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Restoring the Relationship Between Christianity and Science: A Tailored Health Communications Initiative for Watermark Health

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# Restoring the Relationship Between Christianity and Science: A Tailored Health Communications Initiative for Watermark Health

By

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Bachelor of Arts, Religion

Sewanee: The University of the South

2015

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An abstract of
A thesis submitted to the Faculty of the
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Abstract

Restoring the Relationship Between Christianity and Science: A Tailored Health Communications Initiative for Watermark Health

By: Mary Ottley

**Background:**
Vaccines save roughly two to three million lives each year. Yet, despite the robust evidence of vaccines' success, vaccine hesitancy is pervasive among many populations in the United States. In April 2021, the problem of vaccine hesitancy is acute as COVID-19 vaccines are widely available across the United States. Currently, the population most hesitant and least likely to be vaccinated is white evangelical Christians, according to a February 2021 Pew Research Center study. Considering these data, public health practitioners must address Christians' concerns about vaccines. To galvanize sustained vaccine uptake, the historical chasm between the scientific community and the Christian community must be reconciled.

**The Special Studies Project:**
Tailored, targeted health communications initiatives are an evidence-based intervention to address vaccine hesitancy among faith communities. This Special Studies Project seeks to implement education to increase vaccine uptake among the congregants of Watermark Community Church (WCC), to set the stage for future work assessing the effectiveness in addressing a root problem of evangelical Christian vaccine hesitancy: mistrust of science.

**Methods:**
To obtain both qualitative and quantitative data about existing health literacy, healthcare decision-making processes, and attitudes about specific healthcare topics, I used a mixed-methods approach to survey (n=96) and interview (n=5) Watermark Community Church members.

**White Papers:**
The final product of this Special Studies Project is a "starter series" of White Papers for Watermark Health, WCC's healthcare ministry. The "starter series" is a collection of five one-page briefings aimed at restoring the relationship between Christianity and science by illustrating a harmonious relationship between the two communities. White Papers I-III build the "harmony framework" and White Papers IV-V elucidate the implications of the harmonious relationship in two specific healthcare topics: vaccine development and vaccine safety and efficacy. After the "starter series" is released, the goal of the White Papers Initiative is such that Watermark Health will continue to release additional White Papers on other, reader-designated healthcare topics of interest.

**Conclusion:**
This Special Studies Project, The White Papers Initiative, serves as an opportunity to heal the divide between Christianity and science while increasing vaccine uptake, specifically COVID-19 vaccine uptake.

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*Whatever you do, work heartily, as for the Lord and not for men,*
*knowing that from the Lord you will receive the inheritance as your reward.*
*You are serving the Lord Christ.*
*– Colossians 3:23-24*

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# Chapter I: Introduction

## Introduction and Rationale

Vaccines save lives – roughly two to three million each year (WHO, 2019). Yet, despite the robust evidence of vaccines' success, vaccine hesitancy is pervasive among many populations in the United States (US). The problem of vaccine hesitancy is particularly timely as COVID-19 vaccines are widely available in the US. Currently, the population most hesitant and least likely to "get a vaccine" is white evangelical Christians, according to a February 2021 Pew Research Center study of "intent to get vaccinated" by religious affiliations in the US (2021).

Considering this alarming statistic, public health practitioners must address and assuage Christians' concerns about vaccines. To galvanize sustained vaccine uptake, the historical chasm between the scientific community and Christian community must be reconciled and the relationship restored. Tailored, targeted health communications initiatives are an evidence-based intervention to address vaccine hesitancy among faith communities (Kiser & Lovelace, 2019; Lahijani et al., 2021). This Special Studies Project seeks to implement this intervention to increase vaccine uptake among the congregants of Watermark Community Church (WCC) and explore its effectiveness in addressing what I claim to be the root problem of evangelical Christian vaccine hesitancy: mistrust of science.

## Problem Statement

Current COVID-19 vaccine statistics show vaccine hesitancy rates are highest among evangelical Christians. Yet, there is a gap in the literature targeting this population as academics and public health practitioners continue to focus their vaccine hesitancy research elsewhere, which Bednarczyk et al. note in their article "The Church, the State, and Vaccine Policy" (Bednarczyk et al., 2017). Health communications interventions tailored for evangelical Christians are needed to

increase evidence-based decision-making among this population and address the root cause for hesitancy, a century-old mistrust which defines the relationship between Christianity and science.

**Purpose Statement**

The purpose of this Special Studies Project is to create a tailored health communications initiative for Watermark Health, WCC's healthcare ministry. The objectives of the White Papers Initiative are three-fold: 1) to disseminate scientific information on the safety and efficacy of vaccines; 2) to promote healthy, evidence-based decision-making among evangelical Christian congregants of WCC; and 3) to restore trust in the relationship between the evangelical Christian and scientific communities.

**Research Question**

To inform the content of the White Papers, formative research was conducted among WCC members. The objectives of this formative research were: 1) to understand current knowledge and perceptions of historically contentious health topics; 2) to understand current healthcare decision-making processes of WCC members; 3) to identify barriers and facilitators of vaccine acceptance; and 4) to identify which health topics WCC members would like to receive more information about, and their preferred platform for receiving new healthcare information.

**Significance Statement**

To end the COVID-19 pandemic in the US, there is an acute need to increase white evangelical Christian vaccine uptake. White evangelical Christians make up 16% of the US population (Pew Research Center, 2019). If roughly half of that 16% refuse the COVID-19 vaccine, the US immunity rates could be significantly impacted. As such, tailored and targeted health communications interventions are urgently needed to address white evangelical Christian vaccine hesitancy. Furthermore, utilizing health communications interventions to address the root

problem of Christian distrust of science will not only decrease current COVID-19 vaccine hesitancy, but may mitigate or prevent future hesitancy.

**List of Definitions and Abbreviations**

ACLU: American Civil Liberties Union

AME: African Methodist Episcopal Church

APE: Applied Practice Experience

BIPOC: Black, Indigenous, and People of Color

CCT: Clinic Connecting Team (a Watermark Health program)

CDC: Centers for Disease Control & Prevention

COVID-19: Coronavirus disease 2019 (an infectious disease caused by SARS-CoV-2)

Evangelical Christianity: A movement in Christianity defined by the "four primary characteristics of evangelicalism: Conversionism, the belief that lives need to be transformed through a 'born-again' experience and a lifelong process of following Jesus; Activism, the expression and demonstration of the gospel in missionary and social reform efforts; Biblicism, a high regard for and obedience to the Bible as the ultimate authority; Crucicentrism, a stress on the sacrifice of Jesus Christ on the cross as making possible the redemption of humanity" (NAE, 2021)

HPV: Human papillomavirus

IHP: Interfaith Health Program

IPHFC: Institute for Public Health and Faith Collaborations (housed at Emory University)

MeSH: Medical Subject Headings

MMR vaccine: Measles, Mumps, and Rubella vaccine

MPH: Master of Public Health

MRC-5: Medical Research Council cell strain 5

NAE: National Association of Evangelicals

NIH: National Institutes of Health

OPV: Oral poliovirus vaccine

RSPH: Rollins School of Public Health

RTRQ: Real Truth Real Quick (a Watermark Community Church podcast)

SAGE: Strategic Advisory Group of Experts

US: United States

VEC: Vaccine Education Center (housed at the Children's Hospital of Philadelphia)

WCC: Watermark Community Church

WHO: World Health Organization

WI-38: Wistar Institute 38 cell line

WMH: Watermark Health

# Chapter II: Review of the Literature

## Overview of Modern Vaccine Hesitancy

### Introduction

In conjunction with the COVID-19 pandemic and the subsequent vaccine rollout, there exists an alarming and pervasive problem of public distrust in vaccines and the broader vaccination system. Vaccine hesitancy, resistance, and refusal are symptoms of this public distrust, but unlike COVID-19, they are not novel problems. The development of vaccines, and, consequently, vaccine hesitancy, dates back to the late eighteenth century (Dubé et al., 2014). In 1796, Dr. Edward Jenner used cowpox as a "deliberate mechanism of protection" against smallpox, which marked the first scientific attempt to control an infectious disease with a vaccination (Riedel, 2005). By the 1940s large-scale vaccine production in the US had evolved such that disease control efforts were primarily reliant on vaccines (CHOP, 2021). To this day, vaccines remain one of the most successful, cost-effective, and controversial disease prevention interventions available, saving between two and three million lives each year (Chen & Orenstein, 1996; WHO, 2019).

### Adverse Effects and Loss of Public Confidence

The ubiquitous availability of vaccines in the US, together with steady vaccination rates, resulted in the reduction or elimination of many diseases that continue to plague other countries. Diphtheria, for example, was a leading cause of death for children worldwide, including children in the US, but is "now nearly unheard of in the United States," according to the US's Centers for Disease Control and Prevention (CDC) (CDC, 2020). Successful vaccination campaigns, like the diphtheria campaign, generally galvanize positive results such as disease eradication or significantly reduced morbidity and mortality rates. However, in their article "Epidemiologic Methods in Immunization Programs," Chen and Orenstein discuss other, less celebrated results of

successful vaccination campaigns (Chen & Orenstein, 1996). The authors explain that "as the incidence of vaccine-preventable diseases is reduced by increasing coverage with an efficacious vaccine, vaccine adverse events, both causal and coincidental, become increasingly prominent" in the public eye (Chen & Orenstein, 1996, p. 112).

In other words, when incident cases of a disease decline, attention to adverse events increases. Chen and Orenstein give reason for these adverse events: first, "no vaccine is perfectly safe" and second, "no vaccine is perfectly efficacious" (Chen & Orenstein, 1996, p. 104, 112). Vaccines, as a whole, are designed for "healthy persons" because no one vaccine can account for each individual's preexisting health conditions (Chen & Orenstein, 1996, p. 112). "Perfectly efficacious" vaccines are also reliant upon perfect conditions. For a vaccine to be "perfectly efficacious," the vaccination must occur under "optimal conditions" (Chen & Orenstein, 1996, p. 109). Yet, "optimal conditions" are non-existent in day-to-day vaccination campaigns. Vaccines go unrefrigerated; recommended vaccination schedules are ignored; viruses mutate over time; and public misperception soars. Questions of safety and efficacy allow vaccines to be perceived as worse than certain diseases when those diseases are not as prevalent as the more publicized "adverse effects." As documented by Chen and Orenstein, vaccine hesitancy and "loss of public confidence" follow suit (Chen & Orenstein, 1996, p. 112).

**Modern US Vaccine Hesitancy**

According to Dubé et al., modern vaccine hesitancy in the US can be traced back to the documentary '*DTP: Vaccination Roulette*' produced by reporter Lea Thompson for a local news station in Washington, D.C. in 1982 (Dubé et al., 2014). The documentary claimed the pertussis component of the DTP vaccine was causing "severe brain damage, seizures and mental retardation" (Thompson, 1982). The repercussions of this documentary were notable in the 80s:

victim advocacy groups were formed by angry parents, lawsuits against vaccine manufacturers were filed, vaccine prices rose, and new legislature was passed by the US Congress.

Roughly 25 years after this initial DPT upheaval, Andrew Wakefield published a research study in *The Lancet* which alleged possible connections between autism and the MMR vaccine (Dubé et al., 2014; Wakefield, 1998). Before Wakefield's study was retracted from the publication and disproven, further damage to the public's trust of vaccines was caused (The Editors of *The Lancet*, 2010). Measles vaccination rates in the UK fell to less than 80% by 2004, which denotes an alarming decline when compared to the 1997 adherence rate of over 90% (Deer, 2020; Dubé et al., 2014). Brian Deer, an investigative journalist for *The Sunday Times*, a London-based newspaper, exposed Wakefield's unethical and false claims in a series of reports between 2004 and 2010, which were outlined in *The British Medical Journal* in 2011 (Deer, 2011). However, by the time Deer's findings were published and the UK General Medical Council's longest-ever "fitness to practise" hearing resulted in Wakefield's removal from the UK medical register, the modern "anti-vaxx" movement was born (Deer, 2011; Deer, 2020; Kmietowicz, 2010).

**Defining Vaccine Hesitancy**

As a result of the rise of vaccine hesitancy, The World Health Organization's (WHO) Strategic Advisory Group of Experts (SAGE) on Immunisation established a Working Group in March 2012 to research and define the phenomenon of vaccine hesitancy (Larson, 2015). This group was active through November 2014 and, in their published findings, defined vaccine hesitancy as the "delay in acceptance or refusal of vaccination despite availability of vaccination services" (MacDonald et al., 2015; WHO, 2014). The Working Group also agreed that "vaccine hesitancy is complex and context specific, varying across time, place and vaccines" and categorized reasons for vaccine hesitancy "by factors such as complacency, convenience and

confidence" (MacDonald et al., 2015; WHO, 2014). This "3Cs" model, consisting of the aforementioned "Cs," – complacency ("not perceiving diseases as high risk and vaccination as necessary"), convenience ("practical barriers"), and confidence ("lack of trust in safety and effectiveness of vaccines") – was first proposed by the WHO EURO Vaccine Communications Working Group (MacDonald et al., 2015; WHO, 2014).

**Betsch et al.'s 5C Scale**

It was later expounded upon by Betsch et al. who extended the 3C model to include the "5C antecedents of vaccine acceptance" (Betsch et al., 2018). The "5C scale" measures confidence, complacency, constraints, calculation, and collective responsibility to assess individuals' positioning on the "vaccine hesitancy continuum," which ranges from "high vaccine demand" to "complete vaccine refusal" (MacDonald et al., 2015).

Betsch et al. use the 5C scale to demonstrate the interconnected nature of individuals' reasons for vaccine hesitancy, delay, and refusal as well as "the psychological underpinnings of vaccine uptake" (Betsch et al., 2018). "Confidence" is defined using the WHO SAGE Working Group's definition: "trust in (i) the effectiveness and safety of vaccines, (ii) the system that delivers them, including the reliability and competence of the health services and health professionals, and (iii) the motivations of policy-makers who decide on the need of vaccines" (Betsch et al., 2018, p. 5; MacDonald et al., 2015). "Complacency" is also defined using the Working Group's definition: "perceived risks of vaccine-preventable diseases are low, and vaccination is not deemed a necessary preventive action" (MacDonald, 2015, p. 4162). Following "complacency," Betsch et al. utilize "constraints" to represent what the Working Group called "convenience," and use the Working Group's definition of "convenience" to define "constraints": "physical availability, affordability, and willingness-to-pay, geographical accessibility, ability to understand (language

and health literacy) and appeal of immunization service affect uptake" (MacDonald, 2015, p. 4163). "Calculation," one of the new "Cs" proposed by Betsch et al., refers to "individuals' engagement in extensive information searching," and "collective responsibility," the new and final "C," is defined as "the willingness to protect others by one's own vaccination by means of herd immunity" (Betsch et al., 2018, p. 7). Taken together, the 5C antecedents create a web of people's intersecting reasons for and against vaccines as well as a framework for understanding hesitancy.

| | **5C Antecedents:** | | | | |
|---|---|---|---|---|---|
| | **Confidence** | **Constraints** | **Complacency** | **Calculation** | **Collective Responsibility** |
| **Attributes of the 5C Antecedent:** | • Trust in the effectiveness of vaccines<br>• Trust in the system that delivers vaccines, including the reliability and competence of the health services and health professionals<br>• Trust in the motivations of policy-makers who decide on the need of vaccines | • Physical availability<br>• Affordability<br>• Willingness-to-pay<br>• Geographic accessibility<br>• Ability to understand (language and health literacy)<br>• Appeal of immunization service | • Perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a preventive action | • Individuals engagement in extensive information searching<br>• Perceived vaccination and disease risks | • Willingness to protect others by one's own vaccination by means of herd immunity<br>• Willingness to "free-ride when enough others are vaccinated" |

Table 1. "5C Antecedents" of Betsch et al.'s "5C Scale" (Betsch et al., 2018).

Interestingly, Betsch et al. use the 5C scale to defend John Grabenstein's research at one specific intersecting point of the vaccine hesitancy web – "religious reasons to decline immunization" (Grabenstein, 2013). The authors question "religious reasons" for vaccine refusal as they claim these reasons "actually reflect concerns about vaccine safety or personal beliefs among a social network of people organized around a faith community, rather than theologically based objections per se" (Betsch et al., 2018; Grabenstein, 2013). Regardless of reasoning, the role

of religion, and religious practitioners' negotiation of doctrine, is evident in each of the 5C antecedent categories. As such, an understanding of religion and its role in healthcare decision-making is vital to increase vaccine uptake.

## Overview of Religious Reasoning for Vaccine Hesitancy

### Introduction to Grabenstein

In his seminal work on the relationship between religion and vaccine hesitancy, "What the World's religions teach, applied to vaccines and immune globulins," John Grabenstein addresses the "vaccine-preventable infectious-disease outbreaks that occurred within religious communities or that spread from them to broader communities" (Grabenstein, 2013, p. 2011). He offers an overview of different religions' oppositions to vaccines and concludes that there are "few canonical bases for declining immunization, with Christian Scientists a notable exception" (Grabenstein, 2013). Before reaching this conclusion, Grabenstein summarizes historical religious reasoning for vaccine hesitancy and refusal. He focuses on six of the world's major religions – Buddhism, Christianity, Hinduism, Islam, Jainism, and Judaism – and synthesizes the "most ostensible objections to immunization attributable to religious belief" (Grabenstein, 2013). These objections fell into three categories: 1) "violation of prohibitions against taking life," 2) "violation of dietary laws," or 3) "interference with natural order by not letting events take their course" (Grabenstein, 2013, p. 2013).

### Buddhism, Jainism, & Hinduism

Grabenstein begins with Hinduism. He initially emphasizes vaccination as "widely accepted in predominantly Hindu countries," but goes on to cite the ways in which "Hindus advocate non-violence (*ahimsa*) and respect for life, because divinity is believed to permeate all beings, including plants and non-human animals" (Grabenstein, 2013, p. 2013). *Ahimsa* deters

some Hindus from accepting vaccines, but "the degree to which Hindu believers apply the principle of non-violence varies" (Grabenstein, 2013, p. 2013). Dr. John Blevins, Acting Director of the Interfaith Health Program (IHP) and Associate Research Professor at Emory University's Rollins School of Public Health, explains the variation that Grabenstein describes through his "Four Themes" framework for understanding the influences of religion on public health (Blevins, 2020). Blevins claims that "beliefs and practices rarely completely align for anyone inside of any religious tradition but are best understood as a series of negotiations among competing worldviews that claim to tell 'the truth' about the morality of a particular behavior" (Blevins, 2020).

Mahatma Gandhi, a Hindu and the renowned leader of the Indian independence movement, serves as an insightful example of these "negotiations" between *ahimsa* and vaccine acceptance. In 1921 Gandhi published *A Guide to Health* and said, "Vaccination is a barbarous practice…What is vaccination but the taking in of the poisoned blood of an innocent living animal? Better far were it for God-fearing men than they should a thousand times become the victims of small-pox and even die a terrible death than that they should be guilty of such an act of sacrilege" (Berman, 2020, p. 49-50; Gandhi, 1921/2019). But in 1930, after a devastating smallpox outbreak, Gandhi said, "These kiddies are fading away like little buds. I feel the weight of their deaths on my shoulders. I prevailed upon their parents not to get them vaccinated…It may be, I am afraid, the result of my ignorance and obstinacy" (Berman, 2020). This reversal demonstrates the negotiation between *orthodoxy*, "right belief," and *orthopraxy*, "right practice" (Goguen & Bolten, 2017). Grabenstein claims this negotiation is demonstrated in all *ahimsa*-adherent religions, specifically Hinduism, Jainism, and Buddhism, as practitioners of these religions "recognize the need to sustain human life, with regretful acceptance of cooking food, boiling water, using antibiotics and vaccines" (Grabenstein, 2013, p. 2019).

**Christianity, Islam, & Judaism**

The negotiation is no different in non-*ahimsa*-adherent religions, such as Christianity, Islam, and Judaism. Practitioners of Orthodox Judaism must negotiate between the "orthodoxy" of the *kashrut,* the collection of Jewish dietary laws from the books Leviticus and Deuteronomy in the Hebrew Bible, and the "orthopraxy" of the "permissibility" of the "administration of medications with non-kosher ingredients, if necessary to preserve life" which reflects the Jewish principle of *pikuach nefesh*, allowing "all religious obligations [to] be disregarded when the preservation of human life is at stake" (Grabenstein, 2013, p. 2014; Mathieu, 2016, p. 262).

Historically, this negotiation has been a complex one, and its implications notable. In 2019 in the state of New York, such implications manifested as the "longest documented outbreak in the United States since endemic measles was eliminated in 2000" in an Orthodox Jewish community largely unvaccinated against measles (CDC, 2019). A few months prior, in the fall of 2018, a group of unvaccinated Orthodox Jews from Rockland County, New York traveled to Israel when measles was spreading in Israel. Upon their return to the US, they had not only contracted measles, but also began transmitting it in their own community, which only had an MMR vaccination rate of 77%, well below the recommended rate of 95% (CDC, 2019). In response, Orthodox Jewish leaders, rabbinical leaders, and community groups advocated for vaccination. Associate Rabbi at Young Israel of Woodmere and Chief of Infectious Diseases at Mount Sinai South Nassau Hospital, Dr. Aaron Glatt, was one of the leaders who reiterated what Grabenstein writes; that "there's not a single opinion that says vaccination is against Jewish law" (Andrews, 2019).

Analogous to his findings about Judaism, Grabenstein claims vaccinations are also permitted in the Islamic religious tradition. The Holy Book of Islam, the Qur'ān, forbids the

consumption of certain animals (e.g., "the flesh of swine" is *haram*, "forbidden"). Other animals are *halal* ("permissible") when the conditions of how they died or were slaughtered are considered. Consequently, gelatin made from porcine skin or bones is forbidden as food, and gelatin made from other halal animals is acceptable as food (Grabenstein, 2013; Pelčić et al., 2016). However, a person is not guilty of sin in a "situation where the lack of a *halal* alternative creates an undesired necessity to consume that which is otherwise *haram*" (Holy Qur'ān, 2:173; Grabenstein, 2013, p. 2016). This allowance is known as the "law of necessity" in Islam, and it is similar to the principle of *pikuach nefesh* in Judaism. In such a case that a certain vaccine requires the use of an excipient such as hydrolyzed gelatin or trypsin, which may have porcine origins, Muslims have cited the law of necessity in addition to the "principle of transformation" (unclean products transformed into something new), "the principle of preventing harm" (*izalat aldharar*), and "the principle of the public interest" (*maslahat al-ummah*) in order to demonstrate the "orthodoxy" of vaccine acceptance and use (Grabenstein, 2013, p. 2016). Vaccine hesitance and opposition have arisen in the past, but "most of the objections raised related to social issues," rather than theological ones (Grabenstein, 2013; Yahya, 2006). One such example is the sixteen-month oral polio vaccine (OPV) controversy among Muslims in northern Nigeria during the early 2000s. Adherents believed OPVs were "contaminated with anti-fertility substances and the HIV virus was a plot by Western governments to reduce Muslim populations worldwide" (Yahya, 2006, p. 3). This non-theological belief resulted in delays of both the Nigerian and global polio eradication efforts.

Vaccine hesitancy rooted in social reasoning, rather than theological reasoning, is not isolated to Islam. Practitioners of the final religion that Grabenstein reviews, Christianity, are often linked, historically and presently, to social anti-vaccination movements. Yet, Grabenstein argues that there is no doctrinal ground for such anti-vaccination reasoning within Christianity. The

Christian sacred text, the Holy Bible, presents "no scriptural or canonical objection to the use of vaccines or immune globulins," Grabenstein claims (Grabenstein, 2013, p. 2015). While this is objectively true of Christianity, a multitude of subjective interpretations of the Bible have resulted in different sects of Christianity and different opinions about many "orthopraxy" issues, including vaccines. Similar to Grabenstein, other public health scholars, such as Laura Gaydos and Patricia Page, have published various Christian denominations' interpretations of "orthopraxy" issues (Idler, 2014). Gaydos and Page write about different denominations' acceptance of contraception, which draws further attention to Christian divisions.

The two most prominent divisions of Christianity in history were that of the Great Schism in 1054 A.D., which divided a once-unified Christianity into Eastern Orthodoxy and Catholicism, and the Reformation championed by Martin Luther in 1517, which created Protestantism and further divided Christianity into Eastern Orthodoxy, Catholicism, and Protestantism (Stefon, 2018). Grabenstein, and other scholars, include sects such as the Church of Jesus Christ of Latter-day Saints, Christian Science, and Jehovah's Witnesses under the umbrella of Christianity. However, each of the aforementioned sects do not adhere to the fundamental Christian belief of the unity of the Trinity ("God exists as three persons [God, Jesus, and the Holy Spirit], yet he is one God") (Grudem, 1999, p. 104). For this reason, they will not be included in this review as denominations of mainline Christianity. Additionally, with the focus of this review on Christianity in the US, the relationship between vaccine hesitancy and Protestantism will be central. The reason for this being "straightforward," Blevins explains; "the focus on Protestant Christianity reflects the major, formative role that this tradition has played in shaping America and its religious rhetoric for over three hundred years" (Blevins, 2019, p. 4). He claims, "American Protestantism was so foundational in establishing the cultural, political, and religious worldview of the United States

from the 1600s through the middle 1900s that understanding the nation today requires some knowledge of Protestantism's impact in these earlier generations" (Blevins, 2019, p. 5). The same applies to understanding Christians' current views of vaccinations in the US.

Before focusing exclusively on Protestantism, specifically the evangelical Protestant movement in the US, one additional survey of global Christianity is necessary to understand a central reason for adherents' vaccine hesitancy. According to the Pew Research Center, Christianity remains the largest religious group in the world, making up nearly one third (31%) of the global population (Hackett & McClendon, 2017). Of that 31%, over 50% of Christians identify as Catholic; 37% as Protestant; and 12% as Orthodox (Pew-Templeton, 2010).

## A Closer Look at Christian Vaccine Hesitancy

### Vaccines and Fetal Cell Lines

The majority of Catholics and Protestants identify with the "pro-life" movement, meaning they are ethically opposed to euthanasia and abortion and, correspondingly, view the "killing of unborn children" as a "moral evil" (Piper, 2021; Wilcox & Gomez, 1990). As this relates to vaccines, the "pro-life" movement commonly affects Christians' consent to vaccinations. Catholics and Protestants often cite "cell lines harvested from a deliberately aborted fetus," such as Wistar Institute 38 (WI-38) and Medical Research Council 5 (MRC-5), as their chief reason to decline specific vaccines, which were manufactured using those cell lines (Grabenstein, 2013, p. 2017). In 2006, the Pontifical Academy for Life, the academy dedicated to promoting "the consistent life ethic of the Roman Catholic Church," released a pronouncement entitled "Moral Reflections on Vaccines Prepared from Cells Derived from Aborted Human Fetuses" (Pontifical Academy for Life, 2006). This pronouncement offered two influential moral assertions for Catholics: alternatives to vaccines derived from fetal cell lines should be advocated for and sought

after, but when alternatives are unavailable, “vaccines with moral problems pertaining to them may also be used” (Pelčić et al., 2016; Pontifical Academy for Life, 2006, p. 548).

This ethical debate surrounding vaccine production prevails both in Catholicism and the evangelical Protestant movement, commonly referred to as evangelical Christianity. In January 2021, John Piper, a prominent evangelical Christian leader in Minnesota, produced a podcast titled “Can I Take a Vaccine Made from Aborted Babies?”, which urged evangelical Christians to “sacrifice in order to do what’s right” (Piper, 2021). In short, Piper aligns with the first moral argument of the Pontifical Academy for Life, but he renounces the second. Unlike Catholicism, evangelical Christianity has no distinct polity, or governing body, which deters the declaration of a uniform pronouncement like “Moral Reflections on Vaccines Prepared from Cells Derived from Aborted Human Fetuses” for its adherents. This also invites a greater degree of variability of attitudes about vaccines among the tradition’s practitioners. Varying Christian attitudes, specifically about the COVID-19 vaccine, are strikingly evident today as white evangelical Christians are the population in the US least likely to “get a vaccine,” according to a February 2021 Pew Research Center study of “intent to get vaccinated” by religious affiliations in the US (2021). 45% of white evangelical Christians say they will not get a COVID-19 vaccine, which is greater than two times the percentage of white Catholics who say they will not get a vaccine (Pew Research Center, 2021). In December 2020, the Catholic Church’s Congregation for the Doctrine of the Faith issued a “Note on the morality of using some anti-Covid-19 vaccines,” which clarified the overarching moral mandate to be vaccinated (Congregation for the Doctrine of the Faith, 2020).

**Response to Evangelical Christian Vaccine Hesitancy**

Many evangelical Christian leaders have since responded to the high rates of COVID-19 vaccine hesitancy. Leaders like Walter Kim, President of the National Association of Evangelicals,

hope to use their influence and network to encourage evangelical Christians to get vaccinated. Kim wrote an opinion piece for USA Today in January 2021 with Rabbi Moshe Hauer, the Executive Vice President of the Orthodox Union, one of the largest Orthodox Jewish organizations in the US. Together, the two religious leaders argue that "faith communities can help" with the COVID-19 vaccine rollout. They say:

> There are vast numbers of synagogues, churches and mosques located in virtually every community that could be deployed to help in this vaccine effort, making it accessible to so many Americans. Many of our congregations are ready, willing and able to share any or all of these assets with our local governments and health departments as they undertake the vaccination campaign. We would welcome the opportunity for many of our facilities to serve as vaccination sites…We can also work with you to spread awareness to our communities about the importance of the vaccines. (Kim & Hauer, 2021)

The attitude of acceptance, cooperation, and collaboration heralded by Kim stands in contrast to Piper's attitude toward the vaccine, highlighting differences in evangelical Christianity on this topic.

This difference, even in the context of one religious movement, illustrates a key element of the functional intersection between religion and public health: the role of religion as either a positive or negative "social force" (Idler, 2014). Whether positive or negative, its influence cannot be ignored. Professor of Sociology at Emory University and Director of the Religion and Public Health Collaborative, Dr. Ellen Idler, often refers to this influence when she argues for "religious literacy in the twenty-first-century" (Idler, 2014). She claims, "Knowledge about religious practices, particularly as they affect health, is essential for human flourishing in this increasingly multireligious world. Religious literacy is a twenty-first-century skill in many fields but especially in public health" (Idler, 2014, p. xi). In April 2021, public health professionals are able to observe the tangible effects of "religious practices" on health, specifically in the context of the COVID-19 pandemic, just as Idler argues.

White Protestants make up 29% of the US adult population (Pew Research Center, 2019). Of that 29%, 16% of all US adults identify as white evangelicals, or "born-again Christians," and "resistance to vaccination by half of them would seriously hamper efforts to achieve herd immunity," states Curtis Chang, a consulting professor at Duke Divinity School and founder of ChristiansAndTheVaccine.com (Crary, 2021; Pew Research Center, 2019).

**Misunderstanding Evangelical Christian Vaccine Hesitancy**

Yet, the healthcare community's "religious literacy" in regard to evangelical Christianity is sparse. There is a dearth of understanding and literature published about this 16% of the US population, which is evidenced by the Medical Subject Headings (MeSH) thesaurus. The MeSH thesaurus is used by health professionals to research biomedical and health-related information. It is controlled and organized by the National Library of Medicine, an institute within the National Institutes of Health (NIH) (National Library of Medicine, 2021). As of April 2021, "evangelical Christianity" is not a MeSH term, highlighting the difficulty in assessing this particular factor in published scientific literature. The implication of this matters greatly in regard to the vaccine hesitancy pervasive among evangelical Christians in the US today. Without specific information and evidence about this population, vaccine uptake initiatives will fail to identify and address root causes of hesitancy. Harkening back to Betsch et al.'s "5C's," building confidence in vaccines is directly correlated to building trust. The aforementioned example of zero MeSH terms is an indicator of the larger barrier to building trust among evangelical Christians, the decades-long chasm in the relationship between the scientific community and the evangelical Christian one.

Public health practitioners, medical professionals, and members of the scientific community must seek to understand this chasm as a component of their "religious literacy," which

is the first step in bridging it so that positive vaccination behavior change may be promoted (Idler, 2014). To do so, the modern evangelical Christian movement in the US must be examined.

## Overview of the Chasm Between Science and Protestant Christianity in the US

### US Protestant Influence

Blevins' book *Christianity's Role in United States Global Health and Development Policy* helps to elucidate the chasm (2019). Before summarizing the modern evangelical movement, Blevins first outlines the rise and decline of mainline Protestantism in the US, the lineage of which can be traced to Henry VIII who initiated the reformation of the English church in the 1530s. King Henry VIII desired to divorce Catherine of Aragon, who failed to bear him a male heir, and marry Anne Boleyn (Noll, 2019). The Roman Catholic Church refused his request, and Henry VIII subsequently dissolved the ties between the English church and the papacy. The English Reformation followed, and its broader effects "played a large role in the Christian history of North America," claims Dr. Mark Noll, a leading church historian and retired Professor of History at the University of Notre Dame (Noll, 2019). The English Reformation occurred in the wake of the Protestant Reformation, galvanized by Martin Luther's publication of his "95 Theses" in 1517, which called Christians to believe the Bible, not the institutional church or the pope, as the sole source of spiritual authority and encouraged adherents to do nothing "prohibited by Scripture" (Noll, 2019; Reese, 1999). By the time "the Protestants…first arrived in the American colonies in the early 1600s…the religious connections [to Protestantism] were too strong" to break from this sect of Christianity and return to former iterations of their beliefs; for example, Roman Catholicism (Blevins, 2019, p. 20). Of course, other sects of Christianity arose in America, but Protestantism maintained the majority among white Americans until the twentieth century.

Before the turn of the twentieth century, Protestantism also maintained a mostly positive relationship with the scientific community, embracing scientific advances such as inoculation. Blevins details the events of the seventeenth, eighteenth, and nineteenth centuries in greater detail in his book, but a few key examples demonstrate Protestantism as a predominantly positive "social force" for science, specifically public health; for example, Cotton Mather, a pastor in the Massachusetts colony, called for the inoculation of inhabitants after a smallpox outbreak in 1721 (Blevins, 2019). Mather also conducted one of the first recorded experiments of plant hybridization in 1716, and he was known as an influencer of early American science. Similar to Mather's example, General George Washington, an Anglican Protestant, ordered the inoculation of the entire Continental Army in 1777 after another smallpox outbreak (Blevins, 2019).

**US Protestant Influence Disrupted**

A disruption to this positive relationship between Protestantism and science occurred in the middle of the nineteenth century. Charles Darwin published *The Origin of Species* in 1859, which, Blevins says, "upended scientific, religious, and social assumptions" and "countered the default assumptions of European culture regarding cosmology, divine creation, and the unique place of human beings in that creation" (Blevins, 2019, p. 43). Around this same time, higher education in the US began to change. Once devoted to training the next generation of clergy, higher education institutions, such as Harvard College and Johns Hopkins University, began to adopt a German model of academic life. This marked a movement away from the American and British model which "stressed character formation," and embraced the German model's "stress on its freedom from petty sectarian control" (Noll, 2019, p. 303). The founding president of Cornell University, Andrew Dickinson White, promised that Cornell would "afford an asylum for Science – where truth shall be sought for truth's sake, where it shall not be the main purpose of the Faculty

to stretch or cut sciences exactly to fit 'Revealed Religion'" (Noll, 2019, p. 303). Noll cites Darwin as the "chief exemplar of the new science," and illustrates the growing consensus of the late nineteenth century Academy as one that "turned aside from the traditional effort to promote Christianity and a better society in tandem" (Noll, 2019, p. 304). Instead, intellectuals began to embrace "the vision of a future ennobled by science," which, Noll claims, both altered the "context in which Christian intellectual life took place" and "decisively influenced the general climate for Christian faith" (Noll, 2019, p. 304). This is the first fissure in the modern chasm between Christianity and science.

The divide only continued to grow. By the twentieth century, the "new science" reformation that took place in higher education came to a head in a secondary school in Dayton, Tennessee. In 1925, the Tennessee state legislature passed the Butler Act, which prohibited public school employees from teaching evolution to students. The American Civil Liberties Union (ACLU) placed advertisements in Tennessee newspapers which offered to pay for and provide legal services for any teacher willing to challenge this law. The ACLU was founded just five years prior to "defend and preserve the individual rights and liberties guaranteed to all people in [the US] by the Constitution and laws of the United States" (FAQs, 2021). With this goal, the organization perceived the Butler Act to be unconstitutional, and thus, wanted to overturn the legislature. The ACLU found its defendant in John Thomas Scopes, a 24-year-old football coach and substitute teacher in Dayton, Tennessee. Once the trial date in *The State of Tennessee v. John Thomas Scopes* was set, William Jennings Bryan, former US Secretary of State and fervent Protestant, joined the prosecution. Blevins explains this "turned the trial into a national spectacle that newspapers around the country termed 'the trial of the century'" (Blevins, 2019, p. 68). Clarence Darrow, a renowned attorney from Chicago and an agnostic, joined the defense team in

order, he said, to "show the country what an ignoramus [Bryan] was, and I succeeded" (Blevins, 2019, p. 68).

While the jury found Scopes guilty, organizations like the ACLU were buoyed by the verdict. They believed the Dayton court's decision would allow them to appeal to higher courts and build support for their position that scientific theory, not biblical narrative, should be the basis for teaching biology. To this day, the trial is described on the ACLU's website as the "public humiliat[ion]" of William Jennings Bryan and the defeat of "pro-creationist and anti-science crusaders" (Creationism, Evolution, and Religion, 2021; ACLU History, 2021). This portrayal of Christians as definitively "anti-science," birthed during the Scopes era, endured. Conversely, the trial also cemented an enduring ideal in the minds of Christians that those who are pro-science are, correspondingly, anti-creationist.

Citing Matthew Tontonoz, a biologist and social historian, Blevins revisits the Scopes trial and reflects on Bryan's closing argument, which was not delivered during the trial and published posthumously. Blevins states Bryan's key concern was not solely "biblical," but rather to challenge "a science that failed to mirror his belief in moral progressivism" and "justified the dismantling of social support programs in the interest of the 'survival of the fittest'" (Blevins, 2019, p. 69). As such, the Scopes trial was not a "battle" between Christianity and science, but its "perception in American popular culture" is such that it was a "seminal moment in the battle between science and religious fundamentalism," which Blevins says is a "battle that has continued on until this day" (Blevins, 2019, p. 69).

Noll agrees. The early twentieth century drove the "end [of] Protestant control of American higher education" and "produce[d] diverging forms of theology" for Protestants (Noll, 2019, p. 308). American Protestantism splintered under the pressure of a number of divisive issues in the

US: prohibition, immigration, eugenics, birth control, and the teaching of evolution. The amalgamation of these issues, and the contrasting response from the scientific community, acted as the definitive fissure in the modern chasm between Christianity and science.

In the years prior, there were a number of Protestant Christians who identified as both students of Christian theology and scientific researchers. One such individual, Asa Gray, was Darwin's closest collaborator, longtime professor of botany at Harvard, deacon in a Presbyterian church, founding member of the National Academy of Sciences, and an ardent believer that "religion and science were not necessarily mutually exclusive" (McLaughlin, 2019). Scientists like Gray stood as the example that the ACLU's definitive label of "pro-creationist and anti-science" is not accurate. After the Scopes trial, though, this notion is what persisted, and Christianity was viewed, in Idler's terms, as a negative social force. The result: a "religious depression" in the US, specifically among Americans identifying as Protestant. Blevins cites the Foreign Missions Conference of North America as a case study example. In 1920, 2,700 Protestant youth volunteered for foreign missions service, but by 1928 that number had declined to only 252 (Blevins, 2019). The shift was also seen in the larger US population. From 1952 to 2010, the US population more than doubled, but the percentage of the population who identified with a mainline Protestant denomination declined from over 15% to 7% (Blevins, 2019). This can be explained by Protestantism's chosen approach of separatism in the wake of the controversies of the 1920s.

**Evangelical Christianity's Rise**

In its stead rose evangelical Christianity. While the mainline Protestant population declined between 1952 and 2010, evangelical Protestant denominations doubled their membership to over 25 million members (Blevins, 2019). By 1942, the National Association of Evangelicals (NAE) was founded to "connect and represent evangelical Christians in the United States" (About NAE,

2021). Today, the NAE represents more than 45,000 churches, 40 different denominations, and a constituency of millions. Around the time of the NAE's founding, Christians such as Carl Henry and Bernard Ramm sought to revive Christianity's influence in the public sphere. A collection of Henry's essays, titled *The Uneasy Conscience of Modern Fundamentalism,* was published in 1947 and appealed for "renewed social and intellectual engagement" of Christians (Noll, 2019, p. 389). Similarly, Bernard Ramm published *Christian View of Science and Scripture* in 1954, which defended the compatibility of modern science and traditional views of the Bible, and called for the "return of evangelicalism to the tradition of late nineteenth-century conservative scholars, who learned the facts of science and Scripture" (Noll, 2019; Ramm, 1954). Even Billy Graham, the "most visible American Protestant evangelical of the twentieth century's second half," was "unusually eager to cooperate" with a wide range of Christian denominations and sects, with "integrating blacks and whites in his crusades" during the Civil Rights Movement, and with every president from Harry Truman to George W. Bush, regardless of political party (Noll, 2019, p. 390). "Separatistic fundamentalists wrote him off as soft on liberalism," though, says Noll (2019, p. 390). Many of the efforts to bridge the divide between Christianity and science were overshadowed, Blevins claims, by the pervasive "need…to combat the dangers [seen] in secularism and liberalism" (Blevins, 2019, p. 155). The continued decline in membership among mainline Protestant denominations between 1950 and 2000 signaled to evangelical Christians that "liberalism and Christianity are not compatible" (Blevins, 2019, p. 156).

By the turn of the twenty-first century, various other conflicts between Christianity and science, specifically the health sciences, took place. The 1973 *Roe v. Wade* US Supreme Court decision to legalize abortion galvanized opposition from pro-life evangelical Christians. Like John Piper, many evangelical Christians understand this ruling as a direct violation of the Hippocratic

Oath to which medical providers swear – *primum non nocere* ("first do no harm") (Greek Medicine, 2012). Evangelical Christians, like Catholics, believe human life begins at conception. As such, many believe medical professionals who perform abortion procedures commit "first degree murder" (Parker, 2019). Holding to this view, evangelical Christians believe medical professionals are violating the most basic ethical precepts. From the 1925 Scopes trial to the 1973 *Roe v. Wade* trial to government-enforced COVID-19 non-pharmaceutical intervention mandates in 2020, evangelical Christians have lost trust in a government committed to what they perceive to be pro-science, "anti-creationist" legislature. In a 2013 Editorial in *Vaccine*, Dr. Richard Zimmerman relates this perception directly to vaccine science. He says, "Mistrust in vaccine science by some religious communities is due to a perception that many scientists are atheistic and opposed to matters of faith" (Zimmerman & Raviotta, 2013). Zimmerman's claim confirms the century-old chasm, which appears insurmountable.

On April 8, 2021, John Yang, PBS NewsHour correspondent, interviewed Reverend Russell Moore, President of the Ethics and Religious Liberty Commission of the Southern Baptist Convention, the largest evangelical Christian denomination which accounts for 5.3% of the US adult population (Pew Research Center, 2015). During the interview, Yang shared a video clip of Billy Bryan, a 49-year-old white evangelical Christian teacher in Memphis, Tennessee. Bryan describes his hesitancy toward the COVID-19 vaccine by saying, "My real hesitancy, though, is I just don't really want to see the government or anybody force people to do something that those people feel like is not in their best interests" (Yang & Khan, 2021). Bryan doesn't cite religion; he cites government mistrust. Moore, in responding to Bryan, encourages Christians with an appeal to science: "We have really good scientific data on the vaccines" (Yang & Khan, 2021). Yet, for over a century, science and scientific data have not been trusted sources for Christians in the US.

How, then, do we reestablish and reimagine a relationship between the two? To build vaccine confidence, Betsch emphasizes the necessity of "trust in the motivations of policy-makers who decide on the need of vaccines" (Betsch et al., 2018). To build evangelical Christian confidence, we not only need to reframe the relationship between Christianity and science, but we must replicate the targeted interventions of other populations in the US that have made significant strides in overcoming mistrust. Academic literature that focuses on building vaccine confidence specifically among white evangelical Christians is not widely available. However, we can look to another faith-based network – "The Influenza Initiative" – as an example to adapt and replicate.

## Overcoming Mistrust: Examples from Relevant Vaccine Uptake Interventions

### The Influenza Initiative

The Influenza Initiative was created in response to the H1N1 virus, a novel influenza virus that began circulating in the US in early 2009 (Kiser & Lovelace, 2019). The CDC called upon the IHP at Emory University to assist in reaching "vulnerable, hard to reach, and minority populations that were often beyond the reach of traditional public health programs" (Kiser & Lovelace, 2019). The IHP tapped into its existing network of "organizations with a faith-based identity and mission or a strong outreach program into diverse faith communities" to extend vaccination education and services (Kiser & Lovelace, 2019).

The results of the Influenza Initiative were significant. One such result, the "Model Practices" Toolkit, serves as a guide for public health and faith-based partnerships. The toolkit outlines necessary steps in building vaccine confidence. One step, "identifying trusted leaders," was crucial to vaccine uptake. Dr. Mimi Kiser, Director of the IHP's Institute for Public Health and Faith Collaborations (IPHFC), emphasizes that trust is "built within networks of partners when their priorities and the community's needs are met and yours are put aside" (IHP, 2014, p. 12).

Repeated throughout the literature is this notion of prioritizing the target group's concerns. In the WHO's guide "Vaccination and Trust," a similar point is maintained. The guide states, "Health authorities need to understand the target groups and their barriers and motivators to vaccination, and plan communication activities accordingly" (WHO, 2017, p. 32). In the case of the Influenza Initiative's work, an understanding of "histories of unethical practices by public health systems directed at Black, Indigenous, and People of Color (BIPOC)" was essential to carrying out successful programming (American Psychological Association, 2020).

The Influenza Initiative took place across the US with 10 sites that "engaged in capacity building, community outreach, and vaccination administration" (Kiser & Lovelace, 2019, p. 372). At one site in Colorado during the 2015-2016 flu season, 1,376 individuals were vaccinated and 22% of those vaccinated received a first-time flu vaccine (Kiser & Lovelace, 2019). Kiser says addressing upstream barriers to vaccination, like mistrust and transportation, were necessary to achieve the aforementioned uptake in participation and vaccine acceptance. Additionally, 6 of the 10 sites directly provided vaccinations (Kiser & Lovelace, 2019). The administration of vaccines by a trusted vaccinator has also proved to increase vaccine uptake (Larson et al., 2018). Over the course of the seven years that data was collected from the Influenza Initiative, an uptake of 171,747 influenza vaccines was achieved (Kiser & Lovelace, 2019).

**HPV Prevention in AME Churches: A Health Communications Case Study**

Other faith-based initiatives resulted in similar findings of the importance of trusted religious leaders in building vaccine confidence. One study of human papillomavirus (HPV) prevention in an Atlanta, Georgia African Methodist Episcopal (AME) church affirmed the importance of "leveraging the pre-established trust within the church" for effective interventions (Lahijani et al., 2021). The primary author of this research study argues for "tailored church-

based…vaccination promotion strategies" to be implemented to increase vaccination coverage (Lahijani et al., 2021).

**Moral Foundations Theory**

While sources of mistrust among white evangelical Christians cannot be equated to the sources of mistrust among members of the Black or LatinX communities, successful mechanisms for overcoming mistrust in faith communities can be learned from and adopted; specifically, communications interventions that appeal to Christians' moral framework and their basis for decision-making. In a 2017 publication, Amin et al. apply Haidt and Graham's Moral Foundations Theory to vaccine hesitancy (Amin et al., 2017; Haidt & Graham, 2007). The six foundations associated with the Moral Foundations Theory are discussed: care/harm, authority/subversion, loyalty/betrayal, liberty/oppression, purity/degradation, and fairness/cheating (Amin et al., 2017; Haidt & Graham, 2007). The researchers conducted a quantitative study to demonstrate the link between the purity and liberty moral foundations and parental vaccine hesitancy (Amin et al., 2017). This research is also relevant to faith-based interventions as it presents moral foundation-framed messages that may help "translate language and meaning and thus build bridges between different sectors," as Kiser says (Amin et al., 2017; Kiser & Lovelace, 2019). The moral foundations that Haidt and Graham proposed to bridge the moral motivations gap between "political conservatives and political liberals" can be used to bridge the gap between evangelical Christians and scientists as well (Haidt & Graham, 2007).

## Conclusion

Current COVID-19 vaccine statistics show vaccine hesitancy rates are highest among evangelical Christians. Yet, there is a gap in the literature targeting this population as academics and public health practitioners continue to focus their vaccine hesitancy research elsewhere, which

Bednarczyk et al. note in their article “The Church, the State, and Vaccine Policy” (Bednarczyk et al., 2017). Health communications interventions tailored for evangelical Christians are needed to increase evidence-based decision-making among this population and address the root cause for hesitancy, a century-old mistrust which defines the relationship between Christianity and science.

## Chapter III: Methodology

### Introduction

In May 2020, the Executive Director of Watermark Health (WMH), Christy Chermak, offered me the opportunity to complete my Applied Practice Experience (APE) with WMH in Dallas, Texas during summer 2020. The APE is a graduation requirement for the Rollins School of Public Health's (RSPH) Master of Public Health (MPH) degree. During this 200-hour APE, MPH candidates must produce two deliverables that benefit their APE host agency.

My host agency, WMH, originated as QuestCare Clinic in 2012. Watermark Community Church (WCC), a nondenominational church founded in 1999 in Dallas, Texas, established the QuestCare urgent care clinic in partnership with Envision Physician Services in 2012 (Our Story, 2021). In 2018, the dynamic of the partnership between WCC and Envision changed. WCC became the operating partner and restructured the parent 501(c)(3), WMH, to manage the growth of its budding healthcare ministry. As of April 2021, WMH operates the Skillman and Plano Clinics, two urgent care clinics for uninsured and underinsured patients; a Mobile Unit clinic, which provides acute services for people with limited access to healthcare and people experiencing homelessness; and sonography services for pregnant women and dental extraction services at the Skillman Clinic (2020 Year End Review, 2020). Historically, WMH has focused its medical care externally. WCC congregants who identify as underinsured or uninsured are invited to utilize WMH services, but the majority of WMH's patient population does not primarily identify as congregants or affiliates of WCC. Since WMH's beginning, WMH leadership has explored how to expand its reach to serve and educate WCC congregants; most recently through the implementation of a COVID-19 testing site at WCC's Dallas campus and an influenza vaccine

clinic for WCC staff in fall 2020. An April 21, 2020 event intensified Chermak's desire to engage the internal church community on the topic of health.

On April 21, 2020, WCC released a podcast episode of "Real Truth Real Quick" (RTRQ) titled "A Biblical Perspective on Vaccines." The episode lasted fifty-two minutes and thirty-three seconds and featured, as the host described his guest, the podcast's "first ever medical expert" since its inception in 2013 (RTRQ, 2020). The guest, Dr. Matt Bush, is an emergency medicine physician at Medical City Dallas Hospital, a WCC member, and the founder of WMH. Both the podcast host and guest affirmed and heralded Christians' use of vaccines, which incited a strong adverse reaction from certain members of the WCC community. In response, WCC removed the April 21, 2020 episode of RTRQ from all online platforms, and posted an episode titled "How Should a Leader Respond to Failure and Success?" on April 28, 2020 in its place. This episode references an apology video posted to Facebook on April 24, 2020, which features WCC Founding Pastor, Todd Wagner, saying, "While my perspective hasn't changed…that vaccines by and large serve the greater good…I could have done a better job of making sure that other things were shared" (RTRQ, 2020; Watermark Community Church, 2020).

Chermak saw that many of the negative RTRQ responses cited beliefs commonly associated with the modern anti-vaccination movement. In the subsequent weeks, she had conversations with WCC congregants that revealed a pattern of non-evidence-based healthcare decision-making in the WCC community. As such, Chermak recruited me to assess current levels of health literacy of WCC members and create a tailored health communications initiative for WMH to release to its target audience of WCC members.

*Purpose of Special Studies Project:*

The purpose of this Special Studies Project is to create a tailored health communications initiative for Watermark Health. The objectives of the White Papers Initiative are three-fold:

- To disseminate scientific information on the safety and efficacy of vaccines;
- To promote healthy, evidence-based decision-making among evangelical Christian congregants of WCC; and
- To restore trust in the relationship between the evangelical Christian and scientific communities.

**Population and Sample Size**

WCC is made up of 7,280 adult members (S. Parsons, personal communication, April 5, 2021). The adult members are predominantly white, middle-class, and English-speaking. Members attend services at either WCC's Dallas campus or its Frisco campus, which is located roughly twenty miles north of the Dallas campus.

To be considered a WCC member, an individual must complete the "four-step Membership process;" complete Discover Watermark, attend the two-part Membership Class, serve monthly with a WCC-affiliated ministry, and meet weekly with a Community Group (Membership Process, 2021). As such, WCC distinguishes between "members" and "regular attenders." The weekly attendance rate is significantly higher than its population of members. In 2019, when WCC consisted of four campuses, roughly 20,000 people participated in WCC's midweek and weekend ministries each week (Hall, 2019).

When assessing health literacy of WCC members, I conducted our research among a smaller sample of Watermark members; the staff. There are 215 WCC staff members between its

two campuses and roughly 89% are white. A total of n=91 responded and contributed to our health literacy survey, yielding a 42.3% response rate.

I also conducted 6.3 hours of in-depth interviews in August 2020 (n=5 WCC members). Four of the five respondents have chosen to either delay vaccinating or have not vaccinated their children at all. Interviews with these four individuals generated qualitative themes which helped us understand WCC members' reasons for vaccine hesitancy.

Lastly, I conducted research among the WMH staff. To document Christian health practitioners' perceptions and attitudes about the health literacy rates of WCC members, I surveyed the medical providers of WMH's staff. Of the 17-person staff, 53% (n=9) are medical providers. Of the medical providers, 55% responded to the survey (n=5).

In total, n=101 WCC congregants contributed to the formative research utilized to create the White Papers for WMH.

**Research Design & Procedures**

To obtain both qualitative and quantitative data about health literacy, healthcare decision-making processes, and attitudes about specific healthcare topics, I used a mixed-methods approach to survey WCC members.

I designed a qualitative in-depth interview guide (see Appendix 1) and conducted 6.3 hours of key informant interviews between August 4, 2020 and August 7, 2020 with n=5 WCC members.

Additionally, I designed two Google Form quantitative surveys; one for WCC members (see Appendix 2) and another for WMH-affiliated medical providers (see Appendix 3). N=91 WCC members responded to the member survey and n=5 WMH medical providers responded to the provider survey.

*Purpose of Formative Research:*

To create the White Papers, formative research was conducted among WCC members. The objectives of this research were:

- To understand current knowledge and perceptions of historically contentious health topics;
- To understand current healthcare decision-making processes of WCC members;
- To identify barriers and facilitators of vaccine acceptance; and
- To identify which health topics WCC members would like to receive more information about, and their preferred platform for receiving new healthcare information.

**Instruments**

To collect data through key informant interviews, I first conducted purposive sampling through Christy Chermak. She recruited, via email, key informants who were able to elucidate the topic of vaccine hesitancy among WCC congregants as well as Christian decision-making processes. I recorded all interviews using either my personal smartphone, with Apple's "Voice Memos" application, or Zoom. These recordings were then transferred to a password-protected folder on my personal computer and stored securely throughout the life of this project. Upon completion of the project, recordings will be permanently deleted.

To collect the online survey data, I utilized Google Forms, Google Workspace's survey builder. All responses to the surveys were stored on my personal, password-protected Google Drive and only I had access to the resulting data. To solicit online survey participation, Christy Chermak employed convenience sampling by sending an "All Staff" email to both WCC staff and WMH staff, requesting their participation. Upon completion of the project, the Google Forms will be permanently deleted.

## Plans for Data Analysis

Resulting data from the aforementioned qualitative and quantitative research were used to inform the content of the WMH White Papers. To ensure the White Papers' messaging directly targets WCC congregants' misunderstandings and mistrust, we exclusively included topics about which WCC members desire to learn. Additionally, data from Kiser and Lovelace's Influenza Initiative (2019) informed our use of the data from our formative research (Kiser and Lovelace, 2019). In their Model Practices Toolkit, they argue health communications initiatives should be established as partnerships that are "not tied to a specific health topic," but have the flexibility to evolve and be maintained over time (IHP, 2014, p. 11). Incorporating previous findings like this allowed us to analyze and include data in the White Papers from a "collaboration that endures" lens (IHP, 2014, p. 11).

As such, we altered our initial plan to create five White Papers about five different health topics. Instead, we decided to use the initial five White Papers as a "starter series" to lay the foundation for restored Christian trust in science and to address two health topics: vaccine development as well as vaccine safety and efficacy. This allowed us to tailor our message to address root causes of Christian vaccine hesitancy, mistrust in science, and build the foundation for WMH to produce future White Papers for WCC congregants.

## Ethical Considerations

Emory University Institutional Review Board deemed this Special Studies Project to be exempt as the final deliverable, WMH White Papers, is created exclusively for WMH and is not meant to generalize findings to a broader population or be applied to populations outside of the specific study population, WCC congregants.

**Limitations and Delimitations**

Not only does the convenience sample decrease the generalizability of the study among WCC members, but the breadth of the target audience of WCC members is itself a limitation. Five White Papers are not likely to sustainably alter and align 7,280 WCC members' perceptions of vaccinations and/or other healthcare topics to evidence-based findings and conclusions. As such, my APE supervisor and I established a delimitation of narrowing the scope of the White Papers to a "starter series," which will be continued by WMH staff after the completion of this Special Studies Project. Additionally, the White Papers address WCC-identified healthcare topics and sources of hesitation, which are only representative of one evangelical Christian congregation. As such, it cannot be assumed that the broader evangelical Christian community is hesitant about the same topics. If other churches are interested in implementing their own health communications initiative, unique formative research must be executed.

## Chapter IV: Results

### Introduction

The final product for this Special Studies Project can be found in the subsequent pages (43-48). It is a "starter series" of White Papers for Watermark Health designed to increase evangelical Christians' trust in science and increase vaccine confidence. In accordance with the WHO's *Vaccination and trust* guide and the "recommendations on building and restoring confidence in vaccines and vaccination," the "starter series" of Watermark Health White Papers were "shaped to match the characteristics of the specific target group," WCC members, to be inclusive of their "cultural values, norms, [and] traditions" (WHO, 2017). As such, I created tailored health communications materials using "bridging and translation skills" so that the evangelical Christian audience might easily understand the healthcare information being presented by representatives of the public health sector, the WMH team (Kiser & Lovelace, 2019). The format of the materials, one-page White Papers, was determined during formative research. 65.9% of online survey respondents (n=60), the majority, chose a "one-page briefing" as their preferred platform to learn something new. As the reader will notice, the tone of the White Papers is conversational; we intentionally used simple language so that the individuals who engage with the papers feel they are approachable and digestible. Our online survey respondents encouraged this tone; one said, "If healthcare was communicated more simply for people like me who are not in the healthcare industry, that would be helpful."

Readers will also notice the papers utilize religious language and emphasize shared experiences, such as "Join The Journey," with WCC members. This too was intentional. Lahijani et al. (2021) and Kiser and Lovelace (2019) stressed the importance of leveraging pre-existing trust to encourage alternative health behaviors while establishing new trust across different sectors.

In regard to the latter, vaccine hesitancy researchers Amin et al. (2017) recommend appealing to Haidt and Graham's (2007) moral foundations, which we used to frame the community-wide implications of low vaccination rates while bridging the moral motivations gap between evangelical Christians and scientists.

With the overarching project objective being restored trust in the relationship between the evangelical Christian and scientific communities, we followed what Kiser argues is the key ingredient to building trust: "prioritize and meet the community's needs and put [yours] aside" (IHP, 2014). To "put ours aside," we consulted the data generated from our key informant interviews and online surveys to determine the content of the White Papers. We sought to exclusively include topics about which WCC members desired to learn. The data also allowed us to understand the barriers and motivators of vaccine confidence in WCC members, which we subsequently addressed in the White Papers. After analyzing the data, we realized we would not be able to incorporate each health topic that WCC members wanted to learn more about in the "starter series" of White Papers. As such, the "starter series" is the launch of WMH's health communications initiative for WCC members, and additional White Papers will be released by WMH staff on other health topics. The following White Papers constitute the "starter series":

- White Paper I | A Modern History of Christianity and Science & A Vision for the Future
- White Paper II | Implications for Public Health
- White Paper III | Implications for Individual Health
- White Paper IV | Implications for Healthcare Decision-Making: Vaccine Development
- White Paper V | Implications for Healthcare Decision-Making: Vaccine Safety & Efficacy

**Findings**

Initially, we planned to create five White Papers on five different health topics, but after conducting formative research, we learned that we needed to start with the root problem of mistrust of science, which determined the contents of the first three White Papers. In response to the WCC member online survey, 67% of respondents (n=61) identified that they place complete trust ("10" on a 1-10 scale) in God regarding health outcomes, but only 5.5% of respondents (n=5) place complete trust ("10" on a 1-10 scale) in science regarding healthcare outcomes. The majority of respondents (n=26), 28.6%, place partial trust ("7" on a 1-10 scale) in science regarding healthcare outcomes. As such, we developed tailored health communications materials to introduce a vision for a restored relationship of trust between Christianity and science.

When asked about health literacy rates, only 2.2% of respondents (n=2) said they completely understand ("10" on a 1-10 scale) the healthcare information they hear or read. When asked if they are satisfied with the degree to which they understand healthcare information, 61.5% of respondents (n=56) said, "I am not satisfied, and I wish to grow in my understanding of healthcare information." 46.2% of respondents (n=42) identified "lack of trustworthy resources" as a main barrier to understanding healthcare information well, and 47.3% of respondents (n=43) identified "healthcare providers not thoroughly explain[ing] healthcare information" as a main barrier to their understanding. These data were then analyzed in comparison to respondents' willingness to trust healthcare information resources distributed by Watermark Health. 39.6% of respondents (n=36), the majority, said they would place complete trust ("10" on a 1-10 scale) in resources produced and distributed by WMH. 35.2% of respondents (n=32), the majority, indicated a high likelihood ("9" on a 1-10 scale) of utilizing and adhering to resources produced and distributed by WMH. These data demonstrate the pre-existing trust in WMH that we sought to leverage when presenting White Paper readers with evidence-based health information.

| Online Survey Question | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **On a scale of 1-10, what level of trust do you place in God regarding healthcare outcomes?** | | **On a scale of 1-10, what level of trust do you place in science regarding healthcare outcomes?** | | **On a scale of 1-10, when you hear or read about healthcare information, how well do you understand it?** | | **Are you satisfied with the degree to which you understand healthcare information?** | | **What do you perceive to be the main barriers to understanding healthcare information well? (Please select all that apply.)** | | **On a scale of 1-10, how likely would you be to trust healthcare resources produced by Watermark Health?** | | **On a scale of 1-10, how likely would you be to utilize and adhere to healthcare resources produced by Watermark Health?** | |
| **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** | **Response** | **# Respondents (n), % Respondents** |
| 1 | 0,0% | 1 | 0, 0% | 1 | 0, 0% | "I am satisfied." | 33, 36.3% | "Lack of trustworthy resources." | 42, 46.2% | 1 | 0, 0% | 1 | 0, 0% |
| 2 | 0,0% | 2 | 0, 0% | 2 | 3, 3.3% | "I am not satisfied, and I wish to grow in my understanding of healthcare information." | 56, 61.5% | "Healthcare providers do not thoroughly explain healthcare information." | 43, 47.3% | 2 | 0, 0% | 2 | 1, 1.1% |
| 3 | 0,0% | 3 | 1, 1.1% | 3 | 4, 4.4% | "I am not satisfied, and I do not wish to grow in my understanding of healthcare information." | 0, 0% | "I do not know where to go to learn about healthcare information." | 35, 38.5% | 3 | 1, 1.1% | 3 | 1, 1.1% |
| 4 | 0,0% | 4 | 8, 8.8% | 4 | 11, 12.1% | Other | 2, 2.2% | "I, personally, do not care to understand healthcare information well." | 9, 9.9% | 4 | 0, 0% | 4 | 0, 0% |
| 5 | 0,0% | 5 | 10, 11% | 5 | 8, 8.8% | | | Other | 19, 22% | 5 | 1, 1.1% | 5 | 1, 1.1% |
| 6 | 1, 1.1% | 6 | 11, 12.1% | 6 | 18, 19.8% | | | | | 6 | 0, 0% | 6 | 3, 3.3% |
| 7 | 5, 5.5% | 7 | 26, 28.6% | 7 | 20, 22% | | | | | 7 | 4, 4.4% | 7 | 6, 6.6% |
| 8 | 8, 8.8% | 8 | 19, 20.9% | 8 | 12, 13.2% | | | | | 8 | 19, 20.9% | 8 | 21, 23.1% |
| 9 | 9, 17.6% | 9 | 11, 12.1% | 9 | 13, 14.3% | | | | | 9 | 30, 33% | 9 | 32, 35.2% |
| 10 | 61, 67% | 10 | 5, 5.5% | 10 | 12, 2.2% | | | | | 10 | 36, 39.6% | 10 | 26, 28.6% |

Table 2. List of complete responses and the associated data for each of the aforementioned online survey questions.

Key informant interviews helped elucidate the barriers to trust and vaccine confidence that we needed to address in the final two White Papers of the "starter series." One respondent discussed their perception of the healthcare community by saying, "Healthcare is an industry that profits off people getting sick; they're not spending their time helping you not get sick." To address this barrier to trust, we discussed preventative interventions in White Paper IV. This barrier also exposed respondents' lack of understanding of vaccines as a preventative method. Another respondent said, "We trust the Lord's design of our immune systems and want to build up what the Lord's given us rather than attack an immune system that's not fully developed with vaccines. Ultimately, we decided that we're gonna trust the Lord over a vaccine." Yet another respondent said, "I'm hesitant to embrace vaccinations to the extent that we have in modern society. I believe God has gifted us with bodies that are incredibly resilient when cared for properly." Many of these respondents cited non-evidence-based sources to justify their healthcare decisions. In response, we designed two one-page White Papers on the vaccine development process as well as vaccine safety and efficacy. Each White Paper includes links to resources from the CDC, Children's Hospital of Philadelphia's Vaccine Education Center, and other reputable and reliable sources to inform patients that "trust in God" and utilization of medical interventions can go hand-in-hand.

**Other Findings**

Other key findings included a robust list of "other health topics I'd like to learn more about," which online survey respondents generated. This list of topics was shared with WMH staff so that WMH can utilize it to create future White Papers tailored to respondents' needs. Many of these topics centered on WCC members wanting to understand more about the relationship between "healthcare provision and privatized insurance" and how to make sense of the US healthcare system.

**Summary**

See Table 3 for a summary of the contents of each White Paper in the "starter series."

| **Watermark Health White Paper "Starter Series"** | | | | |
|---|---|---|---|---|
| **White Paper I** | **White Paper II** | **White Paper III** | **White Paper IV** | **White Paper V** |
| Title:<br>A Modern History of Christianity and Science & A Vision for the Future | Title:<br>Implications for Public Health | Title:<br>Implications for Individual Health | Title:<br>Implications for Healthcare Decision-Making:<br>Vaccine Development | Title:<br>Implications for Healthcare Decision-Making:<br>Vaccine Safety & Efficacy |
| Contents:<br>• Historical perspective of the relationship between evangelical Christianity and science<br>• Stories and data about Christian-identifying scientists | Contents:<br>• Data about Christian-identifying healthcare professionals<br>• Overview of the disciplines of public health and the scientific method<br>• Introduction to a Biblical example of a clinical trial | Contents:<br>• Explanation of the clinical trial in Daniel 1:12-16<br>• Establishment of the Christian doctrine of health<br>• Introduction to the "healthy homes" framework | Contents:<br>• Discussion of prevention interventions and use of tested<br>• Doctrine of common grace<br>• Vaccine history<br>• Discussion of aborted fetal cell lines in vaccine development | Contents:<br>• Explanation of data collection<br>• Facts about vaccine safety and efficacy<br>• Discussion of community-wide implications of low vaccination rates |

Table 3. Summary of White Paper "Starter Series" content.

**Author's Note**

Hello there, Watermark member,

My name is Mary Ottley, and I'm currently a graduate school student studying public health in Atlanta, Georgia. Before going back to school, I completed the Watermark Institute ('18-'19) and served as a Fellow on the Watermark Health team. Here I am in 2018, posing for my Join The Journey devotional in front of the Dallas campus Welcome Center.

During my year at Watermark I think the phrase I heard repeated most often was "conflict is an opportunity." Most likely, it wasn't, but it is the phrase that stood out to me most. Why? Because at the time, this framework for understanding conflict was foreign to me.

If you and I are similar, it's more likely that conflict is perceived as a threat. I think we can agree that this is the natural, human reaction to conflict. In fact, it is the reaction we see all around us. Viewing conflict as a threat seems to be the zeitgeist of the 2020s in the U.S. Yet, in Romans 12:2 Christians are called to an alternative. The Apostle Paul tells us, "Do not be conformed to this world" and its patterns. Instead, the "renewal of [our] minds," through God's word, allows Christians to "discern" and practice that which is "good and acceptable and perfect," like embracing the conflict opportunity framework. However, when applied to my current field of study, Christians often retreat to the threat framework, even with Romans 12:2 in mind. And I get it. We're living through a complex global pandemic, and the modern history of the relationship between science, specifically the health sciences, and Christianity isn't one marked by trust.

Around this time last year, Watermark released a Real Truth. Real Quick. episode titled "A Biblical Perspective on Vaccines," which presented an understanding of vaccinations that differed from the one held by some Watermark members. As such, the episode triggered the "conflict as a threat" response in many viewers.

This discouraged us over at Watermark Health. As a team of medical providers and public health practitioners, we know health education and information-sharing conversations are meant to encourage and embolden healthcare decision-makers. In response, we've spent the past year researching how to share health information with Watermark members in a way that incites the conflict opportunity framework, rather than the conflict threat one. We collected qualitative and quantitative data from over 100 Watermark members and determined a series of White Papers (one-pagers on different health topics) would be a good starting point.

While I was the principal author of these initial five White Papers, each one was carefully reviewed and edited by Watermark Health staff. My prayer for these papers is that they offer readers a restored view of the common grace of science. If information is presented that conflicts with beliefs you've come to hold, I pray you'll view these White Papers as an opportunity to sit with a different perspective and discern whether it is "good and acceptable," as evidence may suggest.

In Christ,

Mary

**White Paper I | A Modern History of Christianity and Science & A Vision for the Future**

In researching and writing these White Papers, I've become a big Francis Collins fan. Dr. Francis Collins is the Director of the National Institutes of Health (NIH). The NIH is the largest biomedical and public health research agency in the world. Collins started at the agency in 1993, just seventeen years after a patient asked him a question during medical school that would change his life. This patient shared her faith in Jesus and then asked Collins what he believed. At the time, Collins identified as an atheist, but this patient encounter prompted him to explore religion, which led him to "encounter the person of Jesus Christ." The result? "I am now a follower of Jesus," says Collins.[1] Collins detailed his journey from atheism to Christian belief in his book *The Language of God*. The book was celebrated by Christians and scientists alike, which led to Collins founding BioLogos, an organization that invites the church and the world to see the harmony between science and biblical faith. Pastors like N.T. Wright and Tim Keller are BioLogos contributors.

While Dr. Collins' story is an encouraging and compelling one, it's seemingly an anomaly. As Christians, we're accustomed to hearing accounts that reflect a disharmonious relationship between the Christian and scientific communities. As Tim Keller wrote in *The Reason for God*, "It is common to believe today that there is a war going on between science and religion." Acknowledging this commonality, our Watermark Health White Papers team considered it necessary to start here. Before sharing health information with a population that, historically, has been skeptical of the source of such information, we want to retrace the formation of the disharmonious relationship and offer hope for a restored one in the future.

One historical moment is often heralded as central to understanding the modern disharmonious relationship between Christianity and science. In 1925, the Tennessee state legislature passed the Butler Act, which prohibited public school employees from teaching evolution to students. In response, the American Civil Liberties Union (ACLU) placed advertisements in Tennessee newspapers offering to pay for and provide legal services for any teacher willing to challenge this law. John Thomas Scopes in Dayton, Tennessee obliged, and *The State of Tennessee v. John Thomas Scopes* trial materialized. The involvement of two famous lawyers drew national attention to the trial. William Jennings Bryan, former US Secretary of State and devout Christian, served on the prosecuting team, and Clarence Darrow, renowned Chicago attorney and an agnostic, served on the defense. While the prosecution won, the "public humiliation" of Bryan and portrayal of the trial as the defeat of "pro-creationist and anti-science crusaders" endured.[2] The modern relationship between Christians and scientists has appeared splintered ever since.

Prior to the Scopes trial, the relationship was not marked by dissonance; there were a number of "Dr. Collins" who saw the value in both faith and science. Dr. Elaine H. Ecklund, professor of sociology at Rice University, argues that a large proportion of scientists are still pro-faith today. In fact, her "Religious Understandings of Science Study" revealed 17.1% of scientist respondents also identify as evangelical Christians, and 73.9% identified as religious. Only 24.4% of scientist respondents identified as "atheists/agnostics/no religion," similar to the national estimate of non-religious people.[3] Countless Christian-identifying scientists offer us hope for restored relationship.

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[1] https://biologos.org/resources/francis-collins-a-testimony

[2] https://www.aclu.org/issues/religious-liberty/religion-and-public-schools/creationism-evolution-and-religion

[3] https://www.aaas.org/sites/default/files/content_files/RU_AAASPresentationNotes_2014_0219%20%281%29.pdf

**White Paper II | Implications for Public Health**

Many of the aforementioned evangelical Christian scientists practice in the healthcare field. There are numerous Christians who followed God's call on their lives into the health sciences, pursuing careers as doctors, medical researchers, nurses, and public health practitioners. Dr. Ecklund's research again provides us with clarity as we consider these professionals. In a different study than the one previously mentioned, Ecklund surveyed "academic pediatricians" on faculty at thirteen of the *US News & World Report's* "honor roll" hospitals, such as UCLA Medical Center and The Johns Hopkins Children's Center.[4] Of the survey respondents, 67.2% claimed current religious affiliation and 58.6% believed "personal spiritual or religious beliefs influenced their interactions with patients/colleagues."[5] And this is just pediatricians! As Christians we tend to think of influential, academic healthcare decision-makers as people of no faith, approaching research decisions exclusively from a science-based framework. Dr. Ecklund's research encourages us to reframe our thinking and to remember that many Christians are advancing modern medicine.

This spills over into the field of public health, which is the gathering place of many of the professions described above. Public health, as defined by the CDC Foundation, is "the science of protecting and improving the health of people and their communities," which "is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases."[6] Public health is generally divided into the following core disciplines: 1) Biostatistics, "the development and application of statistical reasoning and methods in addressing, analyzing, and solving problems in public health;" 2) Environmental Health Science, "the study of environmental factors including biological, physical, and chemical factors that affect the health of a community;" 3) Epidemiology, "the study of patterns of disease and injury in human populations and the application of this study to the control of health problems;" 4) Health Policy and Management, which is "concerned with the delivery, quality and costs of health care for individuals and populations;" and 5) Social and Behavioral Sciences, which "address the behavioral, social, and cultural factors related to individual and population health."[7] A unifying factor of all five disciplines is their use of the scientific method to generate their evidence base. This method allows practitioners to ask questions about specific subjects, generate a hypothesis, test it, and use what is uncovered from experimentation to drive future decision-making and galvanize healthier outcomes for the public. That said, hypotheses and evidence are always evolving. As we've seen during the COVID-19 pandemic, what may be evident one day will perhaps change with a new experiment or new evidence the next. This does not mean that we cannot place trust in the scientific community, but rather that we must seek to understand how and when the evidence base evolves.

A Christian, Francis Bacon, is often credited with developing the scientific method. As fellow believers, we're no strangers to the scientific method. In fact, we see it in the form of a clinical trial in Daniel 1:12-16. Read Daniel 1 to see if you're able to identify who is in the control group and who is in the treatment group in the passage, and then continue on to White Paper III.

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[4] https://journals.lww.com/academicmedicine/Fulltext/2008/12000/The_Spiritual_and_Religious_Identities,_Beliefs,.17.aspx

[5] Ibid.

[6] https://www.cdcfoundation.org/what-public-health

[7] https://aspph-wp-production.s3.us-east-1.amazonaws.com/app/uploads/2014/04/Version2.31_FINAL.pdf

**White Paper III | Implications for Individual Health**

Were you able to identify the control and treatment groups? Clinical trials are made up of a treatment group (the group of participants who receive the intervention that's being tested) and a control group (the group of participants who either receive the current standard of the intervention, a placebo, or no intervention at all).[8] In the Old Testament book of Daniel, we see Daniel and his companion's resolve to retain their distinctive Jewish identity while they're subject to the authority of the king of Babylon, Nebuchadnezzar. As a means of doing so, when asked to assimilate to the Babylonian diet, Daniel proposes he be "test[ed]" for ten days with "vegetables to eat and water to drink" instead.[9] Daniel 1:15 says, "At the end of ten days it was seen that they were better in appearance and fatter in flesh than all the youths who ate the king's food." Not only does this passage speak to God's provision and His favor, but it also demonstrates the practical observance of different outcomes in two groups over a certain amount of time. Nowadays, clinical trials have many phases and last longer than ten days, but this example from Daniel paints a rudimentary picture of a practice that public health researchers still use to improve individuals' health today.

When researchers introduce an intervention into a treatment group, they test whether this treatment will be helpful, harmful, or no different than available alternatives. They also determine the safety and efficacy of the intervention by measuring certain outcomes. When my grandmother broke her hip when I was thirteen, she had hip replacement surgery. Hip replacement surgery, or "total hip arthroplasty," consists of a surgeon replacing the broken joint with an artificial one, a prosthetic. The new prosthetic that allowed my grandmother to walk again was tested before the doctor used it to replace her old, broken hip. That testing allowed researchers and her doctor to determine the prosthetic would be the best intervention to restore her to health. And it did exactly that.

We must acknowledge something here – our human need for restoration. As Christians, we believe this need is why God sent Jesus to die for us, to restore us so that we might live in right standing with God and spend eternity with Him in Heaven. This doesn't just apply to eternity; it applies to our life in the here and now. A Christian doctrine of health accepts the reality that we currently live in a fallen world, in need of both the Great Physician and medical interventions (Mt. 9:12).

Yet, our White Papers team heard something different in our interviews this summer. We heard some members of the Watermark community heralding a belief that we as humans were created not to need medical interventions which justified their renunciation of medications, vaccines, etc. While this is true, we were created not to need these things, it is also true that mankind sinned (Genesis 3), that after Adam and Eve's sin "none is righteous, no, not one" (Romans 3:10), and that we no longer live in perfect form nor in perfect union with God like mankind did in Eden.

As such, the team at Watermark Health embraces what we call a "healthy homes" framework when understanding a Christian doctrine of health. We believe health is made up of five components: spiritual, physical, emotional, mental, and social. Our spiritual health, our relationship with God, is the foundation, and foundational to human health. The other four components, or "walls," must also be balanced and practiced daily in order to be healthy. Granted, there will be seasons of neglect; grace is the mortar which holds the house together.

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[8] https://clinicaltrials.gov/ct2/about-studies/learn

[9] Daniel 1:12, ESV Study Bible

**White Paper IV | Implications for Healthcare Decision-Making: Vaccine Development**

To keep our "homes" healthy, there are many preventative measures we can take. Exercise, prayer, and eating a balanced, nutritious diet are examples of daily practices that contribute to healthier outcomes, longer life expectancy, and the responsible stewardship of our bodies to which Christians are called in 1 Corinthians 6:19-20. Even Watermark Urgent Care providers often educate patients about seeking medical treatment versus providing care at home.

Yet, there are times in life when a hip breaks, a cancer diagnosis is shared, or an aneurysm ruptures. Unfortunately, adverse health outcomes do occur. They are painful, and a devastating part of our reality in this broken world. When they do arise, Christians often thank God for the common grace of modern medicine and utilize interventions like chemotherapy and prosthetics.

Dr. Wayne Grudem, Research Professor of Theology and Biblical Studies at Phoenix Seminary and author of *Systematic Theology*, describes the doctrine of common grace as "the grace of God by which he gives people innumerable blessings that are not part of salvation."[10] Grudem expounds upon common grace by directly addressing science; he says, "All science and technology carried out by non-Christians is a result of common grace, allowing them to make incredible discoveries and inventions, to develop the earth's resources into many material goods, to produce and distribute those resources, and to have skill in their productive work."[11]

Vaccines are an example of an incredible scientific discovery. While there are a number of other discoveries that were made by non-Christians, the "father of vaccines," Dr. Edward Jenner, was a devout Christian. In 1796, Jenner used cowpox as a "deliberate mechanism of protection" against smallpox, marking the first scientific attempt to control an infectious disease with a vaccination.[12] Since then, vaccines have become one of the most successful, cost-effective disease prevention interventions and save between 2-3 million lives annually.[13] Considering the smallpox vaccine alone, an estimated 150-200 million lives have been saved since its eradication in 1980.[14]

When Watermark released the Real Truth. Real Quick. episode about vaccines last year, a number of concerns were voiced in response. Most conveyed concerns about vaccine safety and efficacy (see *White Paper V*), but some corresponded to vaccine development. One specific concern was the use of aborted fetal cell lines in vaccine development.

Vaccines containing fetal cells have elicited different responses from Christians. Different denominations and sects land in different places, but most align with the Catholic Church's Pontifical Academy for Life's statement, which affirms the use of such vaccines when alternatives are not available. An important thing to remember about the two approved mRNA COVID-19 vaccines is that neither contain fetal cells. Doctors from the Vaccine Education Center (VEC) at Children's Hospital of Philadelphia (CHOP) respond to questions about fetal cell use and provide evidence-based information about other, valid questions about the COVID-19 vaccine here.

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[10] https://www.waynegrudem.com/bible-doctrine
[11] Ibid.
[12] https://www.tandfonline.com/doi/abs/10.1080/08998280.2005.11928028
[13] https://www.who.int/news-room/facts-in-pictures/detail/immunization
[14] https://ourworldindata.org/smallpox#costs-of-smallpox-and-its-eradication

**White Paper V | Implications for Healthcare Decision-Making: Vaccine Safety & Efficacy**

As you may have surmised, I do not have children. When writing about vaccine safety and efficacy, I knew it would be important to consult Christian parents. Generally, the individuals most concerned about the safety and efficacy of vaccines are parents who have been asked to decide whether to vaccinate their beloved child. During summer 2020, I conducted roughly ten hours of key informant interviews with seven different Watermark members, all of whom are parents to multiple children. These parents exhibited the complete spectrum of full vaccine acceptance to outright vaccine refusal, and their perspectives informed the content of this White Paper.

To begin, I must communicate a fact that is acknowledged by Christian and non-Christian scientists alike: no vaccine is "perfectly safe" and no vaccine is "perfectly efficacious."[15] As Christians we believe the truths of Psalm 139, that God intentionally "formed [our] inward parts" and "knit us together," and 1 Corinthians 12, that God designed us differently as "many parts, yet one body." For some, God's design translates to being "born blind," as seen in John 9, and for others, being born with autoimmune diseases or other underlying health conditions. In essence, we were created and designed intentionally and with great care, but humans are not perfect. Neither are the vaccines we take. And yet, God uses imperfect people to do good things (Eph. 2:10). God also brings about good things for many people, like disease protection, though imperfect vaccines.

The recognition that no vaccine is perfectly safe or effective led parents I interviewed to question the practice of vaccination as well as certain vaccines. There is a wealth of information published to assuage concerns you may have about the safety and efficacy rates of recommended vaccines. One place you might begin is CHOP's Vaccine Education Center. Specifically, the "Vaccine- and Vaccine Safety-Related Q&A Sheets," which provide evidence-based responses to frequently asked questions. I often heard parents remark that it is their responsibility to protect their child. There is no refuting that statement, and Watermark Health hopes to provide you with the resources necessary to make responsible, informed, God-honoring decisions on your child's behalf. In fact, the Watermark Health staff is happy to discuss questions you may have. It's easy to get lost in the complexity of scientific data (p-values, confidence intervals, and sample sizes), especially data that were manipulated like those retracted from *The Lancet* which claimed a false link between the MMR vaccine and autism spectrum disorder (ASD).[16] We're here to help clarify your questions.

While vaccinating one's child is a personal parental decision, it is also one that has community-wide implications. Disease outbreaks are common among groups with low vaccination rates. In fact, a measles outbreak occurred in 2013 among the congregants of Eagle Mountain International Church in Newark, Texas, just an hour from Watermark's Dallas campus. 85% of the people who contracted measles during that outbreak had not been vaccinated.[17] If you've ever asked "What would happen if we stopped vaccinations?" the CDC has an answer for you to consider when making the decision to vaccinate. The ten questions from Blake Holmes' "10 Biblical Principles for Making Wise Decisions" are also helpful ones to consider when making your decision.

In closing, we at Watermark Health are ready and willing to serve as a resource for making evidence-based decisions about your family's health. We see harmony between Christianity and science, and we pray these White Papers helped you catch a glimpse of it, too. Stay tuned for more White Papers soon.

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[15] https://pubmed.ncbi.nlm.nih.gov/9021306/
[16] https://www.bmj.com/content/342/bmj.c5347
[17] https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6236a2.htm

# Chapter V: Discussion, Recommendations, Implications, and Conclusion

## Discussion

Professor of Sociology and Director of the Religion and Public Life Program at Rice University, Dr. Elaine Ecklund, was recently quoted in a New York Times article titled "White Evangelical Resistance Is Obstacle in Vaccination Effort" (Dias & Graham, 2021). She said, "Distrust of scientists has become part of cultural identity, of what it means to be white and evangelical in America" (Dias & Graham, 2021). Ecklund points to the failed relationship between the two communities and gives reason for it; they have not been friendly toward one another. Curtis Chang is also quoted in the article saying, "The even deeper problem is the white evangelicals aren't even on their screen," when describing the relationship between secular public health entities and white evangelical Christians (Dias & Graham, 2021). He claims public health practitioners are not equipped to answer evangelical Christians' questions about the COVID-19 vaccine or, ostensibly, other health education-related questions (Dias & Graham, 2021).

Idler argues the same. Without public health practitioners committing to increase their "religious literacy," the two communities will continue on without the ability to communicate (Idler, 2014). Common language for communication is essential to restoring the relationship between evangelical Christianity and science. For Christians, this means increasing our health literacy. The WMH White Papers will help to establish this common language for the WCC members. The White Papers will also encourage WCC members to trust in science and members of the scientific community while adopting evidence-based healthcare decision-making behaviors, specifically vaccine acceptance. In fact, the "starter series" White Papers address each of Betsch et al.'s "psychological antecedents of vaccination" (2018). The papers address "confidence" by promoting trust in the system that delivers vaccines, specifically the scientists who developed them

and the medical professionals who will provide them. “Constraints” are addressed by increasing WCC members’ “ability to understand” as the health communications initiative aims to increase health literacy of readers. “Complacency” is also addressed; White Paper V directly addresses the risks and dangers associated with low vaccination rates. All of the papers contribute to WCC members’ “calculation;” the “starter series” will be accessed by individuals who are actively engaging in “extensive information searching.” Lastly, White Paper V addresses “collective responsibility” and warns Christians who are willing to “free-ride.” Taken together, the White Papers address all of the contributing factors of vaccine hesitancy, even those that seem unique to Christianity like the ethical consideration of accepting vaccines made with aborted fetal cell lines.

By addressing what I claim to be the root cause of evangelical Christian vaccine hesitancy, the chasm in the relationship between Christianity and science, the White Papers tailored health communications intervention has the opportunity to effect meaningful and significant change in the WCC community. This intervention built upon previous research, where possible (Kiser & Lovelace, 2019; Lahijani et al., 2021). Yet, there is limited research which focuses on building vaccine confidence among white evangelical Christian populations. Consequently, there is also limited availability of mechanisms to assess whether sustained changes in vaccine acceptance and other healthcare behaviors take place over time. Further research is needed to evaluate and validate the effectiveness and generalizability of this specific form of tailored health communications interventions. Once evaluated, if other churches were to adopt a similar health education model with the appropriate modifications, there is potential to decrease the high rates of evangelical Christian vaccine hesitancy, ultimately moving us closer toward our collective goal of ending the COVID-19 pandemic. Regardless of scale, communal buy-in from all relevant stakeholders, those

from the Christian and scientific communities, is required to ensure the success of tailored health communications interventions.

## Recommendations

Communal buy-in and participation are dependent upon each stakeholder's commitment to playing their respective part. When applied to health communications interventions, this buy-in ensures the success and sustainability of the interventions – both those occurring now, such as the WMH initiative, and those in the future. As such, I propose the following to three key stakeholders.

### Recommendations for the Scientific Community, specifically the public health community

The Watermark White Papers intervention is oriented toward educating white evangelical Christians about the value of science and evidence-based decision-making. Yet, scientists, specifically public health practitioners, have a key role to play in this education. Kiser and Lovelace continually referenced this in their work, but it bears repeating: "bridging and translation skills" are "an important capacity to leverage for expanded immunization coverage" (Kiser & Lovelace, 2019).

Public health practitioners must learn to understand and converse fluently in the language of evangelical Christians so that they are prepared to respond to, for example, the respondent from my key informant interview who chose not to vaccinate their daughter because they were "gonna trust the Lord over a vaccine." When approaching this statement from a Christian worldview, as I argued in White Paper IV, scientific advances, like vaccines, are a means of common grace that God gave humans to protect them. Accepting vaccines doesn't negate trust in God; in fact, fear and refusal of vaccines just might demonstrate a greater lack of trust than vaccine acceptance. Regardless, public health practitioners aren't required to adopt a Christian worldview, or another religion's worldview, in order to gain "knowledge about religious practices, particularly as they

affect health," but gaining that knowledge is "essential for human flourishing," argues Idler (2014). This is remarkably evident right now with 45% of evangelical Christians displaying vaccine hesitancy (Pew Research Center, 2021). The scientific community cannot continue to operate, as Chang posits, from a separatist framework. Why? Because percentages like the one previously mentioned will only continue to increase. Scientists must engage with Christians, faith leaders, and faith-based organizations as a commitment to help curtail the hesitancy rise.

**Recommendations for the White Evangelical Christian Community**

As Blevins described, it is not only scientists who resort to operating from a separatist framework. Evangelical Christians have intentionally created distance between their community and the community of scientists. Ecklund says that Christians have "not encouraged followers to pursue careers in science" (Dias & Graham, 2021). While Ecklund's research referenced in White Papers I and II demonstrated evangelical Christian presence among the scientific community, Christians typically believe there to be a dearth of "fellow believers" in that realm. Ed Stetzer, Executive Director of LifeWay Research and Lead Pastor of Grace Church in Hendersonville, TN, encourages active Christian engagement with science. He says, "Christians are to champion the good of their city and society as a whole. Leveraging scientific study and achievement for the betterment of people is an entirely Christian thing to do…We, above all others, should love, study, explore, examine, and care for the creation that provides evidence of God and his character" (NAE, 2015). Stetzer makes this case in the National Association of Evangelical's publication of "When God and Science Meet: Surprising Discoveries of Agreement" (2015). In the same way that I urge public health practitioners to increase their religious literacy, I urge Christians to increase their scientific and health literacy in order to bridge the chasm between the two communities. In doing so, Christians will realize there is "more agreement than many realize" (NAE, 2015). This may

take the form of exploring science as a potential career path or learning more about the health sciences to provide better care for loved ones; no matter the form, the result is a contribution toward pursuing harmony with people who help to positively transform society, many of whom are fellow Christians.

**Recommendations for Watermark Community Church and Watermark Health**

Matthew 5:14 has been used in many different contexts to encourage Christian leadership. The verse says, "You are the light of the world. A city on a hill cannot be hidden" (English Standard Version Bible, 2001, Matt. 5:14). Rarely has this verse been used to herald Christian leadership in public health initiatives. However, that is exactly the stakeholder role that WCC and WMH can play in repairing the Christianity, science chasm. The church can lead in modeling a willingness to educate its congregants on matters of science and Christian doctrine. In doing so, WCC can be an example to other churches and congregations, which may galvanize a ripple effect of exploration and a restored vision in other Christian communities for the relationship between Christianity and science. To accomplish this, Watermark should share resources and program documents, like the White Papers, with other churches so that other congregations can draw on the successes of the WMH initiative and learn from its failures, rather than reinventing entirely new programming. Establishing a reporting system could also ensure details about health communications initiatives become available to a wide audience, which would allow future initiatives to build upon previous work. This is vital to a complete life cycle of a health communications initiative. Not only should the materials be tailored and designed for a specific congregation, but their release and users' engagement with them should be monitored, evaluated, and documented to alter future iterations of the materials. This will guarantee greater value for congregants both at WCC and other churches.

# Implications

## Implications for Watermark Health

The "starter series" of WMH White Papers directly address pre-identified concerns, fears, and misunderstandings about certain healthcare topics. However, they are exactly that – a "starter series." For sustained evidence-based healthcare decision-making to occur, WMH needs to accompany the White Papers initiative with additional opportunities for interaction with WMH staff. This additional interaction will allow WCC members to clarify the information presented in the White Papers with trained healthcare professionals. One existing WMH service that can be used as a model for this is the "Clinic Connecting Team" (CCT). The CCT provides WMH clinic patients the opportunity to connect with a WCC member if they would like peer or spiritual support. CCT members meet with interested patients, discuss problems they may be facing, and connect them to ministries at WCC that might serve them. WMH should create a CCT for WCC members to connect with other WCC members who identify as medical professionals, public health professionals, and scientists. This will not only allow non-science-affiliated WCC members to learn new information, but it also serves as an opportunity for restored relationship-building across the Christianity, science divide.

Additionally, WMH needs to monitor and evaluate the efficacy and impact of the White Papers. In order to determine whether the White Papers are galvanizing the desired outcomes and objectives, WMH must monitor who is engaging with them and how. A simple means of collecting these data could be the requirement of all White Paper "downloads" to first enter an email address to access the papers. Other demographic data could also be required to download the papers, such as identification of whether they are a WCC member. This attaches a specific user to the

"download" and creates opportunity for follow up. WMH must decide how much follow up they would like to have with users.

Lastly, Watermark Health must continue the White Paper series. The other findings from our formative research indicated many additional health topics about which WCC members would like to be educated. The White Papers Initiative should continue as the main mechanism WMH uses to educate WCC members. Providing additional evidence-based healthcare information will only further enhance the work of restoring the chasm between Christianity and science.

**Implications for Public Health**

White evangelical Christian vaccine hesitancy produces threatening implications for the health of the public. The high rate of COVID-19 vaccine hesitancy among white evangelical Christians remains steady at 45% of the population claiming they will not get vaccinated (Pew Research Center, 2021). If roughly half of the 16% of Americans who identify as white evangelical Christians do not accept a vaccine, nationwide COVID-19 immunity rates may be negatively impacted (Pew Research Center, 2019). As such, public health practitioners must prioritize vaccine uptake initiatives for this population. Communicating the benefits and importance of vaccination to white evangelical Christians will not only ensure healthier outcomes during the COVID-19 pandemic but may prevent future hesitancy as well. Lastly, to effectively communicate best practices and current research targeting this population, public health authorities at the National Library of Medicine should create a MeSH term for evangelical Christianity. This will allow greater collaboration between public health practitioners testing interventions that target this population, which will lead to more effective approaches for increasing vaccine uptake.

## Conclusion

This Special Studies Project, The White Papers Initiative, serves as an opportunity to heal the divide between Christianity and science while increasing vaccine uptake, specifically COVID-19 vaccine uptake. WMH should continue its implementation of the White Papers Initiative with additional papers about other, congregant-identified healthcare topics. WMH should also implement a CCT to accompany the White Papers Initiative and invite questions and conversation about information that might be confusing or controversial for WCC members. Other churches may benefit from implementing their own tailored healthcare communications initiative, and the White Papers Initiative may serve as a model for them. The WMH White Papers Initiative, and initiatives at other churches, will not be successful without the buy-in and engagement of public health professionals. As such, public health professionals must also seek to cross and restore the divided lines between the Christian and scientific communities. Together, healthier outcomes can be achieved and future hesitancy may be prevented.

**References**

*2020 Year End Review*. (2020). Watermark Health. Retrieved April 20, 2021, from https://www.watermarkhealth.org/2020

About NAE. (2021). National Association of Evangelicals. Retrieved on February 6, 2021, from https://www.nae.net/about-nae/

ACLU History. (2021). ACLU. Retrieved April 14, 2021, from https://www.aclu.org/other/aclu-history-scopes-monkey-trial

American Psychological Association. (2020). Building vaccine confidence through community engagement. https://www.apa.org/topics/covid-19/equity-resources/building-vaccine-confidence.pdf

Amin, A. B., Bednarczyk, R. A., Ray, C. E., Melchiori, K. J., Graham, J., Huntsinger, J. R., & Omer, S. B. (2017). Association of moral values with vaccine hesitancy. *Nat Hum Behav, 1*(12), 873-880. https://doi.org/10.1038/s41562-017-0256-5

Andrews, M. (2019, March 11). *Why measles hits so hard within N.Y. Orthodox Jewish community.* Kaiser Health News. https://khn.org/news/why-measles-hits-so-hard-within-n-y-orthodox-jewish-community/

Bednarczyk, R. A., Tate, T., Opel, D. J., & Omer, S. B. (2017). The Church, the State, and Vaccine Policy. *Am J Bioeth, 17*(4), 50-52. https://doi.org/10.1080/15265161.2017.1284932

Berman, J. M. (2020). *Anti-Vaxxers: How to challenge a misinformed movement*. MIT Press.

Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., & Bohm, R. (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLoS One, 13*(12), e0208601. https://doi.org/10.1371/journal.pone.0208601

Blevins, J. (2020, March 3). *Religious health assets* [PowerPoint slides]. Retrieved from Rollins School of Public Health GH 519 Canvas site.

Centers for Disease Control and Prevention (CDC). (2019, May 17). *Notes from the field: Measles outbreaks from imported cases in Orthodox Jewish communities — New York and New Jersey, 2018–2019*. Morbidity and Mortality Weekly Report. https://www.cdc.gov/mmwr/volumes/68/wr/mm6819a4.htm?s_cid=mm6819a4_w

Centers for Disease Control and Prevention (CDC). (2020, May 26). *About diphtheria*. Diphtheria. https://www.cdc.gov/diphtheria/about/index.html

Chen, R. T., & Orenstein, W. A. (1996). Epidemiologic methods in immunization programs. *Epidemiol Rev, 18*(2), 99-117. https://doi.org/10.1093/oxfordjournals.epirev.a017931

Children's Hospital of Philadelphia (CHOP). (2021, March 30). *Vaccine history: Developments by year*. Vaccine Education Center. https://www.chop.edu/centers-programs/vaccine-education-center/vaccine-history/developments-by-year

Congregation for the Doctrine of the Faith. (2020, December 21). *Note on the morality of using some anti-Covid-19 vaccines*. The Holy See. http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20201221_nota-vaccini-anticovid_en.html

Crary, D. (2021, April 5). *Vaccine skepticism runs deep among white evangelicals in US*. ABC News. https://abcnews.go.com/Health/wireStory/vaccine-skepticism-runs-deep-white-evangelicals-us-7688757

Creationism, Evolution, and Religion. (2021). ACLU. Retrieved April 14, 2021, from https://www.aclu.org/issues/religious-liberty/religion-and-public-schools/creationism-evolution-and-religion

Deer, B. (2011). How the case against the MMR vaccine was fixed. *BMJ, 342*, c5347. https://doi.org/10.1136/bmj.c5347

Deer, B. (2020). *The doctor who fooled the world: Science, deception, and the war on vaccines.* Johns Hopkins University Press.

Dias, E., & Graham, R. (2021, April 5). White evangelical resistance is obstacle in vaccination effort. *The New York Times*. https://www.nytimes.com/2021/04/05/us/covid-vaccine-evangelicals.html

Dube, E., Vivion, M., & MacDonald, N. E. (2015). Vaccine hesitancy, vaccine refusal and the anti-vaccine movement: influence, impact and implications. *Expert Rev Vaccines, 14*(1), 99-117. https://doi.org/10.1586/14760584.2015.964212

*English Standard Version Bible*. (2001). ESV Online. https://esv.literalword.com/

FAQs. (2021). ACLU. Retrieved April 14, 2021, from https://www.aclu.org/faqs

Gandhi, M. (2019). *A Guide to Health*. Good Press. (Original work published 1921)

Goguen, A., & Bolten, C. (2017). *Ebola through a glass, darkly: Ways of knowing the state and each other*. Retrieved March 20, 2021, from https://www.jstor.org/stable/26645884

Grabenstein, J. D. (2013). What the world's religions teach, applied to vaccines and immune globulins. *Vaccine, 31*(16), 2011-2023. https://doi.org/10.1016/j.vaccine.2013.02.026

Greek Medicine. (2012, February 7). National Library of Medicine. Retrieved April 18, 2021, from https://www.nlm.nih.gov/hmd/greek/greek_oath.html

Grudem, W. (1999). *Bible doctrine: Essential teachings of the Christian faith* (J. Purswell, Ed.). Zondervan.

Hackett, C., & McClendon, D. (2017, April 5). *Christians remain the world's largest religious group, but they are declining in Europe.* Pew Research Center. https://www.pewresearch.org/fact-tank/2017/04/05/christians-remain-worlds-largest-religious-group-but-they-are-declining-in-europe/

Haidt, J., & Graham, J. (2007). When morality opposes justice: Conservatives have moral intuitions that liberals may not recognize. *Social Justice Research 2*0(1), 98-116. https://doi.org/10.1007/s11211-007-0034-z

Hall, C. (2019, November 13). *Eight-time Top 100 Places to Work winner Watermark Community Church finds that patience is a virtue*. The Dallas Morning News. https://www.dallasnews.com/business/top-100/2019/11/14/watermark-finds-that-patience-is-a-virtue/

*Holy Qur'an.* (A.Y. Ali, Trans. & T. Griffith, Ed.). (2001). Wordsworth.

Idler, E. (Ed.). (2014). *Religion as a social determinant of public health*. Oxford University Press.

Interfaith Health Program (IHP). (2014). *Model Practices Toolkit*. https://ihpemory.org/ihp-programs/public-health-and-faith-community-partnerships/

Kim, W., & Hauer, M. (2021, January 15). *COVID-19 vaccine: Government, the faith community is ready to partner; give us a shot*. USA Today. https://www.usatoday.com/story/opinion/2021/01/15/faith-community-can-host-covid-19-vaccine-sites-across-u-s/4167153001/

Kiser, M., & Lovelace, K. (2019, March). A national network of public health and faith-based organizations to increase influenza prevention among hard-to-reach populations. *American Journal of Public Health, 109*(3), 371-377. https://doi.org/10.2105/AJPH.2018.304826

Kmietowicz, Z. (2010). Wakefield is struck off for the "serious and wide-ranging findings against him". *BMJ, 340,* c2803. https://doi.org/10.1136/bmj.c2803

Lahijani, A. Y., King, A. R., Gullatte, M. M., Hennink, M., & Bednarczyk, R. A. (2021). HPV Vaccine Promotion: The church as an agent of change. *Soc Sci Med, 268,* 113375. https://doi.org/10.1016/j.socscimed.2020.113375

Larson, H. J., Clarke, R. M., Jarrett, C., Eckersberger, E., Levine, Z., Schulz, W. S., & Paterson, P. (2018). Measuring trust in vaccination: A systematic review. *Human vaccines & immunotherapeutics*, *14*(7), 1599–1609. https://doi.org/10.1080/21645515.2018.1459252

Larson, H. J., Schulz, W. S., Tucker, J. D., & Smith, D. M. (2015). Measuring vaccine confidence: introducing a global vaccine confidence index. *PLoS Curr, 7*. https://doi.org/10.1371/currents.outbreaks.ce0f6177bc97332602a8e3fe7d7f7cc4

MacDonald, N. E., & Hesitancy, S. W. G. o. V. (2015). Vaccine hesitancy: Definition, scope and determinants. *Vaccine, 33*(34), 4161-4164. https://doi.org/10.1016/j.vaccine.2015.04.036

Mathieu, R. (2016). Jewish ethics and xenotransplantation. *Xenotransplantation, 23*(4), 258-268. https://doi.org/10.1111/xen.12247

McLaughlin, Rebecca. (2019, September 17). *A (very) brief history of Christians in science*. BioLogos. https://biologos.org/articles/a-very-brief-history-of-christians-in-science

*Membership Process*. (2021). Watermark Community Church. Retrieved April 20, 2021, from https://www.watermark.org/membership

National Association of Evangelicals (NAE). (2015). *When God and science meet*. National Association of Evangelicals. https://www.nae.net/godandscience/

National Association of Evangelicals (NAE). (2021). *What is an evangelical?* National Association of Evangelicals. https://www.nae.net/what-is-an-evangelical/

National Library of Medicine. (2021, January 7). Medical Subject Headings. Retrieved April 14, 2021, from https://www.nlm.nih.gov/mesh/meshhome.html

Noll, M. A. (2019). *A history of Christianity in the United States and Canada*. William B. Eerdmans Publishing Company.

*Our Story*. (2021). Watermark Urgent Care. Retrieved April 20, 2021, from https://www.watermarkurgentcare.com/our-story

Parker, J. (2019, April 29). Abortion: First degree murder. American Family Association. https://afa.net/the-stand/culture/2019/04/abortion-first-degree-murder/

Pelčić, G., Karacic, S., Mikirtichan, G. L., Kubar, O. I., Leavitt, F. J., Cheng-Tek Tai, M., Morishita, N., Vuletic, S., & Tomasevic, L. (2016). Religious exception for vaccination or religious excuses for avoiding vaccination. *Croat Med J, 57*(5), 516-521. https://doi.org/10.3325/cmj.2016.57.516

Pew Research Center. (2015, May 12). *Chapter 1: The changing religious composition of the US*. https://www.pewforum.org/2015/05/12/chapter-1-the-changing-religious-composition-of-the-u-s/#the-shifting-composition-of-american-protestantism

Pew Research Center. (2019, October 17). *In U.S., decline of Christianity continues at rapid pace*. https://www.pewforum.org/2019/10/17/in-u-s-decline-of-christianity-continues-at-rapid-pace/

Pew Research Center. (2021, March 22). *Intent to get vaccinated against COVID-19 varies by religious affiliation in the U.S*. https://www.pewresearch.org/fact-tank/2021/03/23/10-facts-about-americans-and-coronavirus-vaccines/ft_21-03-18_vaccinefacts/

Pew-Templeton. (2010). *Christians*. Pew-Templeton Global Religious Futures Project. http://www.globalreligiousfutures.org/religions/christians

Piper, John. (2021, January 4). *Can I take a vaccine made from aborted babies?* [Audio podcast]. Desiring God. https://www.desiringgod.org/interviews/can-i-take-a-vaccine-made-from-aborted-babies

Pontifical Academy for Life. (2006). Moral reflections on vaccines prepared from cells derived from aborted human fetuses. *Natl Cathol Bioeth Q, 6*(3), 541-537.

Ramm, B. L. (1954). *The Christian View of Science and Scripture*. W. B. Eerdmans Publishing Company.

Real Truth Real Quick (RTRQ). (2020, April 28). *How should a leader respond to failure and success?* [Video]. YouTube. https://www.youtube.com/watch?v=uZ7SNF4SfX0

Reese, W. L. (1999). *Dictionary of philosophy and religion: Eastern and western thought*. Humanity Books.

Riedel, S. (2005). Edward Jenner and the history of smallpox and vaccination. *Proc (Bayl Univ Med Cent), 18*(1), 21-25. https://doi.org/10.1080/08998280.2005.11928028

Stefon, M. (Ed.). (2018, October 3). *Christianity*. Encyclopedia Britannica. https://www.britannica.com/topic/Christianity

The Editors of *The Lancet*. (2010, February 6). Retraction—Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet, 375*(9713), 445. https://doi.org/10.1016/S0140-6736(10)60175-4

Thomspon, L. (Executive Producer). (April 1982). *DPT: Vaccine Roulette* [TV Documentary]. WRC-TV.

Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., Berelowitz, M., Dhillon, A. P., Thomson, M. A., Harvey, P., Valentine, A., Davies, S. E., & Walker-Smith, J. A. (1998). Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet, 351*(9103), 637-641. https://doi.org/10.1016/s0140-6736(97)11096-0 [Retracted]

Watermark Community Church. (2020, April 24). *An update from Todd Wagner on the most recent episode of Real Truth. Real Quick. on vaccinations* [Video]. Facebook. https://www.facebook.com/watermarkchurch/videos/an-update-from-todd-wagner-on-the-most-recent-episode-of-real-truth-real-quick-o/834551360371551/

Wilcox, C., & Gomez, L. (1990). The Christian Right and the Pro-Life Movement: An Analysis of the Sources of Political Support. *Review of Religious Research, 31*(4), 380-389. doi:10.2307/3511563

World Health Organization (WHO). (2014, October 1). *Report of the SAGE working group on vaccine hesitancy*. Retrieved March 20, 2021, from https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf

World Health Organization (WHO). (2017). *Vaccination and trust*. https://www.euro.who.int/__data/assets/pdf_file/0004/329647/Vaccines-and-trust.PDF

World Health Organization (WHO). (2019, December 5). *Immunizations*. https://www.who.int/news-room/facts-in-pictures/detail/immunization

Yahya, M. (2006, March). *Polio vaccines – Difficult to swallow*. Institute of Development Studies. https://www.ids.ac.uk/download.php?file=files/Wp261.pdf

Yang, J., & Khan, S. (2021, April 8). *Pastor reveals the reasons behind COVID vaccine hesitancy in the evangelical community*. PBS News Hour. https://www.pbs.org/newshour/show/pastor-reveals-the-reasons-behind-covid-vaccine-hesitancy-in-the-evangelical-community

Zimmerman, R. K., & Raviotta, J. (2013). Steps for clinicians and public health officials to take to reach persons of faith, for the sake of protecting all against vaccine-preventable diseases. *Vaccine, 31*(16), 2009-2010. https://doi.org/10.1016/j.vaccine.2013.02.021

# Appendix I: In-Depth Interview Guide

**Healthcare Decision-Making Interview**

**Date: _____**
**Interviewer: _____**
**Interviewee: _____**

*"Thank you for your willingness to participate in this interview. In comparison to what you might be used to when sitting down with someone at Watermark for a conversation, we're going to follow a more structured format for our conversation today. Hence, my reading this informed consent statement. Before introducing myself and giving more context as to what we'll discuss today, I want to make sure you're okay with my recording this conversation. I know that conversations about healthcare decision-making can be vulnerable, but please know that our intention in recording the conversation is to make sure that we're accurately addressing Watermark members' concerns in the future.*

*Are you okay with my recording the conversation?*
If **yes**, **press record**.
If **no**, continue conversation without recording and take notes on margins.

**The recording has begun.**

*To begin, I'd like to tell you a little bit about myself. My name is Mary Ottley, and I am a graduate student at Emory's Rollins School of Public Health in Atlanta, Georgia. At Emory I'm earning my master's degree in Public Health and I'll graduate in May 2021. This summer I'm doing my practicum at Watermark Health. Before I started at Emory, I participated in the Watermark Institute here and was a Fellow with Watermark Health. I'm back in Dallas this summer doing some work for Christy around the differing views on vaccinations and immunizations which has led us at the clinic to explore the different ways that people make decisions about their personal health and the health of their families.*

*As such, you are the expert. There is no one better suited than you are to discuss how the (*insert family name*) family thinks about health and healthcare. I'm excited to hear your thoughts today! During this interview I will ask you to share a bit about yourself; your thoughts on health, science, a few different health topics; and your healthcare decision-making. Your responses will help us better understand different Christians' opinions and views about healthcare.*

*One final note: Partaking in this interview is optional and you may choose to avoid answering certain questions. The interview will last up to one hour. In order to make sure I don't miss any details I will take notes to jot down details that the recording might miss. Your responses and my notes will be kept completely confidential and your name will not be linked to what we talk about today, nor will this recording be shared with anyone outside of Watermark Health.*

*Do you have any initial questions for me?*
*If not, I'd love to pray for our conversation and we'll get started."*

"*We will start with some questions that give you the opportunity to tell me a bit about yourself and your background."*

| **Module 1: Introduction Questions** |
|---|
| 1. Where did you grow up? |
| 2. Tell me about the makeup of your family of origin. (Prompt: Mom, Dad, Siblings?) |
| 3. How long have you been a member at Watermark? How connected do you feel? |
| 4. Which ministries are you involved in at Watermark? |
| 5. Did you attend and graduate from college? If so, which school? What did you study? |
| 6. Did you attend graduate school? If so, which degree did you earn? |
| 7. Tell me about your career path. (Prompt: What line of work are you in? Etc.) |
| 8. Are you married? Do you have children? How many? |
| 9. How long have you identified as a Christian? Did you attend church growing up? |

*"Now, we'll move on to a series of questions that are a bit more specific to the topic of health."*

| **Module 2: Health-Specific Questions** |
|---|
| 10. Did your parents or legal guardians establish a consistent healthcare routine for you as a child? (Prompt: Did you have an annual physical? Regular dentist visits? Were you vaccinated as a child? Etc.) |
| 11. Have you ever received formal health education at a certain point in your life? (Prompt: Think "sex ed" in high school, a YMCA class, etc.)<br>If so, what was that experience like for you?<br>What health topics did you learn about?<br>How did your receiving formal health education (or not receiving*) affect your perceptions of health? **Will change question based on response to first question.* |
| 12. Did your parents or guardians ever talk to you about health? What are some of the messages you received from them about health?<br>How did your parents/guardians affect your perceptions of health? |
| 13. How would you describe or define health? What words come to mind when you think of "health"?<br>Choose one word that came to mind, and then describe to me what that word means for you. Try to go as far as you can, giving me the full meaning behind that word for you. Again, there is no right or wrong answer and the goal is to learn about your experience. |
| 14. What does health education look like for you now? Do you actively seek to learn about health, nutrition, etc.?<br>Where do you go to learn new information about health and healthcare? Why do you choose those sources? How much trust do you place in them? |
| 15. What are your perceptions of healthcare? The healthcare community?<br>What do you think has helped form those perceptions and beliefs? (Prompt: A personal experience, etc.?) |
| 16. Do you regularly see a primary healthcare provider? What are your perceptions of that primary care provider? |
| 17. When faced with a healthcare decision, what factors do you consider when making that decision? Asked in another way — what informs your healthcare decision-making? |
| 18. To what degree does your Christian faith inform your healthcare decision-making? |

| |
|---|
| 19. What perceptions do you have about Christianity's role in decision-making? In healthcare decision-making? |
| 20. If you feel comfortable doing so, will you share a specific example of a decision that you made about either your individual health or the health of a family member? Please be sure to include details about how you made that decision and what factors you considered during your processing. |

*"We will now transition to our last formal section of questions, which are a bit broader in scope."*

| **Module 3: Science-Specific Questions** |
|---|
| 21. How would you describe or define science? What words come to mind when you think of the word science?<br>Using the same exercise that we did earlier with your health words, choose one word that came to mind, and describe to me what that word means for you. Try to go as far as you can, giving me the full meaning behind that word for you. Again, there is no right or wrong answer and the goal is to learn about your experience. |
| 22. What are your perceptions of science? Of the scientific community?<br>What do you think has helped form those perceptions and beliefs? (Prompt: A personal experience, etc.?) |
| 23. Do you personally know a scientist? (Prompt: Could be a doctor, researcher, etc.) If so, how does this relationship change your perception of science? |
| 24. Do you believe your Christian faith affects your perception of science? If so, why and in what ways? |
| 25. If you had to put yourself on scale from 1 to 10, how willing are you to trust guidance that comes from the scientific community? |
| 26. Who are trusted authority figures for you? (Prompt: Political or governmental figures? Religious leaders? Watermark staff? Watermark Health staff? Etc.) |
| 27. What do you think makes an authority figure trustworthy? |

*"Lastly, we'd like to ask you for a series of recommendations about ways you think Christians could act as leaders in the field of public health."*

| **Module 4: Recommendations** |
|---|
| 28. If you were calling someone to make a change in a certain behavior, how would you call them to do it? What things would *you* emphasize in calling that person to an alternative behavior? (Prompt: This could be as simple as asking someone to wear a seatbelt while they're a passenger in a car.)<br>How willing are you to adopt behaviors that others are calling you to? (Prompt: Ex: eating less salt, wearing a helmet while riding a bike.) |
| 29. In your opinion, what are ways that Christians could interact with the healthcare system and/or the scientific community in a healthy way? |
| 30. What are your perceptions about Watermark Health?<br>What about Watermark Health as a resource for health information and education?<br>Would you be willing to trust resources Watermark Health distributes? If not, why? |

| |
|---|
| 31. Are there particular health topics that you wish Watermark or Watermark Health would talk about and/or equip members with resources on? If so, which ones? |
| 32. If you could give one recommendation to the scientific community in light of COVID-19, what would you tell them? |

| **My last question for you today is this:** |
|---|
| Based on the conversation we've had today what question do you wish I would have asked you? And do you feel comfortable offering me your response to it? |

*Thank you again for participating in this interview. Please feel free to contact Watermark Health if you have any additional thoughts or comments.*

## Appendix II: Google Form Survey for Watermark Members

# Watermark Health Survey of WM Members

Hello there! My name is Mary Ottley, and I'm a second-year MPH (Master of Public Health) student at Emory's Rollins School of Public Health in Atlanta, Georgia. During Summer 2020 I completed my graduate school practicum with Watermark Health. Prior to my summer practicum, I completed the Watermark Institute in 2019 and served as a Watermark Health Fellow from 2018-2019. I am now working on my Thesis Project in coordination with the Watermark Health team. This project revolves around the different ways that Christians make decisions about their personal health and the health of their families. As such, we'd like to hear from Christians like you! Will you help us to better understand the Christian healthcare decision-making process by completing this short survey? Thank you!

Note: These surveys are completely anonymous. Please take the survey only one time and answer the questions with as much candor as you feel comfortable.When certain questions ask you to list your response on a "scale of 1-10" please note that "1" indicates the minimum score and "10" indicates the maximum score.

* Required

*Skip to question 1Skip to question 1*

## Introductory Questions

1. Please identify your relationship to Watermark Community Church. *

   *Mark only one oval.*

   - ◯ Staff
   - ◯ Member
   - ◯ Attender
   - ◯ Not affiliated with Watermark Community Church
   - ◯ Other: _____

2. Did you grow up talking about health and healthcare in your family of origin? *

   *Mark only one oval.*

   - ◯ Yes
   - ◯ No
   - ◯ Other: _____

3. On a scale of 1-10, when you hear or read about healthcare information, how well do you understand it? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

4. Are you satisfied with the degree to which you understand healthcare information? *

*Mark only one oval.*

- ◯ I am satisfied.
- ◯ I am not satisfied, and I wish to grow in my understanding of healthcare information.
- ◯ I am not satisfied, and I do not wish to grow in my understanding of healthcare information.
- ◯ Other: _____

5. What do you perceive to be the main barriers to understanding healthcare information well? (Please select all that apply.) *

*Check all that apply.*

- ☐ Lack of trustworthy resources.
- ☐ Healthcare providers do not thoroughly explain healthcare information.
- ☐ I do not know where to go to learn about healthcare information.
- ☐ I, personally, do not care to understand healthcare information well.
- Other: ☐ _____

6. Are there specific health topics that you would like to learn more about? *

   *Mark only one oval.*

   - ◯ Yes *Skip to question 7*
   - ◯ No *Skip to question 9*
   - ◯ Other: _____

"Are there specific health topics that you would like to learn more about?"

7. If you responded "yes," please share the reasons WHY you would like to learn more information about certain health topics.

_____

_____

_____

_____

_____

8. Please share WHICH topics you would like to learn more about.

_____

_____

_____

_____

_____

*Skip to question 10*

"Are there specific health topics that you would like to learn more about?"

9. If you responded "no," please share the reasons WHY you would not like to learn more information about certain health topics.

_____

_____

_____

_____

_____

*Skip to question 10*

## Healthcare Decision-Making

Please note that on the scale of 1 to 10 “1” indicates the minimum score and “10” indicates the maximum score.

10. When making healthcare decisions, what resources do you utilize in order to help you make those decisions? (Please select all that apply.) *

*Check all that apply.*

- [ ] Information from medical providers (e.g., MDs, RNs, etc.)
- [ ] Online resources (e.g., WebMD, CDC website, etc.)
- [ ] Documentaries
- [ ] Books
- [ ] Watermark Health resources
- [ ] Recommendations from family/friends
- [ ] Holy Bible

Other: [ ] _____

11. In reference to the previous question, please specify which books, websites, Bible passages, etc. you utilize when making healthcare decisions. *

_____

_____

_____

_____

_____

12. On a scale of 1-10, to what degree does your Christian faith inform your healthcare decision-making? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

13. On a scale of 1-10, what level of trust do you place in God regarding healthcare outcomes? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

14. On a scale of 1-10, what level of trust do you place in science regarding healthcare outcomes? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

15. On a scale of 1-10, how comfortable do you feel adhering to the scientific community's recommendations for your health? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

16. In reference to the previous question, has this rating changed as a product of the COVID-19 pandemic? *

*Mark only one oval.*

- ◯ Yes, it has increased.
- ◯ Yes, it has decreased.
- ◯ No, it has remained the same.

17. On a scale of 1-10, how much trust do you place in your primary healthcare provider? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

## Healthcare Decisions

The following questions address specific healthcare topics that, historically, have been divisive in the Christian community. We appreciate your candid responses as they'll help us learn how trusted leaders at Watermark think about these topics.

Healthcare Decisions

18. Should Christians seek mental health treatment? *

*Mark only one oval.*

- ◯ Yes
- ◯ No
- ◯ Other: _____

19. If you feel comfortable sharing, we would love to learn about your reasoning for the healthcare decision referenced in the previous question. (Please type your explanation below.)

20. Should Christians use birth control? *

*Mark only one oval.*

- Yes
- No
- Other: _____

21. If you feel comfortable sharing, we would love to learn about your reasoning for the healthcare decision referenced in the previous question. (Please type your explanation below.)

22. Should Christians diagnosed with cancer undergo treatment, such as chemotherapy? *

*Mark only one oval.*

- ◯ Yes
- ◯ No
- ◯ Other: _____

23. If you feel comfortable sharing, we would love to learn about your reasoning for the healthcare decision referenced in the previous question. (Please type your explanation below.)

_____

_____

_____

_____

_____

24. Should Christians vaccinate their children? *

*Mark only one oval.*

- ◯ Yes
- ◯ No
- ◯ Other: _____

25. If you feel comfortable sharing, we would love to learn about your reasoning for the healthcare decision referenced in the previous question. (Please type your explanation below.)

Healthcare Decisions (ctd.)

Please note that on the scale of 1 to 10 “1” indicates the minimum score and “10” indicates the maximum score.

26. On a scale of 1-10, how effective do you believe vaccines to be? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

27. On a scale of 1-10, how safe do you believe vaccines to be? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

28. If you have a child/children, have you chosen to fully vaccinate your child(ren)? *

*Mark only one oval.*

- ◯ Yes, my child(ren) are fully vaccinated in accordance to the recommended immunization schedule.
- ◯ Yes, my child(ren) are fully vaccinated, but on a delayed schedule.
- ◯ No, I have chosen not to give my child(ren) certain vaccines.
- ◯ No, I have chosen not to vaccinate my child(ren).
- ◯ N/A. I do not have child(ren).
- ◯ Other: _____

29. If you feel comfortable sharing, we would love to learn about your reasoning for the healthcare decision referenced in the previous question. (Please type your explanation below.)

_____

_____

_____

_____

_____

Watermark Health

Please note that on the scale of 1 to 10 "1" indicates the minimum score and "10" indicates the maximum score.

30. On a scale of 1-10, how likely would you be to trust healthcare resources produced by Watermark Health? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

31. On a scale of 1-10, how likely would you be to utilize and adhere to healthcare resources produced by Watermark Health? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

32. Which of the following is your preferred platform to learn something new? (Please select all that apply.) *

*Check all that apply.*

- [ ] Book
- [ ] Podcast
- [ ] Social media post
- [ ] Video
- [ ] Infographic
- [ ] One-page briefing

Other: [ ] _____

Thank you!

Thank you for your time and willingness to complete this survey! If you have follow-up comments or questions, please email Christy Chermak (cchermak@watermark.org).

## Appendix III: Google Form Survey for Watermark Health Medical Providers

# Watermark Health Survey of Healthcare Practitioners

Hello there! My name is Mary Ottley, and I'm a second-year MPH (Master of Public Health) student at Emory's Rollins School of Public Health in Atlanta, Georgia. During Summer 2020 I completed my graduate school practicum with Watermark Health. Prior to my summer practicum, I completed the Watermark Institute in 2019 and served as a Watermark Health Fellow from 2018-2019. I am now working on my Thesis Project in coordination with the Watermark Health team. This project revolves around the different ways that Christians make decisions about their personal health and the health of their families. As such, we'd like to hear from Christians like you! Will you help us to better understand the Christian healthcare decision-making process from the practitioner* perspective by completing this short survey? Thank you!

*This survey is designed for credentialed healthcare professionals (RN, NP, PA, DO, MD, etc.) who often provide health education for patients.

Note: When certain questions ask you to list your response on a "scale of 1-10" please note that "1" indicates the minimum score and "10" indicates the maximum score. Additionally, these surveys are anonymous. Please take the survey one time and answer the questions with as much candor as you feel comfortable.

* Required

## Provider-specific Questions

1. On a scale of 1-10, how health literate would you say your patients are? ("Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions." ) *

   Reference: Health Resources & Services Administration. (August 2019). Health Literacy. https://www.hrsa.gov/about/organization/bureaus/ohe/health-literacy/index.html#:~:text=Health%20literacy%20is%20the%20degree,who%20have%20low%20socioeconomic%20status

   *Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

2. On a scale of 1-10, how health literate would you say the average Watermark Community Church member is? *

*Mark only one oval.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ | ◯ |

3. What health topics do you wish Christians knew more about? *

4. What resources do you use to inform patients for whom you are providing health education? (Please select all that apply.) *

*Check all that apply.*

- [ ] Medical journals
- [ ] Scientific journals
- [ ] Websites, online resources
- [ ] CDC materials

Other: [ ] _____

5. In reference to the previous question, please tell us which specific resources you utilize. *

6. Are there specific health-related questions that you often receive from your patients that you wish you had additional educational resources to better address? *

   *Mark only one oval.*

   - ◯ Yes *Skip to question 7*
   - ◯ No *Skip to question 8*

"Are there specific health-related questions that you often receive from your patients that you wish you had additional educational resources to better address?"

7. If "yes," please specify the health-related questions you receive.

   _____

   _____

   _____

   _____

   _____

Watermark-specific Questions

8. Do you wish Watermark educated its members about health topics? *

   *Mark only one oval.*

   - ◯ Yes *Skip to question 9*
   - ◯ No *Skip to question 10*
   - ◯ Other: _____

*Skip to question 10*

"Do you wish Watermark educated its members about health topics?"

9. If "yes," which health topics do you wish Watermark educated its members about?

Watermark-specific Questions (ctd.)

10. What do you wish Watermark members knew more about in regard to science and medicine? *

11. What relationship do you wish existed between Watermark Community Church leadership and the healthcare community? *

12. Do you think Watermark Health is equipped and poised to produce health education resources for Watermark Community Church members? *

*Mark only one oval.*

- ◯ Yes *Skip to question 14*
- ◯ No *Skip to question 13*
- ◯ Other: _____

"Do you think Watermark Health is equipped and poised to produce health education resources for Watermark Community Church members?"

13. If "no," why not?

_____

_____

_____

_____

_____

*Skip to question 15*

"Do you think Watermark Health is equipped and poised to produce health education resources for Watermark Community Church members?"

14. If "yes," what suggestions do you have for these health education resources?

_____

_____

_____

_____

_____

*Skip to question 15*

Interested in joining the team?

15. Are you interested in joining a task force team to help Watermark Health develop these health education resources? *

*Mark only one oval.*

- ◯ Yes
- ◯ No
- ◯ Other: _____

16. If yes, please provide us with your contact information. (Please include your name, email, and medical credential.)

_____

17. Is there anything else you want our team to know as we think about health education for Watermark members?

_____

_____

_____

_____

_____

Thank You!

Thank you for your time and willingness to complete this survey! If you have any follow-up comments or questions, please email Christy Chermak (cchermak@watermark.org).