Uber Health: Mobile Health Adapting to Changing Times

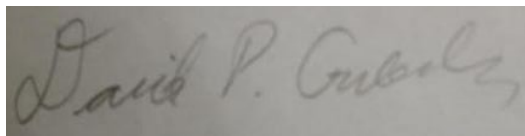A Research Paper submitted to the Department of Engineering and Society

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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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Fable of Tomorrow

        Imagine a world where our seamless communication and desire for instantaneous information simply no longer existed. When one needs a question answered, they have to go to the library, break open the most recent encyclopedia, and hope the answer to their question is found. Food delivery? Doesn't exist. Every time you want to eat you have to drive three hours to the nearest supermarket. Instantly messaging friends? The best people can hope for is to hope that snail mail moves fast enough to make that funny quip or topical reference still relevant by the time it gets there. Medical problems? Forget about them. In this world, if it's life or death, people are ready to accept the inevitable. Society is a depressing apocalypse where no one can get medical assistance.

        This world sounds like a despondent, archaic, and depressing nightmare. For the most part, it doesn't exist. Thankfully, our society does have instant messaging and food delivery. If I didn't know if it did, I could look it up online and confirm my curiosity. The same cannot be said for people dealing with medical issues. Unlike food and messages from friends, which can be digested and processed immediately, delivering an entire emergency room in an instantaneous or deliverable fashion isn't feasible. While there are some options out there to try to mitigate this problem, the lack of trust in these systems is causing the depressing nightmare I described above. Managing health can be borderline impossible, and that is a grim reality for many, many people.

        Some people in rural areas live hours away from the nearest help, and some people in urban areas can be stuck in traffic for hours. It becomes easy for these communities to simply throw caution to the wind and not bother with the healthcare system at all. Especially in a society facing a once-in-a-century pandemic, this severely complicated and important situation needs to be addressed sooner rather than later.

Introduction / Research Questions

For many people going to the doctor is as simple as making an appointment and getting themselves there. However, being unable to ensure one's own health is a harsh reality for a plethora of people. While mobile health options are being created at a rapid pace to try to help these less privileged folks, there are still a tremendous amount of other hurdles standing in the way of an ideal solution.

Mobile health is a newer innovation in the realm of healthcare. It is the idea of either bringing someone to a healthcare facility or having the healthcare facility brought to them. One form of mobile health is telemedicine, which is a modern concept that envisions professionals giving patients proper health treatment from any distance as long as they are in possession of an internet capable device.

The need to find a quality mobile health solution has only increased since the COVID-19 pandemic began to impact societies across the globe. This sudden shock to the system has exposed many holes in healthcare systems, particularly in the United States, when it comes to being able to keep people healthy and economically stable. A redefinition of healthcare is outright necessary to get us through these times as well as future pandemics. The need to keep patients, healthcare workers, and others involved in the process as safe as possible is a tricky juggling act.

During the COVID-19 pandemic, some ridesharing health options, like Uber's healthcare service Uber Health, have ultimately decided to focus their services entirely on helping out healthcare workers get to and from work (Murphy, 2020). However, this drastic change of scope for this business model does prompt some questions. When is Uber Health able to resume their normal order of operations? At what point in the foreseeable or distant future will they be able to fully adapt their model to a new normal of social distancing and heightened awareness of diseases? Their impact on the healthcare industry has undoubtedly changed in this time of mass confusion. Just as ridesharing companies have helped redefine aspects of healthcare, this ever evolving healthcare situation may just in fact redefine these ridesharing companies.

I believe that, in a time where the health industry is perpetually in the news cycle and broadcast every day to a panicked world, understanding what Uber Health has done to help and impact the industry, and what they may need to do to adapt, is an important topic of discussion. Looking back at Uber Health's successes and failures prior to the pandemic can help us understand what impact they have had and what strategies that may have to change given the current circumstances. I have tasked myself with finding the answer to the following questions: How do ride sharing companies participate in and redefine health service in the US? What primarily causes poor healthcare accessibility in communities in the United States? How can mobile health solutions, such as telemedicine and Uber, both negatively and positively impact the lives of people in these communities?

Literature Review

Current literature suggests that poor transportation is one of the largest barriers to healthcare in the United States. Samina T. Syed, Ben S. Gerber, and Lisa K. Sharp researched how transportation acted as a barrier to good health. They found that transportation issues can

impact up to 67% of a single community's access to health care. If one regularly uses a bus to make their way around, they will have double the chance of missing their appointments than car users. Up to 25% of all patients missed their appointments because of transportation issues in general (Syed, Gerber, Sharp, 2013). Talia M. Cray studied the correlation of a lack of transportation and healthcare accessibility. The results of the research showed that many healthcare professionals find that transportation can be a problem, but is never realistically considered as an in-depth situation that needs a solution (Cray, 2000).

While mobile health solutions do fix some problems with physical distance and insufficient finances, there are a number of drawbacks. In an analysis of mobile health by Steven R. Steinhubl, Evan D. Muse, and Eric J. Topol, they discussed some of the potential drawbacks to proposed solutions. In the case of smartphone applications, at the time the article was written, they reported that the U.S. Food and Drug Association had only reviewed and approved around 100 healthcare related applications out of the tens of thousands available on various app stores. The article also discussed how these types of solutions can weaken the already fragile relationships of patients and doctors (Steinhubl, Muse, Topol, 2013).

STS Framework and Research Method

To answer my research questions, I will view the mobile health industry with the STS Framework of Actor-Network Theory (which will be referred to as "ANT" throughout the rest of the thesis). ANT is a social framework that models what nonhuman and human factors go into making a technology more accepted by a society (or a subset of society). For example, initially when the internet came out very few people were comfortable with the new technology. As the internet had human, relevant social groups support it and had nonhuman elements that fixed societal problems, it was able to integrate into more and more people's day to day lives, with society being primarily pro-internet instead of anti-internet.
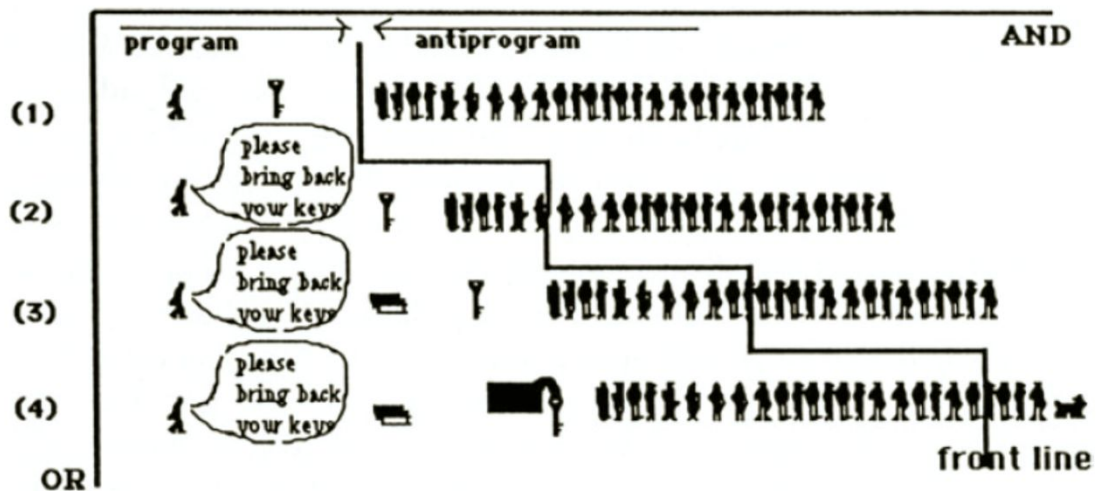

Fig. 1 - ANT Diagram for Hotel Key

Fig. 1 above shows an example, retrieved from a journal discussing Actor Network Theory, using a hotel key, to show how a society can change from anti-program to pro-program (Hertz, 2006). In this example, just having the key on its own doesn't encourage anyone to bring it back. Asking politely changes some people's behavior, but not enough to solve the initial problem of keys not being returned. The most compelling way to accept the process of returning a key was to combine not only asking, but also attaching the key to a large object that would make it borderline impossible to forget to return and would outright take effort to steal. The actants in this situation are the key, the block the key is connected to in the last example, and the message given by the owner of the key. These material objects, in certain combinations with each other, are able to influence the behaviors and desires of the actors.

My goal is to analyze mobile health solutions in this same manner by evaluating how actors respond to mobile health solutions, what nonhuman factors made them harder to accept in the first place, and what factors were introduced to make them more accepted. The actors involved in my discussion are the patients, elected officials, ridesharing employees, and healthcare workers. The actants are the rideshare companies developing healthcare solutions, the states in the U.S.,the healthcare system, and, in 2020, the COVID-19 pandemic. Together, their relationships with each other are in a network defined by how interconnected they are and how much trust is employed.

I felt that the Actor Network Theory framework was the optimal one to use as it perfectly represents the fluctuating situation mobile health options face: being able to gain public trust over time by combining as many positive nonhuman factors as possible. Needing to be accepted by patients, who pay for the service, healthcare workers, who need to approve the service, and elected officials, who need to legally enforce the services, is key for mobile health options to not only succeed financially, but be able to exist. I feel like in this constantly changing healthcare environment, especially with the public being wary and scared of a pandemic, finding out how mobile health solutions impact the healthcare space, primarily by analyzing how they have accomplished and failed to build public trust, is crucial to understanding their impact on society as a whole.

My plan for collecting data involves researching two things: the relevant parties providing the service and what impact these services have on the general public. My primary method of data collection will be document analysis. I feel that the most useful content would be from documents tailored specific to the topic of services such as Uber Health and Lyft's healthcare service.

After my topic became more finalized, I decided to find four documents that I feel will be quality sources of data and perspectives from as many viewpoints as possible. The timeline of this research took place over the week of 03/02/2020. The data was collected and analyzed over the week of 03/02/2020, and was finalized on 03/06/2020. Throughout the month of April, I collected six extra documents, each of varying levels of support to Uber Health and Uber as a company, and analyzed them as well to build my perspective on Uber's role in shaping healthcare in the United States.

In the fall of 2019, I also conducted an interview with Charlottesville healthcare worker Mark Rugarber. The interview was to help contextualize what problems people had with accessing healthcare in the first place and what mobile health can help with.

Data Analysis

The first data I found was back in the fall of 2019. I interviewed Charlottesville healthcare worker Mark Rugarber. Mark Rugarber is a Charlottesville emergency health worker who acts as a resource for people who don't have primary care. During my interview with him, he stated that UVA itself is actually the central hub for a majority of healthcare in the area. One of the main reasons for this is because of a lack of competition, forcing people to have to find more difficult ways to access their health care facility. He also discussed how people in rural communities, and even sometimes people in the more populated downtown, have to spend hours just to make it to the hospital because of traffic and distance (M. Rugarber, personal communication, 2019). Having his firsthand experience explain the difficulties of certain communities when it comes to receiving healthcare definitely highlights the possibilities that mobile health such as Uber Health can provide.

When doing document analysis, discussing the perspectives of the original authors is important. While I feel each document I found was important, I did notice that most of the articles I found tended to skew in favor of Uber Health and other mobile health instead of being overly critical about it. However, looking at when each document was written, I believe that makes sense, as the newer articles were more positive while the older ones addressed more important concerns. I think this paints a picture of change from the original inception of the service to where the service is now.

How Uber Health Gained Prominence

As I analyzed more and more resources, I noticed a trending pattern of Uber Health gaining credibility in the public when partnering with different companies and healthcare facilities. Similar to how Uber as a company was able to integrate into society by assuming the role as a "taxi but anywhere," Uber Health was able to grow because of a similar philosophy of taking what we already had, ambulances and medical taxi services, and making it more convenient and more cost effective ("Adams Clinical," 2019). In particular, ambulances can be so expensive that simply having the alternative of Uber Health can help people miss less appointments (Chen, 2019).

From the documents that I analyzed, and looking at when they were written and the context they were written in, I feel like ridesharing health services have been a progressing, two year long story of starting as a niche and novel concept to strategically becoming a powerhouse in the healthcare field. The genesis of these services began in 2018, with Uber Health in particular starting off by partnering with about 100 locations across the United States ("Uber Health and Cerner," 2019). As time progressed, however, these 100 locations became entire states and almost the entire country. The strategies of successfully starting with a subset of the population and then improving their reputation with small victories was definitely effective. Given the fact that Uber Health has now legally integrated itself in almost all of the United States by this point in time, I would say that building that reputation as an alternative solution that was close to before but slightly different was what made so many actors gravitate towards the concept.

Just as Uber was a close alternative to taxis, except with slightly different improvements, it helped that Uber Health services were viewed as more convenient and widespread taxi

services, which also were being used for healthcare services in some locations ("Adams Clinical", 2019). In addition to strategically partnering with services that already existed and already passed legal requirements, Uber Health was able to capitalize on their successes as Uber to integrate their health service into society. Pretty much any healthcare service that utilized taxis or even volunteer transportation could easily transition into using Uber Health if they chose to do so, and any patient that used taxis to get to the doctor could now have a choice.

The Problems with Uber and Uber Health

Uber Health capitalizing on Uber's own reputation does have some drawbacks, however. One issue that I personally saw is that, if Uber Health uses Uber's model, what protection is there for patients using the ridesharing health service from getting sexually harassed or assaulted? As discussed in a report describing lawsuits against Uber, the company has a history with some of its drivers sexually assaulting their customers (Saddiqui, 2019). This isn't an issue that can be explained away with author bias. This is a factual problem that could possibly make customers feel unsafe with this service. I think it is a very reasonable assumption to make that it's harder to build trust for a health based system that is from a company that has a legal history of this behavior. Another problem with Uber's system is that Uber is notorious for having poor wheelchair accessibility options (Chen, 2019). While ambulances can be expensive, they may be some people's only option.

John Commins of Health Leaders Media helped shed a perspective of how people viewed Uber Health negatively at the time it initially came out. In this document, Commins directly discusses the risks of fraudulent schemes impersonating as ridesharing healthcare services. The risk is that, as long as the advertisement for the service exists, it opens up healthcare providers to financial and legal damages. One of the most important actors in this network is healthcare providers, and the risk of being liable due to any amount of malpractice in a new industry was viewed as very high back when Uber Health was first introduced (Commins, 2018). From my perspective, I noticed most of these negative drawbacks were only discussed back when Uber Health was first introduced, and I think that is because Uber Health was able to show one of two things: its positive attributes heavily outweigh the negatives, or the legal problems it caused weren't enough to shake societal perception. Seeing that Uber Health has managed to not only exist but spread its influence a few years in, these negative attributes definitely didn't turn society anti-mobile health, at least by the start of 2020.

The Positives of Uber Health and their Future

Overall, through my research, even ignoring potential biases, I have seen many positive impacts that mobile health has on society. While mobile health can exacerbate traffic problems and trap patients in potentially hazardous situations, and has been criticized and legally reprimanded in the past, there is a reason why the concerns at the genesis of Uber Health have since gone away at the start of 2020. The positives of decreasing billions of dollars worth of missed hospital visits, being a cheaper alternative to ambulances, and being able to partner with reputable companies and services allowed ride sharing health services to gain the acceptance of consumers, healthcare facilities, and a majority of states and lawmakers across the country.

Right now, using Uber as an example, their health service partner Ride Health is in 30 states under a larger service. The company claims to have all 50 states using Ride Health by the end of 2020 ("RIDE HEALTH HAILS UBER", 2020). Ride Health helps connect healthcare providers to healthcare delivery services like ambulances, taxis, and, in the 30 states they're available in, Uber Health services. This partnership shows that Uber Health intentionally has tried new strategies and partnerships to increase their influence in the healthcare space since their genesis in 2018.

I personally compare the meteoric rise of acceptance from 2018 to now to Uber's initial rise as a company. Society deemed the idea of getting into a car with a stranger this terrifying and irresponsible idea for generations, and Uber was able to introduce enough features and strategic practices to overcome that perception. Using Actor Network Theory as a basis, they were able to combine the right factors to gain trust as not only a company, but as a model. Reading documents from 2018, highlighting the dangers of Uber Health, to finding stories about how their partners planned to be 100% available across the nation in 2020 shows that they made the right decisions as a company to overcome the hurdles of being accepted by lawmakers and patients.

However, a large majority of the data I collected was pre-COVID-19 pandemic. This ability to become a reputable and positive healthcare impact has now suddenly been put into question. Can this model survive multiple months of elective surgeries being cancelled, or be able to sustain itself by essentially being a delivery service for healthcare workers? Only time can tell, but one of the main actors, patients, has now been completely erased from the equation for a long period of time. They will have to earn the trust back of patients once this is all over in order to succeed and continue their model. There's a massive problem right now about how healthcare workers are actually losing their jobs due to a lack of hospital traffic (Karlamangla, Mason, 2020). People are scared to go to the doctor because of this new virus, and it's causing massive layoffs.

Data Discussion

Modeling mobile health solutions such as Uber Health and Lyft's health services in ANT framework involves analyzing the nonhuman and human factors that are promoting mobile health and factors that are preventing mobile health from being as widely accepted in society.

Uber Health and Uber Health-like services came into being after society accepted Uber and ridesharing services as a legitimate solution to transportation problems. However, unlike Uber Health, Uber was primarily for social purposes. The health version of these services came about due to the common problems of people missing their doctor's appointments. It wasn't as simple as having their normal drivers take patients to a hospital. Payment would have to be connected to the users' health insurance and the drivers would have to be knowledgeable about any problems the patients might have during the commute and how to deal with it appropriately.

Just as when Uber and Lyft first came out, the hardest barrier to overcome for these types of services to flourish is the issue of trust. However, the difference between something like Uber and Uber Health is the fact that, with Uber, if the ride is poor or if the user arrives late to their destination, they can simply leave a bad review and move on with their lives. A lackluster Uber Health ride, on the other hand, can become a matter of life and death. As a result, even though

Uber Health has currently expanded to being available wherever Uber is available, there's still a lot of risk when using the product, especially compared to Uber Health's parent service.

Another potential problem with the service is a lesser known issue. The more of these services on the road equates to more traffic in heavily populated areas. A city like Charlottesville, from personal experience, can take upwards of 45 minutes to travel one mile in poor conditions. An Uber Health vehicle on the road in this situation wouldn't necessarily help someone in need, and might actually trap them in a situation where they can't be taken care of.

Many articles found talking about Uber Health were from the genesis of the model. Very few mainstream media outlets were covering the system. ANT states that any accepted service requires social promotion and needs to provide a necessary function. In order for Uber Health-like services to gain more prominence, and for mobile health as a whole to gain trust in society, they need to ease the idea through means of advertisements or free promotional services. Many people don't know what these services are, nor do they believe that they are options. If someone thinks their only way to the hospital is via car, but don't want to spend money on gas for the transit, then there's a chance that they may not have great internet to know about these services. I noticed that most of the articles immediately available about mobile health are from health journals. When looking up "Uber Health" at the start of my data collection, one of the first articles that shows up is from 2018. It's not a mainstream idea that people are talking about, and if they can't get enough momentum to make the general public understand what mobile health can accomplish, they're not going to develop the trust. That being said, even if the patients themselves aren't using these services or don't know about them, if they can gain the trust of healthcare providers and the states legalizing these services, they may not even need patients to directly reach out to use these services to be profitable and helpful.

Even though the documents I analyzed seem to be painting a big picture on society accepting ridesharing health services as solutions, through my research I have personally found some flawed models in the service that could be preventing a faster transition from anti-program to pro-program. The primary reason I found is the fact that simply trusting typical Uber drivers isn't a calming thought. Even now, as COVID-19 is becoming a more major health concern, in my personal opinion, the idea of having strangers take someone to the hospital, who have likely been exposed to sickness or disease, is just not a comforting idea. What these companies need to do is to share how mobile health is shaping the way we think about going to the doctor and how it can encourage people to live longer lives in as many public and seeable places as possible. As with healthcare as a whole, if patients have problems with trusting their doctor, why would they want to risk trusting their transportation with another party that they don't know or trust?

Uber as a model doesn't scream "health" to me personally. If I'm thinking to myself that I need to go to the doctor for whatever reason, the last place I'd want to be personally is in someone else's car driven by a stranger. Even something as simple as a severe allergic reaction from something in an Uber Health driver's vehicle is all it takes for an Uber Health ride to be a failure. Another concern I have for Uber Health is that, for example, if someone is in need of going to the doctor for an injured arm, and their driver decides to attack them physically, what protection does this patient have? They can't as easily fight for themselves in this situation and could possibly be taken advantage of. Even though these systems are more cost effective than ambulances, I could very well see a subset of people giving more money for a safer, government mandated alternative in an ambulance versus Uber Health.

I predict that, with the pandemic of COVID-19 and the advent of social distancing culture, societal opinion Uber Health will likely shift more towards anti-program, even after social distancing ceases to be. In a culture where people are too scared to go to the doctor, even in emergencies, out of fear of contracting COVID-19, in what situation would people feel comfortable riding in stranger's cars when they have actual medical problems? Currently, Uber Health is providing healthcare workers transportation, but once the dust settles, it is impossible to know when we as a society feel comfortable being around strangers again. I think all of the good will that Uber Health built over the years, all of the strategic partners they made, and all of the business decisions that put them in a position to be legal in more locations could possibly be for naught. That's not to say that they'll lose the trust of legal enforcement or the states, as I feel like they've already succeeded on that front, but it'll be hard to win the public back over now that people are more aware of diseases and be more wary of ever getting near people.

Using my ANT diagram of how the different actors respond to the timeline of Uber Health's existence, Uber Health's major problems going forward doesn't necessarily have to do with their own legal implications with healthcare facilities or the states themselves. Their main hurdle they have to get over as a company is to find a way to reintroduce their model to a society that is literally scared to go to the doctor's office. Through no fault of their own, Uber Health's ability to recover billions of dollars of missed appointments has become a moot point, as those appointments aren't being made in the first place. COVID-19 isn't going to change the fact that healthcare facilities, elected officials, and states have agreed to adapt to Uber Health's system, but the average person's fear and disillusion with the idea of the casual doctor's appointment is going to heavily hurt their bottom line. While we don't have any direct evidence of COVID-19 impacting Uber Health themselves, we do have direct confirmation that healthcare as an industry is suffering right now.

Uber Health has a lot of decision making over the next couple of months and possibly years to figure out how to get ordinary people to trust not only them again, but the healthcare system as a whole. If Uber Health was able to get people to miss fewer and fewer appointments, they'll have to come up with strategies to get people to make those appointments again once this all subsides. Based on how Uber and Lyft were able to transcend the eternal "Stranger Danger" messages of yesteryear and become viable solutions in certain locations, I think that, if they play their cards right, they have the ability to gain back the trust of individuals scared of the pandemic. However, this process, like the one before it, will likely take time.

Fig. 2 - ANT Diagram for Mobile Health

The diagram above shows my analysis of Uber Health in the view of Actor Network Theory. While there are hundreds upon thousands of actors and actants, I consolidated those actants into a few major groups: Uber and Uber Health, healthcare partners that deliver patients, the innate fear of Uber, and the COVID-19 pandemic. To understand which actants are connected to which actors, the actants are a darker shade of the same color compared to its connected actors. As seen in the diagram, Uber Health, with the ability to partner and strategize with the right components, were able to win over actors to become heavily more integrated into society. The original actors they attracted from 2018 were very specific, while their introductions of new healthcare partners helped them gain traction with wary healthcare officials and more uninformed patients. A fear of Uber will always prevent certain actors from participating in their service, however. This can likely be remedied by introducing actants and policies that make Uber more trustworthy as a service, but this will always be the most consistent hurdle that the service has to deal with.

Now, with COVID-19 as an actant, while their efforts on some actors remain effective, the fact that so few patients are making appointments drove all categories of patients far into the anti-program category. They were able to gain and maintain trust of healthcare facilities throughout the years, but patients being so unwilling to go to the hospital in this day and age has caused a massive anti-program shift. Moving forward, they need to come up with solutions and introduce actants to get patients back into pro-program so they can succeed as a business model.

Conclusion

Transportation and healthcare are two necessities that are viewed as parallel but are really meticulously intertwined. Current mobile health solutions are a step in the right direction but they are, as of now, not well enough integrated into society to truly be a quality solution that people in every community will use and embrace. There are also problems with trusting drivers to successfully deliver patients. However, the positive of being able to give people transportation to hospitals that can't afford it is too important to not attempt to help bring it to as many people as possible. I believe if we can figure out a reasonable way to broadcast these ideas to as many people as possible, we can start to make healthier and safer people in our community.

Healthcare relies on other people being in a different power dynamic than others, someone will always be at a disadvantage, whether that be through doctors or drivers. Distrust issues require years, if not generations, of societal rebuilding to fix. As long as people feel marginalized, it is hard to find a band-aid solution.

While on paper it seems like the best we can do is to further improve and promote these systems to help as many people as possible, I think it's a bit more complicated than that. Trust in a new technology or system is wholly reliant on the right relationships of actors and actants in a network, as it's a delicate system of give and take that allows technology to become integrated into society. Transportation problems and healthcare inadequacies are here to stay for the foreseeable future, and Uber Health has done a surprisingly good job at helping to remedy both of these problems for communities around the United States over the last couple of years. They have had a positive impact in fixing problems like missed doctor's appointments and have offered cheaper alternatives to ambulances. No matter how they handle their name recognition or their system as a whole, they have helped people and will likely continue to help people.

The problems arise when holes are found in Uber's model. What can Uber do to protect people from not only the novel coronavirus but also diseases as a whole? What can Uber Health do to maintain cultural relevance in a time when people would rather have strokes in their own homes than go to the doctor over the risk of being a statistic in the pandemic? These hypothetical questions are almost impossible to answer and will require creative problem solving to figure out. Just as Uber, Lyft, and other ride sharing operations helped transform healthcare on a legal and state scale, they'll have to retool their operations to make people more confident in their systems during these new times. Trust is the most important metric that keeps systems like Uber Health afloat, and just as the public can give them the power to develop a widely used health delivery service, in an instant the public can take it away. Healthcare is changing and it will be up to these companies to figure out how to adapt to the times.

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