ARE TRADITIONAL CLINICIAN RECRUITMENT PRACTICES, USING NON-VIRTUAL OFF-LINE APPROACHES, REDUNDENT IN THE AGE OF WEB-BASED TECHNOLOGY PLATFORMS?

by

Peter Huynh, BSc. MBA.

DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfillment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS AND MANAGEMENT GENEVA

JUNE 2024

ARE TRADITIONAL CLINICIAN RECRUITMENT PRACTICES, USING NON-VIRTUAL OFF-LINE APPROACHES, REDUNDENT IN THE AGE OF WEB-BASED TECHNOLOGY PLATFORMS?

by

Peter Huynh, BSc. MBA.

Supervised by

Dr Luka Lesko PhD, DBA

APPROVED BY

Dissertation chair

RECEIVED/APPROVED BY:

Admissions Director

Dedication

I dedicate this research to my mother Dr Anna Huynh MD
and my late father Dr Philip Huynh MD, two outstanding physicians, who have inspired me to strive for continued education and academic excellence.

Acknowledgements

I would like to acknowledge the support of my
wife Christine and children Elizabeth and Nicholas.
With their encouragement and support I was able to undertake and navigate this
doctoral research journey.

ABSTRACT

ARE TRADITIONAL CLINICIAN RECRUITMENT PRACTICES, USING NON-VIRTUAL OFF-LINE APPROACHES, REDUNDENT IN THE AGE OF WEB-BASED TECHNOLOGY PLATFORMS?

by

Peter Huynh, BSc. MBA.

The U.S. healthcare staffing market size is expected to reach $34.7 billion by 2030, exhibiting a growth rate 5.6% from 2022 to 2030. The increasing geriatric population is leading to a rising demand for medical services and a shortage of nurses and other medical staff. Our society and the expanding population are living longer but becoming infirm and getting sicker. Our population is experiencing higher rates of morbidity and lower rates of mortality. The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing. Clinicians must be recruited to effectively care for an aging and sicker population. The demographics of such a clinical force is younger and more technologically savvy and the past generations of nursing and medical staff are now aging into retirement leading to a significant clinician shortage and an ensuing problem for the healthcare staffing arena. Furthermore, approximately five hundred thousand nurses plan to retire from the workforce over the coming years. The Association of American Medical Colleges predicts there will be a shortage of up to fifty-five thousand primary care physicians by 2032 leading to a crisis in

clinical staffing. The question being posed is whether healthcare systems are better served using online platforms and dispensing of the older traditional approaches to clinician recruitment such as offline non virtual, hard copy printed resources. This research uses a combination of qualitative data collection (questionnaires) and quantitative data analysis (scaling and scoring system) to ascertain the potential best approach for clinician engagement and recruitment now and in future years. The results observed showed that clinician candidates continue to rely on both virtual and non-virtual traditional approaches as a mechanism for locating job opportunities and non-virtual platforms play an important role in the clinician's due diligence and decision-making process. Thus, traditional recruitment approaches are by no means a redundant resource in an age of web-based technology.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I:

1.1 Introduction

General issues and importance of the research and literature review. The population of the USA is aging, generally in the United States we are living longer and getting sicker (Kim et al., 2021). The severity and acuity of our current population is a chronic issue that requires not just increased production of newer lifesaving molecules but also the production of pharmaceuticals and drugs to treat our aging infirm population (Kim et al., 2021). Verma et al. (2016) states that in order for healthcare systems to diagnose, treat and prescribe to our aging or chronically ill population we need a veritable army of nurses and physicians (collectively referred to in this research study as 'clinicians'). These clinicians must be recruited from the four corners of the USA as well as from the far-reaching corners of the planet (Mmemba et al., 2016). The demographics of such a clinical work force is younger and more technologically savvy (Dickson et al., 2010). The past generations of clinicians now aging into retirement namely the baby boomer demographic born between 1955-1964 (Yacyshyn et al., 2012) and early generation X demographic born 1965-1980, according to Yachyshyn et al., (2012) are giving way to a younger clinical demographic of clinicians such as the Millennials, born 1981-1996 and the Generation Z born 1997-2012. The later generations currently in the work force or about to enter the work force, are raised on mobile applications and social media as a means of garnering the information they require and represent a tidal wave movement away from the main stay of physically mailing postcards and placing job advertising in industry journals, hard copy press and recruiters cold calling (Dickson et al., 2010). Of course, as with any endeavor, mailing hard

press to recipients will still be a worthy approach that will likely still deliver some results (Pittman et al., 2010), the question is to what extents will this deliver and whether healthcare systems are better served using online platforms with their limited budgets to get optimal return of invested budget and time resources. Pittman et al., (2007) highlight that "some large health care organizations and systems, such as academic health centers, recruit directly, but most use third-party recruiters. Among recruiters, sources estimate that about 60 percent are "placement" agencies that charge health care organizations a standard fee per nurse: usually $15,000 to $25,000 depending on the state and the nurse's experience". Additionally, Pittman et al., (2007) states that "the other approximately 40 percent of recruiters are staffing agencies paid on an hourly basis for the nurses they provide. The latter are about four times more lucrative but require significant upfront capital". In addition to placement commissions there are also sign-on bonuses payable to the candidates and relocation costs etc. These sign on bonuses, referred to as 'golden handshakes' can range from $50,000 to in excess of $100,000 plus relocation costs of close to $30,000. (Raha et al., 2009). Therefore, we can see that the potential cost to health systems for future and ongoing recruitment of clinicians is vast and there is a need to find more cost effective yet effective recruitment strategies.

This review will cover the introduction to the online recruitment arena and will assess the most recent research studies delving into this area and include a brief summary of available published research that has examined the area as well as the missing items or blind spots in our knowledge that the proposed research study will help to highlight.

The literature review shows that approximately 20 or more published studies have examined the use of social media to recruit patients in the United States of America (USA)

to participate in clinical trials and approximately 12 studies have examined the effectiveness of using online resources and the internet to recruit physician participants in enrolling patients to clinical studies. Numerous studies review the power and effectiveness of using social media and electronic recruiting to capture the attention of clinicians and its impact on human resources teams across multinational organizations such as Shaffer et al., (2020) and Rahman et al., (2004). More than 8 plus studies contrasted and compared the various online recruitment platforms to ascertain the most effective platforms and their online presence and reach. Moseson and Jusola et al., (2020) reviewed and compared the patient study samples recruited with virtual versus traditional recruitment methods. The study looked at the demographics of patients that had been recruited into a clinical trial via online platforms versus the demographics of patients recruited into the clinical trial using more traditional methods (namely brick and mortar sites like care clinics, health centers and primary care offices etc.). Mosesan et al., (2020) suggested that "the clearest potential advantage of virtual studies is that they maximize the number of individuals able to participate…by removing the barriers to participation" and furthermore "allow researchers to identify a larger pool of eligible participants more quickly" (Mosesan et al., 2020)

Lane et al., (2015) conducted a comprehensive research review of 550 publications (a meta-analysis of numerous studies over time) that examined the use of online virtual resources for the recruitment, retention, and participation of patients into research trials. These authors. acknowledged that "web-based recruitment was the only type of recruitment used in 67% (8/12) of the studies. Online recruitment was used for studies with a variety of health domains: smoking cessation (58%; 7/12) and mental health (17%; 2/12) being the most common" (Lane et al., 2015). The authors went on to state that "of the studies found

Facebook ads or newsfeed posts to be an effective method of recruitment, a quarter (25%; 3/12) of the studies found Google ads to be the most effective way to reach participants" (Lane et al., 2015). Furthermore, the literature review produced over 10 studies showing success in recruiting physicians and nurses into rural health care systems and rural regions of the USA using web-based technologies (Asch et al., 2000). An additional 7 studies looked at the effectiveness of recruiting and enrolling nurses (care providers) in participating in patients care trials.

It appears from the literature review that the types of studies examining online resources and comparing them to traditional brick and mortar resources tended to assess the success of online versus traditional in the recruitment of patients in trials and/or the recruitment of clinicians responsible for enrolling patients in those trials. As stated earlier in this report, there remains a significant research blind spot in our understanding and publication of online career recruitment of clinicians (and not recruitment into clinical trials and clinical research). It must be highlighted that a weakness of this research reviewed is that they are mainly in English language publications and therefore we are missing a huge component of potential research published in other non-English language publications which represents a significant 'blind spot' in our further understanding of this area.

The hypothesis that will be examined in this proposed research is that the demographics of our younger clinical work force is more technologically savvy (Dickson et al., 2010). The past generations of clinicians now aging into retirement namely the baby boomer demographic born between 1955-1964 (Yacyshyn et al., 2012) and early generation X demographic born 1965-1980, according to Yachyshyn at al., (2012) are giving way to a younger clinical demographic of clinicians such as the Millennials born

1981-1996 and the Generation Z born 1997-2012. (Yachyshyn et al., 2012). This younger tech savvy generation currently in the work force, are raised on mobile applications and social media as a means to garnering the information they require and a movement away from the main stay of physically mailing postcards and placing job advertising in industry journals, hard copy press and recruiters cold calling (Verma et al., 2016). Some influential studies in this regard are Moseson et al., (2020) which examined study samples recruited with virtual versus traditional recruitment methods, as well as Verma et al., (2016) which reviewed online recruitment approaches.

1.2 Research Problem

Increasing geriatric population is leading to rising demand for medical services and shortage of nurses and other medical staff (clinicians) according to Raha et al., (2009). The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing, Danish et al., (2020). Clinicians must be recruited to effectively care for an ageing and sicker population. The demographics of such a clinical force is younger and more technologically savvy and the past generations of clinicians are now aging into retirement leading to a significant staffing shortage and ensuing problem for the healthcare staffing arena, Moseson et al., (2020). As stated previously in this thesis and according to the Bureau of Labor Statistics (BLS), approximately 500K nurses plan to retire from the workforce over the coming years. Furthermore, the Association of American Medical Colleges, predicts there will be a shortage of up to 55,000 primary care physicians by 2032 leading to a crisis in clinical staffing. This is a sizable problem that needs to be addressed effectively. The question

being posed in this thesis is whether health systems are better served using online platforms and dispensing of the older approaches to clinician recruitment.

1.3 Purpose of Research

The potential cost to health systems for future and ongoing recruitment of clinicians is vast and there is a need to find more cost effective yet effective recruitment strategies especially in light of the dwindling numbers of available clinician and the huge shortfall of clinicians that is predicted in the near future Rahman et al., (2004). This proposed research assignment objectives are:

A) To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.

B) provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms.

C) To investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

1.4 Significance of the Study

The severity and acuity of our current aging population is a chronic issue which requires the recruitment of significant numbers of clinicians. Verma et al., (2016) states that in order for healthcare systems to diagnose, treat and prescribe to our aging or chronically ill population we need a veritable army of nurses and physicians. In order to recruit these physicians and nurses, health care systems must spend millions of dollars annually to identify, attract and contract with these clinicians. The available pool of clinicians is dwindling, and the reducing recruitment budgets make it ever more vital for

health systems to identify the optimal way to spend their recruitment budgets. It is valuable to know the most optimal approaches to this recruitment and understand whether some of the traditional approaches still have a role to play in clinician recruitment or whether the traditional approaches are redundant in a web base technology arena. Previously, the types of studies examining online resources and comparing them to traditional brick and mortar resources tended to assess the success of online versus traditional in the recruitment of patients in trials and/or the recruitment of clinicians responsible for enrolling patients in those trials. There remains a significant research blind spot in our understanding and publication of online career recruitment of clinicians, and not recruitment into clinical trials and clinical research.

CHAPTER II:

REVIEW OF LITERATURE

2.1 Previous Studies and Literature Review

Overall, we can see that extensive research has been conducted, some of which span 10-year retrospective periods and number hundreds of literature reviews on the topic of e-recruitment and social media recruitment. Literature review shows that approximately 15 or more published studies have examined the use of social media to recruit patients in the USA to participate in clinical trials within the past 10 years and 7 studies examined the effectiveness of using online resources and the internet to recruit physician participants in enrolling patients to clinical studies within the past decade. Pittman et al., (2014) stated and used "qualitative data to describe the industry come from semi structured interviews and focus groups. We derived quantitative data from a review of recruiter advertising on the World Wide Web and unpublished surveys conducted by the Commission on Graduates of Foreign Nursing Schools" (Pittman et al., 2014)

Numerous studies review the power and effectiveness of using social media and electronic recruiting to capture the attention of clinicians and its impact on human resources teams across multinational organizations. Since 2010, more than 20 plus studies contrasted and compared the various online recruitment platforms to ascertain the most effective platforms and their online presence and reach. Moseson and Juusola et al., (2020) reviewed and compared the patient study samples recruited with virtual versus traditional recruitment methods. As clinician recruitment via online and offline resources has seldomly been researched for cost effectiveness and efficiencies, this research paper used recruitment of patients for clinical trials, via online and offline resources, as a proxy and benchmark

representation for the recruitment of clinicians into job vacancies. Human behaviors around utilization of online and offline resources are fundamentally the same when being recruited to a clinical trial or a job vacancy. Perhaps one possible difference is that some clinical trials, due to the nature of the trial, may target the older geriatric population that are not currently in the workforce. In these instances, the researchers have targeted the clinicians instead of the patients and used the clinicians to recruit the patients. Thus, even in those types of research we can still use the on-line offline approaches as a proxy for clinician recruitment. For this research, we are examining resource utilizations around demographic behaviors which remain fundamentally the same whether the goal is to recruit for a job or for a clinical trial. With this in mind, the study looked at the demographics of patients that had been recruited into a clinical trial via online platforms versus the demographics of patients recruited into the clinical trial using more traditional methods (namely brick and mortar sites like care clinics, health centers and primary care offices etc.). Mosesan et al., (2020) suggested that "the clearest potential advantage of virtual studies is that they maximize the number of individuals able to participate…by removing the barriers to participation" and furthermore "allow researchers to identify a larger pool of eligible participants more quickly" (Mosesan et al., 2020)

Lane et al., (2015) conducted a comprehensive research review of 550 publications that examined the use of online virtual resources for the recruitment, retention, and participation of patients in research trials. These authors. acknowledged that "web-based recruitment was the only type of recruitment used in 67% (8/12) of the studies. Online recruitment was used for studies with a variety of health domains: smoking cessation (58%; 7/12) and mental health (17%; 2/12) being the most common" (Lane et al., 2015). The

authors went on to state that "of the studies found Facebook ads or newsfeed posts to be an effective method of recruitment, a quarter (25%; 3/12) of the studies found Google ads to be the most effective way to reach participants" (Lane et al., 2015). Consequently, from this research by Lane et al., (2015), the publication concluded that "although online methods of recruitment may be promising in experimental research, more empirical evidence is needed to make specific recommendations" and that "Several barriers to using online recruitment were identified, including participant retention. These unique challenges of virtual interventions can affect the generalizability and validity of findings from Web-based and mHealth studies" (Lane et al., 2015), these further outlines research pertaining to recruitment for clinical trials and not for job opportunities and compounds the need for research into clinician recruitment for jobs as this is an industry deficit. There is a need for additional research to evaluate the effectiveness of online recruitment methods and participant retention in experimental mHealth studies.

Furthermore, the literature review produced over 10 studies showing success in recruiting physicians and nurses into rural health care systems and rural regions of the USA using web-based technologies (Asch et al., 2000). An additional 7 studies looked at the effectiveness of recruiting and enrolling nurses (care providers) in participating in patients care trials.

Shaffer et al., (2020) suggested that the types of studies examining online resources and comparing them to traditional brick and mortar resources tended to assess the success of online versus traditional in the recruitment of patients in trials and/or the recruitment of clinical responsible for enrolling patients in those trials.

Christensen et al., (2017) concluded that "In our Internet-based cohort study, online recruitment methods were superior to offline methods in terms of efficiency (total number of participants enrolled). The average cost per recruited participant was also lower for online than for offline methods, although costs varied greatly among both online and offline recruitment methods". (Christensen et al., 2017). Further to this, Christensen et al., (2017) in comparing the use of on-line resources has suggested that "recruiting participants for epidemiologic research is increasingly difficult as the number of projects competing for people's attention increases and response rates decline. In cohort studies, participant recruitment and data collection are associated with a heavy workload and high costs, widespread access to the Internet now offers an alternative strategy to recruit participants into cohort studies and to collect data. The Internet offers technical advantages in data collection that can reduce administrative procedures and improve data quality" (Christensen et al., 2017). Once again, we see that prior research focuses on recruitment of patients into clinical research trials and not on recruitment of clinicians for the purposes of job fulfillment. Due to this blind spot and as will be mentioned in this research, we use the recruitment of patients into clinical trials as a proxy for recruiting clinicians as so little data exists.

The data that does reside is provided by industry reports and industry posters or white papers which underscores the difficulties of recruiting clinicians for the purposes of advertising recruitment companies. These posters and data points are most often biased and skewed towards yielding benefits for the recruitment firms that sponsored the research. There remains a blind spot in our research and independent publication of online career recruitment of clinicians (and not recruitment into clinical trials and research), that is not

sponsored by the recruitment industry for the purposes of marketing recruitment services to the healthcare industry. To date there is no research or published study that examines the effectiveness of online clinician career recruitment versus what may be now a redundant resource of brick-and-mortar clinician career job recruitment.

This type of analysis is important as it provides insight into the better allocation of recruitment efforts and cost/expenses/budget dollars and how best to utilize those dollars in an effort to recruit clinicians to open jobs (Oppenheim et al., 2002). Increasing geriatric population is leading to rising demand for medical services and shortage of nurses and other medical staff (clinicians) according to Raha et al., (2009). The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing, Danish et al., (2020). Clinicians must be recruited to effectively care for an ageing and sicker population.

The question being posed in this research is why spend valuable and limited budgets on redundant and obsolete approaches to future recruitment of physicians and nurses to health systems? The proposed study aims to examine through literature reviews and analysis of demographic behaviors, if more traditional approaches are no longer appealing to the new generation of clinicians and older traditional methods of recruitment may be usurped by online resources as their intended clinician targets begin to age into retirement. This research and study will be limited to the United States and European, English publications, job market only and will not look to apply multicultural outlook and experiences outside of the USA or non-English speaking continents. A weakness or one could say a blind spot in our past research reviewed is that researcher publications are mainly in English language publications and therefore we are missing a huge component

of potential research published in other non-English language publications which represents a significant 'blind spot' in our further understanding of this area. Especially considering the fact that the two largest populations of working clinicians reside in China and India and currently many companies are opting to sponsor clinicians from foreign countries and continents to relocate to North America to help buffer the declining number of clinicians in the USA. Therefore, further research published in those pertinent languages should also be considered. To further underscore the importance of Asia as a target for current and future publications, one research paper/publication by Guild et al., (2017) provided insights into Asia and "suggests that even the most sophisticated multinationals must change significantly to realize Asia's growth potential...the region is as diverse as it is vast. Its markets come in a bewildering assortment of sizes and development stages, and its customers hail from a multitude of ethnic and cultural backgrounds" (Guild et al., 2017). Guild mentions in the publication and reports that "Their tastes and preferences evolve constantly. The speed and scale of change in Asian consumer markets can surprise even experienced executives", (Guild et al., 2017). Additionally, the publication continues to say that "to meet the challenge, global companies will have to organize themselves regionally to coordinate strategy and use resources in the most efficient way while at the same time targeting the tastes of consumers on a very local level" (Guild et al., 2017).

One publication from a research trial conducted by Raha et al., (2009), examining the recruitment of Asian physicians, based in New Delhi India and the hurdles experienced in locating qualified physician's candidates. This research by Raha et al., goes some way to examining the hurdles that we discuss here in this research but on the Asian continents. Rahal et al., (2009) based their research on "some of the problems found in recruiting new

doctors to the government health care system, drawing on the recent experiences in three cases: the Central Health Service (CHS), the Uttar Pradesh (UP) government health care system and Tamil Nadu government health care system" (Raha et el., 2009). The review of this literature by Raha et al., (2009) was valuable in better understanding the same obstacles that this research hopes to highlight. The research was conducted in 2009 and no other significant research work has yet been published since. Furthermore, this research was only able to capture in this literature review because the publication was in English language. More publications in English would provide for a better understanding of hurdles and obstacles encountered in the recruitment markets of India and China.

Better delineation of online platforms (specifically which platforms) and deeper stratification of specifically which offline approaches are preferred as the options present a large pool of offline choices and current research does not separate the different options to better understand user preferences. Additionally, research should be conducted to also better understand employer demographics and how that plays a role in the employer's choice of recruitment approaches as employers are also delineated into gender and age categories with demographic preference associated with each. From the literature review, this type of research has not yet been published.

In one meta-analysis by Mbemba et al., (2016) the publication aimed to identify and highlight the "shortage of healthcare workers in rural and remote areas remains a growing concern both in developed and developing countries" and conducted a reviewed "aimed to synthesize the significant factors impacting healthcare professionals' recruitment and retention in rural and remote areas, and to identify those relevant for developing countries" (Mbemba et al., 2016). These researchers screened 224 publications.

They reported that “four reviews focused on recruitment factors, and another four reviews focused on retention factors. The remaining focused both on recruitment and retention factors” (Mbemba et al., 2016). They state that “the main factors influencing recruitment and retention have been largely explored in the literature, the evidence on strategies to reduce the shortage of healthcare workers in rural areas, particularly in developing countries, is low. Further research in this field is needed” (Mbemba et al 2016). Thus, underscoring the need for this current research and highlight the deficit in information we currently have in the literature reviews thus far in this regard.

As already outlined, this analysis is important as it provides understanding into the best allocation of recruitment funds and recruitment efforts as well as cost/expenses/budget dollars and how best to utilize those dollars in an effort to recruit clinicians to open jobs in a timely and efficient manner. But not only to recruit to fill open jobs quickly but also to find the best candidate for the job and not just a candidate for the job. When looking at and comparing online approaches versus traditional recruitment methods, further emphasis and research should be placed on comparing a broader spectrum of publications and studies that focus on metrics like total cost of recruitment, incorporating not just the hard costs but also the soft costs (people and resources) and overall quality of candidates leading to better patient outcomes and patient satisfaction. We cannot merely analyze the speed and cost of advertising but also need to review the lost opportunity costs of hiring the wrong candidates in haste or the effect that the wrong clinician may have on overall clinical outcomes and patient care. Poor clinical outcomes have a very different financial impact on the healthcare system from longer hospital stays to additional procedures to legal costs from law suits due

to poor clinical prognosis. Existing research should expand the scope of analysis to incorporate such factors in order to be more encompassing.

This research respects and acknowledges that online mechanisms may not be the approach of choice in regions where the population reside below the poverty line and where online access and resources are not commonplace with no internet service providers and/or no hardware to access such platforms, however such demographics and this target population are also not good candidates for mailers and postcards either and are not the typical target audience for the types of clinical job vacancies in question. From the literature reviews and searches, it was clear that current and past studies only tested the use of online platforms in recruiting patients to clinical trials and did not however examine the same approach for web based, online recruiting of clinicians into health systems for the purposes of fulfilling job openings. Other studies examined general ability to recruit and retain physicians and mechanisms of recruitment (Verma et al., 2016). Hundreds of Millions of dollars are spent annually on the recruitment and retention of clinicians to health care systems across the United States and across the globe (MacQueen et al., 2018). Knowing how best to spend and where best to spend valuable recruitment dollars can either make or break a health system (Asghari et al., 2019).

The proposed study would seek to ascertain whether traditional methods for identifying and targeting potential clinician candidates for recruitment focused on the baby boomer and generation X demographics and more traditional 'snail' mail approaches (non-virtual or offline), post cards mailings, journal hard press copies and/or newspaper advertising of the past 5 decades may now be redundant as a means of recruiting clinicians to work for health care systems in the United States of America in this new decade and

beyond. Consequently, the limited recruitment budgets of healthcare systems are best served with using e- recruitment approaches and online platforms as suggested by (Galanaki et al., 2002)

The traditional postcard mailings and journal hard press print advertising as recruitment mechanisms may now be entirely redundant if it is established that its intended recipients or audience no longer relies on hard copy press or physically mailed collateral as a source of recruitment information (offline non virtual resources). The proposed study will aim to use a combination of primary data collection via survey questionnaires and secondary data from past literature reviews and analyze such data using quantitative and qualitative analysis to prove the effectiveness of on-line recruitment platforms and examine the potential redundancy of print press collateral and examine whether this non virtual approach may be a relic of the past decades as a means of recruitment. With this research the study intends to either demonstrate that we can simply save the resource of dollars, time, and personnel by turning to electronic mechanisms of advertising to a 'click' generation or that traditional non virtual printed collateral and mailed collateral still has an important role to play in the recruitment of clinicians in the north American job markets. Identifying the best use of resources is vital to the fiscal viability of any company, system or industry and is as important to identify where and how not to spend such resources (Galanaki et al., 2022).

Chapter III:

METHODOLOGY

3.1 Overview of the Research Problem

Increasing geriatric population is leading to rising demand for medical services and shortage of nurses and other medical staff (clinicians) according to Raha et al., (2009). The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing, Danish et al., (2020). Clinicians must be recruited to effectively care for an ageing and sicker population. The demographics of such a clinical force is younger and more technologically savvy and the past generations of clinicians are now aging into retirement leading to a significant staffing shortage and ensuing problem for the healthcare staffing arena, Moseson et al., (2020). As stated previously in this thesis and according to the Bureau of Labor Statistics (BLS), approximately 500,000 nurses plan to retire from the workforce over the coming years. Furthermore, the Association of American Medical Colleges, predicts there will be a shortage of up to 55,000 primary care physicians by 2032 leading to a crisis in clinical staffing. This is a sizable problem that needs to be addressed effectively. The question being posed in this thesis is whether health systems are better served using online platforms and dispensing of the older approaches to clinician recruitment.

3.2 Research Purpose and Questions

The potential cost to health systems for future and ongoing recruitment of clinicians is vast and there is a need to find more cost effective yet effective recruitment strategies especially in light of the dwindling numbers of available clinician and the huge shortfall of

clinicians that is predicted in the near future Rahman et al., (2004). This proposed research assignment objectives are:

A) To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.

B) provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms.

C) To investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

3.3 Research Design

The research methodology will be a combination of qualitative and quantitative approaches. A qualitative approach deployed initially so the researcher will endeavor to disseminate a questionnaire to a database of approximately 24,000 nurses currently actively working in the north American job market and/or looking for clinical roles within the same geographies (50 US States). Quantitative survey analysis involves the use of numerical data to identify patterns and trends in the responses (Berry et al., 2017). Berry et al., (2017) suggests that this type of analysis is useful for understanding the prevalence of certain opinions or behaviors within a population. Furthermore, it can also be used to make inferences about a larger population based on a sample. Some of the benefits of quantitative survey analysis include the ability to identify statistical relationships; to test hypotheses, and to make generalizations about the population being studied (Berry et al., 2017). Qualitative survey analysis, on the other hand, involves the use of non-numerical data, such as open-ended responses, to understand the experiences and perspectives of the

respondents (Berry et al., 2017). According to this author and Oppenheim et al., (2002), this type of analysis is helpful for understanding the underlying reasons and motivations behind certain opinions or behaviors. Berry et al., (2017) informs us that the benefits of qualitative survey analysis include the ability to understand and identify themes and patterns in human behaviors.

The questionnaire, for the purposes of this research thesis, will include a detailed list of questions directed to the participant clinicians and will include a scoring system and survey as suggested by Oppenheim et al., (2002). Furthermore, included in the questionnaire is a scoring system of 1-10 to establish how strongly the participant believes in their responses. Consequently, the scoring system will allow the research to better quantify the magnitude and significance of those responses in order to analyze the numerical value and significance of those responses (Oppenheim et al., 2002). A quantitative research and sampling method will then be applied to the results of the initial phase.

Quantitative research techniques pair well with a deductive approach according to Mitchell et al., (2010), as I am testing my theory in the field. Then the research analysis will involve use of statistical techniques to calculate the percentages and variances in responses (Mitchell et al., 2010). Demographics data, time to fulfilment and cost of fulfilment will also be requested on each questionnaire and a retrospective meta-analysis, of multiple studies, will be conducted, the collective results as examined and analyzed from previous published research spanning the past 10 years will be collated and presented. Following the quantitative analysis of the results drawn from both qualitative and

quantitative approaches outlined in this methodology, a conclusion will be formed based on the significance of the resulting data. Baker et al., (2003) stipulates that "both qualitative and quantitative analysis have their own benefits. The combination of both types of analysis can provide a more comprehensive understanding of the research question and a more complete picture of the population being studied". (Baker et al., 2003). Furthermore, Baker et al., (2003) state that combining qualitative and quantitative research methods can be a useful approach as it allows for the collection of both numerical data (quantitative) and non-numerical data (qualitative) to provide a more comprehensive understanding of the research topic. In this case, using a qualitative approach initially by disseminating a questionnaire to a data base of 24,000 nurses in the north American job market could provide valuable insights and context to the research topic. Additionally, it is important to ensure that the sample is representative of the population of interest and consider any potential biases in the sampling method. (The database of 24,000 clinicians was purchased through various companies that aggregate clinician contact information for the purposes of contact marketing). Using a questionnaire as the initial data collection method allows for a large sample size and can provide a broad overview of the research topic. The use of a scoring system and survey in the questionnaire will provide numerical data which can be analyzed statistically, and the expanded questions will provide qualitative information (Mitchell et al., 2010). The research methodology must ensure that the questions in the questionnaire are clear, unbiased, and relevant to the research topic and the scoring system is appropriate to the questions asked (Hair et al., 2013). Additionally, it's important to ensure that the participants are selected at random and based on their willingness to participate to avoid any bias in the sample. Furthermore, Hair et al., (2013) suggests that

including a survey with a scoring system in the questionnaire is a good way to establish the strength of the participants' beliefs in their responses. The scoring system can provide numerical data that can be analyzed statistically, which can help in quantifying the magnitude and significance of the responses. (Hair et al., 2013)

Using a quantitative research and sampling method in the second phase of the research, after conducting the initial phase of the research, can provide a more detailed and in-depth understanding of the data collected. (Baker et al., 2003). Baker states that this can help to identify patterns, trends, and relationships in the data. Quantitative research techniques, such as statistical analysis, can be used to analyze numerical data and pair well with a deductive approach, which starts with a theory or hypothesis and test it using data. Additionally, when using a deductive approach, we must ensure that the sample is representative of the population of interest and consider any potential biases in the sampling method. (Hair et al., 2013). Using statistical techniques to calculate the percentages and variances in responses. This can help to identify patterns, trends, and relationships in the data, and can be useful in identifying significant results. After analyzing the results of both qualitative and quantitative approaches, the research analyzes the results data and attempts to draw conclusions based on the significance of the data reported. The conclusion should provide an overview of the findings and the implications of the research in relation to the research topic.

Initially the research clearly defined the objectives of the study questionnaires. Knowing the clear objectives helped to shape and design the questionnaires for participants. Is the research trying to understand the clinicians \ current preferences,

experiences, or clinician opinions? Having clear objectives helped structure the questionnaires effectively prior to deployment to the clinician participants.

This research selected an appropriate questionnaire platform to deploy the online questionnaire. A platform that allowed for the creation and distribution of surveys to a large number of participants. Some popular platforms available for the purposes of this study included SurveyMonkey, Qualtrics or Type form. Considering the features, platform accessibility, and pricing options when making the choice of which platform tool to use and this research opted for using SurveyMonkey based on previous experience and cost effectiveness of this platform as prior experience and usage allowed for user efficiencies and faster implementation of the surveys.

The questionnaires were designed to cover the relevant aspects of using online job seeker recruitment platforms and postcard advertising (referred to herein as offline resources). Keeping in mind and considering the following guidance from Galanaki et al., (2002). Galanki states that we must "start questionnaires with an introduction to provide a brief explanation of the purpose/objectives of the of the questionnaire and within that introduction we are to assure survey participants of the confidentiality of their responses and our appreciation for their time allocated to answering our survey questions". The study opted not to offer a financial incentive for the completion of the questionnaires as this would run into the thousands of dollars and was cost prohibitive. Galanaki et al., (2002) recommends using a mix of question types including variety of types of questions, such as multiple-choice (single and multiple answers), use a scale for measuring scope, and use open-ended questions so as not to lead the responses in any particular direction. This type of approach, according to Galanaki (2002) will "allow the study to gather data that is both

quantitative and qualitative in nature". Furthermore, the research by Oppenheim et al., (2002) on the design, interviewing and attitude measurement of survey participants recommends that we keep the questions concise and focused and to ensure that the questionnaire is not too long as this would create a higher non completion rate. Oppenheim et al., (2002) states that we "respect the participants' time and keep the questions concise, clear, and relevant to the research objectives". Consequently, we should avoid biased questions or leading questions that encourage participants to provide responses in a certain manner (Oppenheim et al., 2002). The objective is to ensure our questions are completely neutral, unbiased and nonleading according to Oppenheim et al., (2002). This research and the questionnaire attempted to avoid leading our survey participants towards a specific answer and potentially skewing our results in a particular direction. The finalized questionnaires were distributed to the database of approximately 24,000 clinicians via personalized email invitations and explaining the purpose of the questionnaire. A direct link was provided in the body of the email. Participants were assured their responses would remain confidential and anonymous. The results were collated in a comprehensive report and tabulated for easy review and analysis in the results table.

An additional resource was used to distribute the surveys to allow for more varied distribution and successful garnering of results via a survey tool called Survey Monkey. Survey Monkey is a survey platform tool that allows for distribution and analysis of survey results. A Survey Monkey account was created on www.surverymonkey.com website for the specific purposes of disseminating the questionnaire to the clinicians. Within the Survey Monkey dashboard, the survey editor tool was used to design the research questionnaire and customize the questions and the appearance of the questionnaire as well

as the user experience for each recipient. The platform's email invitation feature was used to email questionnaires to the imported list of recipients (clinician list). The clinician email database was imported as a list into the survey monkey platform and the email invitations were personalized with objectives and additional instructions on completing the questionnaire. The questionnaire was previewed and tested for logic and understanding before it was sent to the imported clinician database. Clinician responses were monitored using the platform. The results were compiled through exporting into a Microsoft Excel spreadsheet and uploaded into Amazon M-Turk for an independent statistical analysis by an Amazon M-Turk contractor.

In summary and as represented, in Figure 1 the flow diagram, the initial 24,056 clinician emails within the database were scrubbed for duplicate contacts and 956 emails (3.9%) were removed as duplicate contact email addresses. The remaining 23100 emails were earmarked for inclusion in the email blast with questionnaire attachment. Additionally, 1000 emails (4.3%) were randomly selected using 23100 as the numerator and 1000 as the denominator and thus every 23rd email in the list was selected for importing into the SurveyMonkey platform (Due to cost limitations the research could import the entire list of 23100 emails). The instance of cost per candidate recruited was analyzed using a retrospective meta-analysis of a cohort of studies examining the cost efficacy and efficiency of online recruitment versus offline recruitment strategies deployed in English speaking countries and English language publications only. The results of the analysis are represented in the results tables. A comparison based on the speed of candidate recruitment per study was also conducted and represented in the tables of results. The publication and/or study selection, inclusion criteria as well as exclusion criteria was based on

articles/studies/publications within English speaking countries (English publications) and clustered in developed geographies. The inclusion criteria for studies had to include those aligned to the research objectives and published in an English-speaking country. The timeline for publication had to be within the past 10 years for relevance and recency.

A second stage of screening and scrubbing the articles was deployed to ensure the articles were relevant and well aligned with this research thesis and was not examining unrelated study outcomes to those applicable herein. Following appropriate selection and two stage screening, the required data was extracted from each of the selected studies. The data extracted was related to the research objectives outlined within this study, specifically data pertaining to the demographics of the participants as well as gender, age, geographic distribution, mechanism by which the participant was recruited (online or offline, virtual, or non-virtual) and the time taken to recruit (speed and efficiency of recruitment). The flow chart represents a visual depiction of the methodology used and each step deployed. The analysis of the results involved pooling the aggregate mean and standard deviations weighted for the size of each study.

3.4 Participant Selection

The database of 24,000 clinicians (Registered Nurses RN, Licensed Practical Nurses LPN) was purchased through various companies that aggregate clinician contact information for the purposes of contact marketing. Specifically on this target list were registered nurses and licensed practical nurses from across all 50 states in the United States of America. Their names, license and certifications, clinical work locations, city, and states. A sample of this list is provided in Appendix A. Using a questionnaire as the initial data collection method allows for a large sample size and can provide a broad overview of the

research topic. The initial 24,056 clinician emails within the database were scrubbed for duplicate contacts and 956 emails (3.9%) were removed as duplicate contact email addresses. The remaining 23100 clinician emails were earmarked for inclusion in the email blast with questionnaire attachment. Additionally, 1000 emails (4.3%) were randomly selected using 23100 as the numerator and 1000 as the denominator and thus every 23rd email in the list was selected for importing into the SurveyMonkey platform (Due to cost limitations the research could import the entire list of 23100 emails). As mentioned earlier, on this target list were registered nurses (RN) and licensed practical nurses (LPN) from across the U.S.A. Their full names, clinical license, certifications, clinical work locations, city, and states. A sample of this final target list can be seen in Appendix A.

3.5 Data Collection Procedures

This research selected an appropriate questionnaire platform to deploy the online questionnaire. A platform that allowed for the creation and distribution of surveys to a large number of participants. Some popular platforms available for the purposes of this study included SurveyMonkey, Qualtrics or Type form. Considering the features, platform accessibility, and pricing options when making the choice of which platform tool to use and this research opted for using SurveyMonkey based on previous experience and cost effectiveness of this platform as prior experience and usage allowed for user efficiencies and faster implementation of the surveys.

The questionnaires were designed to cover the relevant aspects of using online job seeker recruitment platforms and postcard advertising (referred to herein as offline resources). Keeping in mind and considering the following guidance from Galanaki et al., (2002). Galanki states that we must “start questionnaires with an introduction to provide a

brief explanation of the purpose/objectives of the of the questionnaire and within that introduction we are to assure survey participants of the confidentiality of their responses and our appreciation for their time allocated to answering our survey questions". The study opted not to offer a financial incentive for the completion of the questionnaires as this would run into the thousands of dollars and was cost prohibitive. Galanaki et al., (2002) recommends using a mix of question types including variety of types of questions, such as multiple-choice (single and multiple answers), use a scale for measuring scope, and use open-ended questions so as not to lead the responses in any particular direction. This type of approach, according to Galanaki et al., (2002) will "allow the study to gather data that is both quantitative and qualitative in nature". Furthermore, the research by Oppenheim et al., (2002) on the design, interviewing and attitude measurement of survey participants recommends that we keep the questions concise and focused and to ensure that the questionnaire is not too long as this would create a higher non completion rate. Oppenheim et al., (2002) states that we "respect the participants' time and keep the questions concise, clear, and relevant to the research objectives". Consequently, we should avoid biased questions or leading questions that encourage participants to provide responses in a certain manner (Oppenheim et al., 2002). The objective is to ensure our questions are completely neutral, unbiased and nonleading according to Oppenheim et al., (2002). This research and the questionnaire attempted to avoid leading our survey participants towards a specific answer and potentially skewing our results in a particular direction. The finalized questionnaires were distributed to the database of approximately 24,000 clinicians via personalized email invitations and explaining the purpose of the questionnaire. A direct link was provided in the body of the email. Participants were assured their responses would

remain confidential and anonymous. The results were collated in a comprehensive report and tabulated for easy review and analysis in the results table.

An additional resource was used to distribute the surveys to allow for more varied distribution and successful garnering of results via a survey tool called Survey Monkey. Survey Monkey is a survey platform tool that allows for distribution and analysis of survey results. A Survey Monkey account was created on www.surverymonkey.com website for the specific purposes of disseminating the questionnaire to the clinicians. Within the Survey Monkey dashboard, the survey editor tool was used to design the research questionnaire and customize the questions and the appearance of the questionnaire as well as the user experience for each recipient. The platform's email invitation feature was used to email questionnaires to the imported list of recipients (clinician list). The clinician email database was imported as a list into the survey monkey platform and the email invitations were personalized with objectives and additional instructions on completing the questionnaire. The questionnaire was previewed and tested for logic and understanding before it was sent to the imported clinician database. Clinician responses were monitored using the platform. The results were compiled through exporting into a Microsoft Excel spreadsheet and uploaded into Amazon M-Turk for an independent statistical analysis by an Amazon M-Turk contractor.

The questionnaire design and formats are shown below and organized under each research objective outlined earlier in the text.

Objectives of the research

1. Objective 1: To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources. Quantitative questions seen in table 1, Appendix B.

2. Objective 2: To provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms. Qualitative questions seen in Table 2, Table 3, Table 4, Appendix B

3. Objective 3, to investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians. Seen in Table 5, Appendix B

3.6 Data Analysis Procedures

In each set of data collected and in order gain insights into the characteristics of the data, the statistical mean, median and mode was calculated as well as the standard deviation.

1. The statistical mean (average) was calculated as the total sum of all the values, from results data, divided by the number of total values.
2. The statistical median (middle value) is the value middle value when all data is arranged in order of highest to lowest.
3. The statistical mode was calculated as the most frequently appearing number in the results data set.

4. The Standard Deviation (SD) from the mean, was calculated as the dispersion of data or spread of data around the statistical mean to understand how all the values vary from the average value or mean.
5. Two tail t-tests were conducted to calculate any significant differences or variations between the statistical means for our null hypothesis scenarios. In order to either accept the null hypothesis or reject the null hypothesis in favor of the alternative hypothesis.
6. The research examined the relationship between sets of results data using regression analysis and the Pearson Correlation.
7. Pearson Correlation was used to measure the linear relationship between sets of results data to provide understanding of strengths in those relationship of results. To prove or reject the null hypothesis being tested.
8. Regression Analysis was also conducted to understand the significance of statistical relationship between the data sets, as well as to predict the likelihood of future outcomes, given the same research and results. Whether results were random occurrence or repeating patterns used to test our null hypothesis.

Method flow chart

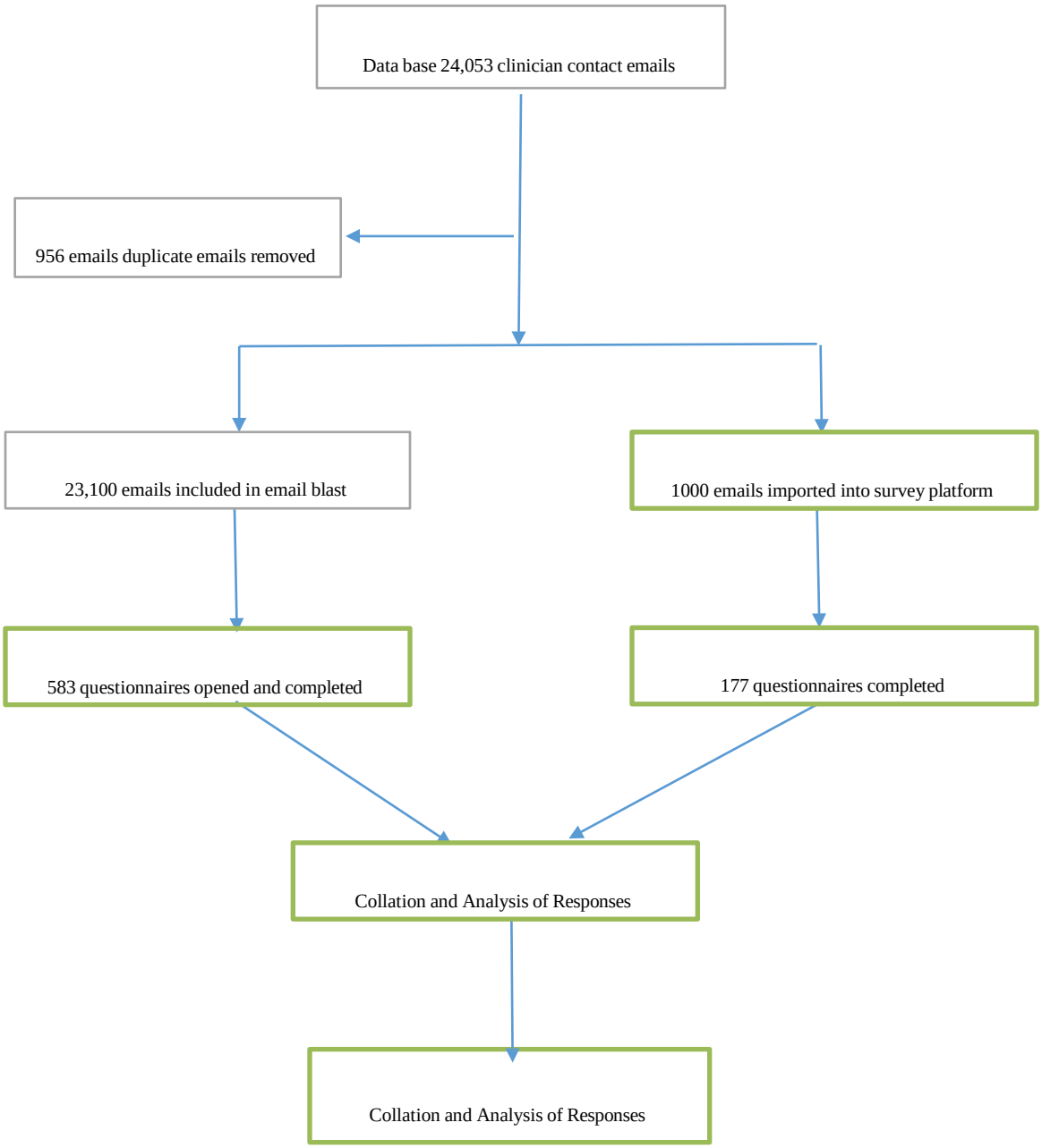


Figure 1: Email List Selection Process, Method Flow Chart.

CHAPTER IV:

RESULTS

4.1 Research Results

Table 6. Participant Generational Demographic Analysis

Participant Generational Demographic Analysis					
Generational demographic	DOB Range	Age Mean (+/- SD)	N value	Gender (M/F/U)	Virtual/Offline
Gen Z	1997 – 2012	25 (+/-3)	308	89/219/0	299/9
Millennial	1981 – 1996	33 (+/-7)	336	104/232/0	307/29
Gen X	1965 – 1980	43 (+/-4)	105	35/70/0	59/46
Baby Boomer	1946 – 1964	58 (+/-2)	11	8/3/0	3/8
Total			760	236/524/0	668/92

The results of the evaluations examining the preference for online resources versus offline approaches in the recruitment clinicians for job opportunities is represented in table 6 the data informs us that:

There is a higher percentage of younger demographic participants opting for using online resources versus offline traditional approaches. Generation Z, 39.34% prefer online and 1.18% prefer offline, Millennials, 40.39% opting for online versus 3.82% offline. Gen X demographic 56.2% prefer online and fairly evenly 43.8% opting for offline. Baby Boomers exhibiting a negligible response of less than 0.01% preferring either. It should also be noted that we would discount the baby boomer generation from this research as this demographic has already aged out of the work force and are not likely to represent the current working population and the results are exhibited on the table as a matter of course but certainly not a meaningful representation of this research study.

This percentage weighs more heavily towards offline approaches as the demographic age increases. Generation Z, 39.34% versus 56.2% of X Generation (for the purposes of this research we have excluded the Baby Boomer generation, 0.004%)

The n value of respondents to the online survey was higher in the younger demographics 336 and reducing to only 11 respondents in the older cohorts of respondents.

Results of questionnaires:

Each respondent was asked to score on a scale of 1 (low) -10 (high) rating scale, on various motivations and attitudes towards online (virtual) resources and offline resources with regards to recruitment and job searches. The statistical mean of all the scores is represented in table 7.

Table 7. Candidate Questionnaire #1

Candidate Questionnaire #1 On a scale of 1 – 10 please answer the following questions: 1= least likely, 10 = most likely	
-how likely are you to use an online internet resource to locate a new job?	9.37
-how useful do you find printed collateral as a source of recruitment?	8.48
-how effective has printed collateral been as a tool for recruiting?	7.73
-how useful do you find online internet resources in locating a new job?	9.18
-how effective have online resources been for your recruitment?	9.36
- on the scale provide your opinion on the effectiveness of online recruitment resources	9.98
- on the scale provide your opinion of the effectiveness of printed recruitment resources	9.92
- how likely are you to use printed resources for your recruitment needs?	8.35
- how likely are you to use printed resources for your recruitment needs?	8.35
- how likely are you to use printed collateral instead of online platforms	1.55
-How likely are you to use online platforms instead of printed collateral	9.15

As represented in table 7, evaluation respondents indicate that they would be highly likely to use online resources with a mean score of 9.37 out of 10 and a maximum score of 9.18 for their opinion on the effectiveness of online resources.

The results indicated that respondents found online resources effective for recruitment with an aggregated mean score of 9.36.

The evaluation respondents indicated that that found printed, offline resources almost equally as useful with a score of 8.48.

However, the same respondents scored the effectiveness of printed collateral for recruitment with a lower mean score of 7.73.

All respondents to the evaluation scored the effectiveness of online recruitment resources 9.36 out of 10.

Likewise, all respondents scored their likelihood of using printed collateral and offline resources as 8.35. Respondents scored their likelihood of using printed offline collateral over online collateral an average low score of 1.55 out of 10.

The next questionnaire examined the medium through which the respondents were likely to access their collateral. Whether they were inclined to buy and newspaper and read through the job vacancy sections; or read the newspaper inserts; or read recruitment postcards delivered in the post office or health system mailboxes. Alternatively, they may access their collateral via desk top computers or mobiles devices which would immediately exclude the offline approaches. For each of the questions asked, the statistical mean scores are represented in table 8.

Tables 8. Collated Results of *Candidate Questionnaire #2*

Collated Results Candidate Questionnaire #2 On a scale of 1 – 10 please answer the following questions: 1= least likely, 10 = most likely	
-how likely are you to respond to a printed mailer when locating a new job?	7.25
-how likely are you to use your mobile device to locate a new job opportunity?	9.41
How likely are you to use a desktop computer or laptop computer to locate a new job opportunity?	9.49
-How likely are you to use newspapers advertising to locate a new job?	1.21
-How likely are you to use mailers to locate a job opportunity?	1.21
-how useful do you find printed mailers when locating a new job?	7.25
- how likely are you to use printed collateral instead of online platforms	1.55
-How likely are you to use online platforms instead of printed collateral	9.15

Respondents scored their likelihood of using online platforms above off-line printed collateral as 9.15 out of 10.

The results of the evaluations showed a mean score of 1.55 out of 10 for participants likelihood of using printed new papers and advertising collateral and offline resources as a replacement or in place off online virtual platforms.

The results of the evaluations showed an average score of 1.21 out of 10 for participants likelihood of using advertising mailers as a replacement or in place off online virtual platforms.

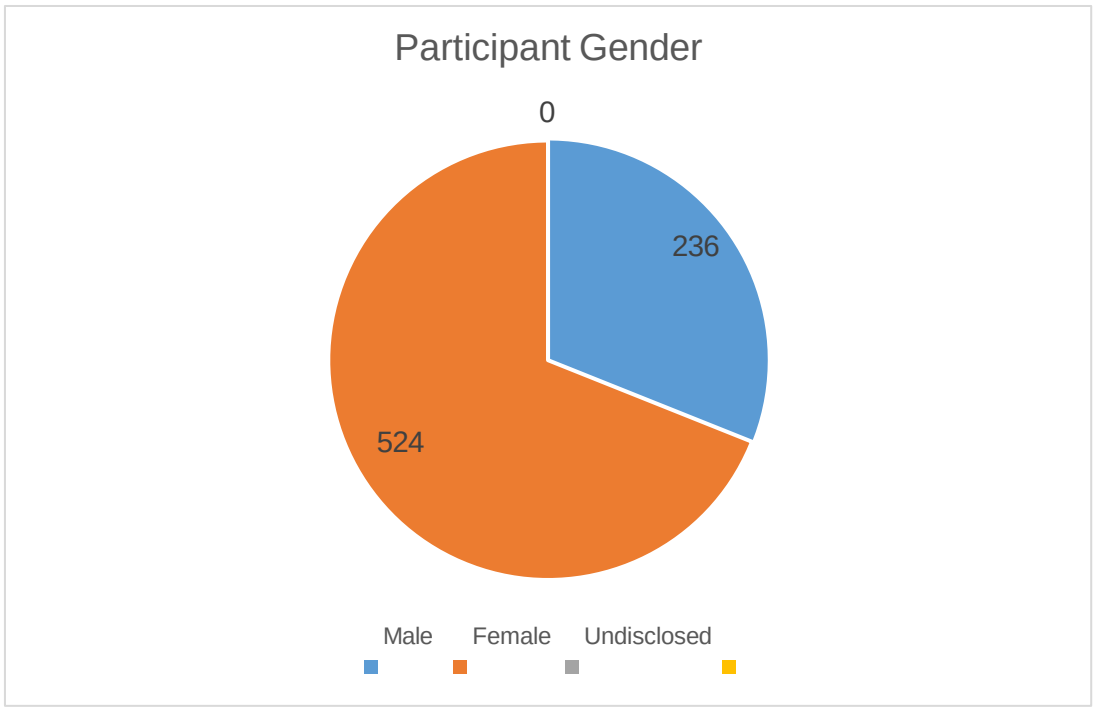
Respondents indicated with a score of 7.25 on the usefulness of printed mailers over online platforms. Respondents indicated that would be unlikely to use printed collateral instead of online platforms as a means of finding jobs with an average score of 1.55.

There was overwhelmingly high scores 9.41 and 9.49 for the likelihood of using a mobile device or a laptop respectively. The data is further aggregated in the table below and the statistical analysis is performed to understand the numerical relationship and significance of the data collected.

Table 9. Statistical Analysis of Results

Questions	MEAN	MEDIAN	MODE	STD	RANGE
candidate: how likely are you to use online resource to locate a job?	9.373526	9	10	0.684037359	3
candidate: how useful is printed collateral to locate a job?	8.486239	8	8	0.699273624	3
Employer: how affective has printed collateral been as a tool for recruiting?	7.730013	8	8	0.726678255	4
Employer: how useful internet resources as recruitment tool?	9.182176	9	9	0.544210267	3
Employer: How effective has online resources been for your recruitment?	9.363041	9	10	0.676215486	3
employers: effectiveness of online recruitment	9.986894	10	10	0.113804054	1

Employer: effectiveness of printed offline resources	9.920052	10	10	0.332261791	3
Employer: how likely will you use printed resources for recruitment?	8.353866	8	8	0.693479278	3
Candidate: How likely are you to use printed resources INSTEAD of online	1.555701	1	1	0.733866455	3
Candidate: how likely are you to use online platforms INSTEAD of print collateral?	9.153342	9	9	0.513670056	3
Candidate: how useful are printed mailers when locating a job?	7.251638	7	7	1.002415359	5
Candidate: How likely will you respond to printed mailers when locating a job?	7.225426	7	7	1.008641622	5
Candidate: How likely are you to use mailers when locating a job?	1.21363	1	1	0.499577569	2
Candidate: How likely are you to use newspaper advertising when locating a job?	1.209699	1	1	0.491993949	2
Candidate: How likely are you to use a mobile device to locate your job	9.411533	9	10	0.63656982	3
candidate: How likely are you to use a desktop or laptop computer to locate a job?	9.499345	10	10	0.557400312	3



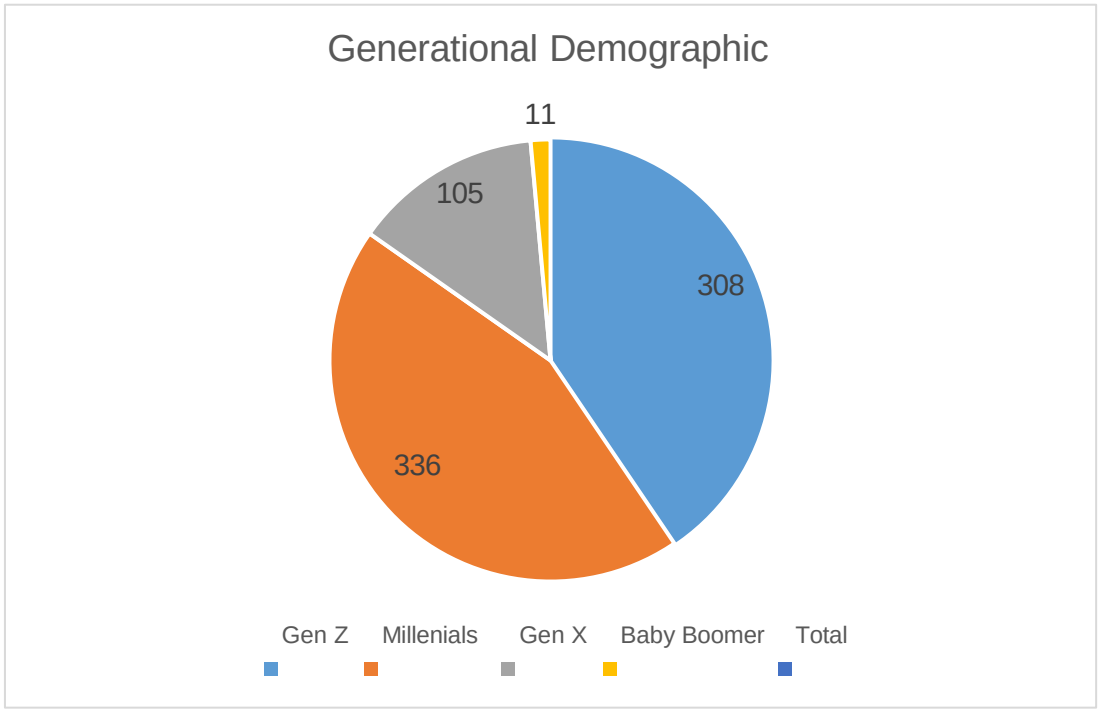


Figure 2. Gender and Generation Composition of Candidates

The respondents weighed more heavily to the female gender versus the male gender as depicted in figure 2., 68.9% female compared to 31.1% male respondents.

The vast majority of the online respondents were a younger demographic, Genz and Millennials, accounting for 40.5% and 44.2% respectively. The two cohorts totaling 84.7% of all respondents. Generation X respondents amounted to 13.8% and Baby Boomer demographic respondents represented less than 1.5% of the total.

Table 10. Frequency Distribution Results Analysis

Frequency Distributions	
candidate: how likely are you to use online resource to locate a job?	Frequency
10	362
9	336
8	53
7	12
Candidate: how useful is printed collateral to locate a job?	
8	402
10	64
9	270
7	27
Employer: how effective has printed collateral been as a tool for recruiting?	
8	332
7	311
9	111

6	6
10	3
Employer: how effective are internet resources as recruitment tool?	
9	521
10	192
8	47
7	3
Employer: effectiveness of printed offline resources for recruitment	
9	347
10	352
8	53
7	11
Employer: How effective has online resources been for your recruitment?	
10	714
9	39
8	8
7	2
Employer: how likely will you use printed resources for recruitment?	
8	430
9	237
10	43
7	53

Candidate: How likely are you to use printed resources INSTEAD of online	
1	432
2	256
3	57
4	18
Candidate: how likely are you to use online platforms INSTEAD of print collateral?	
8	42
9	553
10	165
7	3
Candidate: how useful are printed mailers when locating a job?	
5	38
7	277
6	125
8	255
9	66
10	2
Candidate: How likely will you respond to printed mailers when locating a job?	
6	125
5	43
7	277

8	255
9	61
10	2
Candidate: How likely are you to use mailers when locating a job?	
1	631
2	101
3	31
Candidate: How likely are you to use newspaper advertising when locating a job?	
2	102
1	632
3	29
Candidate: How likely are you to use a mobile device to locate your job	
9	343
10	370
8	44
7	6
candidate: How likely are you to use a desktop or laptop computer to locate a job?	
10	403
9	339
8	20

7	1

From the frequency distribution results in table 10 above the results of the data were as follows:

1. When respondents were asked as to the usefulness of online resources when trying to find a job as a job seeker, 91.5% of the respondents fell in the 90th percentile as to the usefulness of using online resources and the statistical mode was 10.
2. When those same respondents were asked as to the usefulness of printed collateral for job seeker situations 43.4% fell in the 90th percentile and the statistical mode was 8
3. When respondents we asked, as an employer, how effective they found printed collateral for recruiting, 14.9% were in the 90th percentile and the statistical mode was 8.
4. When responding to the effectiveness, as an employer, of the internet as a tool for recruitment, 93.4% of responses fell in the 90th percentile and the statistical mode was 9.
5. When employers were asked as to the effectiveness of printed offline collateral for staff recruitment 91.6% fell in the 90th percentile with a statistical mode of 9
6. When employers were asked the same question regarding the effectiveness of online tools for staff recruitment 98.7% of responses fell in the 90th percentile and the statistical mode was 10
7. The employer's likelihood of using online tools instead of printed offline resources was 94.1% in the 90th percentile and the statistical mode was 9 versus a statistical

mode of 1 for likelihood in using printed offline resources instead of online platforms.

Hypothesis testing scenario 1.

The null hypothesis in this instance is, “There is no significant difference in the likelihood of candidates using online resources to locate a job, when compared to offline printed resources for locating the same position”.

Table 11. Null Hypothesis #1 Testing

Null Hypothesis #1 Testing		
t-Test: Paired Two Sample for Means		
	how likely are you to use online resource to locate a job?	How likely are you to use printed resources INSTEAD of online approaches?
	10	*1*
Mean	9.372703412	1.556430446
Variance	0.46800556	0.538861355
Observations	762	762
Pearson Correlation	-0.057635733	
Hypothesized Mean Difference	0	
Degree of freedom (d.f.)	761	
t Stat	209.0992381	

P(T<=t) one-tail	0	
t Critical one-tail	1.646858406	
P(T<=t) two-tail	0	
t Critical two-tail	1.963086172	

In the research, statistical analysis was deployed when comparing whether candidates would prefer to use online resources instead of printed offline platforms and offline resources, the ‘null hypotheses used in this scenario and analysis is there is no significant difference in the likelihood of candidates using online resources when compared to offline printed resources. This null hypothesis would imply that any observed difference in candidates using online resources versus offline printed resources, is potentially due to chance and does not represent a real difference in the candidates’ preferences between online and offline approaches. The analysis aims to either accept the null hypothesis or reject the null hypothesis in favor of an alternative hypothesis.

As seen in table 11, the statistical mean likelihood for candidates to use online resources was 9.37 compared to the mean of 1.55 for candidates likely to use offline resources. The difference between these two statistical means, 9.37 versus 1.55 (online offline respectively) implies that there is a significant difference and strong likelihood that candidates would use online resources instead of offline resources when searching for potential job opportunities. Therefore, the contrast between these two statistical means would indicate the null hypothesis may be rejected in favor of the alternative hypothesis suggesting a significant difference in the two cohorts being analyzed. Furthermore, T tests were conducted to examine the data for statistical significance. Given the data generated

from testing, (reference Appendix C) t-stat = 208.099 and with the critical t-value for one tailed test (at 95% confidence level) equal to 1.646 and the critical t-value for a two tailed test, (at 95% confidence level) equal to 1.96. It can be seen that the t-stat of 208.099 is much larger than the critical t-values in both one tailed (1.646) and two tailed (1.96) tests. This would indicate that the difference in the statistical means of the two cohorts (online and offline resource utilization) is statistically significant at a 95% confidence level. So, in this case we must reject the 'null hypothesis' in favor of the 'alternative hypothesis' and conclude that there is a significant difference in the likelihood that candidates would use online resources compared to printed offline resources. The large t-stat is strong evidence against the null hypothesis and indicates that the observed difference in the two statistical means is not random or by chance and supports the position that there is a true difference in the two groups. The F statistic of 2.612698 (table 11) suggests that there is statistical evidence of differences between the statistical means of the two groups under analysis. Additionally, in applying the Pearson correlation analysis, which we use to analyze the direction and statistical vigor of the relationship between our two responses, we can see that the Pearson correlation coefficient is -0.057 potentially indicating a somewhat weak linear relationship between the two cohorts under analysis (reference Appendix C)

Hypothesis testing scenario 2.

Null hypothesis under analysis in this instance is “From an employer’s viewpoint there is no difference between using online resources to recruit candidates for a job and using off-line resources for recruitment of candidate to the same job”.

Table 12. Null Hypothesis #2 Testing:

Null Hypothesis #2 Testing		
t-Test: Paired Two Sample for Means		
	Employer: How effective have online resources been for your recruitment?	Employer: how effective has printed collateral been as a tool for recruiting?
Mean	9.363517	7.729659
Variance	0.457695	0.528659
Observations	762	762
Pearson Correlation	-0.01901	
Hypothesized Mean Difference	0	
Degree of freedom	761	
t Stat	44.98804	
P(T<=t) one-tail	7E-217	
t Critical one-tail	1.646858	
P(T<=t) two-tail	1.4E-216	
t Critical two-tail	1.963086	

The null hypothesis being tested in table 12, for scenario 2, above was from an employer's point of view and the two approaches being tested were how effective has online resources been versus the effectiveness of off-line resources for recruiting candidates (from an employer's point of view) to job openings. So, the null hypothesis would be that from an employer's viewpoint there is no difference between using online resources to recruit candidates and using off-line resources for recruitment. In this instance the statistical mean for online resources is 9.36 and the mean for offline resources 7.72 with a t-statistic of 44.98, t-critical value for a one-tailed test of 1.64 and t-critical value for a two-tailed test of 1.96. A high t-statistic value of 44.98 would indicate a large differential between the statistical means of the two samples. With this, there would be evidence to reject the null hypothesis in favor of the alternative hypothesis and implies that one method (online) is significantly more effective as a recruitment tool than the other method (offline). Additionally, table12, the t-statistic is much larger than both the critical values for a one-tailed testing (1.64) and a two-tailed testing (1.96), the results are highly statistically significant. This means that the null hypothesis is rejected at a level of statistical significance (p value < 0.05 or 0.01).

Hypothesis testing Scenario 3.

The null hypothesis in this instance is, “From an employer’s position, the internet is neither useful as a recruitment tool nor are online resources useful for recruiting candidates for job opportunities.”

Table 13. Null Hypothesis #3 Testing:

Null Hypothesis #3 Testing		
t-Test: Paired Two Sample for Means		
	Employer: How useful internet resources as recruitment tool?	Employer: How effective has online resources been for your recruitment?
Mean	9.182175623	9.363040629
Variance	0.296164814	0.457267383
Observations	763	763
Pearson Correlation	0.668776443	
Hypothesized Mean Difference	0	
d.f.	762	
t Stat	-1.244	
P(T<=t) one-tail	1.2139	
t Critical one-tail	1.646855772	
P(T<=t) two-tail	2.4278	

t Critical two-tail	1.963082068	

In table 13, the t-test that was conducted to compare the means of the two samples ask the question as to how useful the internet for recruitment (mean = 9.1821) is and how useful are online resources (mean = 9.3630) for recruitment as an employer. The null hypothesis being that neither approach is useful for employer recruitment. The results exhibited in the table above. The Pearson correlation coefficient was seen to be 0.66 and the t statistic value was -1.244 with the one tail test p value 0.12139 and two test p value at 0.24278. The p value being the probability of error. The results suggest that there is no statistically significant difference in the two samples means and therefore we would reject the null hypothesis in favor of the alternative hypothesis. The data result does not show that statistically there a significant difference in the usefulness perceived between internet recruiting and online recruiting and thus it supports the alternative hypothesis that the respondent (employers) report that there is a perceived usefulness with online recruiting as well as using the internet for recruiting candidates to job opportunities. As seen in the results table the Pearson correlation coefficient value was 0.66. which may indicate that statistically there is a linear relationship between the two sample variables (a positive statistical relationship). The value of 0.66 reflects a strong positive correlation and linear relationship between the two groups of responses.

Results of retrospective meta-analysis of studies (table 14) that reviewed effectiveness and efficiency of online versus offline recruitment of patients into clinical trials, used as a proxy for online clinician recruitment.

Table 14. Publications Meta-Analysis

PUBLICATIONS META-ANALYSIS					
Publication or study	Study Title	Participant N value	Cost Per Participant $$	Online Conversion Rate %	Traditional conversion rate %
Moseson, H., Kumar, S., Juusola, J. L. (2020)	Comparison of study samples recruited with virtual versus traditional recruitment methods. Contemporary Clinical Trials Communications, 19, 100590.	157	14.56	14.2	5.1
Blumenberg, C., Menezes, A. M. B. et, al. (2019).	How different online recruitment methods impact on recruitment rates for the web-based coordinate project:	209	11.70	12.7	3.3

Christensen, T., Riis, A. H., Hatch, E. E., Wise, L. A., Nielsen, M. G., Rothman, K. J., ... Mikkelsen, E. M. (2017).	Costs and efficiency of online and offline recruitment methods: a web-based cohort study. Journal of Medical Internet Research, 19(3), e6716	75	9.54	10.5	2.8
Lane, T.S., Armin, J., and Gordon, J.S., 2015.	Online recruitment methods for web-based and mobile health studies: a review of the literature. *Journal of medical Internet research*, *17*(7), p. e4359.	173	8.51	16.3	2.0
Rahman, M., Morita, S., Fukui, T.	Physicians' choice in using Internet and fax for patient recruitment	95	8.30	11.7	1.2

and Sakamoto, J., 2004.	and follow-up in a randomized controlled trial. *Methods of Information in Medicine*, *43*(03), pp.268-272.				
So, R., Shinohara, K., Aoki, T., Tsujimoto, Y., Suganuma, A.M. and Furukawa, T.A., 2018.	Effect of recruitment methods on response rate in a web-based study for primary care physicians: factorial randomized controlled trial. *Journal of medical Internet research*, *20*(2), p. e8561.	64	7.73	6.5	0.5
Sylva, H., & Mol, S., 2009.	E-recruitment: A study into applicant perceptions of an online application system. *International Journal of Selection*	83	5.56	10.4	1.8

	and Assessment, 17 (3), pp. 311 – 323.				
Tong, D., 2009.	A study of e-recruitment technology adoption in Malaysia. *Industrial Management & Data Systems*, 109 (2), pp. 281-300.	42	5.21	8.0	0.7

The results of the literature reviews and meta-analysis of 8 studies looking at the previous research examining the success of online resources versus offline approaches in the recruitment of patients to clinical research (we used this as a proxy for examining population proclivity for virtual online platforms versus traditional offline non virtual approaches). The results are aggregated and represented in table 14. As we can see there is a higher overall percentage of candidates converted when using online platforms when compared to offline non virtual approaches. We can also see from the data that there is a positive correlation between using online resources and higher conversions rates, whereby the higher the percentage of participant preferring online resources the higher the ultimate conversion rate from candidate to participant.

There is a lower cost per candidate conversion when there is a higher ratio of online platforms used against offline non virtual approaches. The higher the percentage ratio the lower the conversion costs.

Conversely, the lower the ration percentage between online platforms and offline platforms the higher to cost to convert/recruit the candidates into each research trial. Recall we are using recruitment into each research trial as a proxy for recruiting clinicians for job opportunities as this data point currently does not exist in past research trails.

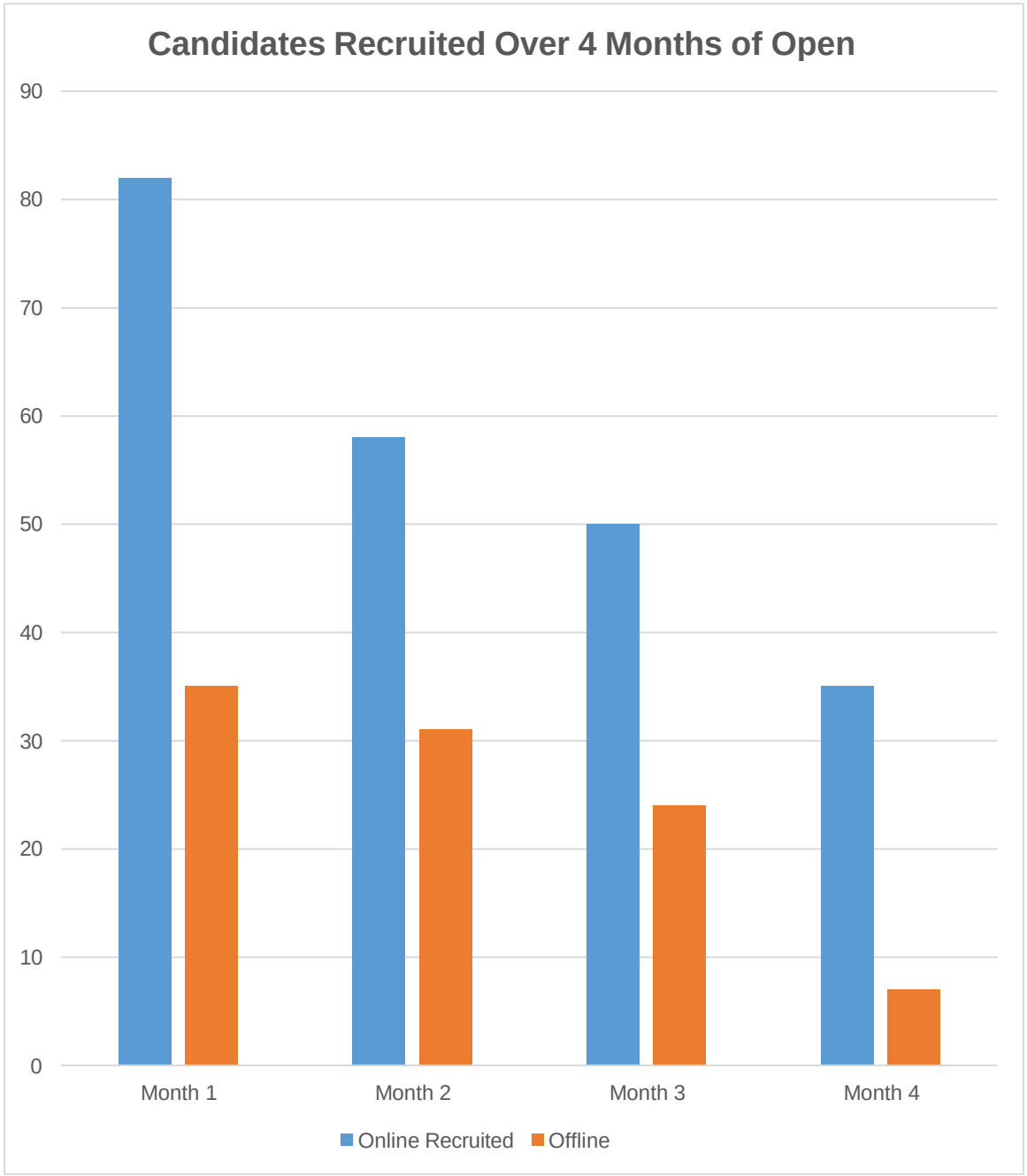


Figure 3. Candidates Recruited Over 4 Months of Open Position

The data in figure 3. informs us that more participants were recruited earlier in the first month using online virtual platforms 82 respondents versus 35 enlisted using offline approached, this representing a 134% difference in preference for online platforms over using offline approaches. This pattern remains the same for month 2, where 58 respondents were recruited compared to 31, representing an 87% difference between the two cohorts in favor of online platforms. Furthermore, this data pattern continues in month 3 (50 vs 24, 108% difference for online platforms) and month 4 showing the largest difference between online and offline approaches with an almost 7 times differential (35 vs 4 in favor of recruitment via online platforms). Both cohorts in all four months of analysis decreased in volume of respondents recruited but the online platforms reduced the least over the four months with a 42.6% reduction of respondents enrolling compared to the offline approach which enrolled 35 respondents in the first month and only 7 respondents in the fourth month, an 80% reduction over the time period.

CHAPTER V:
DISCUSSION

5.1 Discussion of Results

From the literature reviews and searches, it was clear that current and past studies only tested the use of online platforms in recruiting patients to clinical trials and did not however examine the same approach for web based, online recruiting of clinicians into health systems for the purposes of fulfilling job openings. Other studies examined general ability to recruit and retain physicians and mechanisms of recruitment (Verma et al., 2016)

Hundreds of Millions of dollars are spent annually on the recruitment and retention of clinicians to health care systems across the United States and across the globe (MacQueen et al., 2018). Knowing how best to spend and where best to spend valuable recruitment dollars can either make or break a health system (Asghari et al., 2019).

The proposed study aimed to ascertain whether traditional methods for identifying and targeting potential clinician candidates for recruitment focused on the baby boomer and generation X demographics and more traditional 'snail' mail approaches (non-virtual or offline), post cards mailings, journal hard press copies and/or newspaper advertising of the past 5 decades may now be redundant as a means of recruiting clinicians to work for health care systems in the United States of America in this new decade and beyond or whether health systems would still benefits from using a variety of online as well as off line approaches for clinician recruitment.

Consequently, the limited recruitment budgets of healthcare systems are best served with using e- recruitment approaches and online platforms as suggested by (Galanaki et al., 2002). The results of the evaluations examining the preference for online resources versus offline approaches in the recruitment clinicians for job opportunities is represented in the results table informs us that there is a higher percentage of younger demographic participants opting for using online resources versus offline traditional approaches. Generation Z, 39.34% prefer online and 1.18% prefer offline, Millennials, 40.39% opting for online versus 3.82% offline. Generation X demographic 7.76% prefer online and fairly evenly 6.12% opting for offline. Baby Boomers exhibiting a negligible response of less than 0.01% preferring but the cohort of this demographic was admittedly insignificant in the respondent pool. The percentage weighs more heavily towards preference for offline approaches as the demographic age increases. Generation Z, 39.34% versus Baby Boomers, 0.004%

The n value of respondents to the online survey was higher in the younger demographics 308 and 336 and reducing to only 11 respondents in the older cohorts of respondents. This was however and likely a function of numbers of the different demographics in the initial list of nurses who were mailed. Most all the nurses on the list were in working age groups and the number of older demographics in the list was marginal. The respondents weighed more heavily to the female gender versus the male gender as depicted in pie chart, 68.9% female compared to 31.1% male respondents.

The vast majority of the online respondents were a younger demographic, Generation Z and Millennials, accounting for 40.5% and 44.2% respectively. The two cohorts totaling

84.7% of all respondents. The Generation X respondents amounted to 13.8% and Baby Boomer demographic respondents represented less than 1.5% of the total.

The results of the literature reviews and meta-analysis of 8 studies looking at the previous research examining the success of online resources versus offline approaches in the recruitment of patients to clinical research (we used this as a proxy for examining population proclivity for virtual online platforms versus traditional offline non virtual approaches). The results are aggregated and represented in results table 14. As can be seen in this results table 14 there is a higher overall percentage of candidates converted when using online platforms when compared to offline non virtual approaches. This may be attributable to the speed of data disseminated and overall geographic reach of the online recruitment campaign according to Moseson et al., (2020). The ability to reach candidates swiftly, efficiently and without geographical boundaries allows for information to reach many more job seekers and in a shorter period of time thus translating to more applications Moseson et al., (2020).

We can also see from the data that there is a positive correlation between using online resources and higher conversions rates, whereby the higher the percentage of participant preferring online resources the higher the ultimate conversion rate from candidate to participant. This is potentially a function of ‘user self-service’ as candidates can research the job opportunities themselves and locate additional data to help them make informed decisions such as FAQs, company reviews, corporate identity etc. which may not be readily available to them on a postcard or printed mailer Moseson (2020). Furthermore, having direct access to the internet allows for immediate engagement of the candidates and

the ability for recruiting teams to make an impression on candidates to encourage candidate applications (Kotler and Keller, 2016). The online approach coupled with access to the internet to uncover more information is a very compelling approach compared to a mailer or printed collateral.

There is a lower cost per candidate conversion when there is a higher ratio of online platforms used against offline non virtual approaches. The higher the percentage ratio the lower the conversion costs. This may also be explained by the higher number of applicants, per online advert, which brings down the overall cost per applicant. The cost to recruit being the numerator and the number of applicants being the denominator. Conversely, the lower the ratio percentage between online platforms and offline platforms the higher the cost to convert/recruit the candidates into each research trial. Recall we are using recruitment into each research trial as a proxy for recruiting clinicians for job opportunities as this data point currently does not exist in past research trails.

The data from figure 3 informs us that more participants were recruited earlier in the first month using online virtual platforms 82 respondents versus 35 enlisted using offline approaches, this representing a 134% difference in preference for online platforms over using offline approaches. This pattern remains the same for month 2, where 58 respondents were recruited compared to 31, representing an 87% difference between the two cohorts in favor of online platforms. Furthermore, this data pattern continues in month 3 (50 vs 24, 108% difference for online platforms) and month 4 showing the largest difference between online and offline approaches with an almost 7 times differential (35 vs 4 in favor of recruitment via online platforms). So far, the results show a very compelling

argument in favor of using virtual online platforms versus offline non virtual approaches in terms of speed of recruitment and cost efficacy. Both cohorts in all four months of analysis decreased in volume of respondents recruited but the online platforms reduced the least over the four months with a 42.6% reduction of respondents enrolling compared to the offline approach which enrolled 35 respondents in the first month and only 7 respondents in the fourth month, an 80% reduction over the time period.

Evaluation respondents indicate that they would be highly likely to use online resources with an average score of 9.37 out of 10 and a maximum score of 9.18 for their opinion on the effectiveness of online resources.

The results indicated that respondents found online resources effective for recruitment with an aggregated score of 9.36. These evaluation respondents indicated that that found printed, offline resources almost equally as useful with a score of 8.48 out of 10. However, the same responses scored the effectiveness of printed collateral for recruitment with a lower score of 7.73 out of 10. All respondents to the evaluation scored the effectiveness of online recruitment resources 9.36 out of 10.

Likewise, all respondents scored their likelihood of using printed collateral and offline resources as 8.35 from 10 possibly indicating the need to use both type of approaches as it is not entirely clear whether the options are binary and that candidates would use one approach instead of another but likely would use one approach as well as another. Respondents scored their likelihood of using printed offline collateral over online collateral an average low score of 1.55 out of 10 as a standalone option which is underscored by respondents scoring their likelihood of using online platforms above offline

printed collateral as 9.15 out of 10. So, they would not use offline in place of online (possibly a function of age demographic) but would still likely use offline in conjunction to online approaches. The results of the evaluations showed an average score of 1.55 out of 10 for participants likelihood of using printed new papers and advertising collateral and offline resources as a replacement or in place off online virtual platforms. There is clearly a differential between offline approaches in that the question is not as simple as whether the candidate would choose from offline and online approaches, but we should pose the question "which offline approaches would you use?". A better delineation between offline resources should be included in any future expansion of this research and/or publications. Additionally, the results of the evaluations showed an average score of 1.21 out of 10 for participants likelihood of using advertising mailers as a replacement or in place off online virtual platforms. We should have delineated between different offline resources as many candidates showed willingness to refer to post card mailers but were not equally as enthusiastic in their scoring of newspaper advertising.

Respondents indicated with a score of 7.25 on the usefulness of printed mailers over online platforms so there is not a clear- and clean-cut choice between the two resources and respondents appear somewhat endeared by both approaches.

They also indicated that they would be unlikely to use printed collateral instead of online platforms as a means of finding jobs with an average score of 1.55 but we should better understand specifically which printed resources as there as many types to choose from and some may not be as favorable as others. This question was potentially too generic in nature and did not help us due to lack of specificity.

The respondents weighed more heavily to the female gender versus the male gender as depicted in the gender chart, 68.9% female compared to 31.1% male respondents. This is likely a reflection of the nursing industry as a whole, being that the majority of nurses are female in gender according to a survey by Pittman et al., (2007).

The vast majority of the online respondents were a younger demographic, Genz and Millennials, accounting for 40.5% and 44.2% respectively. The two cohorts totaling 84.7% of all respondents. Generation X respondents amounted to 13.8% and Baby Boomer demographic respondents represented less than 1.5% of the total. The initial list of clinicians potentially skewed the results in favor of the younger generation as the list mostly included the younger current work force and was not a representation or cross section of the work force. From the frequency distribution results in the results table 10 the results of the data were as follows, when respondents were asked as to the usefulness of online resources when trying to find a job as a job seeker, 91.5% of the respondents fell in the 90th percentile as to the usefulness of using online resources and the statistical mode was 10. When those same respondents were asked as to the usefulness of printed collateral for job seeker situations 43.4% fell in the 90th percentile and the statistical mode was 8. This echoes our previous observations that there is still potentially a compelling argument for using offline and to better understand the nature of this response we need to ascertain specifically which offline approach as they are not all utilized similarly. Better differentiation between offline approaches is needed in this regard. When respondents we asked, as an employer, how effective they found printed collateral for recruiting, 14.9% were in the 90th percentile and the statistical mode that was observed was equal to 8. So,

from an employer's point of view there may also be a role for using printed collateral in addition to online platforms.

When responding to the effectiveness, as an employer, of the internet as a tool for recruitment, 93.4% of responses fell in the 90th percentile and the statistical mode was 9.

When employers were asked as to the effectiveness of printed offline collateral for staff recruitment 91.6% fell in the 90th percentile with a statistical mode of 9

When employers were asked the same question regarding the effectiveness of online tools for staff recruitment 98.7% of responses fell in the 90th percentile and the statistical mode was 10.

The employers likelihood of using online tools instead of printed off line resources was 94.1% in the 90th percentile and the statistical mode was 9 versus a statistical mode of 1 for likelihood in using printed offline resources instead of online platforms and again we observe that there is still potentially a compelling argument for using offline approaches and to better understand the nature of this response we need to ascertain specifically which offline approach as they are not all utilized similarly. Better differentiation between offline approaches is needed in this regard. The data informs us that employers are not likely to use offline resources instead of online resources, more likely to use online resources instead of offline resource if they must choose between the two but are compelled with use both approaches if given the option for both types of approaches. Future research should however delineate the specific demographics of the employer respondents to better understand how age and age drives employers' decision making and how they drive adoption of various approaches.

There is a higher percentage of younger demographic participants opting for using online resources versus offline traditional approaches which is not surprising and has been outlined in previous research such as Pittman et al., (2007). The results may be skewed in favor of the online resource as the questionnaires and methodology was conducted entirely over the internet using electronic surveys and online platforms. This resulted in the exclusion of all potential participants who would otherwise be inclined to use hard copy mailings. Generation Z, 39.34% prefer online and 1.18% prefer offline largely driven by their acquaintance with online platforms and was not entirely unexpected (Pitman et al., 2007). Millennials, 40.39% opting for online versus 3.82% offline was once again not an unexpected outcome according to other researchers such as Pittman. The Generation X demographic, 7.76% prefer online and fairly evenly 6.12% opting for offline, and so this generation was approximately evenly split amongst using online and offline resources. This may be explained by the fact that the front end of this generational window was still heavily reliant upon hard copy mailings and the internet was in its infancy and only beginning to develop in the early days of the Generation X years. The latter half of the Generation X years saw the rise and surge of the internet as a mainstream tool for productivity and thus it's not surprising that the latter half of the Generation X respondents voted more favorably for the use of online resources for recruitment of staff as well and when searching for job opportunities. Further study would be suggested on how the even split correspondent to the actual age of the respondents to better understand the delineation of early Generation X and late Generation X populations and how each of those cohorts viewed online resources

and also perhaps which online resources specifically as we saw a preference for certain offline resources such as mailers versus newspapers.

The Baby Boomer cohort of respondents exhibited a negligible response of less than 0.01% preferring either. There were not many baby boomer generation in this research study and although this age group was included in the research study, their involvement was somewhat moot due to the fact that this age category was already in the retirement years and no longer in the work force and therefore their preference for how they wish to locate jobs was entirely redundant as they would be unlikely to be searching for job opportunities whether online or offline. Their results were nonetheless included as a matter of course and for balance.

The results showed that the preference for offline platforms and those percentages weighs more heavily towards offline approaches as the demographic age increases. Generation Z, 39.34% versus Baby Boomers, 0.004%. The n value of respondents to the online survey was higher in the younger demographics 308 and 336 reducing to only 11 respondents in the older cohorts of respondents. This again being a function of the method by which the research opted to send the questionnaires, using online platforms to disseminate the surveys will potentially skew the results towards online responses and online preferences.

The results also showed that respondents weighed more heavily to the female gender versus the male gender as depicted in chart A, 68.9% female compared to 31.1% male respondents. This is perhaps a function of the nursing population as according to Pitman et al (2007) the nursing profession gender split is made up of 65% females. Therefore, this

can explain the same percentage representation shown in our results in this research study. The vast majority of the online respondents were a younger demographic, Generation Z and Millennials, accounting for 40.5% and 44.2% respectively. The two cohorts totaling 84.7% of all respondents. A reason for this could be explained by a) both the age demographics are currently in working age and b) both these population cohorts were more likely to response to the surveys as they more commonly use online resources and the platform for the surveys was online and electronic and we did not use the traditional mailing system to post the evaluations so the results would naturally be skewed towards a group of respondents more inclined to use electronic platforms. Once again there is potential that the results are skewed in favor of online resources for this very reason. In future expanded research we would also mail hard copies of the evaluations and questionnaires to observe whether the response rates to the questionnaires would be affected positively or negatively.

Generation X respondents amounted to 13.8% and Baby Boomer demographic respondents represented less than 1.5% of the total. Both these populations are currently aging out of the work force, so it stands to reason that there was less of a footprint for both of these populations in the survey respondents as it's a reflection of the lower numbers of Generation X and especially baby boomers in the current working population and therefore highly unlikely to be actively searching for job openings.

From the results and the analysis of the responses, the research aimed to examine the effectiveness and value of online and offline resources as a mechanism for recruiting staff in current and future years. For fiscal viability where should health systems be spending

their recruitment budgets for optimal return of investments? It appears from the results that traditional postcard mailings and journal hard press print advertising as recruitment mechanisms still have their utility and may not be redundant even when its audience no longer relies on hard copy press or physically mailed collateral as a source of recruitment information (offline non virtual resources). The proposed study aimed to use a combination of primary data collection via survey questionnaires and secondary data from past literature reviews and analyze such data using quantitative and qualitative analysis to understand and examine the effectiveness of on-line recruitment platforms and examine the potential redundancy of print press collateral which may be a relic of the past decades as a means of recruitment. Traditional recruitment practices, such as mailings and phone calls, are however becoming less effective in the age of online search engines and quick click technology platforms. Many candidates also opt to not use hard copy advertising, post cards and mailers as a means of being environmentally friendly or socially responsible according to research by O'Loughlin et al., (2002) and according to this publication most have opted out of receiving any form of printed collateral in order to be environmentally friendly (McKracken et al., 2009). Additionally, as reported by McKracken et al., (2009), many global organizations must also endeavor to be socially and environmentally responsible in their efforts to reduce their carbon footprint or carbon emissions and hence reduce unnecessary wastage through printed collateral that may often end up in the waste basket. McKracken et al., (2009) state that corporate social responsibility is a huge driver to utilization of online resource over offline printed and seemingly wasteful collateral, at least

in terms of social and organizational perception. Right or wrong, one's perception is one's reality.

With the widespread availability of the internet and increasing use of online job search portals, job seekers are able to easily search for and apply to jobs from anywhere (Kim et al., 2021). This fact means that the online resources provide greater organizational reach in advertising (without the hinderance of geographically mailing boundaries) and affords a quicker dissemination of information to a wider audience unhindered by geography making the online approach vastly more efficient and cost effective for health care systems and organizations, a position supported by Morales et al., (2021).

Additionally, with the use of quick click technology platforms, the process of applying for a job has become more streamlined and efficient, reducing the need for traditional recruitment practices. Furthermore, according to Pittman et al., (2012) many of the workforce population are now more socially aware and environmentally conscious thus leading to them opting out of receiving mailers and deciding to 'go green' by going paperless. In balance, let us consider the merits of hard copy mailers and offline platforms as a means of recruitment and why some job seekers are opting to use offline platforms. Albeit hard copy prints and mailers can still be an effective recruitment tool, even in the age of online technology and social media. While many job seekers use online resources to find employment opportunities, some may not have access to the Internet or may prefer to receive information in a physical format. Furthermore, direct mail can be targeted towards specific demographics and can be used to reach candidates who may not be actively searching for a new job but may be open to new opportunities (Yacyshyn et al.,

2012). However, it is important to consider the cost of environmental impact of using hard copy materials and to balance that with the potential benefits. (Wilkie et al., 2002). There will always be a current clip of the population who prefer the more tangible hard copy mailers, some wish to have mailers in addition to online information and some use a combination of both online and offline resources.

Organizations and health systems must weigh up the risk versus rewards and make certain sacrifices in favor of fiscal viability. Some candidates may prefer to use both platforms but considering limited budgets and increased costs, corporations may be left with no choice by choosing one approach over another, forced to choose online versus offline. The questionnaires showed a visual preference of candidates opting for online resources over offline resources, when asked to opt for one over another, the research also shows that using online resources results in a speedier rate of candidates' recruitment. However, we statistically tested the hypothesis of candidates opting for one approach over another as seen in the results analysis and conducted hypothesis testing to find out if the results may be random or by chance.

Testing the hypothesis. Scenario #1.

Statistical analysis was deployed when comparing whether candidates would prefer to use online resources instead of printed offline platforms and offline resources, the 'null hypotheses used in this scenario and analysis is there is no significant difference in the likelihood of candidates using online resources when compared to offline printed resources. This null hypothesis would imply that any observed difference in candidates using online resources versus offline printed resources, is potentially due to chance and

does not represent a real difference in the candidates' preferences between online and offline approaches. The analysis aims to either accept the null hypothesis or reject the null hypothesis in favor of an alternative hypothesis.

As seen in the tabulated results table 11, the statistical mean likelihood for candidates to use online resources was 9.37 compared to the mean of 1.55 for candidates likely to use offline resources. The difference between these two statistical means, 9.37 versus 1.55 (online offline respectively) implies that there is a significant difference and strong likelihood that candidates would use online resources instead of offline resources when searching for potential job opportunities. Therefore, the contrast between these two statistical means would indicate the null hypothesis may be rejected in favor of the alternative hypothesis suggesting a significant difference in the two cohorts being analyzed. Furthermore, T-tests were conducted to examine the data for statistical significance. Given the data generated from testing, t-stat = 208.099 and with the critical t-value for one tailed test (at 95% confidence level) equal to 1.646 and the critical t-value for a two tailed test, (at 95% confidence level) equal to 1.96. It can be seen that the t-stat of 208.099 is much larger than the critical t-values in both one tailed (1.646) and two tailed (1.96) tests. This would indicate that the difference in the statistical means of the two cohorts (online and offline resource utilization) is statistically significant at a 95% confidence level. So, in this case we must reject the 'null hypothesis' in favor of the 'alternative hypothesis' and conclude that there is a significant difference in the likelihood that candidates would use online resources compared to printed offline resources. The large t-stat is strong evidence against the null hypothesis and indicates that the observed

difference in the two statistical means is not random or by chance and supports the position that there is a true difference in the two groups. The F statistic of 2.612698 suggests that there is statistical evidence of differences between the statistical means of the two groups under analysis. Additionally, in applying the Pearson correlation analysis, which we use to analyze the direction and statistical vigor of the relationship between our two responses, we can see that the Pearson correlation coefficient is -0.057 potentially indicating a somewhat weak linear relationship between the two cohorts under analysis.

Hypothesis testing scenario #2.

The hypothesis being tested in the table 13 of results, for scenario 2, above was from an employer's point of view and the two approaches being tested were how effective has online resources been versus the effectiveness of off-line resources for recruiting candidates (from an employer's point of view) to job openings. So, the null hypothesis would be that from an employer's viewpoint there is no difference between using online resources to recruit candidates and using off-line resources for recruitment. In this instance the statistical mean for online resources is 9.36 and the mean for offline resources 7.72 with a t-statistic of 44.98, t-critical value for a one-tailed test of 1.64 and t-critical value for a two-tailed test of 1.96. A high t-statistic value of 44.98 would indicate a large differential between the statistical means of the two samples. With this, there would be evidence to reject the null hypothesis in favor of the alternative hypothesis and implies that one method (online) is significantly more effective as a recruitment tool than the other method (offline). Additionally, the t-statistic is much larger than both the critical values for a one-tailed testing (1.64) and a two-tailed testing (1.96), the results are highly statistically

significant. This means that the null hypothesis, “from an employer’s viewpoint there is no difference between using online resources to recruit candidates and using off-line resources for recruitment” is rejected at a level of statistical significance (p value < 0.05 or 0.01) in favor of the alternative hypothesis which is that there is evidently a significant difference between recruitment using online resources versus using offline printed resources. However, in this instance we would further delineate the demographic of the group we called the ‘the employer’. Further understanding as to the makeup of the group responding as the ‘employer’ which is a mixed group of gender and demographics, and it would be inaccurate to state that all employers felt the same way without understanding how this employer group was comprised in terms of gender and age etc.

Hypothesis testing scenario 3.

The t-test was conducted to compare the means of the two samples asking the question as to how useful the internet for recruitment (mean = 9.1821) is and how useful online resources (mean = 9.3630) are for recruitment as an employer. The null hypothesis being that neither approach is useful for employer recruitment. The results exhibited in the table above. The Pearson correlation coefficient was seen to be 0.66 and the t statistic value was -1.244 with the one tail test p value 0.12139 and two test p value at 0.24278. The p value being the probability of error. The results suggest that there is no statistically significant difference in the two samples means and therefore we would reject the null hypothesis in favor of the alternative hypothesis. The data result does not show that statistically there a significant difference in the usefulness perceived between internet recruiting and online recruiting and thus it supports the alternative hypothesis that the

respondent (employers) report that there is a perceived usefulness with online recruiting as well as using the internet for recruiting candidates to job opportunities. As seen in the results table the Pearson correlation coefficient value was 0.66. which may indicate that statistically there is a linear relationship between the two sample variables (a positive statistical relationship). The value of 0.66 reflects a strong positive correlation and linear relationship between the two groups of responses.

The three research objectives of this study were:

1. To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.
2. To provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms.
3. To investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

Each of the research objectives are addressed as follows:

Research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.

Research suggests that health systems may be better served using online recruitment platforms to get optimal return on their invested budget and time resources. One of the main advantages of using online recruitment platforms is that they allow health systems to reach a larger pool of potential candidates quickly and efficiently. (Galanaki et al., 2002)

These platforms also provide access to a diverse range of job seekers, including those who may not be actively searching for a new job but would be open to new opportunities. Online recruitment platforms also tend to be more cost-effective than traditional recruitment methods, such as print advertising and recruitment agencies. (Lane et al., 2015) Health systems can save money on recruitment costs by posting job ads on online platforms, rather than paying for print ads or agency fees. From personal and professional experience, I have found that Online recruitment platforms also tend to have built-in applicant tracking systems (ATS) that can help health systems manage and track the entire recruitment process, from initial job posting to final candidate selection. This can help reduce the time and resources required to manage the recruitment process. Additionally, online recruitment platforms allow health systems to reach a more diverse and inclusive pool of candidates, as they tend to reach a larger and more diverse group of people. (Laws et al., 2016) This can increase the chances of finding the right candidate for the job. The effectiveness of online recruitment platforms however may vary depending on the specific industry and the type of positions being filled. A modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

The use of mobile devices and online platforms has certainly made it easier for health care systems to reach a large number of potential candidates quickly and efficiently. Many health care professionals use social media and online job boards to search for employment opportunities (Indeed.com, 2024) and many health care systems have their own websites and online recruitment portals. However, it is important to note that not all

health care professionals use technology in the same way, and some may not be as active on social media or online job boards. Therefore, hard copy recruitment mailings can still be an effective way to reach a wider range of potential candidates, especially those who may not be actively searching for a new job. Additionally, some health care professionals may prefer to receive recruitment information in a physical format and may find hard copy mailings more credible than online adverts. (Bassler et al., 2019) It is also important to understand the environmental impact of using hard copy materials and balance that with the potential benefits.

This type of analysis is important as it provides insight into the better allocation of recruitment efforts and cost/expenses/budget dollars and how best to utilize those dollars in an effort to recruit clinicians to open jobs (Baker et al., 2003). Why spend our limited budgets on redundant and obsolete approaches to future recruitment of physicians and nurses to health systems? The research aims to better understand, through literature reviews and analysis of demographic behaviors, the benefits of more traditional approaches and whether they are still appealing to the new generation of clinicians (younger demographic of tech users) and understand if older traditional methods of recruitment may be usurped by online resources as their intended clinician targets begin to age into retirement. This research and study were limited to the United States job market only and did not look to apply multicultural outlook and experiences outside of the USA. This is a shortcoming and future research would broaden the scope of reach and be more inclusive of other job markets outside of North America. This research respects and acknowledges that online mechanisms may not be the approach of choice in regions where the population reside

below the poverty line and where online access and resources are not commonplace with no internet service providers and/or no hardware to access such platforms. The research is only pertinent to the clinician workforce with north America.

Law et al., (2016) suggest that there are some main drivers that influence clinician decision making pertaining to using online recruitment platforms. According to Laws et al., (2016) these drivers include "The convenience factor, as health care professionals who are busy and most have limited time for searching new job opportunities may rely on online recruitment to make it easy for them to search/find/apply for job openings from any location and at any time of day" (Laws et al., 2016), thus making the adoption rate of technology and the hit rate of the job advert more appealing and successful respectively. Lane et al., (2015) underscores that the reach of the internet is also appealing to the target audience, suggesting that "online recruitment platforms give health care professionals access to a wide range of job opportunities that may not be available in their local area. This can be particularly important for health care professionals who are willing to relocate for the right job opportunity". (Lane et al., 2015). Furthermore and according to a study by Laws et al., (2016) the variety of online recruitment platforms "offer a diverse range of job opportunities, from part-time and locum work to permanent positions, making it easy for health care professionals to find a role that fits their specific needs" (Laws et al., 2016) Laws identifies that the speed with which the internet source may be accessed as an additional advantage and state that *"*online platforms allow for faster application processes, and candidates can often receive a response within a short time frame". (Laws et al., 2016). Additionally, Blumenberg et al., (2019) suggest that privacy afforded by online platforms

is an important consideration as *"*some health care professionals may prefer the anonymity of online job searching, as they may not want to disclose their job search to their current employer" (Blumenberg et al., 2019). And furthermore, these researchers suggest that "many health care professionals are looking for opportunities to advance their career and professional development, and they may use online recruitment platforms to find out more about the training and development opportunities offered by different employers". (Blumenberg et al., 2019)

According to Baker et al., (2003) "customized job alerts are also possible using online recruitment platforms thus allowing healthcare professionals to set up customized job alerts, which can help them stay informed about new opportunities that match their specific interests and qualifications". (Baker et al., 2003). Using a questionnaire as the initial data collection method allows for a large sample size and can provide a broad overview of the research topic. (Baker et al., 2003) The use of a scoring system and survey in the questionnaire will provide numerical data which can be analyzed statistically (Baker et al., 2003). The questions in the questionnaire were designed to be clear, unbiased, and relevant to the research topic and the scoring system is appropriate to the questions asked. (Malhotra et al., 2006). Additionally, including a scoring system in the questionnaire is important as a means of establishing the strength of the participants' beliefs in their responses (Oppenheim et al., 2002). Also, Baker et al., (2003) state that a "scoring system can provide numerical data that can be analyzed statistically, which can help in quantifying the magnitude and significance of the responses" (Baker, 2003). The research by Baker et al., (2003) research states that "using a quantitative research and sampling method in the

second phase of the research, after conducting the initial phase of the research, can provide a more detailed and in-depth understanding of the data collected. This can help to identify patterns, trends, and relationships in the data. Quantitative research techniques, such as statistical analysis, can be used to analyze the numerical data and pair well with a deductive approach, which starts with a theory or hypothesis and tests it using data" (Baker et al., 2003). Thus, using simple statistical techniques and formatting via MS Excel to calculate the percentages and variances in responses is a common method for analyzing quantitative data. (Mitchell et al., 2010) which will help identify patterns and relationships in the data to subsequently determine if the results are significant.

After analyzing the results of both qualitative and quantitative approaches, conclusions were drawn based on the significance of the data. (Baker et al., 2003) according to Baker et al., (2003) as well as Mitchell et al., (2010) the conclusion should provide an overview of the findings and the possible implications or applications of the research.

The younger tech savvy generation that is currently in the workforce has grown up using mobile applications and social media as their primary sources of information. (Moraes et al., 2021). They are more accustomed to using these platforms to search for and apply for jobs, rather than relying on traditional methods such as mailing and postcards and placing job adverts in industry journals and newspapers. (Moseson et al., 2020) Additionally, many job seekers in this generation are not responsive to cold calls from recruiters as they may prefer to find a job opportunity on their own. (Morales et al., 2021).

As a result, companies and recruiters are shifting their recruitment efforts towards online platforms and social media to reach this generation of job seekers. (MacQueen et al., 2018). The results in this study suggest that even traditional mailers have a function and place in recruitment but given the time and cost constraint the questions being posed in the thesis is whether health systems are better off served by using online platforms and dispensing with the older approaches to clinician recruitment. This would involve using digital recruitment methods such as online job boards, social media, and digital networking to reach potential candidates, rather than relying on traditional methods such as mailings, phone calls and industry journals (Raha et al., 2009). The advantages of using online platforms include the ability to reach a larger pool of potential candidates, a more efficient application process, and the ability to target specifics groups of candidates. (Moseson et al., 2020). Also, analysis of email open rates, website bounce rates, email response and engagement rates allow for a vast collection of added data on behaviors and levels of candidate interest. However, it is important to consider if there could be drawbacks or limitations to this approach, such as difficulty in reaching certain populations or lack of personal touch.

The second research objective is to provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms. Prior to further review of the benefits of online platforms for a balanced approach, we examine reasons why certain audiences might consider or prefer to receive hard copy mailings in regard to job recruitment. Physical printed copies of the job listing, or a printed brochure allows the recipient the ability to refer back to the brochure, rather

than relying on an electronic version (MacQueen et al., 2018). Hard copy mailings are visually appealing and tangible versus an electronic version and may be more likely to catch a person's attention (Mbemba et al., 2016) and consequently “mailings may be perceived as more professional and credible than electronic versions” (McQueen et al., 2018). As mentioned earlier, some of the target audience may not have regular access to the internet and prefer to learn about work opportunities via traditional mailers (Moseson, 2020) these researchers also suggest that “physical copies of documents, especially for longer job descriptions or company brochures are easier to read for some” (Moseson et al., 2020). This can certainly be used in combination with multiple approaches. As an adjunct to online platforms technology may also be used to optimize online recruiting, which is not an option with hard copy mailers. Technology may be used as an adjunct to optimize online job recruiting in a number of ways according to Tong et al., (2009). Tong (2009) suggests that applicant tracking systems can be used to streamline the recruitment process for online resources by automating CV management and applications which will save time/resources for employers and job seekers alike. Additionally, “social media and professional networking platforms can be used to reach a wider pool of job candidates and to promote job openings”. (Tong et al., 2009)

Online platforms can be coupled to video interviewing and used to conduct initial screenings of interested candidates, “allowing employers to get a sense of a candidate's qualifications and personality” (Christensen et al., 2017), however this is not unique to just online resources but may be deployed to mailers as a means to create efficiencies in the recruitment process.

More recently an interesting and resourceful application of ‘chatbots’ or virtual assistants have been used to answer candidates' questions, early in the screening process thus allowing better information dissemination and engagement of candidates. Such virtual assistants and chatbots can also schedule interviews and streamline the recruitment process even further (Shaffer et al., 2020). Such virtual robotic and artificial intelligence applications are not available to non-virtual mailers and present a distinct advantage for virtual platforms. What is remarkable is that according to researchers Shaffer et al., (2020) “automated matching software can be used to match candidates with job openings based on their qualifications, skills, and experience…. virtual and augmented reality technologies can be used to create immersive experiences that allow job candidates to learn more about the company and the job before they even apply” (Shaffer et al., 2020). Online recruitment technologies can help to increase the efficiency and effectiveness of online recruiting allowing healthcare employers to locate more fitting candidates for their open positions quicker and for the job seekers to find the right positions in a timely fashion (Moseson et al., 2020).

Of course, the results of this study are not absolute and it is also worth noting that different people have different preferences and recruitment companies may try to reach as many people as possible. Therefore, it is without question that hard copy mailers and print copies are not devoid of some merit and will likely yield some returns. According to Christensen et al., (2017) who concluded that “In our Internet-based cohort study, online recruitment methods were superior to offline methods in terms of efficiency…. the average cost per recruited participant was also lower for online than for offline methods, although

costs varied greatly among both online and offline recruitment methods. We observed a decrease in the efficiency of some online recruitment methods over time, suggesting that it may be optimal to adopt multiple online methods" (Christensen et al., 2017). The statistical observations within the results of this study encourages the adoption of multiple approaches as one mechanism alone will become exhausted and it would likely be more effective to utilize multiple approaches and multiple platforms for optimal recruitment results.

The question is whether using the recruitment budget for online resources would provide a significantly higher return on investment (ROI) versus traditional mailers and offline resources. This is not to mention the environmental impact of sending countless mailers which may invariably end up in the trash. Environmental and social conscientiousness is a driving factor for many job seekers (Lin et al., 2012).

It has been noted and published by Moseson et al., (2020) and various others that "mailing job postings, resumes, and other materials can be expensive, especially if you are recruiting for multiple positions or sending materials to a large number of candidates" (Moseson et al., 2020). Additionally, the printing costs for resumes, candidate cover letters, job applications and other related materials is a costly endeavor, once you aggregate the cost for multiple recruitment positions (Nash et al., 2000). According to Nash et al., (2000), there is also a 'time cost' as the longer the opportunity remains open the costlier the missed opportunity. Online recruitment "can save time by automating many of the tasks associated with recruiting, such as posting jobs and sorting resumes" (Shaffer et al., 2020).

Furthermore, and according to the research by Shaffer et al., (2020), “online recruitment tools often allow you to reach a wider audience at a lower cost than traditional advertising methods, such as print ads or radio spots”. (Shaffer et al., 2020)

Verma et al., (2016) studied the costs incurred for travel expenses and state that “Recruiting in person can be expensive and time-consuming, especially if you are recruiting for positions in different locations” …. they stipulate that “Online recruitment tools can help you reach candidates in different areas without the need for travel”. (Verma et al., 2016).

Overall, online recruitment tools can save costs by automating and streamlining many aspects of the recruitment process. As suggested in the results of this study, the traditional postcard mailings and journal hard press print advertising as recruitment mechanisms may not be entirely redundant even when its audience no longer relies on hard copy press or physically mailed collateral as a source of recruitment information. As a multitude of resources deployed in combination may be the best approach. However, identifying the best use of resources is vital to the fiscal viability of any company, system or industry and is as important to identify where and how not to spend such resources (Galanaki et al., 2022)

The third objective to this research is to investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians. The results observed indicated there is a higher overall percentage of candidates

converted when using online platforms when compared to offline non virtual approaches. We can also see from the data that there is a positive correlation between using online resources and higher conversions rates, whereby the higher the percentage of participant preferring online resources the higher the ultimate conversion rate from candidate to participant. There is a lower cost per candidate conversion when there is a higher ratio of online platforms used against offline non virtual approaches. The higher the percentage ratio the lower the conversion costs. Conversely, the lower the ration percentage between online platforms and offline platforms the higher to cost to convert/recruit the candidates into each research trial. Recall we are using recruitment into each research trial as a proxy for recruiting clinicians for job opportunities as this data point currently does not exist in past research trails.

So, what are the demographic preferences regarding technologies versus mailings? Does age, education and socio demographics have an impact on technology utilization for job recruitment? Age demographic can have an impact on technology utilization for job recruitment. Younger generations are generally more familiar and comfortable with technology and are more likely to use online platforms for job searching and applying. (Yachyshyn et al., 2012). Older generations may be less familiar with technology and may prefer more traditional methods of job searching, such as contacting companies directly or using print newspapers for job listings. Furthermore, the extent of education and thus exposure to online educational resources and platforms would further expose the academic demographic to familiarization with online and virtual resources which in turn would develop their dependance on such online resources for job searches and recruitment

opportunities (So et al., 2018). As this research only focuses on clinically educated job seekers, the entire cohort being researched have undergone academia (universities and colleges) and would almost entirely, without exception, have been exposed to online and virtual platforms to great extents. Almost all universities and colleges now offer partial or completely virtual synchronous and asynchronous learning via online platforms and since the Covid19 pandemic, a paradigm shift has occurred which forced all universities and colleges to deploy virtual resources and forced all students to virtual platforms for learning and in some cases completion of degrees. As technology continues to advance and become more prevalent, it is virtually impossible to attain a clinical degree without the utilization and familiarization of online technologies and additionally, once the academics are completed, it is becoming increasingly important for all age demographics to be familiar with and comfortable using technology in order to be competitive in the job market. (So et al., 2018). Using online platforms has been shown to improve recruiting time and thus enhance recruitment success (Christensen et al., 2017). Recruitment time is defined as the time taken to fulfil an open opportunity and recruitment success is defined as placing a suitable candidate in an open position with minimal delays. Time is absolutely an important factor in gauging recruitment success. Clinical job opportunities cannot be left lingering as very often this affects the daily operations for health care systems and patient care and outcomes. All health care systems are mandated to provide minimum clinician; patient care ratios and are not permitted to operate without the correct staffing ratios. If certain positions remain open and unfilled the health clinic or hospital may not be allowed to open its doors and operate its operations due to patient safety issues and concerns. This

makes the need for fulfilling open vacant job opportunities even more vital. A timely response to job applications and resumes can help to keep candidates engaged and interested in the position (Williams et al., 2011) leading to higher capture and closure rates of job vacancies. Waiting too long to contact or interview candidates can lead to them losing interest or accepting another job offer. Additionally, a quick and efficient hiring process can help to fill open positions more quickly, reducing the impact on productivity and morale. And increasing efficiency and operating economies of the healthcare system. However, it's also important to balance the need for timeliness with the need for thoroughness in the hiring process. Taking the time to thoroughly review resumes, conduct multiple interviews, and check references can help ensure that the best candidate is selected for the position. (Bassler et al., 2019). This is affected more efficiently and expeditiously via virtual platforms that can filter candidates and thoroughly deploy selection criteria using automated platforms and artificial intelligence tools such as Chat GPT enterprise or AmazonQ. Time consuming and labor consuming resources may be replaced with streamlines and automated virtual tools. As already stated by many researchers, technology can help time efficiency and scrub CVs quickly and efficiently using social media; video conference interviews; automation and artificial intelligence; candidate management software. These tools and resources can also help to remove geographic barriers to recruitment as interviews may be conducted virtual online via video conferences without the need for candidates to travel to interview locations. Removing the need to travel greatly improves recruitment timelines as it removes barriers to traveling such as availability or willingness to travel, travel time scheduling, and travel expenses (Christensen et al., 2017)

Automation of tasks like resume screening or scheduling interested candidate interviews saves time and reduce administrative burdens on recruiters, allowing recruiters to source many more viable clinical candidates in shorter periods of time (Christensen et al.,2017). Using Artificial intelligence such as Ai-powered tools like ChatGPT and AmazonQ (provided by Amazon Web Services) can support efficient and timely identification of the most qualified candidates by scanning resume data and information for keywords and specific clinical qualifications. (Thawrani et al., 2021). Virtual video interviewing software enables job recruiters to conduct interviews remotely, saving time and resources. (Danish et al., 2020)

Additionally, healthcare system recruiters can use social media platforms to quickly and easily identify potential candidates and reach out to them directly. (Linkedin.com, 2024). Such platforms not only identify viable candidates that are currently looking for opportunities but can help to identify suitable potential candidates that are not currently looking for jobs but may still be interested and 'headhunted' by the recruiter and convinced to switch jobs. Once suitable candidates are identified, recruitment management software platforms can support streamlining of the hiring process by managing candidate resumes and scheduling interviews to save time and improve efficiency. Overall, virtual technologies and online platforms can speed up the healthcare system recruitment and hiring process and make it more efficient, allowing healthcare recruiters to identify clinicians and hire the best clinical candidates more quickly. Our research results also observed that the respondents were extremely likely to use a mobile device, laptop computer or desk top computer when search for a new job opportunity which would make

them more likely to use online virtual platforms as these platforms are accessible via their mobile devices. How does this compare to non-virtual offline recruitment practices and resources? Online job search platforms, recruitment management software, and social media have made it easier and more efficient for recruiters to reach and connect with potential candidates. (Blumenberg et al., 2019) Additionally, many companies have implemented paperless hiring processes, allowing them to manage resumes, schedule interviews, and even sign offers electronically. (Zhang et al., 2014). Furthermore, hard copy press will become more redundant as organizations maneuver to ensure better environmentally friendly processes and the reduction of their carbon footprint by going paperless. That being said, it's important to remember that not all job seekers have equal access to technology, and hard copy mailings may continue to be used as a way to reach candidates who may not be as digitally connected (Pittman, et al., 2014). Also, certain industries may still rely on traditional methods like hard copy mailings and newspapers for recruitment. Where will recruitment mailing go in the future? According to Block et al., (2016) it is likely that hard copy mailings for job recruitment will become less common in the future as technology continues to advance and become more prevalent. (Block et al., 2016) in an age where ‘digital savviness’ is a recruitment criteria and lack thereof would be considered a reason not to employ a potential candidate. Therefore, those candidates that prefer to use print copy would by definition remove themselves from the selection pool of possible recruits. (Schiff et al., 2012) and/or those candidates will begin to age out of the workforce leaving only the younger and more tech aware demographic in the job selection pool. Mosesan et al., (2020) suggested that “the clearest potential advantage of

virtual studies is that they maximize the number of individuals able to participate…by removing the barriers to participation" and furthermore "allow researchers to identify a larger pool of eligible participants more quickly" (Mosesan et al. 2020). However, overall, while hard copy mailings may become less common in the future, such approaches may still be used as a supplement to digital recruitment methods, depending on the industry and the specific needs of the job seeker and employer (Sharma et al., 2010) but to what extent and return on investment when compared to the virtual online resources available. What percentage of the working population demographic prefer technology or online resources over offline resources?

Many publications and researchers suggest that the percentage of people who prefer using technology for job seeking has been increasing in recent years, particularly among younger generational demographics. Younger generations are generally more familiar and comfortable with technology and are more likely to use online platforms for job searching and applying. (Stephens et al., 2006) However, as technology continues to advance and become more prevalent, it is becoming increasingly important for all age demographics to be familiar with and comfortable using technology in order to be competitive in the job market. (Moseson et al., 2020). Additionally, with the current trend of remote work and digital hiring process, thrust upon the workforce by the Covid19 pandemic in recent years, it's likely that the number of people using technology for job seeking has grown and will continue to grow exponentially (Moseson et al., 2020).

From literature reviews, research and results be can ascertain that the main drivers for using the internet and online resources for recruitment of staff as well as for job seekers

to gravitate to this approach are, ease of use for the younger generations as defined in the demographics earlier and those with in the current workforce or those entering the work force and less so for the older demographic but as explained this older demographic is already aging out of the workforce. Online virtual platforms generally are designed with user-friendly dashboards and interfaces, allowing for an easier user experience for job candidates to navigate the opportunities and for employers to efficiently express their open opportunities (Danish et al., 2020). Employers such as health systems and hospitals may easily sort and filter candidate applications and candidates seeking job opportunities can search for posted jobs using a variety search criterion such as job titles, annual salary, benefits, work hours and opportunity locations.

The internet and virtual platforms are accessible 24 hours per day and 7 days per week which allows candidates seeking jobs to search for opportunities and apply for those jobs at convenient times for them, often out of the usual working hours in their existing positions. This may not be the case with traditional non virtual search methods which may be limited to the hours of operations of the employers, especially if questions need to be asked and answered and may also be hampered by mail delivery and operating times. This limitation on ability to gain information regarding a job opening extends the job closure times and reduces the contracting rates according to Danish et al., (2020). Furthermore, virtual, and online recruitment platforms enable employers with open job opportunities to reach a broader and wide selection pool of job candidates quickly and without geographic hinderances or reliance upon the traditional mailing system and hours. Employers (such as health systems) are able to advertise for an open job opportunity and receive responses or

applications in the same instance or without much delay. Fulfilment of open opportunities is especially vital in the health care industry as many hospital systems cannot operation effectively without the correct clinical staffing ratios according to Winn et al., (2023)

The ability to fulfil open job opportunities then leads to better efficiency and cost effectiveness. The cost effectiveness of virtual and online approaches is a significant driver of why employers use this approach and is one of the main questions being asked in this research. The ability to post job ads online via virtual platforms is very often more cost effective and provides a better return on investment than printing and mailing copies of job collateral. Additionally, from an applicant point of view, job seekers can submit CVs and resumes electronically instantaneously and thus saving applicants on print cost and postage stamp costs as well as time.

Danish et al., (2020) have reported that increasingly businesses and perhaps entire industries are shifting toward virtual and/or digital operations, some businesses are entirely virtual and no longer brick and mortar sites. It becomes inevitable that the recruitment process will reflect the same approach. Blumenberg et al., (2019) reports at many jobs currently require employees and candidates to have 'digital literacy', and virtual and online applications now become a form of filtering out digital literacy. Therefore, the benefit of using online approaches not only enhances efficiencies and reach but also functions are a candidate digital assessment of applicants which helps employers assess the digital skills of the applicants according to Blumenberg et al., (2019).

Another reason why industries are gravitating towards online job recruitment and candidates opt for virtual job searches is environmental awareness according to research

by Engardio et al., (2007). According to Engardio et al., (2007) virtual business in general but also in terms of online job recruitment approaches have lower impact of the environment, more sustainable and environmentally friendly than traditional approaches of printing and mailing as seen in non-virtual traditional methods. Engardio et al., (2007) reports that virtual online methods potentially eliminate the need for printed paper documents (printed hard copy collateral) or physical transportation (mailing and delivery) consequently leading to the reduction of our potential carbon footprint ultimate carbon emissions.

Furthermore, and according to Danish et al., (2020), the utilization of online recruitment platforms enables real-time and immediate updates regarding candidate application status and additional relevant information like job status fulfilled or currently still open unfulfilled. Historically, employers would need to deploy a recruiter of Human Resource personnel to update such items and keep accurate records of status. In the instance of using virtual platforms these updates are maintained automatically by the virtual system as candidates apply or reject offerings and those records are automated and reported to employers instantly.

A further reason why we may be seeing a movement towards utilization of online platforms and away from traditional methods is the ability for real time data analytics according to Kroft et al., (2014). Virtual platforms can provide a tremendous amount of data analytics according to Kroft et al., (2014) which may be used to match job seekers with opportunities advertised by employers immediately and enhance effectiveness and efficiency for the money and resources spent. Employers are able to analyze data streams

and benchmark the candidate's data against industry statistical bells curves to measure skills and candidate experience or even to test candidates' skills and experience in order to garner a more detailed outlook for each applicant. As a result, employers are able to recruit the best fit candidates for the role and the organization thus improving recruitment but also retention (Kroft et al., 2014).

We now focus the discussion on methodology dissection and seek to identify ways of improving the research and what some of the pitfalls might be. Some identified shortcomings of using a contractor on Amazon M-Turk for statistical analysis are reduced control over the analysis as contract workers on M-Turk are independent, the research had limited control over their action which impacted the project deadline and scope of the research. Furthermore, there is a risk of the statistician rushing through analysis tasks assigned without giving the data sufficient attention or detailed efforts. Fortunately, the scope of the project was simple mathematically and repetitive which did not require critical thinking or creative. However, there were communication challenges as there was a lack of direct dialogue with the statistician and verbal interaction which made it difficult to give instructions and clarification. This resulted in an initial misunderstanding that required a number of iterations thus slowing down the research and data output. There are also some identified Survey Monkey limitations and process improvements. To improve the quality of results and response times from the questionnaires conducted using SurveyMonkey, the objectives and goals needed to be clearly defined. This helped to design the targeted questions and enabled the gathering of more meaningful data. Additionally, the questionnaires were kept concise to reduce the likelihood of respondent fatigue and

improve response rates. The questionnaires were concise and focused on essential questions optimize the survey completion rates as well as timeliness of responses. Simple and clear language was used to ensure respondent understanding, clarity and better quality of result and negate the chances of inaccurate responses or possible confusion. Initially the research experienced a very low response rate, and so reminder emails needed to be sent to recipients who haven't responded. The responses trickled in over time thus slowing down the analysis of the data as the research needed enough responses to make the results meaningful and statistically significant. Many prompts were sent to the participants to remind them to complete the questionnaires and the response rate was at times frustratingly slow to an alarmingly low yield. Fortunately, the responses aggregated over a number of months giving rise to enough response data to analyze for meaningful results. In future research one might consider offering an incentive for completion of the questionnaires or consider using multiple survey platforms in order to get higher volumes of results in a shorter period of time. It was concerning the lack of responses as it almost made the research study unviable without enough responses and results to review. In the instance of this research study 5 rounds of emails needed to be sent, over a four-month period, in order to capture more respondents and enough results for analysis. Once enough responses/data was collected, the data was analyzed using Survey Monkey's reporting and analysis tools to help identify patterns and key trends.

Another possible reason for low response rates and slow response times is that the Survey Monkey platform operates as an online survey tool and so the responder needs an internet connection to access as well as complete the questions, this fact posed many

challenges and is likely the reason for the slow and low response rates. The possible correlation between online and offline response times may lead us to consider the importance of 'virtual' platforms versus non virtual platforms and the impact on speed of responses, which is one of the research objectives in this study.

There was clearly a degree of survey fatigue experienced by the respondents, which lead to lower response rates, slower response rates (needed multiple reminders) or perhaps less thoughtful responses.

There is a higher percentage of younger demographic participants opting for using online resources versus offline traditional approaches. This percentage weighed more heavily towards offline approaches as the demographic age increases. Additionally, the n value of respondents to the online survey was higher in the younger demographics and reducing in the older cohorts of respondents. The respondents weighed more heavily to the female gender versus the male gender and the vast majority of the online respondents were a younger demographic. The results of the literature reviews and meta-analysis of the studies looking at the previous research examining the success of online resources versus offline approaches in the recruitment of patients to clinical research (we used this as a proxy for examining population proclivity for virtual online platforms versus traditional offline non virtual approaches). There is a higher overall percentage of candidates converted when using online platforms when compared to offline non virtual approaches. We can also see from the data that there is a positive correlation between using online resources and higher conversions rates, whereby the higher the percentage of participant preferring online resources the higher the ultimate conversion rate from candidate to

participant. There is a lower cost per candidate conversion when there is a higher ratio of online platforms used against offline non virtual approaches. The higher the percentage ratio the lower the conversion costs. Conversely, the lower the ration percentage between online platforms and offline platforms the higher to cost to convert/recruit the candidates into each research trial. Recall we are using recruitment into each research trial as a proxy for recruiting clinicians for job opportunities as this data point currently does not exist in past research trails. The data observed was that more participants were recruited earlier in the first month using online virtual platforms. Both cohorts in all four months of analysis decreased in volume of respondents recruited but the online platforms reduced the least over the four months. Evaluation respondents indicate that they would be highly likely to use online resources and a strong degree of confidence in the effectiveness of online resources for both job seekers and employers alike. The results indicated that respondents found online resources effective for recruitment. The evaluation respondents indicated that printed, offline resources almost equally important. However, the same respondents scored the effectiveness of printed collateral for recruitment with a lower score. All respondents to the evaluation scored the effectiveness of online recruitment resources highly. Likewise, all respondents scored their likeliho0d of using printed collateral and offline resources equally as high.

Respondents indicated that would be unlikely to use printed collateral instead of online platforms as a means of finding jobs, but the results show that given the option job seekers would be inclined to use both approaches in locating a job but if forced to opt for one instead of another they would be more likely to opt for online virtual approaches instead

of offline printed options. Given the option they would not be inclined to choose offline instead of online virtual options.

To ensure a fair and balanced discussion of the results it is important to review some of the potential disadvantages of virtual or online approaches and platforms when targeting candidates seeking job opportunities.

Research by Block et al., (2016) describe a potential for over inundation of applications. One might be led to think that the more applicants for opportunities the better as there is a larger selection pool from which to select the best applicant however Block et al., (2016) suggest that because online platforms make it so easy for candidate to apply for positions, with just a quick and simply click of the button, many applicant over saturate employers with interest and apply for multiple job opportunities in multiple locations leading to a 'choking' of the recruitment process and the creation of a huge amount of workload for the employers to sort through the duplicate applicants. Many applications being duplicates according to Block et al., (2016). This can ultimately lead to a huge volume of applications overwhelming employers and the recruitment process, making the hiring process more challenging and time consuming according to Block et al., (2016)

Furthermore, Berry et al., (2017) suggests that the absence of a personal connection and dialogue with the candidates, human to human, creates a distancing of the candidates due to no empathy and a lack of rapport building or face to face interaction which is vital in many instances to recruit the best candidates. The lack of trust and rapport building from face-to-face interaction creates difficulties for recruiters to effectively assess potential candidates and their soft skills, potential fit for the company, communication style,

business acumen and clinical abilities. In the instance of clinicians, it is vital to assess candidates' bedside manner and how they will likely interact with their patient population (Berry et al., 2017). The researchers Berry et al., (2017) further note that there is potentially a limited scope of data that is uploaded by candidates that may not give the employer a full outlook on candidate's depth of experience and knowledge. Information that may be better gleamed from non-virtual approaches and/or candidate interviews that may not be ascertained using online portals and virtual platforms (Berry, et al., 2017). It is also important to highlight that online virtual platforms greatly increase the level of competition for candidates as more job opportunities are made available to candidates, the array of access to open opportunities is monumental and employers must compete aggressively to make the same impression and engagement with candidates which will drive up costs of advertising jobs according to research by Kotler and Keller (2016). These authors stipulate that higher competition increases rates of advertising and cost to recruit, such high volumes of available opportunities dilute employers job offerings and may result in a great deal of noise online. Kotler and Keller (2016) highlight the fact that virtual platforms easily allow job seekers to locate, review and submit applications for a huge range of roles in all geographies and industries which results in increased competition online from employers and companies looking to recruit and thus the competition drives up online recruitment costs for companies. Couple this to the advantages, quoted by many, for using off line traditional hard copy collateral such as a more personalized and targeted approach is possible when using targeted mailers to specific candidates allowing employers to mail to very specific regional locations such as zip codes in close proximity to the hospital system

attracting those candidates that live neatly with the health system catchment areas thereby increasing chances of closure due to proximity to the job opportunities (Berry et al., 2017). Kotler and Kohler (2016) have also expressed that having a physical and 'tangible presence' plays an important role in successful recruitment of the most eligible candidates, whereby in receiving an actual tangible or physical job leaflet mailed specifically to the candidates helps to make a strong first and last impression on a job seeker, especially in light of so many adverts bombarding candidates online having a printed collateral helps to make the employer stand out from all the online noise by creating the perception of important and uniqueness (Kotler et al., 2016). However, employers must, as previously reported, balance these advantages with the fact that printed collateral are more costly and time consuming to print and mail with limited geographical reach according to Berry et al., (2017)

Generically, virtual, and online approaches may yield higher return on investment due to wider geographic reach and swift messaging, but for certain niche industries that require specific skill sets such as the healthcare industry and specific clinical specialties, it is very often necessary to deploy additional resources in locating the correctly qualified clinical skill sets and therefore additional layers of recruitment will still be required (Guild et al., 2009). Furthermore, according to Guild et al., (2009), technical issues with online platforms, website glitches and crashes may hamper recruitment pipelines and create hurdles to online recruitment. This is of course provided to balance the argument of online versus offline approaches but in reality, even with such potential for technical issues,

organizations will already account for such operating issues and budget for these hurdles as part of the overall return on investments (Guild et al., 2009)

As mentioned earlier in this discussion, the shift from traditional, physical job search and recruitment methods to online platforms is due to several factors. The U.S. healthcare staffing market size is expected to reach $34.7 billion USD by 2030, exhibiting a Compound Annual Growth Rate (CAGR) of 5.6% from 2022 to 2030. Increasing geriatric population is leading to rising demand for medical services and shortage of nurses and other medical staff. The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing (2022). The demographics of such a clinical force are younger and more technologically savvy and the past generations of clinicians are now aging into retirement leading to a significant staffing shortage and ensuing problem for the healthcare staffing arena. If the work force currently and in the very near future are comprised on a younger and more technologically savvy demographic, we can see why online recruitment resources and becoming more prevalent. Especially as the results of this research also showed that the respondents were most likely to search for future job opportunities or respond to open job opportunities using a mobile device, laptop, or desk top computer. Kotler et al (2016) report that the demographics of virtual job seekers via online platforms will change depending on varying factors like the region (also social economic regions), the type of industry from which they are being recruited (IT, healthcare, construction, services etc.) The authors highlight that online job seekers will represent a wide spectrum of ages and that younger individuals in the workforce, specifically workers in their twenties, thirties, and early

forties, will most likely use virtual approaches to proactively engage with online virtual job seeking as this demographic grew up in the age of internet expansion (Kotler et al., 2016). The authors go on to suggest that older workers are also increasingly using virtual and online platforms to search of job opportunities in order to remain competitive and viable in the current work force and technical fluency is now a necessary work requirement. Therefore, such requirements drive all workforce members to utilize online platforms as a condition of work eligibility in many technical job arenas and is especially true for the healthcare industry upon which this research is specifically focused.

Moseson et al., (2020). Maintain that candidate education levels strongly dictates whether they will use online versus offline resources in their job seeking. This research is specifically focused on the recruitment and job seeking of a clinical work force and hence many if not all candidates searching for jobs and those employers searching for candidates will be educated to a bachelor's, master's, or doctorates level. This strongly skews the likelihood that many if not all candidates will be using online approaches for their job seeking. The higher the education level, according to Moseson et al., (2020), the greater the likelihood of online search platform utilization when searching for job opportunities. This report from Moseson et al., (2020) is further supported by the result of this study which also reflected a positive and parallel correlation between preference for virtual platforms and the younger demographic or workers as well as their preference for online platforms as clinicians search for clinical opportunities. Moseson et al., (2020) research represents that gender may have a limited sway on virtual platform utilization when searching for job opportunities but is often driven by certain gender dominated industries

for example the engineering industry is mainly male gender dominated and the nursing industry is female gender dominate. These differentials in gender and specific industries may balance out but as yet are still relevant and will skew the results when ascertain gender specific preferences as they relate to virtual or non-virtual approaches to job seeking as gender majority and gender minorities as are also industry specific. In the context of this research study as it pertains to clinician searching for job in the healthcare industry, we have established that the healthcare industry is typically 67% female for the nursing cohort and 65% male gender for the physician cohort (Yacyshyn et al., 2021). This split has also been reflected in the results of our evaluations when the gender of respondents was analyzed for gender specific responses. Additionally, Yacyshyn et al., (2021) stipulates that virtual platforms and seeking jobs online permits job seekers to search and identify positions of employment beyond the boundaries of their local regions. This has been especially true since the COVID19 pandemic which drove many workers to position themselves remotely and work online. Therefore, they were no longer restricted by geographical limitations. However, aside from geographic boundaries and whilst candidates may be located globally, the candidate demographic will certainly differ based on the market and how accessible virtual platforms are within different countries, areas, regions. The ability to speak English language has a significant impact on the candidate demographics via online job platforms according to Yacyshyn et al., (2021). These researchers have reported that “English-speaking individuals often have greater access to global job opportunities” (Yacyshyn et al., 2021) and presumably greater access to

technologies and connectivity to virtual and online resources versus lower socio-economic region without the financial resources and the same access to technology.

There is a higher percentage of younger demographic participants opting for using online resources versus offline traditional approaches. Generation Z, 39.34% prefer online and 1.18% prefer offline, Millennials, 40.39% opting for online versus 3.82% offline. Gen X demographic 7.76% prefer online and fairly evenly 6.12% opting for offline. Baby Boomers exhibiting a negligible response of less than 0.01% preferring either. This percentage weighs more heavily towards offline approaches as the demographic age increases. Gen Z, 39.34% versus Baby Boomers, 0.004%. Additionally, the n value of respondents to the online survey was higher in the younger demographics 308, 336 and reducing to only 11 respondents in the older cohorts of respondents. The respondents weighed more heavily to the female gender versus the male gender as depicted in chart A, 68.9% female compared to 31.1% male respondents. The vast majority of the online respondents were a younger demographic, Generation z and Millennials, accounting for 40.5% and 44.2% respectively. The two cohorts totaling 84.7% of all respondents. Gen X respondents amounted to 13.8% and Baby Boomer demographic respondents represented less than 1.5% of the total. The results of the literature reviews and meta-analysis of 8 studies looking at the previous research examining the success of online resources versus offline approaches in the recruitment of patients to clinical research (we used this as a proxy for examining population proclivity for virtual online platforms versus traditional offline non virtual approaches). The results are aggregated and represented in Table 6. As can be seen in this results table 6: There is a higher overall percentage of candidates

converted when using online platforms when compared to offline non virtual approaches. We can also see from the data that there is a positive correlation between using online resources and higher conversions rates, whereby the higher the percentage of participant preferring online resources the higher the ultimate conversion rate from candidate to participant. Quote %. There is a lower cost per candidate conversion when there is a higher ratio of online platforms used against offline non virtual approaches. The higher the percentage ratio the lower the conversion costs. Conversely, the lower the ration percentage between online platforms and offline platforms the higher to cost to convert/recruit the candidates into each research trial. Recall we are using recruitment into each research trial as a proxy for recruiting clinicians for job opportunities as this data point currently does not exist in past research trails. The data from the graph informs us that more participants were recruited earlier in the first month using online virtual platforms 82 respondents versus 35 enlisted using offline approached, this representing a 134% difference in preference for online platforms over using offline approaches. This pattern remains the same for month 2, where 58 respondents were recruited compared to 31, representing an 87% difference between the two cohorts in favor of online platforms. Furthermore, this data pattern continues in month 3 (50 vs 24, 108% difference for online platforms) and month 4 showing the largest difference between online and offline approaches with an almost 7 times differential (35 vs 4 in favor of recruitment via online platforms). Both cohorts in all four months of analysis decreased in volume of respondents recruited but the online platforms reduced the least over the four months with a 42.6% reduction of respondents enrolling compared to the offline approach which enrolled 35 respondents in

the first month and only 7 respondents in the fourth month, an 80% reduction over the time period. Evaluation respondents indicate that they would be highly likely to use online resources with an average score of 9.9 out of 10 and a maximum score of 10 for their opinion on the effectiveness of online resources. The results indicated that respondents found online resources effective for recruitment with an aggregated score of 9.7. The evaluation respondents indicated that that found printed, offline resources almost equally as useful with a score of 9.6 out of 10. However, the same responses score the effectiveness of printed collateral for recruitment with a lower score of 7.7 out of 10. All respondents to the evaluation scored the effectiveness of online recruitment resources 10 out of 10. Likewise, all respondents scored their likeliho0d of using printed collateral and offline resources as 10 from 10. Respondents scored their likelihood of using printed offline collateral over online collateral an average low score of 2.4 out of 10. Respondents scored their likelihood of using online platforms above offline printed collateral as 10 out of 10. The results of the evaluations showed an average score of 1 out of 10 for participants likelihood of using printed new papers and advertising collateral and offline resources as a replacement or in place off online virtual platforms.

The results of the evaluations showed an average score of 1 out of 10 for participants likelihood of using advertising mailers as a replacement or in place off online virtual platforms Respondents indicated with a score of 6/10 on the usefulness of printed mailers over online platforms. Respondents indicated that would be unlikely to use printed collateral instead of online platforms as a means of finding jobs with an average score of 1 out of 10. Additionally, the researchers Christensen et al., (2017) found similar results

when comparing online patient recruiting methods versus traditional hard copy press mailers in the recruitment of patients for research study purposes. These authors and researchers state that "in our Internet-based cohort study, online recruitment methods were superior to offline methods in terms of efficiency (total number of participants enrolled). The average cost per recruited participant was also lower for online than for offline methods, although costs varied greatly among both online and offline recruitment methods. We observed a decrease in the efficiency of some online recruitment methods over time, suggesting that it may be optimal to adopt multiple online methods" (Christensen et al, 2017), and furthermore the researchers continue with the statement that "widespread access to the Internet now offers an alternative strategy to recruit participants into cohort studies and to collect data. The Internet offers technical advantages in data collection that can reduce administrative procedures and improve data quality" according to the researchers some advantages include "incorporating skip patterns that avoid displaying irrelevant questions, building in internal consistency checks, and avoiding errors that occur during manual data entry. Furthermore, the Internet is an effective tool to reach populations who are otherwise challenging to enroll" (Christensen et al., 2017) the researchers surmised that "both online and offline costs per enrolled participant showed great internal variation. However, given the higher workload associated with offline methods and the lower efficiency, online methods appear the most appealing" (Christensen et al., 2017)

Christensen et al., (2017) concluded that "In our Internet-based cohort study, online recruitment methods were superior to offline methods in terms of efficiency (total number of participants enrolled). The average cost per recruited participant was also lower for

online than for offline methods, although costs varied greatly among both online and offline recruitment methods. We observed a decrease in the efficiency of some online recruitment methods over time, suggesting that it may be optimal to adopt multiple online methods". This echoes the need to utilize both online and offline approaches as also outlined and underscored in this research. That no one approach is effective but a spectrum of different approach using online and offline platforms would yield higher rates of recruitment, faster contract closure and consequently better outcomes for the health systems, hospital systems and ultimately the patient population.

CHAPTER VI:

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary

The research objectives of this study were:

1. To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.
2. To provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms.
3. To investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

In regard to objective number one- whether health care systems are better served using online recruitment platforms to get optimal return of invested budget and time resources. The observation is that clinician recruitment is hugely expedited when using online and virtual recruitment as these platforms increase the geographical reach and scope of the recruitment campaign, Furthermore, this research and other studies have shown that online virtual recruitment enables efficiencies and cost effectiveness for financial resources with potentially better return on investment. We have shown faster and more efficient contract closure rates when utilizing online approaches.

When reviewing the second objective, which was to provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of

online recruitment platforms. We can see from the research that virtual platforms provide clinicians, who are looking for opportunities, as well as clinician employers who are searching for candidates, a platform for attracting, filtering, and assessing candidates to a great degree and level of efficiency. The ability to quickly disseminate collateral electronically, attract candidates without much delay and without the hinderances of geographic boundaries and then sort and assess those candidates is an attractive prospect for employers. Such efficiencies pay huge dividends for health care systems as this is vital to their clinical operations to have the correct staffing ratios without delay and for the benefit of optimal patient outcomes.

In regard to the third objective of the research study which was to investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians. We found that clinicians would not opt to use hard copy traditional approaches in place of online resources, they still valued the hard print collateral as a means of due diligence when researching a job opportunity. The respondents would use online platforms instead of traditional approaches if they must use it instead of traditional approaches, but the results showed that the preference would be to use both online resources as well as traditional offline non virtual approaches in their job searches. We may conclude that in our modern climate of technology (mobile devices and online platforms) there is still a vital role for hard copy recruitment mailings, and these approaches are not redundant as a tool for health care systems in recruitment of clinicians. Where health systems must deploy all resources available, they should continue to utilize all resources

possible to ensure that they recruit generate a vast selection pool of candidates from which to elect the best clinical candidate possible for the best possible patient outcomes.

This results suggest that some approaches to this endeavor include both online virtual resources as well as offline non virtual traditional resources. This research has suggested that there may still be instances where offline approaches can still be effective, like reaching out to potential clinical candidates who prefer to not have an online presence or who may not be actively searching for a career change. Additionally, some candidates may potentially still prefer to use these non-virtual approaches and traditional methods as part of their job search. The research supports the potential that many candidates still utilize non virtual methods to verify the data that they may gather online. The offline approaches are used to validate the data and still represent a portion of the data used in the decision-making process of picking one position over another. Therefore, based on the research results it is evident that candidates still rely on offline resources and that companies should opt to use a variety of recruitment methods/strategies to ensure the broadest and deepest pool of potential job candidates are reached.

6.2 Recommendations for Future Research

A weakness to this research reviewed is that they are mainly in English language publications and therefore we are missing a huge component of potential research published in other non-English language publications which represents a significant ‘blind spot’ in our further understanding of this area. Furthermore, better delineation of online platforms (specifically which platforms) and deeper stratification of specifically which

offline approaches are preferred as the options present a large pool of offline choices and this research did not separate the different options to better understand user preferences. Additional research may be conducted to also better understand employer demographics and how that plays a role in the employer's choice of recruitment approaches as employers are also delineated into gender and age categories with demographic preference associated with each. This type of analysis is important as it provides insight into the better allocation of recruitment efforts and cost/expenses/budget dollars and how best to utilize those dollars in an effort to recruit clinicians to open jobs.

When looking at and comparing online approaches versus traditional recruitment methods, further emphasis and research should be placed on comparing a broader spectrum of publications and studies that focus on metrics like total cost of recruitment, incorporating not just the hard costs but also the soft costs (people and resources) and overall quality of candidates leading to better patient outcomes and patient satisfaction. We cannot merely analyze the speed and cost of advertising but also need to review the lost opportunity costs of hiring the wrong candidates in haste or the effect that the wrong clinician may have on overall clinical outcomes and patient care. Poor clinical outcomes have a very different financial impact on the healthcare system from longer hospital stays to additional procedures to legal costs from law suits due to poor clinical prognosis. Future research should expand the scope of analysis to incorporate such factors in order to be more encompassing.

There is clearly a differential between offline approaches in that the question is not as simple as whether the candidate would choose from offline and online approaches, but

we should pose the question “which offline approaches would you use?”. A better delineation between offline resources should be included in any future expansion of this research and/or publications.

6.3 Conclusion

Future Research potential and possibilities to expand the current research are now identified in the following conclusions. This review detailed the introduction of the online recruitment arena and assessed the most recent research studies delving into this area, including a brief summary of available published research that have examined the area as well as the missing items or blind spots in our knowledge that the proposed research study will help to highlight. Numerous studies reviewed the power and effectiveness of using social media and electronic recruiting to capture the attention of clinicians and its impact on human resource teams across multinational organizations such as Shaffer et al., (2020) and Rahman et al., (2004). More studies contrasted and compared the various online recruitment platforms to ascertain the most effective platforms and their online presence and reach. Moseson et al., (2020) reviewed and compared the patient study samples recruited with virtual versus traditional recruitment methods. The study looked at the demographics of patients that had been recruited into a clinical trial via online platforms versus the demographics of patients recruited into the clinical trial using more traditional methods (namely brick and mortar sites like care clinics, health centers and primary care offices etc.). Mosesan et al., (2020) suggested that “the clearest potential advantage of virtual studies is that they maximize the number of individuals able to participate…by

removing the barriers to participation" and in addition "allow researchers to identify a larger pool of eligible participants more quickly" (Mosesan et al., 2020) Many authors. acknowledged that "the studies found Facebook ads or newsfeed posts to be an effective method of recruitment…. Google ads being the most effective way to reach participants" (Lane et al., 2015). Furthermore, the literature review produced over 10 studies showing success in recruiting physicians and nurses into rural health care systems and rural regions of the USA using web-based technologies (Asch et al., 2000). Additional studies looked at the effectiveness of recruiting and enrolling nurses (care providers) in participating in patients care trials. As seen from the literature reviews, the types of studies examining online resources and comparing them to traditional offline, non-virtual, brick and mortar resources tended to assess the success of online versus traditional in the recruitment of patients in trials and/or the recruitment of clinicians responsible for enrolling patients in those trials. As stated earlier in this research study, there remains a significant research blind spot in our understanding and publication of online career recruitment of clinicians (and not recruitment of patients into clinical trials and clinical research).

The shift from traditional, physical job search and recruitment methods to online platforms may be due to several factors. The U.S. healthcare staffing market size is expected to reach $34.7 billion USD by 2030, exhibiting a Compound Annual Growth Rate (CAGR) of 5.6% from 2022 to 2030. Increasing geriatric population is leading to rising demand for medical services and shortage of nurses and other medical staff. The cost of temporary staffing is likely to drive the market in the coming years. U.S. Bureau of Labor Statistics predicts 19% growth in travel nursing (2022). Clinicians must be recruited to

effectively care for an ageing and sicker population. The demographics of such a clinical force are now younger and more technologically savvy and the past generations of clinicians are now aging into retirement leading to a significant staffing shortage and ensuing problem for the healthcare staffing arena. If the work force currently and in the very near future are comprised of a younger and more technologically savvy demographic, we can see potentially why online recruitment resources are becoming more prevalent. Especially as the results of this research also showed that the respondents were most likely to search for future job opportunities or respond to open job opportunities using a mobile device, laptop, or desk top computer (further research would be needed to represent a pattern in behavior). This would discount hard copy mailers and printed collateral. According to the Bureau of Labor Statistics (BLS), approximately 500K nurses plan to retire from the workforce over the coming years, with this retirement and aging out of the workforce comes the redundancies of printed collateral and the dominance of online approaches if not already true. The Association of American Medical Colleges, predict there will be a shortage of up to 55,000 primary care physicians by 2032 leading to a crisis in clinical staffing. The question is whether health systems are better served using online platforms and dispensing of the older approaches to clinician recruitment. This is especially important to ascertain as previously stated the population of the USA is aging, generally in the United States we are living longer and getting sicker (Kim et al., 2021). The severity and acuity of our current population is a chronic issue that requires not just increased production of newer lifesaving molecules but also the production of pharmaceuticals and drugs to treat our aging infirm population (Kim et al., 2021). Verma et al., (2016) states

that in order for health care systems to diagnose, treat and prescribe to our aging chronically ill population we need a veritable army of nurses and physicians (clinicians). The later generations currently in the work force or about to enter the work force, are raised on mobile applications and social media as a means to garnering the information they require and represent a tidal movement away from the main stay of physically mailing postcards and placing job advertising in industry journals, hard copy press and recruiters cold calling (Dickson et al., 2010). Of course, as with any endeavor, mailing hard press to recipients will still be a worthy approach that will likely still deliver some results (Pittman et al., 2010), the question is whether health systems are better served using online platforms with their limited budgets to get optimal return of invested budget and time resources. We can see that the potential cost to health systems for future and ongoing recruitment of clinicians is vast and there is a need to find more cost effective yet effective recruitment strategies.

The younger generations currently in the work force, are technologically proficient and raised on mobile applications and social media as a means to garnering the information they require and represents a movement away from hard copy press and recruiters cold calling. Some influential studies in this regard are Moseson et al., (2020) which examined study samples recruited with virtual versus traditional recruitment methods, as well as Verma et al., (2016) which reviewed online recruitment approaches. In summary, online job search and recruitment methods offer numerous advantages over traditional methods, making them the preferred choice for many employers and job seekers.

The research objectives of this study were:

1. To research and investigate if health systems are better served using online recruitment platforms to get optimal return of invested budget and time resources.

2. To provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms.

3. To investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians.

In regard to objective number one- whether health care systems are better served using online recruitment platforms to get optimal return of invested budget and time resources. The observation, from the result of this study, is that clinician recruitment is hugely expedited when using online and virtual recruitment as these platforms increase the geographical reach and scope of the recruitment campaign, Furthermore, this research and other studies have shown that online virtual recruitment enables efficiencies and cost effectiveness for financial resources with potentially better return on investment. We have shown faster and more efficient contract closure rates when utilizing online approaches.

When reviewing the second objective, which was to provide a comprehensive understanding of the main drivers in clinician decision making as it pertains to their use of online recruitment platforms. We can see from the research that virtual platforms provide clinicians, who are looking for opportunities, as well as clinician employers who are searching for candidates, a platform for attracting, filtering, and assessing candidates to a great degree and level of efficiency. The ability to quickly disseminate collateral electronically, attract candidates without much delay and without the hinderances of

geographic boundaries and then sort and assess those candidates is an attractive prospect for employers. Such efficiencies pay huge dividends for health care systems as this is vital to their clinical operations to have the correct staffing ratios without delay and for the benefit of optimal patient outcomes.

Regarding the third objective of the research study which was to investigate if a modern climate of technology (mobile devices and online platforms) potentially makes the hard copy recruitment mailings a redundant approach for health care systems in recruitment of clinicians. We found in this study that clinicians would not opt to use hard copy traditional approaches in place of online resources, they still valued the hard print collateral as a means of due diligence when researching a job opportunity. The respondents would use online platforms instead of traditional approaches if they must use it instead of traditional approaches, but the results showed that the preference would be to use both online resources as well as traditional offline non virtual approaches in their job searches. We may conclude, from the results of this research, that in our modern climate of technology (mobile devices and online platforms) there is still a vital role for hard copy recruitment mailings, and these approaches are not redundant as a tool for health care systems in recruitment of clinicians. Where health systems must deploy all resources available, they should continue to utilize all resources possible to ensure that they recruit generate a vast selection pool of candidates from which to elect the best clinical candidate possible for the best possible patient outcomes.

This results, of this research, shows that the best approaches to this endeavor include both online virtual resources as well as offline non virtual traditional resources.

This results have shown that there may still be instances where offline approaches can still be effective, like reaching out to potential clinical candidates who prefer to not have an online presence or who may not be actively searching for a career change. Additionally, some candidates may still prefer to use these non-virtual approaches and traditional methods as part of their job search. The research supports that many candidates still utilize non virtual methods to verify the data that they may gather online. The offline approaches are used to validate the data and still represent a portion of the data used in the decision-making process of picking one position over another. Therefore, based on the research results it is evident that candidates still rely on offline resources and that companies should opt to use a variety of recruitment methods/strategies to ensure the broadest and deepest pool of potential job candidates are reached.

A weakness to this research reviewed is that they are mainly in English language publications and therefore we are missing a huge component of potential research published in other non-English language publications which represents a significant 'blind spot' in our further understanding of this area. Furthermore, better delineation of online platforms (specifically which platforms) and deeper stratification of specifically which offline approaches are preferred as the options present a large pool of offline choices and this research did not separate the different options to better understand user preferences. Additional research may be conducted to also better understand employer demographics and how that plays a role in the employer's choice of recruitment approaches as employers are also delineated into gender and age categories with demographic preference associated with each. This type of analysis is important as it provides insight into the better allocation

of recruitment efforts and cost/expenses/budget dollars and how best to utilize those dollars in an effort to recruit clinicians to open jobs.

When looking at and comparing online approaches versus traditional recruitment methods, further emphasis and research should be placed on comparing a broader spectrum of publications and studies that focus on metrics like total cost of recruitment, incorporating not just the hard costs but also the soft costs (people and resources) and overall quality of candidates leading to better patient outcomes and patient satisfaction. We cannot merely analyze the speed and cost of advertising but also need to review the lost opportunity costs of hiring the wrong candidates in haste or the effect that the wrong clinician may have on overall clinical outcomes and patient care. Poor clinical outcomes have a very different financial impact on the healthcare system from longer hospital stays to additional procedures to legal costs from law suits due to poor clinical prognosis. Future research should expand the scope of analysis to incorporate such factors in order to be more encompassing.

There is clearly a differential between offline approaches in that the question is not as simple as whether the candidate would choose from offline and online approaches, but we should pose the question “which offline approaches would you use?”. A better delineation between offline resources should be included in any future expansion of this research and/or publications.

APPENDIX A

SAMPLE OF 100 FINAL RESPONDENT TARGET LIST

TYPE	LOCATION	CITY	STATE
LPN	The Cottage Extended Care	Tulsa	OK
RN	Somerford of Frederick	Frederick	MD
RN	Sierra Rehabilitation and Care Community-Vivage	Lakewood	CO
RN	Sierra Rehabilitation and Care Community	Lakewood	CO
RN	woodlands at Robinson	Ravenna	OH
LPN	Amberwood Court Care Center	Denver	CO
RN	Plum Healthcare	Oroville	CA
RN	North Star Rehabilitation & Care Community	Aurora	CO
RN	Saber	Cuyahoga Falls	OH
RN	Summit Rehab and Care Community	Aurora	CO
RN	Vivage Quality Health Partners	Lakewood	CO
RN	Allison Care Center	Lakewood	CO
RN	Chatham Health and Rehab	Chatham	VA
LPN	Christopher House	Wheat Ridge	CO
RN	Covenant Retirement Communities	Skokie	IL
RN	Avante Group	Hollywood	FL
RN	Wheat Ridge Manor Care Center	Littleton	CO
RN	Wheatridge Manor ADONa	Wheat Ridge	CO
RN	Hunters Pond Skilled Nursing and Rehabilitation - Senior Care Centers	San Antonio	TX
RN	Avante Group	Hollywood	FL
LPN	Rowlett health and rehabilitation	Mesquite	TX
RN	Senior care centers	Houston	TX
RN	Westover Hills Rehabilitation	San Antonio	TX
LPN	Wheat Ridge Manor	Wheat Ridge	CO
LPN	Senior Care Centers	Corsicana	TX
RN	Rowlett health and rehabilitation	Rowlett	TX
RN	MAEFAIR HEALTHCARE CTR	Trumbull	CT
RN	TCC Corsicana	Corsicana	TX
LPN	Hearthstone Health Center	Round Rock	TX
RN	Senior Care of Brownwood	Brownwood	TX
RN	Hearthstone	Round Rock	TX

LPN	Kempsville Health and Rehab	Virginia Beach	VA
RN	Smith Center Health and Rehab	Smith Center	KS
LPN	Hutchinson Health and Rehab	Memphis	TN
LPN	Dockside Health and Rehab	Locust Hill	VA
LPN	Rowlett health and rehabilitation	Rowlett	TX
LPN	Sundance Inn	New Braunfels	TX
RN	Bainbridge Health & Rehab	Bainbridge	GA
RN	EmpRes Healthcare LLC	Long Beach	CA
LPN	MYSTIC PARK	San Antonio	TX
LPN	Senior Care of Sinton	Sinton	TX
LPN	Senior Care of Jacksonville	Jacksonville	TX
LPN	Chatham Health and Rehabilitation	Chatham	VA
LPN	Avante of Lake Worth	Lake Worth	FL
LPN	Crestview	Lancaster	TX
LPN	Windsor gardens health and rehab	Lancaster	TX
LPN	Rowlett Health and Rehabilitation	Rowlett	TX
RN	various	St Petersburg	FL
LPN	Lancaster Nursing and Rehabilitation	Lancaster	TX
RN	Independent contractor	Gaffney	SC
RN	North Ridge Health and Rehab	New Hope	MN
LPN	Park Manor of McKinney	McKinney	TX
LPN	Rowlett Healthcare and Rehab (Senior Care Center)	Wills Point	TX
RN	South Health Care Management - have multiple	Casselberry	FL
RN	Palm City Nursing and Rehab	Palm City	FL
LPN	Bainbridge Health & Rehab	Bainbridge	GA
LPN	Avante at Waynesboro	Waynesboro	VA
RN	Boulevard	Boynton	FL
LPN	Tiffany Hall Nursing and Rehab	Port St Lucie	FL
RN	Regency Heights of Detroit	Detroit	MI
LPN	Majestic Memory Care Center	Hollywood	Fl
RN	Christopher House Rehab & Care Community	Littleton	CO
RN	Kindred Healthcare	Ionia	IA
RN	Boulevard Rehab Center	Boynton Beach	FL
RN	Monroe Rehabilitation	Monroe	NC
RN	Heartland Rehab	Fort Worth	TX
RN	Ciena	Waterford	MI

RN	Shady Knoll Health Center	Seymour	CT
LPN	Colorow Care Center	Olathe	CO
RN	Falls Run Nursing and rehab	Fredericksburg	VA
LPN	Vohra Post Acute Physicians	Miramar	FL
LPN	Falls Run Nursing and Rehab	Fredericksburg	VA
LPN	SCC COTTONWOOD CREEK SNF	Cedar Park	TX
RN	Senior Care Center of Crowley	Crowley	TX
RN	Mullican Care Center	Savoy	TX
RN	AVANTE Group	Marshville	NC
LPN	Pratt health and rehab	Pratt	KS
LPN	The Lenn Wood Nursing and Rehabilitation	Dallas	TX
RN	Marlborough Hills	Marlborough	MA
RN	Manukamed USA	Southbury	CT
RN	Andrew House Healthcare	New Britain	CT
LPN	Longmeadow Healthcare	Justin	TX
LPN	Brookdale Senior Living	Cleveland	OH
RN	Medical Facilities of America	Kannapolis	NC
LPN	Legacy place	Akron	OH
LPN	Department of Veterans Affairs	Lawrenceville	GA
RN	Kindred healthcare	Louisville	KY
LPN	Stratford Commons	Glen willow	OH
LPN	Longleaf Neuromedical Treatment Center	Wilson	NC
LPN	Lamplight Inn	Maple Heights	OH
LPN	grace healthcare	Smyrna	TN
RN	Cleveland clinic	Cleveland	OH
RN	Longleaf Neuromedical Treatment Center	Wilson	NC
LPN	Colorow Care Center	Olathe	CO
LPN	State of Ohio	Twinsburg	OH
LPN	Signature Health	Marietta	
LPN	John Knox Village	Tampa	FL
RN	Wheatridge Manor	Wheatridge	CO
RN	Capital Regional Medical Center	Tallahassee	FL
LPN	Kindred Healthcare Stratford Commons	Solon	OH

APPENDIX B

TABLE 1. QUESTIONNAIRE TO CLINICIANS #1

Survey monkey questionnaire. On a scale of 1 – 10 please answer the following questions:

1= least likely, 10 = most likely	
-how likely are you to use an online internet resource to locate a new job?	
-how useful do you find printed collateral as a source of recruitment?	
-how effective has printed collateral been as a tool for recruiting?	
-how useful do you find online internet resources in locating a new job?	
-how effective have online resources been for your recruitment?	
- on the scale provide your opinion on the effectiveness of online recruitment resources	
- on the scale provide your opinion of the effectiveness of printed recruitment resources	
- how likely are you to use printed resources for your recruitment needs?	
- how likely are you to use printed resources for your recruitment needs?	
- how likely are you to use printed collateral instead of online platforms	
-How likely are you to use online platforms instead of printed collateral	

TABLE 2. QUESTIONNAIRE TO CLINICIANS #2

Survey monkey questionnaire. On a scale of 1 – 10 please answer the following questions: 1= least likely, 10 = most likely

-why do you use an online internet resource to locate a new job? Qualitative question.	
-why do you find it useful to use online internet resources in locating a new job?	
-why do you find it useful to use printed collateral as a source of recruitment?	
-why is it effective to use printed collateral as a tool for recruiting?	
-why is it effective to use online resources for your recruitment?	

TABLE 3. QUESTIONNAIRE TO CLINICIANS #3

-Which of the following would best describe your reason on the effectiveness of online	
recruitment resources	
Convenience	
Access	
Cost	
Reach	
Responsiveness	
Comfort/ease/familiarity	

TABLE 4. QUESTIONNAIRE TO CLINICIANS #4

Which of the following would best describe your reason on the effectiveness printed offline resources	
recruitment resources	

Convenience	
Access	
Cost	
Reach	
Responsiveness	
Comfort/ease/familiarity	

TABLE 5. QUESTIONNAIRE TO CLINICIANS #5

Survey monkey questionnaire. On a scale of 1 – 10 please answer the following questions: 1= least likely, 10 = most likely	
-how likely are you to respond to a printed mailer when locating a new job?	
-how likely are you to use your mobile device or computer to locate a new job opportunity?	
-How likely are you to use newspapers advertising to locate a new job?	
-How likely are you to use mailers to locate a job opportunity?	
-how did you locate your current position?	
-how useful do you find printed mailers when locating a new job?	
- how likely are you to use printed collateral instead of online platforms	
-How likely are you to use online platforms instead of printed collateral	

Survey monkey questionnaire. On a scale of 1 – 10 please answer the following questions: 1= least likely, 10 = most likely	
-why do you use an online internet resource to locate a new job? Qualitative question.	
-why do you find it useful to use online internet resources in locating a new job?	
-why do you find it useful to use printed collateral as a source of recruitment?	
-why is it effective to use printed collateral as a tool for recruiting?	
-why is it effective to use online resources for your recruitment?	

APPENDIX C

NULL HYPOTHESIS #1 T-TEST AND REGRESSION ANALYSIS

Hypothesis		
t-Test: Paired Two Sample for Means		
	10	*1*
Mean	9.372703412	1.556430446
Variance	0.46800556	0.538861355
Observations	762	762
Pearson Correlation	-0.057635733	
Hypothesized Mean Difference	0	
df	761	
t Stat	209.0992381	
P(T<=t) one-tail	0	
t Critical one-tail	1.646858406	
P(T<=t) two-tail	0	
t Critical two-tail	1.963086172	

0								
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.058493557							
R Square	0.003421496							
Adjusted R Square	0.002111932							
Standard Error	0.683314657							
Observations	763							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	1.219918125	1.219918	2.612698	0.106425706			
Residual	761	355.3252981	0.466919					
Total	762	356.5452163						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 25%*	*Upper 25%*	*ower 25.0%*	*Upper 25.0%*
Intercept	9.458345309	0.058013588	163.0367	0	9.344459638	9.572231	9.34446	9.572230981
X Variable 1	-0.05452188	0.033730767	-1.61638	0.106426	-0.120738282	0.011695	-0.12074	0.011694522

Confidence interval		
	Lower 95% Confidence Interval	Upper 95% Confidence Interval
Intercept	9.344638677	9.572051942
X variable	-0.120634183	0.011590423

NULL HYPOTHESIS #2 T-TEST AND REGRESSION ANALYSIS

Hypothesis

t-Test: Paired Two Sample for Means

	9	*8*
Mean	9.363517	7.729659
Variance	0.457695	0.528659
Observations	762	762
Pearson Correlation	-0.01901	
Hypothesized Mean		
Difference	0	
d.f.	761	
t Stat	44.98804	
P(T<=t) one-tail	7.217	
t Critical one-tail	1.646858	
P(T<=t) two-tail	1.4E-216	
t Critical two-tail	1.963086	

Regression Statistics

SUMMARY OUTPUT

ssion Statistics	
Multiple R	0.019265116
R Square	0.000371145
Adjusted	-0.000942428
Standard	0.676534053
Observati	763

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regressio	1	0.129320827	0.129321	0.282546	0.595192438
Residual	761	348.3084249	0.457698		
Total	762	348.4377457			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 25%*	*Upper 25%*	*ower 25.0%*	*Upper 25.0%*
Intercept	9.501618798	0.26185347	36.28601	3.9E-168	8.987577873	10.01566	8.987578	10.01565972
X Variable	-0.017927288	0.033726402	-0.53155	0.595192	-0.084135121	0.048281	-0.08414	0.048280546

Confidence Interval

	Lower 95% Confidence Interv	Upper 95% Confidence Interv
intercept	8.988385997	10.0148516
X variable	-0.084031035	0.04817646

NULL HYPOTHESIS #3 T-TEST AND REGRESSION ANALYSIS

Regression Statistics									
SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0.668776443								
R Square	0.44726193								
Adjusted R Square	0.446535599								
Standard Error	0.404866251								
Observations	763								
ANOVA									
	df		*SS*		*MS*	*F*	*Significance F*		
Regression	1		100.9369939		100.937	615.7823	4.6105E-100		
Residual	761		124.7405946		0.163917				
Total	762		225.6775885						
	Coefficients		*Standard Error*		*t Stat*	*P-value*	*Lower 25%*	*Upper 25%*	*Lower 25.0%*	*Upper 25.0%*
Intercept	4.142767944		0.203607656		20.34682	8.04E-74	3.743068571	4.542467317	3.743068571	4.542467317
Employer: How effective has online reso	0.538223412		0.021689472		24.81496	4.6E-100	0.49564511	0.580801715	0.49564511	0.580801715

Confidence interval		
	Lower 95% Confidence Interval	Upper 95% Confidence Interval
intercept	3.743696939	4.541838949
X variable	0.495712047	0.580734778

REFERENCES

1. Antoun, C., Zhang, C., Schober, M. F. 2004. Comparisons of online recruitment strategies for convenience samples: Craigslist, Google AdWords, Facebook, and Amazon Mechanical Turk. Journal Name, Volume (Issue).
2. Asch, S., Connor, S.E., Hamilton, E.G. and Fox, S.A., 2000. Problems in recruiting community-based physicians for health services research. *Journal of general internal medicine*, *15*(8), pp.591-599.
3. Asghari, S., Kirkland, M.C., Blackmore, J., Boyd, S.E., Farrell, A., Rourke, J., Aubrey-
4. Baker, M.J., 2003. Data collection–questionnaire design. *The marketing review*, *3*(3), pp.343-370.
5. Bassler, F.K., Godwin, M., Oandasan, I. and Walczak, A., 2019. A systematic review of reviews: recruitment and retention of rural family physicians. *Canadian Journal of Rural Medicine*, *25*(1), pp.20-30.
6. Berry, M. J. A., & Linoff, G. S. (2017). Data Mining Techniques: Peer Marketing Sales, and Customer Relationship.
7. Bezawada, R., Balachander, S., Kannan, P. K., & Shankar, V. (2009). Cross-Category Effects of Advertising and Display Placements: A Spatial Modeling Approach. Journal of Marketing, 73, 000-000.
8. Block, D.J., 2016. Understanding recruitment and retention. *Physician Leadership Journal*, *3*(4), p.44.

9. Blumenberg, C., Menezes, A. M. B., Gonçalves, H., Assunção, M. C. F., Wehrmeister, F. C., Barros, A. J. D. (2019). How different online recruitment methods impact on recruitment rates for the web-based coortesnaweb project: a randomized trial. BMC medical research methodology, 19(1), 1-9.
10. Cargan, L., 2007. *Doing social research*. Rowman & Littlefield Publishers.
11. Cayla, J., & Peñaloza, L. (2016). Mapping the Play of Organizational Identity in Foreign
12. Christensen, T., Riis, A. H., Hatch, E. E., Wise, L. A., Nielsen, M. G., Rothman, K. J., ... Mikkelsen, E. M. (2017). Costs and efficiency of online and offline recruitment methods: a web-based cohort study. Journal of Medical Internet Research, 19(3), e6716.
13. Danish, A., Champagne, F. and Blais, R., 2020. Theoretical analysis of policies to improve the recruitment and retention of rural physicians. *Australian Journal of Rural Health*, *28*(5), pp.427-433.
14. Day, G. S., & Schoemaker, P. J. H. (2006). Peripheral Vision: Detecting the Weak Signals That Will Make or Break Your Company. Cambridge, MA: Harvard Business School Press.
15. Dickson, D., & Nusair, K., 2010. An HR perspective: The global hunt for talent in the digital age. *Worldwide Hospitality and Tourism Themes*, 2 (1), pp. 86-93
16. Dodd, D., & Favaro, K. (2006). Managing the Right Tension. Harvard Business Review, December 2006, 62-74.

17. Drucker, P. (1973). Management: Tasks, Responsibilities and Practices (Chapter 7). New York: Harper and Row.
18. Ehrenfield, J. R. (2006-2007). Feeding the Beast. Fast Company, December 2006-January 2007, 42-43.
19. Engardio, P. (2007). Beyond the Green Corporation. Business Week, January 29, 2007, 50-64.
20. Fannin, J.M. and Barnes, J.N., 2007. Recruitment of physicians to rural America: a view through the lens of Transaction Cost Theory. *The Journal of Rural Health*, *23*(2), pp.141-149.
21. Finotelli, C., 2014. The international recruitment of physicians and IT and engineering specialists in Germany and Spain: actors, processes, and challenges. *Torino (FIERI Working Papers). Available online at http://www. labmiggov. eu*.
22. Gagnon, M.P., Pollender, H., Trepanier, A., Duplaa, E. and Ly, B.A., 2011. Supporting health professionals through information and communication technologies: a systematic review of the effects of information and communication technologies on recruitment and retention. *Telemedicine and e-Health*, *17*(4), pp.269-274.
23. Galanaki, E., 2002. The decision to recruit online: a descriptive study. *Career Development International*, 7 (4), pp. 243-251.
24. Guild, T. (2009). Think Regionally, Act Locally: Four Steps to Reaching the Asian Consumer. McKinsey Quarterly, 4 (September 2009), 22-30.

25. Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E., 2013. Multivariate Data Analysis. Always Learning.
26. Hamel, G. (2000). Leading the Revolution. Boston: Harvard Business School Press.
27. Hessekiel, D. (2012). Cause Marketing Leaders of the Pack. Forbes, January 31, 2012. Retrieved from www.forbes.com.
28. Homburg, C., Koschate, N., & Hoyer, W. D. (2005). Do Satisfied Customers Really Pay More? A Study of the Relationship between Customer Satisfaction and Willingness to Pay. *Journal of Marketing*, 69, 84-96.
29. Hopkins, M. (2009). What the 'Green Consumer Wants. MIT Sloan Management Review, (Summer 2009), 87-89.
30. Isaga, N., 2012. *Entrepreneurship and the growth of SMEs in the furniture industry in Tanzania* (Doctoral dissertation, Amsterdam: Vrije Universiteit).
31. Johansson, J. K. (2002). Global Marketing: Research on Foreign Entry, Local Marketing, Global Management. In Weitz, B., & Wensley, R. (Eds.), Handbook of Marketing (pp. 457-483). London: Sage.
32. Kalb, I. (2013). How to Do Direct Marketing That's Not Annoying. Business Insider, November 12, 2013.
33. Keegan, W. J., & Green, M. C. (2005). Global Marketing (4th ed.). Upper Saddle River, NJ: Prentice Hall.
34. Keegan, W. J. (2002). Global Marketing Management (7th ed.). Upper Saddle River, NJ: Prentice Hall.

35. Keiningham, T. L., Aksoy, L., Buoye, A., & Cooil, B. (2011). Customer Loyalty Isn't Enough. Grow Your Share of Wallet. Harvard Business Review, October 29-31.

36. Kim, J., Yang, G.S., Lyon, D., Kelly, D.L. and Stechmiller, J., 2021. Metabolomics: Impact of comorbidities and inflammation on sickness behaviors for individuals with chronic wounds. *Advances in Wound Care*, *10*(7), pp.357-369.

37. Kozinets, R. V., de Valck, K., Wojnicki, A. C., & Wilner, S. J. S. (2010). Networked Narratives: Understanding Word-of-Mouth Marketing in Online Communities. Journal of Marketing, 74(2), 71-89.

38. Kroft, S. (2014). The Data Brokers: Selling Your Personal Information. CBS News, March 9, 2014. Retrieved from www.cbsnews.com.

39. Kotter, J. P., & Heskett, J. L. (1992). Corporate Culture and Performance. New York: Free Press.

40. Kotler, P. (1999). Kotler on Marketing. New York: Free Press.

41. Lane, T.S., Armin, J., and Gordon, J.S., 2015. Online recruitment methods for web-based and mobile health studies: a review of the literature. *Journal of medical Internet research*, *17*(7), p.e4359.

42. Laws, R. A., Litterbach, E.-K. V., Denney-Wilson, E. A., Russell, C. G., Taki, S., Ong, K.-L., ... Campbell, K. J. (2016). A comparison of recruitment methods for an mHealth intervention targeting mothers: lessons from the growing healthy program. Journal of Medical Internet Research, 18(9), e248.

43. Lee, J., Walus, A., Billing, R., and Hillier, L.M., 2016. The role of distributed education in recruitment and retention of family physicians. *Postgraduate medical journal*, *92*(1090), pp.436-440.

44. Leftley, A., 2007. E-recruitment delivers return on investment for DML. *Strategic HR Review*, 6 (4), pp. 7-9.

45. Lin, Y.-C., & Chang, C.-C. A. (2012). Double Standard: The Role of Environmental Consciousness in Green Product Usage. Journal of Marketing, 76 (September 2012), 125-134.

46. MacQueen, I.T., Maggard-Gibbons, M., Capra, G., Raaen, L., Ulloa, J.G., Shekelle, P.G., Miake-Lye, I., Beroes, J.M. and Hempel, S., (2018). Recruiting rural healthcare providers today: a systematic review of training program success and determinants of geographic choices. *Journal of general internal medicine*, *33*(2), pp.191-199.

47. Malhotra, N.K. and Peterson, M., 2006. *Basic marketing research: A decision-making approach*. Prentice hall.

48. Malaviya, P. (2007). The Moderating Influence of Advertising Context on Ad Repetition Effects: Role of Amount and Type of Elaboration. Journal of Consumer Research, 34, 32-40.

49. McKracken, G. (2009). Chief Culture Officer. New York: Basic Books.

50. Mbemba, G.I.C., Gagnon, M.P. and Hamelin-Brabant, L., 2016. Factors influencing recruitment and retention of healthcare workers in rural and remote

areas in developed and developing countries: an overview. *Journal of public health in Africa*, *7*(2).

51. Mitchell, M.L. and Jolley, J.M., 2010. Research design explained: Instructor's edition.
52. Moraes, R. R., Correa, M. B., Daneris, Â., Queiroz, A. B., Lopes, J. P., Lima, G. S., ... Demarco, F. F. (2021). Email vs. Instagram recruitment strategies for online survey research. Brazilian Dental Journal, 32, 67-77.
53. Morgan, N. A., & Rego, L. L. (2006). The Value of Different Customer Satisfaction and Loyalty Metrics in Predicting Business Performance. *Marketing Science*, 25(5), 426-439
54. Moseson, H., Kumar, S., Juusola, J. L. (2020). Comparison of study samples recruited with virtual versus traditional recruitment methods. Contemporary Clinical Trials Communications, 19, 100590.
55. Nash, E. L. (2000). Direct Marketing: Strategy, Planning, Execution, 4th ed. New York: McGraw-Hill.
56. O'Loughlin, S. (2007). The Wearing o' the Green. Brand Week, April 23, 2007, 26-27.
57. Oppenheim, A. N. (2002). Questionnaire design, interviewing, and attitude measurement (New ed). Pinter Publishers; Distributed exclusively in the USA and Canada by St. Martin’s Press
58. Osgood, C. E., & Tannenbaum, P. H. (1955). The Principles of Congruity in the Prediction of Attitude Change. Psychological Review, 62(1), 42-55.

59. Paladine, H.L., Hustedde, C., Wendling, A., Sola, O., Prasad, R., Bjorkman, S. and Phillips, J., 2020. The role of rural communities in the recruitment and retention of women physicians. *Women & Health*, *60*(1), pp.113-122.

60. Pittman, P., Folsom, A., Bass, E. and Leonhardy, K., 2007. US-based international nurse recruitment. *Washington, DC: Academy Health*.

61. Pittman, P.M., Folsom, A.J. and Bass, E., 2010. US-based recruitment of foreign-educated nurses: implications of an emerging industry. *AJN The American Journal of Nursing*, *110*(6), pp.38-48.

62. Peters, T. J., & Waterman, R. H. Jr. (1982). In Search of Excellence: Lessons from America's Best-Run Companies. New York: Harper and Row.

63. Pittman, P., Frogner, B., Bass, E. and Dunham, C., 2014. International recruitment of allied health professionals to the United States: piecing together the picture with imperfect data. *Journal of Allied Health*, *43*(2), pp.79-87A.

64. Porter, M. E. (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Free Press.

65. Porter, M. E. (1996). What Is Strategy? Harvard Business Review, 61-78.

66. Peters, T. J., & Waterman Jr., R. H. (Year). In Search of Excellence: Lessons from America's Best-Run Companies.

67. Raha, S., Berman, P., and Rao, K.D., 2009. Challenges in recruitment of doctors by government.

68. Rahman, M., Morita, S., Fukui, T. and Sakamoto, J., 2004. Physicians' choice in using Internet and fax for patient recruitment and follow-up in a randomized controlled trial. *Methods of Information in Medicine*, *43*(03), pp.268-272.

69. Reinartz, W., & Saffert, P. (2013). Creativity in Advertising: When It Works and When It Doesn't. Harvard Business Review, 107-112.

70. Sargeant, J., Allen, M. and Langille, D., 2004. Physician perceptions of the effect of telemedicine on rural retention and recruitment. *Journal of Telemedicine and Telecare*, *10*(2), pp.89-93.

71. Saunders, M., Lewis, P. and Thornhill, A., 2009. *Research methods for business students*. Pearson education.

72. Schiff, A. (2012). DMA: Direct Response Rates Beat Digital. Direct Marketing News, June 14, 2012.

73. Schultz, et al. (1994). Strategic Advertising Campaigns. Chicago: NTC/Contemporary Publishing Company.

74. Selden, L., & Colvin, G. (2003). Angel Customers & Demon Customers. New York: Portfolio (Penguin).

75. Sridhar, S., Mantrala, M. K., & Albers, S. (2010). Personal Selling Elasticities: A Meta-Analysis. Journal of Marketing Research, 47 (October 2010).

76. Sharma, P., Marshall, R., Reday, P. A., & Na, W. (2010). Complainers vs. Non-Complainers: A Multi-National Investigation of Individual and Situational Influences on Customer Complaint Behavior. Journal of Marketing Management, 26(1-2), 163-180.

77. Shoemaker, P. J. H. (1995). Scenario Planning: A Tool for Strategic Thinking. Sloan Management Review, (Winter 1995), 25-40.

78. Stephens, C. R., & Sukumar, R. (2006). An Introduction to Data Mining. In Grover, R., & Vriens, M. (Eds.), Handbook of Marketing Research (pp. 455-486). Thousand Oaks, CA: Sage Publications.

79. Shaffer, F.A., Bakhshi, M.A., Farrell, N. and Álvarez, T.D., 2020. CE: original research: the recruitment experience of foreign-educated health professionals to the United States. *AJN The American Journal of Nursing*, *120*(1), pp.28-38.

80. Silverstein, M. J., Singhi, A., Liao, C., & Michael, D. (2012). The $10 Trillion Prize: Captivating the Newly Affluent in China and India. Boston: Harvard Business School Publishing.

81. So, R., Shinohara, K., Aoki, T., Tsujimoto, Y., Suganuma, A.M. and Furukawa, T.A., 2018. Effect of recruitment methods on response rate in a web-based study for primary care physicians: factorial randomized controlled trial. *Journal of medical Internet research*, *20*(2), p.e8561.

82. Sullivan, E. (2009, November 30). Play by the New Rules. Marketing News, 5-9.

83. Sylva, H., & Mol, S., 2009. E-recruitment: A study into applicant perceptions of an online application system. *International Journal of Selection and Assessment*, 17 (3), pp. 311 – 323.

84. Tan, P.-N., Steinbach, M., & Kumar, V. (2005). Introduction to Data Mining. Upper Saddle River, NJ: Addison Wesley.

85. Tax, S. S., & Brown, S. W. (Year, if available). (Title of the Article). Journal or Publication Title, Volume (Issue), Page Range.

86. Thawrani, M.R., 2021. Impact of Web-Based Recruitment on Organizational Image and Organizational Familiarity: A Study among HR Professionals. *International Journal of Social and Management Studies*, *2*(4), pp.123-140.

87. Thomas, R.M., 2003. *Blending qualitative and quantitative research methods in theses and dissertations*. Corwin Press.

88. Tong, D., 2009. A study of e-recruitment technology adoption in Malaysia. *Industrial Management & Data Systems*, 109 (2), pp. 281-300.

89. Unnava, H. R., Burnkrant, R. E., & Erevelles, S. (1994). Effects of Presentation Order and Communication Modality on Recall and Attitude. Journal of Consumer Research, 21(3), 481-490.

90. Van Der Lans, R., Cote, J. A., Cole, C. A., Leong, S. M., Smidts, A., Henderson, P. W., ... Schmitt, B. H. (2009). Cross-National Logo Evaluation Analysis: An Individual-Level Approach. Marketing Science, 28(5), 968-985.

91. Varey, R.J., 2006. Business and Management Research: How to Complete Your Research Project Successfully. *European Journal of Marketing*.

92. Verma, P., Ford, J.A., Stuart, A., Howe, A., Everington, S. and Steel, N., 2016. A systematic review of strategies to recruit and retain primary care doctors. *BMC Health Services Research*, *16*(1), pp.1-25.

93. Wade, T., Sauer, M.L. and Kushner, C., 2007. Recruitment and retention of physicians and primary care practitioners for North Carolina: a partnership approach. *North Carolina Medical Journal*, *68*(3), p.187.
94. Williams Jr, T.E., Satiani, B. and Ellison, E.C., 2011. A comparison of future recruitment needs in urban and rural hospitals: the rural imperative. *Surgery*, *150*(4), pp.617-625.
95. Wilkie, W. L., & Moore, E. S. (2002). Marketing's Relationship to Society. In Weitz, B. A., & Wensley, R. (Eds.), Handbook of Marketing (pp. 1-38). London: Sage.
96. Yacyshyn, A., 2012. Demographic Cohorts and Marketing Research. In *Opportunities and Challenges for Applied Demography in the 21st Century* (pp. 195-203). Springer, Dordrecht
97. Zikmund, W.G., 2000. Business research methods, Fort Worth, Tex.
98. Zhang, Y., Bradlow, E. T., & Small, D. S. (2014). Capturing Clumsiness when Valuing Customers: From RFM to RFMC. Working paper, Wharton School of Business.