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**The Negative Influence of External Stressors on Patient Outcomes: Why Physicians Should
Consider More than Outwardly Presenting Symptom(s)**

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DePauw University Honor Scholar Program

Class of 2023

Written Under the Supervision of Dr. Sharon Crary, Dr. Kevin Moore, and Mrs. Emily Knuth

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Abstract

In this thesis, the influence of external stressors on patient health outcomes in the medical setting will be examined. There is an overwhelming amount of reputable research that suggests that the American healthcare system, at least as it operates now, does not effectively improve patient health outcomes. Simply focusing on outwardly apparent illness or disease does not address the full scope of patient need. Ample evidence will be provided in the form of a comprehensive literature review accompanied by supporting anecdotes from real physicians in hopes of encouraging healthcare professionals to increase the breadth of their considerations when it comes to treating their patients.

While much of the information emphasized throughout this thesis may seem discouraging, the reality of the situation is that it is more than possible for physicians to aid in repairing the damage currently being done. By giving credence to the impact of anxiety, socioeconomic status, and personal concerns on a patient's capacity to heal properly, professionals can provide medical care that truly meets patients where they are.

The Negative Influence of External Stressors on Patient Outcomes: Why Physicians Should Consider More than Outwardly Presenting Symptom(s)

The United States healthcare system is broken. Fortunately, it has not yet reached the point of no return. That being said, in order to undo the harm to American society that has repeatedly been perpetuated by profit and efficiency-driven trends in medical care that have only grown increasingly more common over the last several decades, it will take widespread collaboration, communication, and a communal desire to enact change for the better on the part of doctors across the country. Improvement is possible, but it will need to take place both quickly and mutually. Rather than bending to a medical culture that emphasizes a “bandage” approach - that is, to treat the primary complaint of a patient with little consideration of possible underlying causes of that complaint - physicians should adopt a patient-centric model of care. Although “Symptom-oriented research has been a driver for medical progress for centuries... re-focusing on patient-centered clinical research will strengthen this field in the future in order to support smarter medicine” (Bingisser & Nickel 2019). In order to provide healthcare services that promote genuine long term recovery, it is crucial that doctors consider the impact of their patients’ anxiety levels, socioeconomic contributors, and personal stressors on those patients’ health. A wealth of resources suggest that acknowledging these influences in the clinical setting might just be the key to turning the tide of medical care for vulnerable Americans.

Firstly, it feels important to emphasize that this thesis is by no means intended to be a personal affront to any physicians in particular, nor is it meant to discredit the invaluable work that doctors complete every day. In no way, shape, or form should it be interpreted that, overall, physicians do more harm than good. However, any positive sentiments toward doctors do not detract from the indisputable fact that the American healthcare system falls far behind its

“developed” country counterparts in terms of health outcomes, perhaps the most important metric in gauging whether or not current medical methodologies are serving their intended purpose: to legitimately help patients. The system itself often ties physicians’ hands behind their backs, subjecting them to the whims of for-profit hospitals with administration “whose primary aim is making a profit. Such hospitals will encourage doctors to promote profit-producing drugs, surgeries, tests and treatments” (Andre & Velasquez, 2015). Although, in terms of healthcare, the United States spends “more than twice the average of 10 other wealthy countries... according to the Organization for Economic Cooperation and Development,” Americans are “a lot sicker than people in those countries. Some of that is because of America’s large socioeconomic differences, but some of our problems stem from the way health care is delivered in the United States” (Ervin 2021). Clearly, there are discrepancies in the baseline approach to healthcare that necessitate systemic change. Otherwise, experts like cardiologist and researcher Dr. Lars Lund would not find it so important to emphasize that, in America, “Access to care is poor and inconsistent... So is continuity of care. And there are huge inequalities in access, so large segments of the population have terrible health outcomes” (Ervin 2021). Ultimately, the most common barriers to care that contribute to lower percentages of completed follow-up appointments and less overall availability of healthcare services are, as previously acknowledged, concerns like anxiety, socioeconomic contributors, and personal stressors, any and all of which can make it next to impossible for a patient to acquire the resources necessary to regularly access care. This is why it is critical for the medical community as a whole to acknowledge the influence that such factors have on its ability to make any more than a nominal impact on its patients’ health outcomes.

In the wake of the Covid-19 pandemic, the shortcomings of the American healthcare system have become all the more clear. Regardless of the enormous amount of monetary

resources it pours into the medical establishment, comprehensive analysis of the United States's performance in such areas as overall healthcare performance, affordability and timeliness of care, care process, and administrative efficiency reveals that the country ranks dead last compared to ten other countries (Australia, New Zealand, Germany, and Switzerland, to name a few) of comparable global status. Results like these prove that, without a doubt, "the U.S. health system delivers too little of the care that's most needed — and often delivers it too late — especially for people with complex chronic illness, mental health problems, or substance use disorders, many of whom have faced a lifetime of inequitable access to care" (Schneider et al., 2021). As difficult as it may be for those already practicing within a medical system so rife with inequalities and proof that the current process simply is not working for its patients, the fact of the matter is, it is undeniable: something has to change. While that something is certainly more complex than what could be formally solved on an individual basis, simple changes in terms of an increased scope of consideration adopted by physicians across the country could make a massive difference.

While such changes in breadth of consideration will be discussed in far more detail later in this thesis, one has to consider as motivation not only the improved patient outcomes that are guaranteed to follow, but also the moral obligations members of the healthcare community have to "support individuals' health capabilities by enabling them to meet their health needs and by fostering what [some experts] call health agency (i.e., people's ability to make health decisions and pursue health goals)" (Ruger 2008). There exists no signed legislation, line of the Hippocratic Oath, or legally authorized contract to officially legitimize the moral importance of patient health agency within the medical community, but ethical considerations are rarely so concrete. Rather, they are revealed through the underlying goals upheld by the vast majority members of a community - in this case, the healthcare community - and the reasons behind why

those goals are considered to be nearly universally important. In general, American society places an immense amount of value on individual autonomy, and a patient's health agency is closely tied to this concept. Unfortunately, under the present medical system, all patients regardless of their socioeconomic background are not afforded equal ability to exercise the health agency to which most believe they have a moral right, the primary reason being that physicians are not prepared to address any patient needs that extend beyond prescribing a medication or splinting a damaged bone. This is not for lack of skill, but simply for lack of recognition of the importance of disseminating resources to upholding their ethical duties as healthcare providers.

In the world of healthcare, doctors encounter people from every walk of life - different ethnicities, different levels of wealth, different degrees of educational attainment, and more. As such, it is crucial that, when a physician inevitably treats a patient facing challenges in their personal life that are insurmountable without additional support, that physician knows how to guide that patient to the proper form of aid. Abiding by the ethical sensibilities of most, doctors should be able and willing to provide such assistance to any patient who walks through the doors of their clinic, regardless of how severe a level of need a patient may demonstrate. Odds are, this type of ethical sensibility is reinforced by a moral phenomenon that has come to be known as Aristotle's principle of just distribution, which states that "like cases should be treated similarly and unlike cases differently, in proportion to their difference. This account is primarily based on need. It proposes measuring the quality of health care by its ability to address functional impairments arising from injury or illness... It implies that people with the same health needs might require different levels of resources to ensure the same capability to achieve a given health state" (Ruger 2008). The most crucial component of Aristotle's principle of just distribution, at least for the purposes of this thesis, is that even the same medical diagnosis should be understood

to potentially require the employment of a different number of resources depending on the circumstances of the various patients provided that same diagnosis. If the majority of people believe that this is the case, then it only stands to reason that physicians should, supported by pre-established ethical tenets of the American healthcare system, evaluate the extenuating circumstances plaguing their patients that may be contributing to variations in demonstrated need. The most effective means of achieving this goal is to actively work to bridge the physician-patient communication gap.

In simple terms, the physician-patient communication gap exists when there is a barrier preventing a doctor from having the ability to address all components of a patient's healthcare needs in a way that is constructive for both the physician and the patient alike. This may arise due to any number of reasons, from a legitimate physical communication barrier (i.e. language discrepancy, speech impediment, etc.), to an inability to adequately convey to a person with no prior medical knowledge the details of their condition and how they can best care for themselves in terms that they can understand. Regardless of how a physician-patient communication gap comes to be, it should be apparent that, in the absence of remediation, patient outcomes are bound to be poorer, especially since it has been found that "Communication during the medical interaction among the health practitioner and the patient has a pivotal role in creating a positive health impact that includes drug adherence, future decision making on the interventions and modifying the health behaviours of the patient" (Tiwary et al., 2019).

And there exists further evidence that the physician-patient communication gap is linked to worse physical and mental health alike. As is the case in much of healthcare, mental health and physical health appear to be inextricably linked. In fact, "When compared with individuals reporting optimal patient-provider communication (PPC), those who reported an average PPC

had a 44% higher likelihood of reporting a poor state of physical health. Furthermore, those with poor PPC were twice more likely to rate their state of physical health as poor. A similar trend is also seen with PPC and mental health score” (Okunrintemi et al., 2017). These alarming statistics make for a strong case in favor of improved physician-patient communication being the very first step in paving the way toward a medical system fully committed to considering the anxiety levels, socioeconomic contributors, and personal stressors instrumental in their healthcare outcomes. Given the close connection already demonstrated to exist between physical and mental/emotional health, there are more than enough grounds to examine this component of overall patient health further to better convey its importance.

Anxiety and Poor Health Outcomes

“As a doctor, I’ve encountered many patients over the years, each with their unique stories and struggles. However, one particular recent encounter that comes to mind is one I had with a woman who I was seeing for a routine follow-up appointment for her diabetes. She had begun to have difficulty maintaining compliance with her regimen for her diabetes as was evidenced by her gradually increasing blood sugar levels. As I probed a little deeper, it became apparent that she was struggling with severe depression due to the stress of living far away from her family during the pandemic. Her family had been insisting that she stay at home and never leave her house due to their concerns about COVID-19. She was feeling overwhelmed and isolated and was struggling to cope with the constant anxiety and worry. As a result, she had found it difficult to remember to take her medicines and had found comfort in eating unhealthy foods.

“As I spoke with her, it became clear that her family's concerns were impacting her mental health in a significant way. While it was important for her to take appropriate precautions to protect herself and others, it was also important to acknowledge the realistic nature of risk in life in general. I encouraged her to have a conversation with her family about the importance of balancing their concerns with the need for social interaction and mental well-being.

“We discussed the many ways in which she could safely interact with others, such as by wearing masks, practicing social distancing, and taking advantage of outdoor spaces. I also provided her with some practical tips and strategies for managing her depression, such as regular exercise, healthy eating, and spiritual care.

“Over time, she began to feel more empowered and in control of her situation. She began to have more open and honest conversations with her family about their concerns, and was able to find a balance between staying safe and maintaining her mental well-being. She also continued to seek out support from local resources, such as attending church and seeing a counselor, which helped her manage her stress and anxiety. In the end, she also gradually improved her glycemic control, and she now has well-controlled diabetes.

“As a healthcare provider, it was incredibly rewarding to see her make progress and begin to feel more hopeful about the future. This experience reminded me of the important role that doctors can play in providing emotional support and guidance to their patients, particularly during times of crisis. By providing empathy, compassion, and practical advice, we can help our patients navigate even the most challenging situations and find hope and healing.” - Dr. Adam Amos, Family Medicine of Greencastle, IN.

According to the National Institute of Mental Health, “An estimated 31.1% of U.S. adults experience any anxiety disorder at some time in their lives,” which means that mental health and anxiety more specifically will almost certainly be in some way personal to every practicing physician in America, not just Dr. Amos. With anxiety being such a prevalent component of the lives of quite literally millions of Americans, it is easily feasible that this mental health condition, one that is so often described as all-consuming, debilitating, and demoralizing by those who suffer from its effects, has symptoms that bleed over into physical manifestations of ailments as well - especially in the aftermath of a global pandemic, as exemplified by Dr. Amos’s anecdote. In hopes of further exemplifying anxiety’s capacity to drastically influence whatever course of treatment is suggested by physicians for any number of illnesses, it is pertinent to collect information regarding the psychology of stress, how anxiety impacts the body, and, of course, practical ways for physicians to reduce anxiety for the patients in the clinical setting.

The Psychology of Stress

Today, it is difficult for many to imagine that anxiety and stress in general could have ever served some sort of functional purpose. Depending on how one chooses to look at it, it can either be a comfort or a disappointment to learn that anxiety is, at its very core, an evolutionarily derived response. Fear reactions across a wide range of species were studied by Darwin when he was still alive, and the king of evolution himself, along with plenty of other reputable scientists over the ages, found evidence of such fear reactions - stress - in the vast majority of sentient beings that occupy Earth (Stein & Bouer 1997). Humans are, of course, no exception. That fear reactions are such a common trait amongst members of the animal kingdom leads experts to agree that there must be an evolutionary purpose behind the development of such

tendencies. The running theory, one that makes a fair amount of common sense, is that an avoidant response to potential sources of danger reflects the developmental and evolutionary history of a species, a history that was only able to develop because threats were dodged due to innate stress. In reality, this stress is so innate that, “There is some evidence that biological predispositions exist for anxiety responses toward specific kinds of stimuli (Davey, 1995; Mineka, 1987; Russel, 1979; Seligam, 1971). Furthermore, in complex species, different kinds of anxiety emerge at particular development stages” (Stein & Bouer 1997), which suggests that anxiety may just be embedded into the very fabric of humanity’s DNA.

The classic fight or flight response that so often characterizes humanity’s understanding of fear responses can be directly traced back in time as an evolutionary component of anxiety’s origination. Where anxiety becomes detrimental rather than functional, however, is when that heart rate elevating, edge-of-your-seat feeling associated with the fight or flight response is activated in the absence of any true threat to wellbeing. For those with chronic anxiety, they live on the brink of fight or flight, unable to ever truly let down or experience a sense of tranquility. While such a prolonged state of stress may have offered a bit more utility in prehistoric times when human beings were constantly looking over their shoulders in case a predator swooped in for the kill, it offers little more than the potential for a slew of medical bills in today’s post-industrial, urbanized, and (mostly) predator-free society. Hence the modern classification of anxiety as a mental health disorder rather than an evolutionarily derived survival tactic.

So, what causes this state of evolutionary dysbiosis, as experts in the field so often refer to it? Unfortunately, in a manner very much not preferred by most physicians, anxiety is not a condition with an easily pinpointable cause. Although it has assumed the title of “Most Frequently Encountered Mental Disorder in Clinical Practice,” it is hardly in the running for

“Most Straightforward Etiology” (Shri 2012). Instead, researchers propose a multi-faceted origin for the disorder, one with ties to nearly every facet of a patient’s life. In general, scientific literature divides the causes of stress into three overarching categories: biological, psychological, and social (or biopsychosocial as a catch-all term). Of course, each category is complex enough to warrant its own academic paper, but the most basic tenets of each will be described for the purposes of this thesis.

Firstly, the biological component of anxiety’s proposed origin is perhaps the least ambiguous and most tempting to target clinically because it has the potential to be treated with directly targeted pills mass-manufactured by the pharmaceutical industry. The reason for this is that, while science points to the fact that heredity and “Genetic factors predispose certain people to anxiety disorders,” the neurobiology of anxiety suggests that an imbalance of certain neurotransmitters is an even larger culprit (Shri 2012). Thanks to evolution’s nature *and* nurture principles, principles which state that the environment in which someone is raised influences outcomes equally as much as genetics, genetically programmed neurotransmitters can be altered as a direct result of circumstantial factors. For example, in rat studies involving higher levels of maternal nurture, offspring have correspondingly higher levels of central serotonin activity (Schneiderman et al., 2005). This increased activity, in turn, manifests as greater expression of a central glucocorticoid receptor gene, more of these receptors being present in the limbic system, and better glucocorticoid communication with the central nervous system for the duration of the rat’s life. In a true expression of the genetic component of anxiety, the rats raised in such nurturing conditions are far more likely to raise their offspring in the same way, meaning that their progeny over the course of several generations has the tendency to have more glucocorticoid receptors and, ultimately, lower anxiety levels (Schneiderman et al., 2005). In

those situations where glucocorticoid receptors are insufficient, it may be useful to take medication intended to fulfill the functionality that a receptor-deficient body is not able to sustain.

While, no, humans and rats are not biologically identical, they do share enough similarities to draw invaluable conclusions from studies like these. Despite the presence of some baseline level of genetic influence on anxiety levels, the delicate balance of neurotransmitter function versus dysfunction largely hinges on the environment in which someone is brought up. This means that, even though “evolution has provided mammals with reasonably effective homeostatic mechanisms for dealing with short-term stressors,” biological nature is not impervious to extenuating circumstantial occurrences such that it can prevent the fact that, “if the threat is persistent, particularly in older or unhealthy individuals, the long-term effects of the response to stress may damage health” (Schneiderman et al., 2005). There may be several pharmaceutical compounds on the market invented specifically to meet the needs described in the aforementioned study analysis, but that is a mere “bandage” tactic that does not yield lasting improvement if and when a patient can no longer routinely access that medication for any number of reasons.

Furthermore, there are a number of psychological factors that can cause anxiety, factors which can be further broken down into categorizations like psychodynamic (conflicting instincts and impulses), behavioral, and spiritual elements (Shri 2012). Much of what causes someone to be plunged into a constant state of anxiety hinges on their opinion of themselves and their perceived ability to operate effectively in society, but these self-perceptions can be severely altered by negative events that occur at any stage of life. That being said, stressors that arise during adolescence and stressors that arise in adulthood manifest differently. In essence,

childhood stressors that culminate in chronic anxiety are typically centered around some kind of trauma that severely alters mental development from a very early age. Examples include any form of abuse, exposure to war or terrorism, growing up in an unstable household, and violence more generally. Understandably, these kinds of deeply harmful conditions experienced throughout one's most formative years of intellectual development can lead to a lifetime of chronic anxiety. On the other hand, anxiety-inducing stressors that occur in adulthood are more likely to center around a major negative life event, such as the loss of a job or an impending divorce, rather than disturbing, repeat childhood situations. Ultimately, trauma - like an assault or the death of a loved one - can occur at any age, and these types of circumstances have all been proven to directly correlate with chronic anxiety as well (Schneiderman et al., 2005).

Lastly, the social factors that contribute to anxiety in adults have been described as "Life experiences like death in the family, divorce, job loss, financial loss, accident or major illness affect a person's attitude and response to life situations. Long term exposure to abuse, violence, terrorism and poverty may affect an individual's susceptibility to anxiety disorders" (Shri 2012). It is made abundantly apparent from the prior list that there is much overlap between the psychological and social influences of chronic anxiety which, given psychology's classification as a social science, should come as no surprise. The distinction between the two can be made in the sense that the psychological implications come as a result of the social factors. In other words, psychologically speaking, trauma is the mental/emotional manifestation of a variety of social factors like the ones listed above. In order to identify a root cause of anxiety's psychological factors, it is important to first turn to the social factors in one's life that generate them. Interestingly, Schneiderman et al. suggests that other diseases impacting a patient at any given time could also be considered a social component of anxiety. Many of the comorbidities

plaguing America today are the result of cultural aspects of our society, like overeating or excess drinking. With this in mind, it is not hard to see that health issues like cardiovascular disease that arise from poor diet and lack of exercise are the result of social factors. As disease progresses, patients are more likely to have integral components of their life impacted by its effects, resulting in an anxiety-inducing cycle that only continues to exacerbate the condition itself as well as mental health decline (Schneiderman et al., 2005).

In summary, there is no clear-cut methodology for ascribing an originating point to anxiety. It cannot be overstated that the circumstances of every individual patient will be vastly different from others, so efforts to attribute anxiety to one specific source are unproductive and should be discontinued by physicians and other medical professionals. Instead, it is far more beneficial to utilize the aforementioned information as a guide to reinforce the importance of considering just how many different life situations may have culminated into chronic anxiety for a patient. In this way, the healthcare community should be able to see how the extenuating circumstances that contribute to anxiety themselves can serve as aspects of disease etiology and should therefore have associated “treatment” plans and designated courses of action on the part of doctors just like any other physical symptom does.

How Anxiety Impacts the Body

Truthfully, while anxiety is certainly a mental health condition, its effects are so multifaceted that it is not far fetched to also consider it a physical symptom due to the dramatic effects it can have on the body. The brain is the control center of human behavior, therefore any dysregulation present there is bound to express itself through the rest of the body. The fight or flight mechanism so heavily emphasized by human developmental evolution is meant to trigger a

physical response that removes an individual from the direct path of danger, otherwise it would serve no valuable purpose. Chronic anxiety, while no longer acting as an adaptation - rather, quite the opposite - is unable to escape the physical manifestations pertinent to its evolutionary past.

Anxiety has been scientifically proven time and time again to lead to poorer health outcomes in patients being seen across the healthcare field by generalists and specialists alike. Naturally, there are biochemical reasons behind this fact that are crucial in understanding just how much anxiety can consume the body. A person subjected to a chronic state of stress can have their brain structure quite literally altered. Studies have shown that those subjected to prolonged anxiety have lower brain volume in certain regions that contain structures directly linked to the stress response system. Additionally, as a function of neural plasticity, anxious patients are likely to have neuronal pathways that have rerouted themselves abnormally in an attempt to compensate for chronic stress. Unfortunately, even this capacity can decrease over time as anxiety eats away at nerve structures, making that neural plasticity less and less feasible the longer the anxiety persists (Mariotti 2015). Again returning to the notion of the neurotransmitter and hormonal components of stress, “The long-term activation of the stress response system and the overexposure to cortisol and other stress hormones that follows can disrupt almost all your body's processes” (Mayo Clinic Staff 2021). So, not only does anxiety modulate the brain’s legitimate structure on a macroscopic level, it also begins a microscopic cascade of biochemicals that can throw the rest of the body’s functions out of balance. The Mayo Clinic goes on to describe that chronic stress can vastly increase the risk of other health problems, including but not limited to digestive problems, headaches, heart disease, sleep

problems, and memory lapses. In essence, no biological system - neurological or otherwise - is safe from anxiety's catastrophic effects.

One of the primary reasons that anxiety is so often an exacerbator of other health concerns is its impact on the body's immune system. Given that the immune system's primary function is to fight off invading disease, that chronic anxiety can prove catastrophic to this function increases susceptibility to a whole host of bacterial and viral invaders. There is such a close link between anxiety and the immune system because, again, there is overlap in the chemical and cellular responses employed by each. One of the most common mechanisms of immune response is the secretion of cytokines that serve as biochemical indicators of where to initiate an attack on an unwelcome pathogen. People in a state of chronic anxiety also release large quantities of cytokines that trick the body into responding with unnecessary inflammation as if a legitimate immune response was warranted (Mariotti 2015). Over time, as constant cytokine release prevents the body's immune system from ever taking a break, the channels through which the immune response is mediated degrade to such an extent that, when the body does in fact face a legitimate pathogenic threat, it is no longer able to mount a sufficient attack. In this way, the effects of anxiety share many similarities between devastating autoimmune disorders that are afforded much more legitimacy in terms of aggressive treatment by the medical community. It is time to start including anxiety in these treatment plans.

The implications of the above physical impacts of anxiety on the body with regard to health outcomes are drastic. Studies have shown that, not only does chronic anxiety have a strong relationship with bodily pain likely due to the energy conservation required by cytokine release that could inhibit regular physical activity, but it also impedes a patient's ability to participate as they normally would in almost every other facet of their daily life. "After

controlling for demographic information and medical conditions, anxiety symptoms remained significantly associated with physical functioning, role limitations due to physical health problems, role limitations due to emotional health problems, social functioning, pain, vitality, emotional well-being, and general health perceptions, accounting for 10% to 35% of the variance in these domains” (Brenes 2007), further reinforcing that anxiety is directly correlated with loss of role fulfillment capabilities. When a patient can no longer live a life meaningful to them, one in which they can serve as a successful parent, boss, hobbyist, etc., it becomes incredibly difficult for them to feel motivated to overcome any ailment plaguing them at the time. Half the battle of overcoming illness is mental attitude, and anxiety completely drains that from patients; of course their health outcomes are poor compared to their non-anxious counterparts.

If the previous examples of anxiety’s correlation to poor health outcomes was not clear enough, there exists published anecdotal research detailing its catastrophic effects in the clinical setting of certain medical subspecialties. Firstly, and likely at least a little expectedly, specialists in the field of neurology often encounter patients whose conditions are significantly exacerbated by anxiety and healthcare worry in general. One condition that is particularly susceptible to anxiety’s debilitating effects is multiple sclerosis, or MS. This is a degenerative neurological condition in which the body eats away at the lining of its own nervous system structures, leading to the progressive development of a wide range of neurological symptoms that can quickly become crippling for a patient. In dealing with health conditions as complex and long term as MS, even the slightest disruption to healthy mental status can create a biological cascade that worsens symptoms considerably. A comprehensive study conducted by Jones and Amtmann not only discovered that multiple sclerosis patients experiencing chronic anxiety fared worse than those who were either less anxious or not anxious at all, they were also able to establish a general

reason behind such a finding. In essence, the very same symptoms that plague those with anxiety disorders, i.e. sleep disturbances, decreased social function, and pain interference, had all previously been established as exacerbators of MS progression symptoms. This has great implications in the clinical setting, as “People with MS reporting perceived cognitive dysfunction as well as other symptoms may also be experiencing additional distress from healthcare worry and clinicians may need to refer patients for treatment or to additional resources if needed” (Jones & Amtmann 2014). In effect, Jones and Amtmann are reinforcing the very foundational principle of this thesis: addressing anxiety, among other stressors, in the clinical setting should be considered a top priority of physicians. In so doing, whatever standard of treatment is currently employed will only work so much more effectively, since untreated anxiety can counteract that treatment just as much as a negative drug interaction might.

The devastating impacts of anxiety can further be felt in the more complex field of general surgery. While most people would agree that having to undergo surgery of any kind is a stress inducer for anyone, few consider how abnormal levels of anxiety before and after surgery can negatively influence the degree to which a patient is able to recover from their invasive procedure. During surgical operations, an extraordinary amount of consideration must be paid to body chemistry and, as previously discussed in some depth, one’s body chemistry undergoes drastic changes experiencing anxiety. Not only do cytokines mediate immune response, but cortisol as well - and significantly so. In fact, cortisol is one of the most quintessential stress hormones released while anxious. An prolonged influx of cortisol, just as was the case with cytokines, also makes it more difficult for the body to adequately respond to bacterial invaders. In the case of surgery, this can have dramatically negative effects since postoperative infection is often the greatest risk factor of any invasive procedure. Research data suggests that postoperative

infection rates are higher in patients who self-report as more anxious (Kassauhn et al., 2022).

While there should be no expectation on the part of a surgeon to mitigate every single aspect of their patient's presurgical anxiety (at least some stress is only normal), unnerving data such as the increased likelihood of surgical site infection should absolutely serve as good reason to adopt new patient care methodologies that emphasize "more personal attention and additional information regarding the procedure, personal experience and previous outcomes from the surgeon performing the procedure as well as stress management and psychological intervention services, if available, should be integrated early rather than late in the preoperative course" (Kassauhn et al., 2022). Yet again, this quote is a prime example of the foundational ideals of this thesis playing being suggested by external professionals who, through well-respected observational research, have witnessed firsthand the innumerable advantages that accompany careful consideration and subsequent addressing of such factors as anxiety experienced by their patients.

How to Reduce Anxiety as a Physician

Although the research-backed and scientifically substantiated reasons that support the notion of anxiety being so influential to mental and physical health alike are well documented, it can be more difficult as a healthcare provider to find valuable advice about how to go about implementing positive change within their practice. Fortunately, a handful of academics have formally collected patient insight into the matter and compiled it into an easily understandable instruction guide of sorts. The most common theme amongst all of these explanatory papers is that, in order to calm anxiety, it is first and foremost vital that patients feel heard by their clinician. If the medical setting is not one that seems to promote a mutual understanding that the

patient knows best, the patient will have no confidence that the full scope of their concerns will be met and, therefore, they will be anxious about the perceived level of care being shown by their doctor. The patient-knows-best approach does not need to be extended to legitimate treatment methods; naturally, well-educated and experienced professionals will be far more in tune with available medications and social resources than the average patient. The patient is, however, the only person who can attest to what they themselves have been experiencing, so in order to glean the maximum amount of useful information possible, physicians must learn to respect their patients as the vital sources of medical clues that they are.

To ease anxiety by establishing early on in the clinical setting that the patient's input will be highly valued can be accomplished in a multitude of ways. One is to review the patient's chart with them at the very start of their appointment. By doing so, the clinician can verify a broader patient history as well as clarify the patient's goals for the appointment at hand, solidifying in the mind of the patient that they will not leave more confused than they arrived (Badger 1994). It is also crucial to obtain the patient's complete perspective on everything ailing them. For example, in the spirit of easing anxiety, should a patient come to a physician with a complaint of "stress," it is important for the doctor to then ascertain more precisely what the patient means by that. Stress means something different to everyone, just as stress manifests differently for everyone, and it never hurts to ask clarifying questions that communicate to the patient that, not only does their physician care, but that they are attempting to get to the bottom of the situation (Badger 1994). Oftentimes, in asking these clarifying questions, some of the additional factors this thesis argues are essential to also consider in the context of medical care are brought to light. Again, a patient complaining of stress who is then asked something to the effect of "During what times do you feel the most stressed?" may end up revealing to the doctor that their anxiety levels spike

around the holidays because they do not have the financial means to guarantee food on the table every night, let alone buy gifts. In that case, the physician gains a wealth of information that can better inform further action on their part, particularly when it comes to the possibility of referring them to social services, which often has the resources to alleviate some burden outside of a purely medical environment.

While the above strategy to ease patient nerves may further perpetuate the common stereotype of the doctor as a detective, it is at the same time important for a physician - and very meaningful to patients - to admit when they have reached the extent of their expertise. Rather than attempt to feign mastery over a complex health condition (there is no possible way for a single doctor to know everything about everything) by further agitating the patient with inaccessible terminology and theoretical diagnoses, it is much more valuable to consult a specialist when the need arises. In fact, research shows that, while the vast majority of patients have high levels of trust in their primary care physicians and feel best when they seek their advice first, they also consider one of the fundamental roles of primary care to be disseminating referrals when the need arises. Furthermore, surveys support the idea that, in general, patients “want to be able to obtain specialty care when they believe they need it” (Grumbach et al., 1999). Given the availability of such research-backed data, it can be ascertained that one of the biggest favors a physician can do for a nervous patient is to direct them to the highest level of mastery when it comes to the symptoms they are experiencing. It is no surprise that patients are calmed by action rather than complacency, since action is far more likely to result in relief than the alternative.

On a similar note, even if the condition is not one that warrants referral to a different specialist, it is still crucial as a provider to routinely inform the patient as much as possible,

accompanying that information with reassurance (Badger 1994). The patient, although they most likely will not be a trained healthcare professional themselves, is the person who will be responsible for living with and managing the condition(s) with which they are diagnosed. They enter a healthcare clinic knowing that, for all the rest of the hours of the day they are not at the doctor's office, it will be up to them to care for themselves. Without any prior knowledge or experience, the thought alone can be overwhelming and anxiety-inducing. That is exactly why being an informative healthcare professional can be so therapeutic to distressed patients. As the old saying goes, "knowledge is power," and in no setting is this more true than in medicine. The more education a patient receives, the more they are empowered to take control of their health.

Additionally, informing patients allows them to feel more comfortable communicating their condition in their professional environment, to their family and friends, and even to caregivers, all of whom constitute healthy support systems that are much better equipped to act as such if they are armed with information about the patient's affliction. However, it is important to acknowledge that education in this context can be a double-edged sword. While the overall headway it makes in reducing patient anxiety makes it a valiant pursuit in all cases, information overload is a very real and valid feeling for many navigating the healthcare system. At the same time someone is learning how to live with a new diagnosis, they are also compiling new anxieties about how to incorporate those management strategies into their day-to-day routine. For this reason, a little reassurance goes a long way. It is never morally permissible to reassure through misinformation or omission, but humanity does thrive on hope; not false hope, but hope that comes from hearing from their doctor say they have seen others thrive in spite of the health circumstances they face, hope that comes from reassurance that they will have the full support of their healthcare team, and hope that comes from knowing what treatment options are available to

pursue full speed ahead. Physicians may be charged with treating illness, but I would argue they are also charged with being beacons of hope for those they serve.

Socioeconomic Contributors

“In my pre-visit chart review I noticed this 21 year-old was a new patient who was concerned about his blood pressure. That’s an unusual issue for a young person, but in fact he did have slightly elevated numbers. As a practicing family medicine doctor for over 20 years, my experience told me there must be a secondary cause for his hypertension. The obvious answer on questioning him centered around substance abuse. He was a current smoker and about four months clean from an addiction to everything else (meth, narcotics, cocaine, etc).

“It would have been easy to stop there, but clearly the story was deeper. Imagine being born to two addicts, abused and neglected as a young child and passed around until placement into foster care. Then he meets his mother for the first time at age 12 when she gets out of prison. Mom fails again so he gets moved to another school with his grandparents, then another school with dad, then child protective services (again), then other relatives.

“He grew up with no lessons of hard work and discipline from his father or lessons from a mother of love and security. A childhood of constantly changing schools and eventually dropping out without a diploma. The example he saw taught him to spend any available dollar on getting high, not rent, food, education or savings. True poverty, not only of finances, but poverty of emotional development, education, friendship and physical health.

“Our encounter didn’t end with a prescription for blood pressure medication. He admitted to needing help with depression, anxiety and PTSD. His treatment started with trying to find hope in life, trying to see a future that was positive. We talked at length about setting goals

and working intentionally each day towards a defined purpose in life. I helped him lay out a plan starting with getting his GED and a job. I'll continue to see him every few months and act as a counselor, cheerleader, and sometimes just a friend.” - Dr. Keith Landry, Family Medicine of Cloverdale, IN

Throughout history, those higher up in the social ranks have been afforded considerably more privilege than their less wealthy or influential counterparts in nearly every measurable way. The field of medicine is no exception. More money equates to easier access to resources that improve health outcomes and, in general, makes it less demanding to follow through with the care instructions provided by medical professionals. On the other hand, as Dr. Landry endorses through his anecdote, socioeconomic disadvantages can also subject patients to conditions from which they may have never otherwise been prone to suffer. While “socioeconomic contributors” is a broad term encompassing a host of different components that influence the lives of patients, for the purposes of this thesis, housing insecurity, lack of insurance, transportation problems, and educational limitations will be the primary topics of discussion. Broad review of literature - which was only further reinforced through correspondence with Dr. Landry - suggests that these are among the most common socioeconomic factors with the potential to inhibit positive health outcomes.

Although any and all four of these categories have the capacity to restrict the extent to which patients can truly utilize the medical system to its full potential, it is important to understand that not all of these categories impact every individual to the same degree (Cutler et al., 2008). Rather, depending upon patients’ location of residence and their proximity to a provider, the finances and other resources possessed by their support systems, and other uncontrollable facets of their backgrounds, these concerns will be reflected by the success (or

lack thereof) of their medical treatment - however limited that may be - in different ways. Regardless of these distinctions, however, all warrant the attention of their physicians.

Housing Insecurity

Since the early 2000s, the United States has and continues to face intermittent economic crises and recessions that take a devastating toll on Americans regardless of their background, sex, or age (Tsai 2015). The grave socioeconomic challenges that have arisen as a direct result of these fluctuations in national economic stability make it so that, on a daily basis, upwards of 610,000 Americans are experiencing full-blown homelessness, with more than one third of these people comprising entire family units (Maness & Khan 2014). Given these alarming statistics, it is nearly impossible that, as a healthcare provider, there will not be patients entering the clinic on a regular basis who are suffering from some form of housing instability - all of which have undeniable negative implications on health outcomes. However, prior to discussing in more depth the specifics behind housing instability and how it disrupts medical care, extensive research into the subject has made it clear that it is important to make a distinction between homelessness and housing instability. Although both contribute to massive levels of harmful stress on a patient, and both will be discussed within this section of the thesis, they do warrant defining separately. In general, housing instability refers to a more broad range of issues under the categorization of housing insecurity, from the vast majority of monthly income being forced to go toward housing, to difficulties keeping up with rent, to being financially limited to staying in unsafe and overcrowded living conditions. Homelessness, on the other hand, means that, quite literally, consistent living arrangements are not possible. These people are regularly forced to stay in shelters or even on the streets, as housing is not a feasible option.

With these definitions in mind, it becomes easier to understand how having such significant stressors underpinning one's life can wreak havoc on the ability not just to financially support oneself through medical hardship, but also to prioritize health in general. Previously conducted research studies overwhelmingly support this notion of housing insecurity negatively influencing health outcomes. In one specific literature review aggregated by Alexander Tsai, a carefully curated collection of thirty-five unique studies about this particular topic were assessed as a group in order to find overarching commonalities that establish patterns related to housing instability, homelessness, and the health of those suffering from them. The majority of these studies evaluated the influence of housing insecurity on mental health. But, as it has already been discussed at length in previous sections, psychological distress is intrinsically linked to physical health. 91 percent of the thirty-five analyzed studies linked home foreclosure, a clear legal indicator of housing instability, to adverse mental and/or physical health outcomes (Tsai 2015). In 100 percent of those cases, as it specifically relates to mental health or health behaviors like substance abuse, foreclosure was accompanied by poorer outcomes. Furthermore, in those studies that emphasized individual responses to questions of wellbeing in spite of housing insecurity, "the personal experience of home foreclosure was associated with worsened outcomes including depression, anxiety, alcohol use, psychological distress, and suicide" (Tsai 2015).

Speaking more directly about physical health outcomes, Tsai's analysis also found that foreclosure led to poorer outcomes in 83 percent of cases overall, with 80 percent of data on the individual level, i.e. self-reported, pointing to the same conclusion (Tsai 2015). Although Tsai's comprehensive literature review may be more indicative of overarching trends rather than specific impediments toward meaningful, long-lasting healthcare access, his study provides

important insight into just how grave these concerns are for the many thousands of patients who experience them every day.

Perhaps one of the most dangerous aspects of housing insecurity as it relates to patient health is the way in which it acts as such a seemingly impenetrable barrier to access to primary and preventative care. Although this is of course also the case for more specialized medical treatment as well, primary/preventative care is arguably the most effective means of reinforcing long-term health, and without it as a strong foundation, patients are considerably more likely to struggle chronically. For those with demonstrated housing insecurity, research by Martin et al. shows that they report considerably higher rates of chronic illnesses like diabetes and heart disease - upwards of 12 percent more than their housing secure counterparts (Martin et al., 2019). As unfortunate as it is, this statistic makes sense, as chronic conditions are more often than not managed long term by primary care physicians.

People facing housing insecurity are shown to be 10 percent less likely to have a usual source of care like a primary care provider (PCP), the chief reason for which is deferral of treatment due to overwhelming cost in the face of attempts to establish stable housing (Martin et al., 2019). This means that, even if someone with housing insecurity manages to be seen by a PCP during their lifetime, they are considerably more likely to opt out of follow-up appointments out of fear they cannot afford it. As a direct result, research strongly suggests that those with housing instability experience more than double the amount of poor health days per month compared to those who do have stable housing (Martin et al., 2019). This is particularly true as it relates to poor mental health, with days of emotional distress being reported even more frequently than poor physical health within the housing insecure demographic (Martin et al., 2019). With such staggering differences in primary care access and directly related health status

between people with housing insecurity and people who do have stable housing, it appears impossible to deny the strong impact lack of secure housing can have on one's ability to achieve the kind of routine health maintenance that protects them from debilitating health concerns.

In the case of something as clearly detrimental to health as housing insecurity, it begs the question: what has brought about the increasing housing instability crisis in America to begin with? Although there is no concise yet adequate response to such a question, the answer appears to have something to do with the recent string of recessions plaguing the economy (Burgard et al., 2012), though this of course is not the sole explanation for an issue as complex as this one. What is slightly more clear, however, is the ability of additional studies to reinforce the conclusions drawn by Martin, et al. Research collected and analyzed by Burgard et al. also calls to attention that “respondents [to experimental survey] who experienced homelessness and those who were behind on their mortgage or in foreclosure had a higher likelihood of reporting fair/poor self-rated health” and “...were more likely to meet the criteria for major or minor depression (Burgard et al., 2012), further stressing how closely associated physical health is to emotional health and vice-versa. Relatedly, the same study found the housing insecure to be much more prone to self-reporting anxiety attacks, another indicator of the toll that housing instability takes on a person's mental health.

There is also data to suggest that homelessness inspires alcohol abuse (Burgard et al.,). Addiction has been found across the board to be one of the most common accompanying diagnoses of mental illness which, based on the data already provided, is clearly typical for the housing insecure. And the percentages of occurrence are astounding. According to one publication, homelessness and mental illness go hand-in-hand as often as 30 percent of the time, with best approximations of the frequencies of “either substance abuse or dual disorders”

reaching upwards of 50 percent (Maness and Khan 2014). But substance abuse and mental illness are not the only two health conditions identified by Maness and Khan that are exacerbated by housing insecurity. The two authors - both physicians who have years of experience practicing in clinical settings in which they have seen the accuracy of their findings play out in real time - have laid out a laundry list of health struggles either brought about by or worsened by housing insecurity. These include but are not limited to: cardiovascular disease, cognitive disorders and traumatic brain injuries, preventive health issues, infectious diseases, sexually transmitted infections, skin and foot problems, and exposure-related conditions, (Maness and Khan 2014). While the specific components of housing instability that are most likely to contribute to any one of the conditions in the aforementioned list differ from ailment to ailment, housing insecurity is still the common denominator. It is quite frightening just how widely penetrating its effects are.

An abundance of literature suggests that the impact of housing insecurity on health outcomes is not just negative for adults, but also for children. Devastatingly, pediatric offices are in no way immune to the effects of housing insecurity on the patients who walk through their doors. In fact, in a massive study conducted by Sandel et al., 34 percent of the staggering 22,324 families of pediatric patients faced some sort of “adverse housing circumstance,” whether that was being behind on rent, making multiple moves, having a history of being homeless, or more than one of these - all of which can be considered strong indicators of housing insecurity and have been proven via other scientifically-backed literature to have a negative effect on health and maternal outcomes (Sandel et al., 2018).

Although Sandel et al.’s work indicates that statistics for poor health and housing instability are most revealing when housing insecurity is defined as being behind on rent, the

other definitions of housing instability show similar, although perhaps not quite as strong, trends. More specifically, housing insecurity in these capacities have been associated with worse caregiver health and, in the context of pediatrics, nearly all children rely on their caregivers for everything - obtaining medical care included. Mothers are by far the most common caregivers for children, and lack of access to stable housing has also been shown to increase the likelihood of maternal depressive symptoms in those mothers who are such crucial advocates for their child's health (Sandel et al., 2018). This translates directly to the overall health of the child, with certain studies corroborating the notion that housing insecurity is directly associated with lower child well-being when compared to those living in stable home environments. These less housing-fortunate children have also been shown to, over the course of their adolescence, be admitted to the hospital more frequently, likely because their inability to regularly attend routine pediatrician appointments means healthcare is reserved for emergencies only (Sandel et al., 2018).

But the impact that housing insecurity has on development does not stop there. In fact, its influence is so profound that it has lasting effects on biological and psychological development in addition to poorer health over the lifecourse. Even the American Academy of Pediatrics recognizes how dire an impact housing insecurity poses to children and, as of 2018, recommends that pediatric providers screen their patients for housing insecurity early on in life as part of standard care procedures (First 2018). Timing, it seems, is a crucial component of the strong impacts housing insecurity has on young children. According to an article published by Sturtevant et al., if a child experiences homelessness for more than six months, their risk of facing more and worse negative health outcomes is considerably higher than if they only experienced housing insecurity for less than six months. It can also be just as negatively

influential to health, although with slightly different manifestations, if there is prenatal (prior to birth) housing insecurity vs. postnatal (after birth) housing insecurity (Sturtevant et al., 2015). Children who were subjected to prenatal homelessness, despite that homelessness resolving post-birth, have research-backed higher rates of hospitalization and overall worse health, as mentioned prior in more generalized terms, than those children who are not subjected to the same conditions before they are born (Sturtevant et al., 2015). Even postnatal homelessness in the absence of prenatal homelessness correlates with poorer health, as well as higher risk of developmental delays, than children who have remained housing secure throughout their entire lives, according to Sturtevant et al.

When children were subjected to homelessness for a period of time greater than six months, not only did they face the same disadvantages as those children in the prenatal and postnatal housing insecurity category, but they were also found to be more likely to struggle with obesity throughout their childhood (Sturtevant et al., 2015). Essentially, data analysis reveals a strong pattern proportional relationship between the length of time spent homeless, the younger the age(s) spent homeless, and the “cumulative toll of negative health outcomes” (Sturtevant et al., 2015). In other words, even if someone is too young to ever recall the period of time during which they were subjected to conditions of housing insecurity, the health impacts can be devastating and lifelong. The team involved in this research posit that it is “the compounding stress of homelessness both before and after birth” that is the underlying cause of these negative health outcomes (Sturtevant et al., 2015), which heavily reinforces the previous section’s discussion about the inextricable psychological-biological connection. Whether in childhood or adulthood, the mental and emotional distress brought about by housing insecurity seems to

manifest itself in a multitude of ways, further demanding that practicing physicians give it the attention it deserves for their patients' sakes.

Lack of Insurance

While the previous subsection went into great depth about the impact of homelessness and housing insecurity as a whole on pediatric and adult mental and physical well being, it was less detailed about the consequences these decreased health outcomes pose for civilization as a whole. Increased healthcare burden generated by those who are already socioeconomically disadvantaged “involves large financial costs, most of which are paid by public health insurance. In 2012 the average cost of non-birth-related pediatric hospital stays was \$14,266 for infants and \$8,901 for toddlers, with 52% of all such stays covered by Medicaid” (Sturtevant 2015).

Medicaid is a form of governmental insurance that provides health coverage to millions of low-income Americans on any given day, and its acknowledgement in the prior quote calls to attention the integral role that insurance - or lack thereof - plays in America's healthcare system. Being uninsured and having poor health outcomes is a relationship not always applicable outside of the United States due to the American medical system being largely private rather than universally accessible as it is in a growing number of countries. For that reason, because the government does not provide automatic coverage for any and all medical expenses, the difference in out-of-pocket cost of healthcare for someone covered by an insurance policy vs. someone who is not covered by an insurance policy is staggering. More specifically, in 2014, the uninsured spent an average of 752 dollars out-of-pocket, while those who had private insurance coverage spent an average of 658 dollars out-of-pocket and those with public insurance coverage spent an average of 236 dollars out-of-pocket (Garfield et al., 2020). It is easy to see the importance of health insurance in the attainment of manageable healthcare costs when certain

policies will save an individual more than 500 dollars for the exact same procedure. When someone does not have insurance, therefore, navigating the American healthcare system becomes all the more a struggle, which begs the complex ethical question of the extent to which a government has an obligation to its citizens to cover healthcare costs in a way that makes them less financially devastating in the absence of insurance coverage.

Research reveals many similarities between the healthcare disadvantages spurred by lack of insurance coverage and the healthcare disadvantages identified in the previous subsection to be spurred by housing insecurity. Namely, as Kasper and Hoffman have discovered, loss of health insurance - either private or public - leads to a marked decrease in healthcare access in quite broad terms. As was the case with housing insecurity, the uninsured are far more likely to face challenges as they attempt to acquire medical management and, therefore, experience higher rates of dissatisfaction with their navigation through the healthcare system. Also like with housing insecurity, this extends to greater chances of lacking a usual source of care or, in other words, lacking an established PCP. In fact, Kasper and Hoffman's research shows that many uninsured people report having had zero physician visits within the past year. However, what is truly shocking is the comparison between such statistics pre- and post-insurance loss. The same people who experienced all of the aforementioned healthcare disparities after having lost insurance were previously experiencing equal access to care as the rest of the insured population while being covered by a plan (Kasper & Hoffman 2000). Essentially, this reveals that, for the sample examined by Kasper, the disadvantaging factor boiled down to lack of insurance, plain and simple. The studied demographic faced healthcare access equal to the average of the general populace prior to losing their coverage, only after which point did their medical experience decline dramatically.

A simple compare and contrast approach to this subject from the opposite vantage point also reveals striking evidence in favor of a lack of insurance being detrimental to patient health. Kasper and Hoffman discovered that, to a statistically significant magnitude, upon gaining public insurance coverage after having previously been uninsured, a person's access to consistent, routine healthcare becomes far greater than it is for those considered chronically uninsured, or never having gained coverage. One can only assume that, for those who do not have insurance, the current structure of the American medical system discourages them from even attempting to visit a physician because they already know it will be unaffordable or denied outright (Kasper & Hoffman 2000). By that logic, it is difficult to dispute the extreme health disadvantages inextricably linked to lack of insurance, at least for patients within the United States.

Kasper and Hoffman's study may emphasize more specifically a lack of insurance's ability to critically impede a patient's access to a provider, but research also shows how being uninsured has close connections to health vulnerabilities like minority status, income level, and overall state of health. Unsurprisingly, it is generally the case that populations already considered to be more vulnerable have lower likelihoods of being covered by a health insurance policy. That being said, "Between race and income, income was a more significant predictor of lack of insurance coverage since low-income people regardless of race and health were significantly more likely to be uninsured or partially insured," (Shi 2001) which seems to suggest that, as a healthcare provider, lack of health insurance is not something that will spare patients of any one race in totality and should therefore be taken into consideration as a possible exacerbating factor for all people under a physician's care. There are, however, important points to be made regarding race and lack of insurance. Contrary to what might initially be thought based on the long history of medical discrimination in the United States, Shi found that whites classified as

low income have, on average, higher rates of uninsurance than minorities classified as low income. This statistic is largely overshadowed by the fact that minorities are far more prone to having poorer health or being low income in general, though, which only further reinforces the adverse connection between various vulnerabilities and lack of insurance coverage and how minorities are impacted to greater magnitudes (Shi 2001).

Certain vulnerabilities to which some patients are predisposed more than others have also been found to indicate higher likelihoods of certain types of insurance coverage if insurance coverage is present. From a provider's standpoint, it might be useful to understand that extenuating circumstances may be the driving force behind adopting certain policies even when insurance is possessed. The population with the highest vulnerability (low income, minority, and poor health) are most likely to be covered by public insurance like Medicaid, whereas the population with the lowest vulnerability (high income, white, and fair health) are least likely to be covered by public insurance and most likely to be covered by private insurance (Shi 2001). This begs the question of whether or not there may be implicit disparities embedded within public insurance policy details, but that is too complex an issue to adequately examine in the context of this thesis.

Although there are plenty of health-related outcomes that can cause lifelong suffering and poor quality of life, mortality is by and large considered the strongest indicator of an external factor's devastating effects. There is data to suggest that, not only does lack of insurance limit patients in the ways already described, but it is also linked to higher mortality rates, thereby validating the severity of a lack of insurance in the eyes of many. A comprehensive analysis conducted by Bittoni et al. "showed that insurance status was strongly related to the risk of mortality from cancer, all causes, CVD and diabetes, both in unadjusted and adjusted models,"

with adjustments to account for vulnerabilities like those described in Shi's work as well as risk factors caused by lifestyle choices only increasing the probability of mortality for all of the aforementioned diseases by a *minimum* of 35 percent (Bittoni et al., 2015). And for no condition is lack of insurance potentially more deadly than for diabetes. In fact, mortality rates were shown by Bittoni et al. to increase by 245 percent for people with diabetes who either totally lack insurance coverage and even who have public insurance only. Although being uninsured is not solely to blame for these concerning discoveries, it certainly plays a role that must be acknowledged in the healthcare world.

Again, just as was the case with housing insecurity, the devastating impacts of housing insecurity on health outcomes is not simply restricted to adults. As alarming as it is, pediatric patients are also equally susceptible to such effects, even effects as tragic as higher mortality rates. It has been shown that those children without insurance are more likely to die while hospitalized than those who do have insurance coverage (Bernstein et al., 2010). But published research reveals many more striking similarities between the impacts of lack of insurance on children and its impacts on adults than increased mortality. As is the case for their older counterparts, children whose families are not covered by an insurance policy are far more likely to lack of usual source of care / not have a regularly visited primary care provider, report unmet healthcare needs, and be discouraged from utilizing medical services due to financial limitations imposed by no insurance coverage (Lave et al., 1998). Moreover, Lave et al. points out that uninsured children are particularly susceptible to delays in care while in the midst of perhaps the most crucial stage of development, which can create a ripple effect of poorer health outcomes for the rest of their lives, as well as be limited in their usual activities as a direct result. When there is not an equal chance to participate in extracurricular opportunities as a result of untreated

health conditions, the uninsured children who are impacted “lose opportunities for normal development. Their educational achievement suffers because they miss more days of school” and they are even less likely to have been able to receive mandated vaccinations, which only further limits the scope of their developmental involvement (Bernstein et al., 2010).

However, disparities in these areas improved dramatically for children as well once coverage was gained. Following enrollment in an insurance program, there was a significant increase in access to medical care such that, “at 12 months after enrollment, 99% of the children had a regular source of medical care, and 85% had a regular dentist, up from 89% and 60%, respectively, at baseline” (Lave et al., 1998). Furthermore, according to Lave et al., post-insurance coverage, there was a 40 percent decrease in reports of unmet need or delayed care, a 5 percent increase in children who managed to attend a doctor’s visit and, no doubt as a direct result, a 5 percent decrease in the amount of children who needed to go to the emergency room. On top of it all, “Parents reported that having health insurance reduced the amount of family stress, enabled children to get the care they needed, and eased family burdens” (Lave et al., 1998). This is a substantial positive change from the baseline of lack of insurance, which is very often accompanied by reports from parents of unmet healthcare needs, whether that be in the realm of mental health, treatment of chronic conditions, or management of common childhood illnesses (Bernstein et al., 2010). The statistics are abundantly clear: the positive impact of insurance coverage on the health of both children and, of course, adults alike set it apart as a crucial indicator of medical outcomes. Any patient without it is bound to face immense hurdles as they seek - or are maybe even discouraged to seek - healthcare.

Transportation Problems

Housing insecurity and lack of insurance are far from the only two socioeconomic contributors to poorer health outcomes. As a matter of fact, one of the most frequently cited barriers to healthcare is transportation problems, and it is not hard to rationalize why. When the term “barrier” is mentioned, it is often associated with tangible, physical separation. Given the widely acknowledged fact that millions of people in the United States (and worldwide) live much too far away from a treatment facility to reasonably be expected to walk there, it is quite logical to equate issues with transportation access with poorer health care access and, by direct extension, poorer health outcomes. There is a plethora of well-researched data to substantiate this claim - an assumption about barriers to medical care that is perhaps so obvious, many physicians are prone to overlooking the destructive nature of its impact on patient response to treatment.

Samina Syed and her research team said it best in their highly influential literature review: “Transportation barriers lead to rescheduled or missed appointments, delayed care, and missed or delayed medication use. These consequences may lead to poorer management of chronic illness and thus poorer health outcomes” (Syed et al., 2013). However, this socioeconomic healthcare concern has been found to be far more nuanced than anything that could be captured in a meager two sentences. For starters, Syed et al. was deliberate in pointing out that transportation problems are clearly a category of issue with roots in economic status; those who have lower incomes or, poignantly given the previous subsection of this thesis, those who have poor insurance / are completely uninsured have healthcare experiences more greatly impacted in a negative way by transportation barriers. As such, there is no disputing the validity of categorizing it under this particular thesis section. The destructive factor of low transportation access ultimately boils down to disruption of continuity of care, with it being nearly impossible

to make follow-up appointments, arrive to appointments on time, or get to a treatment facility if ill when there is not an operational vehicle readily on hand for use. However, there are multiple facets of continuity of care disruption spurred by transportation problems that may not readily come to mind, but that impact patients everywhere.

And this truly is an issue for a huge number of patients. Two separate studies note that 25 percent of sampled patients missed a scheduled appointment with a healthcare provider because of what they cited as transportation problems like being unable to secure a ride, while another study noted that same percentage of missed/rescheduled appointments being the result of no transportation access (Syed et al., 2013). Furthermore, those restricted to traveling via public transportation faced double the likelihood of missing an appointment when compared to those who owned a car, which is reflected also by the statistic that 82 percent of made appointments were attended by people who can easily access a car, whereas only 58 percent of missed appointments were unattended by a patient with easy car access (Syed et al., 2013). In another study, “results indicate that about 3.6 million Americans do not obtain medical care because of a lack of transportation in a given year,” with these 3.6 million people being, on average, more likely to occupy a lower income bracket, have less education, be older / female / a minority, or experience higher rates of more illnesses than those who are able to obtain medical care (Wallace et al., 2005). Just because 3.6 million people have been found to have been completely blocked from receiving health treatment as a result of transportation problems does not mean that such a number adequately describes the full scope of people struggling to access transportation, though. The demographic with a strong potential to miss out on medical care as a result of transportation barriers may be as large as 15.5 million annually, “even though nearly 12 million of these either

did not need care in the study year or managed to obtain transportation when it was needed, despite difficulties in doing so” (Wallace et al., 2005).

These are not the sole transportation problem-related statistics indicative of an inability to attend scheduled medical visits that are crucial to improving healthcare outcomes due to routine maintenance of concerns. “In one study of 200 children with a history of missed appointments, 51 % of parents identified transportation barriers as the primary reason for missing clinic appointments,” while, in another study, 50 percent of no shows attributed their inability to make their appointment to transportation problems but only 30 percent of people who could attend their appointment identified transportation access as a concern (Syed et al., 2013). Not only are patient outcomes worsened by this barrier as it relates to visiting medical offices, but they are also worsened by this barrier as it relates to accessing the pharmacy and, by extension, their vital medications. Syed et al. also reports that, after being discharged from the hospital, patients who self-identify as having trouble accessing transportation have a 20 percent prescription fill rate versus the 55 percent prescription fill rate for patients who do not have low transportation access. 65 percent of patients presumed that improved access to transportation would increase their medication use post-discharge (Syed et al., 2013).

As was the case in the subcategory emphasizing the negative health effects caused by lack of insurance, diabetes is a specifically mentioned condition also exacerbated by transportation problems. In one of the many studies assessed by Syed et al., “67 % of DKA admissions were related to stopping insulin and 50 % of those patients cited either lack of money for insulin or for transportation to get their medicine,” again establishing a clear pattern between low transportation access and inability to upkeep prescriptions. A considerable 45 percent of polled patients suffering from epilepsy, a seizure disorder that frequently bars those with the

diagnosis from driving, were confident that should such a transportation limitation not exist for them, they would have much higher rates of medication compliance (Syed et al., 2013).

Chronic illnesses are typically considered distinct from disabilities, but the two are often discussed in tandem with one another. This connection continues through the fact that people who suffer from some form of disability are just as likely to have poorer health outcomes as a result of transportation barriers as those with chronic illnesses. Drainoni et al. studied the relationship between problems with transportation and poorer health outcomes within the disabled community and found that, just as was the case with chronic illness sufferers, disabled individuals are particularly susceptible to transportation problems. This is likely the result of disabilities, by their very nature, being indicative of a physical disadvantage from the start. For those disabled patients who live in regions long distances away from their treatment centers, or even for those living in areas with few to no providers equipped to treat their specific concerns, the travel distance required to receive care is much farther than it is for people in different circumstances. This, on top of plenty of disabilities making it too challenging to drive alone even if a car happens to be readily accessible, increases a disabled person's reliance on transportation accommodations like The Ride or the Medicaid transit system, at least where they are available (Drainoni et al., 2006).

In the Drainoni study, the majority of those who provided commentary and were considered victims of a disability as well as dependent upon public transportation methods such as the two mentioned previously noted having issues with such means of transport. "Patients were frequently picked up or dropped off 'a couple of hours early or late,' which transformed medical visits into 'a whole-day affair,'" if not being the cause of them missing their medical appointment altogether (Drainoni et al., 2006). Drainoni and the rest of her team even present

poignant commentary that further reinforces the incredible disruption imposed by transportation problems for the disabled community, noting how “One Deaf participant recalled, ‘One time, I took The Ride... to sign language training. By the time they got me there, I was one-and a-half hours late. No one was there. So, I got some money and took the bus home’” (Drainoni et al., 2006). Regardless of the speciality, as a healthcare provider, treating patients with disabilities is an integral part of the job. It is no doubt disheartening at the very least to hear just how miserable so many disabled patients’ experiences are as they attempt to navigate faulty transportation systems, many of which they may not even be eligible for because, as Drainoni et al. explains, certain insurance policies unfairly fail to consider blindness or deafness to be “medical” conditions in the first place.

However, the patient subgroup encompassing those with pre-existing conditions like diabetes or epilepsy or a lifelong disability is not the only one shown to have poorer health outcomes as a result of transportation issues. As it has been shown throughout this paper, children are rarely - if ever - immune to health outcome disparities simply because of their young age. Although anyone younger than sixteen can generally be expected to not be the ones driving, they are still impacted by their guardians’ access or lack of access to transportation. Two distinct studies say that between 18 and 21 percent of inner-city children are unable to be brought to their doctor’s appointments due to transportation barriers, while 80 percent of migrant farm workers attribute their children’s unmet medical needs to lack of transportation (Syed et al., 2013).

Although there may be less data about the impact on children generated by this particular socioeconomic contributor to poorer health outcomes because of their removal from the active role of transportation, there is a plethora of information regarding the ways in which the elderly are impacted by transportation troubles. At baseline, older people are more prone to requiring a

greater number of medical visits due to already worse health than younger people, so transportation affects them deeply. In short, three to 21 percent of elderly patients who disclose that they are impacted by any barrier to healthcare attribute that barrier to transportation problems, which is an especially alarming statistic when it is contextualized as impacting as many as one out of every five disadvantaged elderly patients (Syed et al. 2013). Old or young, these facts and figures are enough to reiterate the fact that all ages are susceptible to the harmful ramifications of transportation barriers.

It has now been acknowledged that all patient subgroups as determined by age and by illness or disability status are prone to poorer health outcomes as a result of transportation barriers. Harkening back to Shi's work, which was discussed at length in the Lack of Insurance subcategory, certain implicit vulnerabilities like minority status can predispose individuals to have even poorer health outcomes due to some form of socioeconomic contributor. Transportation problems are no exception. Flores et al. expands upon this idea of minority status as a health outcome vulnerability, specifically as it relates to the Hispanic population. Within this minority population - the largest in the United States - "When parents were asked if a particular barrier had ever caused them not to bring their children in, transportation was cited by 21%," making it participants' most often reported reason for being unable to get their child to their doctor's appointments (Flores et al., 1998). Six percent of respondents to Flores et al. considered transportation arrangements to be the absolute greatest barrier to care in their experience, with not having a car being the specific difficulty most often mentioned, but also far distances from healthcare facilities and unaffordable/inconvenient public transportation options coming up frequently as big issues.

Minority status, it seems, persists as an exacerbator of poor healthcare outcomes regardless of the underlying external factor being experienced by members of that community, as Wolfe et al. reinforces the very same sentiments about transportation barriers communicated by Flores and his team. In the Wolfe study, minority populations across the board were found to have higher rates of transportation problems, but data revealed that Hispanics feel the impacts of this barrier most profoundly. More specifically, “Hispanic people had 1.5 times the odds of having a transportation barrier to care compared with non-Hispanic Whites after we controlled for other sociodemographic and health characteristics ($P = .02$)” (Wolfe et al., 2020). All of that being said, Wolfe et al. found that there was much variation in the rates of transport-delayed care if they were examined across race and ethnicity groups, but non-Hispanic Blacks were noted to experience the highest rates of all. Transportation problems certainly do not exclude any one race completely, but from the vantage point of a healthcare provider, it may be wise to pay particular attention to Hispanic patients in hopes of ascertaining whether or not transportation could be a destructive influence on their ability to experience positive health outcomes.

Vulnerabilities completely independent of minority status also have the potential to worsen health outcomes for millions of patients in all healthcare contexts and even beyond simply the scope of the United States, with research showing that “many people in low and middle income countries lack access to basic health-care services leading to high morbidity and mortality rates” (Agatz et al., 2021). Agatz et al. go on to acknowledge that one of the primary driving factors behind those increased morbidity and mortality rates is that a myriad of transportation concerns that prevent doctor’s office visits ultimately result in longer amounts of time to identify, diagnose, and treat disease. When serious illnesses are given the opportunity to progress prior to beginning treatment, patients tend not to fare as well. Some public health

experts have suggested the implementation of more at-home healthcare initiatives in hopes of overcoming this boundary, but that requires funding and additional manpower that many communities do not possess (Agatz et al, 2021). However, it is also true that certain areas experience higher rates of transportation concerns not just because of the demographic of those who live there, but also because of more physical disadvantages like already poor roads which can be washed away entirely after heavy rains (Agatz et al., 2021), or perhaps not having any maintained roads at all. The population most prone to such issues is far and above the rural one, so much so that, “Compared with people living in the Northeast, people in the Midwest and South regions of the United States,” two regions with large swaths of rural land, “had 1.9 and 1.6 times the odds, respectively, of delaying care because of [transportation] barriers (Wolfe et al., 2020). As a physician, it is important to check in with patients commuting from rural regions with regard to their transportation circumstances.

Research conducted by Arcury et al. that focused on twelve predominantly rural counties in western North Carolina revealed more specific information regarding impact of transportation barriers on poor health outcomes in rural areas. It can be assumed, however, that these statistics likely translate more broadly than simply in rural contexts since, “[adults facing transportation problems] are spread across urban and rural areas much like the general population,” though some studies may support the idea that children who lack consistent access to transportation might actually be more prominent in urban environments (Wallace et al., 2005). That being said, out of those participants in the Arcury et al. study, it was found that people with a driver’s license - a necessity for autonomous transportation - were almost twice as likely to attend routine healthcare appointments and 2.29 times more likely to make it to appointments for management of chronic illness than people without a license. Even for those who could not necessarily

manage autonomous transportation, having a support system able to assist with transportation still managed their chronic conditions at rates 1.58 times those without friends or family able to get them to their appointments (Arcury et al., 2005). Unfortunately, public transportation is hard to come across in rural areas. This presents yet another transportation disadvantage to those residents, since Arcury et al. found that the few rural locals who could utilize public transportation “had 4 more chronic care visits per year than those who did not,” which can make a massive difference in the successful maintenance of such conditions (Arcury et al., 2005).

The field of medicine is often considered to be one of consistent progress, but it seems as though transportation problems presenting as a barrier to better health outcomes is a phenomenon only worsening as time passes. This is indicative of just how urgent it is for physicians to address this socioeconomic contributor on a broader scale. Up considerably from the Wallace et al. study published in 2005, a full eighteen years ago now, new research from as recent as 2017 suggests that approximately 5.8 million Americans put off treatment at medical facilities as a result of transportation problems (Wolfe et al., 2020). Also in 2017, nearly two percent of adults in the United States delayed healthcare due to lack of access to transportation, with a more specific breakdown of 2.2 percent of women and 1.5 percent of men (Wolfe et al., 2020). Perhaps unsurprisingly, people with lower incomes reported transport-delayed care at a higher frequency than people with higher incomes - “7% of those living below the federal poverty threshold, according to the US Census Bureau in 2017” - with insurance yet again creeping into other socioeconomic barrier statistics due to 5.6 percent of people covered by Medicaid reporting the same (Wolfe et al., 2020). Wolfe et al. also remarks on unemployment and already poor health being closely associated with transportation barriers, noting that 4.5 percent of the unemployed and 11.6 percent of people with self-identified “poor” health

experience problems accessing transportation. It is important to remember, however, that despite all of these specific statistics about transportation issues and their impacts on specific patient subgroups, “studies that reported low rates of transportation barriers to health care access often did not include more vulnerable populations, such as lower income or uninsured patients” (Syed et al., 2013), meaning that any patient, regardless of background, should be considered susceptible to transportation problems and provided adequate support should that be something with which they routinely struggle.

Educational Limitations

Just as was the case with the socioeconomic contributors to poorer health outcomes discussed prior, educational limitations present a multitude of disadvantages to those patients who have experienced them. They also happen to be equally as interdisciplinary; transportation problems, for example, have been found to differ in prevalence based upon the level of education attained by patients, such that approximately three percent of those with a high school diploma or less report experiencing transportation barriers, while only 0.6 percent of those with a bachelor’s degree or higher report that barrier as well (Wolfe et al., 2020). It may not be immediately clear, however, why educational limitations pose such a significant threat to health outcomes. In reality, the intersectionality between the two subjects is wide spanning, and plenty of data suggests that higher education is closely associated with higher levels of health. Different experts offer different insights into the structural mechanisms that reinforce this close association, but it is typically agreed upon that both direct and indirect reinforcement is at play - indirectly, “through work, economic conditions, social-psychological resources and health lifestyle” - and directly, through several proposed factors (Furnée et al., 2008). These proposed factors include but are not limited to: similarities between the ways by which health is influenced genetics or

socioeconomic status and the ways by which health is influenced by education, that education might simply be a pathway to improved health management, and that longer periods of better health spurs increased educational investment (Furnée et al., 2008). Furnée et al. also references the 2003 Human Development Report, which outright professes the connection between investment in higher levels of education and improved health, as defined by life expectancy and infant mortality rate.

This 2003 Human Development Report also acknowledges differences between the ability to achieve certain health outcomes in spite of education level from country to country. While this thesis is primarily geared toward the American healthcare system, doctors practicing in the United States are likely to encounter at least one patient in their career from another country, therefore this information still proves beneficial. Simply put, “low-income countries have fewer resources for publicly financed education and health care,” which translates to citizens in these low-income nations struggling to afford both education and medical care (Furnée et al., 2008). This is why humanitarian nonprofits typically emphasize the health and/or education sectors through their aid; improvements in these two areas are widely considered the keys to long term improvement.

Returning once again to a more American-centric analysis of educational limitations on poorer health outcomes, a 1994 evaluation by Pincus and Callahan shows how, for decades now, patients in the United States have continued to suffer the negative effects of less education on their wellness. This is likely due to the fact that educational attainment and socioeconomic status are closely interwoven within the fabric of our society - and have been for generations - as a result of education’s ability to dictate profession, salary, and lifestyle/image (Pincus and Callahan 1994). Whatever the original source may be, health records reveal an alarming pattern dating

back more than forty years. American citizens younger than sixty-five with fewer than twelve years of education who participated in a particular 1978 survey were diagnosed with one or more of the most common health conditions plaguing the nation at the time (arthritis, hypertension, psychiatric disease, heart attack, diabetes, renal disease, chronic bronchitis and emphysema, epilepsy, stroke, etc.) a mind-blowing 2-3 times more often than people with twelve or more years of education (Pincus and Callahan 1994). Pincus and Callahan note that the only exceptions to this trend seem to be cancer, allergies, asthma, thyroid disease, and multiple sclerosis, which actually happened to be the sole condition more prevalent in those with higher socioeconomic status. This might suggest that those five diseases affect people indiscriminately and are not influenced by anything that either a more or less advanced degree would cause.

There is even evidence to suggest that dementia patients with more formal education experience less cognitive impairment than their less educated counterparts, again highlighting the alarming impacts that educational disadvantage may cause far into the future (Pincus and Callahan 1994).

Unfortunately, these issues only seem to be growing more prominent as time passes. Way back in 1972, college graduates were 23 percent less likely to report having fair or poor health (the two worst descriptive categories offered in the survey) than people who did not manage to graduate high school, but this discrepancy grew to be as large as 36 percent by the time of Goldman and Smith's publication in 2011. Unfortunately, "disease prevalence for the least educated is rising and the gap in prevalence between the least and most educated is increasing over time" for all five of the extremely common chronic health conditions assessed by Goldman and Smith: arthritis, heart disease, lung disease, hypertension, and diabetes - many of which have already been described to be influenced by education level in other studies (Goldman and Smith 2011). The study found that this gap was especially prominent for arthritis, heart disease, and

diabetes, but ever-increasing distinctions in prevalence of disease that most disservice those of a lower education level do exist for a full five of the conditions listed above. The reality of the situation is that, in the past thirty years, the less educated population has endured ever-increasing rates of disease, claimed to be in fair or poor health an average of thirty percent more often, reported deteriorating health to a greater extent both outside of and within disease group, and faced a notable increase in probability of suffering from a chronic health condition than the more educated (Goldman and Smith 2011). Clearly, the need for physician intervention is dire. While doctors cannot manipulate circumstances to be such that their patients are able to go back and achieve a higher degree of education, they absolutely can supplement their care with additional medical education of their own that empowers the people they treat - irrespective of education level - to maintain their health effectively.

There is a large proportion of academics who support the theory that literacy, an integral component of education that confers so many life advantages to those who do learn to read, is the primary link between educational attainment and health outcomes. When one considers just how crucial literacy is to reading care instructions, educating oneself on emerging health crises via written reports, and even regularly communicating with medical professionals, this makes sense. Research supported statistics, however, show that illiteracy as a result of poor education may be even more troubling to one's health outcomes. Overarchingly, "People who read at lower levels are generally 1.5 to 3 times more likely to have an adverse outcome as people who read at higher levels," but studies have managed to identify much more specific indicators of poor health outcomes related to the absence of literacy and education than simply "adverse outcomes" (DeWalt et al., 2004).

The less literate population being covered by Medicare in particular have been shown by DeWalt et al. to be less likely to have gotten a Pap smear or a mammogram, two potentially life saving screening procedures, within the past two years when compared to the more literate population. In the same vane of predicting future poor health outcomes for certain patient subgroups as a result of their failure to attain preventative treatment, those with lower literacy rates are less likely to receive influenza or pneumococcal vaccinations than those with higher literacy rates, as well as be 1.69 times more likely to be hospitalized within a given year (DeWalt et al., 2004). Further investigation into this subject reveals that a likely explanation for these facts and futures is that literacy can more generally be correlated with health literacy, which is the ability of a person to both interpret and utilize medical information to make informed decisions about their health. One study on just this topic shows that “those with higher health literacy skills had better self-reported general health, physical health as well as mental health” while, at the same time, demonstrated higher levels of health literacy overall “than those with lower health literacy skills” (Van Der Heide et al., 2013). When one takes into account the incredibly close relationship between literacy and education then, by proxy, the equally close relationship between education and health outcomes, it becomes incredibly easy to understand how and why educational limitations prove so detrimental to patient medical management and warrant immense consideration from practicing healthcare professionals.

Personal Stressors

In September 2020, while in the midst of contract renegotiations for the very successful practice I built from scratch, I was diagnosed with clinical stage II oral Buccal squamous cell cancer. After undergoing surgery, the pathology report revealed that I was at stage IVB. Adding

to my stress was the fact that my surgical corporate medicine contract was expiring in November 2020. The surgery was a 14-hour procedure with immediate reconstruction via a pedicle left forearm pedicle skin graft using radial artery and vein from wrist to antecubital fossa. My wife was alone at the hospital due to COVID-19 restrictions, and she had to rely on my contacts to visit me in the ICU immediately after surgery.

While still recovering in the hospital, I received an email from my employer stating they had hired another bariatric surgeon to “help me with my practice” and that they would “consider” renewing my contract. This was a blow since I had two children and a wife who depended on me, as well as a mortgage and car payments. Although I had short and long-term disability, the stress was overwhelming as I had put so much effort into building a successful practice, and now it was uncertain. I underwent adjuvant chemo-xrt for the next 3.5 months, which was unbelievably painful, and my employer kept me in limbo with no contact via FMLA rules. Patients were upset, and I was forced to job hunt via Zoom.

Finally, after 4-5 months, I was offered a base contract to rebuild a new portion of my own practice, the productive part of which had been given to the newly hired surgeon. This was very upsetting. The future was uncertain since I was not sure if I would survive. I went through clinical and radiologic (CT) follow-ups every three months, and every little sore throat or neck pain had me worried about recurrence. Despite the uncertainty, I returned to work full time to build up money and make sure my family would be taken care of if I passed away. I returned to work with no restrictions in February or March 2021 and never missed a day, including return to in-house level II trauma call.

At the same time, my family put our house up for sale and moved to Georgia to care for my wife’s mother, who had suffered a stroke. This added to the already overwhelming stress.

I moved into a one-bedroom apartment while waiting to see if my cancer would recur. I eventually found a job in Greencastle, which was an opportunity to start over.

Overall, the experience was incredibly stressful, both because of the corporate medicine environment and the family and environmental stresses. However, my socioeconomic status allowed me to have access to the best physicians and nutrition, which helped to balance out some of the difficulties I faced. - Dr. Ricardo Young, bariatric surgeon in Greencastle, IN (narrative adapted with permission)

Personal stressors, unique from anxiety and socioeconomic stressors, have the capacity to cripple a patient's health outcomes not because of disadvantages that an underlying mental health condition or a systemic impediment may impose, but because of a situation deeply personal to the patient on an individual level. As Dr. Young describes, personal stressors often render patients feeling hopeless and overwhelmed because the concern consumes such a large portion of their immediate sphere of experience. Also as Dr. Young describes, doctors are not even immune to these effects themselves. Physicians do, however, have the capacity to work through these circumstances with impacted patients and disseminate resources with the power to eradicate what once may have been detrimental to their health and replace it with tools that improve health outcomes long term. However, the list of personal stressors is long and complex, and without provider intervention, truly does pose extreme risks to the wellbeing of thousands of patients.

Caregiver Status

A caregiver, for the purposes of this thesis, can be described as someone caring for a family member or a friend, not a professional who is acting in a caregiver capacity for reasons of employment. Now having established a workable definition for the remainder of this

subcategory, it is possible to delve more deeply into the deep influence of caregiver status on poorer health outcomes. First and foremost, caregivers are the unsung heroes of the American healthcare system and account for far more of all healthcare provision annually than most people realize. “An estimated 15 million to 25 million adults in the United States currently provide informal care (i.e., unpaid care) to relatives and friends,” which ends up being equivalent to billions of dollars of formally unrecognized medical services placed on the shoulders of concerned family members or close friends (Navaie-Waliser et al., 2002). Furthermore, ninety percent of medical assistance for adults who require long-term care, eighty percent of whom live at home and not at a formal healthcare facility, is provided by unpaid family caregivers (Swartz and Collins 2019). It does not help that a large proportion - upwards of 36 percent according to Navaie-Waliser et al.'s findings - of these caregivers can be considered vulnerable, in much the same way that vulnerability has been defined in previous sections of this thesis. Despite being in a vulnerable state, more than half of these caregivers struggle to provide care to their loved one, often dedicating more than twenty hours per week to their efforts which, in turn, manifests itself as an approximately 33 percent physical health problem rate amongst these caretakers (Navaie-Waliser et al., 2002). An increase in physical health problems certainly can be presumed to worsen patient healthcare outcomes over time, so caregiver status should be strongly considered by physicians as potentially contributing to particular symptoms and ailments.

Healthcare outcome is not the only component of the patient healthcare experience worsening over time. Just as could be deduced from previous discussions earlier in this thesis, caregiver burden is yet another factor in a patient's life that seems to show trends of magnification rather than improvement. Plenty of literature predicts that demand for caregivers is only set to increase in the coming years, a growing demand that is the result of society's

tendencies to lean toward “shorter hospital stays, limited hospital discharge planning, and an aging U.S. population” twenty percent of which is predicted to be composed of people aged 65 or older - the very demographic that most often requires caregivers - by 2030 (Swartz and Collins 2019). Even now, with the requirement for caregivers lower than it is predicted to be in the future, those who dedicate their time in this way, however noble the cause may be, more often indicate that they have reduced availability for spending time with their loved ones and friends, experience heightened emotional pressure, and overlook their own wellbeing by neglecting healthy habits like sleep, exercise, and diet, all of which are necessities in the pursuit of positive health outcomes (Swartz and Collins 2019).

The effects of caregiver burden on patient health outcomes can be even more clearly defined. While there is data to reinforce the causal relationship between caregiver stress and physical health concerns, there is no question that the effects of caregiving on psychological well-being have been the most extensively studied by experts in the field. Measures such as depression and stress are by far the most commonly investigated of such effects, and studies have consistently shown significant impacts on health outcomes caused by caregiver status, with the extent of these effects being influenced by factors including age, socioeconomic status, and the level of informal support available (Schulz and Sherwood 2008). In particular, Schulz and Sherwood found that more elderly caregivers, individuals with limited economic resources, and those lacking in interpersonal support are at higher risk of experiencing poorer psychological and physical health outcomes than their younger, better-resourced counterparts. These findings highlight the importance of considering the broader context in which caregiving occurs, and the need for targeted support to be provided by physicians and the rest of the care team to those most at risk of negative impacts.

Some sources also highlight specific sociocultural differentiations amongst the caregiver population that have the potential to manifest poorer health outcomes in different ways. For example, an incredibly in-depth study by Kim and Knight points out that, in the Korean-American population that tends to abide more by Confucian traditions of respect to elders and, as a result, care of elders through their old age, the perception of caregiving and the resulting experiences of these Korean-American caregivers are bound to be different than more Western points of view. Much of the emphasis of the work of Kim and colleagues is centered around caregiver coping style as a crucial variable at play in the connection that exists between caregiving stressors and the physical health outcomes of caregivers. Ineffective coping styles, such as avoidant coping, are determined to be ineffective when they are linked to adverse caregiving outcomes (Kim and Knight 2008). In an adjacent study involving White and African American caregivers, Kim et al. managed to confirm “the intervening effects of avoidant coping on the relationship between caregiver burden and poor self-reported physical health outcomes,” meaning that certain populations’ tendencies to cope with caregiver burden in a particular way is in and of itself a cause of poorer health outcomes (Kim and Knight 2008). After controlling for suggested variables, the study also found that being a caregiver was significantly associated with higher systolic and diastolic blood pressure, which is indicative of poorer physical health outcomes (Kim and Knight 2008). Additionally, cortisol levels were found by Kim and Knight to be higher for the Korean-American caregivers involved in this study due to “receiving lower levels of quality of instrumental social support,” also indicating greater physiological stress. The culmination of these findings are undeniable reinforcements of the notion that caregiver status, even amongst a population that greatly values the assistance it is able to provide to the elderly, can be a direct cause of poor health outcomes.

Berglund et al. provides insight into an additional internationally-tied population, but one that carries with it high levels of significance to the patient demographic physicians are likely to encounter here in the United States. Caregiver status, it seems, actually has the potential to act as a risk factor for mortality - premature and simply increasing likelihood - due to “the combination of the physical demands of caregiving, prolonged distress and biological vulnerability of caregivers may compromise their physiological functioning and increase their risk for physical health problems that may lead to increased mortality” (Berglund et al., 2015). Berglund et al. also warns those in the healthcare industry that caregiver burden has been shown to be a high risk for detrimental mental health in addition to physical health outcomes, even proving to be associated with more frequent institutionalization; nearly 22 percent of caregivers in their study identified themselves as having poor psychological wellbeing, greater than four percentage points higher than what was reported for non-caregivers. What’s more, poor self-rated health was prevalent in 34.6 percent of caregivers but only 28.3 percent of non-caregivers, and caregivers had more days with both poor physical and poor mental health within the past month overall (Berglund et al., 2015). It is undeniable that caregiver status, a role that so many patients play without anyone knowing, is a strong predictor of worse health outcomes. Those struggling with the burden would benefit greatly from implementation of social services that will ultimately translate into improved health for an increased duration of time, which is every physician’s goal for the people they treat.

Interpersonal Conflict

Interpersonal conflicts are an inevitable component of human relationships, and they can arise in various contexts, including personal, social, and work-related settings. While conflict

resolution skills are crucial for maintaining healthy relationships, unresolved or chronic conflicts can lead to a range of negative outcomes, including, of course, poorer health outcomes. It appears through preliminary research that the setting in which the interpersonal conflict arises - academic, professional, personal - has considerable influence on how the conflict might contribute to worse health outcomes. However, some impacts can be extrapolated across the board of conflict types. Individuals who self-report increased work-to-family as well as family-to-work conflict have, on average, worse mental and physical health, particularly amongst the job insecure (Minnotte and Yucel 2018). Additionally, in another study, “work–family conflict was associated with lower life satisfaction and positive affect,” with physical health being impacted in the form of “direct effects of work–family conflict on fatigue and perceived health... as well as chronic health conditions” (Davis et al., 2017). Another study still found that having a conflict negatively affected people's mental health, but the conflict in question was between work and school rather than family and work (Park and Sprung 2013).

Interpersonal conflict has been established to spur poorer healthcare outcomes overall, irrespective of its form. Therefore, it is now possible to delve deeper into the specifics of what leads to those poorer outcomes as a result of different types of interpersonal conflict. In one specific study, the single most prominent health risk factor out of the entirety of the associations between work factors and health outcomes was work-life conflict (Hämmig and Bauer 2014). The risk posed by the psychosocial impacts of work-life conflict was so strong, in fact, that Hämmig and Bauer claim it was even more indicative of future poor health outcomes than any physical work factor or even potential exposures due to the hazardous nature of certain jobs. Interestingly enough, these career-related interpersonal conflicts tend to operate in ways that influence health outcomes on a specific timeline. This manifests as more intense medical

implications at both baseline and one-year follow-up appointments, with career fluidity at that one-year follow-up being reported by patients to be low (De Raeve et al., 2009). De Raeve and the rest of the research team explain this to mean that, essentially, interpersonal conflicts that take place in the workplace tend to impact self-reported health nearly right away, but the decision to potentially switch employers because of this conflict is too large to make even within a full year. Although conflict resolution in this capacity does decrease the extent to which health outcomes are impacted, “a small, though not significant residual effect on health” persists even still (De Raeve et al., 2009).

Interpersonal conflict can completely destroy social connections that are so crucial to maintaining an adequate support team for the management of health conditions. This is why those living in environments which surround them with close-knit and stable ties have reported lower rates of heart attacks and mental illness, as well as exemplify a more effective buffer against illness, even when times get especially hard (Ell 1984). Studies also reveal that married individuals, likely because of the consistent emotional support afforded by a spouse, have a lower mortality rate than unattached individuals (Ell 1984), which is very clearly revealed by the fact that “single individuals report 2–5% more chronic conditions and 3–8% more physically limiting conditions than married individuals, and mortality rates are as much as two times greater for some single individuals in comparison to the married (Carter & Glick, 1976)” (Whitson and El-Sheikh 2003). But really, this lower mortality rate seems to extend to all individuals who have greater social and community ties. Ell strongly alludes to the primary contributing factor to poorer healthcare outcomes as a result of interpersonal conflict being the disruption of personal medical support networks that, through their influence, have the power to prompt substance abuse rehabilitation efforts, encourage prenatal care, and simply comply with healthcare

instructions in general. And the tendency for health outcomes to erode in the absence of strong social connections fueled by interpersonal conflict can go so far as to have significant associations with mental illness. People with psychiatric disorders are generally less satisfied with their level of social support - either from family members or friends - and have a lower quantity of interpersonal connections than others, which shows the potential to increase likelihood of hospitalization for this demographic (Ell 1984).

Yet again, the implications of interpersonal conflict are shown to extend to children just as they do to adults. Troxel and Matthews conducted a wide-spanning literature review of their own specifically aimed at evaluating the health outcomes of children subjected to higher levels of interpersonal conflict, and they found that the physical health status of those living in households experiencing marital strife was overall poorer. Divorce in particular tended to be “linked with self-reported somatic symptoms (Aro & Palosaari, 1992), hospitalizations (Romelsjo et al., 1992), and mortality (Romelsjo et al., 1992; Schwartz et al., 1995)” (Troxel and Matthews 2004) with there being upwards of a “50% increase in the risk of illness among children post divorce. In addition, children of divorce were rated as 6% less likely to have optimal health than children from intact marriages” (Whitson and El-Sheikh 2003). Such alarming statistics only further legitimize marital conflict as a chronic stressor for children with the ability to deeply impact their long term health and wellness outcomes. However, interpersonal conflict is clearly a detrimental factor against health outcomes for people of all ages. Regardless of whether or not the source of the conflict is work, family, or school, sustained tension within the environments in which patients spend a considerable amount of their time has been proven to cause medical problems. Healthcare providers, therefore, should be mindful of

these underlying sources of tension in situations where perhaps the standard treatment methodologies are proving to be less helpful than expected.

Safety Concerns

Of all the personal stressors discussed in this thesis, safety concerns can easily be denoted as the most deeply personal. The specific circumstances that generate safety concerns for one person are never the same for another and, for that reason, they are highly predisposed to individual perception. It does not help that a considerably large number of safety concerns are born from a toxic interpersonal relationship that escalates to one that causes trauma and fear. Because of the subjective nature of this particular stressor, peer-reviewed literature is forced to focus on more niche demographics that encapsulate a succinct perspective, as one is only able to generalize data regarding a safety concern if that concern is shared by multiple study respondents by virtue of communal experience. However, if one group in a particular area has been scientifically found to have their health outcomes worsened as a result of a specific safety concern, it is fair to presume that a similar group that may arise in the future, even if in a different population, will be affected by said safety concern in a comparable manner.

Having established this necessary presumption in the context of currently published literature on the subject of safety concerns and poor health outcomes, it is possible to examine more specific data within some of those aforementioned niche groups. The first of these is the elderly Swedish population, between the ages of 65 and 84, and the safety concern in question is fear of crime and psychological and physical abuse. Understandably, those members of the elderly population who experienced psychological or physical abuse had a higher odds ratio for negative health outcomes in both men and women, particularly in terms of psychological abuse

(Olofsson et al., 2012). This again reinforces the power of the psyche on physical health, which has been discussed in great depth throughout this thesis. Furthermore, it was found by Olofsson et al. that approximately forty percent of elderly women and approximately twenty percent of elderly men refrained from going out alone due to feeling unsafe outside their homes. Through this revelation, the study also revealed that elderly individuals, regardless of their gender, who reported feeling fearful of crime were at higher risk of experiencing both physical and psychological symptoms than those who did not report such fears, as this anxiety about their own immediate environment “is associated with increased risk of mobility disability among the elderly, since they refrain from going outside and taking walks” (Olofsson et al., 2012). Although women were deemed more likely to express concerns about their safety, the link between fear of crime and negative health outcomes was not gendered in the Olofsson et al. study, except for a stronger association with suicidal thoughts and attempted suicide in men. Overall, the study found that fear of crime was a strong predictor of poorer health outcomes in both Swedish elderly men and women, and there is no reason to believe that this does not also extend to the elderly population in America.

Warr et al. studied the impacts of feeling unsafe in one’s own neighborhood, at least within the country of Australia, to an even greater extent than Olofsson et al., who merely touched on the subject as they collected data to further their own initial research goals. According to the findings of their study, people who reported substandard neighborhood conditions and safety were more inclined to perceive their health status as being fair or poor, the lowest end of the measured spectrum. Warr et al. solely gathered data from neighborhood renewal sites and highlighted a few concerns that were more strongly linked to fair or poor health. These issues included the presence of youth in groups, alcohol or drug use, violent

behavior, theft, house robbery, car theft, and joyriding (Warr et al., 2009). Furthermore, the study showed that being exposed to unsafe neighborhood conditions could adversely impact one's self-reported health status, regardless of whether they live in a disadvantaged or advantaged area, except for perceptions of policing (Warr et al., 2009). In conclusion, the very kinds of behaviors that sometimes transpire within the neighborhoods of American patients that can lead to immense feelings of unsafety or fear of harm have been associated, to a statistically significant degree, with poorer health outcomes in Australia. Who is to say the case is not exactly the same here in the United States if the conditions in question are often replicated here?

This next study no longer takes place in a country other than the United States, but it does focus on a very specific subgroup of people: US South Asian women. It is so important to reference, however, because it deals heavily with the impact that domestic violence can have on a patient's health outcomes. Domestic violence is, tragically, one of the more common causes of feelings of personal safety concerns, because it more often than not involves abuse from an intimate partner who was supposed to be a person who can be relied upon. When even the closest relationship in a patient's life turns so destructive, it is difficult to feel at ease in any situation. Hurwitz et al. surveyed a group of US South Asian women who had been subjected to domestic violence in at least one of its many forms (abuse, assault, violence, etc.). Within this group, 10 percent of people reported poor physical health, 16 percent reported poor mental health, 15 percent reported depression, 23 percent reported anxiety, 5 percent suicidal ideation, 30 percent sleep disruption, 7 percent pain-inhibited normal activity, and 8 percent health inhibited activity (Hurwitz et al., 2006). Each of these negative results of domestic violence severely impede daily life for those who suffer from them, as well as cripple health outcomes. More precisely, women who were once the victims of abuse had far higher incidences of poor physical health and

suicidal ideation than women who were not (Hurwitz et al., 2006). Many of these victims also report, through interview transcripts from Hurwitz et al., that they experience fewer chronic health complaints since escaping their bad situations, further reinforcing that it is the safety concerns prevalent during the period of active domestic violence that prompt those additional poor health outcome reports from victims.

Domestic assault is another specific personal stressor with far too great a prevalence. “In reviews of US and Canadian population-based surveys during 1985–98, between 8 and 14% of women of all ages reported physical assault in the previous year by a husband, boyfriend, or ex-partner; the lifetime prevalence was between 25 and 30%,” and these statistics do not even compare to the percentage of murders of North American women perpetrated by an intimate partner: 40-60 percent (Campbell 2002). On top of intimate partner violence being so pervasive, it also has the ability to impair the health of its victims well after the abuse ends, leading to worse quality of life, more need to utilize healthcare services but less likelihood of seeking treatment for domestic violence related injuries, and decreased health status (Campbell 2002). “The injuries, fear, and stress associated with intimate partner violence can result in chronic health problems such as chronic pain” or other lifelong/long term conditions impacting the nervous system, the gastrointestinal tract, the cardiovascular system, immune response, and gynecological function (Campbell 2002). Essentially, personal safety concerns as a result of domestic violence have the capacity to damage every bodily system in unpredictable ways. Nothing seems more worthy of physician attention than that.

Lastly, as far as causes for safety concerns go, the last one that warrants discussion is stalking. In a world as increasingly digitized as this one, stalking is becoming easier and easier to accomplish, meaning that thousands more victims are seeking medical attention today than they

were two decades ago. Physicians are likely to encounter someone in this kind of predicament at least once, if not multiple times over the course of their practice, but it may be difficult to ascertain this information because it is not often readily shared, making it a particularly dangerous health concern on top of being a safety concern because it often goes unnoticed.

People who report having a stalker and who claim to be terrified of that stalker are more likely to identify as having poor health status, to develop a chronic disease or mental illness, or to become injured than people who are not dealing with that specific safety concern (Davis et al., 2002).

One can only assume that this is attributed to the feeling of constantly needing to look over one's shoulder, as victims of stalking often report, thereby leading to other important emotional needs being neglected in favor of protecting safety in the immediate term. In cases like these, and really all cases of personal safety concerns, it is beyond beneficial to the health outcomes of the individuals feeling the effects of this personal stressor if their physician is prepared to do the thinking for them when their mind is understandably too preoccupied on the scary situation to advocate for their health as much as they probably should.

Conclusion

Even before I began work on this Honor Scholar thesis, I knew the current American medical system was flawed. Not completely broken, but flawed. I navigated for years through the healthcare system as a patient myself and was never able to find a lasting solution to my ailments. That is, until I encountered a physician who demonstrated a true interest in determining the underlying causes of my chronic migraines. Treatment would not have been nearly as productive had this doctor not been so willing to investigate every other component of my health history and rule out more specific hypotheses from there. Under his watchful care, I learned to

more closely monitor my anxiety levels, to keep a food journal to identify hidden migraine triggers, and to engage in more regular exercise that has been scientifically proven to work as well as medication in many cases. For that reason, I feel a personal connection to the information presented throughout this literature review, though I certainly have been more fortunate than many to only have experienced a few of the specific external stressors listed here. However, this is also personal from the standpoint of someone soon to attend medical school. I have encountered firsthand the benefits afforded to patients by a comprehensive approach to healthcare delivery, and I want nothing more than to provide my future patients with the same level of all-encompassing care.

While conducting this literature review, it became very apparent to me that the benefits of investigative healthcare in terms of acknowledgment of a myriad of “invisible illnesses” - namely the anxiety, socioeconomic contributors, and personal stressors discussed at length - is all information that has been available for decades. Approaching a patient with these things in mind truly works, at least if you define working as leading to better patient health outcomes overall, and academics know it works. Due to the nature of the medical system pushing doctors, whether it is their preference or not, to see the maximum number of patients possible and prescribe medications that simply mask their patients’ underlying issues in hopes of financial gain, it is difficult to heed the data presented in this paper. Resultantly, these considerations are not being implemented at fast enough rates to keep up with the detrimental effects caused by ignoring patient external stressors for so long. That is why I decided to compile all the evidence in one place, not leaving it scattered about the internet: to convince physicians to resist the pull of the establishment as best they can in favor of what science really does prove is the best approach to treatment.

But data from research papers is only so convincing, hence why I also spoke to real doctors who have seen firsthand the impacts of broader considerations during patient care in their own communities. There is often nothing more convincing than a passionate peer, and these physicians truly were passionate about conducting their practices in a manner that addresses multiple facets of patient need. Their testimonies in favor of the benefits of this kind of interdisciplinary medicine, coupled with the extensive research to support the role of external stressors on health outcomes, provides what is, at least in my view, a deeply persuasive narrative. Just as I began every subsection of this thesis with an anecdote, I now leave you with the cogent words of my grandfather, who dedicated over five decades his life to compassionate healthcare, to implore healthcare professionals one final time to consider addressing patient anxiety, socioeconomic contributors, and personal stressors through adapted treatment within the scope of your own practice:

“After a comprehensive history and physical examination by my neurology mentor, it was clear that the patient was so anxious and fearful that she would not be able to comprehend conclusions and make decisions. Until, that is, he placed his hand on her arm and allowed her to express her emotional stress. This lesson of the value of touch was an important initiation of a reassuring and caring professional relationship, self-fulfilling for both doctor and patient throughout my career.

“The willingness to add a personal expression of support and respect was made clear to me when I was in the room of a dying patient who was cognitive and surrounded by his grieving family. All were overwhelmed and unable to relate to one another, until his wise internist knelt on the floor by the patient, held his wife's hand and said a brief prayer. The overwhelming fear, anxiety, and inability to relate was immediately relieved and a fulfilling parting expedited. Over

my 51 years of practice, my patients always expressed appreciation and the belief that positive outcomes were the result of a caring, positive, and optimistic attitude which then made more informed decision making possible.

“As a Multiple Sclerosis specialist, it was a daily affirmation of the need for an MS team to provide support for positive outcomes. An MS clinic was established to integrate family relationships and activities with social groups. Social workers helped to improve communications within the patient's family over such issues as death fears of children, spousal support, and treating patient depression. Financial issues in reference to insurance and copays, drug costs, environmental concerns such as accessibility ramps, wheelchairs and vans. Fertility and child bearing issues that affect drug choices must be addressed. Such simple environmental concerns such as air conditioned environments for consultation and treatment are important since MS patients may decompensate with heat exposure. Transportation needs may be specialized in order for patients to get to appointments. Employment limitations might include additional time to complete tasks, frequent bathroom breaks, and provision for time for medical treatment need to be made clear to the proper personnel.” - Dr. Roy Meckler, recently retired from Norton Neurology Services in Louisville, KY

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