Preventative Healthcare as a Sustainable Transition

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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It is often argued that there are two ways to compartmentalize healthcare: as a commodity, or as a social good. Within the United States, the greater portion of the healthcare system is organized in a manner that defines healthcare as a commodity. As it frequently generates more profit for providers, healthcare treatment in the US is often reactive, meaning treatment takes place after an abnormality is discovered, rather than preventative, where treatment is preemptive and intended to minimize formation of health abnormalities. Implementation of preventative healthcare models and programs within the United States, as opposed to the reliance on reactive care, would induce a transition to the greater long-term health of individuals. Various stakeholders within the US healthcare regime hold motive to both inhibit and promote a transition to a primarily preventative healthcare treatment model. *This paper will discuss the effects of a societal sustainable transition to a focus on preventative care and the stakeholders within the healthcare regime that promote or inhibit this transition. With potential inhibition, individualistic application of preventative care will also be discussed.* The current status of the US healthcare system will first be specified to outline the need for such a transition, then effects of, and requirements for a transition to, a preventative healthcare model will be discussed.

Current Health in the United States of America

In the United States, access to healthcare is not a guarantee; there is no universal coverage as there is in many developed nations (New York State Department of Health, 2011). The healthcare system within the US can be defined as a mixed system, meaning there is multiple payers and providers within the system. Americans obtain their healthcare coverage through various entities. In 2019, 90.8% of Americans held healthcare coverage at some point

within the year. A majority of individuals (~56%) were covered by private health insurance agencies, often obtained through employment. Others were covered by Medicaid (20% of individuals), Medicare (14% of individuals), or other public forms of insurance (1% of individuals). This leaves ~9% of Americans being classified as uninsured (International Society for Pharmacoecomics and Outcomes Research, 2018).

The Costs of Reactive Treatment

In 2020 the US spent $4.1 trillion on healthcare expenses; health spending per person was $11,945 (Centers for Medicare and Medicaid Services, 2021; Wager et al., 2022). While it can be difficult to compare US healthcare spending to that of other nations due to the influence of politics, economics, and social norms within various nations, trends show that higher-income nations, including the US, spend more on healthcare per person than lower-income nations. On average however, comparable high-income countries spend only $5,736 on healthcare per person per year. This value is approximately half of what the US spends (Wager et al., 2022). There are many reasons that US healthcare spending is much higher than that of other nations – the excessive usage of expensive medical technologies for reactive care, the high (and increasing) prevalence of chronic disease, and the framing of health as a commodity all are attributable factors.

The US's use of medical technology, such as a magnetic resonance imaging (MRI) system or computed tomography (CT) scan, is much higher than the median for the Organization for Economic Co-Operation and Development (OECD), members of which are high-income developed nations. MRI and CT exams given per 1,000 people in the US in 2013 was 106.9 and 240 respectively, and the OECD median was 50.6 and 136. The use of these medical technologies can be incredibly helpful for professionals to obtain a proper diagnosis, but is also

very expensive. Excessive use of them, and other technologies like them can greatly increase the amount spent on health treatment. Despite spending a vastly greater amount on healthcare, the health of Americans is known to fall far below that of other high-income nations. Of all the nations in the OECD the US has the highest chronic disease burden, has the lowest life expectancy, and the highest number of hospitalizations from preventable causes (The Commonwealth Fund, 2020).

Frequently, in the U.S., high individual healthcare spending correlates to the presence of chronic disease within the given individual (Anderson & Horvath, 2004). This is supported by data showing that in 2016 the top one percent of individuals ranked by their healthcare spending, most of whom suffer from chronic disease, were responsible for 21.9 percent of total U.S. healthcare expenditures with a mean expense of $110,003 (Mitchell, 2019). In 2014, 60% of Americans had at least one chronic disease with 42% diagnosed with more than one chronic disease (Buttorff et al., 2017). These chronic diseases include heart disease, cancers, Alzheimer's disease, diabetes, and chronic lung or kidney disease.

To intervene in the trends of the highest cost populations, communities would benefit from the implementation of upstream prevention programs - or preventative healthcare practices**.** Preventative healthcare includes any practice that supports the prevention of illness and thus reduces the burdens associated with disease. These practices can focus on environmental factors, genetic predisposition, disease agents, and lifestyle choices. Prevention programs enable individuals to reduce their personal expenditure on healthcare and/or obtain an improved quality of life. A greater practice of preventative healthcare may also help to lessen the gap in racial, gender, socio-economic, and zip code health disparities by removing instances of treatment bias, reducing long term costs, and increasing access to care.

The Need for Preventative Healthcare

Preventative healthcare is intended to "…prevent disease, disability, and death." (American College of Preventative Medicine, 2019). There several tiers of preventative healthcare actions and services. This paper will discuss implemented methods of primary and secondary prevention as these levels of prevention are not seen as necessarily medically mandatory as no disease is known to be present in the use of these levels of prevention (Kisling & M Das, 2021). Primary prevention describes preventative measures that aim to reduce the risk factors that lead to disease development for a specific individual. Typically, this level of prevention requires changes in individual exposure or behavior. Secondary prevention describes clinical preventative measures to ensure early or cost-effective intervention; the most common secondary prevention procedures are screening procedures. In the United States, only 8% of individuals undergo preventative healthcare screenings (Batarseh et al., 2020). This shows that the importance of preventative care in the United States is greatly neglected. It is important to distinguish the levels of prevention because each level involves different stakeholders and has a dissimilar degree of difficulty in achievement.

The top five percent of individuals ranked by their healthcare expenditures in the United States can be categorized as high-risk/high-cost individuals. These individuals likely already have at least one chronic condition diagnosis. However, those who are ranked between the top 65%-95% of healthcare spenders can be categorized as rising risk. Rising risk individuals could profoundly benefit from primary and secondary prevention as their incidence of possible future chronic disease and disability or death due to chronic disease can be substantially reduced through such prevention (Centers for Disease Control and Prevention, 2009). With an increasing number of individuals with chronic disease and a high chronic disease burden, to protect the

health and well-being of the nation, it is vital to focus on measures that lower the prevalence of chronic disease development (Holman, 2020; The Commonwealth Fund, 2020). Such reduction would allow the chronic disease burden in the US to match that of other developed nations (The Commonwealth Fund, 2020). This reduction would not only better the health of Americans, it would change the composition of US healthcare spending. The majority of US healthcare costs are related to chronic disease; 86% of US healthcare costs in 2020 were due to chronic disease (Holman, 2020). Between 1987 and 2000, healthcare spending in the US increased by $314 billion. Of this $314 billion increase, $211 billion was due to an increase in the prevalence of chronic disease. Within the time span of the years 2005 to 2030, the number of individuals in the US with a chronic disease is predicted to rise from 133 million to 171 million (Institute of Medicine (US) Roundtable on Evidence-Based Medicine et al., 2010). There are both economic and, clearly, health ramifications with this increase. Inadequate use and/or availability of preventative services enables the excessive use of medical resources to treat chronic disease, resulting in astounding health costs.

A sustainable transition is defined as "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption." (Markard et al., 2012, p. 956). The transition to a primarily preventative healthcare model for individuals in the US would reduce the long-term cost of healthcare treatment for and improve the health of many individuals. For example, per capita health expenditures for obese adults, a chronic disease with increasing prevalence in the US (nearly 1 in 2 adults in the US are predicted to be obese by the year 2030), was 81% higher than that of normal-weight adults (Arterburn et al., 2005; Ward et al., 2019). Such costs were associated with office-based visits, outpatient hospital care, in-patient hospital care, and

prescription drugs. If preventative healthcare services became increasingly supported by individuals and stakeholders of influence, and more individuals participated in preventative practices, in the long term, care would become less expensive and intensive for individuals and allow for a larger number of individuals to actively protect their health.

In the US, certain programs have proven to reduce healthcare costs for individuals, while bettering their health through preventative care within the first few years of implementation. One such model is based on personalized preventative primary care and the betterment of clinician-patient relationships; it is called the MD-Value in Prevention. (MDVIP). The program requires members to pay an average of $150 a month for a set of improved services from a primary care physician, however the program does not cover fees for inpatient and outpatient services. Members of the program are allotted longer appointment times with a personal physician, same-day and punctual appointments, and coaching by their physician outside of the clinical setting. The success of the program is shown by reducing individuals' average monthly healthcare spending prior to starting the program by at least $150, as well as by improving the health of program members. At the end of the first year of the program, 24% of members saved at least $150 in healthcare costs per month. By the end of the third year of the program 63% of members were saving at least $150 in healthcare costs per month. This cost reduction of inpatient outpatient services is attributable to the betterment of clinician-patient relationships as clinicians were better able to convince patients of lifestyle changes for the betterment of their health. The use of the emergency room by members continued to decrease by the second year, and the use of urgent care facilities continued to reduce by year one (Musich et al., 2016). In a separate program, individuals partook in a form of exercise they enjoyed for a year and instances of coronary heart disease and morbidity were lowered and financial savings ensued (Evridiki

Hatziandreu et al., 2011). A study conducted in 2010 showed that increasing the delivery of recommended primary and secondary preventative services would result in a marginal impact of $7 billion in savings in regards to the primary services, and a $1.7 billion cost for the secondary prevention services – a net savings of $5.3 billion (Institute of Medicine (US) Roundtable on Evidence-Based Medicine et al., 2010). With an increased utilization of preventative healthcare models and services across the various possible levels of preventative actions (primary and secondary), and the decrease in development and progression of chronic disease, the healthcare costs related to the treatment of such chronic diseases would decrease.

It is easy to imagine the economic effects of such a sustainable transition, but the non-monetary results should also be regarded in equal value. The betterment of American health and the reduction of chronic disease and disability should be considered a great incentive to promote this sustainable transition. As Americans become healthier, they will be able to live longer with a higher quality of life (Musich et al., 2016). Noted in this paper's introduction, within the existing US healthcare model, healthcare is widely thought of as a commodity rather than as a social good. Many other developed nations choose to invest greater amounts in preventative healthcare for individuals within the country as healthcare is thought of as a social good. A social good is commonly thought of as a system, concept, or practice that benefits the greatest number of people in a particular community or society. A healthcare model that promotes the implementation of preventative healthcare practices and services is of the greatest benefit to the people in American society.

In addition to various preventative health practice trials that have shown to reduce long term costs, trials also indicate an improvement in physical health. In the US, 40% of deaths are attributable to behavioral causes inducing chronic disease (Institute of Medicine (US)

Roundtable on Evidence-Based Medicine et al., 2010). These behaviors, including tobacco smoking, unhealthy diet, physical activity, and problem drinking, can be mitigated before chronic disease is able to form. In fact, new cases of diabetes have been shown to reduce by 58% through intensive lifestyle changes in randomized trials (Diabetes Prevention Program Research Group, 2002). And increasing the number of individuals in the US who receive a screening test for colorectal cancer (high-sensitivity FOBT, flexible sigmoidoscopy, or colonoscopy) from 67.7% of the eligible population to 90% of the eligible population is predicted to save 24,530 lives – or prevent 32.9% of the deaths due to colorectal cancer each year (Sharma, 2020). Increased utilization of existing services can better the long-term health of Americans.

Stakeholder Influence on Preventative Healthcare Implementation

There are several stakeholders incorporated within the US healthcare regime: patients, providers, payers, and policymakers are among the most prominent. The involvement of these stakeholders is intertwined. Policymakers create the major framework from which the regime is based. They decided who is eligible to receive care, what services are provided, how the services are provided, how healthcare services are paid for, how healthcare is delivered, and what health concerns to plan for in the coming future. In the US, policymakers are often politically elected and appointed officials. Payers ensure financial stability of the healthcare system. Major payers in the US healthcare system include insurance companies as well as the government, as the government is responsible for Medicare and Medicaid payments. Providers coordinate patient care and maintain patient health information. Hospitals and other medical facilities where care is administered are considered providers. Patients are simply the individuals who receive care. Ideally, the framework should be designed to benefit the patients. Each of these stakeholders have influence on the functionality of the healthcare regime. However, the motives of each

stakeholder differ, and therefore, the interests of each stakeholder have the potential to conflict one another.

Patients

Logically, patients seek to have a greater quality and access to care for the lowest possible cost. However, more American patients are finding it increasingly difficult to afford care. In 2021 the average annual cost for health insurance premiums was $22,221 for family coverage. This value is an increase of 47% since 2011 (Kaiser Family Foundation, 2021). Meanwhile, the median total monetary household income in the US was $63,292 in 2000 and $67,521in 2020 – only a 6.6%. increase over a 20-year time frame (US Census Bureau, 2021). Under the current structure of the healthcare system, with a reactive care framework, patients are struggling to afford care. In fact, more than a quarter (26%) of adults in the US have said that they or a family member have had problems paying for medical care in the past year (Stokes et al., 2021). With the increase in chronic disease prevalence, it is the interest of patients, both economically and in regards to their physical wellbeing, to promote the transition to a healthcare system with a framework surrounding the implementation of preventative health care. However, the benefits of preventative care are contingent on the effort put in by individuals or their caretakers. Individuals must be willing to sacrifice the time and effort required to maintain primary preventative services such as life-style changes, as well as secondary preventative practices such as proper medical screenings.

Providers

Providers want to provide access to safe and timely care to their patients, while managing their own finances and potentially making a small profit. However, preventative care is often administered by a primary care physician, rather than professionals in an inpatient or outpatient

setting. These later facilities are dependent on administering reactive care, may it be due to ailments in need of immediate care or emergency procedures, or treatment that is nonemergent, but medically necessary, such as many elective procedures. During COVID-19, many facilities were forced to postpone all elective procedures, and in this time, providers saw a great revenue loss (American College of Surgeons, 2021). If increase of preventative care would result in the elimination of many emergent and elective treatments, many providers would be at a great financial loss. Therefore, while individual clinicians should be inclined to promote practices that better the long-term health of their patients, hospitals are not greatly incentivized to promote a systematic shift to a framework that would limit tests and procedures that are financially beneficial for the short term.

Payers

There are several payers in the healthcare industry. Major payers include insurance companies and federal programs including Medicare and Medicaid. In 2020, a majority of Americans, 66.4%, had private health insurance coverage (Katherine Keisler-Starkey & Lisa N. Bunch, 2021). Health insurance companies seek to make a profit off of their risk investment, and over the years they have continue to do so despite the rising demand and costs of healthcare as the prevalence of chronic disease has risen across the country. In 2014, 2019, and 2020 the National Association of Insurance Commissioners US Health Insurance Industry reported the health insurance industry had a net income of $14 billion, $22 billion, and $31 billion with a profit margin of 3.4%, 3.0%, and 3.8%, respectively (Financial Regulatory Servicies Division, 2021). Because many individuals are limited in their choice of private insurance by geographical location, there is often not great competition in the health insurance market. Companies are able to raise premiums, afford the increase in demand of reactive care, and still maintain their profit

margin. In the previous section, long-term potential marginal savings were noted, but in order to achieve these savings, a financial investment, or initial loss, must be made. In the short term, these companies have no overbearing incentive to promote the systematic change to a healthcare system that will decrease the need for reactive care. They may begin to slowly invest in minimal risk long-term savings, but with slow introduction to this transition, users will fail to reap the possible benefits.

Policymakers

As previously noted, policymakers are often elected. However, these elected officials must hold ideals on issues outside of healthcare. There is a plethora of reasons constituents may elect a particular candidate. Therefore, it is important to recognize that these policymakers may be less adamant or have a clear standpoint on particular subjects, including healthcare. Lobbying is a major part of politics. Elected officials are influenced by lobbyists and their interests; politicians often are swayed by lobbyists through monetary influence. Between the years 1999 and 2018, at the federal level, the pharmaceutical and health product industry documented $4.7 billion in lobbying expenditures (Wouters, 2020). Politicians that participated in drafting health care laws or on state committees that involved interaction with policies involving drug pricing and regulation were often targeted. The pharmaceutical and health product industry operates under the reactive care framework. A transition to a preventative care model would be detrimental to the success of many products. Because these companies have the financial ability to obtain influence by proxy, their wants are ultimately represented. While morally, policymakers should have loyalty to the betterment of their constituents, the financial influence of the existing industry may promote them to inhibit the transition to a preventative care framework.

Preventative Care as an Ideology

Thus far, this paper has discussed the current state of the US healthcare system, the possible benefits to a transition to preventative care – and the results of small-scale programs, and why at a high scale, large stakeholders may or may not support such a transition. However, when one looks at the regime as a whole, they are able to recognize that the actions and interests of stakeholders involved are intertwined, rather than stand alone. This means that the major stakeholders cannot move in different directions, even if said different directions are simply separate paths to the same destination. For a truly successful transition to a primarily preventative healthcare system, all stakeholders must not only take initiatives in the same direction, but also agree as to which avenue of change is optimal. If stakeholders do not move along the same avenue of change, ramifications will be felt by other stakeholders intertwined in decisions. This brings about the questions: Who holds the power to make the decisions? What form of preventative care brings about successful outcomes? What are the metrics of successful outcomes? Do all individuals benefit equally from particular preventative care? Who is responsible for making an initial investment? These questions, which must be answered, pose preventative care as an ideology, rather than a well-defined, well distinguished avenue.

Some physicians, including Dr. Kyle Jones, believe that prevention should be taught as a concept to consumers, and patients should then apply the services that best align with their pre-dispositions and needs to their healthcare routine (Jones, 2016). To Dr. Jones, there is no single well-defined avenue for society as a whole, but rather paths exist on a per person basis. Dr. Ron Goetzel, a professor at Johns Hopkins, argues that the discussion surrounding preventative healthcare should not surround how to save the most dollars, but how to provide the most cost-effective healthcare (Goetzel, 2009). In agreeance with Dr. Jones, he also believes that this

would require services to be individualized or targeted, rather than applied to society as a whole. From here, the questions become: Who is responsible for public education? Are needed services accessible? Is this form of care equitable?

For the optimization of preventative services used based on individual need, similar to the usage of reactive care, much more research must be conducted to determine the characteristics, including benefits, of possible services. Evidence-based application will require the understanding of many factors that may affect the need for particular services including geographic location, individual socio-economic status, the general socio-economic status of the geographic location, race, age, gender, living conditions, nutrition, local pollution levels, and many more factors.

Discussion

With the current health trends in the United States, it is evident that a new approach in regards to healthcare must be taken to protect both the physical and fiscal well-being of everyday individuals. However, in the US there are many sources of influence that are able to either promote or inhibit a transition to an increase of, and healthcare framework focused on, preventative healthcare. For multiple stakeholders to support a mass societal transition, their profits must be threatened. This is supported by the results of a series of interviews conducted by the CDC in 2019. Individuals who had a minimum of ten years of experience within health care decision making in various stakeholder groups within the healthcare regime were interviewed. Such stakeholder groups included health systems, hospitals, physician groups, commercial payers, or state Medicaid agencies. It was found that financial and economic considerations most greatly influenced the acceptance or rejection of a healthcare program. This means that, as quoted by one individual interviewed, “With no margin, there is no mission.”(Levine, 2019, p.

2). It was also a popular belief of those interviewed that transition to value-based healthcare from a volume-based system has not gained enough popularity in the United States. Thus, the healthcare regime does not feel pressured to make an exerted effort to make a societal transition. Systematic healthcare change in the US will require major stakeholders to have threatened profits under the existing system, or an opportunity for greater profits (short term and long term) after the transition, and/or grassroot movements in support of change for the transition to gain popularity and stakeholders be pressured into transition.

Because healthcare in the US is so deeply rooted as a commodity rather than a social good, it is likely that extrinsic motivations must be used to gain the support of major stakeholders for a societal transition. In regards to the individualized treatment discussed in a previous section, rather than a mass societal adaptation, research must be able to determine what services and programs would serve to most greatly benefit the short and long-term health of an individual with any combination of physical characteristics, environmental circumstances, and economic opportunity. The utilization of a reactive care system will continue to enable the current trends of increasingly poor health and excessive spending. A transition to preventative care will be an investment, however, it will better the long-term health and lessen the financial burden of the average American. To better promote the transition to preventative healthcare, the health of Americans needs to be considered valuable in itself as this would allow stakeholders to justify the initial monetary investment. The questions, however, regarding which stakeholder is responsible for making such an investment, and which stakeholder chooses the optimal investments to be made, still remain.

References

American College of Preventative Medicine. (2019). *What is Preventive Medicine?* https://www.acpm.org/about-acpm/what-is-preventive-medicine/

American College of Surgeons. (2021, October 23). *Hospitals sustained huge financial losses from lost revenues during COVID-19 pandemic as patients lost timely access to surgical services*. American College of Surgeons. http://www.facs.org/media/press-releases/2021/financial-losses-102321

Anderson, G., & Horvath, J. (2004). The Growing Burden of Chronic Disease in America. *Public Health Reports*, *119*(3), 263–270. https://doi.org/10.1016/j.phr.2004.04.005

Arterburn, D. E., Maciejewski, M. L., & Tsevat, J. (2005). Impact of morbid obesity on medical expenditures in adults. *International Journal of Obesity (2005)*, *29*(3), 334–339. https://doi.org/10.1038/sj.ijo.0802896

Batarseh, F. A., Ghassib, I., Chong, D. (Sondor), & Su, P.-H. (2020). Preventive healthcare policies in the US: Solutions for disease management using Big Data Analytics. *Journal of Big Data*, *7*(1), 38. https://doi.org/10.1186/s40537-020-00315-8

Buttorff, C., Ruder, T., & Bauman, M. (2017). *Multiple Chronic Conditions in the United States*. Rand Corporation.

Centers for Disease Control and Prevention. (2009). *The Power of Prevention*. National Center for Chronic Disease Prevention and Health Promotion. https://www.cdc.gov/chronicdisease/pdf/2009-Power-of-Prevention.pdf

Centers for Medicare and Medicaid Services. (2021, December 15). *National Health Expenditure Data-Historical*. National Health Expenditures 2020 Highlights.

Diabetes Prevention Program Research Group. (2002, February 7). *Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin*. New England Journal of Medicine. https://www-nejm-org.proxy01.its.virginia.edu/doi/10.1056/NEJMoa012512?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%20%200www.ncbi.nlm.nih.gov

Evridiki Hatziandreu, Jeffrey Koplan, Milton Weinstein, Carl Caspersen, & Kenneth Warner. (2011, October 7). *A cost-effectiveness analysis of exercise as a health promotion activity.* https://doi.org/10.2105/AJPH.78.11.1417

Financial Regulatory Servicies Division. (2021). *U.S. Health Insurance Industry Analysis Report: 2020 Annual Results*. National Association of Insurance Commissioners. https://content.naic.org/sites/default/files/inline-files/2020-Annual-Health-Insurance-Industry-Analysis-Report.pdf

Goetzel, R. Z. (2009). Do Prevention Or Treatment Services Save Money? The Wrong Debate. *Health Affairs*, *28*(1), 37–41. https://doi.org/10.1377/hlthaff.28.1.37

Holman, H. R. (2020). The Relation of the Chronic Disease Epidemic to the Health Care Crisis. *ACR Open Rheumatology*, *2*(3), 167–173. https://doi.org/10.1002/acr2.11114

Institute of Medicine (US) Roundtable on Evidence-Based Medicine, Yong, P. L., Saunders, R. S., & Olsen, L. (2010). Missed Prevention Opportunities. In *The Healthcare Imperative: Lowering Costs and Improving Outcomes: Workshop Series Summary*. National Academies Press (US). https://www-ncbi-nlm-nih-gov.proxy01.its.virginia.edu/books/NBK53914/

International Society for Pharmacoecomics and Outcomes Research. (2018, June 21). *ISPOR - US Healthcare System Overview-Backgound*. https://www.ispor.org/heor-

resources/more-heor-resources/us-healthcare-system-overview/us-healthcare-system-overview-background-page-1

Jones, K. (2016, April 12). *Does Prevention Save Money? That's the Wrong Question*. https://www.aafp.org/news/blogs/freshperspectives/entry/does_prevention_save_money_that.html

Kaiser Family Foundation. (2021, November 10). *2021 Employer Health Benefits Survey - Section 1: Cost of Health Insurance*. KFF. https://www.kff.org/report-section/ehbs-2021-section-1-cost-of-health-insurance/

Katherine Keisler-Starkey & Lisa N. Bunch. (2021, September 14). *Health Insurance Coverage in the United States: 2020*. Census.Gov. https://www.census.gov/library/publications/2021/demo/p60-274.html

Kisling, L. A., & M Das, J. (2021). Prevention Strategies. In *StatPearls*. StatPearls Publishing. http://www.ncbi.nlm.nih.gov/books/NBK537222/

Levine, S. (2019). Health Care Industry Insights: Why the Use of Preventive Services Is Still Low. *Preventing Chronic Disease*, *16*. https://doi.org/10.5888/pcd16.180625

Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, *41*(6), 955–967. https://doi.org/10.1016/j.respol.2012.02.013

Mitchell, E. (2019). *STATISTICAL BRIEF #521: Concentration of Health Expenditures and Selected Characteristics of High Spenders, U.S. Civilian Noninstitutionalized Population, 2016*. https://meps.ahrq.gov/data_files/publications/st521/stat521.shtml

Musich, S., Wang, S., Hawkins, K., & Klemes, A. (2016). The Impact of Personalized Preventive Care on Health Care Quality, Utilization, and Expenditures. *Population Health Management*, *19*(6), 389–397. https://doi.org/10.1089/pop.2015.0171

New York State Department of Health. (2011, April). *Foreign Countries with Universal Health Care*. https://www.health.ny.gov/regulations/hcra/univ_hlth_care.htm

Sharma, K. P. (2020). Preventing Breast, Cervical, and Colorectal Cancer Deaths: Assessing the Impact of Increased Screening. *Preventing Chronic Disease*, *17*. https://doi.org/10.5888/pcd17.200039

Stokes, M., Kearney, A., Hamel, L., & Brodie, M. (2021, December 14). *Americans' Challenges with Health Care Costs* [Kaiser Family Foundation]. KFF. https://www.kff.org/health-costs/issue-brief/americans-challenges-with-health-care-costs/

The Commonwealth Fund. (2020, January 30). *U.S. Health Care from a Global Perspective, 2019: Higher Spending, Worse Outcomes?* https://doi.org/10.26099/7avy-fc29

US Census Bureau. (2021, September 14). *Income and Poverty in the United States: 2020*. Census.Gov. https://www.census.gov/library/publications/2021/demo/p60-273.html

Wager, E., Ortaliza, J., & Cox, C. (2022, January 21). How does health spending in the U.S. compare to other countries? *Peterson-KFF Health System Tracker*. https://www.healthsystemtracker.org/chart-collection/health-spending-u-s-compare-countries-2/

Ward, Z. J., Bleich, S. N., Cradock, A. L., Barrett, J. L., Giles, C. M., Flax, C., Long, M. W., & Gortmaker, S. L. (2019). Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. *New England Journal of Medicine*, *381*(25), 2440–2450. https://doi.org/10.1056/NEJMsa1909301

Wouters, O. J. (2020). Lobbying Expenditures and Campaign Contributions by the Pharmaceutical and Health Product Industry in the United States, 1999-2018. *JAMA Internal Medicine*, *180*(5), 1–10. https://doi.org/10.1001/jamainternmed.2020.0146