WHITE PAPER

Mitigating the Spread of COVID-19 Determinants of Health

Sara Ratner, SVP Government Programs & Strategic Initiatives

COVID-19 is a catastrophic pandemic—the effects of which the U.S. will continue to experience for the foreseeable future. People have suffered educational gaps, mental health issues, layoffs, loss of healthcare coverage, and declining healthcare utilization. Included in this is a significant reduction in access to and utilization of preventive services and vaccinations, both of which are critical in prevention and mitigation of more serious chronic conditions. This is a natural consequence of stay-at-home orders and the potential to limit increased exposure to COVID-19 when going to a healthcare provider. However, delaying healthcare will have a sustained and perpetual adverse impact on preventing and managing diseases, ultimately contributing to an increase in chronic conditions, accelerated comorbidities, a spiked death rate, and persistent cost increases and spending. Revel tracks this as a new, unique, and significant health factor referring to it as COVID-19 Determinants of Health (CDoH) since there are unpredictable health impacts, and a newly formed caste system around access to critical programs and services necessary for work, care, and basic living.

Background on Vaccinations and Screenings

Preventive services and vaccinations have played a critical role in healthcare, so much so that the federal and state governments create financial incentives and quality indicators that are directly linked to performance in these domains. Pre-COVID in February 2020, 63% of individuals received necessary vaccines on time, while 23% limited the number of shots or skipped at least 1 vaccine. However, COVID-19 has interfered with the rates in a way that will have a catastrophic effect on healthcare conditions and cost burdens.

The below demonstrates the overall decline in vaccination rates with numbers as high as 60% since the World Health Organization (WHO) declared COVID-19 a pandemic.

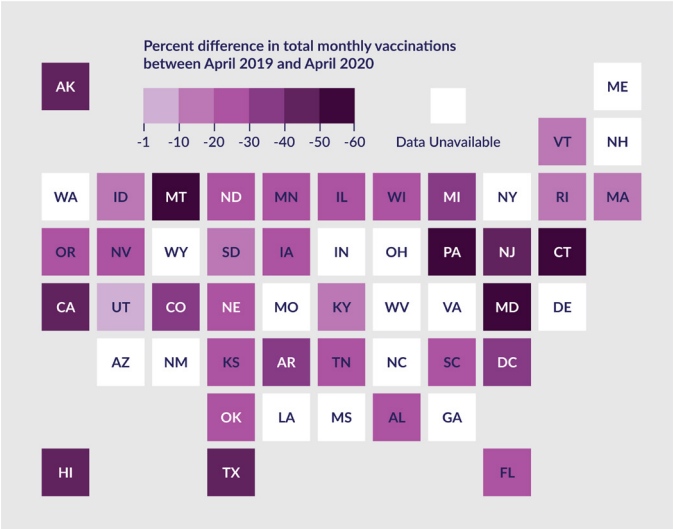


Image Source
https://www.scientificamerican.com/article/vaccinations-have-sharply-declined-nationwide-during-the-covid-19-pandemic/

2020 © Revel Health, LLC

The paltry vaccination rates have triggered alarms in the medical community considering the secondary effects on future spread and herd immunity. Also, the COVID-19 ubiquity perpetuates the inimical impact on immunizations.

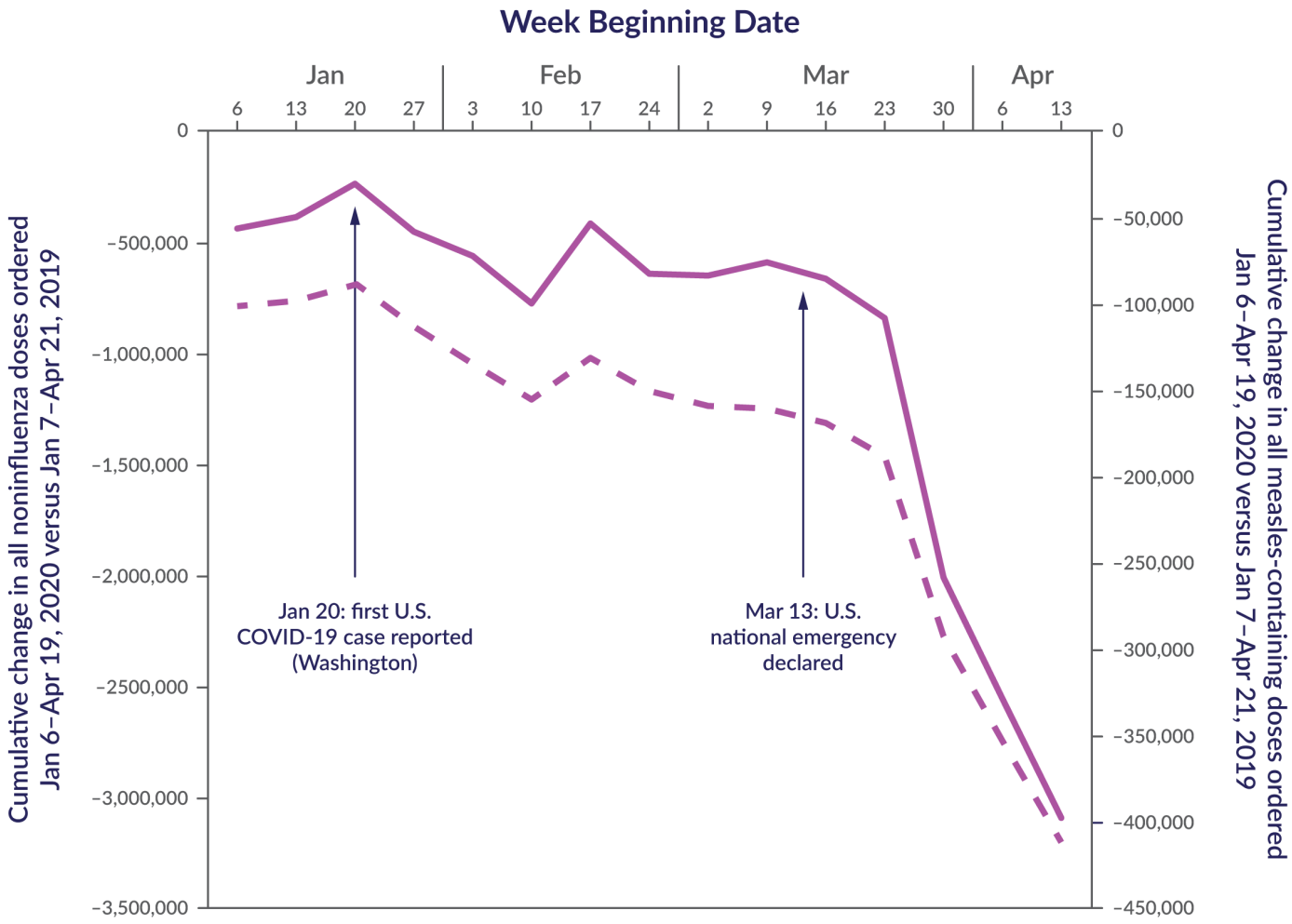
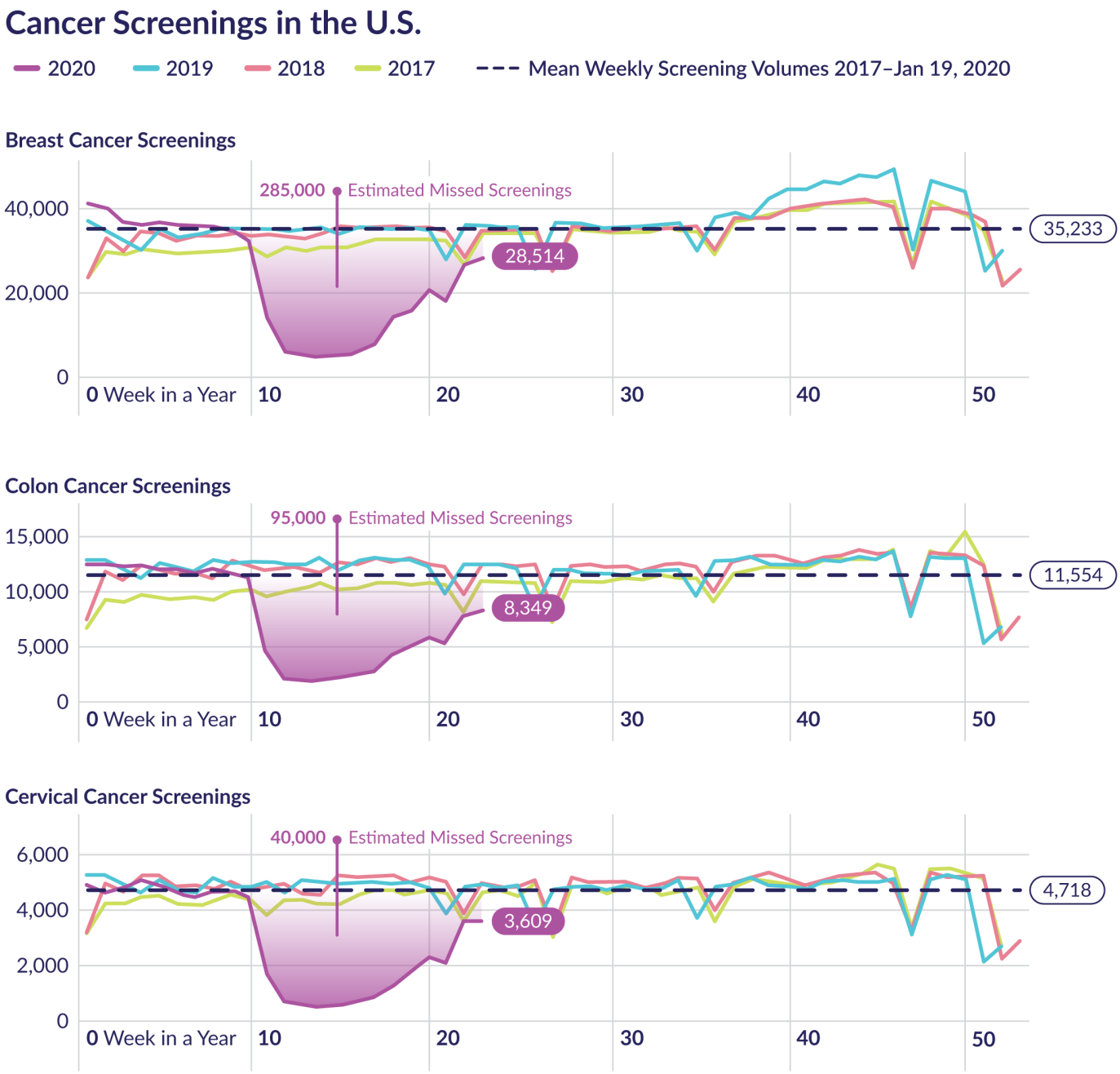


Image Source
https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm

2020 © Revel Health, LLC

Recent data shows that of the missed appointments, 60% are for vaccines with 50% of those for kids younger than 2.

In addition, the U.S. has also experienced a perennial decline in preventive screenings. Epic recently measured this for several types of screenings indicating a drop in preventive cancer screenings for colon and breast/cervical cancer by 86% and 94% respectively.



2020 © Revel Health, LLC

This data shows since the beginning of the pandemic a significant dip with continued periods of declining volume. While this data is acute, more so is absence in subsequent and corresponding increase demonstrating that **patients are not rescheduling for missed preventive screenings**. As a result, "cancer cases could go undiagnosed or be diagnosed at a later stage with a poorer prognosis."

Similar data from Komodo Health indicates **cervical cancer waning by 68% and tests for cholesterol, diabetes, and other types of cancer also experiencing sharp declines**. Future rates of cancer would be a consequence of this period and a CDoH.

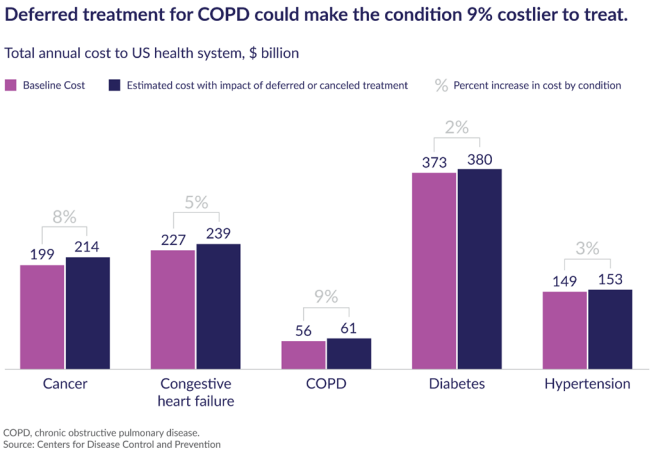
There are multi-variant ramifications for missing recommended preventive screenings.

Diabetes	• Pre-COVID there were 20% undiagnosed diabetics • Delaying diagnosis by up to 3 years results in 40% higher rate of cardiovascular disease (CVD) and 20% higher all-cause mortality • Cardiovascular and vascular events are 11-16% higher with every 1% increase in A1C • Per year costs for diabetic: $16,750 ($10K due to disease)
Chronic Kidney Disease (major cause of Hypertension and Diabetes)	• Affects 13% of population • From stage 3 ($3500) to 4 ($12,700), $9200 per person per year cost increase; all cause costs go from $27,000 to $77,000 per year (those who progress to ESRD is greater than $300K per year)
Colorectal Cancer	• 1st year costs: Stage 1 ($30,000) Stage 4 ($67,000) • Ongoing costs: Stage 1 ($2500) Stage 4 ($11K) • Increased rates of screening demonstrates a 25.5% reduction in incidence • Pre-COVID: 1/3 non-adherent to screening recommendations

Data Source
https://www.canaryfoundation.org/wp-content/uploads/EarlyDetectionFactSheet.pdf

2020 © Revel Health, LLC

Data from a recent McKinsey article, Understanding the Hidden Costs of COVID-19's Potential Impact on US Healthcare, provides further support for this. The chart below shows a substantial cost increase from delayed or cancelled care with COPD reporting the highest with a 9% increase.

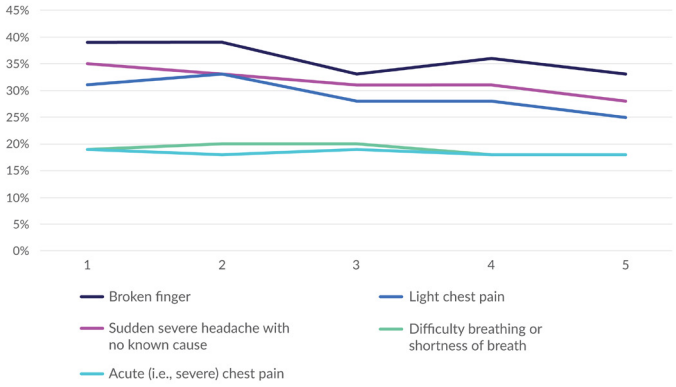


This data establishes the stark difference in cost and results by delaying routine screenings. To the extent COVID-19 has created an actual or perceived limitation to healthcare access, the industry is likely to see tectonic increases in the chronic diseases listed above along with others. The current cost burden and pandemic demands do not support utilization elasticity driven from these delays and foster adverse consequences from more inauspicious conditions.

Revel Data

Revel commissioned the Harris Poll to conduct several independent surveys to discern if people were delaying or foregoing care. Starting the week of April 13th and running through August 27th, Revel conducted 5 waves of surveys studying declines in healthcare utilization during the COVID-19 pandemic. Initially exploring access to health services based on severity, Revel sought to understand whether individuals are less likely to go to the doctor with the stay-at-home orders for the following conditions: broken finger, light chest pain, sudden severe headache with no known cause (a sign of a stroke), difficulty breathing or shortness of breath, and acute chest pain. The table below, shows more people are willing to go to the doctor for much more acute issues, such as chest pain or shortness of breath, while others are less likely for minor ailments.

While there is a slight improvement in wave 3 which occurred May 29, 2020, these studies show a consistent access and utilization rate through the pandemic. It is worth noting an exception for sudden severe headaches where people are less likely to go to the doctor at a higher rate. This is concerning since sudden headaches with no known cause can be an indicator of a stroke.



Separately, and relative to child visits and vaccinations, Revel measured the impact of COVID-19 on utilization in three waves between May 29th and August 27th. Initially, nearly half of parents with children under age 18 (46%) did/would go to an appointment as scheduled if their child was scheduled for a well-child doctor visit and/or vaccinations during the COVID-19 outbreak, 50% would reschedule for a future time, while 4% would cancel and not reschedule. In the August survey wave, there was a slight increase in willingness to go to the doctor with 49% (compared to 46%) did/would go to an

2020 © Revel Health, LLC

appointment scheduled for their child, and 46% would reschedule for the future with 5% canceling.

Both of these studies demonstrate that people have not significantly changed their views about accessing healthcare providers since the start of the pandemic. The reduction in willingness to go to the doctor has perpetuated even as states lift their stay-at-home orders. This is concerning because of the pernicious effects of foregoing care or vaccinations and the corresponding burden on virus exposure, disease progression, and lifespan.

As part of the August 27th wave, Revel assessed the propensity for getting a COVID-19 vaccine when it becomes available. A majority of parents with children under age 18 (88%) say if a COVID-19 vaccine becomes available they would vaccinate their children against COVID-19, with nearly one-third (31%) saying they would get their children vaccinated immediately. However, a recent Gallup poll measuring willingness to be vaccinated showed 65% of adults were likely to get a vaccination when available. Further, a third of employed Americans are unwilling to take a vaccine.

These figures are consistent with another study published in EClinicalMedicine reporting 67% of respondents would accept a COVID-19 vaccine. The study goes on to discuss the disparate health outcomes related to COVID-19 in Black and Hispanic communities largely related to historical oppression and current disparities in healthcare. To this end, the study found Black Americans were less likely to get the influenza vaccine and are less likely to accept a potential COVID-19 vaccine. Years of education and employed status also correspond to increasing vaccination acceptance rates with the study noting, “these findings demonstrate that low income communities, which are disproportionately impacted by COVID-19, may be more susceptible to continued outbreaks, even if a vaccine is available.”

Revel and other industry studies expose some of the underlying reasons, determinants, and biases that trigger individual-specific decisions around healthcare and the underpinnings that produce some of the results described above. It also helps inform some of the strategies further discussed in this article that can help drive individual and population-specific health action combatting some of the determinants precluding meaningful healthcare access.

Changing Behavior Going Forward

It takes, on average, 18 to 254 days for a new behavior to become automatic. The pandemic, quarantines, and restrictions have persisted for over 5 months with enough time to pass precipitating new habits, behaviors, expectations, and ways of experiencing life. Quarantines and restrictions are spawning new convictions around healthcare. Contrary to pre-pandemic with consistent vaccination adoption rates, some may now view these measures as unnecessary with the quarantine, limitations in school attendance, and infrequent socialization and engagement. Others may weigh the benefits of getting vaccinations with the potential COVID-19 exposure and decide, due to the ease of transmission, it is safer to forego vaccination especially for those with comorbidities. And others are luddites.

As long as it takes to form an opinion, it can take just as long to change it. Until the U.S. realizes a decline in COVID-19 cases, people will be reticent to change established behaviors. For this reason, it is critical to develop messaging for patients and members to edify and reinforce the need for vaccinations and screenings, the safety and efficacy, and implications for failing to observe recommended healthcare.

Education and personalized messaging can help evolve assumptions, judgments, and perceptions, especially those ingrained and entrenched. These can help reverse and avoid availability heuristics or other cognitive biases that can give rise to misconceptions that vaccines are

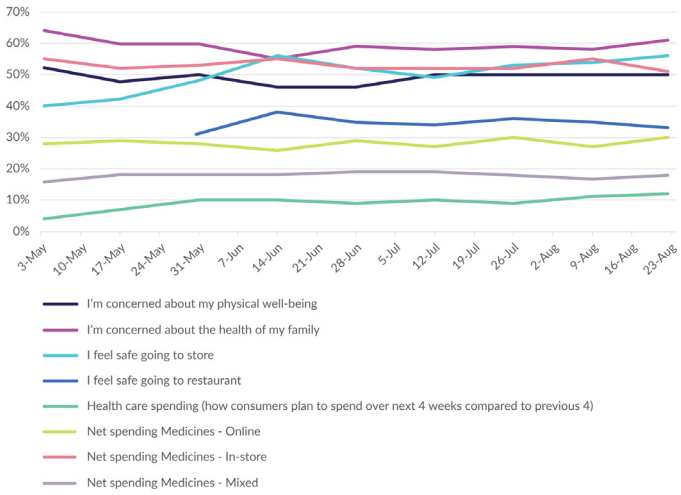
2020 © Revel Health, LLC

not effective, certain people are invulnerable, the vaccine can actually cause the ailment, or there can be harmful side effects. With these tendencies it is fundamental to advance an approach that is personalized acknowledging the greater message adoption rate with a bespoke design.

This approach can be especially critical for Medicare and Medicaid beneficiaries. For Medicare, it is vital to access services fostering preventing and managing chronic conditions, or the disease burden and cost will become untenable. In addition, COVID-19 has catalyzed millions of newly eligible Medicaid beneficiaries. In the midst of changing and utilizing new healthcare benefits, clear messaging is fundamental to promote frictionless access to necessary services. Clarity and personalized messaging furthers the chance that the beneficiary will engage in the recommended behavior.

Decision-Making

A recent Deloitte poll examined healthcare utilization and consumer goods buying patterns.



The State of the Consumer Tracker measures behaviors during COVID. In examining how people are accessing health and non-healthcare services, the tracker highlights several interesting behaviors.

1. People are increasingly concerned about the health of their families. Interesting, levels are rising to the rate initially experienced in May when COVID-19 rates first spiked. While there was a decrease in daily confirmed cases from June to July, August has experienced the highest rate of daily confirmed cases since this start of the pandemic.

2. While there is a steady increase in those that feel safe going to the store, there has been a decrease in net spending on medication in-store as well as a drop in the number of people feeling safe going to a restaurant. These data points are a bit inconsistent since the expectation would be feeling safe going to the store would tie to an increase in in-store medication purchases and greater safety in going to a restaurant.

3. Corresponding to the decline in in-store medication spending, the data reflects an increase in online medication spending.

4. While the Revel Harris Poll reflects a continued reticence in accessing healthcare, the Deloitte Tracker shows an uptick in healthcare spending since May.

Healthcare and Future Vaccinations

As flu season approaches there is laser focus around the exacerbated and compounded impact and toll on the healthcare system another virus could catalyze. While availability heuristics and biases may hinder vaccinations, the potential to have multiple vaccinations—COVID-19 and flu—during the same season may engender certain convictions influencing access to only one of the vaccines rather than both.

For example, there is media attention around the notion that some people believe getting only one vaccine will inoculate them from both viruses. In addition, there is concern that limiting COVID-19 vaccine access to only

2020 © Revel Health, LLC

physician offices creates a preclusion with wider, but singular, adoption for the more accessible flu vaccine.

Further evidence for this is seen through studies evaluating compliance with multiple-dose vaccines. One study assessed children, adolescents, and adult rates of compliance for all required doses for varicella, hepatitis A, and hepatitis B vaccines. Of those receiving the first dose or any of these vaccinations, only approximately 50% completed the series with the lowest compliance rates for adolescents (35.9%) and Medicaid beneficiaries (29.7%). While COVID-19 and flu vaccinations are not multi-series vaccinations (note: at the point of writing this article COVID-19 is not multi-series, however as the vaccination is released that may change), this study lends support for the fact that when multiple vaccines are required there is a lower compliance rate. This season people may choose either COVID-19 or flu vaccination but there is a lower probability people will opt for both. Especially concerning is the vaccination rate for Medicaid beneficiaries who reflect a population that is more susceptible to, and adversely impacted by, COVID-19.

Going Forward

We have experienced volatility in decision-making and consumer behavior unlike any other time reflecting unprecedented conditions accruing from the COVID-19 pandemic. Emerging from this period are new barriers and unanticipated CDoH. The long-term consequences from this are unprecedented and dependent on the likelihood that a treatment delay or cancellation could exacerbate a condition. The recent McKinsey article referenced above highlights the qualitative impact on this on total spend.

Condition	Likelihood of delaying or canceling treatment	Consequences of delaying or canceling treatment	Total impact
Cancer	Low	Very high	High
Congestive heart failure	Medium	High	Medium
Chronic obstructive pulmonary disease	Medium	High	High
Diabetes	Low	Medium	Low
Hypertension	Low	Medium	Low

This chart illustrates the likelihood of delaying or canceling treatment, the consequences, and total impact with the article noting that when experienced across all conditions for an extended period of time, the pandemic could produce a cumulative and unprecedented burden on health system costs.

There are new requirements and needed capabilities around communication methods, tone, and content to encourage people to access healthcare that prevents or lessens acute conditions, promotes vaccinations, and manages chronic conditions. The attributes supporting previous approaches and tactics have been suppressed requiring new strategies for this remarkable time. The longer this pandemic ensues, the harder it will be to shape behavior change and reverse course on contemporary belief systems, yielding diminishing returns.

2020 © Revel Health, LLC

With this in mind, Revel recommends several strategies in communicating the need for health actions:

1. **It is imperative to use personalized messages to create a strong desire to act.** Messaging that isn't person-specific lessens the likelihood of influencing health action. The differences in populations and profiles impacted require behavior change tactics individually architected, understanding and respecting healthcare is highly personal and heuristics, biases, and authorities are developed from individual experiences; influencing actions need to be done through a similar framework and lens in which they are formed. Specifically, the industry cannot expect to change behaviors and beliefs through a universally adopted approach when the barriers were created through a personalized process.

2. **Reduce the emotional and behavioral barriers preventing action, especially fear.** As we described above, fear can immobilize action especially when supported by availability heuristics that help support and rationalize behaviors. As a result, education aimed to influence and change belief systems is essential in reshaping emotional barriers to action. Fact-based education can help eliminate cognitive dissonance when logical action is at odds with personal belief barriers.

   However, it's not always about information—as it's often said, you can't "fact" people into believing something. For example, anti-vax advocates are well-informed, but their actions are emotional. The key is that, overall, the desire to act has to be above, or higher than, the barriers that keep someone from taking action. Communication can help influence this.

   Using vaccinations as an example, the communication should include sharing information about the process to ease worries normalizing it through messaging such as "people like you are going to get their flu shot," and pre-empting any objections to proactively address trade-offs.

3. **Reduce the logistical barriers preventing action (e.g. not knowing where to go, what the experience will be like, how I get started, etc.).** This is especially critical for the most vulnerable populations, which have experienced some of the poorest health outcomes from COVID-19. Transportation, financial, health literacy, time-off from work, and other barriers contribute to the reasons people cannot take health action. It is compulsory that these be eliminated to influence the behavior change that drives positive health outcomes. The industry has largely understood and accepted this and is adopting new approaches to help reduce access and barrier burdens. States and the federal government are encouraging and even incenting around investing in services and programs to remove various healthcare determinants. However, COVID-19 has created additional, and exacerbated existing, determinants requiring constant iteration around new approaches to promote and facilitate health action.

   Messaging where there are logistical barriers should address things such as: where to go, the process once the consumer arrives, cost, and other salient steps. For example, if an individual is getting a vaccination, the messaging would entail where to go, arrival and check-in time, and any logistical information such as a mask is required.

Conclusion

The pandemic has commuted healthcare beliefs and utilization resulting in CDoH that hinder access and availability. New patterns, biases, and constitutions have manufactured a barrier to healthcare that has been critical to preventing the evolution of more chronic and complex healthcare, and provided preventive health to mitigate virus susceptibility. To ensure durability and sustainability in the mechanisms suppressing virus spread, continued education and messaging is required. Data has demonstrated that, with the spread of information, healthcare access and utilization will change. As a result, it is paramount to disseminate information fostering increased adoption and utilization of preventive healthcare. Without this, the industry will continue to experience an ineffective exercise of healthcare that is critical, especially during the pandemic.

2020 © Revel Health, LLC

With over 100 million member and patient connections, Revel is a next-gen healthcare technology company that uses data to move people to take action for better health.

Our mission is to make the world a healthier place using innovative technology, fanatical teamwork, and brilliant creativity.

revel-health.com | go@revel-health.com

Revel/Harris Poll Methodology:
The surveys were conducted online within the United States by The Harris Poll on behalf of Revel Health. Wave 1 fielded April 13-15, 2020 among 2,032 U.S. adults ages 18 and older, Wave 2 fielded from May 5-7, 2020 among 2,051 U.S. adults ages 18 and older, Wave 3 fielded from May 27-29, 2020 among 2,019 U.S. adults ages 18 and older, among whom 686 are parents of children under age 18, Wave 4 fielded from July 7-9, 2020 among 2,022 U.S. adults ages 18 and older, among whom 748 are parents of children under age 18, and Wave 5 fielded from August 25-27, 2020 among 2,067 U.S. adults ages 18 and older, among whom 792 are parents of children under age 18. These online surveys are not based methodologies, including weighting variables and subgroup sample sizes, please contact Sara Ratner (sara.ratner@revel-health.com).

2020 © Revel Health, LLC