Disparities in Service and Accessibility for ACL Reconstruction between Medicaid Adolescent Patients and Privately Insured Adolescent Patients

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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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Introduction

Health insurance is essential for patients in providing affordability and attainability to many health services and providers. One such service is for anterior cruciate ligament (ACL) reconstruction surgery. ACL reconstruction is a surgical procedure for ACL injuries, which is common among adolescent patients. ACL reconstruction is costly, especially if the surgery fails, and the patient must be readmitted. Health insurance is known to have a large impact in supporting patient health and needs for differing situations, however, this does not ensure equal services between differently insured patients. Public health insurance such as Medicaid are not widely accepted by various health operations and providers, or if they do accept it, they may have limitations when compared to private health insurance plans. This includes receiving early appointment times, the option of an earlier ACL injury diagnosis, and more accessibility to postoperative physical therapy. By assuming all ACL reconstruction insured patients are provided equal quality services, the disparity between private and public, specifically Medicaid, insured patients will be missed. By understanding this difference between insured patients, one can understand the effect of a patient's overall health before surgery and post-op recovery.

I will use the technological politics framework to analyze how adolescent patients insured by Medicaid are marginalized from accessing ACL services in comparison to the same patient population but under private insurance. Technological politics is the idea that technology not only has a technical element, but a social element that looks at how technology influences power relations between social groups (Winner 1980). This will be done by examining how Medicaid's design gives privileges to privately insured patients and excludes publically insured patients. I will look at three different perspectives through the lens of technological politics to show the marginalization of Medicaid ACL adolescent patients: access to earlier appointment times,

timely diagnosis of injury, and accessibility to post-operative services. In addition, I will use evidence from research articles and journals that focus on comparing Medicaid and privately insured adolescent patients that underwent ACL reconstruction to support my arguments.

Background

In 1965, Lyndon B. Johnson enacted the first public insurance programs in the United States which would cover over 20% of Americans: Medicare and Medicaid (Tikkanen et al., 2020). Medicaid is a state program that follows federal requirements where 63% of its funds come from federal taxes and the rest from state taxes (Tikkanen et al., 2020). The program funds health services including inpatient and outpatient care, long-term care, diagnostics services, etc. with possible additional services such as physical therapy for those qualified (i.e. low-income families and young children). Later in 2010, Barack Obama further expanded the Medicaid program through the Affordable Care Act (ACA), which expands coverage to adults under 65 years old, addresses affordability, improves quality and efficiency, etc (Canonico, n.d.).

Literature Review

There are various articles and studies about the disparities and biases between public and private health insurance, even for the uninsured. These types of articles tend to focus on the case from a more technical perspective such as patient outcome and surgical success rate. In addition, the articles discussed more the effect of socioeconomic standing and race rather than in conjunction with the case. These studies fail to focus on how Medicaid's design, in comparison to commercial insurance, bias against certain populations, and therefore, result in these technical outcomes.

In a general study by Stepanikova and Cook (2008), they found that there were racial and ethnic biases towards their uninsured black and Hispanic populations compared to their privately insured counterparts, and low-income families (not factoring in race) were also more likely to experience bias by healthcare providers. These findings are essential in creating the foundation that there are biases towards populations due to their healthcare coverage. While it does show that the most affected populations are low-income and minorities, the study fails to explain the direct effects of how their coverage leads to these biases. In addition, they compare the uninsured and insured rather than public versus private. As mentioned, these findings are foundational to the argument, but the authors do not discuss in depth specifically how the coverage itself elicits bias from their design.

In another study, the authors focused on the effect of patient demographic and socioeconomic factors on the accessibility of ACL reconstruction surgery (Testa et al,. 2022). They concluded that various factors affect the rate of surgery such as being above 50 years old, being a minority, and being of lower income. They also deduced that patients with private health insurance have better diagnosis service and timely reconstruction surgery. Compared to the last article, it shows younger patients, such as adolescents, are more likely to receive surgery, and the type of insurance statistically creates disparities. A limitation of this study is that it deduces insurance as a factor for ACL reconstruction rate, but, similar to the last article, it does not discuss exactly how Medicaid creates these biases.

In both articles, they discuss the technical reasons treatment has disparities between certain demographics and also between specific health coverage. These technical reasons are important in better understanding the case. However, the limitation of the articles is that they discuss insurance as a factor of many factors. There is no further discussion on its design or the

implicit bias it creates over its users. Using the information from these articles, I will use technological politics to analyze in depth the effects of insurance coverage on the ACL reconstruction rate for adolescent patients.

Conceptual Framework

By applying technological politics, I can address and analyze how ACL reconstruction Medicaid adolescent patients are unintentionally marginalized by services, providers, and certain provisions of the Medicaid program when compared to their privately insured counterparts. Technological politics aims to address concerns of power and justice in technological design (Winner, 1980). It does this by questioning the intentions of a design, whether it implicitly or explicitly biases or excludes affected groups because of the technology's design. In addition, the framework provides a different perspective of how technology is not just a tool for humans but how it acts on its own in society. Schraube (2021) explains this well in her review: "it asks not just what people do with technology, but also what technology is doing with us and our world [and] engages to reconnect the maker with the making."

In technological politics, the focus is not on the technology itself and its technical features rather it is the economic and social qualities that stem from the technology. I first must discuss what is "politics". According to Winner, politics refers to the power dynamics and power relations among various social groups, and he argues two ways technology can be political: technology is created for a political stance or the technology is inherently political. Focusing on the first case, engineers have the ability to design technology to promote their own beliefs, therefore, causing a device to promote some type of explicit bias. However, a device may also be created with the intention to be unbiased, but still hold some biases. It is important to understand

the creator's intentionality of a device, but it is as important to understand that the focus is on the device as well and how that device may favor social groups, not the creator. In addition, the intentionality of the device could lead to bias that could lead to privileging or marginalizing certain groups. Those groups could be biased against and so marginalized. Ultimately, technological politics questions outside of the technical sphere, technology's intentionality, and its ability to empower or exclude groups of people.

Medicaid and general public healthcare were not purposefully written up to bias against specific demographics such as low-income families, minorities, or both. However, when questioning its intentionality, there is still a presence of implicit bias in its design and implementation. By using technological politics, I will analyze further Medicaid's intentionality and the political consequences of this intentionality. This will be done by discussing different ACL services and how they elicit these disparities among Medicaid and private adolescent beneficiaries.

Analysis

When Medicaid was first established by Johnson and then expanded by Obama, it intended to allow health services to be more accessible and affordable. However, various outcomes of Medicaid have been shown to create biases towards different demographic groups, therefore marginalizing them. Therefore, Medicaid elicits a type of implicit bias because the program was not intentionally created to have these biases. Heath (2022) also notes this in her analysis: "patients who were uninsured or on public insurance were five times as likely to say their insurance status determines implicit bias and unfair treatment from medical providers." Specifically, for ACL adolescent patients, Medicaid exerts political attributes by excluding them

from timely and necessary services for diagnosis and recovery. This allows groups not marginalized, such as private insurance ACL adolescent patients to have more privileges in comparison to their Medicaid counterparts. Using technological politics, I will use three different ACL services to examine their ability in shaping social power between Medicaid and privately insured ACL adolescent patients. These three services are appointments, diagnosis, and post-operative physical therapy.

Early Appointment Bookings

While appointment bookings are a normal step in service, it is also important to service in accessing the first step of treatment. Being able to book an appointment with a local health service can be straightforward. It begins with locating a location for a check-up, choosing and discussing a date and time for the appointment, and confirming the appointment. However, with more advanced services such as ACL reconstruction, it takes more time to get these appointments as it requires specifically trained professionals. This is usually the first step in accessing any type of service, not just health care. Even so, from the beginning, Medicaid patients are faced with the difficulty of getting an appointment. For instance, in the Cincinnati area, including Ohio, Indiana, and Kentucky, a study was done where a fictional male adolescent with an ACL tear was used to contact 42 orthopedic centers. It was found that 38 of 42 orthopedic services offered the privately insured version an appointment within 2 weeks, while 6 of 42 services offered the Medicaid adolescent an appointment also within those 2 weeks (Pierce et al., 2012). This means the privately insured is 57 times more likely to get an appointment than a Medicaid patient. Another similar study in California did this with the state's public insurance, Medi-Cal, and it resulted where only 1 orthopedic center offered an appointment compared to all

50 for the privately insured (Skaggs et al., 2001). Both studies then conclude that one of the main factors for this occurrence is the Medicaid reimbursement rate, which is much lower than private insurance. Because Medicaid's reimbursement rates are much lower than private insurance's, healthcare providers are more likely to allow better service to privately insured as the pay is better. A visual comparison can be seen in the chart in Figure 1 (Lopez et al., 2020). The chart shows that in most services, there are around an average of 43% (physician services) to 164% (outpatient service) higher percentage of reimbursement rates compared to public health insurance. When computing the numbers, a hospital treating a privately insured patient would receive two times the profit compared to treating a publicly insured patient.

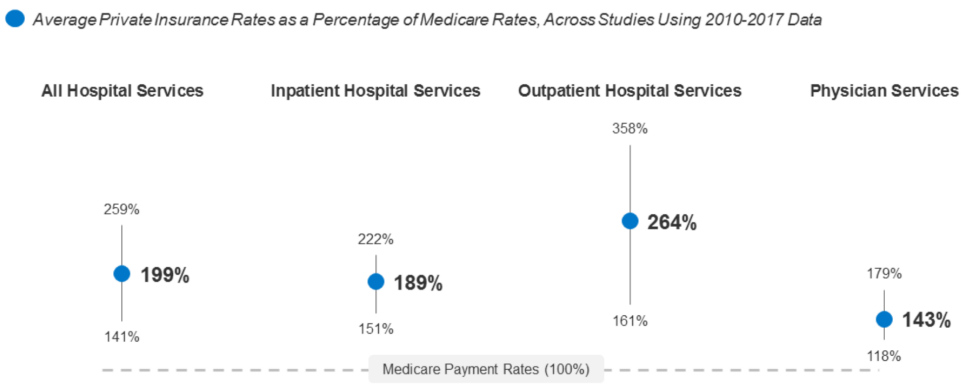

Figure 1: Healthcare reimbursement rates for different services between Medicaid/Medicare and private health coverage

It can be seen from this study that there was a statistical difference between privately insured patients and Medicaid patients. Public insurance reimbursement rates and their inability to compete with private rates create a bias against Medicaid users and their ability to receive appointments. Not being able to receive an appointment promptly can extend the surgical timeline and also extend the time of the injury. This means that privately insured adolescents can receive the necessary care in a shorter time frame compared to Medicaid patients, providing an

advantage over Medicaid patients. In addition, Medicaid's design implicitly creates this bias from the provisions of its reimbursement rates. Healthcare providers and services may choose to accept Medicaid or not, and because of the significance between private and public rates, providers are more likely to prioritize privately insured patients, accept their insurance, and provide appointments to services more timely. Accessibility to receive appointment bookings is directly related to Medicaid's reimbursement rate. It can be seen that Medicaid asserts a form of politics that advantages privately insured ACL adolescent patients over Medicaid patients.

As seen above, I argued that the design of Medicaid that reduces the accessibility for appointment bookings. However, others argue rather it is the providers that are at fault for not accepting Medicaid. Medicaid was developed with good intentions to make healthcare more affordable for low-income groups, and it does increase improvement compared to the uninsured. In terms of the framework, the argument is that Medicaid was created to be an unbias artifact that would promote health accessibility. I do agree with the statistic and the numbers that Medicaid itself has increased the affordability and attainability of health care, but I also agree with the argument that Medicaid's design still holds biases that policymakers embedded into the design. Medicaid's design was not to act as another type of cheaper insurance, rather it was created to act as a financial buffer (Tallon, 1990). This shows that Medicaid's original attention was to never be an insurance replacement. Its design was biased from its creation due to its creator, therefore it would not be able to further empower marginalized groups compared to private health insurance. In addition, reimbursement rates are given broadly at the federal level, and so the state chooses what the exact rate/cost will be for providers. This allows another level of bias as states are free to choose how much Medicaid can influence the social sphere.

Earlier Diagnosis of ACL Injury

A consequence of having untimely appointment times is also having a later diagnosis of ACL tears. Healthcare services not providing earlier appointment times such as the privately insured further lengthens the time of the injury from when it first occurred. This could cause more damage to the knee and also promote the body to recover in a not ideal or efficient manner. An example of this is in Florida, privately insured patients were diagnosed 14 days after the injury while Medicaid patients were diagnosed after 56 days (Baraga et al., 2012). This is a difference between 2 weeks and almost over a month for Medicaid patients. In addition to the later service to be discussed and appointment bookings, a Medicaid's patient timeline of diagnosis, surgery, and recovery is much longer than that of a privately insured patient. In addition, the available services that Medicaid patients may receive may not be the best service available. The quality of service is important in determining if the patient did or did not tear their ACL because the necessary actions must be decided soon after the diagnosis.

Medicaid patients are further biased due to the lack of earlier diagnosis of the injury. In technological politics, these statistics further prove Medicaid's politics by having a bias against their users and excluding them from timely diagnosis. As earlier diagnosis is connected to receiving earlier appointment times, this means that Medicaid's design indirectly marginalizes its user by directly affecting the ability of the user to book an appointment. It also overlooks the quality of the service and diagnosis. By having only selected clinics or hospitals be able to select to accept Medicaid or not, users may be only limited to the bare minimum service. This excludes patients from having higher quality diagnoses with privately insured patients who have more options for care.

Post-operative Physical Therapy

After receiving a late appointment time and delayed diagnosis, ACL adolescent patients must go through the struggle to get post-operative care after surgery, specifically physical therapy. The last service to discuss is post-operative ACL care, mainly focusing on physical therapy. After replacing the old ACL with a new graft, the patient must undergo timely physical therapy to allow the patient's body to get accustomed to the new ligament. These could specifically include muscle stretches and muscle mobility. As these patients are adolescents and tend to be a part of some type of sport or physical activity, these patients need to have an efficient recovery to return to their sport. If these requirements are not met, some may not be able to return to their usual active lifestyle, as their injured joint did not recover to its original or close to its original mobility. As seen in the previous argument, Medicaid patients already have difficulty in receiving appointments whether it is for diagnosis, surgery, or outpatient care. To add to appointment biases, there is also exclusion in physical therapy accessibility. An example is in Massachusetts, privately insured patients had access to 96.4% of physical therapy services while publicly insured patients only had access to 51.8% with the main reason being also low reimbursement rates or no existing contract with Medicaid (Rogers et al., 2018). In another study, it was also found that those with Medicaid attended fewer therapy appointments than privately insured, and it was statistically determined that privately insured patients are more likely to return to sports compared to Medicaid users, 50% of patients versus 79% (Chava, 2022).

Therefore, the reasons for biases in receiving necessary physical therapy services are due to the same reason as previously stated. Because therapy accessibility is determined by timely appointment bookings and appointment bookings are determined by Medicaid's design,

Medicaid indirectly exerts a bias over outpatient accessibility and excludes its users from such services. When looking at it from the technological politics lens, privately insured patients are more privileged to receive adequate and timely therapy that allows faster and long-lasting recovery. This allows the overall return to sports outcome to be much higher for privately insured patients over Medicaid patients. The addition of physical therapy services exclusion with appointment bookings exclusion adds another level of biases causing the power gap between Medicaid and privately insured users to be larger. While I will not discuss this too in-depth, this could be assumed for other services such as accessibility to the ACL reconstruction surgery itself, as they are directly affected by appointment times, which are affected by Medicaid's reimbursement rates.

Conclusion

While Medicaid does not intentionally create explicit bias, Medicaid elicits implicit bias by unintentionally overlooking the inequality in accessibility from differing providers and services. Through the technological politics framework, I argued the politics within Medicaid and its creator, the government. It allowed privately insured patients to be more privileged and have more power over Medicaid users in the social sphere. Medicaid's design causes patients to have a harder time attaining an appointment whether it is for diagnosis, surgery, or physical therapy. The exclusion is caused mainly by Medicaid's reimbursement rates. Because of this, marginalized patients such as lower economic standing or minority adolescent patients have an increased time window between injury, surgery, and recovery.

When designing any new device, technology, or artifact, there are a lot of technical factors that must be considered such as measurements, reproducibility, production, etc. However,

there are also many social and economic factors in designing. By better understanding how the artifact affects society and its users and, specifically in technology politics, how technology empowers certain groups of people, engineers and designers can make more just decisions for the betterment of society.

Word Count: 3230

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