measured by CMS' HVBP TPS. In addition, HIT technologies, such as electronic lab tracking functions, may actually improve patient quality indicators beyond those that are measured by TPS. Therefore, policymakers should consider exploring other quality of patient care measures beyond those that comprise the current TPS methodology.

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## **THE IMPACT OF LEADERSHIP STYLE ON ADMINISTRATIVE CREATIVITY IN HEALTH ORGANIZATIONS**

**ABSTRACT**

*Leadership in business organizations is the main driver of their work because it gives importance in ensuring the continuity of the organization through its functions of planning, organization, direction and control. The prevailing leadership style and the philosophy of managers in dealing with their subordinates have a great impact on the creativity level of employees. The positive attitude of managers towards their subordinates and giving importance of their role in the management process lead to opportunities for professional growth. Hence, building relationships between managers and subordinates are based on respect and appreciation. The aim of the study is to determine administrative leadership styles and its relationship on the creativity of employees in health organizations.*

*This is a cross-sectional study which will be undertaken at Hafr Al-batin. The study questionnaire will be completed by employees working at select health organizations. Ethical clearance will be secured from the institutional review board. Main outcome measures will be statistically treated using descriptive statistics.*

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Nasser Alsafi  
College of Business Administration, Majmaah University  
Ministry of Health, Hafr Al-batin  
Majmaah University, Kingdom of Saudi Arabia  
[naaa2007@gmail.com](mailto:naaa2007@gmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

# THE USE OF MOBILE HEALTH CLINICS IN SAUDI ARABIA IN IMPROVING PRIMARY HEALTHCARE DELIVERY

Saud Al Otaibi, Majmaah University  
Majed Alamri, Majmaah University

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## ABSTRACT

*The government of Kingdom Saudi Arabia has been facing a number of challenges including inadequate access to some health care facilities. Mobile Health clinics have been utilized in some areas in Saudi Arabia to facilitate the equitable delivery of primary health care services in remote and rural areas. Nevertheless, mobile clinics are often the provider of last resort in places where the mainstream health care system has not provided a point of access and is an untapped resource, for helping the nation reduce health disparities while improving care, improving health and saving healthcare costs.*

*This study used review method to search for electronic articles between years 2004 and 2018 to examine the appropriateness and feasibility of utilizing mobile health clinics in enhancing the delivery of health care needs, improve the response to health PHC programs and review the cost-effectiveness of PHC. The MOH has a clear need to review protocols and finances regarding the use of mobile health clinics and mobilize the research community to improve the capacity of the mobile clinic sector to evaluate its impact. To decrease the non-adherence of rural area communities to primary health care deliveries and the cost of health especially in emergency department by improving the information drive, health delivery and return of investment on health by the use of Mobile Health Clinics.*

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Saud Al Otaibi  
College of Business Administration, Majmaah University, Graduate student  
Majmaah University, Kingdom of Saudi Arabia  
[alotaibi8saud@gmail.com](mailto:alotaibi8saud@gmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

# TIME MANAGEMENT AND ITS IMPACT ON EMPLOYEES; PERFORMANCE IN HEALTH ORGANIZATIONS

*Nasser AlGharabi, Majmaah University  
Majed Alamri, Majmaah University*

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## ABSTRACT

*Time management is one of the basic criteria to be considered in determining the success and effectiveness of the administration. The mismanagement of time affects the institution as a whole. It will generate some disadvantages for some workers such as misuse of the human and material resources. This study aims to determine how time management practices affect the employees' job performance in health organizations.*

*A questionnaire will be used to gather data from the respondents. Ethical clearance will be secured from the institutional review board. Computation of the frequency distribution, percentage, weighted mean, standard deviation, variance, correlation, multiple regression, analysis of variance (ANOVA) and t-test will be utilized to give statistical interpretation of the data.*

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Nasser Algharabi  
College of Business Administration, Majmaah University, Graduate student  
Ministry of Health, Hafr Al-batin  
Majmaah University, Kingdom of Saudi Arabia  
[nasser\\_edh@hotmail.com](mailto:nasser_edh@hotmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

**TRACK**  
**INTERNATIONAL HEALTHCARE**

# **CONCEPT OF MOHALLA CLINICS IN INDIA, HEALTHCARE COMPARATIVE ANALYSIS BETWEEN COUNTRIES, AND SINGAPORE'S 3M'S HEALTHCARE SYSTEM**

Gurpreet Singh  
MHA Student  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
Home Address: 19111 Arcadia Cove CT, Cypress, TX, 77429  
Email- [gpmehrtot0001@gmail.com](mailto:gpmehrtot0001@gmail.com)  
School email- [singhg2798@uhcl.edu](mailto:singhg2798@uhcl.edu)  
Phone- 832.420.2024

Mallory Rose Tynan  
MHA Student  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
Home Address: 10327 Glenfield Park Ln, Houston, TX, 77070  
Email- [mallorytynan@gmail.com](mailto:mallorytynan@gmail.com)  
School email- [tynanm0757@uhcl.edu](mailto:tynanm0757@uhcl.edu)  
Phone- 936.697.5968

Ashish Chandra (CONTACT AUTHOR)  
Professor  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
[chandra@uhcl.edu](mailto:chandra@uhcl.edu)  
281-212-1717  
Office Address: 2151 W. Holcombe Blvd Suite #120, Houston, TX 77030

# CONCEPT OF MOHALLA CLINICS IN INDIA, HEALTHCARE COMPARATIVE ANALYSIS BETWEEN COUNTRIES, AND SINGAPORE'S 3M'S HEALTHCARE SYSTEM

Gurpreet Singh, University of Houston – Clear Lake  
Mallory Rose Tynan, University of Houston – Clear Lake  
Ashish Chandra, University of Houston – Clear Lake

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## ABSTRACT

*The purpose of this research paper is to do a comparative analysis of different countries' Healthcare system and analyzing the successful healthcare concepts in Singapore and India, namely 3 M's and Mohalla Clinics, respectively. The paper is divided into two parts. The first part covers the Delhi government's concept of Mohalla Clinics in India. The idea is to provide free of cost basic, preventive health care to an underserved population in Delhi, fully funded by the state. It outlines about the concept, the idea, evolution, technology used, operational costs, analyzing the concept from universal health coverage point of view, Washington Post's coverage on this project, world leaders' views about clinics, and suggestions on what this concept can teach other countries. The second part includes the comparative analysis of health spending, prices, supply, utilization, technology, and health outcomes among different countries like Australia, Canada, Denmark, France, Germany, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States. Additionally, the second part talks about the Singaporean successful healthcare concept, called 3 M's. The 3 M framework involves how Singapore publicly finances their universal health care coverage to its citizens. Medisave, MediShield, and Medifund are the three "M's" that play a vital role in the public's health care.*

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## INTRODUCTION



(“Have holistic approach towards mohalla clinics,” n.d.)

Although, India has experienced few successes in the past eliminating poliomyelitis, maternal and neonatal tetanus but, there are still many health challenges, like low health expenditures on health by government, prevalence of communicable diseases such as TB, measles; rising burden of non-communicable diseases like hypertension,

diabetes; limited focus on primary health care (PHC) and shortage of healthcare personnel (“Have holistic approach towards mohalla clinics,” n.d.).

The major problem with healthcare in India is the lack of assured services, diagnostics, medicines, providers and poor referral outline. Majority of the population look out to governmental hospitals for even common illnesses like fever, cold, which tends to cause overcrowding, long waiting times. This ultimately leads to poor quality of service delivery, making people unsatisfied. This experience costs the patient more than what they think of (transport costs by visiting multiple times) and a too much hassle for them at public health facilities. Therefore, they seek private providers, leading to more out of pocket spending.

In recent years, the situation has changed slightly. The National Health Mission, through the government's provision, has contributed to the awareness of the health system but still not what one would have liked to. State-wise, the Delhi government's concept of Mohalla clinics, whose focus is to provide essential health services to underserved population across the state, has received much worldwide attention, especially from the health experts. After the implementation and results of these clinics, many other countries in India are thinking to initiate the same concept.

The paper outlines the concept, design, evolution of Mohalla clinics, examining the strengths and weaknesses and suggesting the way to broaden the vision towards the universal health coverage idea in India.

### THE MOHALLA CLINICS CONCEPT

The Mohalla clinics, or the community clinics concept was first launched by the Delhi government in July 2015 with once clinic in the slum area. The idea was to provide primary health care services to the underserved population of Delhi at no cost, meaning funded entirely by the state government. The idea came from the success of the Mobile Medical Units (MMU). Then, with the change in the government and to fulfill the electoral promise along with strengthening the health system, the concept of Mohalla clinics came into force (Executive, 2017).

**Idea:** To provide health care services at no cost within walking distance, open for about 4-6 hours a day, covering essential health services including medicines and diagnostic tests. It is estimated that about 80-90% of the basic health problems likely to be taken care of at these clinics, reducing the referral numbers.

**Targeted population:** Underserved population, slum areas (Jhugi-Jhompri people), migrants, targeting approximately 10,000-15,000.

**Staff:** Minimum one qualified physician, auxiliary nurse midwife, a pharmacist, and other medical personnel as needed.

**Services:** Basic first aid services, specialist services like pediatricians, gynecologist, ophthalmologist (on a weekly basis), outpatient consultations, maternal as well as child health services, antenatal and postnatal services, vaccinations/immunizations, family planning, counseling, and finally, referrals for specialized treatment.

**Diagnostics and medicines:** Approved list of medicines (108) and provision of more than 200 diagnostic tests, all at no cost to the patients.

**Location:** The main area is where the underserved population lives. The selection of area is based on the inputs from the local community/RWA (Residents Welfare Association)/survey by planning branch/site verification by health personnel teams.

**Physical Infrastructure:** One clinic is in two/three rooms. One for physician and other for medical examination, maintaining confidentiality. Wherever there are three rooms; the third can be used as a waiting area room; otherwise, the waiting area is outside, covered with a roof. A proper water dispensing system along with one restroom is attached. Additionally, there is a provision of air conditioning along with a TV with cable. The locations and design made in a way to be easily accessible with an all-weather road, ambulance accessibility.

**Financing - Cost of clinics:** One clinic costs about 2,000,000 rupees, about \$30,000. However, the government is operating many clinics at the rented accommodations.

**The technology used:** For critical issues, these clinics use the token vending machine; EHR system; use of an Android-based tablet, Swastha Slate, for performing many diagnostic tests.

**Governance:** The program is led by the Minister of Health services and other senior officials. The government appointed a particular agency, called Delhi Healthcare Corporation to implement the concept, led by Principal Secretary and other top health bureaucrats.

**Private Physician engagement:** The government recruited private physicians at 'fee for service' basis, that is, Rs30/patient as consultation charges (i.e., less than 50 cents). For helper, if needed, additional Rs10/patient is paid (i.e., about 15 cents).

**Timing and working days:** The minimum time for each clinic is 4 hours, which can last for 6 hours. Mostly, the clinics open in the morning, but can be altered with patients' needs and can be operated in the evening as well. The clinics open for 6-days a week including public holidays.

**Other services provided under Mohalla Clinics:** A strong-effective referral linkage system; reduce the cost of care by investment on healthcare, ambulance services.

### EVOLUTION OF MOHALLA CLINICS

The first clinic was installed on July 19, 2015, at Peeragarhi area of West Delhi. The Government had planned to introduce 1000 total clinics, out of which 106 were established by December 2016 across all 11 districts and in 55 of total 70 assembly constituencies of the state (Lahariya, 2017).

#### Medicine Vending Machine (MVM)

- The machine uses sensor technology to dispense medicines based on doctor's prescription
- The first machine was set up on August 22, 2016, which can stock up to fifty different medications including tablets and syrup forms.
- It dispenses medicines only when a physician prescribes on a connected tablet, cutting the need of a pharmacist.
- The machine prevents human interventions and reduces the risk of medicines not being dispensed while in stock.

### WASHINGTON POST'S COVERAGE OF MOHALLA CLINICS

The concept to Mohalla Clinics became so famous that even the Washington post also covered this idea. The article hails the Mohalla clinics by giving an example of one patient, named Rupandeep Kaur, 20-weeks pregnant, who came to clinic looking fatigued and ready to collapse. After being asked few questions, she was taken to the doctor, where doctor reviewed her history, asked questions and ordered tests including blood and urine tests. After checking, the doctor found out that the fetus was healthy, but the women had low hemoglobin and blood pressure levels. Then, the doctor immediately ordered the ambulance and transferred her to the nearest hospital.

All of this took about 15 minutes from entry to the clinic to transferring to an ambulance, including tests as well. The entire process was automated, from check-in to retrieval of medical records, test results, ambulance dispatch. There was no paperwork, no bills, no delays. Everything was free. Later, the hospital told that if she had not received the timely care, she might have had a miscarriage.

Next, the article talked about the technology used during the process, which is called *Swastha Slate*. The slate is a \$600, cake tin size, performing 33 different common medical tests like BP, blood sugar, heart rate, blood hemoglobin, urine protein, glucose. Additionally, it also tests diseases like dengue, hepatitis, HIV, malaria, typhoid. These tests take about a minute or two and upload the data to a cloud-based medical record management system, easily accessible by the patient.

The slate was developed by Kanav Kahol, a biomedical engineer and researcher at Arizona State University until he became frustrated because of lack of interest to reduce the cost of diagnostic testing. In 2011, he returned home to New Delhi to develop a solution. About 496 clinics use this slate in Jammu and Kashmir. The focus is to provide antenatal care to more than 22,000 mothers. Of which, 277 mothers were diagnosed as high risk and offered timely care at local sites instead of going to villages.

A newer version of Slate, called HealthCube, was tested by teams of physicians, technology, operations, marketing experts at Peru's leading hospital, that is, Clinica International. It was checked for its durability against the western equipment in ERs and clinical settings. The general manager, Alvaro Chavez Tori, told that the results were highly successful, and this Slate can help millions of those people who lack access to quality diagnostics in Peru and Latin America ("What New Delhi's free clinics can teach America about fixing its broken health care system," n.d.)

## **VIEWS OF WORLD LEADERS ABOUT MOHALLA CLINICS**

Former UN Secretary-General Ban Ki-Moon praised the Delhi government for their concept of Mohalla Clinics calling it the "best form of healthcare" and asked the central government should implement the model throughout the country. He added, "I've been to different parts of the world. What I saw today is the best and systematic form of healthcare," Ban Ki-Moon told the media ("Former UN Chief Ban Ki Moon Hails Delhi Govt's Mohalla Clinic, Calls It 'Best Form Of Healthcare,'" n.d.)

The former WHO director general and Gro Harlem Brundtland, former PM of Norway, added that the Mohalla clinics are not only a universal health care concept, but may also partially solve the problem of antimicrobial resistance. "The healthcare reforms being undertaken in Delhi strike me as an excellent strategy to build an exclusive health system in India and bring universal health care to its people."

Next, the former Secretary General of UN, Kofi Annan, had written to Delhi CM, Arvind Kejriwal, to commend the project. He added that the concept could be a model for those trying to move towards UHC ("After Kofi Annan, another world leader praises AAP govt's mohalla clinics | Delhi | Hindustan Times," n.d.)

## **KEY TAKEAWAYS**

Mohalla Clinics concept, however, looks very small and a new idea, but it can bring some exceptional outcomes for the low-income population, especially the underserved ones. Some of the learnings from Mohalla clinics are:

- Free of cost for basic quality healthcare services to the underserved population of Delhi and a step towards Universal Healthcare
- Swastha Slate technology, making all health records electronic, cheap, and easily accessible by both providers and patients
- Cutting down workforce costs by using MVM to dispense medications, Slate, smart-tablets, attaching them to several medical devices like ECG, glucometer, BP monitor, and so on.

## **WHAT WORLD CAN LEARN FROM MOHALLA CLINICS**

It is always hard to compare one country or one country's system with other countries as there are many different loops in every country's healthcare, state, federal system. However, in this today's rising healthcare prices era, Mohalla Clinics concept can teach some good points to all countries, especially where there is a lack of resources like infrastructure, financial, manpower. The opportunity is more significant for Latin America considering this concept. Talking about the United States healthcare system, no doubt, it is the most advanced with high-tech machines, one of the world's best healthcare system providing quality care. However, there are some concerns as well. The United States is the only country who spends about 18% of the total GDP on healthcare alone.

Along with this, despite the ACA introduction, there are still 28.1 million Americans are uninsured. Mostly, it includes children under 19 living in poverty (7%), blacks and Asians (10.5% and 7.6% respectively), and Hispanics at the top, with 16% (Bureau, n.d.). As a result, the poor population lacks preventive care because of high prices,

commute problems, and waiting times, which finally leads to more severe issues, which costs too much to treat. Because of the high uninsured rates, the ERs get also crowded with other people seeking primary care.

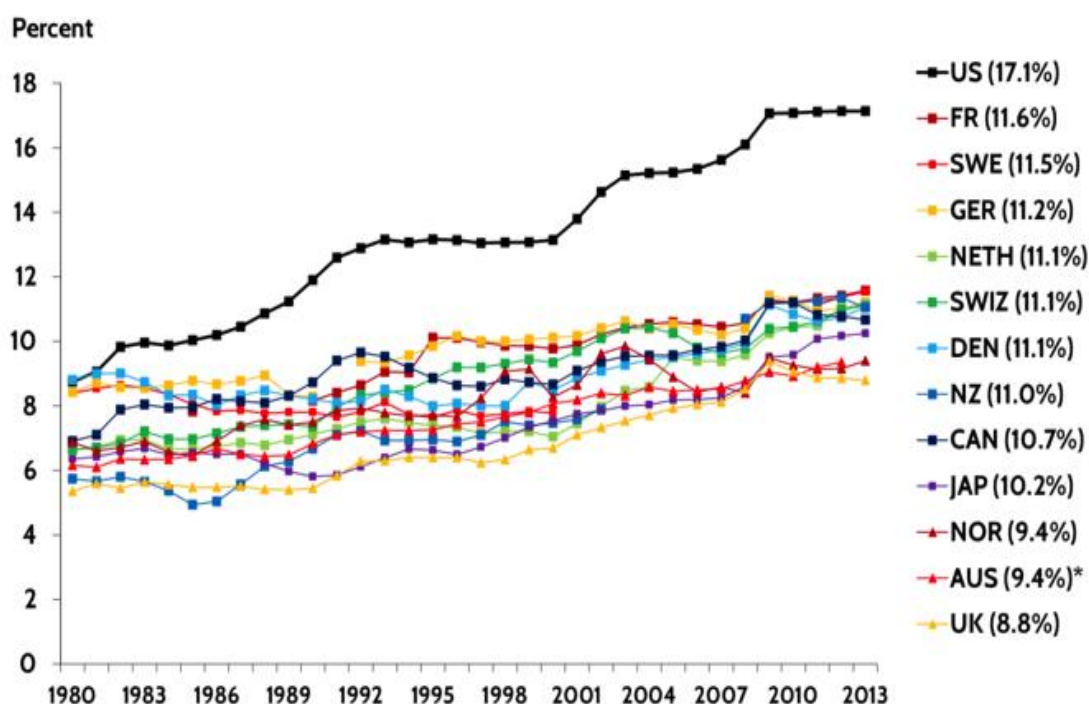
The uninsured rate, high health care cost, and serving the underserved population is not only a U.S problem, but it is a universal problem, even in India as well from where this concept came. So, countries can use this concept by setting up small community clinics within walkable distance, using cheap and quality technology like Swastha Slate, MVMs to reduce the healthcare costs providing quality services at free or low cost. This concept can also be used to reduce the uninsured rates by having a special and separate insurance system for those living in underserved areas.

Although, it is hard to provide free health care services to those with serious problems but, if timely manner basic preventive care can be provided to those in need, especially the poor and the uninsured because of the economic issues, it could save a country a tremendous amount of health care costs by preventing the conditions from becoming worse and reducing hospitalizing costs.

### GLOBAL HEALTHCARE SYSTEMS – A BRIEF COMPARATIVE ANALYSIS

The information on Exhibit 1 below from the OECD demonstrates that the U.S. spent 17.1% of its total Gross Domestic Product (GDP) on health care in 2013. This was just about 50 percent more than France at 11.6% of Gross domestic product and twofold what was spent in the U.K. at 8.8%, and United States spending per individual was equivalent to \$9,086 (Squires & Anderson, 2015) but as you will see in the next graph, that number has gone up to over \$10,000 per person as of 2016.

**Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013**



\* 2012.

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.

Source: OECD Health Data 2015.

## EXHIBIT 2: Global Health Expenditures

Total health expenditures per capita, U.S. dollars, PPP adjusted, 2016



The US value was obtained from the 2016 National Health Expenditure data

Source: Kaiser Family Foundation analysis of data from OECD (2017), "OECD Health Data: Health expenditure and financing: Health expenditure indicators", OECD Health Statistics (database) (Accessed on March 19, 2017). • [Get the data](#) • [PNG](#)

Peterson-Kaiser  
Health System Tracker

The United States on average spends more than double the amount of price per person in health care expenditures than of a comparable country. Spending per individual in the U.S. was \$10,348 in 2016 – 31% higher than Switzerland, the following most noteworthy per capita spender (Sawyer & Cox, 2018). Until the 1980's, the United States was relatively on the same track as other countries, but health spending increased at a significantly faster rate than its gross domestic product.

## EXHIBIT 2: Global Health Insurance Coverage

Percent of total population covered by private and/or public health insurance, 2016 or nearest year



Note: 2016 data shown for the U.S., Australia, Canada, France, and Sweden.

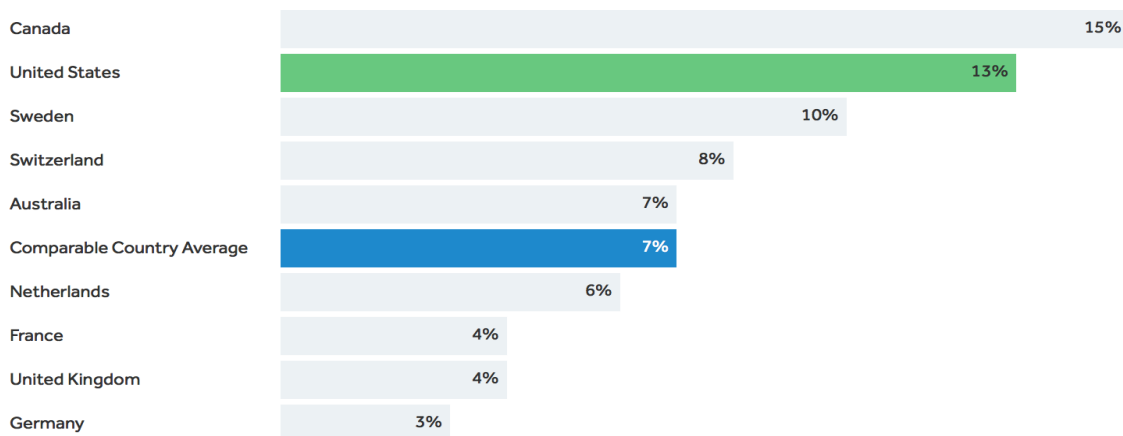
Source: Kaiser Family Foundation analysis of data from OECD (2018), "Social protection", OECD Health Statistics (database) (Accessed on 25 January 2018) for comparable countries and U.S. Census Current Population Reports for the United States. • [Get the data](#) • [PNG](#)

Peterson-Kaiser  
Health System Tracker

Although gains of health care coverage increased from the Affordable Care Act, the rate of insured Americans in the United States is still lower than comparable countries.

### EXHIBIT 3: Global Emergency Department Utilization

Percent that used emergency department for a condition that could have been treated by a regular doctor or place of care in the past 2 years, ages 65 and older, 2014



Source: [2014 Commonwealth Fund International Health Policy Survey](#)

Peterson-Kaiser  
**Health System Tracker**

Could part of the rising costs of healthcare in the United States be a factor of avoidable emergency department visits? Even though the United States is not the highest based upon this data, it is almost double the amount of the comparable country average. Americans visit the emergency room twice as often instead of seeing a regular doctor or place of care. An emergency room costs much more than going to a specialist or primary doctor.

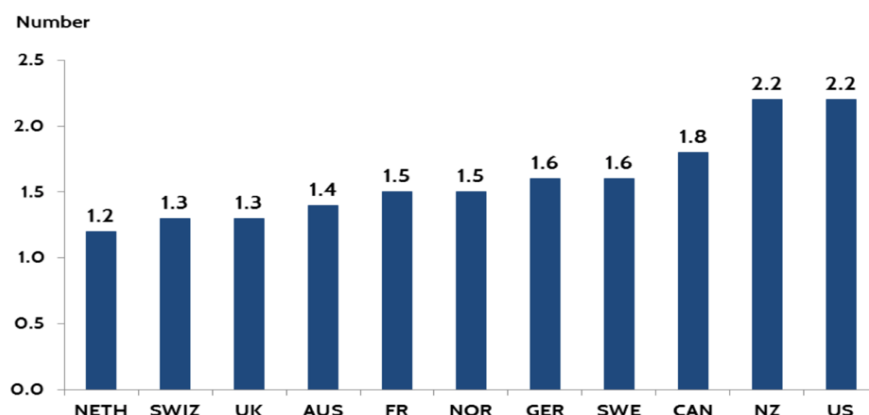
### Exhibit 5. Diagnostic Imaging Supply and Use, 2013

|                | Magnetic resonance imaging    |                          | Computed tomography          |                         | Positron emission tomography  |                          |
|----------------|-------------------------------|--------------------------|------------------------------|-------------------------|-------------------------------|--------------------------|
|                | MRI machines per million pop. | MRI exams per 1,000 pop. | CT scanners per million pop. | CT exams per 1,000 pop. | PET scanners per million pop. | PET exams per 1,000 pop. |
| Australia      | 13.4                          | 27.6                     | 53.7                         | 110                     | 2.0                           | 2.0                      |
| Canada         | 8.8                           | 52.8                     | 14.7                         | 132                     | 1.2 <sup>a</sup>              | 2.0                      |
| Denmark        | –                             | 60.3                     | 37.8                         | 142                     | 6.1                           | 6.3                      |
| France         | 9.4                           | 90.9                     | 14.5                         | 193                     | 1.4                           | –                        |
| Japan          | 46.9 <sup>b</sup>             | –                        | 101.3 <sup>b</sup>           | –                       | 3.7 <sup>b</sup>              | –                        |
| Netherlands    | 11.5                          | 50.0 <sup>b</sup>        | 11.5                         | 71 <sup>b</sup>         | 3.2                           | 2.5 <sup>a</sup>         |
| New Zealand    | 11.2                          | –                        | 16.6                         | –                       | 1.1                           | –                        |
| Switzerland    | –                             | –                        | 36.6                         | –                       | 3.5                           | –                        |
| United Kingdom | 6.1                           | –                        | 7.9                          | –                       | –                             | –                        |
| United States  | 35.5                          | 106.9                    | 43.5                         | 240                     | 5.0 <sup>a</sup>              | 5.0                      |
| OECD median    | 11.4                          | 50.6                     | 17.6                         | 136                     | 1.5                           | –                        |

<sup>a</sup> 2012. <sup>b</sup> 2011. <sup>c</sup> 2010.  
Source: OECD Health Data 2015.

Exhibit 5 above shows how the United States emerges as a top consumer for refined technology and imaging innovation. The highest price per capita rates for magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET) show Americans being at the top among the nations where data was accessible. The figure shows that Japan and the United States were the countries with the highest number of these type of imaging machines.

**Exhibit 6. Average Number of Prescription Drugs Taken Regularly, Age 18 or Older, 2013**



Source: 2013 Commonwealth Fund International Health Policy Survey.

This exhibit shows that the United States, as well as New Zealand, has the highest consumption of prescription drugs taken on a daily basis.

**Exhibit 7. Prices for Hospital and Physician Services, Pharmaceuticals, and Diagnostic Imaging**

|                | Total hospital and physician costs, 2013 <sup>a</sup> |              | Diagnostic imaging prices, 2013 <sup>a</sup> |                   | Price comparison for in-patient pharmaceuticals, 2010 (U.S. set to 100) <sup>b</sup> |
|----------------|-------------------------------------------------------|--------------|----------------------------------------------|-------------------|--------------------------------------------------------------------------------------|
|                | Bypass surgery                                        | Appendectomy | MRI                                          | CT scan (abdomen) |                                                                                      |
| Australia      | \$42,130                                              | \$5,177      | \$350                                        | \$500             | 49                                                                                   |
| Canada         | –                                                     | –            | –                                            | \$97              | 50                                                                                   |
| France         | –                                                     | –            | –                                            | –                 | 61                                                                                   |
| Germany        | –                                                     | –            | –                                            | –                 | 95                                                                                   |
| Netherlands    | \$15,742                                              | \$4,995      | \$461                                        | \$279             | –                                                                                    |
| New Zealand    | \$40,368                                              | \$6,645      | \$1,005                                      | \$731             | –                                                                                    |
| Switzerland    | \$36,509                                              | \$9,845      | \$138                                        | \$432             | 88                                                                                   |
| United Kingdom | –                                                     | –            | –                                            | –                 | 46                                                                                   |
| United States  | \$75,345                                              | \$13,910     | \$1,145                                      | \$896             | 100                                                                                  |

<sup>a</sup> Source: International Federation of Health Plans, 2013 Comparative Price Report.

<sup>b</sup> Numbers show price indices for a basket of in-patient pharmaceuticals in each country; lower numbers indicate lower prices.

Source: P. Kanavos, A. Ferrario, S. Vondoros et al., "Higher U.S. Branded Drug Prices and Spending Compared to Other Countries May Stem Partly from Quick Uptake of New Drugs," *Health Affairs*, April 2013 32(4):753–61.

The data above suggests that the United States has a pattern of higher costs for procedures and physician costs, imaging, as well as pharmaceuticals.

## Exhibit 9. Select Population Health Outcomes and Risk Factors

|                | Life exp. at birth, 2013 <sup>a</sup> | Infant mortality, per 1,000 live births, 2013 <sup>a</sup> | Percent of pop. age 65+ with two or more chronic conditions, 2014 <sup>b</sup> | Obesity rate (BMI>30), 2013 <sup>a,c</sup> | Percent of pop. (age 15+) who are daily smokers, 2013 <sup>a</sup> | Percent of pop. age 65+ |
|----------------|---------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------|-------------------------|
| Australia      | 82.2                                  | 3.6                                                        | 54                                                                             | 28.3 <sup>e</sup>                          | 12.8                                                               | 14.4                    |
| Canada         | 81.5 <sup>e</sup>                     | 4.8 <sup>e</sup>                                           | 56                                                                             | 25.8                                       | 14.9                                                               | 15.2                    |
| Denmark        | 80.4                                  | 3.5                                                        | –                                                                              | 14.2                                       | 17.0                                                               | 17.8                    |
| France         | 82.3                                  | 3.6                                                        | 43                                                                             | 14.5 <sup>d</sup>                          | 24.1 <sup>d</sup>                                                  | 17.7                    |
| Germany        | 80.9                                  | 3.3                                                        | 49                                                                             | 23.6                                       | 20.9                                                               | 21.1                    |
| Japan          | 83.4                                  | 2.1                                                        | –                                                                              | 3.7                                        | 19.3                                                               | 25.1                    |
| Netherlands    | 81.4                                  | 3.8                                                        | 46                                                                             | 11.8                                       | 18.5                                                               | 16.8                    |
| New Zealand    | 81.4                                  | 5.2 <sup>e</sup>                                           | 37                                                                             | 30.6                                       | 15.5                                                               | 14.2                    |
| Norway         | 81.8                                  | 2.4                                                        | 43                                                                             | 10.0 <sup>d</sup>                          | 15.0                                                               | 15.6                    |
| Sweden         | 82.0                                  | 2.7                                                        | 42                                                                             | 11.7                                       | 10.7                                                               | 19.0                    |
| Switzerland    | 82.9                                  | 3.9                                                        | 44                                                                             | 10.3 <sup>d</sup>                          | 20.4 <sup>d</sup>                                                  | 17.3                    |
| United Kingdom | 81.1                                  | 3.8                                                        | 33                                                                             | 24.9                                       | 20.0 <sup>d</sup>                                                  | 17.1                    |
| United States  | 78.8                                  | 6.1 <sup>e</sup>                                           | 68                                                                             | 35.3 <sup>d</sup>                          | 13.7                                                               | 14.1                    |
| OECD median    | 81.2                                  | 3.5                                                        | –                                                                              | 28.3                                       | 18.9                                                               | 17.0                    |

<sup>a</sup> Source: OECD Health Data 2015.

<sup>b</sup> Includes: hypertension or high blood pressure, heart disease, diabetes, lung problems, mental health problems, cancer, and joint pain/arthritis. Source: Commonwealth Fund International Health Policy Survey of Older Adults, 2014.

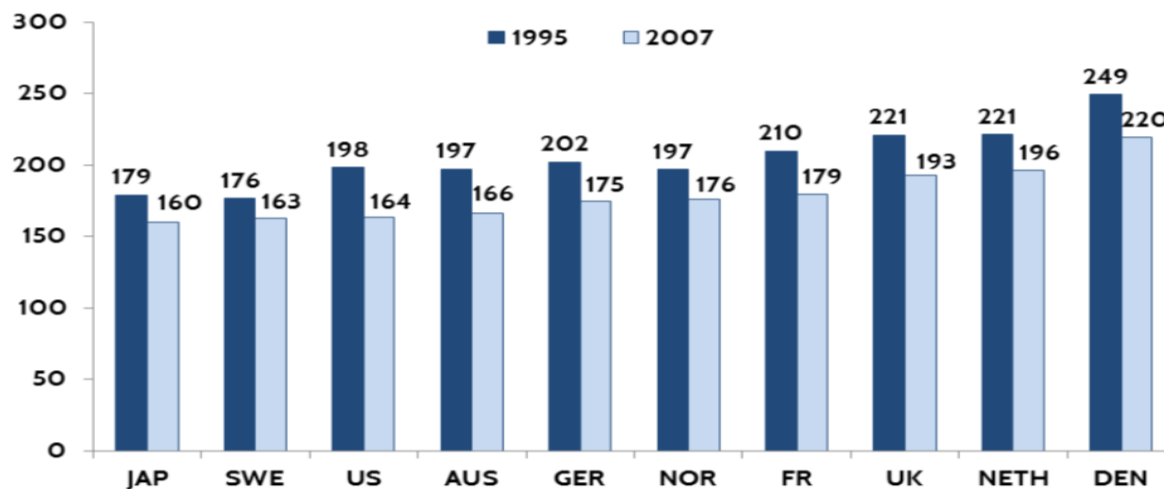
<sup>c</sup> DEN, FR, NETH, NOR, SWE, and SWIZ based on self-reported data; all other countries based on measured data.

<sup>d</sup> 2012. <sup>e</sup> 2011.

The United States had the lowest life expectancy at birth and the highest infant mortality rate in 2013. The obesity rate is also among the highest in the US compared to other countries which lead to higher rates of chronic disease such as diabetes.

## Exhibit 10. Mortality as a Result of Cancer, 1995 to 2007

Deaths per 100,000 population (adjusted)\*



\* Mortality rates are adjusted for likelihood of death from other causes.

Source: W. Stevens et al., "Cancer Mortality Reductions Were Greatest Among Countries Where Cancer Care Spending Rose the Most, 1995–2007," *Health Affairs*, April 2015 34(4):562–70.

Mortality rates from cancer show that the United States performs well overall in comparison to other countries, but mortality rates from heart disease are almost as high as New Zealand. The data shows that the rates

have significantly dropped between 1995 and 2013, but how can the United States lower the heart disease mortality rate even more?

## CONCLUSIONS

As was noted above, the U.S. Healthcare systems is no doubt quite expensive and not all individuals are covered by health insurance. However, the concept of Mohalla Clinics does provide an intriguing idea of providing opportunities for expanded healthcare in the U.S. and other expensive healthcare marketplaces. The bigger challenge would be to convince the patients to really take advantage of it as they may perceive lower quality care at these clinics. But then, one has to think whether they would like to receive any kind of affordable care or not.

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# GLOBAL HEALTH “HEALTHCARE IN UGANDA”

John P. Wiercinski, University of Scranton  
Priya Patel, University of Scranton

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## ABSTRACT

*Health and illness are universal concerns given the interconnected and globalized world economy. The promotion of worldwide health strengthens the humanitarian tradition and creates a sense of global solidarity. International organizations and world powers, like the United States, need to take a leadership role in strengthening global health through education, research, science, and technology. Countries throughout the world are increasingly concerned with the growing cost of healthcare, health status of their population, access to care, quality of care, and policy considerations that address the equitable distribution of healthcare. There are opportunities for advancing leadership, developing global partnerships, addressing global health problems, and engaging in cooperative actions and solutions. Capitalizing on such opportunities requires an understanding of other countries, an awareness of other cultures, personal reflection, and skills to effectuate collaboration.*

*To fully prepare students to analyze and relate the competencies needed to be an effective healthcare leader in a multicultural and global environment, first-hand experience in other countries is imperative. Thus, we propose a course titled, Global Health - “Healthcare in Uganda”, which is designed to provide an introduction to global healthcare services and systems in sub-Saharan Africa. Students are given an opportunity to spend fifteen days in various parts of Uganda experiencing and gaining exposure to social, cultural, historical, geographical, environmental, economic, and political factors that influence health. It allows students to build a foundation for understanding, comparing, and analyzing select healthcare services and systems. Advancing international understanding increases students’ sensitivity and awareness to global health issues and solutions that transcend national boundaries. The built-in discussions and tasks are directed toward the development of diverse interpersonal skills and experience-based learning.*

*Throughout the course, we aim to prepare students to analyze the structural and functional designs of healthcare services and systems in other developing countries. Upon completion, students will be able to apply the knowledge gained to understand issues regarding global health and propose solutions to national and international healthcare problems. They will be able to synthesize principles, generalizations, and theoretical concepts to improve their problem-solving and decision-making skills. This course in combination with other healthcare administration courses will provide students with a truly global education and ensure the sustainability of the Jesuit value of “men and women for others” on a global level.*

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John P. Wiercinski, MHA, FACHE  
Panuska College of Professional Studies  
University of Scranton  
Tel: 570-941-4691  
[John.wiercinski@scranton.edu](mailto:John.wiercinski@scranton.edu)

Priya Patel, MHA Student  
Panuska College of Professional Studies  
University of Scranton  
Tel: 570-941-4691  
[Priyap895@gmail.com](mailto:Priyap895@gmail.com)

**TRACK**  
**LONG TERM CARE**

# FALL INJURIES AMONG ELDERLY IN DIFFERENT NURSING HOME SETTINGS IN PENNSYLVANIA

*Hengameh Hosseini, University of Scranton*

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## ABSTRACT

*Falls among older adults are a major public health concern: They result in \$30 billion in direct US healthcare costs annually, and take an immense psychological and physical toll on older adults. Particularly concerning are falls in nursing home settings, which account for three times as many falls in adults over 65 than in any other setting. The efficacy of falls prediction tools and prevention plans currently in popular use is questionable. We hypothesized that tailoring falls prevention and response plans to nursing home profit model (for- or non-profit) and ownership type (public, private, franchise) would greatly improve effectiveness of general plans. To this end, we extracted data from existing government databases, collected qualitative data through structured interviews with home employees, and collected novel quantitative data through web surveys from a representative sample of 40 Pennsylvania nursing homes about prevention and mitigation protocols, population and facility characteristics, and falls outcome metrics. We analyzed fall-related risk factors that we scored and used to build multivariate logistic regression models to predict falls rates, and subsequently used to build multilevel logistic regression multivariate models to pinpoint the influence of facility type. We found a significant correlation between facility ownership and profit type and falls rates and outcomes. Armed with these analytical insights, we formulated improved falls prevention plans targeted to home types to achieve better falls outcomes as predicted by the models. Finally, we quantify the predicted impact of implementing these targeted plans on fall rates and outcomes in the homes in our study.*

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Hengameh Hosseini  
Department of Health Administration & Human Resources  
University of Scranton  
101 Sunset Drive  
Dunmore PA 18512

**TRACK**  
**NURSING**

# INFORMAL CAREGIVERS' PAIN RECOGNITION IN OLDER ADULTS WITH CHRONIC PAIN AND DEMENTIA

Rebecca Anne Morgan, Clayton State University

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## ABSTRACT

*Chronic pain and dementia are prevalent in the older adult population. Persons with dementia may not always be able to verbally communicate when they experience pain. Pain related behaviors can also be similar to dementia related behaviors making pain identification difficult for caregivers. Inaccurate pain identification or misinterpretation can result in adverse outcomes for care recipients. Older adults with dementia and arthritis are often cared for by informal caregivers. Informal caregivers, typically spouses/family members, are tasked with accurately identifying pain for care recipients that cannot verbally communicate their pain, making their assessment skills and use of pain relieving strategies important. The purpose of this study was to examine the feasibility of an informal caregiver pain management intervention (education about pain and pain management strategies and training of how to use a pain assessment a structured scale; PASS) when caring for older adults with dementia and arthritis.*

*The design was a single-group design with two intervention sessions and a two week follow-up. Informal caregivers of care recipients with arthritis and moderate/severe dementia were recruited from an existing memory assessment disorder clinic database. Measures included a daily diary for recording structured pain scale scores, pain intensity scores, pain management strategies and care recipient negative behaviors. Additional standard instruments measured care recipient negative behaviors, caregiver confidence, and caregiver knowledge in pain assessment and pain management. An exit interview about using PASS was done.*

*A total of four informal caregiver/care recipient dyads were enrolled and received the PASS intervention. All four caregivers completed the study and used the structured pain assessment daily except for 4 days. Pain intensity on average was mild  $1.8 \pm 1.9$ . Descriptively, care recipients had low pain scores and caregivers used few non-pharmacological pain management strategies. After the PASS intervention caregivers reported fewer care recipients' negative behaviors and these behaviors were less bothersome to caregivers. Caregivers' confidence and knowledge in assessing and managing pain was slightly higher after the PASS intervention.*

*Informal caregivers and care recipients may benefit from a pain management intervention. The current study was a first step in examining the feasibility of informal caregivers learning more about pain management including using a structured assessment pain tool as part of pain management. A larger study is needed to further refine the PASS intervention and to examine its effect on caregiver and care recipient outcomes. This study is important to nursing because informal caregivers are being tasked with assessing their care recipients' health status/symptoms and provide interventions based on these assessments in the home setting for a variety of health conditions. Nurses are often times tasked with educating caregivers/care recipients' about how to deliver care in the home setting. There is a need for effective educational informal caregiver interventions.*

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Rebecca Morgan RN MSN PhD  
Associate Professor  
Clayton State University, School of Nursing  
2000 Clayton State Boulevard, Morrow, GA 30260  
678-873-0499, rebeccamorgan@clayton.edu

# MOTIVATIONAL FACTORS AND BARRIERS RELATED TO SAUDI ARABIAN NURSES' PURSUIT F A MASTER OF SCIENCE IN NURSING DEGREE

*Mohamed Alquliti, Ministry of Health, Majmaah University  
Majed Alamri, Majmaah University*

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## ABSTRACT

*The purpose of this exploratory descriptive study is to determine motivational factors in relation to demographic factors associated with Saudi Arabian registered nurses' pursuit of a Master of Science in nursing (MSN) degree, to compare demographic data and assessment of motivational factors across health care sectors in Saudi Arabia, and to identify barriers to graduate study. The motivational factors and barriers will be examined by administration of the Nursing Educational Motivation and Barriers Inventory-Arabic (NEMBI-A).*

*This study will examine Saudi Arabian nurses who are pursuing MSN studies or those who finished MSN program within the last five years. A convenience sample will be recruited in the western region of Saudi Arabia, and via Saudi Arabian Cultural Missions in USA, Australia and UK. To achieve a significance level of .05, power of 0.80, the minimum requirement is established at 102 subjects.*

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Mohammed Alqulaiti, RN, BSN  
College of Applied Medical Sciences, Majmaah University, Graduate student  
Ministry of Health  
Majmaah University, Kingdom of Saudi Arabia  
[m.alquliti@gmail.com](mailto:m.alquliti@gmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

# THE EXPERIENCES OF NATIONAL GUARD FATHERS WHEN COMMUNICATING WITH THEIR YOUNG CHILDREN DURING COMBAT DEPLOYMENT

Kim Massey, Georgia State University  
Ptlene Pender, Georgia State University  
Jiwon Lee, Georgia State University  
Gary Bingham, Georgia State University

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## ABSTRACT

*The frequency of deployment combined with the length of deployment have led to excessive amounts of time separated from families as a result of the prolonged engagement in OIF and OEF. Given that there are over two million children with a parent in the military and that nearly half of these children are under the age of 5, the likelihood that a military member will be absent from his young child's life while deployed to a combat zone is significant. This places the military member and family members at increased risk of adverse outcomes related to mental health, disrupted paternal attachment, impaired maternal acceptance of pregnancy, and role confusion. Paternal absence resulting from frequent, lengthy deployment-related separations can adversely affect the relationship between a father and his child. National Guard members and their families are unique in that they often do not have access to resources and support that active duty soldiers and their families may have.*

*The purpose of this study is to examine the experiences of National Guard fathers of young children in order to understand more about communication patterns during periods of separation while deployed to a combat zone and the father's perception of the relationship with his young child. If we study the experiences of military fathers' communications with their young children while deployed to a combat zone, we can better understand the unique needs of these individuals and their families.*

*A qualitative, phenomenological design was used. National Guard fathers (n = 7) with the experience of a combat-deployment participated in semi-structured interviews. Constant comparative analysis was used to code line-by-line, collapse the codes into categories, and identify prominent themes.*

*Fathers seem to feel conflicted about their need to focus on issues critical for combat while wanting to fulfill their role as a father. Fathers also identified that they had to surrender many aspects of the father role while they were deployed (discipline, comfort, mentor). Technology helps these fathers to stay connected with their young children, but it is also important for the young child to have something physical to remind them of father (i.e., photos, letters, videos, dolls). Many of the fathers felt they were missing out on sharing important time with their young children, who change rapidly (physically and developmentally).*

*Potential facilitators to promote the father-child relationship and improve adverse outcomes related to combat-deployment separations are proposed in this study. Existing research on this topic and the population of young children aged five and under is limited and does not address combat-deployment communication and outcomes on the father-child relationship. Future research on this and the role of technology and mental health on the father-child relationship will assist healthcare providers with identifying needs, providing assistance, and developing interventions to facilitate the father-child relationship in this population.*

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Kim Massey, MS, APRN, NP-C  
Byrdine F. Lewis College of Nursing and Health Professions  
Georgia State University  
P.O. Box 3995  
Atlanta, GA 30302-3995

Ptlene Pender, PhD, RN; Associate Professor Emireta  
Byrdine F. Lewis College of Nursing and Health Professions  
Georgia State University  
P.O. Box 3995  
Atlanta, GA 30302-3995

Jiwon Lee, PhD, RN, Assistant Professor  
Byrdine F. Lewis College of Nursing and Health Professions  
Georgia State University  
P.O. Box 3995  
Atlanta, GA 30302-3995

Gary Bingham, PhD, Associate Professor  
Byrdine F. Lewis College of Nursing and Health Professions  
Georgia State University  
P.O. Box 3995  
Atlanta, GA 30302-3995

# THE IMPACT OF MANAGERS' PERFORMANCE AND THEIR QUALIFICATIONS ON HEALTH SERVICES IN SAUDI ARABIA

*Ali Altrad, Majmaah University  
Majed Alamri, Majmaah University*

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## ABSTRACT

*The output and performance of hospitals in Saudi Arabia vary from hospital to another. There may be several reasons, including the qualifications of managers, which we will discuss in this study. We will use the key performance indicators (KPI's) which approved by the Ministry of Health, to discover the performance of 20 hospitals in the Eastern region of Saudi Arabia.*

*The Kingdom is moving towards changing the health care system and improving the health of patients and communities, so healthcare managers play a crucial role in leading and shaping healthcare institutions in the future.*

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Ali Altrad  
College of Business Administration, Majmaah University, Graduate student  
Majmaah University, Kingdom of Saudi Arabia  
[ali\\_altrad@hotmail.com](mailto:ali_altrad@hotmail.com)

Majed Alamri, PhD, RN  
College of Applied Medical Sciences, Majmaah University  
Majmaah, Kingdom of Saudi Arabia  
[m.alamri@mu.edu.sa](mailto:m.alamri@mu.edu.sa)

# **USING SOCIAL MEDIA IN NURSING EDUCATION**

Ihraq Almasoudi  
College of Nursing and Allied Health Professions  
Indiana University of Pennsylvania  
Shooshoo114@hotmail.com  
(314) 817-4600

# USING SOCIAL MEDIA IN NURSING EDUCATION

*Ishraq Almasoudi, Indiana University of Pennsylvania*

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## ABSTRACT

*Nursing education must adapt to changes in technology, especially changes expected to not only add value to nursing as a profession but enhance efficiency as well. Changes in the nature and form of nursing education are reflected by the fact many courses in the field are offered online. Modules that are essential in e-learning are mandatory as well as helpful in undergraduate and post-graduate nursing education. Social media has been integrated into nursing education through the instructor using the platform as a way to supplement material taught in the formal classroom environment, proving beneficial to nursing education given that social media is not only cheap but also convenient. However, many barriers exist regarding the use of social media to promote nursing education, and addressing these barriers is critical for enhancing its successful integration. The primary objective of this paper is to explore the use of social media in nursing education. The assessment is expected to provide insight into how social media can be better integrated into nursing education to achieve the target goals and objectives in teaching nursing. Nurse educators can also use the information on better integration of social media in nursing education to enhance their use and integration of social media in the teaching and learning process.*

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## BACKGROUND

Various fields experience advances in technology, and social media has been the most significant element and example of advances in technology. Social media can be defined as platforms that constitute information networks and technologies that facilitate communication based on user-generated content and helps maintain relationships between people. Some of the most common social media platforms include Facebook, Twitter, and Instagram as a medium of communication and interaction at personal and professional level (Thalluri & Penman, 2015). In the United States and Canada alone, more than 80% of people have access to and subsequently use the internet, and a similar percentage of people in both nations seek information concerning health through the internet. Healthcare has been one of the greatest beneficiaries of technological developments, and social media use in nursing education is an aspect of technology with immense potential, especially to facilitate direct interaction among individuals, dissemination of information, or access to critical learning and teaching content. Between 2012 and 2013, the use of social media for educational purposes registered a 21% increase (Arrigoni, Alvaro, Vellone, & Vanzetta, 2016). As a platform, social media is fundamental in enhancing nursing students' understanding of skills as a function of the faculty. Information concerning health policy, ethics as well as the privacy of patients can be efficiently disseminated by the faculty to the students through social media (Ventola, 2014).

Social media is critical in the development of communication not only between nursing students but between the faculty and students as well. Group learning is one of the most significant effects of social media in the learning process. These platforms are also essential in that social skills are of great essence in nursing practice, and their development is facilitated through their use in nursing education (Thalluri & Penman, 2015).

Nursing educators can use social media in new and advanced ways through the creation of teaching methods alternative to the traditional mode of information dissemination. Three critical elements exist in the use of social media in nursing education: groups, content, and the internet. The content nursing educators disseminate through social media can take various forms including videos, text, and pictures. Nursing educators efficiently distribute this content through multiple groups while the internet facilitates its use. The primary area of focus concerning the use of social media in nursing education is the faculty and educators given that they are at the center of the teaching and learning process (O'Connor, 2017).

## BARRIERS

A wide range of barriers exist on the path to adopting social media in nursing education. Some of these barriers are manageable and can be resolved while others are more complex. Resolving these challenges would create a pathway to enhance the use of social media in nursing education and ensure nursing students and educators reap its full potential and benefits. The following sections will discuss the barriers to the use of social media in nursing education.

### *Negative Attitudes*

One of the most significant obstacles towards the integration and use of social media in nursing education is a negative attitude, not only from the educators but among some students as well. As a concept, social media has not been in existence for long, and while it has been embraced by many globally, some have not accepted it wholeheartedly. Particularly, some nursing educators consider the use of social media to be informal as a medium of information dissemination—therefore, unacceptable. A negative attitude from nursing educators has also resulted in some not being part of the social media community. The case is similar for some nursing students who have yet to become members of social media sites. The negative attitudes have made it a huge challenge to integrate social media in nursing teaching since they tend to not be cooperative; however, these attitudes can be changed through education on the positive attributes and benefits of the use of social media. A change in attitude is the critical first step in enhancing confidence and trust in the use of social media for nursing education (D'Souza et al., 2017).

### *Lack of Social Networking Skills*

Social networking is a relatively new phenomenon not only among nursing educators but middle-aged people in society, creating a huge challenge for its integration in nurse education. Social media is often considered to be for the young people in society, which is reflected by the percentage of young people who use social media being far higher than the middle-aged and elderly users. Moreover, social media tends to change over time and keeping up with the changes is a challenge for many users. Effective use of social media in nursing education requires the faculty and educators to have quality social networking skills, which many lack. Proper training and refreshment of social media skills, mainly for nursing educators, is critical to ensure success is achieved in inculcating social networking skills and knowledge (Ross & Myers, 2017).

### *Privacy Concerns*

The use of social media and its integration in nursing education also faces the barrier of privacy concerns among nursing educators and students. Privacy issues are the primary reason many people have been reluctant to use social media; users of social media platforms must be assured of the security of their personal information, especially in group platforms which are fundamental in the case of nursing educators. Privacy issues are a barrier that can be addressed through a nursing educator putting proper guidelines, rules, and procedures in place regarding the manner in which personal information should be handled when using these platforms (Thalluri, & Penman, 2015).

### *Content Standardization*

Nursing educators use of social media must be performed in such a way that the content is standardized to be disseminated efficiently to students given the format, number of words allowed and the need for efficiency in social media use. The educators must ensure the content available on social media platforms is simplified and adequately phrased. Nursing educators face the challenge of creating proper content to provide students via social media platforms. In the process of standardization and summary, nursing educators are likely to not deliver critical information, leaving important content out, an aspect that negatively impacts the teaching and learning process. Efficient content management on social media platforms is a significant challenge, and proper planning and the use of experts by nursing educators should help in the elimination of the challenge of barrier to nursing educators using social media platforms successfully (O'Connor, 2017).

### *Lack of Appropriate Tools*

Social media platforms were not initially created with the objective of facilitating teaching and learning—rather, socialization was the objective instead. Subsequently, many tools that have been integrated into these platforms aim to enable and ensure the enhancement of the socialization process. No tools have been created to allow nursing educators to use social media as platforms to provide content and valuable information. This poses a huge barrier in the appropriateness and a coherent strategy and method in the use of social media, and educators must become creative and innovative in shaping social media as information dissemination platform for nursing

students. The lack of proper tools has, therefore, been an enormous barrier to the adoption of social media in nursing education (Arrigoni, Alvaro, Vellone, & Vanzetta, 2016).

Even though social media is a cheap and extremely powerful form of modern technology, its adoption in nursing education has been slow. Significant barriers complicate and inhibit the adoption of social media by nursing educators. Addressing these barriers is a significant step to ensure social media platforms facilitate enhanced teaching and learning (Tuominen, Stolt, & Salminen, 2014).

### **USING SOCIAL MEDIA EFFECTIVELY IN NURSING EDUCATION**

Social media can be efficiently used in nursing education. However, crucial factors and elements be observed and adhered to when using social media. The effective use of social media in nursing education would be done through the following ways;

The use of social media in nursing education should complement conventional teaching and instructional methods and procedures, and social media cannot be depended on as the sole teaching procedure in nursing education. Given that social media has not been fully integrated into mainstream teaching and learning, its use has not been made mandatory for many students. However, nursing students should be encouraged to use platforms where nursing educators can interact with them efficiently so students can benefit from social media use. Making social media a complementary medium of instruction by nursing educators enhances its effectiveness (Lahti et al., 2017).

The effective use of social media in nursing education requires methodical organization and planning. It begins with the nursing educator organizing the students and informing them in advance that a social media group will be created. The creation of the group should be the responsibility of a student chosen by their peers and must be created before a given period of study begins. The created group should be closed to the public, and group membership should be executed through individually inviting the students as well as other members of the faculty. The goals and objectives to be achieved through the closed group membership must be outlined as well, and engagement with content related to nursing as well as consultation between the students and the members of the faculty must be emphasized. The nurse educator should set clear expectations of the group, including when social media is to be used in the teaching and learning process. The nursing educator should also encourage the cooperation and participation of the nursing students by highlighting the benefits they would reap from social media use (Ventola, 2014).

The element of safety must be addressed to effectively use social media platforms, which is an activity the nursing educator is responsible for. The privacy of users on a social media platform used in nursing education should be respected, and nursing students should be instructed on how to set the proper privacy settings on the social media platform. Moreover, the nursing educator should put in place guidelines relating to privacy that must be followed by the nursing students during the period they are in a social media group. Assurance of student and faculty members confidentiality is critical in creating a safe platform and encouraging cooperation between social media group members (Arrigoni et al., 2016).

To effectively the social media platform, a space should be provided for the students to interact, collaborate, and communicate. The nursing educator should not inhibit the students from interacting freely with each other on the platform, especially for purposes related to nursing. Allowing student interaction is a way to enhance the effectiveness of using a social media platform. Interaction and communication through a social media platform ensures students do not feel detached from the initial purpose of the platform. The students should not be limited in terms of the normal interaction and use of social media essentially because it is being used for teaching. While responsibility and high levels of discipline should be encouraged during student interaction on social media platforms, their collaboration and free communication should not be censored. It helps create a conducive and normal social media use environment as long as discipline is maintained (Ventola, 2014).

The role of the nursing educator and the interaction between the nursing students and educators are both exceptionally significant in ensuring the effectiveness of social media in nurse education. A primary role of the nursing educator is providing regular feedback concerning the student's activities and general progress. The

educator should update students on the level or percentage of achievement regarding the set goals and objectives in the context of the social media platform. Additionally, the nurse educator should engage in discussions with the students on the social media platform, especially through answering questions and providing clarification as well as supplemental information on nursing-related topics explored within the platform. Enriching meaningful activities for the students that are critical to the achievement goals and objectives in nursing education through social media platforms is crucial to achieving the set objectives. Some of these include setting up questionnaires that are interactive and engaging (O'Connor, 2017).

Learning is the primary objective of using social media in nursing education, and success in learning requires active student engagement. The nursing educator should encourage active learning, which calls for providing a platform for the students in the social media space created for the purpose of making them to be actively engaged, through response and asking questions. Primarily, the educator should provide opportunities for nursing students to illustrate the learned material. The expression of the learned material promotes higher motivation and positive competition. It would not only facilitate effective use of social media but ensure the target goals and objectives are achieved as well in delivery of nursing education information and concepts (Ventola, 2014).

Ensuring a pleasant experience also promotes effective use of social media in nursing education. Social media users tend towards being disrespectful, and lousy behaviour is typical on most platforms. In a social media group with the purpose to promote and facilitate nursing education, such vices should not be condoned. Proper etiquette must be encouraged and demanded from the group members. The posts of the social media group members should be respectful and relate to the primary goals and objectives set in line with nursing education. The administrator of the group should be granted the power to delete inappropriate postings. Etiquette and ethical behaviour are essential elements that help create a pleasant experience and create a conducive environment for learning, which subsequently translates to the effective use of social media in fulfilling the target objectives in nursing education (Arrigoni et al., 2016).

The way students learn tends to vary due to differences in their abilities. The teaching approaches used in a social media platform should also have variety for the platform to be effective. The nursing educator should use different methods to ensure every nursing student is accommodated. In the integration of teaching methods and styles, a teacher should provide video-based instruction, important notes, and in the form of worded images. The nursing educator further enhances the effectiveness of using social media in nursing education by providing individualized attention through active response to student queries. Some concepts are likely to be confusing or too complicated to be easily understood, and the additional explanation is essential to ensure information is clarified (Paton, Bamidis, Eysenbach, Hansen, & Cabrer, 2011).

## **BENEFITS OF USING SOCIAL MEDIA IN NURSING EDUCATION**

The use of social media in nursing education has a wide range of benefits. These benefits are mainly long-term and help nurture nurses that can deliver quality health services. The following section describes the outcomes of using social media in nursing education.

First, nursing students learn new skills in communication, a critical element in their practice. Better communication skills, especially the use of appropriate etiquette, are essential to ensuring proper interaction between nursing students and patients. The development of a good relationship between the nurse and the patient and understanding the healthcare needs of a patient is enhanced through better communication skills. The nurse is able to ask proper and direct questions concerning the best ways of improving and resolving the health issues of a patient. Better communication is one of the most important and long-term benefits of using social media in nursing education which often helps nursing students while in practice (Ross & Myers, 2017).

Restraint and discipline in using social media for nursing education lay a strong foundation for nursing students to be well behaved and act in an ethical and morally acceptable manner. Nurses must adhere to a professional code of ethics, and nursing students need to be taught the appropriate actions in their practice at an early stage. The interaction between students on a social media platform provides an opportunity for the nursing educator to streamline the behaviour of the nursing students, which is reflected in the later life of the nursing students during their practice (Lahti et al., 2017).

The use of social media enhances the efficiency of a nursing educator to quickly, efficiently, and promptly disseminate relevant information to the students. New information concerning health policy as well as changes in nursing practice can be disseminated to the nursing students through social media groups. The dissemination of the information costs very little, and the efficiency cannot be compared with traditional modes of teaching given its higher level of efficiency and ability to reach a higher number of students. (Ventola, 2014).

In nursing education, students are likely to encounter daily problems and challenges, especially in lack of access to proper and quality educational materials which are integral in learning. Having these challenges addressed through the assistance of fellow students and nursing faculty is easy and highly convenient through social media groups. The groups provide a platform where an issue raised can be resolved through brainstorming. Better yet, this can be done at any time of the day, irrespective of the location of the nursing students, which is a huge benefit of social media in nursing education (Paton et al., 2011).

### **WHAT'S NEW IN USING SOCIAL MEDIA IN THIS FIELD?**

The use of social media in nursing education has a wide range of relatively new aspects, one of which is its engagement of nurses in the development of health policy. Social media use in nursing education enables educators and policymakers to gain access to a pool of valuable information based on the views of nurses. The health policy can then be formulated based on issues nurses consider to be a priority. Social media as a phenomenon is currently being used for engaging nursing students as well as practising nurses in the development of policy that will help address the challenges and issues they encounter (Lahti et al., 2017).

Currently, nursing students engaged in practice use social media to facilitate regular contact and interaction with patients. Through social media, nursing students can keep track of their patients and quickly follow up on their progress. The interaction between the nursing students and patients further helps create a close relationship, trust and understanding. The trust helps establish a bond that makes the patient more open in terms of the health issues they encounter. This is key in ensuring satisfactory services and better health outcomes (Ventola, 2014).

Collaboration and sharing critical information are also new when using social media in nursing education. Students can work together on a project while many miles apart, which is facilitated through regular updates on social media, and problems and challenges can be resolved promptly. Research activities are also accomplished more conveniently through social media collaboration as the information gathered can be shared between the students to enrich their knowledge and understanding concerning a research topic (Lahti et al., 2017).

### **CONCLUSION**

Social media is extremely popular, and the trend in the use of these platforms is expected to grow in the near future. Nursing education has integrated social media, an aspect met by multiple barriers. One barrier is the negative attitude towards social media, which has been evident among students as well as nursing educators. The use of social media in nursing education will only be effective if several factors and elements such as content standardization and change of negative attitudes are changed. The use of social media has had a wide range of benefits as well. In using social media in nursing education, many aspects and elements are relatively new, such as its use in gathering information that helps in shaping health policy. Nursing students will become better communicators due to experiences in their use of social media. It is also likely to be much easier to follow up on progress of patients treated through social media in a cheap, easy and convenient manner (Ross & Myers, 2017).

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**TRACK**  
**PHARMACEUTICAL MARKETING**

# HOW MIGHT THE REPEAL OF THE “GAG RULE” IMPACT THE RETAIL COST OF PRESCRIPTION DRUGS FOR PATIENTS?

Gene C. Wunder, Washburn University  
Judy Wunder, Wunder Consulting Group

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## ABSTRACT

*This paper will explore retail prescription drug pricing in the United States. Presently pricing is complex, confusing, lacking transparency, and a mystery to most customers/patients purchasing prescription drugs. First a quick review; Pharmacy Benefit Managers (PBMs) along with pharmaceutical manufacturers, wholesalers, and insurance providers (be they insurance carriers, self-insurers, or employers) play key roles in determining the retail price of a prescription drug. PBMs play the major lead role in determining the price of retail prescriptions.*

*A commercial insurance carrier offering pharmaceutical drug coverage works with one of 42 PBMs in the United States. Their function is to determine the price, co-pay, deductible, which drugs will be covered, and in what tier, etc. The health care drug provider gives the details of the coverage being proposed for their customers/patients. The PBM takes this information, formulates the coverage plan, establishes prices, and other details for the drug plan. The PBMs are not transparent and they may negotiate discounts with drug manufacturer. The PBM may pass all, part, or none of the discounts along to their client insurer or health care provider.*

*President Donald Trump signed legislation on October 10, 2018, outlawing confidentiality agreements or gag rules effective immediately. Other parts of the legislation will be effective January 1, 2020 (Vazquez, 2018). After that date the pharmacist is required to fill a prescription at the lowest price available. This legislation is informally known as The Lowest Price Act or Patients Right to Know Drug Prices Act. The patient has always had the ability to find a lower price by shopping around. One option was to consult one of numerous sites such as Good Rx. Often this and numerous similar sites could perhaps offer a substantially lower price than offered by the patient's insurance plan. Other times the price offered by insurance coverage is lower. Sometimes the cash price is lowest. Comparison shopping is a must.*

*Here are two examples. First, Nitrofurantion Mono 100 MG, commonly used to treat urinary infections, is priced by Good Rx at \$19.57 for 10 capsules. The Walmart cash price is \$5.37 and the insurance price is also \$5.37. A second example is for Doxycycline Hiclate 100 MG, is priced at Good Rx at \$17.90 for 20 capsules, the Walmart cash price is \$74.20, the insurance price is \$38.76. Keep in mind that all of the illustrated prices were set by PBMs. Prices will vary between and among retailers and may change from day to day.*

*Seemingly there are several outcomes to the repeal of the gag rule and the recent legislation. One scenario suggests that pharmaceutical manufacturers will continue to raise prices to offset the potential loss of revenue because consumers are now presumably better informed as to what they should pay for prescription drugs. Perhaps this is being overoptimistic at best. Consumer education in the opinion of this author has a very long way to go in this area. There is still the issue of the PBMs and their complete lack of transparency*

*Another possible outcome is that more pressure will be exerted on PBMs and they will be forced to become more transparent. More transparency may lower drug costs as more information such as discounts negotiated from drug manufacturers become known. Given the position of drug companies and their hold on members of Congress this is perhaps an optimistic view. Currently PBMs have no real reason to capitulate. They hold most of the cards and are a quasi monopoly. PBMs have huge historical data bases, information on patients, drug usage, etc. that give them an enormous economic advantage. For anyone else to try to replicate what PBMs do would require a huge financial investment and undoubtedly a steep learning curve.*

*Perhaps a third outcome will be no change. Drug prices will continue to escalate. PBMs will continue to maintain their position as the “price decider” for retail drug prices. Until constituents exert extreme pressure on members of Congress there is little chance anything will change. Perhaps there will be some trimming around the edges and rearrangement of the furniture will occur but no real changes will be made.*

*The brief speculation of outcomes is not intended to cover all possible scenarios. Changes in federal and state statutes, political shifts, economic changes, international events, etc. could bring about unforeseen changes.*

*It is unlikely that short-run effects will emerge relating to drug pricing and effects prior to the implementation of Lowest Price Act and the Patients Right to Know Drug Prices Act. This topic seemingly offers numerous opportunities for further research. I shall leave this to future writers and researchers.*

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Gene C. Wunder  
Cell: 785-554-6036  
Fax: 785-670-1063  
[Gene.wunder@washburn.edu](mailto:Gene.wunder@washburn.edu)  
3611 Southwest Blue Inn Road  
Topeka, Kansas 66614-4677 U.S.A

Judy Wunder  
Wunder Consulting Group  
[dr1drphd@gmail.com](mailto:dr1drphd@gmail.com)

# THE PLACEBO EFFECT: MEDICINE OR MARKETING?

*Irfan Ahmed, Sam Houston State University  
Vivek Shankar Natarajan, Lamar University*

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## ABSTRACT

*In recent years severe doubts have been cast about the efficacy of non-traditional meditational systems and modalities so much so that hitherto widespread and popular medicinal systems such as homeopathy and Chinese traditional medicine have been denounced as being little more than placebos (Lancet, 2005). However, the number of believers in such alternatives does not appear to be receding by any means, and those who have a faith in such alternatives continue to patronize their practitioners and consume the medicinal products.*

*While the placebo effect has long been studied in medicine and psychology, a newer interpretation of the concept of placebo has emerged in marketing and consumer research (Shiv, Carmon and Ariely, 2005). according to studies based on and explicating this interpretation, characteristics attributed to products due to product claims and descriptors influence the perceived efficacy on the part of consumers. However, the relative roles of the placebo effect, operating through a medicinal agency vis a vis a marketing agency is not clear. The purpose of this paper is to delineate a framework that identifies factors that lead to or enhance the placebo effect and lead consumers to buy products whose efficacy has been questioned.*

*We draw upon existing literature in medicine, psychology, marketing and consumer behavior to attempt a comprehensive identification of factors antecedent to or enhancing the placebo effect. Implications for the marketing of such products, as well for dissuading consumers from buying them, are presented, with potential for use by public health educators and policy-makers.*

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Irfan Ahmed, PhD  
Associate Professor of Marketing  
College of Business Administration  
Sam Houston State University  
Huntsville, TX 77341-2056  
[irfanahmed@shsu.edu](mailto:irfanahmed@shsu.edu)  
(936) 294-1276

VivekShankar Natarajan, Ph.D—CONTACT AUTHOR  
Vice President/General Program Chair, Federation of Business Disciplines (Houston 2019)  
Associate Professor and Jerry and Sheila Reese Faculty Scholar in Business  
Department of Management and Marketing  
Box # 10025, Lamar University, Beaumont, Texas-77710  
Email: [vnatarajan@lamar.edu](mailto:vnatarajan@lamar.edu)  
Phone: 409-880-8643

**TRACK**  
**PUBLIC HEALTH**

# HIV+ TRANSGENDER ADHERENCE TO CARE

*Marcia Butler Clayton State University  
Joey Helton Clayton State University  
Deborah Gritzmacher Clayton State University*

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## ABSTRACT

*HIV/AIDS infection rates continue to escalate although efforts from CDC and HIV/AIDS organizations to decrease this trend continue to intensify. Committed to funding programs that will improve adherence to care among one of the most difficult populations to reach, the Transgender population, energies toward improvement are intense. Previous studies focused on the transgendered population showed high infection rates and either no care or no adherence to care/drug therapy. Transgender may be defined as “individuals who may have the genitals of one sex, but a gender identity associated with the other sex.” Because of stigma, socio-economic barriers, and health literacy this population is difficult to bring into care settings.*

*Traditional methods used to increase adherence such as housing, case management, behavioral health, etc. that have shown increased success in other populations do not show mirrored successes for the transgender population. Our study follows a nontraditional piloted program through Positive Impact Health Centers, an HIV/AIDS service organization located in Metro-Atlanta. This study aims to capture whether or not incorporating hormonal therapy into clinical care of male to female transgendered clients has any impact on adherence. Adherence will be defined as keeping clinic appointments, taking meds, and maintaining undetectable viral load. The cost-benefit of this effort can be seen when comparing cost of treatment for non-adherent clients, and comparing the cost of hormone therapy as an incentive for adherence.*

*At present, this on-going pilot study includes ten clients and is successful in that they are meeting all three requirements. The study will grow by a snowballing technique for a population that is hesitant to committing to care at all, much less clinic visits, medication, and viral load testing. These early efforts are proving very effective.*

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Marcia Butler  
College of Health, Department of Health Care Management  
Clayton State University  
Tel: 678-466-4565  
Fax: 678-466-4599  
[MarciaButler@clayton.edu](mailto:MarciaButler@clayton.edu)

Joey Helton  
College of Health, Department of Health Care Management  
Clayton State University  
Tel: 678-466-4566  
Fax: 678-466-4599  
[JoeyHelton@clayton.edu](mailto:JoeyHelton@clayton.edu)

Deborah Gritzmacher (CONTACT AUTHOR)  
College of Health, Department of Health Care Management  
Clayton State University  
Tel: 678-466-4934  
Fax: 678-466-4599  
[DeborahGritzmacher@clayton.edu](mailto:DeborahGritzmacher@clayton.edu)

# ONSET OF DUAL DIAGNOSIS: MENTAL HEALTH AND SUBSTANCE ABUSE

*Henil Patel, University of Scranton*  
*Steven Szydlowski, University of Scranton*

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## ABSTRACT

*Mental health and substance abuse problems often go hand-in-hand. Adults 16 years and older suffering from any sort of mental health disorder like Depression, Anxiety, Bipolar disorder etc. are more prone to develop substance abuse such as alcohol, drugs, and smoking. There are various reasons for them to get into substance abuse. They feel detached and disowned by this world, there is this constant feeling of worthlessness and helplessness. In order to suppress this feeling they turn towards substance abuse. It helps them to escape reality and takes them to a virtual world where they feel good. It creates a vicious cycle.*

*People who tend to have substance abuse, if not treated, are more prone to develop some sort of mental illness sooner or later. Substance abuse is often an escape mechanism which clouds people's thoughts. They only see what they want to see and are nowhere within the radius of reality. Gradually they get lost in their own world and thoughts, and eventually come up with some sort of mental health problem. There are many factors responsible for turning a person towards substance abuse. It may be environmental such as surrounded by people who are already into substance abuse, childhood trauma, parental issues, or living in a hostile environment. Emotional factors such as stress, disturbed married life, loss of loved ones, guilt, and many other factors like unemployment tend to turn a person towards substance abuse.*

*Mental health and substance abuse are a very serious problem in today's world with some serious consequences. They should not be overlooked. The patient diagnosed with a mental disorder may be in denial about the drinking or substance abuse, while the substance abuse of others can disguise the mental disorder. Patients use one disorder to hide the another and it is a constant challenge for professional counsellors and mental health care providers to help these patients is making an accurate diagnosis. The presenters provide recommendations on how to best address this issue.*

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Henil Patel, M.B.B.S  
Masters in Health Administration (MHA)  
University of Scranton  
Telephone: 805-300-8911  
[henil.patel@scranton.edu](mailto:henil.patel@scranton.edu).

Steven Szydlowski, DHA, MHA, MBA  
University of Scranton  
570-941-4367  
[Steven.szydlowski@scranton.edu](mailto:Steven.szydlowski@scranton.edu)

# POPULATION HEALTH: COMMUNITY-BASED PREVENTION PROGRAMS FOR THE U.S. OPIOID CRISIS

*Michaela Dolde, University of Scranton*

*Lisa Lech, University of Scranton*

*Elizabeth Steele, University of Scranton*

*Robert Spinelli, University of Scranton*

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## ABSTRACT

*This presentation will focus on community-based prevention strategies for the United States' opioid crisis. While opioid misuse and overdoses have been at crisis levels since the early 1990s, prior public health initiatives have not been able to stymie the opioid epidemic. According to the United States Department of Health and Human Services, over 130 people die every day from opioid-related drug overdoses and 11.4 million people misuse prescription opioids. Possible explanations will be addressed as to why the opioid crisis has reached a national emergency. Population health management combined with community-based prevention techniques and strategies offer solutions for healthcare managers to effectively reach individuals in their communities in both rural and urban geographic areas.*

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Michaela Dolde (CONTACT AUTHOR), Master of Health Administration Student  
Department of Health and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
(T) 724-984-4259  
(F) 570-941-5882  
[michaela.dolde@scranton.edu](mailto:michaela.dolde@scranton.edu)

Lisa Lech, Master of Health Administration Student  
Department of Health and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[lisa.lech@scranton.edu](mailto:lisa.lech@scranton.edu)

Elizabeth Steele, Master of Health Administration Student  
Department of Health and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[elizabeth.steele@scranton.edu](mailto:elizabeth.steele@scranton.edu)

Robert J. Spinelli, MBA, MHA, DBA  
Assistant Professor and Program Director  
Department of Health Administration & Human Resources  
Panuska College of Professional Studies  
University of Scranton

# PRIMARY CARE PROVIDER ROLE IN POPULATION HEALTH

*Khandker A. Haque, University of Scranton  
Steven Szydlowski, University of Scranton*

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## ABSTRACT

*The presenters discuss the potential role primary care providers can have on improving population health. A review of public health, medical care, and population health is provided as it relates to primary care. The presenters review existing literature and present the challenges and opportunities to mitigate the barriers for primary care providers to help improve population health. The current job description, roles, and responsibilities of primary care providers are assessed suggesting a need for a protocol to adapt to evolving roles required to achieve optimal patient and population health. The ways to potentiate the process to achieve the expectations necessary is addressed. Fields are in population health including constraints and limitations are discussed. Strategies and case examples are illustrated displaying positive engagement of primary care providers in contributing to enhanced population health.*

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Khandker A. Haque  
University of Scranton

Steven Szydlowski, DHA, MHA, MBA  
University of Scranton  
570-941-4367  
[Steven.szydlowski@scranton.edu](mailto:Steven.szydlowski@scranton.edu)

# TELEHEALTH AND RURAL HEALTH CARE

William F. Miller, University of Scranton  
Maitri Shah, University of Scranton

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## ABSTRACT

*Despite the fact that the United States spends more on healthcare than any other country, both in absolute numbers and on a per capita basis, the health status of Americans ranks relatively low when compared with that of other developed nations. This is especially true when it comes to rural communities due to uneven distribution of resources, relative shortage of medical care providers, and other access-limiting factors. To overcome such accessibility barriers, telehealth plays a major role. Telehealth is the use of electronic information and telecommunications technologies to support and promote long-distance clinical health care. It includes live videoconferencing, asynchronous remote monitoring, and mobile health. Telehealth may be incorporated into the following applications useful to the field of rural health: direct patient care; training, supervision and consultation; and continuing education, as well as an opportunity to ameliorate the isolation that can exist in rural areas.*

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William F. Miller, Ph.D., MHA  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
Telephone: 570-941-4527  
Fax: 570-941-5882  
[william.miller2@scranton.edu](mailto:william.miller2@scranton.edu)

Maitri Shah, Master of Health Administration Student  
Department of Health Administration and Human Resources  
Panuska College of Professional Studies  
University of Scranton  
[maitri.shah@scranton.edu](mailto:maitri.shah@scranton.edu)

# THE EFFECT OF CLEAN CLOTHES ON SCHOOL ATTENDANCE AND FUTURE HEALTH OUTCOMES

Carrie Mehringer, University of Evansville

Su Jin Jeong, University of Evansville

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## ABSTRACT

*In the past decade, public health research has established a connection between a lack of school attendance and poor health outcomes in adulthood. Low school attendance correlates with low graduation rates and individuals without high school diplomas experience higher rates of obesity, diabetes, and other negative health outcomes. Therefore, public health officials seek to discover explanations for low school attendance.*

*One potential explanation for low school attendance is a lack of clean laundry experienced by children without regular access to washing machines and dryers. The aim of this literature review is to evaluate the current research available regarding the relationship between clean laundry and school attendance.*

*Only the key terms “laundry” and “school attendance” were used to find the studies for this literature review. In order to be included, studies must have been performed within the past decade. Finally, included studies were only those that utilized experimental protocol by evaluating attendance rates before and after a specified intervention. Studies focusing on general hygiene were excluded due to their broad focus.*

*Research regarding the relationship between clean laundry and school attendance is relatively new and, therefore, very few experiments have been performed to prove a significant connection. However, the existing research shows a promising relationship between an increase in the availability of clean laundry and a decrease in school absenteeism. Schools implementing laundry initiatives see drastic decreases in chronic absenteeism among their high-risk student population. However, current literature on this topic demonstrates a need for further research in order to establish that a statistically significant relationship exists.*

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Carrie Mehringer—CONTACT AUTHOR

School of Health Sciences

University of Evansville

Tel: 812-631-8919

[cm314@evansville.edu](mailto:cm314@evansville.edu)

Su Jin Jeong, DrPH

School of Health Sciences

University of Evansville

Tel: 812-488-3102

[sj117@evansville.edu](mailto:sj117@evansville.edu)

# **THE OPIOID EPIDEMIC IN NORTH AMERICA: A PUBLIC HEALTH CRISIS**

Mehwish Waseem  
MHA Student  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
[mwaseem3474@gmail.com](mailto:mwaseem3474@gmail.com)  
281-750-5969  
Home address: 11131 Wickwood Dr. Houston, TX 77024

Ashish Chandra (Contact Author)  
Professor  
Department of Healthcare Administration  
College of Business  
University of Houston-Clear Lake  
Houston, TX, USA  
[chandra@uhcl.edu](mailto:chandra@uhcl.edu)  
281-212-1717  
Office Address: 2151 W. Holcombe Blvd Suite #120, Houston, TX 77030

Hamza Razzak Paracha  
Aon-Hewitt  
Ontario, CANADA  
[hamza.peracha@hotmail.com](mailto:hamza.peracha@hotmail.com)  
226-988-2356  
Home Address: 650 Waterloo St. Apt. #207, London, Ontario, Canada N6B 2R4

# THE OPIOID EPIDEMIC IN NORTH AMERICA: A PUBLIC HEALTH CRISIS

Mehwish Waseem, University of Houston – Clear Lake  
Ashish Chandra, University of Houston – Clear Lake  
Hamza Razzak Paracha, Aon – Hewitt

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## ABSTRACT

*The purpose of this study is to explore the effects of the opioid crisis in North America. The United States, Canada, and Mexico all function under different healthcare systems, but that each have fallen victim to the opioid epidemic. The United States and Canada both lead in numbers of opioid-related deaths. This has led to severe economic and social ramifications. This paper will explore the past and current state of the opioid crisis, how it impacted North America economically and socially, and the policies and initiatives that have been established in order to combat this crisis. Through this, new strategies can be created to further aid in reducing opioid-related deaths.*

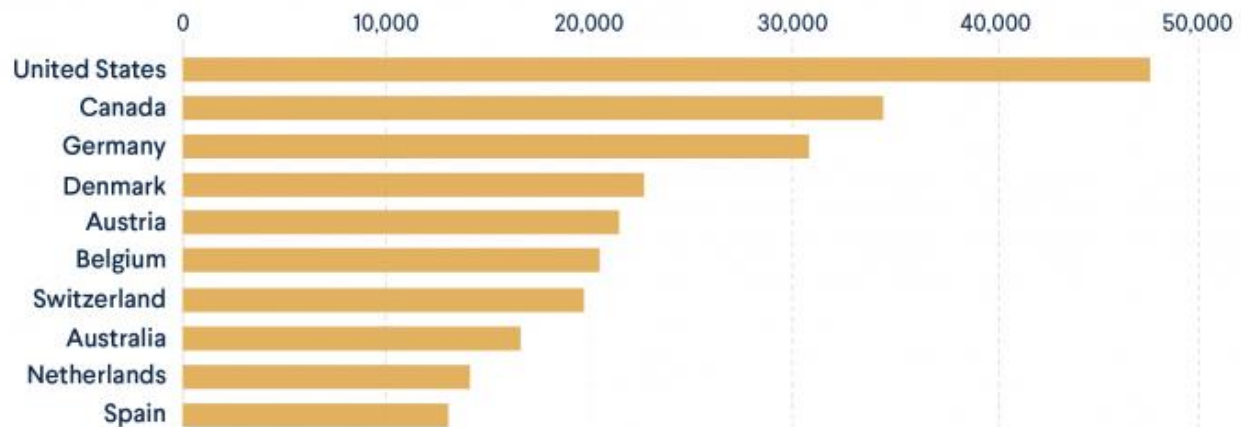
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## INTRODUCTION

Bill Sternberg was a father of three children until his son, Scott, lost his life when he overdosed on opioids. Unfortunately, Scott's family, like many around the world, have witnessed the struggles of their loved one being addicted and losing their lives to opioids. However, Bill Sternberg took his son's death and his platform as an editorial page editor at USA Today to discuss the struggles of opioid addiction and the need to change the system and fix treatment options for patients who struggle with this illness. One important fact that Bill highlights in his article is that his son was one of 72,000 individuals who lost their lives to drug overdoses in the United States in 2017, which is the same number of people it takes to fill up an NFL stadium (Sternberg, 2018). If 72,000 individuals passed away in the United States alone, how many lost their lives to drugs on a global scale? According to the United Nations Office on Drugs and Crime (UNODC), "globally, there are an estimated minimum of 190,000 — in most cases avoidable — premature deaths from drugs, the majority attributable to the use of opioids" (*World Drug Report*, 2017). The following table from the Council on Foreign Relations also illustrates the countries that have the highest opioid consumption, with the United States and Canada topping the list (Felter, 2017). These astonishing numbers illustrate that the opioid crisis is a worldwide disparity that needs attention and immediate action.

## Countries Consuming the Most Opioids

Standard Daily Opioid Doses Per Million People, 2013–2015



Source: UN International Narcotics Control Board

Source: <https://www.cfr.org/backgrounders/us-opioid-epidemic>

North America, particularly the United States, are leading in the number of opioid-related deaths. Because of this, the United States, Canada, and Mexico have taken action to combat the opioid crisis. The misuse of opioids for the last several decades has also had economic ramifications. According to an article by Altarum, “The cost of the country’s opioid crisis is estimated to have exceeded \$1 trillion from 2001 to 2017, and is projected to cost an additional \$500 billion by 2020”. Loss of productivity and healthcare costs are just two of many contributing factors of the high cost of the opioid crisis. In order to control costs, immediate action must be taken (*Economic Toll of Opioid Crisis in U.S. Exceeded \$1 Trillion Since 2001*, 2018).

This study explores the economic impact of the opioid crisis in North America, specifically in the United States, Canada, and Mexico, all of which have different types of healthcare systems. The United States has a capitalist system, Canada has a universal healthcare, and Mexico has mostly a self-pay system. By exploring the economic and social impact, policies, and healthcare initiatives in North America related to the opioid crisis, we hope to gain insight on how to combat this epidemic.

### WHAT ARE OPIOIDS?

According to John Hopkins’, “opioids are a class of drugs naturally found in the opium poppy plant and that work in the brain to produce a variety of effects” (*Butanis*, 2018). The most common side effects being the relief of pain, coughing, and diarrhea. The most commonly used opioids include prescription opioids such as OxyContin and Vicodin, fentanyl, and heroin (an illegal substance). The mechanism of action that opioids utilize include binding onto G-protein receptors in order to cause hyperpolarization. Hyperpolarization is known to cause an inhibitory effect on the central and peripheral nervous system which typically triggers pain relief (Pathan & Williams, 2012)

Typically, opioids are prescribed for a short period of time in order to treat moderate-to-severe pain following an injury or surgery. However, according to the National Institute on Drug Abuse, “Opioids can also make people feel very relaxed and “high” - which is why they are sometimes used for non-medical reasons” (*What are prescription opioids?*, 2018). This can lead to detrimental effects on the brain and body as opioids are a highly addictive substance. These include collapsed veins, abscesses, infection of the lining and valves in the heart, constipation and stomach cramps, liver or kidney disease, and pneumonia” (*Commonly Abused Drug Charts*, 2018). Moreover, abusers of opioids face increased “risk of HIV, hepatitis, and other infectious diseases with shared needles” (*Commonly Abused*

*Drug Charts*, 2018). Misuse during pregnancy can also lead to “miscarriage, low birth weight, and neonatal abstinence syndrome” (*Commonly Abused Drug Charts*, 2018). Despite this, many across the globe misuse prescription opioids or actively try to acquire opioids illegally for personal use and distribution.

The legal acquisition of opiates includes either through prescription or over-the-counter (OTC). However, many choose to acquire these illegally. There has been a long history of drugs being smuggled and sold in the black market. Currently, there has also been a rise in the online market distribution network for selling opioids. Users now have the ability to purchase and distribute opioids in large quantities. However, drug trafficking has been a topic of interest for many decades.

## **HISTORY OF THE OPIOID CRISIS IN NORTH AMERICA**

Five thousand (5,000) years ago opioids first arose for medical and others means. Since then their popularity has only risen. Although there has been a recent rise in cracking down on the opioid epidemic, the opium trade has been around in the United States since its inception. In the 16<sup>th</sup> and 17<sup>th</sup> century, China and British India started increasingly trading opium and as a result, trading and use of opioids rose in Europe and North America (Nicolussi, 2018). The distribution of opioids throughout North America continued from there.

Opioids were heavily used during the American Civil War. During this time, “the Union Army used around half a million opium pills and 2.8 million ounces of laudanum powder” because “there was no better substitute at the time, and its pill and powder forms made it easy to distribute to the needy masses” (On Opium: Its History, Legacy, and Cultural Benefits, 2011). This illustrates that despite the negative connotation surrounding opioids, there have been several benefits to utilizing them as well, particularly in times of war. However, after the Civil War, opioid addiction increased because of they were readily available. American’s history with illicit drug trading continued throughout the 20<sup>th</sup> century with the rise of American Mafia families, heroin smuggling during the Vietnam War, and the creation of the Medellin Cartel in the 1970s led by Pablo Escobar (*History of Drug Trafficking*, 2017).

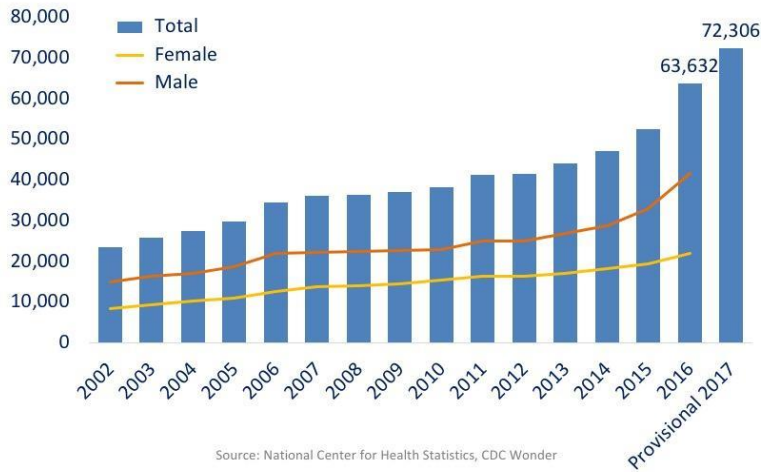
Recent history has shown a sharp increase in opioid-related deaths. According to the National Capital Poison Center, the opioid crisis has occurred in three waves. The first wave started in 1991 after opioids and opioid-combination medications were being increasingly prescribed for pain treatment. The second wave started in 2010 because of the rising popularity in heroin use. The third wave, which we are currently in, started in 2013 and is due to the abuse of synthetic opioids, particularly fentanyl (*History of Opioid Epidemic: How Did We Get Here?*).  
Opioid Crisis in the United States

Currently, the United States leads globally in the number of opioid-related deaths while Canada falls second. The graphs below showcase the rise of opioid-related deaths in recent years in the United States.



## National Overdose Deaths

### Number of Deaths Involving All Drugs

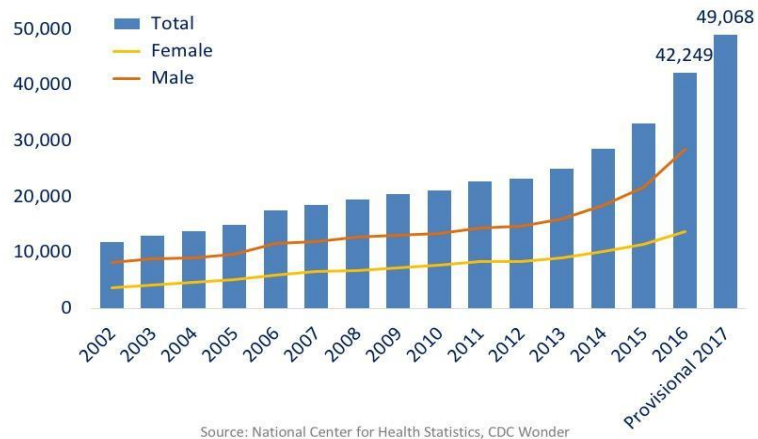


Source: <https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates>



## National Overdose Deaths

### Number of Deaths Involving Opioids

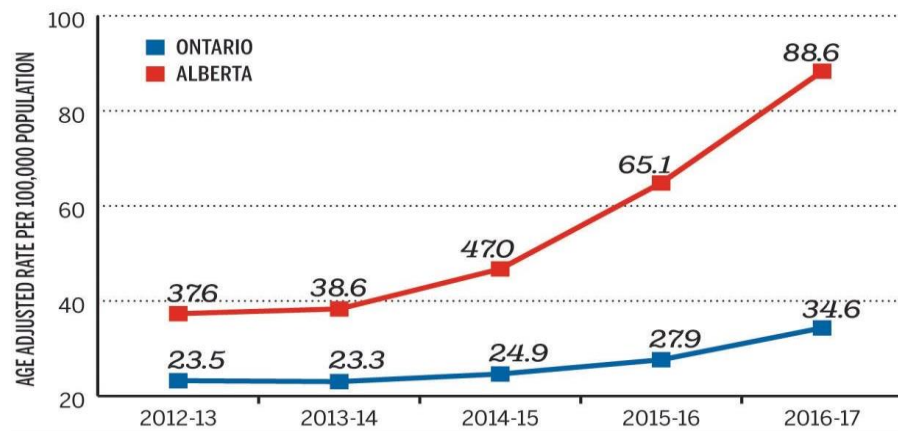


Source: <https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates>

By comparing these graphs one can see that most of drug-related deaths are caused by opioids and the rise in drug-related deaths and opioid-related deaths are extremely similar. Moreover, the number of opioid-related deaths in the United States increased almost 2-fold between 2015 and 2017. This illustrates that the crisis is reaching astonishing breaking points and must be remedied.



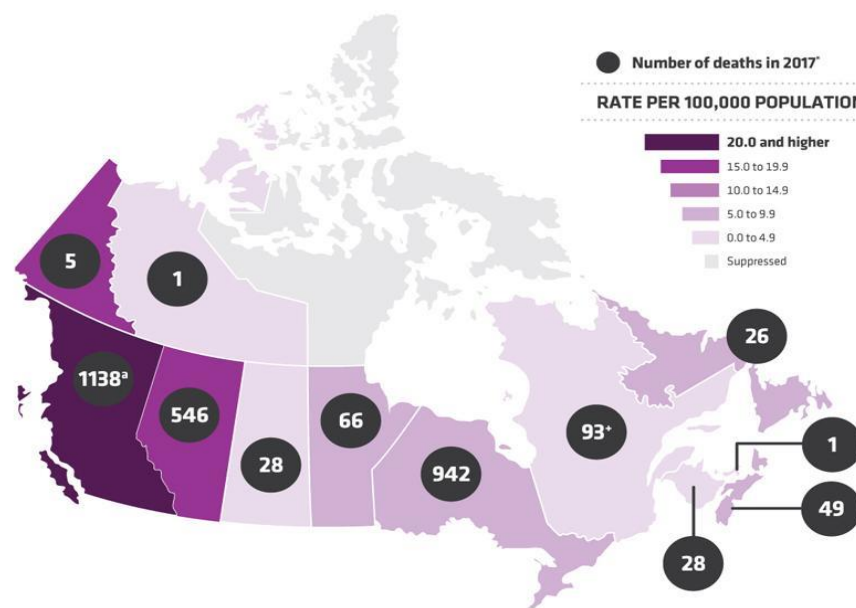
### OPIOID POISONING EMERGENCY DEPARTMENT VISITS, ONTARIO AND ALBERTA, 2012-13 TO 2016-17



SOURCE: CIHI

POSTMEDIA NEWS

Source: <https://edmontonjournal.com/news/local-news/emergency-room-visits-hospitalization-from-opioid-overdoses-spike-in-alberta-report>



<sup>a</sup>Includes data from July to September only. For 2017 data, Quebec reports deaths related to all illicit drugs including, but not limited to, opioids. This number is expected to rise.

<sup>\*</sup>British Columbia reports deaths related to all illicit drugs including, but not limited to, opioids.

<sup>\*</sup>The estimated annual rates for 2017 are based on available data from January to September.

Source: <https://www.canada.ca/en/public-health/services/publications/healthy-living/national-report-apparent-opioid-related-deaths-released-march-2018.html>

### OPIOID CRISIS IN MEXICO

Mexico is leading the world in drug distribution and has been facing a war on drugs since 2006. Because of this, there has been an increase in violence related to drugs that has effects the lives and safety of many of Mexican residents. It has also been the root cause of instability in Mexico. Mexico is currently most known for its production of heroin which increased 169% from 2013 to 2015 in the state of Guerrero. Currently, the United States is more concerned with the rising deaths related to the use of fentanyl, “but DEA reports claim that most of the illegal fentanyl

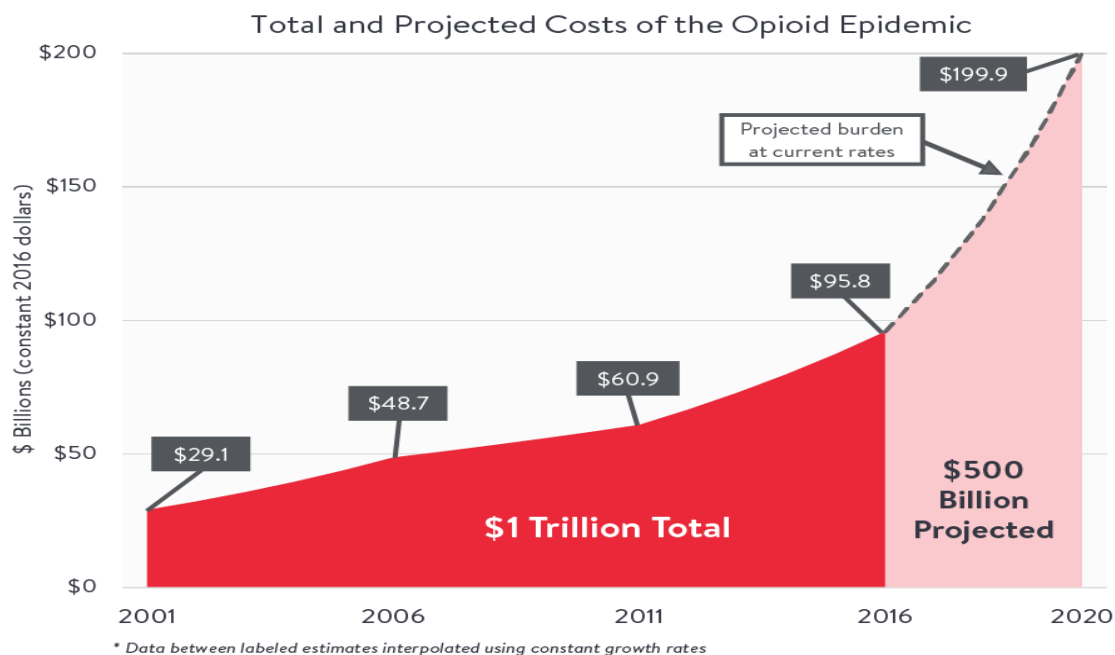
entering the U.S. is produced in China” (Epstein, 2017). However, since fentanyl “use is intrinsically tied to heroin, the U.S. must tackle the broader opioid crisis if illegal Fentanyl use is to be reduced” (Epstein, 2017). Strictly regulating opioid distribution is key helping combat the opioid crisis.

#### From Drug Misuse to Drug Abuse

Although the terms misuse and abuse of drugs are related, they’re both separate entities and battles altogether. Drug misuse occurs when “a prescription drug is used for a purpose other than its intended purpose”. However, drug abuse occurs when an individual takes drugs, that they are most often not prescribed, in order “to “feel high” or to chase a euphoric feeling”. Drug abuse leads to dependency and can have many negative consequences on an individual’s life personally and professionally. Misuse and abuse are often used “interchangeably”, however, they both have different meanings behind them (*Drug Misuse Versus Drug Abuse*, 2016). Often times drug misuse can lead to drug abuse. It is important that as a society, we recognize these differences and know when to take the proper action to combat the situation.

Misuse of opioids can lead to addiction which can lead to many health problems and loss of productivity in a society. At the rate the United States, Canada, and Mexico are losing lives to opioids whether it be due to misuse, illegal distribution, or drug-related violence, the economic climate is also at risk. By examining the economic impact of the opioid crisis in North America, we can start to get an idea how our society is being affected by this epidemic. Economic Impact

The United States, Canada, and Mexico have all incurred numerous costs to as a result of the opioid crisis, particularly the United States. According to The Council of Economic Advisors “in 2015, the economic cost of the opioid crisis was \$504.0 billion, or 2.8 percent of GDP that year” and has only risen since then (*The Underestimated Cost of the Opioid Crisis*, 2017). Moreover, according to Altarum, since 2001, the opioid crisis has cost the United States over \$1 trillion (*Economic Toll of Opioid Crisis in U.S. Exceeded \$1 Trillion Since 2001*, 2018). The following graph illustrates the accumulation and projects of costs in the near future due to the opioid crisis.



Source: <https://altarum.org/about/news-and-events/economic-toll-of-opioid-crisis-in-u-s-exceeded-1-trillion-since-2001>

Costs were evaluated based on the value of statistical life, or VSL, which put a value on the life of an individual. This evaluation allows the ability to analyze how much an individual can contribute to society. The more costs that are incurred, the more it affects the society. The VSL is said to be based mostly on age. According to Emma Court in an article from MarketWatch.com, the “age-adjusted approach values opioid overdose deaths, combined with the non-fatal costs of opioid abuse — including health care costs, costs to the criminal justice system and reduced productivity — at \$504 billion”. However, Court also adds that if this calculation was not based on age the cost would vary from \$294 billion to \$622 billion.

A further breakdown also illustrates the cost of opioid use in the United States. There are many costs in healthcare, criminal, business, etc. that have developed as a result of the opioid crisis. According to Maria LaMagna, hospitals saw an average cost of a patient in intensive care due to opioids across 162 academic hospitals was \$92,400 per patient. In addition to this, patients with untreated opioid disorders incur more than \$18,000 annually in healthcare costs. The criminal-justice system spends over \$8 billion in relation to the use and trading of opioids. The business sector loses \$20 billion each year due to loss in productivity. Moreover “fatal overdoses cost nearly \$22 billion in healthcare and lost productivity costs” (*More evidence that the opioid crisis is getting worse*, 2018). The United States has fallen victim to the highest costs and economic impact because of the opioid crisis. However, Canada is also seeing rising costs as well.

According to Leslie Young in an article by Global News, the cost of substance use in Canada costs the economy a total of \$38 billion, about 10% of which is related to the costs of opioid usage. Although not nearly as high as the United States, Canada has seen an impact of nearly \$3.8 billion due to opioids and the costs are steadily increasing. However, the accuracy of this cost may be lower or higher as the article did not indicate whether the currently was in American or Canadian dollars (Young, 2018).

The impact of costs in Mexico are significantly different. Mexican drug cartels have made their fortune off the distribution of drugs. Since the 1970s, Mexico has had a huge supply and demand of drugs that has historically been smuggled primarily into the United States. However, most recently, because of the rising popularity of fentanyl, Mexican drug distributors have seen less of a demand in their supply and more competition from Chinese drug distributors. In an article by the New York Post, “at its height a few years ago, the farmers say they could get 20,000 or 25,000 pesos (\$1,000 to \$1,250) per kilogram. In 2018, prices have dropped to 5,000 (\$250) per kilo” (Associated Press, 2018). Although the demand is still extremely high in Mexico, the competition from the Chinese has severely affected their business. In addition to the abundance of drug cartels, for many years, many Mexican residents have fallen victim to drug violence which has caused loss of productivity and economic instability for last several years. Moreover, violent drug crimes have put the safety of citizens at extreme risk. Due to the fact that Mexico does not have a system for recording health records in the same capacity as the United States and Canada, it is difficult to give precise numbers. However, these facts do indicate that there are economic and legal issues when it comes to the opioid crisis in Mexico.

The opioid epidemic has led to loss in productivity, rising healthcare costs, and increase in crime which has contributed to economic instability in the United States, Canada, and Mexico. Although these three countries work under different healthcare systems, it has not saved them from the despair that this crisis has caused all over the world. With the United States and Canada leading the world in opioid-related deaths, major changes and action must be taken in order to address these concerns.

## **SOCIAL IMPACT OF THE OPIOID CRISIS**

According to the National Institute of Health (NIH), historically, those who were at an advantage in American society typically had easier access to opioid epidemic based on socioeconomic class, race, and gender (Dasgupta, Beletsky, & Ciccarone, 2018). Epidemiological studies showed that “structural advantages in health care access may have contributed to increased opioid prescribing and availability among White patients” (Dasgupta, Beletsky, & Ciccarone, 2018). However, in clinically-controlled experiments, it was shown that Black patients tended to receive more opioids because of their “patient assertiveness, physician gender, and cognitive load” (Dasgupta, Beletsky, & Ciccarone, 2018). Either way, each scenario illustrates an association between socioeconomic class, race, and gender to the access of opioid prescriptions.

Opioids usage has been known to be spread across in all areas in America with “approximately 41% of drug overdose deaths occur in urban counties, 26% in the suburbs, 18% in small metropolitan areas, and 15% in rural communities” (Dasgupta, Beletsky, & Ciccarone, 2018). It also a well known fact that areas where residents are of a lower socioeconomic class tend to have a higher usage opioids and other drugs. Tackling urban areas of lower socioeconomic class in order to eradicate the opioid crisis can go a long way in lowering the death toll of opioid-related deaths in North America. The influence in these communities to use drugs is extremely high and can have severe effects on the life on an individual.

An individual that is addicted opioids is limited in their health, their quality of life, their ability to work and to benefit the society. Opioid addiction also has the ability to affect the family unit as they see their loved one struggle or lose their life. Moreover, when the influence of one individual spreads, the effects of opioids can handicap an entire society.

## **POLICIES & HEALTHCARE REFORM IN THE UNITED STATES**

Throughout the 20<sup>th</sup> and 21<sup>st</sup> century there have been numerous policies enacted in order to gain control over the opioid epidemic. Canada was one of the first nations to “ban opium for personal, non-medicinal use, starting with the Opium Act of 1908” (Nicolussi, 2018). The United States followed showed shortly after with the Harrison Act of 1914 which “outlawed the use of opium and cocaine for non-medicinal purposes” (*History of Drug Trafficking*, 2017). Recently there has been a recent trend in enacting policies to combat the opioid crisis in the United States, Canada, and Mexico.

In the United States, there has been a recent increase in awareness of the opioid crisis. According to the White House, this epidemic has been declared a “national public health emergency” (The Opioid Crisis, 2018). In addition to this, the White House has also released an initiative that outlines a plan to fight and stop opioid abuse in the United States. The Opioid Initiative will:

“Reduce drug demand through education, awareness, and preventing over-prescription.

Cut off the flow of illicit drugs across our borders and within communities.

Save lives now by expanding opportunities for proven treatments for opioid and other drug addictions.”

(*President Donald J. Trump’s Initiative to Stop Opioid Abuse and Reduce Drug Supply and Demand*, 2018)

This comprehensive plan seeks to eliminate the opioid epidemic in the United States through education and prevention, stricter regulation of the distribution of drugs, and expansion of treatment options.

## **POLICIES & HEALTHCARE REFORM IN CANADA**

Canada has been taking aggressive action on the opioid epidemic since 2016. According to the Government of Canada, the federal government is taking a comprehensive approach which includes promotion and prevention, treatment, harm reduction, and collaboration and support. The Canadian government has also take huge steps in order to educate its general public on the state of the crisis, what they doing in order to tackle the situation, and how to recognize signs for when an individual may be exhibiting symptoms of misuse or overdose (*Federal Action on Opioids*, 2018).

Under promotion and prevention, changes are being made in the system in order to address the “social inequalities that significantly impact access to mental and addiction services that lead to problematic opioid use” (*Care not Corrections: Relieving the Opioid Crisis in Canada*, 2018). For treatment, program on intervention and support will be initiated in order to help individual make health decisions in their lives. “Strategies that aim to reduce harm for people who use substances, focusing on the harm caused by problematic substance use, with the goal of creating healthier lives for people who use drugs and a healthier community for everyone” are being put into place to contribute to harm reduction when it comes to opioid abuse (*Care not Corrections: Relieving the Opioid Crisis in Canada*, 2018). Lastly, the Canadian government is actively building connections “among law enforcement, the justice system, and mental health professionals” so that people that are facing issues with opioid addiction are guided to the proper facilities that will help them cope with their issues (*Care not Corrections: Relieving the Opioid Crisis in Canada*, 2018).

The concrete plan that Canada has enacted in order to combat their opioid crisis is on a more aggressive and larger scale than America, despite America being impacted on a larger scale by the opioid epidemic. Moreover, “It is estimated that the Government of Canada and the provinces combined spent over \$1 billion to address this public health crisis and provided more than 6,000 person-days to coordinate an emergency response” (*Care not Corrections: Relieving the Opioid Crisis in Canada*, 2018). These initiatives will hopefully become more aggressive with time and will help Canada successfully combat the opioid epidemic in their country.

## **POLICIES & HEALTHCARE REFORM IN MEXICO**

Mexico has recently taken political initiatives in order to combat the opioid crisis in their country as well. A drug policy reform has taken place that will penalize those who are in possession of illicit drugs. The police have been educated to refer those who show signs of substance abuse to the correct treatment facilities (Burgos & Cepeda, 2018). Like Canada, Mexico has taken step to expand drug treatment in order to reduce the number of opioid-related deaths. The United States, Canada, and Mexico have all taken steps to help reduce the number of opioid related deaths as well come up with strategies for prevention of drug misuse. While Canada and Mexico have taken steps to expand their treatment options, the United States have lagged behind in this area. According to the Health Resources and Services Administration (HRSA), “Prevention and access to treatment for opioid addiction and overdose reversal drugs are critical to fighting this epidemic” (*Opioid Crisis*, 2018). Physicians need to be better educated on the crisis, Medicaid coverage needs to be expanded, and a more strategic and effective plan needs to be put into place in order to effectively combat this epidemic.

## **IMPORTANCE OF TACKLING THE CRISIS**

With the United States and Canada leading the world in opioid-related deaths, with number reaching as high as 72,000 drug overdose deaths, more than half of which were caused by opioids in the United States, the need to effectively combat the opioid epidemic in North America has become vital. Mayo Clinic had dubbed the opioid epidemic as the “most important and most serious public health crisis today” (Srivastava & Gold, 2018). Active preventative and treatment measures need to be taken in order to ensure that the public has the proper educational tools to make good decisions when it comes to drug use as well as better treatment options for those that are victims of opioid addiction. Currently, only “10% of patients with opioid use disorder receive treatment” (Srivastava & Gold, 2018). In order for their needs to be met, healthcare personnel such as physicians and nurses, as well as public officials such as police and social workers must become educated on how to properly refer patient to the proper treatment and mental facilities to help cope with their problems. Without this, the death toll will continue to rise and social and economic welfare will continue to be at risk.

Because of the sharp increase in the death toll surrounding the opioid crisis, immediate and aggressive action must be taken in order to control the situation. Evidence provided in this paper shows that expansion of treatment and education of healthcare personnel, public officials, and the general public is essential in combating this epidemic. According to the National Institute of Health, better treatment options must be created in order to “prevent opioid misuse, treat opioid use disorders, and manage pain” (*Opioid Overdose Crisis*, 2018). These options include “safe, effective, non-addictive strategies to manage chronic pain, new innovative medications and technologies to treat opioid use disorders, and improved prevention and reversal interventions to save lives and support recovery” (*Opioid Overdose Crisis*, 2018). In addition to this treatment must be made readily available to the public which can be achieved through the expansion of Medicaid. Currently, the US is lacking in its treatment options for its public with only 29% of adults with addiction were treated in 2016 (Zur & Tolbert, 2018). Giving the public proper access to the correct treatment and mental health facilities are vital in combating this crisis.

The Canadian government has taken on an extremely aggressive and transparent approach to their plan on combating the opioid crisis. They have taken many steps to educate the public and well as the correct personnel on how to prevent and cope with opioid addiction. The model they have created is one that should be adapted across the globe.

## **STRATEGIES FOR TACKLING THE CRISIS**

In order to effectively tackle the opioid crisis in North America, strong strategy must be put into play. The following are a few recommended strategies for tackling the opioid crisis:

- Education of middle school and high school going children on the dangers of opioids;
- Education of children on how to properly cope with mental health issues;
- Education of general public, social workers, and health professionals on how to detect signs of mental health or opioid addiction;
- Education of general public, social workers, and health professionals on how to direct others to the proper resources and facilities for opioid addiction;
- Education is extremely important in the prevention of opioid addiction. In addition to this, giving others the resources on how to deal with their mental health issues before opioid addiction starts can further aid with prevention;
- Stricter policies for prescribers, dispensers, and distributors of opioids;
- Better control of drug distribution;
- More man power to monitor the opioid crisis. This can be done by possibly creating a new agency under the Health and Human Services Department

### **LIMITATIONS OF THE STUDY**

This study included multiple sources from where information was gathered from. However, the study did have its limitations. One of the drawbacks included the measure of currency. The articles utilized in the study did not indicate whether the currency was in American dollars or in Canadian dollars. Because of this, the amount shown in the study may be higher or lower.

Another drawback in this study was the difficulty in gathering information on the effect of the crisis in Canada and Mexico, particularly Mexico. The capacity of these countries to record and gather healthcare information was at times limited. However, the articles that were found did indicate significant economic and social issues when it came to the opioid crisis. Because of this, the details indicated about the crisis in these countries should be duly noted.

### **Conclusion**

The United States and Canada have both declared the opioid crisis a public health emergency. Out of the three countries in North America, two of them lead globally in opioid-related deaths. Combating the crisis in North America has been extremely important. Although each country operates under different healthcare system, it hasn't saved them from the effects of the opioid epidemic. It has caused economic casualties that has affected each country's society. Immediate and aggressive action must be taken in order to combat this epidemic.

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# WOMEN'S HEALTH: A GLOBAL HEALTH ISSUE

*Millicent A. Obuadey, University of Scranton  
Dr. Daniel J. West, Jr., University of Scranton*

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## ABSTRACT

*While sex-based health disparities are a global reality and are evident throughout the world, these disparities are nowhere greater than in resource-poor countries. Women and girls in developing nations lack basic health care and they face debilitating and life-threatening health issues that have long since been controlled or eradicated by science in developed and well-resourced countries. A few of these issues that plague these resource-poor countries include maternal mortality, female genital cutting, child marriage, human immunodeficiency virus (HIV)/AIDS, obstetric fistulas, malaria in pregnancy and cervical cancer. Due to the fact that these women and girls have less access to education and employment, they are encouraged by society to marry early and bear many children. As a result, these women and girls suffer from higher rates of illiteracy, fertility/infertility, morbidity, and mortality. These social and economic conditions not only directly affect the health and well-being of these women, but also their children, their families, and their communities as a whole. This paper is intended to highlight global women's health issues, increase awareness and establish a renewed commitment to improving the livelihood and the welfare women.*

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Millicent A. Obuadey  
Graduate Student MHA Program  
The University of Scranton  
515 East Market Street  
Scranton, P.A. 18509  
Telephone: 973 424 7147  
Email: [millicent.obuadey@scranton.edu](mailto:millicent.obuadey@scranton.edu)

Dr. Daniel J. West, Jr., Ph.D., FACHE, FACMPE  
Professor and Chairman  
Department of Health Administration & Human Resources  
The University of Scranton  
417 McGurkin Hall  
Scranton, Pennsylvania 18510  
Telephone: (570) 941-4126  
Fax: (570) 941-5882  
Email: [daniel.west@scranton.edu](mailto:daniel.west@scranton.edu)