ABSTRACT

Creation Rx: An Exploration of Christian Primary Care Physician Responses to Implementing Nature Prescriptions

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Many chronic illnesses that Americans suffer from can be alleviated through time in nature. In addition to the medicinal effects of time spent outdoors, nature plays a key role in the Christian faith and offers spiritual benefits. Some clinicians and medical practices have already adopted nature prescription programs to treat these chronic illnesses. This thesis reviews the scientific and theological evidence for the benefits of time in nature and provides a qualitative analysis of the role of Christian faith in implementing park prescriptions through multiple interviews with Christian primary care physicians. These findings will assist public health professionals and medical administrators in identifying and removing future barriers for nature prescriptions while contributing to the growing literature on medicine and religion.

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CREATION RX: AN EXPLORATION OF CHRISTIAN PRIMARY CARE PHYSICIAN RESPONSES TO IMPLEMENTING NATURE PRESCRIPTIONS

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DEDICATION

Psalm 104:1-6

This thesis is dedicated to the Southerland family. Their wonder for God's creation, passion for equitable health, and love for their farm's beautiful simplicity has shown me the innate and chaotic beauty of dependency on Christ in family and medicine.

In memory of Addison Smith, who worshipped in sanctuaries, mountains, and lakes.

CHAPTER ONE

Introduction

Chronic diseases are among the most prevalent and costly challenges for the United States (U.S.) healthcare system, as "90% of the nation's $4.1 trillion in annual healthcare expenditures are for people with chronic and mental health conditions." (Centers for Disease Control, [CDC], 2023). Many of the most frequently diagnosed chronic illnesses in the U.S. require extensive treatment and have high morbidity rates. To resolve this crisis, practitioners in the U.S. are faced with the difficult task of providing preventive care in addition to treating symptoms.

There is growing literature identifying a positive relationship between time spent outdoors and overall health. However, the average Americans spends "approximately 90 percent of their time indoors," (Environmental Protection Agency [EPA], 1989) which decreases access to the health benefits offered by outdoor spaces. Furthermore, researchers believe that increased time outdoors provides numerous health benefits and can serve as a method of preventing and decreasing the prevalence of chronic illness and its effects (ParkRx, 2019).

Time in nature or in the outdoors is characterized by time spent in a space that is predominantly characterized by organic matter, often referred to as "green space" whether it be "synonymous with nature" or "explicitly urban vegetation" (Taylor and Hochuli, 2017).

Though there are methods of quantifying what characterizes natural or "green" spaces such as the Normalized Difference Vegetation Index (NDVI) (James, 2015), for

the purpose of this thesis "time in nature" will refer to any prolonged time in an outdoor area characterized as "green space" or composed of natural vegetation with limited man-made structures. This definition differentiates "time in nature" from simply "being outdoors" since organic or "green" components are required. For example, sitting on a balcony in a city may be "outdoors" but for the purpose of this study, it cannot be classified as "time in nature" due to its lack of vegetative contact and general space for the encouragement of movement. Time in nature might occur anywhere from a small urban park with maintained landscape to a large national park with little to no maintenance. Keniger et al. (2013) identify the "settings in which interactions between people and nature occur" (p. 915). These settings that are pertinent to this study include urban, fringe, production landscape, wilderness, and specific species, and they describe the types of spaces referenced in the definition of "time in nature."This indicates that the areas referenced in this study are diverse and applicable to many geographical areas.

The physical, mental, and social benefits of human health and nature contact are well documented across many disciplines. For instance, studies suggest that nature benefits cardiovascular (Kawakami et al., 2004), endocrine (Ohtsuka, Y. et al., 1998), psychological (Shuda et al., 2020), and immune system functioning (Ohtsuka, Y. et al., 1998; Q. Li et al. 2007), while recent studies have emerged which explore contact with nature in relation to microbial health (Rook, 2013; Zheng et al., 2020). Additionally, nature contact caused decreased sympathetic nervous system function (Yamaguchi et al., 2006), which is a physiologic manifestation of lowered stress levels. One systematic review of the evidence-based health benefits of nature contact by Frumkin et al. (2017) lists twenty health and well-being benefits including reduced diabetes, better eyesight,

and improved mental health. These physiological factors are significant in the global health field because they provide potential preventative interventions for Noncommunicable Diseases (NCDs), otherwise known as chronic illnesses (World Health Organization [WHO], 2023). NCDs such as "heart disease, stroke, cancer, chronic respiratory disease, and diabetes are the leading cause of mortality in the world" (WHO, 2023) and globally challenge healthcare practitioners with the ever-growing demand of providing effective treatment and prevention. Particularly, in the U.S., heart disease and stroke are the leading causes of death for both men and women, followed by cancer and diabetes (National Institutes of Health [NIH], 2023). In addition to the prevalence of chronic physical illnesses in U.S. healthcare, an increasing number of Americans suffer from chronic mental illnesses, predominantly anxiety and depression. Harvard Medical School's (2007) study found "an estimated 31.1% of U.S. adults experience an anxiety disorder at some time in their lives," and a National Survey on Drug Use and Health (2021) found that 8.3% of adults in the United States "had at least one major depressive episode." Furthermore, individuals aged 18 to 25 had the highest prevalence (18.6%) of major depressive episodes (National Institute of Mental Health (2021). In addition to its positive effects on chronic physical illnesses, research suggests that time in nature can serve as a possible solution to a growing mental health epidemic because of its psychological benefits (Shuda et al., 2020; Twohig-Bennett and Jones, 2018; Vanaken and Danckaerts, 2018).

The significance of the current chronic health crisis in America demands sustainable, adaptive, and effective methods for both medical treatment and prevention. The demonstrated relationship between time in nature and wellness suggests that

increased time outdoors might serve as an effective means of medical treatment. Many medical practitioners nationwide have observed this relationship and have begun to utilize the medicinal benefits of the outdoors by prescribing time in nature and specifically time in park settings. This trend in practice (prescribing time in nature as a method of treatment) led to a collaboration between the National Park Service and the practitioners already using park prescriptions clinically in October 2013 (ParkRx, 2016). This collaboration worked to pilot a structured protocol for a nature-based clinical prescription program. Following, the National ParkRx initiative was developed to provide resources for practitioners who already used ParkRx clinically and to educate and equip practitioners who are uninformed of the potential usage of nature prescriptions in clinical settings. Now over ten years old, the ParkRx mission has continued from its beginnings "as the home for the National ParkRx Initiative and has grown into the leading information hub for Park Prescriptions, creating a space for knowledge sharing in the practitioner community. Led by the Institute at the Golden Gate, ParkRx.org builds on the Park Prescription movement and provides a platform to share best practices, toolkits, and case studies," (About ParkRX, 2016).

Though the physiological evidence for the health benefits of time spent outdoors should encourage all practitioners to utilize park prescription programs in their work, primary care practitioners who identify as Christian have a vested interest in the medicinal effects of nature due to the spiritual significance of creation in the Christian tradition. In accordance with the belief that God is the Maker of all creation including man and earth, spending time in nature allows those who practice Christianity to connect with God, enjoy his creation, and experience spiritual growth and connection (Binde,

2001, p. 20) along with wonder and awe. The Bible contains numerous examples of Christ's repeated usage of natural metaphors (New Revised Standard Version Updated Edition [NRSVUE] 2021, Matt. 24:32, John 7:38). Additionally, the Gospels display Christ's tendency to seek time in nature for prayer and solitude (NRSVUE, 2021, Matt. 26:36, Luke 3:2).

Though scripture, tradition, and theology indicate there is a need for Christians to foster a relationship with creation, it is unclear if Christian practitioners feel obligated to apply this aspect of their faith in clinical practice. Furthermore, there is a lack of research exploring the combined roles of the health and faith-related benefits of nature in influencing practitioners to implement park prescriptions in their medical practice.

The research conducted in this study will serve to fill this gap in the literature by exploring Christian primary care physicians' attitudes towards nature prescription program implementation while identifying additional barriers which might prevent physicians form integrating these prescription programs into their practice.

Interviews were conducted with Christian primary care physicians to explore the following research questions:

1. Are practitioners aware of the health benefits of nature contact and existing nature prescription programs?
2. Do Christian practitioners currently offer or intend to offer nature-based prescriptions?
3. What existing beliefs, particularly faith-related beliefs, inform these intentions or practices?
4. What challenges or barriers prevent practitioners from implementing nature prescription in their practices?

Increased knowledge of the role of Christian faith in medical practice is of particular importance for understanding practitioners who are integral parts of the

American healthcare system. Robinson et al. (2017) found sixty-three percent of physicians surveyed reported religious affiliation and ninety-two percent of those with religious affiliation identified as Christians. Considering this large representation of practitioners in the U.S. that identify as Christian, this study will contribute to the body of knowledge by providing a report on the awareness of existing nature prescription programs, the awareness of the benefits, and current trends of Christian practitioners. It will also identify the role of faith-based beliefs for Christian practitioners and identify factors which prevent the implementation of nature prescription programs in medical practice. This will serve as an introductory framework for further research regarding practitioners' perceptions of creation and its following effect on offering nature prescriptions. These findings will practically assist public health professionals and medical administrators in identifying future barriers for clinical nature prescriptions and explore prospective areas for further research in the growing field of medicine, religion and medical humanities.

CHAPTER TWO

Literature Review

There are several arguments that form the basis for prescribing time outdoors as a valid therapeutic intervention. One consideration pertains to benefits to physical and mental well-being. There is a growing amount of literature that addresses the health benefits of time spent outdoors, and recent literature addresses these effects on common chronic physical and mental illnesses. This line of literature has contributed to the founding of the ParkRx movement which is centered on inspiring and equipping practitioners to prescribe time in nature as a response to the current Non-Communicable Disease (NCD) epidemic. Additionally, there is a vast amount of literature which explores the role of nature in Christian theology.

The purpose of this chapter is to review existing scientific and theological literature which provides a basis for how Christian physicians might perceive the relationship between nature and physical/spiritual health. The following paragraphs will (1) explore the various physiological and psychological "pathways" that explain the benefits of the outdoors on physical and mental health and (2) provide a review of the theological arguments for relationship with creation.

There are numerous benefits of nature contact, but these benefits depend in part on the human connection with nature. For instance, there is reason to believe that in the U.S., this connection may be at risk. The Environmental Protection Agency's (1989) report to congress on Indoor Air quality indicated the average American spends

"approximately 90 percent of their time indoors." However, this current trend does not reflect the historical patterns of the human relationship with nature. Richard Louv, an influential figure in the nature contact movement, was the first of many researchers to observe the negative effects of declining nature/human contact on physical and mental wellbeing. His book, *Last Child in the Woods,* (2005) gives a historical perspective on American's path to becoming an "indoor nation "He overarching thesis is that there is a decline in outdoor experiences which has been detrimental to humans, in particular children. He refers to this phenomenon as "Nature Deficit Disorder" (NDD) and defines it as a psychosocial disorder that follows a separation from the outdoor world (Louv, 2006). He argues that "the quality of exposure to nature affects our health at an almost cellular level," (Louv, 2006, p. 41) and in a blog post wrote, "the human costs of alienation from nature [is extensive] … diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses," (Louv, 2019). In recent years, his findings have inspired similar research on NDD in various fields from ecology to medicine.

Nature Deficit Disorder, which results from the separation of man from nature is thought to be a result of their evolutionary relationship which was first proposed in *The Biophilia Hypothesis* (Kellert and Wilson, 1993). They defined the term *Biophilia*, which translates from Greek to "love of living things" and is "the innate tendency to focus on life and lifelike processes" (Kellert and Wilson, 1993). Fromm (1973) first proposed a definition for the term as "the passionate love of life and all that is alive" (p. 365). This, *biophilia* provides a conceptual argument for the overall health benefits of time spent outdoors. Frumkin et al. (2017) provided a survey of the benefits that nature yields in

"Nature Contact and Human Health: A Research Agenda" stating, "the diversity of benefits suggests a broad, nonspecific physiological pathway of action, a multiplicity of pathways, or a combination of these" (Frumkin et al. 2017, p. 3).

The literature on human health and nature contact spans many disciplines, acknowledging physical, mental, and social benefits. Within the medical profession, most studies explore the positive effects of nature contact on health in cardiovascular, endocrine, and immune function, while newer studies have explored its effects relating to microbial and immune health. The physiological factors are significant in the global health field, because they pose potential preventative interventions for Noncommunicable Diseases (NCDs), otherwise known as chronic illnesses, (WHO, 2023). Ailments such as "heart disease, stroke, cancer, chronic respiratory disease, and diabetes are the leading cause of mortality in the world" (WHO, 2023), and healthcare providers globally are faced with the ever-growing demand of treating these illnesses which often result in premature death. Particularly, in the U.S., heart disease and stroke are the leading causes of death for both men and women in addition to cancer and diabetes according to the listing of "Our Biggest Health Challenges" by the National Institutes of Health (2023).

Several studies have addressed the role of outdoor exposure for physiologic and psychologic health. For example, a Harvard Medical School study (2007) found "an estimated of 31.1% of U.S. adults experience an anxiety disorder at some time in their lives" and, according to the National Survey on Drug Use and Health (2021) 8.3% of adults in the United States "had at least one major depressive episode." These findings indicate that time in nature is particularly relevant in alleviating chronic mental health illnesses.

Physiological Benefits

There are several significant studies that have demonstrated the positive influence nature has on health through physiologic pathways. A significant factor in human physiology is the role of a balanced autonomic nervous system, which is a subdivision of the generalized nervous system, and is divided into the sympathetic, parasympathetic, and enteric nervous systems. The parasympathetic (PNS) and sympathetic (SNS) subdivisions of the autonomic nervous system are responsible for different roles. The SNS regulates what is commonly known as the "fight or flight" response, while the PNS controls rest and relaxation (Waxenbaum et al., 2023). Though the PNS effects many physiological functions, it primarily decreases blood pressure and heart rate while increasing digestion and producing a more relaxed state. In contrast, the stress response is coordinated by the sympathetic nervous system, indicated by increased heart rate and blood pressure. Without homeostasis between PNS and SNS, states of chronic stress yield "depression, anxiety, cognitive impairment, and heart disease" (Chu et al., 2022) along with generalized increase in pro-inflammatory cytokines (Won and Kim, 2016).

Japanese scientist Yamaguchi's (2006) interest in researching the benefits of nature contact was sparked by the traditional Japanese cultural practice of spending time in a forest or "forest bathing," traditionally known in Japanese culture as *shinrin-yoku.* Though its name was coined in 1982, *shinrin-yoku* is consistently practiced throughout Japanese culture and was recently popularized as a means of maintaining connection and relationship with nature despite the continued industrialization of modern society. In recent years, Japanese researchers have begun to explore the physiologic benefits of this traditional practice. Yamaguci et al.'s (2006) study observed the effect of the outdoors on

SNS activity by quantifying and examining the presence of plasma noradrenaline levels through salivary amylase activity, since increased salivary amylase levels indicate increased SNS function. The study conductors measured salivary amylase levels following forest bathing through handheld monitors used by participants. Data was collected after forest bathing, and statistically significant lower quantities of salivary amylase were observed. They concluded "the forest was a good environment in which people experienced much less environment-derived stress, which enabled observations of exercise-induced physiological effects to be made" (Yamaguchi et al., 2006, p. 158).

Further research on the physiologic effects of *shinrin-yoku* explored changes in blood glucose levels in patients with diabetes mellitus. Following walks of varying distances in forested areas, participants experienced a mean decrease in blood glucose levels by 39.7% (Ohtsuka, Y. et al., 1998, p. 127). Since the percent decrease in blood glucose levels following *shinrin-yoku* did not differ between a short distance (3km) walk and a long distance (6km) walk, these researchers attributed this consistent benefit to the forest environment's "volatile and non-volatile compounds called phytoncides … emitted by plants" (Ohtsuka, Y. et al., 1998, p. 127). This indicates that outdoor exposure might serve as an effective intervention in a patient's treatment plan for diabetes mellitus.

The effects of phytoncides on stress were also studied in another species by Kawakami et al. (2004). Spontaneously Hypertensive Stroke Prone (SHRSP) rats were placed under conditions of restraint stress with one group exposed to phytoncides and the other without any exposure. Following observation, the blood pressure and plasma catecholamine concentration of the group exposed to the phytoncides was significantly

lower than those without exposure, indicating that "phytoncides reduced the cardiovascular response to restraint stress in SHRSP" (Kawakami et al., 2004).

In addition to decreased sympathetic nervous system function (Yamaguchi et al., 2006) and decreased blood glucose levels (Ohtsuka, Y. et al., 1998) a pilot study by Tsao, Tsung-Ming et al. (2018) observed the effects of forest environments on Natural Killer (NK) cells. These cells are part of the innate immune system and are lymphocyte subsets "important in the human endocrine and immune systems to induce tumor of virus-infected targeted cell death" (Ohtsuka, Y. et al. 1998, p. 16501). Comparisons from before and after five-day forest trips in Xitou and four-day forest trips in Taipei both revealed statistically significant increases in Activating NK cell percentages (p values of 0.002 and 0.004) (Ohtsuka, Y. et al. 1998, p. 16508). Another study by Q. Li et al. (2007) found similar results of increased NK cell activity and increased proportion and numbers of perforin, granulysin, and granzymes A/B expressing cells, which are all significant in cancer prevention since these "cytolytic molecules contribute to NK and anti-tumor activity" (Q. Li et al., 2007, p. 5).

These three studies (Yamaguchi et al., 2006; Ohtsuka Y. et al., 1998; Q. Li et al., 2007) demonstrated that forest bathing, or *shinrin-yoku* yields direct physiologic benefit. Time spent outside in a particular environment yielded decreased sympathetic nervous system activity, decreased blood glucose levels, and increased activity of NK cells. These findings present that nature exposure improves physiologic response to stress, manages diabetes mellitus, and prevents cancer. With the Center for Disease Control (CDC) reporting 1 in every 5 deaths caused by heart disease, 11.6 of the US population suffering

from diabetes, and cancer as the second highest cause of death (Hoyert, 2012), the future of health in America will rely on preventative measures.

In addition to the observed effects of *shinrin-yoku,* the health benefits of nature contact have been studied on a microbial level. The past two decades of microbiological research have discovered the role of the microbiome in physical, mental, and environmental health (Panthee et al., 2022). This is significant in the study of nature exposure effects, since researchers have discovered that individuals' microbial and immunological activity are diminished by decreased nature exposure. Particularly, Rook (2013) argues that the chronic illnesses which characterize high-income countries today are caused by the effects of decreased biodiversity on immunoregulation. This provides evidence for an microbial immunologic pathway as an additional factor of psychologic and physiologic benefits of outdoor exposure.

The human microbiome "consists of the 10-100 trillion symbiotic microbial cells harbored by each person, primarily bacteria in the gut" (Ursell et al., 2012, p. 1) and the genes within these microbial varieties. These microbes, though not visible to the naked eye, are essential for human health, particularly in immune function, since "varying microbial species in the GI track help with the maturation of the innate immune system (part of the body's defense against pathogens), allergy tolerance, and overall homeostasis" (Zheng et al., 2020, p. 493). An additional role of the immunoregulatory system is regulating inflammatory responses based on need. Continued inflammatory response when unnecessary is seen in "high income countries where persistently raised levels of C-reactive protein (CRP) are common." These "persistently raised inflammatory mediators lead to increased risk of cardiovascular disease, and depression" (Rook, 2013,

p. 18361). The microbiome, transferred to a child at birth through its mother's vaginal canal (Shin et al., 2013) requires exposure to a vast array of organisms in order to develop the immune system. One category of microbes is referred to as "Old Friends" from mankind's evolutionary past which evolved to have roles in driving immunoregulatory mechanisms" (Rook, 2013, p. 18360). Without exposure to these organisms (which takes place in outdoor, natural environments) the microbiome is not able to develop a vast array of pathogenic knowledge and fails to establish an immune system which can differentiate between attacking pathogens and the human body itself (Rook, 2013, p. 18361). This hypothesis is expressed as the "hygiene hypothesis or Old Friends mechanism or biodiversity hypothesis" (Rook, 2013, p. 18365) and represents the evolutionary relationship between the human microbiome and immunoregulation.

Rook (2013) argues that the main cause of increased chronic inflammatory diseases (i.e. obesity and inflammatory bowel disease) is decreased diversity in microbial input yielding insufficient immune system regulation of inflammation. He notes,

> The underlying principle of the immunological explanation is that for many reasons, exposure to green spaces will lead to increased immunoregulation, resulting in lower background inflammation, manifested as lower resting CRP. Improved control of inflammation results in lower prevalence of inflammatory disorders, cardiovascular disease, and depression and increased stress resilience (Rook, 2013, p. 18365).

This provides another defense for the role of nature contact in human health and wellbeing. This immunologic argument works similarly alongside the physiologic and psychologic benefits of outdoor exposure explored in this chapter, indicating that the benefits of nature exposure are vast, diverse, and in need of further research, as proper immune function and decreased inflammation have drastic effects on physical and mental health.

The effects referenced in *shinrin yoku* and microbial diversity exist amongst dozens of additional benefits. One systematic review of over twelve studies found "an inverse relationship between nature exposure and stress, both perceived and physiologic" (Shuda et al., 2020). This included improved perceived stress, reduced hypertension, decreased stress recovery times, decreased DASS (depression, anxiety, and stress scores), increased parasympathetic activity, and higher quality of life and well-being. An even larger metanalysis of over 100 studies showed similar results. Increase in green space contact yielded decreased salivary cortisol, diastolic blood pressure, heart rate, low frequency heart rate variability, preterm birth, type II diabetes, all-cause mortality, and cardiovascular mortality as well as increased incidence of good self-reported health (Twohig-Bennett and Jones, 2018). Additionally, "incidence of stroke, hypertension, dyslipidaemia, asthma, and coronary heart disease were reduced" (Twohig-Bennett and Jones, 2018, p. 628). These findings all indicate beneficial physiologic pathways in response to nature contact, but additionally time outdoors yielded beneficial psychological effects.

Psychological Benefits

There are two proposed theories for these psychological benefits. Rita Berto's "The Role of Nature in Coping with Psycho-Physiological Stress" (2014) describes "natural places that allow the renewal of personal adaptive resources to meet the demands of everyday life" (p. 394) as *restorative environments*. Berto argues that these restorative environments have their positive effects based on two theoretical psychological mechanisms: Stress Recovery Theory (SRT) and Attention Restoration Theory (ART). SRT parallels Kellert and Wilson's (1993) *Biophilia Hypothesis* as a psycho-evolutionary

theory, explaining the benefit of nature exposure as a result of man's evolutionary background in natural areas and resulting phycological discomfort in modern, urban areas (Berto, 2014). ART posits that humans have an "unlearned predisposition to pay attention and respond positively to natural content… and to configurations characteristic of settings that were favorable during evolution" (Berto, 2014, 396). Each method establishes a different role of nature in health outcomes, with SRT "relieving physiologic stress' (Frumkin et al. 2017, p. 3) and ART "relieving mental fatigue" (Frumkin et al. 2017, p.3).

Stephen Kaplan (1995) further explores the restorative benefits of nature through ART, providing a framework for the psychological role that attentive efforts play on wellbeing. Kaplan draws on Mesulam's (1985) concept of 'directed attention,' a mechanism which "requires effort, plays a central role in achieving focus, is under voluntary control (at least some of the time), is susceptible to fatigue, and controls distraction through the uses of inhibition" (Kaplan 1985, p.170). In the same way that students might feel exhausted or overwhelmed following a difficult exam or lecture, "any prolonged mental effort leads to directed attention fatigue" (Kaplan 1985, p.170). Kaplan notes sustained directed attention is essential for general human wellbeing and performance. However, directed attention capacities are limited and, following, "the fatigue of directed attention is similarly a key ingredient in the ineffectiveness of human error" (Kaplan 1985, p.172). Therefore, rest and restoration of one's directed attention capacity is necessary to avoid this infectivity described.

Kaplan proposes a mechanism for the relief of directed attention which yields restoration of 'fascination' and 'involuntary attention' (Kaplan 1985, p.172). Particularly,

"soft fascination" is experienced by the subject in nature as they take in their surroundings. In this process, "the executive system that regulates directed attention gets to rest, pessimistic thoughts are blocked, and negative emotions are replaced by positive ones" (Berto, 2014, p. 396), allowing for directed attention to be relieved.

Kaplan and Talbot (1983) used this concept of soft fascination in their qualification of elements that characterize a restorative environment: 1) being away physically or changing of one's gaze, 2) fascination, 3) having extent (feeling of depth or "other world") and 4) compatibility of purpose with the individual (does not pose a threat to the individual's activities) (Kaplan, 1995). Following the establishment of what constitutes a restorative environment, Kaplan proposes that natural settings meet every one of these qualifications as they are often away, yield soft fascination as they "readily hold attention, but in an undramatic fashion" (Kaplan 1985, p.174), are diverse, and yield compatibility.

According to Kaplan and ART, nature provides vast psychological benefits and improves individual effectiveness by providing an environment for relief from directed attention strain. This applies to stress as well, which Kaplan (1995) acknowledges is related to directed attention exhaustion and might be "an outcome of resource depletion" (Kaplan 1985, p.179).

This reflects the compatibility of SRT and ART theories, as stress and mental fatigue can be related. Berto (2014) notes,

> These theories complement one another, in that the elevated physiological arousal and negative affect characteristic of stress (SRT) can occur in absence of mental fatigue. Conversely elevated arousal or negative affect do not always accompany attentional fatigue (ART); attentional fatigue can be considered a stress aftereffect and treated as a condition that increases vulnerability to stress (p. 396).

ART also explains why decreased nature contact would result in negative behavioral effects. When individuals fail to spend time in outdoor settings, their directed attention is overextended and unable to recover since "inhibition is essential to delay and reflection, lacking this capability an individual behaves in a less adaptive and appropriate fashion" (Berto, 2014, p. 400). This is applicable for most Americans considering in a population size of 5,550 participants, The Nature of Americans (2023) found over 60% of adults reported spending five or less hours outdoors each week. Without nature exposure to restore attentive abilities, subjects might be at risk for increased aggression following gthe findings of Kuo and Sullivan (2001) who found that residents in buildings relatively barren in nature contact reported higher levels of aggression and violence contrast than to those with increased green space.

ART and SRT provide an explanation for why outdoor exposure contributes to psychological health and wellbeing. Further research on the psychological effects of nature exposure by Triguero-Mas et al. (2017) found those who were in a green environment had decreased salivary cortisol levels (indicating decreased stress) and experienced lower Total Mood Disturbance (TMD) in comparison to those in urban environments (Triguero-Mas et al. 2017, p.2). (TMD is derived from a questionnaire which assesses feelings and changes in mood.)

Additionally, nature exposure has been known to decrease levels of anxiety and depression, as green space exposure was found to be inversely related to self-rated depressive symptoms in adolescents (Vanaken and Danckaerts, 2018, p. 10). Specifically, nonvolatile compounds called monoterpenes (MTs) emitted from plants were found to decrease reported anxiety symptoms. Donelli et al. (2023) found "exposure to inhalable

MTs during 3-h long forest therapy sessions can produce specific effects on anxiety levels" (Donelli et al., 2023, p. 2). Following exposure to MTs, participants filled out a State-Trait Anxiety Inventory (STAI) questionnaire to assess anxiety levels. State and trait anxiety differ in that state anxiety refers to "a transitory emotional response involving unpleasant feelings of tension and apprehensive thoughts" (Jouvent et al. 1999) while trait anxiety is more chronic, "referring to individual differences in the likelihood that a person would experience state anxiety in a stressful situation" (Jouvent et al. 1999). This study relied predominantly on STAI-S (state trait anxiety) scores for main outcome measurements to study short term effects. Following, it concluded "inhalation of plant-emitted MTs, and in particular α-pinene, can produce a specific anxiolytic effect" (Donelli et al., 2023, p. 12) represented though decreased STAI-S points (Donelli et al., 2023, p. 11).

A study of nature access and wellbeing during COVID-19 found similar results regarding the effects of outdoor time on mental health and overall wellbeing. It concluded "withdrawal of nature exposure … compromise individual emotional health and wellbeing" (Tomasso et al., 2021, p. 15). Additionally, Tomasso et al (2021) discovered the mental health issues from COVID-19 could be remedied by increased outdoor contact and "proactively confront the emotional and physical health consequences corollary to social isolation and physical inactivity that COVID-19 has exposed" (Tomasso et al., 2021, p. 16). Furthermore, outdoor time proved to be an integral part of maintaining wellbeing in stressful circumstances such as a pandemic. This was observed in those who had already established natural contact habits before the pandemic, since they

experienced continued wellness once restrictions were mandated during the COVID-19 (Tomasso et al., 2021, p. 14).

The reviewed literature on the physiological and psychological benefits of nature contact indicates that increasing access to nature through measures such as ParkRx styled prescriptions can prevent or treat most chronic illnesses which cause pain and discomfort for millions of Americans and increase the burden on the US healthcare system (WHO, 2023).

Theological Benefits

An exploration of Christian practitioners' responses to implementing nature prescriptions requires not only a review of the scientific arguments for nature contact, but the faith-based arguments as well. The following paragraphs will provide a review of the theological grounds for the benefits of time in creation, focusing primarily on the Christian tradition's perception of creation, the concept of creation as kin according to St. Francis of Assisi, and trinitarian theology.

The second argument that forms the basis for prescribing time outdoors is rooted in theology. The Christian tradition holds a rich history of interpretations of the natural world. Particularly, in early Catholic thought, nature was discussed in two ways: one as a dualistic terminology viewing matter as entirely distinct from the spiritual, and the other considering matter in relation to the divine in a "realm of supernatural forces" (Binde, 2001, p. 17). The latter of these views originated from St. Paul's writings on creation in Romans. He writes, "For what can be known about God is plain to them, because God has shown it to them. For his invisible attributes, namely, his eternal power and divine

nature, have been clearly perceived ever since the creation of the world, in the things that have been made. So they are without excuse" (NRSVUE Bible, 2021, Rom. 1: 19-20).

This ideology reflected in St. Paul's epistle is practiced throughout the Bible, Jewish tradition, and the life of Christ himself. Jesus' teachings relied heavily on natural metaphors, from "fig trees", to "living water" to the relationship between the "vine and the branches" (NRSVUE Bible, 2021, Matt. 24:32, John 4:14, John 15:1), Christ demonstrates significant understanding of the natural world and its greater significance in spirituality.

Following Jesus' baptism and before his ministry commenced, he was "led by the Spirit in the wilderness" (NRSVUE Bible, 2021, Luke 4:1) to face forty days and forty nights of temptation in preparation for his work. Even his last moments on earth were spent in deep fellowship with his father in creation. Following the last supper and preceding the betrayal and arrest of Jesus, Christ and his disciples retreat to the garden of Gethsemane (NRSVUE Bible, 2021, Matthew 26:36) where he seeks time alone in prayer. This practice, Christ's seeking out natural spaces to participate in prayer or worship, was not a novel act, as the location of John the Baptist's ministry was in "the wilderness" (NRSVUE Bible, 2021, Luke 3:2).

Furthermore, Jewish tradition similarly values nature as a place of encountering and witnessing the glory and presence of God, specifically in the prophetic tradition. The desert, preceding Christ's time of formation there, held deep significance as "in desolate environments the prophets could come close to God and receive revelations from him. The desert was, furthermore, an arena for trials and temptations where the faith of the believer was put to the test" (Binde, 2001, p. 18).

This conceptualization of nature as relational to humans as a continuation of Edenic living in a fallen world was championed by St. Francis of Assisi. After leaving a life of material comfort in the home of his wealthy merchant father, St. Francis sought to live in solidarity with the poor in complete service and devotion to Christ by imitating his life. In addition to the discipline of poverty and service, St. Francis practiced further reverence in his treatment of all creation. This flowed from his regard of Christ, as "His tenderness toward animals was an expression of his dedication to Christ and of his practical compassion for all Creation" (Armstrong, 1973, p. 7). This vision of "nature as sanctified" (Armstrong, 1973, p. 9), inspired St. Francis to hold the belief that all of creation bore witness to the glory of God and was not merely matter, but "kin," as Celano described him as someone who "was wont to call all created things his brothers and sisters, and in a wonderful manner inaccessible to others he would enter into the secret of things as one to whom 'the glorious liberty of the children of God' had been given" (Armstrong, 1973, p. 9).

This posture held by St. Francis is visible throughout his work "The Canticle of Creatures," as he personifies creation by writing, "Brother Sun" "sister moon and the stars" "sister water" and "sister mother earth" (Doyle, 1974, p. 395-396). From these canticles originates the theological concept of "kinship" as an argument for reverence and relationship with creation. This practice by St. Francis significantly influenced Franciscan and other monastic traditions in the Middle Ages, since the devotion of the monastic tradition to spiritual disciplines often took place in outdoor spaces which were secluded and far from crowded cities. In these settings, the concept of relationship between

humans and creation was further developed and celebrated, as “Christian imagery depicts the forest as similar not to the desolate desert but to the Paradise” (Binde, 2001, p. 19).

This theological approach to nature as kin by St. Francis of Assisi in 1200 AD has persisted in the Christian tradition, particularly in recent Catholic doctrine and ecotheology considering modern environmental crisis. It centralizes on “the two notions that God has a certain presence in nature and that mankind has an affinity with all of God's creatures” (Binde, 2001, p. 20). It is through this conception of holistic affinity between God, his creatures, and all of creation that inspired Pope Francis’ Encyclical letter *Laudato Si* (Francis, 2015).

Pope Francis, paralleling St. Francis’ of Assisi’s relational and divine perception of nature, suggests that the Genesis narrative introduces “that human life is grounded in three fundamental and closely intertwined relationships: with God, our neighbor and with the earth itself. According to the Bible, these three vital relationships have been broken, both outwardly and within us” (Francis, 2015, section 66). These three relationships, according to Pope Francis, suggest that to be a Christian and, furthermore, to be a human is to be not only in fellowship with God and fellow man, but with creation in its entirety. Though the *Laudato Si* provides a call for members of the Catholic church to understand the deep spiritual realities of creation and inspire members to grow in its care considering the climate crisis, it additionally provides argumentation for restoring relationship with creation and, further, spending more time in communion with God in these spaces. Pope Francis acknowledges this communion, writing, “as part of the universe, called into being by one father, all of us are linked by unseen bonds and together form a kind of universal family, a sublime communion which fills us with a sacred, affectionate and humble

respect" (Francis, 2015, section 89). The Environmental Protection Agency's (1989) findings on the decrease of time spent outdoors indicate that Americans fail to participate fully in life's intended relationships due to separation from a connection to the earth. The relationship to creation through the Christian tradition from St. Paul to Pope Francis, is further developed in contemporary theology which provides faith-based justification for spending time outdoors. Primarily, this is seen in contemporary theologian Norman Wirzba's writings on creation and the trinitarian theological concept of *perichoresis.*

In his work, *From Nature to Creation: A Christian Vision for Understanding and Loving our World*, Wirzba (2015) seeks to transform postmodern conceptions of nature as something to be exploited to perceive it "instead [as] the material manifestation of God's love operating within it" (Wirzba, 2015, p. 19). He critiques the present conception of creation and the lack of human efforts towards relationship with it, observing the general lack of desire to deepen this connection to one's creator through his creation, writing, "though people are physically in the world, they do not often know where they are because their movements take them quickly *across* rather than patiently *into* the places of their life" (Wirzba, 2015, p. 63). In this work, Wirzba acknowledges the state of human relationship with creation and calls for renewal through ascetic practice, instructing Christians to "listen carefully and patiently for the pulse and song of the world, take its movement deep within our heart and breath, so that we can then imagine and attempt a sympathetic, harmonious sound from out of ourselves" (Wirzba, 2015, p. 62).

It is only within this posture, of immersing oneself in creation and creating the space to participate in its worship of a common creator, that the Christian may foster a

true bond with creation and God. Wirzba proposes that the lack of relationship between man and creation stems from capitalist ideologies, since in an economy centered on each individual self, "people do not need to develop deep bonds with any place or any person" (Wirzba, 2015, p. 141). Failure to resist the cultural drift towards self-dependency and lack of relationship results in the destruction of bonds between man, creation, and creator. Wirzba argues for time spent immersed in creation as a means of encountering God, since the life of God begins and finds a basic and abiding point of contact in the ground beneath our feet" as "God is to be met in the most intimate and practical places of our lives as the source of life's inspiration and nurture" (Wirzba, 2015, p. 103).

In one of his other works: *Food and Faith: A Theology of Eating*, Wirzba (2019) elaborates on his theology of creation by invoking fidelity as a means of describing the essence of human relationship to the earth. Though the primary thesis of this work explores a theology of food, Wirzba places eating within the context of relationship in nature. His elaboration of the theological significance of creation is supported in his presentation of trinitarian theology, as "creation is intimately bound up with the Trinitarian life of the Father, Son, and Holy Spirit" (Wirzba, 2019, p. 47). This is expressed through the trinitarian theological concept of *perichoresis*, which is described as the "making room within oneself for another to be" (Wirzba, 2019, p. xii). In viewing creation and creatureliness through *perichoresis*, the essence of human life is to be

> one who is from the beginning shaped by and called into hospitality and fellowship… founded upon an unending sharing and receiving of each other, a perpetual 'making room' within ourselves for others to be rather than being in possession, life is a gift- a movement of self-offering and receiving love (Wirzba, 2019, p. 50).

Here, creation is a result of God "making room" and inviting his beloved creatures into a life of infinite relationships in which they might give and receive. Within this perception

of the Christian life and creation, no person can flourish apart from creation, reaffirming the three essential relationships established by Pope Francis in the *Laudato Si* (2015). Wirzba's account which established creation and human flourishing as symbiotic entities presents a theological demand for fellowship with nature. This fellowship, however, requires presence within the place it occurs. Man is not able to truly participate in the trinitarian-natured creation unless he physically steps outside of a lifestyle restricted to indoor spaces and into true fidelity with fellow creatures in a shared space, allowing for fellowship with creation and, simultaneously, with his creator.

CHAPTER THREE

Methods

The purpose of this study is to explore the role of faith in Christian primary care physicians' intent to offer nature-based prescriptions and identify future barriers for ParkRx style prescriptions. To assess and analyze the data collected from interviews, followed Creswell's (2007) basic qualitative analysis: collecting qualitative data through open-ended interview questions and analyzing the transcripts from these interviews for codes (Creswell, 2007, p. 171) was followed. This qualitative approach allowed for a broad exploration of the themes which emerged from research. The semi-structured interview technique used in this study provided the best means of understanding the influence of Christian faith in prescribing time in nature. Qualitative inquiry was best suited for this study, since it "employs different philosophical assumptions; strategies of inquiry; and methods of data collection, analysis, and interpretation… and draw on diverse strategies of inquiry" (Creswell, 2007, p. 162) which cannot be accomplished through a quantitative approach. The experience of faith in this study appears in nuanced ways and requires this style of inquiry. Additionally, qualitative research allowed for a "holistic account" (Creswell, 2007, p. 165) of the themes which emerged from my data collection.

I anticipated that the findings of this study would assess the role of faith in introducing ParkRx prescriptions and contribute to the knowledge in the intersecting fields of medical humanities, medicine, religion, and public health. In addition to these theoretical contributions, this study sought to assess obstacles for future nature

prescription implementation and provide the ParkRx movement, medical directors, and public health officials with practical barriers to address as they seek to grow the usage of nature prescription programs.

Current literature exists which reviews the evidence-based health benefits and theological argumentation for nature contact. However, there is limited research assessing provider's perspectives regarding these programs (Kondo et al, 2020), and no research exists which specifically examines Christian physicians' perspectives in this area of study. Christian physicians are faced with the task of integrating evidence-based clinical practices to promote health but also with navigating how their personal belief system applies in practice. This study sought to deepen the understanding of how these factors work cooperatively or independently.

Prior to this study, during my time as an undergraduate student, I shadowed medical practitioners and took courses in the biological sciences and medical humanities subjects. While shadowing, I was exposed to the role of lifestyle as a factor in social determinants of health and furthermore as a style of prescription to alleviate chronic illnesses. Additionally, as a practicing Christian, I have participated in many retreats aimed at spiritual formation in outdoor settings, and I personally spend time in nature as a spiritual practice and a place for exercise. These combined interests lead to a discovery of ParkRx and the concept of nature prescription programs, but I found that there was no existing research which related these existing programs to the Christian faith.

To prepare for this study, I spent two years reading theologies of creation, agriculture, environmentalism, and medicine in addition to cientific publications on health-related benefits of nature contact and histories and usages of park prescription

programs. My significant medical and academic experience in the biological sciences provided the required conceptual understanding and vocabulary to understand and summarize the extensive literature on the physiological and psychological benefits of nature contact. Further, an increased familiarity with the Christian tradition, texts, and theologies in varying religion courses equipped me with a general understanding of the theology required for the faith-based aspect of this research. Additionally, sufficient time spent working with, shadowing, and learning from Christian physicians gave an insider understanding that helped guide research questions and provided the contacts of many Christian primary care physicians who practice in diverse geographical areas. I found that my intent to work in primary care as a prospective Physician Assistant (PA) where I plan to one day apply my findings encouraged some physicians to freely offer their thoughts, perspectives, and advice during the interview process. All the physicians I interviewed had an eager desire to share their experiences and to inform me on their philosophy of care, which I believe stemmed from the medical community's dedication to equipping and educating future practitioners, as I am a student who has much to learn from their clinical experience. This personal experiences and previous extensive research of these seemingly separate fields: faith, medicine, and the outdoors, equipped me to speak with confidence and understanding with the physicians I interviewed. Additionally, this allowed for observation of interrelated themes and concepts during the interviews themselves and coding of the data.

It is important to note that my insider experience and personal interest in these areas additionally presents potential biases. As a Christian who associates a significant amount of their spiritual life and faith with creation, I naturally assume that this concept

influences other Christians similarly. Though I personally hold this stance, I sought to remain objective. I did not intend to let it influence the questions I posed to physicians, nor my analysis of the data.

Participants and Sampling

Physicians signed an informed participant form for recording before their interview found in Appendix B. Participants were emailed this consent document for their review prior to the interview and informed consent was documented and stored in a password protected box folder. Additionally, physicians were recommended through snowball sampling. As recommended by Creswell and Plano Clark (2006), interviews were when I when data saturation was reached.

All except one of the physicians contacted agreed to participate in an interview. They ranged in age from 35 to 54 (M=46) and ranged in years of practice from 3.5 to 28 (M=16.07), while ranging in years of practice in primary care from 3.5 to 25 (M=12.5). Two of the physicians were female, and five were male. One practiced in a rural setting, and the other seven practiced in a variety of urban cities (seen in Table 1).

Table 1: Key Informant Descriptions

Physician	Age	Sex	Race	# of years practicing	# of years practicing in primary care	Location of practice	Socioeconomic demographic of patient population
1	40	M	White	3.5	3.5	Rural New York	FQHC
2	45	F	White	11	11	Waco, Texas	Insured
3	54	M	White	28	3	Cleveland, Tennessee	Uninsured
4	35	M	White	6	6	Waco, Texas and Detroit, Michigan	FQHC
5	53	F	White	25	25	Orlando, Florida	FQHC
6	49	M	White	21	21	Chicago, Illinois	FQHC and hospital
7	47	M	White	18	18	Waco, Texas	Private insurance
Mean:	46			16.07	12.5		

Procedures

I conducted seven in-depth semi-structured interviews spanning from March to April 2024. These interviews were conducted via Zoom video conferencing software using preset interview questions with occasional probing. The interviews lasted twenty minutes to one hour in length. I gained permission to record these interviews via zoom's recording and cloud storage system through the consent form. This document additionally informed physicians that anonymity would be protected, and that the recordings would be securely stored.

A brief summary of the scope of this research was provided, and each physician was asked to share "whatever might come to mind" in response to each question. Table 2

lists the ten interview questions which were asked. These questions were designed to promote reflection on the themes in this study's four research questions and were reviewed and revised by my faculty mentor before the interviewing process began. Following each interview, I would review the notes taken manually during the interview process and reflect on the physician's responses. It was during this time and this note-taking process that I would identify most of the themes which later became codes used in my qualitative analysis.

Table 2: Interview Questions

1.	Do you think your Christian faith influences the way in which you practice medicine?
2.	Throughout the Bible, the concept of the majesty and glory of nature is reinforced. There are numerous examples throughout the Psalms where the psalmists sing praises about the handiwork of God (heavens, rivers, stars, rocks cry out, etc). Christians receive instruction on how to care for creation and get a sense of its beauty in the Garden of Eden before sin. Do you believe that there is something unique or divine about spending time in nature? How have you experienced this personally?
3.	A 2017 study by Frumkin et al. summarized the evidence-based health benefits of nature contact. There were 20 health benefits listed with corresponding citations. These benefits included: improved outcomes of diabetes, cardiovascular disease, depression, and the others seen int this chart. (A copy of the chart of findings which was screen-shared with participants). Were you aware of these benefits?
4.	Do you feel there is a need for Christian providers in particular to provide treatment that is more holistic in nature?
5.	Park RX is a program that allows physicians to work with local and national parks and recreation departments to create a detailed prescription for time outdoors for patients in order to promote general wellness and alleviate chronic disease. Were you aware that programs like Park RX existed?
6.	Would you consider integrating a similar outdoor RX prescription program in your practice? Why?
7.	Do you feel more inclined to institute this in your practice because of your Christian beliefs?
8.	What are some constraints/barriers/challenges/concerns that you have about prescribing nature in your practice?
9.	Which of the constraints/challenges you noted above primarily, if eliminated, would cause you to consider prescribing time in nature?
10.	Do you think your patients would consider it a legitimate treatment plan? How would you measure success?

Trustworthiness and Subjectivity

As previously stated, personal experience with the subjects of this research project result in personal bias; however, a commitment was made to neutrality in the collection and analysis of this study. Furthermore, I consistently met with my faculty mentor to

review the findings during the thematic observation process and received feedback to ensure the proposed codes were unbiased.

The physicians who participated in the interview process were given space to express any additional thoughts they might have about this study in general. They were also encouraged to ask any further questions. After interviewing, I contacted each physician via email to confirm their information regarding their duration of practice, age, race, and geographical area of practice.

Analysis

Following, interviews were transcribed, and thematic analysis was used to identify emerging themes from Braun & Clarke's (2006) methods with six phases: 1) familiarizing yourself with your data, 2) generating initial codes, 3) searching for themes, 4) reviewing themes, 5) defining and naming themes, and producing the report (Braun and Clarke, 2006). While conducting interviews, I took notes when I observed a theme in the physician's response. After the first two interviews, I re-read transcripts and used the data collected to identify similar patterns, thoughts, and repeating types of statements which developed into a set of codes. These codes were used in analysis of subsequent interviews, and new codes were added to the existing set when a new theme was encountered. Each theme was defined and named upon its discovery. Following, "peer debriefing" (Creswell, 2007, p. 178) was conducted with my faculty mentor to review themes and receive guidance before continuing to code additional transcripts. These reoccurring themes were sorted into categories which corresponded to the four original research questions. Lastly, category was created for the themes which emerged outside

the scope of these research questions. These remaining themes were concepts which were found to be surprising, helpful contributions in the field, or useful for future research.

CHAPTER FOUR

Results

The purpose of this study was to explore the thoughts and attitudes of Christian primary care physicians regarding the implementation of nature prescription programs in their practices and identify prospective barriers. Specifically, it sought to research the role of the Christian faith in influencing these decisions.

The primary goals were to (1) assess whether these physicians were aware of the health benefits of time in nature and the existence of nature prescription programs, (2) report if Christian practitioners intend to offer nature-based prescription programs after being presented with data regarding their effects, (3) explore how and if their Christian beliefs and faith might influence the decision to offer these prescriptions, and (4) identify the barriers which might prevent physicians from implementing these type of prescriptions in the future. The organization of this analysis is modeled after these four goals, since most of the themes discovered throught research corresponded with one of the four questions. Additionally, themes that emerged outside of the scope of the guiding research questions will be presented. It is important to note that this research is a preliminary attempt towards exploring the role of faith in ParkRx style prescription implementation. For this reason, interviews were conducted with an intentionally small sample size and suggests that these findings are not generalizable but provide an introductory framework for future research in the field.

Research Question #1: Are Practitioners Aware of Existing Nature Prescription Programs and Associated Health Benefits?

During interviews, physicians were presented with the findings of a meta-analysis of the evidence-based benefits of nature contact by Frumkin et al. (2017) which demonstrated twenty benefits of nature contact and studies supporting each listed benefit. The goal was to provide practitioners with a summary of the research that supports health benefits and examine the extent to which these physicians were aware of nature's role in improving health.

Awareness of Health Benefits of Nature Contact

Responses regarding the awareness of nature's health benefits were categorized in two groups: those who had a more general understanding and those who were well-informed and had more advanced knowledge and education about the existing evidence. None of the physicians that participated in this study reported to be completely unaware of any benefits from nature contact.

General awareness. Those whose responses were classified as "generally aware" of the health benefits of nature exposure acknowledged there were benefits and/or were familiar with the general findings of one or two studies of nature's effects in one physiological pathway. However, these physicians lacked a more in-depth understanding of how many physiological and psychological effects exist. Physician #6 responded, saying, "I think I had a little bit of an idea… I never thought about better eyesight," indicating there were specific findings he had never heard of. Others referenced studies they had heard about or read, with Physician #2 discussing "the brain in nature versus the brain in a city" and "how much less anxiety you have when you're in nature." Physician

#1 explained he “had read articles about nature and forest bathing and things like that … having the power to influence our neurochemistry with endorphins and things” but that “it was never really touched on in medical school.”

Well-informed. Two physicians shared responses which suggested they had more knowledge and further education about the health benefits of nature exposure than those with a general understanding. Though these physicians were not familiar with all twenty of the listed benefits, each expressed a personal interest in the relationship between wellness and the outdoors and were able to refence multiple studies pertaining to the benefits of nature for human health.

Physician #5 began to speak on these studies before she was presented with the findings and referenced current wellness trends, saying,

> ...more holistic approaches that are really being shown to promote anti-inflammatory things antiaging, and changing of epigenetics and telomeres- if you look at them now, they’re red light therapy, which comes from the sun grounding which has to do with the fact of reconnecting yourself with the earth, and going back to our natural states of water, reverse osmosis.

She elaborated that her current understanding of the scientific basis of health from nature exposure inspires her to take patients on short walks outdoors around the clinic. She reported that these walks in nature “change their mindset.”

The other physician who fit into the “well-informed" category said, “being out in nature just decreases a person’s cortisol and stress hormones, and that’s totally proven.” He also referenced Eye Movement, Desensitization, and Repossessing (EMDR) used for psychological healing, saying,

> When I’m out in nature and scanning the horizon, and my eyes are going back and forth, but it’s also activating different parts of the brain and things that are …

> causing anxiety, stress, and decreased concentration. With that sense … eye movement can help put some piece of that mental aspect that's giving us trouble into a place of our brain that's not necessarily giving us trouble… there's different things we can do to kind of help that, but nature contact is one of the things that seems to be the most helpful.

He additionally noted that, in addition to EMDR, he experiences

> there's something about the nature, calming events of nature, unless you're maybe in a hurricane, that decreases your cortisol and then that decreases your fight or flight hormones like norepinephrine, epinephrine, and insulin levels… it repositions your whole body, decreases stress on the cardiovascular system, symptoms of diabetes, and it keeps going on and on…

Additionally, physicians in both categories (well informed and generally aware) referenced on how they rely on their own personal experiences. Physician #2 said, "I know I have personally experienced some of these benefits" (referring to the benefits listed in the chart). Physician #7 reflected on his time as a youth minister taking kids from out of inner-city Houston, Texas and witnessing "something about nature repositioning a person's wellbeing" in relation to their transformation away from aggressive behavior after a few days at a retreat center in a natural setting. He additionally reported personally feeling his ADD symptoms decrease following a trail run, being "able to concentrate more for probably about two or three days" after.

Awareness of ParkRx or Similar Prescription Programs

Seven out of eight physicians had little to no familiarity with ParkRx or similar structured nature prescription programs. Physician #2 responded to my question inquiring about her awareness of ParkRx saying "No. Nope. Not at all." Physician #1 had previously heard of ParkRx through a paper article but did not know any specific details or have in depth understanding of the program's role. Both responses indicate a

significant lack of awareness of ParkRx styled programs or how they could support their goals in clinical practice.

Research Question #2: Do Christian Practitioners Currently Offer or Intend to Offer Nature-Based Prescriptions?

All the physicians interviewed expressed intent to implement these programs in their practice. Physician #2 responded to the question regarding the potential usage of this method in practice saying, "I absolutely would do it, because I know it works." The other physicians interviewed expressed similar enthusiasm towards integrating these programs, responding "Totally. Awesome," "for sure," "we definitely would do it," "I think that's a great idea," "yes, I don't think I have any reservations," and "I would consider it … because I'm looking for ways to holistically treat patients."

Research Question #3: What Existing Beliefs (Including Spiritual or Theological) Inform this Intention of Offering Nature Prescriptions?

This research question elicited the most diverse range of responses since, though all the physicians indicated that they would consider implementing a program like ParkRx in their practice, everyone's reasoning differed. Several themes emerged in response to this question. There were four sub-themes related to influential beliefs. Three of these were connected to faith and include: personal experience, holistic approach to care, evangelistic motivation, or no role of faith. The remaining theme, "more than a pill philosophy" didn't indicate faith as an influential factor.

Faith-related beliefs influence prescriptions

Most physicians indicated that faith played a secondary role in influencing their likelihood to provide nature prescriptions, but the extent which faith influenced their decision varied. Two physicians relied heavily on evidence for their motivation but felt that their faith contributed to personal experiences which contributed to their likelihood to prescribe ParkRx. Two physicians felt that their holistic philosophy of care, which was influenced by their faith, inclined them to prescribe. Additionally, another felt that the potential opportunity to connect patients with God was an influence. The remaining physician felt that he had only recently been able to learn about nature as creation and was not able to discern its influence yet in his clinical decision making. One physician proposed that her decision would not be motivated by faith-based measures.

Personal experience. Two physicians shared similar perspectives on the role of scientific evidence in their likelihood of prescribing, but they also leaned on their personal faith experience as a motivational factor. Physician #7 shared, “If I took my Christian belief out of it, I think I’d still be inclined to do it. I think there’s evidence there that even if you’re not a Christian, there’s benefits for it.” He referred to evidence as his primary influence, but he also emphasized that an and additional influential factor in his decision to prescribe would be his personal faith experience of these benefits, saying “my personal experience, which is specifically from my faith make me more inclined to do it.”

Physician #4 noted, “I don't know that that's the only reason [faith] because I also see that there's clinical benefit, but I think for me personally, there would be some connection to my faith as well.”

Both physicians who shared that their decision is influenced by a combination of clinical evidence and personal faith experiences perceived creation as something innately divine and deeply personal in their spirituality. Physician #4 said he used time outdoors in his "spiritual practices … connecting that kind of intellectual understanding of scripture references to what it kind of looks and feels like in my life."

Physician #7 described faith as essential in his perception of creation. He reflected on the changes in the way he perceived the earth after becoming a Christian, saying,

> I grew up in a very small town and in the country of a small town. And, you know, I think when I became a Christian, when I was like probably 21, I was at [college and], there was some eye-opening, you know, joy about being back in nature. Watching the sunset had a different definition. Watching the stars at night had a different, you know, like meaning towards it. Like, and there was much more, you know, awe, even though, and somewhat, I do say that going to Africa probably helped me with my faith … my faith has been able to see a little bit more God in creation. And that has kind of gone on with just how I see people as well.

The sentiments from these physicians illustrate the power of deep and personal-spiritual experiences with nature as influential factors towards their intentions to offer nature prescriptions.

Holistic approach to care. An additional category of physicians who viewed faith as influential in their interest in prescribing nature programs were those who attributed their holistic philosophy of medicine to their faith. When asked to explain how faith affects their practice, these physicians reported that their Christian beliefs influence the way they perceive their patients. They described how they are "seeing humans as more than just a human body, but also a soul and spirit" (Physican #6). Additionally, Physician #5 explained "we are a body, mind, and spirit. We have three strands interwoven, so when one is weak, the other two suffer." She felt that all Christians should practice more

holistic care which included ParkRx prescriptions because of their faith, saying, “I think everyone should be doing it, let alone Christians. But I think for us, when we reconnect to where our creator was, I think it’s even more important.”

Furthermore, both physicians expressed a personal connection with nature on a spiritual level. Physician #5 responded, “I one hundred percent believe that we are all connected through nature,” and Physician #6 said,

> I believe the beauty of nature as well as the complexity and sort of ingenuity of it leads us to that sense of the other… of majesty or even God’s care for the world and creating the world as a unique place for us. And then of course my own experiences with nature, I live in kind of an un-naturey area of Chicago, but I find that I am renewed physically and spiritually for seeking-out being in nature as well as … the things around me in my house like plants and animals.

He continued to revisit this point of holistic healthcare as a Christian obligation and later continued,

> We need the voice of Christians especially, you know, to promote such things. I think Christians maybe can have a special voice in promoting such things for the general medical healthcare community in that we hopefully have a view of a whole person care and thinking about things outside of a clear … not scientific model, but a scientific model that includes more than that includes a broader scope. And so as we're thinking about the person before us as broader possibly than just their physiological processes, that we could think about our treatment of them in a broader sense to include things like this [nature prescription programs].

Both physicians indicated that their faith influences them to treat the “whole person” through a balance of scientific and spiritual care. Additionally, Physician #4 and Physicans #1 whose faith based motivations were categorized primarily under “personal experience” indicated intentions which could be considered to be “holistic as well.” This faith-based holistic method contributed to their intent to prescribe ParkRx style programs. Though all four of these physicians acknowledged intentions to implement ParkRx styled

prescriptions for the health benefits, the role of faith in inspiring their holistic method of practice motivated their prospective implementation of nature-based prescription programs. When asked whether their Christin beliefs influence their interest in prescriptions, one reported "yes" because of his "holistic nature of care." The other responded, saying,

> First of all, I feel like every practitioner should be using this, but I think someone like me who does realize the deity of God and that we are all supposed to come back to our connection to our creator, which is the most important part of our spirit man, you know, our connection with God. I think that every Christian, I think every provider should be doing a period of, but let alone we have a higher calling. And because we realized the yoking of the importance of us always being surrendered to God.

Evangelistic. Among the practitioners who identified faith as a factor in their inclination towards introducing nature prescription, Physician #1's response was unique. Though he shared similar sentiments as the previous physicians regarding holistic practice, he argued that this perspective came from a sort of divinely mandated humility since "if you're not holistic, you're kind of assuming that you do have a lot more control than we actually do." He reported finding beauty in this sort of humility, saying "we can appreciate the complexity of how God created us" [in the way physicians view and treat patients]. This unique perspective on holistic practice, however, was not his primary faith-based motivation for implementing nature prescriptions. His response reflected an evangelistic influence in his intent to offer ParkRx in his practice, reporting that what motivated him was the opportunity to expose patients more widely to creation and, following, God himself. He responded,

> I think because of my Christian faith makes me more inclined because I feel like it can be a way that people come to know God. It is through their, witness of

> nature and his creation… the Bible says that kind of everyone can look at nature and really should feel convinced that there's a creator … I think it's a good thing to just encourage people into that setting in a way to yeah, even offer glimpses of your faith in how you promote that in terms of like talking about a beautiful, place that our God's created for them to enjoy that can actually give them very tangible, real health benefits.

Undetermined. One physician's response could not be categorized within these overarching themes. He, similarly, to the other physicians, noted that faith would have some role in any of his life decisions since its "your own belief system" but admitted that the political stereotyping of an affinity for nature had previously caused him to not completely integrate his love of nature and Christianity, saying,

> Maybe my own bias sort of makes me think, you know, nature is kind of over here and it's a part of my life and I think its important, but I haven't integrated that thought as well into my own faith system… growing up in America, the way that I have, has somewhat spilt those beliefs and they really shouldn't be.

This understanding prevented him from being able to report how exactly his faith-related beliefs regarding nature influenced his decision to offer ParkRx style prescriptions.

Faith having no role. Lastly, Physician #2 reported that though her faith is inseparable from her entire self and essentially influences everything she does, it did not serve as a motivational factor for prescribing outdoor time. This physician found that her motivation towards these prescriptions was based on the clinical evidence, explaining that,

> I mean, everything I do stems from my faith, of course, but if I were to break it down, I would say intellectually, if I, I know the evidence is there… so me, versus a non-Christian doctor sitting next to me, I think we would both evaluate the evidence the same way.

She shared a similar view of the relationship between faith and science in her sentiments towards experiencing the divine in nature. She noted,

> I don't necessarily think my faith has anything to do with how I feel contentment in nature, but I actually feel the Lord more when I'm there. I've always said that when the wind blows is when I feel the most connected to the Lord, for some reason, like I feel his touch or his presence in that… I think every faith has its way of explain that, whether it be through chakra or through energy levels or hertz levels or though whispers from the Lord, you know, I think that we can't deny the fact that we feel at home in nature because … we are made of carbon particles.

Non-Faith-Related Beliefs Influencing Prescriptions

In addition to scientific arguments indicated by each physician, one theme emerged as a non-faith related factor in influencing nature prescriptions. When each physician began to discuss their approach to practice and the medical field in general, many referred to a similar philosophy captured in the repeated theme "more than a pill philosophy." This theme references the reoccurring idea of a "holistic" approach as a philosophy of care, specifically within the current context of American healthcare. Responses were categorized under this theme when the physician being interviewed referred to a method of care which was "alternative" or differed from the current philosophy of practice described as "just about medicine" or "time is money" and "just give me a pill."

A group of the physicians in this study were open to prescribing nature because of their efforts and desire preserve the human art of medicine through a "more than a pill philosophy." Physician #1 felt that,

> it would be a really good thing just to be able to talk to them about and expand how they're thinking about their treatment plan that they come to the doctor and it's not just about medicines, but they're going to have different things on their

> sort of goal and agenda to work on and that we can check in on and see if they kind of notice influencing their health.

Physician #3 similarly described this phenomenon as a means of influencing his decision, saying "I mainly would consider it because I'm looking for ways to holistically treat patients."

Specifically, within the "more than a pill" philosophy there was a reoccurring theme of exercise or other lifestyle prescriptions. Many physicians either already used or were familiar with exercise and lifestyle prescription programs. They thought that ParkRx style prescriptions might contribute additional mental and physical health benefits when compared to a generic exercise prescription.

Physician #3, who currently uses exercise prescriptions with his patients, reported these sentiments, saying, "if that exercise could be in more of a natural world … that would be fantastic." He attributed some of his interest in ParkRx prescription programs to their possible role in the exercise prescriptions he already encourages in his practice, saying, "I guess I would definitely be interested just because compliance with an exercise program is difficult… perhaps they could, you know, exercise from home four days a week and go to a park one day a week with their family, something like that."

Physician #5 was already using a similar method in practice to expose her patients to the outdoors. She reports that she tells patients to, "Go outside, take your shoes off, walk in your backyard or somewhere and try to find a place or a park even for five minutes." She finds her current usage of alternative methods effective and noted "I believe all practitioners should be doing this. You get out, you get away from the blue light, get out and get sunlight, vitamin D exercise. You become much more mindful, much more present."

Physician #7, who currently practices at a with uninsured patients also noted that a program like ParkRx would work well with the lifestyle prescriptions that are already in place at the clinic where he works. He responded,

> Whenever we talk about diabetes, high blood pressure management, we always talk about lifestyle things and Chicago does have a nice circuit of forest preserves around it as well as there's a national park and I think some state parks farther out, but if there was a way to help people get out there and, you know, just on the surface just exercising in addition to the other benefits of being in nature, I think we definitely would do it.

Additionally, Physician #2 referenced a program which is already in use called "walk with a doc" and noted how,

> they've shown that when physicians are out in the community, setting the example, doing things like walk with a doc, then you get people out who wouldn't' normally exercise or walk ant they learn the importance of it because they have a community to it in.

She proposed that ParkRx style programs could work similarly through this exemplary model, saying "we could have hike for anxiety … and things like that where we could teach people how to be in nature and relax and chill and turn their brainwaves from red and yellow to purple and blue."

This analysis of the beliefs which incline physicians to offer nature prescriptions indicate that faith plays a variety of roles through influencing personal experience, contributing to holistic style of practice, and offering evangelistic potential. Furthermore, a shared desire for the renewal of medicine from a merely transactional process towards a "more than a pill" approach was expressed as a motivational factor and discussed in relation to current exercise or lifestyle prescription models. Physicians used existing programs like these to serve as a scaffolding for their understanding of the potential role and likelihood of compliance of a ParkRx program in their practice.

Research Question #4: What Challenges or Barriers Prevent Practitioners from Implementing Nature Prescriptions in Their Practices and How will Success be Measured?

Multiple themes emerged from the responses to questions regarding barriers. The barriers are presented based on three thematic categories: logistical, cultural, and expectation for pharmacological intervention.

Logistical

Transportation emerged as the most commonly referenced logistical barrier that prevented prescribing nature. All of the physicians interviewed for this study indicated that they work with at least some lower income populations. They noted that with "incomes under $20000 a year … they have a lot of problems with transportation and getting to nature," (Physician #3). Another reported a similar response, saying,

> Because of the reality of the places and communities that I work in things like transportation or access or ways to actually get to public spaces or parks like that could be really challenging… there's not sidewalks … and then often my patients don't even have reliable transportation to get to their appointments let alone outside the city to a park or something (Physician #4).

Some proposed affordable transportation methods such as "medically subsidized cabs" since,

> It's not accepted by insurance companies … to be able to write a prescription and say, go to Cameron Park, and this group will meet and you will commune with nature and talk about the leaves on the trees and learn and walk through nature and learn how to do this and meditate. Like those are not things honored by insurance companies are covered (Physician #2).

Another Physician #4 noted that "if there's any sort of cost associated, often my patients are struggling to make sure they can afford food that month and pay for their medications, and so if anything that's going to be an added cost is really hard if my

patient's don't see it as completely central or necessary to their treatment." This reported cost as the second logistical barrier.

Physician #5 recognized this concept, that any additional cost, such as transportation, might prevent patients for being able to fulfill a ParkRx prescription due to financial constraints and needs to prioritize other necessities. She said,

> A lot of them are undocumented, so they don't have transportation. They're very financially constrained. So even getting to a park means they'd probably have to take a bus and pay for that. So as you can imagine, when you're struggling putting food on the table, getting to a park is probably not it. And a lot of our neighborhoods, if you patients where they live, if you went to their neighborhoods, you'd realize why they don't walk outside. It's not safe.

This additionally indicates there is a problem of access to natural settings that not only qualify as green space, but as safe space. Safety of outdoor spaces was identified as the third logistical barrier. Physicians #5 continued to report this, saying, "One of our biggest problems is a lot of the neighborhoods that our patients live in are not safe. There's nothing natural around them." Physician #4 expressed the same concern, saying "even if you can't get to a park, even that's difficult … there's not sidewalks and neighborhoods, there's not safe places to walk or there's crime rates that make people uncomfortable with being outside even."

Lastly, time was a theme that emerged under logistical barriers that was most relevant to patients with a families or those who were single parents, since "time would be something where single parents or families that are struggling to balance certain childcare might feel there's a barrier too" (Physician #3).

Physician #2 noted that time also was a barrier for patient effort in implementing a nature prescription. She said,

> I don't think people spend enough time on themselves. In a constructive way. I think they spend plenty of time on themselves thinking about themselves. And like we're inherently more selfish now than we've been… However, we're not thinking about ourselves in a constructive way, like, 'how can I make things better?' 'What are the boundaries I can put in my life time constraint wise?' It's more of a 'how can I make more money?' 'How can I make myself more efficient?' How can I make myself more profitable? Like more marketable? … there's so much more of that driving us then what are the long term benefits I could set up by starting right now with a pattern of being in nature and working on my depression or anxiety by being connected to other humans and connected… we're not, we're not looking to the future in those ways. We're looking so much more so for instant gratification.

Cultural

Two physicians who worked predominantly with lower income populations identified that cultural and ethnic differences which shape views and values around nature might create a constraint or barrier. Physician #3 said that, while he didn't have any empirical evidence, he could not recall any of his Hispanic patients identifying hiking as a hobby when he inquiries about leisure behaviors. Additionally, he hypothesized that typically "larger" Hispanic families might struggle to comply with nature prescriptions because of the costs or challenges with childcare. This physician and the other who identified cultural barriers (Physician #4) hypothesized that past traumas, whether historical or personal, might affect the patient's perception of the outdoors or even trigger a previous traumatic event taking place in a natural space, whether it be "brutal stories of children killed" as part of "what they had to do to get here."

Physician #4 reflected, noting,

> most of my patients are from racial and ethnic minority groups, and sometimes public parks or heavily wooded areas or places outside of the immediate neighborhoods that they're familiar with are not seen as safe or welcoming, or places of historical trauma or traumatic events, like lynchings, that connects to kind of possible negative psychosocial effects of thinking about that is connected in mind and imagination and is not something for health and healing.

Both Physicians #3 and #4 expressed concern that the ParksRx research might not be representative of minority populations. This identifies white privilege as a potential barrier for minority groups and relates to the overarching concept of diversity in outdoor spaces which will be addressed in the discussion section of this paper. Additionally, Physician #4 noted that there may be a need for further research on different cultures' perceptions of the outdoors before offering widespread parks prescriptions. He continued to emphasize that any prescription, including ones like ParkRx, "should be done in a culturally sensitive way to … address those things specific to a community."

Expectation of Pharmacological Intervention

This barrier, the expectation of pharmacological intervention, emerged as a theme which represents a predominant ideology held by patients. Though the physicians interviewed view nature prescriptions as part of a "more than a pill philosophy" and a means of providing holistic, preventative care for patients beyond the typical pharmacological intervention, this approach might be met with resistance. They described a kind of quick fix "pill philosophy" that is prevalent among most Americans as what they are accustomed to and prefer. They reported this attitude with remarks such as "if there isn't a pill, people leave upset," "they all want a pill," or "I came in here for you to give me a pill to make me feel better."

One physician expressed concern that this "quick fix" ideology which manifests in an expectation of pharmacological intervention also prevents patients from buying into the patient/physician relationship and working towards any goals. Physicians expressed similar pushback for exercise or other lifestyle-change prescriptions. Referring to dementia, Physician #2 said,

> how do you prevent dementia, and people want pills, and they want, give me the formula to prevent or to slow down my dementia or reverse it, you know, when they get there, for that point, or they start experiencing it, and you can't, you can't do that. And so, but we do have ways in which to fight it or to slow it. And, and those are things that we talk about, like staying socially active and intellectually active and physically active, and eating a healthy diet, like low processed foods.

This serves as one example of how patients neglect the efforts which wellness requires, and she continued to address three additional problems with medicine that identified the entire "pill philosophy" culture as a barrier to preventative means, noting,

> I think one, the common belief of a, you know, a patient who comes to see me that when they come to see me for high blood pressure, or anxiety or depression, or chronic pain, that they will walk away with a pill. So I think that's, I think that's number one.

She observed that the expectation of pharmacological intervention stemmed from the American preference for immediate or quick fixes, and she reported this mindset might deter patients from buy-in to non-pill prescriptions. She proposed a barrier of

> The American perspective that we should get what we want, how we want it and as quickly as we want it, and that we are in a fast food or a fast … society where you should be able to snap your fingers and have what you want… we aren't teaching our society… our children, or ourselves that patience and waiting are important. And so, like waiting on the Lord, waiting on your health, waiting on this, like feeling, giving it time are things we don't want to do anymore… I get patients who come, they've had a cold, and it's been a week, and they're coming in complaining of fatigue and continued cough, and they want me to prescribe them something. And I say, you need a prescription of time and rest and drinking

> fluids. And, you know, I can't, make this go away. There isn't a pill and people leave upset. So I think that's barrier number one is kind of the way our culture, especially in the United States or the Western world, industrialized civilization, we don't wait for anything.

Similarly, Physician #5 described how this phenomena is one of the most difficult parts of medicine, and that the greatest challenge to ParkRx programs would be "motivating them." She observed that prescribing programs like ParkRx takes extensive effort and an overall ideological shift. In her practice, these efforts consisted of going with her patients during their visits on a walk to assist in the motivation process. She addressed motivation in the following statement:

> [Motivation] is one of the reasons I usually take people on a walk, because I'm trying to get them over the hump of seeing how this actually helps. So, by the time when we get back, I make sure to point out 'what are you thinking and feeling?' Just for them to realize, 'Oh, wait a second. I actually did make a difference!' Because we live in a culture that is sedentary, that doesn't believe in most of this.

Three other physicians observed this barrier affecting their current practice and provided a thorough critique of what they describe as a "transactional system." Physician #4 expressed how difficult it is to practice under such strict pressure,

> because there's kind of an expectation for many people when they come to the doctor of what they'll experience. It's unfortunately a very transactional type of encounter. So, expectation of receiving a particular service or good, like an exchange… It's just very much like a provider-consumer business model.

He noted that he must deliberately address this with patients and explain his desire to provide total care, telling them "For me to attend to your physical health and to neglect your mental health and your spiritual health is to not care for you as a whole person."

Physician #2 argued that it is important to establish a physician/patient relationship for this style of prescription, which makes nature prescriptions difficult until

trust is established. She noted that this could serve as a barrier since healthcare administrators "are working really hard to take away the doctor/patient relationship, or say that it doesn't really matter… that primary care could be serviced by anybody." She objected to this ideology, saying, "I don't believe that is true to some regards… I do think people should seek relationships." This physician noted that it is in this physician/patient relationship that progress can best be tracked and encouraged. She shared personal stories of patients who she has partnered with overtime and the term and beneficial lifestyle changes that resulted through their relationship.

Measuring Success

Measuring Success is a theme that describes ideas and statements around the importance of continuity of care and data. Physicians described how important it is to follow up with patients about nature-based prescriptions and use baseline data for measuring change or progress. Physician #1 noted that they had witnessed previous success in this approach, since "having a follow up and sort of recording in your chart and they goals they articulated and then really asking about it, and I think that's where you get some accountability with patients. They realize that you care and you're going to follow up when you're asking about the things from before."

Six physicians indicated that they would use objective measurements such as "PHQ9" mental health assessments, "A1C," "blood pressure," "weight," and others as means of measuring success. They proposed that integrating these types of measurements during the follow-up process might motivate patients. Physician #4 viewed these type of measurements as "a conversation starter with the patient" which would allow for

discussion between the physician and the patient about nature prescription compliance, possible adjustments, and visible results.

Themes Outside of Research Questions' Scope: Politicization of Nature Connection

Though most of the emerging themes from the interviews corresponded to one of my original research questions, politicization of nature connection was a predominant theme that was not anticipated but worth noting and describing. Two practitioners repeatedly referenced the influence of politics in American Christianity and its effects on nature perception and the medical field. This influence is seen in Physician #3's response to the second research question. He felt that he was not raised in an environment where the church encouraged any relationship with creation. This most likely stems from the common ideology held in evangelical groups from the interpretation of a command in Genesis 1:28 to "fill the earth and subdue it and have dominion over… every living thing that moves upon the earth" (NRSVUE Bible, 2021) as encouragement to have power over creation instead of fellowship or relationship with it. As a result of this separation of faith and nature, he was unable to fully understand the influence of his faith in his intention to offer nature prescriptions since he himself was still learning that nature and faith are interrelated. He felt that his consistent care for the environment and enjoyment of time in nature as a man in Southern evangelical culture was not accepted or encouraged in the church and stereotyped him not as a Christian but as "hippy" or "liberal." He reflected,

> People who believe that nature was this amazing thing that God had created were kind of seen as, like I said, liberal hippies. And so, maybe my own bias sort of makes me think, you know, nature is kind of over here and it's a part of my life and I think it's important, but I haven't integrated that thought as well into my own faith system as perhaps I should have, because it's almost like I know what you're saying is correct [That relationship with creation is a core part of Christian faith]

> but I think growing up in America, the way that I have has somewhat split those beliefs and they really shouldn't be.

Physician #2 observed similar phenomena of the church creating a hostile environment towards creation care, love, and conservation, saying,

> there's just, there's so much baggage that comes when you look at certain evangelical circles and say, like, I feel closest to God in nature. And they'd … label you or [ask] 'Are you more spiritual than Christian? Do you follow the word of the Lord?'

She proposed the need for a shift, and

> to be able to, to put those labels aside and say, 'embrace the world that God gave us, like the nature, the, the trees, the ocean, everything, and know that it's healing, it has its healing powers'. And, none of that means you're, you're looking for alternative ways to worship, you know, or alternative gods to worship.

Both physicians observed how this cultural Christianity's absence of acceptance and encouragement of faith and creation has yielded a lack of environmental stewardship. Physician #3 expressed his frustration with how the Christian faith has particularly become so politicized in the south against environmental care, saying,

> for whatever reason, we have very, very much lost our way as Christians and especially politically. I don't, I don't know how in the world … that idea that, taking care of the environment, is some kind of crazy hippie liberal [concept]. I really feel like that we are here to serve and to preserve and we are doing a terrible job.

Physician #2 continued to report on this theme in American Christianity. She argued that the posture of this "older generation" of Christians towards the earth is paralleled in multiple areas of living. She described their posture towards creation as follows,

> I think that [in] the older generation … there is not much call to take care of the earth as a, as a gift from the Lord. It's more of a, 'we were put on this earth for a short time, it doesn't matter, we can do what we want. We don't need to take care of the earth.'

However, she felt that this political stereotyping of the Christian faith is starting to change, saying,

> We're seeing an evolution in Christianity in our faith right now, I think, as a practice of Christianity, of, because people are leaving the churches at higher rates than ever before, younger people want something different. I think people as a society are seeing something different and that the old school way or like the very traditional way of doing something, (which is church on Sundays) is being redefined as the churches is greater than that and bigger than that. And the connections are, are bigger than that.

She further proposed that Christian practitioners might be a key part of this cultural shift, and thought,

> if we had more Christian leaders or Christian professionals and physicians who could say things like being in nature, it's healing of anxiety and not, not just saying 'well, your prayer life's off. Then you're not praying enough.
> If you have anxiety, then you're praying. If you have depression, then you're not praying.' Well, these are the things that God calls us to do to mitigate anxiety and depression. He calls us to be in nature, to take care of his earth, the garden, to eat well, to be in connection with other people.

These results demonstrate a variety of themes which emerged from the research questions. These findings will be discussed in Chapter Five.

CHAPTER FIVE

Findings and Discussion

Purpose of the Study

This study provided an exploration of Christian primary care physicians' perspectives regarding the implementation of nature prescription programs. Additionally, it attempted to identify various barriers which might prevent physicians from implementing ParkRx styled prescriptions and explore the ways in which evidence and faith-based arguments for time in nature influence these physicians' considerations of offering nature prescriptions. Additionally, it aimed at providing recommendations for further research which might contribute to the increase of park prescription programs, particularly amongst Christian primary care physicians.

This study additionally assessed the motivations and barriers surrounding nature prescription programs and provide a brief overview of existing research in faith, science, and medical practice. It provided a review of the existing science and faith-based arguments for increased time outdoors. Following, it explored Christian primary care physicians' awareness of these arguments and their various roles in influencing these practitioners to offer nature-based prescription programs. This thesis positions the role of faith in nature prescription implementation and the study of nature prescriptions into additional disciplines such as medical humanities, medicine, religion, and public health.

Each practitioner's faith affected his/her life and approach to medicine in nuanced ways. The analysis of their responses attempted to identify common themes

regarding the role faith plays in influencing their intentions to integrate ParkRx style prescriptions.

Key Findings

The three key findings of this study which emerged from the original research questions were (1) inconsistent awareness of ParkRx and nature's health benefits (2) varied motivations of practitioners towards using nature prescriptions, and (3) identification of barriers for nature prescription implementation. The remainder of this chapter will present major findings, limitations to this study, and recommendations for future research.

The first major finding was the inconsistent awareness regarding ParkRx and the health benefits of nature contact. Though all the physicians interviewed were interested in holistic approaches to health and familiar with various methods of preventative treatment, most had never heard of ParkRx or of the specific health benefits of nature contact. This finding indicates the lower usage of nature prescriptions is not from a lack of practitioner buy-in, but from a lack of practitioner awareness and education.

The root cause of this issue may stem from the American medical educational system itself, since "Medical education has focused on teaching acute management of medical disease and the intricate details of various disease processes" (Cardarelli and Shie, 2000). The concepts of preventive and/or lifestyle medicine are not prioritized in medical education. Practitioners who desire to integrate more holistic methods in their practice often seek out these resources on their own, whether it be through an added-on certification in specialties like lifestyle or functional medicine or by reading additional literature. This type of education, however, should be foundational instead of

supplemental in a physician's training. The American Journal of Preventative Medicine (2019) reflects on this need for a change in medical education to include instruction on preventive methods writing,

> With a transformation of curriculum and development of new policies to support a focus on lifestyle medicine education in medical education across the continuum, a new healthcare model could be successful against noncommunicable chronic diseases and U.S. citizen wellness could become a reality.

This "transformation" in order to combat NCDs could rely on methods like ParkRx prescriptions since the health benefits of nature were demonstrated to have curative effects on many chronic illnesses (Frumkin et al. 2017).

The inclusion of ParkRx style programs and the health benefits of nature contact in preventive medicinal education for future physicians could serve as a solution to the lack of awareness and education surrounding nature prescriptions. Additionally, one method of education for physicians who have already completed medical school may be found through the American Medical System's usage of Continuing Medical Education (CME). Family practice physicians are required to complete these educational programs which "consists of educational activities which serve to maintain, develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession" (*ACCME*, n.d.). These supplemental educational courses or experiences are available through certain conferences, online courses, or meetings. ParkRx could create CME courses to be used as a resource and market them towards physicians. These courses would provide an opportunity for physicians to learn about the benefits of time in nature and gain practical understanding of how they might use ParkRx's tools to implement these prescriptions in their practice.

The second finding of this study was that practitioners expressed varied motivations in their intentions to prescribe park or nature-based interventions. Findings indicated that faith played a variety of roles in the implementation of ParkRx style prescriptions. Most felt that their faith had an indirect influence in their intent to prescribe time in nature. Two described that their faith contributed to their positive personal experience in creation and was a source in their motivation towards prescribing outdoor time. Four physicians felt that their faith inspired them to hold a more holistic view of medical practice, and it was this view that influenced their intention to offer nature prescriptions. These responses and others indicated that the Christian faith's perception of God in creation was a consistent factor in their consideration of implementing ParkRx styled prescriptions in clinical practice but was not uniform in nature.

The idea that faith plays a role in motivating Christian practitioners to offer park prescription programs implies that Christian medical organizations and initiatives might partner with or promote ParkRx. Faith-based organizations which support Christian physicians such as Christian Community Health Fellowship (CCHF) could encourage the introduction of nature prescriptions. CCHF's mission to "grow in our understanding of what it means to be ambassadors of Christ in healthcare and in communities of need" (Christian Community Health Fellowship [CCHF], n.d.) can be applied through ParkRx's cost effective treatment approach.

Additionally, the inclination that Christian physicians feel towards offering these prescription programs, suggests that ParkRx and other leaders in the nature-contact movement might consider partnering with faith-based medical organizations or Christian health clinics. This would additionally increase awareness surrounding the health benefits

of nature and ParkRx programs and could allow these organizations to integrate faith discussions in their prescription protocol.

In addition to faith, there were other themes identified which contributed to an interest in offering nature prescriptions. Many physicians were motivated by their desire to practice a more holistic and preventative style of medicine with a more relational approach. This theme was identified as a "more than a pill philosophy." This desire parallels current movements advocating for the transformation of medicine from its current state as "transactional" or "mechanistic" towards a more human or organic practice that is centered on whole-person care. Partnering with the many causes which advocate for a holistic approach to medicine might serve as an additional network to broaden the scope of ParkRx's reach. Particularly, the medical humanities movement and its various programs and organizations might serve as an intriguing area for collaboration since this field is "designed to overcome the separation of clinical care from the 'human sciences' and to foster interdisciplinary teaching and research to optimize patient care" (Gordon, 2005).

Furthermore, teaching about preventive methods such as ParkRx in medical humanities would introduce nature as a potential intervention earlier on in the medical education process, since medical humanities undergraduate programs are growing nationally (Lamb et al., p. 6, 2021). Involving ParkRx in various areas of medical humanities curricula might increase awareness as early as the undergraduate level, contributing to a more holistic understanding of medicine at the beginning of students' medical education journey and increasing awareness of the benefits of nature-contact. Additionally, practitioners who are involved in the medical humanities movement might

appreciate the interdisciplinary nature of these prescription programs and consider introducing them in their practice as well.

The third contribution of this study was its identification of the various barriers which might hinder implementation of ParkRx styled prescription programs. The barriers identified were found to be both logistical but also ideological. This study identified transportation cost, safety, and time as logistical barriers. These findings relate to existing research on inclusivity in the field of outdoor recreation.

Englert et al. (2023) studied obstacles which contribute to the lack of inclusivity of marginalized groups in the outdoors in their undergraduate research and found that "respondents reported facing seven key barriers to outdoor recreation: financial, social, lack of information, accessibility, time and money, safety, and transportation" (p. 2). The barriers identified in thse findings parallel the barriers physicians identified in this study. This indicates that the obstacles identified for ParkRx prescription compliance are a part of the larger problem of equitable access to outdoor spaces.

The solutions physicians posed to the barriers identified in the study: "insurance" or "government funded transportation services" or "grants paying for outdoor transport with pickups from clinics" might be attainable through partnership with similar causes. Many lobbyists and non-profit groups are advocating for inclusivity in the outdoors and currently are attempting to discover methods for increased access to natural spaces in response to the barriers that these physicians identified.

One example of these organizations is REI co-op, an American outdoor gear chain, who is working towards creating a more inclusive outdoor community and infrastructure for outdoor access. They collaborated with The Atlantic magazine to create

a panel of experienced professionals who developed “Five ways to Make the Outdoors More Inclusive.” Action step 4A from this action plan for change was to “subsidize or provide free transportation options for low-income families” (REI Co-op, “Five ways to make,” 2024). They offered a potential solution to the identified barrier of transportation, arguing that “parks could seek corporate underwriters to help subsidize free or discounted ride-shares or charter buses, among other possibilities” (REI Co-op, 2024).

Additionally, other organizations exist like Opening Up the Outdoors (OUTO), a not-for-profit which focuses on the “continued inclusion, education, and enjoyment of outdoor spaces by people of the global majority… that is truly diverse, equitable, anti-racist, and accessible to everyone” (OUTO, 2021). Like REI’s efforts towards addressing these barriers, OUTO encourages buy-in from other outdoor related brands such as Patagonia, The North Face, and Arc’teryx who are committed to diversifying outdoor demographics.

If the ParkRx movement were to unite with other grassroots outdoor movements with a shared understanding that the identified barriers are national or world-wide problems, their causes might gain additional lobbying efforts, awareness, and funding so these barriers might be practically addressed.

Additionally, this finding suggests that the exam room could not only serve as a place of physical healing, but also as a locus for transforming marginalization. Following, physicians (particularly those serving in marginalized communities) could provide personalized and culturally sensitive encouragement for underrepresented groups in the outdoors through their trusted medical recommendation and follow-up protocol. The specificity provided through ParkRx styled prescriptions in conjunction with local and

national parks might serve as a bridge between groups previously excluded in the outdoors and the natural spaces around them. This theory relates to the contribution of the identification of ideological barriers for offering park prescriptions. These non-logistical barriers were cultural sensitivity, patient expectations of pharmacological interventions, and the politicization of faith.

This cultural barrier observed in the research of marginalized groups' access to the outdoors was similarly reported by the physicians in this study. They proposed that patients' differing cultural backgrounds might contribute to a diverse range of perceptions or hesitations regarding spending time outside. Physician #3 observed that he has never had one of his Hispanic patients report any outdoor related hobbies as a response to his inquiry about his patient's interests. This observation is consistent with research findings which reported:

> In the United States, approximately 38% of Black Americans and 48% of Hispanic Americans participated in outdoor recreation in 2020. This is compared to 55% participation among Caucasian Americans. Many other intersecting identities are actively excluded, including people with disabilities, fat populations, and members of the LGBTQIA2S+ community; furthermore, class-based hierarchies are shown through the restricted outdoor access of low-income populations (Englert et al., 2023, p. 3).

Additional methods of overcoming this cultural barrier (besides the increased accessibility discussed in relation to logistical barriers) are increasing the racial diversity of medical practitioners who might offer ParkRx and providing further education for other physicians. Evidence suggests that patients who share the same race as their practitioner have better medication adherence, overall trust (Traylor et al., 2010), and reception to physician recommendations (Saha and Beach, 2020). This cultural barrier would be most effectively addressed by physicians who belong to the cultures or groups

that are traditionally underrepresented in the outdoors. Partnership with minority physician organizations such as the National Medical Association (NMA) which represents African American physicians, the National Hispanic Medical Association (NHMA), the National Arab American Medical Association (NAAMA), and the NIH National Institute on Minority Health and Health Disparities (NIMHD) might allow ParkRx to equip physicians who serve patients from their same cultural backgrounds. This finding also suggests that ParkRx needs to provide practitioners who serve patients from different cultural backgrounds than their own with resources for adapting park prescriptions to provide patient-centered culturally sensitive health care (Tucker et al., 2007). Additional ideological barriers identified during interviews were the patient expectation of pharmacological intervention and the politicization of nature contact. Both barriers had philosophical and theological implications.

All physicians interviewed addressed to some extent that American patients generally seek "quick fixes" or a pill when they see a practitioner. This issue indicates an overarching need for a change in the philosophy which defines the American medical system and American society. Practically, Physician #2 indicated that this phenomenon has implications for Christians in the American church. Physicians reported that not only patients, but Christians in America and society in general have lost a respect and understanding of the necessity of the slowness and patience that faith and health require.

This concept is seen in scripture, which instructs Christians to be "patient in affliction" (NRSVUE Bible, 2021, Rom. 12:12) and practice suffering which "produces perseverance; perseverance, character; and character, hope" (NRSVUE, 2021, Rom. 5: 3-

4). Furthermore, many Biblical concepts such as creation, sabbath, and exile indicate the importance of waiting and rest.

Many Christian authors and theologians have observed that this aversion to slowness is detrimental to faith and spiritual wellness. John Mark Comer's (2021) book *The Ruthless Elimination of Hurry: How to Stay Emotionally Healthy and Spiritually Alive in the Chaos of the Modern World* addresses this phenomenon and provides practical tools which encourage slowness and sustained efforts for spiritual growth. Wendel Berry (1987) and Norman Wirzba (2006) similarly write on this theme and critique modern Christianity's neglecting of the practice of sabbath, the Biblical concept of rest. Physician #1 reported on how the church in America falls into this "quick fix" mentality and has forgotten the importance of waiting, whether it be "on the Lord" or on improved physical or mental health outcomes. Growth that decreases the tendency towards a "quick fix" mentality can take place in Christian communities when clergy members initiate conversations and studies of spiritual disciplines to encourage perseverance and patience in slowness. Furthermore, Christian physicians who recognize this problem firsthand in their medical practice can offer unique insight in their congregations and have similar conversations about growing in this area with their patients who express an interest in discussing faith or spirituality.

The last contribution of this study was the discovery of the ideological barrier of the politicization of creation. Two physicians expressed deep concern relating to faith's influence in implementing nature prescriptions, because they felt that the American church has not historically encouraged the relationship between Christian faith and a love

of creation. They reported this phenomenon resulted from the church's false stereotyping of those who appreciated and cared for creation as nonreligious "liberals" or "hippies."

The literature review of the theological basis for spending time in creation in Chapter Two of this study demonstrates that this church stigma towards creation care and stewardship is heretical. This finding indicates that many Christians like Physician #3 are discouraged and feel unwelcome in church communities and lack further deepening of their relationship with God and creation because of social barriers that are illegitimately constructed.

Like the suggestions made for clergy to transform "quick fix" ideologies, the church should initiate conversations and lessons developed around this topic to better educate members, encourage change, and create unity of mind through a shared gratitude for the gift that is creation. The pervious understanding that only people with certain political affiliations should prioritize time in creation can be combatted with Biblical and theological understanding. Following, spending time in nature can be valued and shared by all Christians as they learn to experience fellowship with God in his creation.

Limitations

This study sought to explore the perspectives of Christian primary care physicians regarding nature-based prescription programs. Additionally, the purpose was to explore barriers which might prevent the implementation of these programs.

One limitation that occurred in this research was the size and demographic of the physicians interviewed. Originally, it was assumed that data saturation would be reached through the originally scheduled interviews. However, as theoretical analysis was performed on the collected data, I realized how diverse the range was for the role of faith

in influencing decisions to prescribe outdoor time. At this time, due to submission deadlines and the preliminary nature of this study, there was no continuation of additional interviews. However, a larger number of interviews in future study would allow for the findings on faith's influence in implementing nature prescriptions to be generalizable and father increase understanding of the themes already identified. Furthermore, only two of the physicians interviewed were females, and all seven were white. This was potentially a result of the snowball sampling data collection method used. This limits the collection of faith and practice perspectives to one racial background. This limitation prevents these findings from being generalizable, since there is a lack of racial diversity in the data which influenced my findings, and future might be conducted which addressed these limitations on physician demographics.

Another limitation of this study was the lack of assessment of physicians serving insure populations. Five of seven physicians worked predominantly with uninsured patients in Federally Qualified Health Centers (FQHC's) while only two worked with predominantly insured patient populations.

A final limitation of this study was the potential for personal bias to interfere in various stages of the research and writing process. As discussed in the methods section, I personally experience time in creation as a fundamental part of my Christian faith and an important factor for my mental and physical wellbeing. I was committed to neutrality throughout my research process and discussed the themes observed along with my initial thoughts and findings with my faculty mentor before writing any analysis. However, it is important to acknowledge that though I utilized additional research and perspectives, my

experience and personal interest in the faith-based reasoning for increased time in nature might have unintentionally shaped my conclusions and interpretation.

Suggestions for Further Research

These observed limitations: lack of sufficient numbers and diverse backgrounds in interviewed physicians, indicate that further research is required to generalize these findings. Additionally, a full-scale understanding of responses to park prescriptions programs in not complete without a study of patient's perspectives. One group of patients which should be interviewed should be patient's with disabilities, since their population might identify unique barriers. Further research relating to this subject should investigate how the American church's reported stigma towards nature-enthusiasts' effects park prescriptions. Additionally, each of the barriers identified reveal specific areas in which public health professionals might begin to research solutions for outdoor access. The cultural barrier physicians identified revealed there is a need for further research to understand different perceptions of nature and time outdoors in various minority groups. This could be further investigated in relation to this topic by assessing the perception of creation in the faith of Christian physicians from different cultural backgrounds.

Though environmental concepts did emerge from this research which are discussed in the theme "politicization of nature," I was not able to integrate the topic of environmentalism into this study due to its narrowed scope. However, there is significant overlap with environmentalism and theology (Binde, 2001) and evidence demonstrating that increasing nature connectedness yields Pro-Environmental behaviors (DeVille et al., 2021). Future research might conduct a similar study but additionally integrate

environmental theology and environmentalism as factors influencing practitioner responses.

Finally, in the findings section various solutions were proposed to the barriers identified during interviews. Existing movements and organizations in similar fields which share similar purposes and values with ParkRx were identified. I proposed that these varying organizations might effectively collaborate with ParkRx to increase awareness of their program and the health benefits nature yields. These findings recommended that ParkRx or similar organizations seeking increased access to nature should conduct research regarding these potential areas of collaboration and assess how they might specifically broaden each other's reach, yielding more widespread implementation of nature contact prescriptions.

The qualitative approach was an effective methodology for gaining an understanding of the lack of awareness of ParkRx and nature's health benefits, the varied motivations for practitioners in park prescription intentions, and identification of barriers for nature program implementation. The variety of themes which emerged regarding the influence of faith-based motivation demonstrated the complexity of an individual's perception of God and provided categorization for further research on the role of faith in nature prescription implementation. There were many barriers, both logistical and ideological, that might deter physicians or patients from implementing or complying with ParkRx prescriptions. These barriers, however, parallel barriers in similar fields which are currently being addressed, indicating that there is hope for their removal which would potentially increase the offering of ParkRx style prescriptions. Furthermore, unanimous interest by these Christian physicians indicated that this specific population might serve

as a target group for increasing the number of practitioners who offer nature prescription programs. This study further revealed that the topic of nature prescriptions serves as an integrative network between many fields and can initiate conversations and actions aimed at progress in the fields of outdoor recreation, medical humanities, public health, medicine, and religion.

APPENDIX A

Health Benefits of Nature Contact Findings table from Frumkin et al. (2017) presented to physicians during interview question 3 (see Table 2)

Summary of evidence-based health benefits of nature contact.

No.	Health/well-being benefits	References
1	Reduced stress	Berto 2014; Fan et al. 2011; Nielsen and Hansen 2007; Stigsdotter et al. 2010; van den Berg and Custers 2011; van den Berg et al. 2010; Ward Thompson et al. 2016
2	Better sleep	Astell-Burt et al. 2013; Grigsby-Toussaint et al. 2015; Morita et al. 2011
3	Improved mental health:	
	Reduced depression	Astell-Burt et al. 2014c; Beyer et al. 2014; Cohen-Cline et al. 2015; Gascon et al. 2015; Kim et al. 2009; Maas et al. 2009b; McEachan et al. 2016; Nutsford et al. 2013; Sturm and Cohen 2014; Taylor et al. 2015; White et al. 2013
	Reduced anxiety	Beyer et al. 2014; Bratman et al. 2015a; Maas et al. 2009b; Nutsford et al. 2013; Song et al. 2013; Song et al. 2015

No.	Health/well-being benefits	References
4	Greater happiness, well-being, life satisfaction	Ambrey 2016; Fleming et al. 2016; Larson et al. 2016; MacKerron and Mourato 2013; Van Herzele and de Vries 2012; White et al. 2013
5	Reduced aggression	Bogar and Beyer 2016; Branas et al. 2011; Kuo and Sullivan 2001a, b; Troy et al. 2012; Younan et al. 2016
6	Reduced ADHD symptoms	Amoly et al. 2014; Faber Taylor et al. 2001; Faber Taylor and Kuo 2009; Faber Taylor and Kuo 2011; Kuo and Faber Taylor 2004; Markevych et al. 2014b; van den Berg and van den Berg 2011
7	Increased prosocial behavior and social connectedness	Broyles et al. 2011; Dadvand et al. 2016; de Vries et al. 2013; Fan et al. 2011; Holtan et al. 2015; Home et al. 2012; Piff et al. 2015; Sullivan et al. 2004
8	Lower blood pressure	Duncan et al. 2014; Markevych et al. 2014a; Shanahan et al. 2016
9	Improved postoperative recovery	Park and Mattson 2008; Park and Mattson 2009; Ulrich 1984
10	Improved birth outcomes	Reviewed by Dzhambov et al. 2014

No.	Health/well-being benefits	References
11	Improved congestive heart failure	Mao et al. 2017
12	Improved child development (cognitive and motor)	Fjørtoft 2001; Kellert 2005
13	Improved pain control	Acutely (Diette et al. 2003; Lechtzin et al. 2010) and chronically (Han et al. 2016)
14	Reduced obesity	Bell et al. 2008; Cleland et al. 2008; P. Dadvand et al. 2014a; Lachowycz and Jones 2011; Sanders et al. 2015; Stark et al. 2014
15	Reduced diabetes	Astell-Burt et al. 2014a; Bodicoat et al. 2014; Brown et al. 2016; Thiering et al. 2016
16	Better eyesight	French et al. 2013; Guggenheim et al. 2012; He et al. 2015
17	Improved immune function	Li et al. 2006; Li et al. 2008a; Li et al. 2008b; Li et al. 2010; Li and Kawada 2011
18	Improved general health:	

No.	Health/well-being benefits	References
	Adults	Brown et al. 2016; de Vries et al. 2003; Kardan et al. 2015; Maas et al. 2006; Maas et al. 2009b; Stigsdotter et al. 2010; Wheeler et al. 2015
	Cancer survivors	Ray and Jakubec 2014
	Children	Kim et al. 2016
19	Reduced mortality	Coutts et al. 2010; Gascon et al. 2016b; Hu et al. 2008; James et al. 2016; Takano et al. 2002; Villeneuve et al. 2012
20	Asthma and/or allergies (studies show both improvements and exacerbations)	Andrusaityte et al. 2016; Dadvand et al. 2014a; Fuertes et al. 2014; Fuertes et al. 2016; Lovasi et al. 2013; Lovasi et al. 2008; Ruokolainen et al. 2015

Note: ADHD, attention-deficit hyperactivity disorder. The references in Table 1 [of Frumkin et al. (2017)] are illustrative rather than exhaustive; they include both recent reviews and research reports and older, widely cited publications.

APPENDIX B

Copy of Information Sheet for Informants

Exploring Christian Practitioner Responses to Nature-Based Prescription Programs

Introduction
You have been asked to participate in a research study for an undergraduate honors thesis designed to explore the responses of Christian medical practitioners towards nature-based prescription programs. You were selected to be a possible participant because you have been identified as a Christian primary care physician.

What will I be asked to do?
You will be asked to participate in an interview where you will asked to discuss your thoughts, feelings and behaviors pertaining to faith, medical practice, and nature-based prescriptions. The interview will take 1-2 hours of your time. With your verbal consent, your participation in the interview will be audio recorded. I may contact you for a follow up interview. I will ask for your permission to record the actual interview as part of your agreement to participate in the study at the conclusion of this review sheet.

What are the risks involved in this study?
Your identity will be kept confidential and the data which may include reports, publications or presentations will be reported with no reference to your name or other identifying information that would link you to a particular event. The risk of participation is not greater than that posed by ordinary life.

What are the possible benefits of this study?
Your participation will assist in identifying factors which encourage and/or prevent the implementation of nature prescription programs by practitioners in clinical practice. Additionally, your responses in this study will contribute to field of theology and medicine by exploring the role of faith in creation care and their related influence in clinical practice.

Do I have to participate?
No. Your participation is voluntary. You may decide not to participate or to withdraw at any time before or during the interview.

Who will know about my participation in this research study?
This study is confidential and the records of this study will be kept private by both PI (Lily Weir) and faculty mentor (Dr. Kelli McMahan). No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely. If you choose to participate in this study, you may be audio recorded.

Any audio recordings will be secured securely. Any recording will be kept for no more than two years and then erased.

Whom do I contact with question about the research?
If you have any questions regarding this study, you may contact Lily Weir (lily_weir1@baylor.edu, 407-490-6307)

Whom do I contact about my rights as a research participant?
This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Baylor University, and, because of its size and anonymity, has been declared as Non-Human Subject Research. For research-related problems or questions regarding your rights as a participant, you can contact these offices at 354-710-3708 or irb@baylor.edu

Participation
Please be sure you have read the above information, asked questions and received answers to
your satisfaction.

Read active acknowledgement of recordings:
_____ I give my permission for audio recordings to be made of me during my participation in this research study.

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