



LESSONS FROM COVID-19

Toward a Resilient System of Health

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PARTNERSHIP
for New York City

Table of Contents

Preface	3
Executive Summary.....	5
A Vision of Health and Economic Resiliency for New York City.....	7
Blueprint for a Resilient Future	21
Call to Action.....	41
Appendix A: Social Determinants of Health Deep Dive	42
Appendix B: Analysis of Health Care Ecosystem	53
Appendix C: Quantitative Deep Dive and Analysis.....	76
Appendix D: Qualitative Analysis	89
References and Acknowledgments	91
Endnotes	93

Preface

New York City has withstood many crises over its 400-year history, none more challenging than the COVID-19 pandemic. The first major outbreak in the United States took place in New York, with its first case diagnosed on March 1, and the city remained the global epicenter of contagion and death for almost two months before gaining control of the spread and gradually achieving one of the lowest positivity rates in the country while continuing to conduct testing at a very high rate.¹

COVID-19 profoundly disrupted every sector of the nation's largest urban economy and dramatically changed the lifestyle of its residents. New York was one of the first areas in the U.S. to be significantly impacted by the pandemic. Although New York's pandemic is not over, it is being managed in an effort to maintain low infection rates. Some things worked well and others did not, but there were many opportunities to learn for the future. These lessons learned are not only helpful to guard against future disruptions in the New York metropolitan region. They are also applicable and ready to be shared with emerging COVID-19 hot spots, just as New York is learning from what is happening in other places.

COVID-19 has taught us that this disease—at pandemic scale—is not just a problem of health and health care but has wide ranging economic and social implications. This report, developed in collaboration with Deloitte, takes a close look at the interconnected health and economic impacts in New York and the implications for the future of cities more generally.² It identifies systemic factors that contributed to the magnitude of the pandemic's impact on the city and provides recommendations for both near-term recovery and long-term revitalization. It is important to note that the research for this report was conducted between May through July 2020, as with much related to the pandemic, things have been shifting rapidly but calculations and assumptions needed to be set for a specific period of time. Its preparation involved an in-depth exploration of the health care ecosystem and the broader health determinants affecting approximately 20 million people who live and work in the New York metropolitan region, which has always been a leader in health care, medical education and public health.

Research for the report included more than 50 interviews with hospital leaders and business leaders, government officials, entrepreneurs, investors, insurers, nonprofit directors, frontline health care workers and many others. One theme—**New Yorkers uniting to support each other**—recurred throughout the discussions, highlighting the resolve and values of New York. Some key examples that emerged throughout the research process include:

- **Competing hospital systems banded together to address their biggest challenges.** Health systems in New York City and Connecticut coordinated efforts to form purchasing coalitions for personal protective equipment (PPE), distribute ventilators, share clinical insights and more. In fighting COVID-19, these organizations collaborated more closely over the course of a few weeks than they had in years.³
- **Residents spontaneously organized to support frontline health care workers and stopping the spread.** Every day, at the 7 p.m. shift change, city residents opened their windows to cheer on frontline health care workers. Restaurants donated food to hospitals, and pet and child care services were offered to support workers who were unable to go home. Citibank supplied meals to hospital workers from its office cafeteria. Above all, “nonessential” workers and their families sheltered inside their cramped apartments to help “flatten the curve.”⁴
- **Organizations proactively protected the most vulnerable residents.** One regional health plan partnered with a technology company to build a chatbot to contact its 115,000 New York members with underlying health conditions. The outreach focused on ensuring food access, support for unemployment benefits and connecting residents to other social services.⁵ Philanthropists organized private funds for human services organizations to distribute to immigrant households not eligible for unemployment insurance and federal aid.⁶
- **Health care workers made personal sacrifices beyond working in hospitals.** Many medical workers took measures to protect their families from being exposed to COVID-19. For example, a practicing emergency room doctor and her husband (also an emergency room doctor) sent their young children to live with other family members so they wouldn’t be exposed to viruses they might have brought home from the hospital.⁷
- **The government temporarily waived 250+ regulations to enable health care providers to more quickly respond to the crisis.** By removing these regulations, clinicians were able to travel to understaffed hospitals across state lines. Moreover, nurses had fewer administrative burdens, which allowed them to balance increasing patient loads, and clinicians were able to expand virtual health tools to continue non-COVID-19 patient care.⁸
- **Partnerships filled food-security gaps for communities in need.** New York City’s Food Czar contracted with GrowNYC to support its food access programs during the pandemic. One component of this contract was the distribution of free Emergency Fresh Food Boxes provided to GrowNYC under the USDA Farmers to Families Food Box program. The USDA contracted with an upstate packing house that delivered the boxes to GrowNYC’s Food Hub. From there, the boxes were delivered to families living in neighborhoods most impacted by COVID-19 through GrowNYC’s partnership with over 25 community partner organizations.

These stories collectively remind us of what is possible when people come together—particularly across sectors—and help provide the hope and optimistic mindset needed to drive positive change.

Executive Summary

COVID-19 revealed the imperative to move towards a resilient system of health where the primary focus is to predict and proactively treat illness at a community level rather than provide reactive care when an individual gets sick. By creating and utilizing interoperable health data, organizations can leverage real-time scientific insights to move towards a “learning health system” to improve overall population health and reduce the outsized health and economic impacts on vulnerable populations. COVID-19 vividly demonstrated how social determinants of health—factors beyond direct medical services that influence overall health—are linked to disparate outcomes for Black and Hispanic populations.⁹ These findings emphasized the underlying need for health care payment reform as well as for cross-sector approaches to achieve a more equitable and resilient future state.

The Blueprint for Resiliency

RENEW AND SUSTAIN CONFIDENCE

As the region moves beyond pandemic, there are several near-term actions that can be taken to recover, restore confidence and bring hope for the future:

- Closely support and track the evolving science-based public health guidelines, with clear guidance from the state government
- Encourage independent validation of healthy workplaces
- Maintain regulatory flexibility that was put in place to deal with the COVID-19 emergency
- Use a data-driven approach that considers social determinants that are essential to public health
- Expand preventative care with community health hubs and other local institutions

MOVE BEYOND RECOVERY

Medium-term actions for a resilient future system of health will lay the groundwork to encourage equitable health outcomes and a better resourced health system:

- Encourage a shift to community-focused, value-based care
- Establish the basis for a learning system of health which can leverage data to learn in more real-time with real world evidence
- Encourage public-private partnerships (PPPs) to address the social determinants of health issues
- Convene a group of health care, business and government leaders to investigate the potential to improve supply chain redundancy and investigate localization as well as expand participation in group purchasing organizations to additional entities considered front line workers such as small business owners, food service and other entities vital to keep services running.

FUTURE-PROOF THE REGION

Through interviews and analyses, it became clear that achieving resiliency would need to go beyond addressing systems within the traditional health care ecosystem. Rather, it is about the different systems that support health and well-being—from business to food to job support to health care.

Leaders from the health sector should collaborate to protect against future disasters and to ensure long-term resiliency, including:

- Reform Medicaid reimbursement
- Develop regional, cross-sector strategic plans for future disruptive events
- Encourage health systems, businesses and educational institutions to leverage their “anchor institutions” status to support community investments that improve underlying social, economic and environmental factors that impact health.

A Vision of Health and Economic Resiliency for New York City

As New York City charts its recovery from the pandemic, resilience will be key to weathering current challenges and withstanding future crises. Resilience will help the city ward off future surges of COVID-19 as well as prepare for other disruptions such as major storms, bio or cyber terrorism and climate change. Contributing to rebuilding and resiliency efforts is not a new venture for New York’s business community, although the challenges emanating from COVID-19 are uniquely complex. In July 2020, the Partnership for New York City published “A Call for Action and Collaboration”, the first comprehensive assessment of the impact of COVID-19 on the region. The report provided an overview of actions necessary to restore confidence in the future of the city, starting with the creation of a more resilient and interconnected health system.¹⁰ The purpose of this subsequent report is to provide a more in-depth examination of what must be done to create a truly healthy city and region, particularly in addressing underlying social, economic and environmental factors which were highlighted during the pandemic.

Social injustice protests at the height of the pandemic drove home the extent to which racial and equity issues are central to health and economic resiliency. On June 2, 2020, more than 200 CEO members of the Partnership for New York City signed an open letter decrying systemic racial injustice in America, as reflected in the disparate impact of the pandemic on communities of color, and pledged to take action.¹¹ This follow up report takes care to focus on a range of contributing factors leading to greater vulnerability of the Black and Hispanic communities, and broadly to communities of color to COVID-19.

This report refers to a **Resilient System of Health**—one that provides health resources to meet the needs of individuals and the community and can overcome moments of disruption and distress.

Re·sil·ien·cy

noun

an ability to recover from or adjust easily to adversity or change¹²

Resiliency can be defined in any number of ways. The dictionary definition provided above is one example. New Yorkers, however, have their own unique takes on the concept. The definitions below come from a short [video](#) released by the New York City Mayor's Office of Resiliency where an interviewer asked New Yorkers for their definition of resiliency.¹³

Resiliency is...

"Going through tough times and coming out stronger on the other side."

"Preparing for the unexpected."

"It may knock you down, but it doesn't hold you down. You can overcome it."

"Being resilient also includes having skills and community that you can count on when things get rough."

"It means being able to adapt to a changing environment and being resourceful."

"The definition of resiliency is overcoming something. That's what New York is all about."

Lessons of COVID-19 in a National Context

The U.S. spends more on health care than peer countries, yet despite a growing investment in health care, has worse health outcomes. In fact, life expectancy is lower and more stagnant in the U.S. than in most other OECD countries, despite health care spend being significantly higher.¹⁴ Furthermore, total annual waste is estimated to be around \$935 billion, over 25% of total U.S. health care spend. In 2017, health care spending in the U.S. neared 18% of gross domestic product (just over \$3.5 trillion).¹⁵

Many have been looking at these trends alongside other changes in society, recognizing that current health care trends are not sustainable. Deloitte has also been looking deeply at industry trends to understand the future of health and other exponential changes transpiring to usher in a new era in health care. In “Forces of Change: A Future of Health”, the future of health care twenty years hence is examined, specifically looking at the transformational shift of moving beyond treating illness to predicting and proactively treating illness before it happens.¹⁶ Currently our health care systems consist of collections of disparate players with the majority of attention focused downstream when an individual is already sick. Many of the changes highlighted in Forces of Change are the same themes that emerged with leaders across the New York metropolitan region as factors, that if in place, could have aided a smoother response to COVID-19, emphasizing the importance of catalyzing needed changes to the system to improve response efforts by supporting rapid detection, earlier prevention of disease, better insight into treatment and ultimately, well-being. The COVID-19 pandemic represents a call to action to continue to drive the transformation of the health ecosystem. For example, if some of the anticipated systems in Forces of Change would have already been in place some potential differences could have been:

- Creating **interoperable data** with a data convener → health systems and providers would have been able to share data in real-time to allow for better insight into the impacts of COVID-19
- **Science insights in real-time** → as a novel virus, COVID-19 forced impromptu learning. However, health care providers and other actors had little ability to leverage electronic health records or different practice standards to act as a true “Learning Health System” that could aggregate learning in real-time for action
- **Consumer centric approaches** to meet the individual and wrap services around them → patients often had to travel to big health centers for care, had trouble accessing testing and faced disjointed services. A more consumer centric approach would have helped tailor services to meet the needs of the individual and increase accessibility

- **Local health hubs** → patients would have been able to access care more locally in their community as well as be more readily connected to virtual care
- Connectors and **just in time supply chain distribution** → would have been able to adjust rapidly to demand and offer agile delivery across systems for supplies
- **Regulatory innovation** → the federal and state governments were able to relax many regulations to allow for rapid COVID-19 response efforts, however, if such responsive practices were commonplace, they could help build future resiliency

These themes emerged throughout various discussions and interviews used to inform this report and alongside the insights from the quantitative analysis help form the recommendations. Additionally, they build upon the fundamental understanding that social, economic and environmental factors greatly impact health and contributed to health outcomes seen in the COVID-19 pandemic.

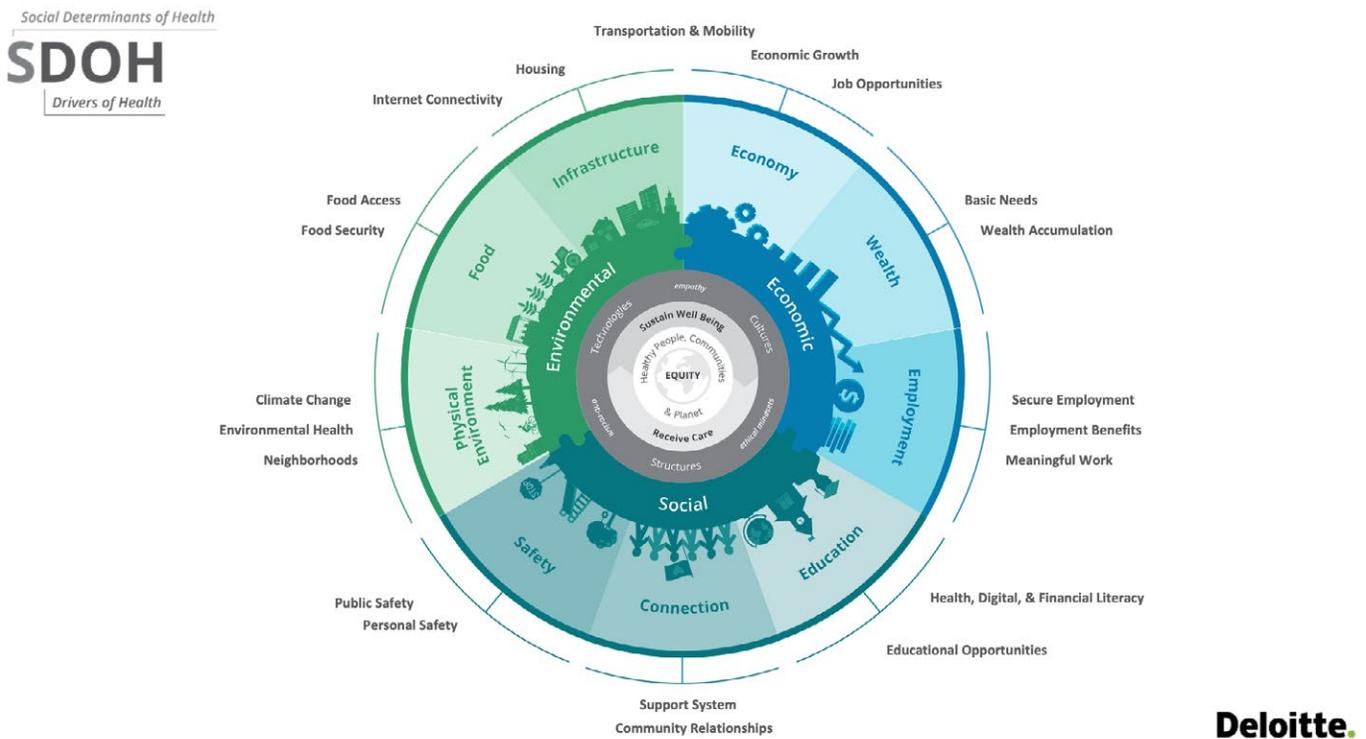
Social Determinants of Health and the Impacts of COVID-19

The social determinants of health (SDOH) (also referred to as “Drivers of Health”) refer to the social, economic and environmental factors beyond direct medical services that influence overall health (Figure 1). There is a substantial body of evidence that the impacts of these factors—including but not limited to poverty, unemployment, lack of education, insufficient housing, lack of public transportation, limited access to healthy food and neighborhood decline—shape health and contribute to health inequities.¹⁷ SDOH can contribute to 80-90% of health outcomes for a population, with medical care comprising the remainder.¹⁸ Notably, these individual factors can have an outsized impact on health outcomes.

In New York City, 44% of renter households are rent burdened (meaning they spend more than 30% of their income on rent) and 25% of renter households are severely rent burdened (meaning they spend more than half of their income on rent).¹⁹ Nationally, 45% of those who are severely rent burdened did not follow a treatment plan provided by a health care professional because it was not affordable.²⁰ Within the New York metropolitan region, approximately 2.3 million people experience food insecurity.²¹ Nationally, food insecurity can be linked to a number of health issues (e.g., diabetes, suicide) causing more than \$160 billion in health care costs in 2014.²² Environmental factors like poor air quality can increase cardiovascular disease risk and increase asthma-related hospital utilization.²³ While broadband internet service is widely available, many homes have not adopted or do not have access to broadband service. This can hinder access to critical services across health care, education and government. About 18% of New Yorkers have neither home nor mobile broadband service, and 46% of those who live in poverty do not have home broadband service.²⁴

FIGURE 1

Deloitte's Framework for the Social, Economic and Environmental Factors impacting health



Source: Deloitte's Future of Health framework on the social, economic and environmental factors impacting health

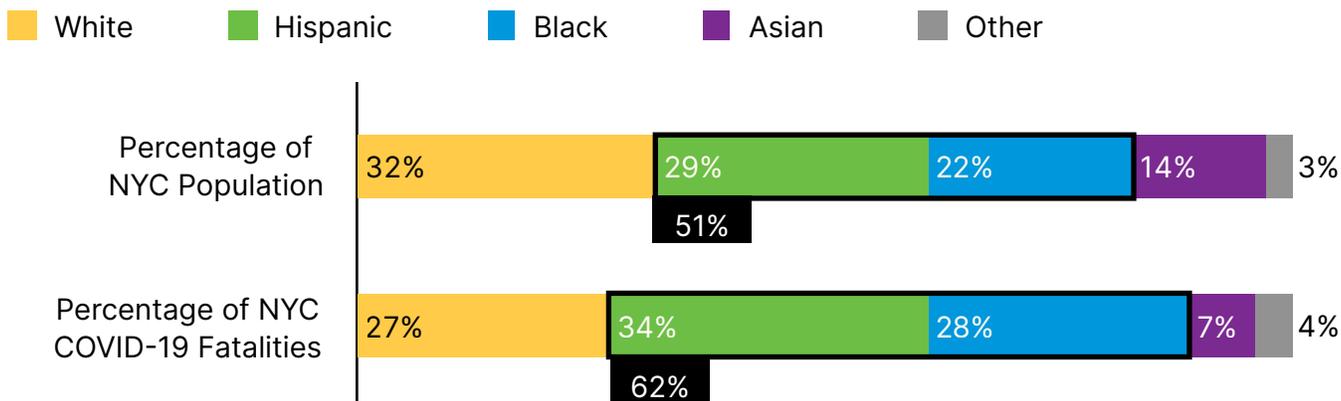
Many other SDOH have similar effects on health and show direct links to the disparate outcomes that emerged during the COVID-19 pandemic. More data on the direct impact of SDOH and health outcomes on New York, New Jersey and Connecticut can be found in Comorbidities by State in Appendix A.

COVID-19 has highlighted some of the disparate health outcomes along racial and socioeconomic lines. In New York City, Black and Hispanic populations account for 62% of overall fatalities even though they only represent 51% of the population (Figure 2).²⁵

Black and Hispanic populations represent 27% and 34% of the population in Connecticut and New Jersey, respectively, yet they account for 46% and 47% of COVID-19 cases, respectively, across the two states and 24% and 39% of COVID-19 fatalities (Figure 3 and Figure 4).^{26,27}

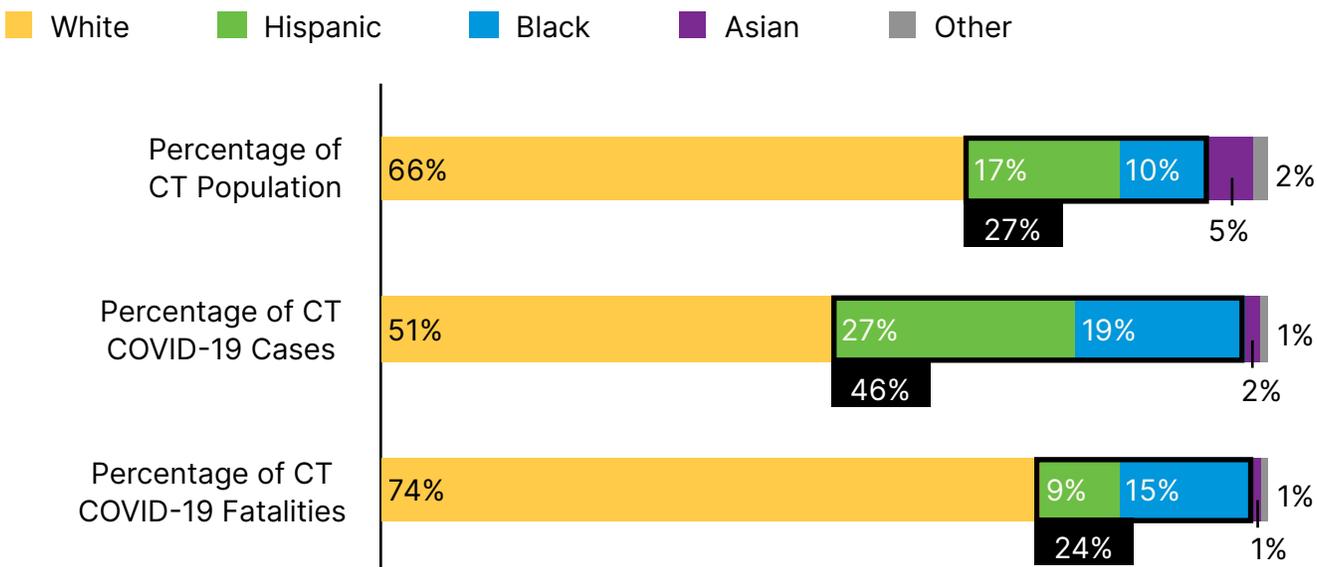
These racial/ethnic disparities in health outcomes are largely due to underlying SDOH, including lower household incomes, prevalence of underlying health conditions, greater food insecurity, higher transmissibility risk and overcrowded households.

FIGURE 2
New York City COVID-19 fatalities by race



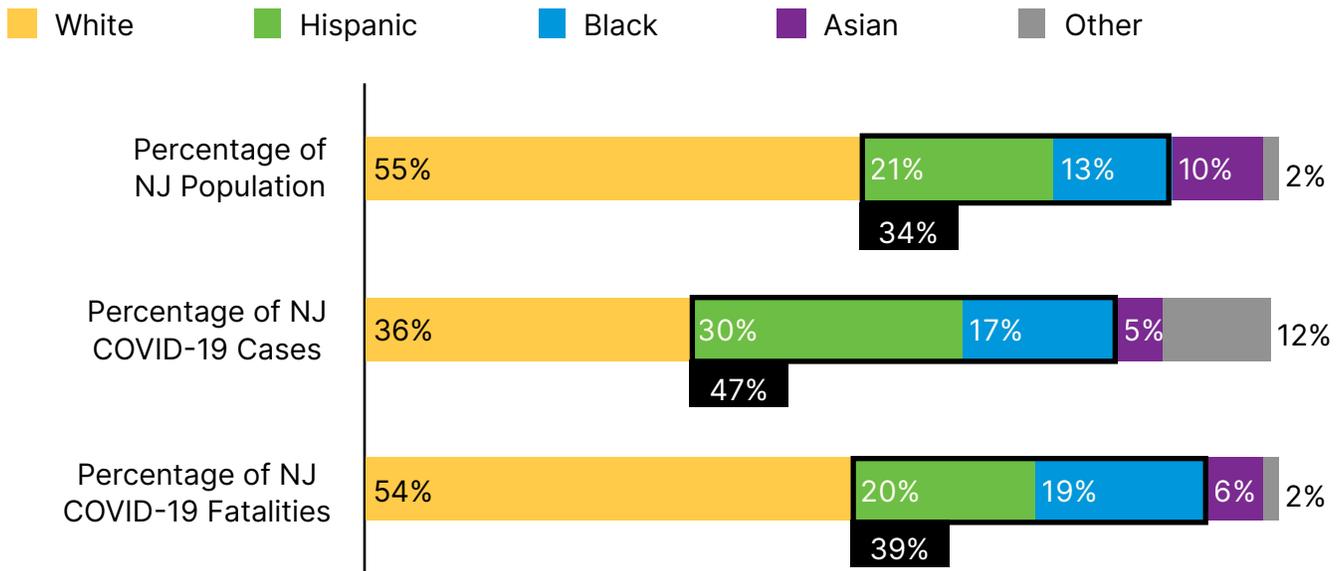
Source: NY State Department of Health
Note: Reporting 63% of deaths as provided by NYCDOHMH (as of 6/15/2020)

FIGURE 3
Connecticut COVID-19 cases and fatalities by race



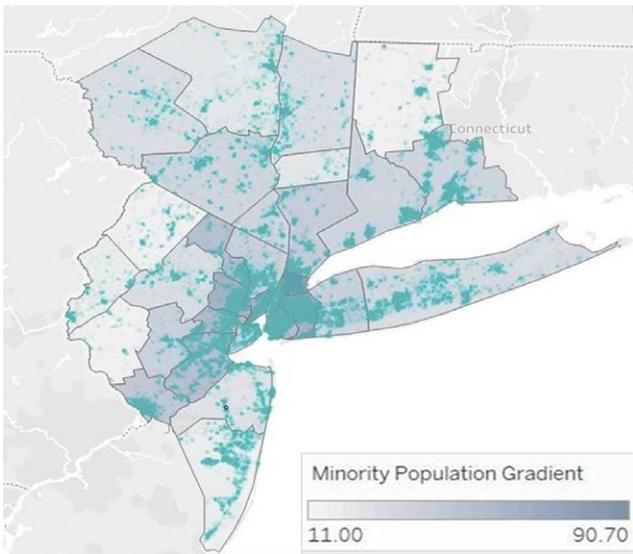
Source: CT Department of Health
Note: Reporting on 68% of cases and 99% of deaths (as of 6/15/2020)

FIGURE 4
New Jersey COVID-19 cases and fatalities by race



Source: NJ Department of Health
Note: Reporting on 100% of cases and 100% of deaths (as of 6/15/2020)

FIGURE 5
Individuals with low income and at least one health condition in the New York metro region



Source: Deloitte D.SMaRT™

Mapping Underlying Conditions and Income

The prevalence of both (1) low household income and (2) underlying health conditions put individuals at a higher risk of COVID-19 infection and mortality relative to higher income populations that have fewer underlying health conditions.

Each dot in Figure 5 represents an individual with a high probability of at least one health condition (hypertension, diabetes, cardiovascular disease, asthma, COPD) and who belongs to a low-income group (annual income less than \$30,000 and net worth less than \$30,000). The Minority Population gradient, as defined by the CDC Social Vulnerability Index, is an estimate of the percentage of the minority population (total population less the white, non-Hispanic population).^{28,29} This data helps illustrate the geographic dispersion of at-risk individuals in order to identify communities with these populations. Generally, regions with a high concentration of at-risk individuals also tend to have a higher minority population percentage. Three underlying conditions—hypertension, obesity and diabetes—were the most common comorbidities observed in hospitalized COVID-19 patients in the New York metropolitan region.³⁰ Further details on the prevalence of these conditions can be found in Appendix B.

New York City Focus: High-Risk Populations by County

Counties that have more at-risk individuals, due to the prevalence of chronic health conditions, tend to have higher COVID-19 mortality rates. This was particularly true in Bronx, Kings (Brooklyn) and Queens Counties.

At the time of analysis of this report, Bronx County had the highest mortality rate of any county at 3.2 deaths per 1,000 followed by Queens and Kings (Brooklyn) Counties with 2.8 and 2.7 deaths per 1,000, respectively (Figure 6). While Westchester County experienced a higher case rate than Bronx, Queens and Kings (Brooklyn) Counties, it also had the lowest mortality rate. This discrepancy is likely due to differences in income, underscoring the impact of a specific SDOH on overall health outcomes. Of the seven counties shown, Westchester County has the second-highest median household income, nearly 2.5x that of Bronx County, the lowest.

FIGURE 6

High risk individuals, income, and COVID-19 rates in select counties

Each dot on the maps below indicate an individual who has a high probability of at least one underlying health condition (hypertension, diabetes, cardiovascular disease, asthma, COPD) and who belongs to a low-income group (annual income less than \$30,000 and net worth less than \$30,000).

Westchester County

35.2 cases per 1,000

1.4 deaths per 1,000

Median income: \$94,521

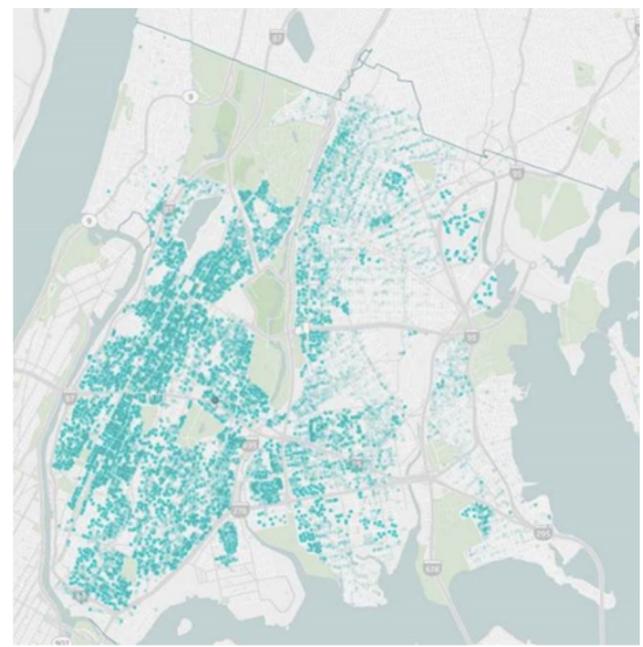


Bronx County

32.6 cases per 1,000

3.2 deaths per 1,000

Median income: \$38,566



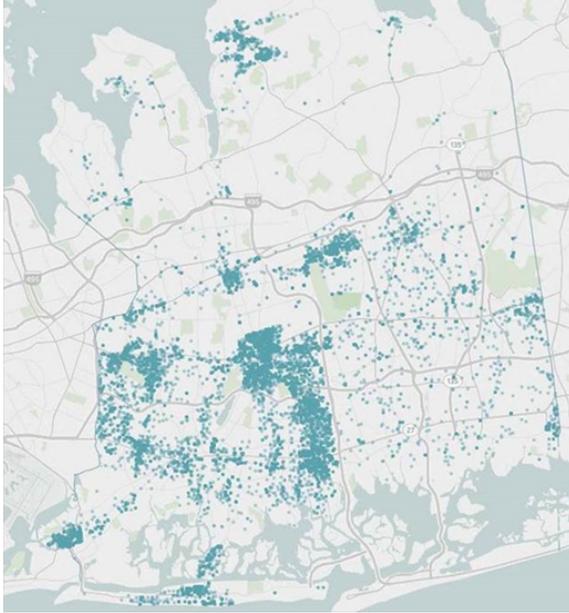
Sources: Deloitte Health360; COVID infection and mortality rates from USAFacts (as of 6/11/2020); Income data from U.S. Census Bureau - Small Area Income and Poverty Estimates (2018)

Nassau County

30.2 cases per 1,000

1.6 deaths per 1,000

Median income: \$115,301

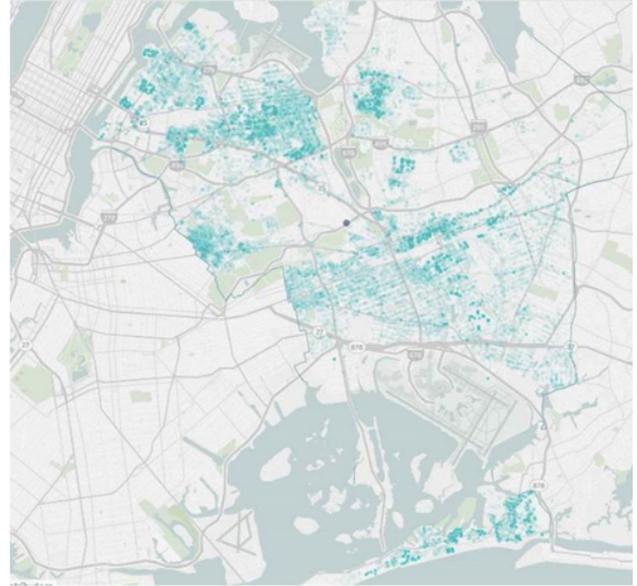


Queens County (Queens)

28.1 cases per 1,000

2.8 deaths per 1,000

Median income: \$68,432

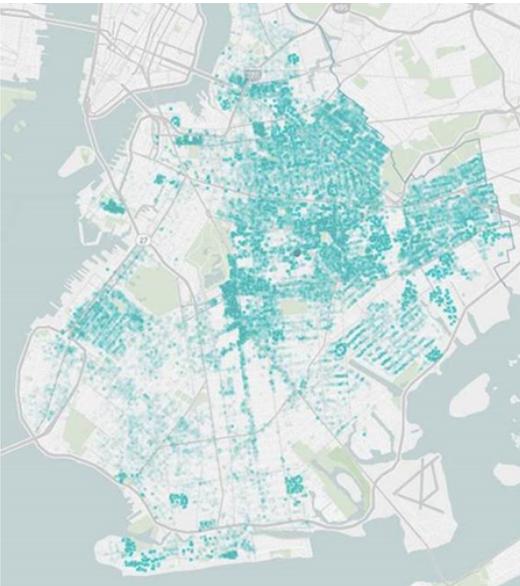


Kings County (Brooklyn)

22.5 cases per 1,000

2.7 deaths per 1,000

Median income: \$60,432

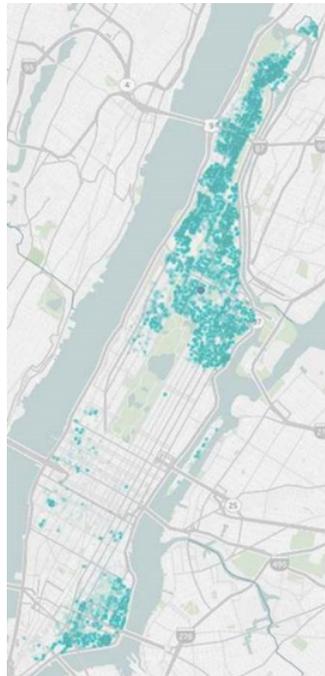


New York County (Manhattan)

16.8 cases per 1000

1.8 deaths per 1000

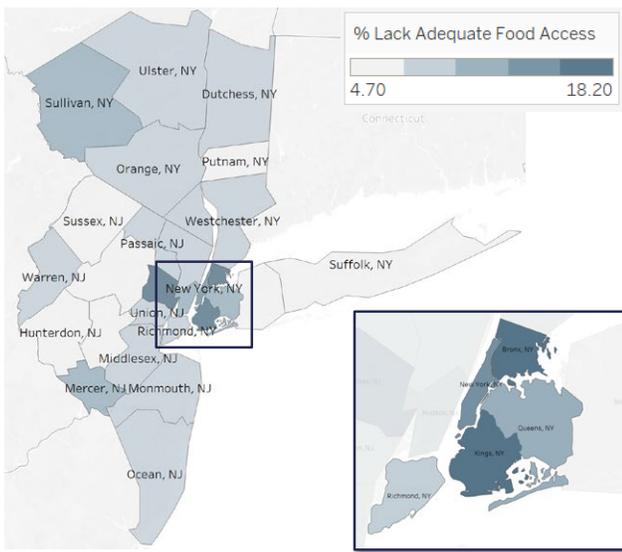
Median income: \$84,610



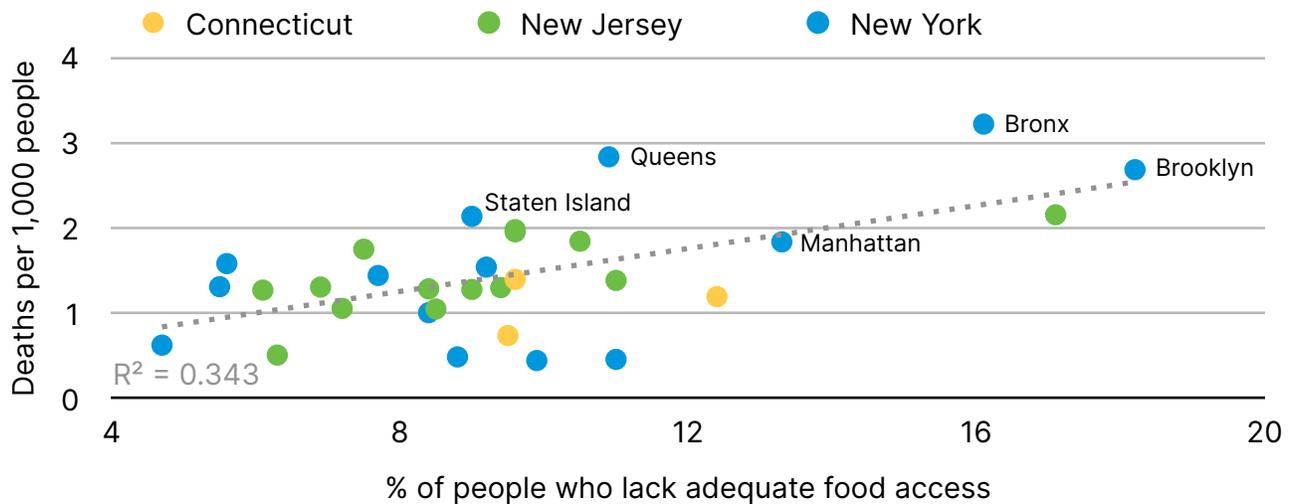
Food Insecurity

In New York City's five counties (Figure 7), many people don't have access to enough healthy food. This is most significant in both Bronx and Kings (Brooklyn) Counties where there is a 16% and 18% rate, respectively, of people who are lacking food access. These two counties plus Queens County have the highest COVID-19 mortality rates, showing the correlation between adequate food access and health outcomes.

FIGURE 7
Food Access and COVID-19 Mortality Rate



Source: Deloitte D.SMaRT™

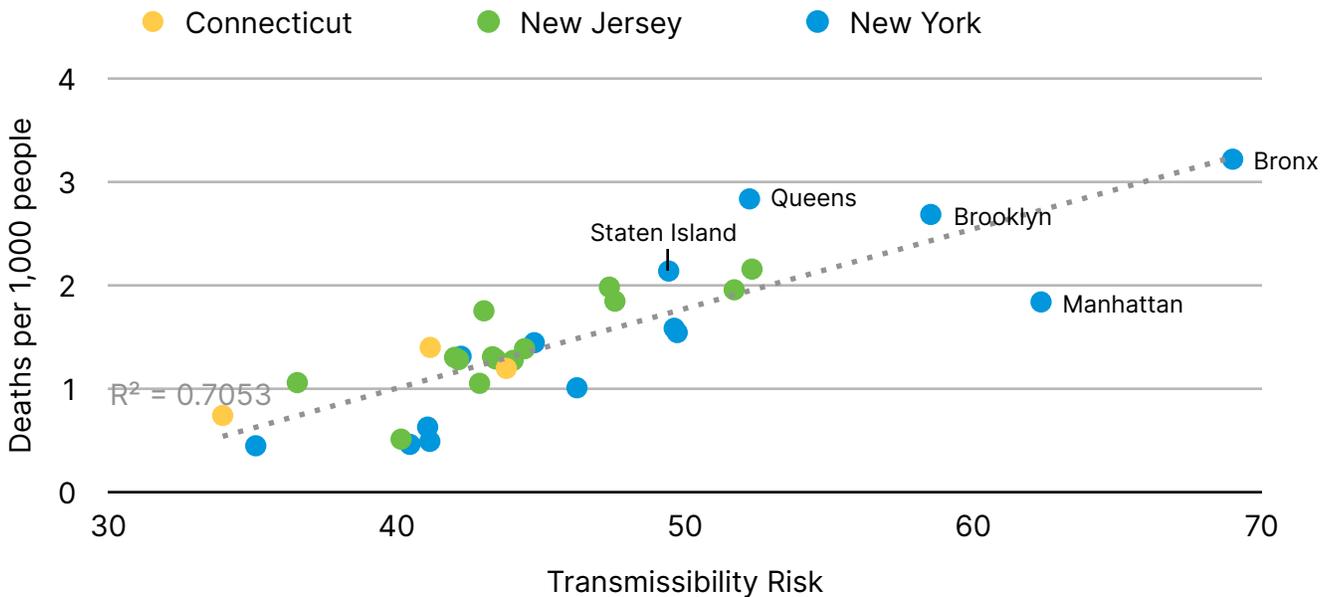


Sources: COVID-19 mortality rates from USAFacts (as of 6/11/2020); Feeding America - Map the Meal Gap (2017)

Transmissibility Risk and Overcrowding

A variety of factors influence the likelihood of infection spread of a disease. Using analytics to combine several factors (such as density, overcrowding, homeownership, use of public transit, commutes and frequency of infection spread in hospitals) into an index can help inform the overall transmissibility risks within communities.

FIGURE 8
Transmissibility Risk and COVID-19 Mortality Rate

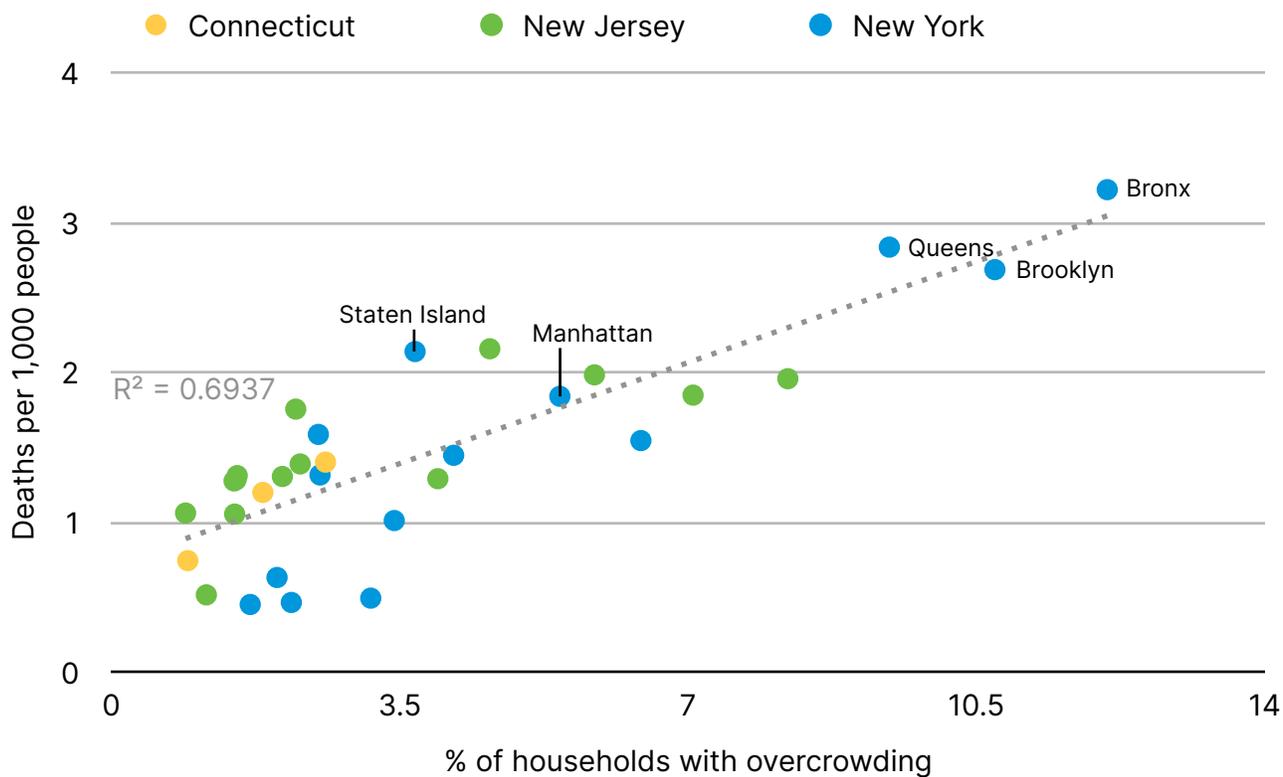
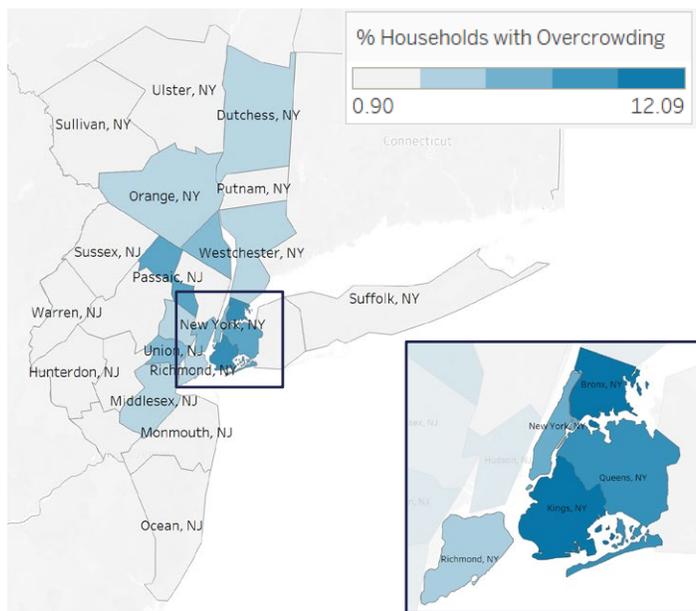


Source: Deloitte D.SMaRT™ (additional details can be found in Appendix B: Analysis of Health Care Ecosystem); COVID-19 mortality rates from USAFacts (as of 6/11/2020)

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

Figure 8 shows that counties with a higher transmissibility risk strongly correlated with a higher mortality rate. While overall transmissibility risk was greatest in Bronx and New York (Manhattan) Counties, the high mortality rate in Bronx County, as well as in Kings (Brooklyn) and Queens Counties, indicates that additional factors of transmissibility specific to these counties—such as overcrowding—contributed to the higher mortality rates. Overcrowding of housing can often be a factor when housing costs are high. Additional analytics exploring other metrics and risk indices in comparison to COVID-19 mortality rates can be found in Appendix B.

FIGURE 9
Overcrowding and COVID-19 Mortality Rate



Source: U.S. Department of Housing and Urban Development (HUD) – CHAS (2016); COVID-19 mortality rates from USAFacts (as of 6/11/2020)

Note: Overcrowding defined as more than one person per room.

As shown in Figure 9, Queens, Kings (Brooklyn) and Bronx Counties all have overcrowding rates of greater than 8% with Bronx and Kings (Brooklyn) Counties experiencing double-digit overcrowding rates for households (12% and 10.5%, respectively). By contrast, New York (Manhattan) County and Richmond (Staten Island) County have fewer than 6% of households experiencing overcrowding. The prevalence of overcrowding across all 31 counties in the New York City metropolitan region correlates strongly with the COVID-19 mortality rate. These data points highlight the differences in the number of family members living in one household across the New York metropolitan region. Given the increased likelihood of COVID-19 transmission from close contact, the high percentage of households with overcrowding in Queens, Kings (Brooklyn) and Bronx Counties likely contributed to the higher COVID-19 mortality rate in those areas.

Blueprint for a Resilient Future

Approach

The team of researchers from Deloitte completed both a quantitative (Appendix C) and qualitative (Appendix D) analysis of the New York metropolitan region's ecosystem before and after the COVID-19 pandemic.

Quantitatively, economic and demographic analyses were completed for the New York metropolitan region pre-COVID-19. Data from the American Hospital Association (AHA) Annual Survey Database and IBM Truven was the basis for the economic analysis. Information about underlying health conditions and comorbidities—pulled from publicly available demographic data from the Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System (BRFSS) and the Centers for Medicare & Medicaid Services (CMS)—was overlaid with census data (e.g., race, income). The team relied on two proprietary tools from Deloitte Consulting LLP to identify high-risk regions: Health360, a predictive tool and D.SMaRT™, which produces local risk metrics using over 70 data inputs on demographic, social, economic and environmental factors.

For the post-COVID-19 analysis, the team then layered on infection and mortality rates. For a full list of indices and drivers included from D.SMaRT™, please see Appendix A of this report.

Additionally, the team conducted over 40 interviews with over 50 stakeholders representing 37 organizations. These organizations spanned eight industries ranging from hospitals and health systems, health plans government agencies, large non-health care employers, investors, disruptors, food/retail companies and nonprofits. All interviews were conducted virtually, and all interviewees were ensured full confidentiality and deidentification of responses. Where quotes are used in the context of this report, the team obtained permission from the interviewees.

A standard set of questions was used for each interview and was provided to interviewees in advance. Questions focused on the pre-COVID-19 landscape, impacts of the pandemic and vision for a more resilient system of health.

The quantitative and qualitative analyses were synthesized to distill themes and to develop a set of recommendations for the near, medium and long-term future. These recommendations summarized in this report span multiple dimensions, including population/public health, technology, consumer, operations, finance and regulatory. A comprehensive set of recommendations—focused on increased resiliency—was created for the New York metropolitan region to aid in recovery and to help future-proof the region. Some areas have related case studies and those were included where applicable.

While New York City is emerging from the initial wave of COVID-19 the threat posed by the virus will likely continue until an effective vaccine is developed, distributed and immunity developed. As the city reopens, careful considerations must be taken to control and monitor the spread so that New York does not face additional spikes in cases.

A consistent theme in the actions below is their **cross-sector nature**. The different challenges of COVID-19 are interconnected. As a result, the solutions are also interconnected and will require business, nonprofits, government and many other actors coming together for change. With many of the recommendations below there are also case studies which provide lessons learned, successes and related example efforts at areas around the U.S. and globally.

Renew and Sustain Confidence in NYC

Several near-term actions can be pursued to recover from the pandemic.

NEAR-TERM ACTION #1

Closely follow and align with evolving science-based public health guidelines

Because this is a novel virus, public health guidance has evolved with experience. At this point, there is growing evidence on how to reduce the risk of infection and pursue better treatment protocols. For instance, at the start of the pandemic, it was not fully realized that the virus was spreading via airborne mechanisms which has led to the face covering recommendations.³¹

As the pandemic continues, embracing science-based guidelines will be critical to minimizing spread and allowing for businesses to operate **testing and contact tracing**. This is vital to monitor exposure and cases accurately as well as to inform community planning and policies.

Current recommended practices include wearing a face covering, social distancing and hand-washing to limit transmission of the virus. These crucial steps can help ensure that testing, tracing and isolation efforts are effective and that cases do not spike again in the region.

CASE STUDY EXAMPLE

Universal masking in hospitals has been shown to decrease risk of transmission of SARS-CoV-2. Additionally, another case study showed that when two infected hairstylists complied with the local ordinance and company policy and wore a face covering, none of the 139 clients they saw were infected with the virus.³²

"Months ago, I thought my health was in my hands. If my neighbor smoked, was overweight or ate poorly it didn't matter to me. But now, my health depends on what my neighbor is doing and not as much on what I am doing. It is not just taking care of my health but taking care of my neighbor's health too. If he is infected, I am at risk."

—Expert Stakeholder

NEAR-TERM ACTION #2

Encourage independent validation of healthy workplaces

There will be an ongoing need for standardized trust markers to verify the health of indoor venues even after there is a vaccine for coronavirus, especially in New York City, which has the highest population density of any city in the U.S. Workers and consumers will need to feel a sense of safety and trust to return to daily activities. The toll the virus has taken on mental health has been high and social isolation has been a contributor.³³

Convene a multi-sector workgroup to establish a recommendation on a path to establish an accredited rating system that focuses on criteria to keep facilities clean and establishes confidence. Evidence is shifting regarding factors for greater risk of spread, including the airborne nature of SARS-CoV-2.³⁴ This has implications for building system's HVAC policies, cleaning standards, use of elevators and policies that impact air circulation. A consistent set of guidelines, informed by science, can help instill confidence in building use and safety to keep buildings open and operating.

This workgroup could monitor and certify compliance with different levels of safety assurance (e.g., Gold, Silver) to ensure that the city is better prepared for future health crises.

Additionally, dynamic entry and exit of people into indoor spaces could be integrated with testing, tracing and symptom monitoring protocols.³⁵

"Not all impacts are going to be apparent immediately as we deal with the virus. We also need to deal with the mental health issues that start with workers being scared to go back, but have other sorts of permutations that are going to need to be dealt with."

—Expert Stakeholder

CASE STUDY EXAMPLE

Allow businesses to self-certify as they meet or exceed specific guidelines related to slowing COVID-19 spread.

Examples include: Chicago's business self-certification program,³⁶ Abu Dhabi's Go Safe program,³⁷ Singapore's SG Clean program³⁸

Overview: Various governments have introduced self-certification cleaning or safety guidelines with the goal of allowing businesses to self-certify and help reduce COVID-19 spread. Requirements can range from enforcing social distancing at the place of business to introducing cleanliness standards.

Execution: Some of these programs allow businesses to self-certify simply by completing an online assessment. Some programs—such as Singapore’s—are more stringent and require a compliance officer to be onsite ensuring standards are met and that temperature checks are taken of all visitors.

Impact: The impact of these self-certification standards is still unclear given that many of them are new. They are also often intended to increase visitor volume, which could increase the spread of COVID-19. Scientific evidence suggests that including stricter levels of enforcement with the certification will likely help better control the COVID-19 spread. Additionally, pairing such measures with testing, tracing and isolation could help control the virus spread.

NEAR-TERM ACTION #3

Maintain regulatory flexibility to allow for a quick, resilient response to changing conditions

During the initial stages of the pandemic, emergency waivers for certain regulations provided flexibility that helped consumers access care relatively efficiently. Maintaining these waivers will ensure that health care providers can rapidly respond to another wave of infections and consumers can promptly access care. Recent announcements from CMS regarding the creation of an Office of Burden Reduction indicate that there is appetite for more flexible regulation on a large scale.³⁹

- **Preserve telehealth adjustments.** Telehealth waivers helped ensure reimbursement parity with in-person visits. This allowed for more technology platform options and removed geographic restrictions for providers. Assuming a broadband connection, telehealth can expand access to care (especially for low-income communities), free up capacity in hospitals and urgent-care facilities and assist in staffing capacity.⁴⁰ Telehealth will be critical for future crises (including new waves of COVID-19 infection) and the development of a resilient system of health.
- **Continue to waive reciprocity of provider licensure across state borders.** This allowed licensed physicians and nurses from other states to deliver care to patients in New York—both in-person and remotely. With the potential for new waves of the virus, the ability to seamlessly provide care across state lines is essential.

- **Uphold relaxed pharmacy measures.** Waiving these measures supported pharmacists and technicians working from alternate locations. It allowed resident pharmacies to compound hand sanitizer, and prevented drug shortages by allowing outside licensed pharmacies, manufacturers and distributors to make deliveries to New York.
- **Allow trained, but unlicensed, individuals to continue collecting specimens.** This allowed for a ramp up of COVID-19 testing, which will continue to be important in lieu of a vaccine.

"More people will demand health care delivery remotely. To the degree that we can adjust payment systems to account for this, we can increase access to care."

—Expert Stakeholder

NEAR-TERM ACTION #4

Use a data-driven approach to support health equity, integrating SDOH data from nontraditional sources.

COVID-19 exposed the need to incorporate data on social, economic and environmental conditions in order to better respond to the health disparities in low-income areas and communities of color. These disparities were notable across the U.S., and much worse in many areas outside of the New York metropolitan region.⁴¹

- **Leverage existing data from trusted sources to identify disparities.** Nonprofit and foundation partners collect large quantities of data related to food insecurity, homelessness, education and other SDOH. These organizations can likely provide a localized perspective on communities that experience these disparities. They can help identify gaps in existing health data, allowing for successful monitoring of health needs within these vulnerable populations.

"This crisis will give us the opportunity to rethink what is important to health care delivery [to underserved populations]."

—Expert Stakeholder

NEAR-TERM ACTION #5

Expand preventative care by creating community health hubs and leveraging neighborhood institutions

While hospitals will always be necessary for addressing high-acuity cases, shifting to community health hubs can make preventative care more accessible and help lower health care costs.

- **Encourage the creation of community health hubs to increase access to care.** Community health hubs can help expand preventative services, such as screening and diagnostic services, home-based care delivery, physical therapy and nursing services. These community health hubs could also serve as localized centers for access to the broadband capabilities necessary for effective virtual care to be delivered closer to home. These entities can be driven by several ecosystem players, such as academic medical centers, family health centers, private clinics, government agencies or retail pharmacies. Involving various ecosystem players in the delivery of care will require evaluating the scope of services each can deliver. To achieve this, factors that could limit the ability to provide necessary care and assessment, as is the case for pharmacists, should be evaluated.

Move Beyond Recovery

Medium-term actions can help set the foundation for a resilient future system of health.

MEDIUM-TERM ACTION #1

Encourage a shift to community-focused value-based care

Value-based care (VBC) has been a common talking point in the health care community for years, and there has been progress, but slowly. With COVID-19, there is a renewed opportunity to shift models of care and reimbursement mechanisms. In fact, CMS has issued a call to action to shift from “fee for service” to VBC given the impacts of COVID-19 on Medicare and Medicaid populations.⁴² New York has an opportunity to rebuild its health care system around VBC, which will require a new set of state incentives. This must be done carefully to ensure the right care is provided and well-coordinated. Basing payments on health outcomes, rather than on the number of services provided, could help ensure more equitable outcomes and more coordinated care across all the different players in the ecosystem including nonprofit partners addressing SDOH.

- **The government should explore ways to incentivize payers and providers to pursue VBC arrangements.** The government can define new payment models that lead to reduced costs for health plans while providing financial incentives to develop new delivery models focused on holistic patient outcomes. By using a data-driven approach to assess a health system’s provider network, the government can incentivize the creation of a care delivery system built around value.
- **The system should allow and incentivize more care to happen in the home and in the community.** Decreasing barriers for new models of service provision will help bring care to the consumer. Services that bring care direct to consumers, such as through prescription refill and home delivery, could increase access and allow vulnerable consumers to receive needed care while in their homes. Ensuring favorable reimbursement structures and relaxed regulations for providers to pursue new business models that allow for effective community-based care delivery in homes will allow for more flexibility.

"There is an opportunity [in New York’s COVID-19 recovery] to not just move virtually, but to start putting a value on quality and see a world where people providing quality [care] are getting paid more."

—Expert Stakeholder

CASE STUDY EXAMPLE

Allow and incentivize more care to take place in the home and in the community.

Central Falls, Neighborhood Health Station⁴³

Overview: The Neighborhood Health Station was developed in 2019 by Blackstone Valley Community Health Care (BVCHC). With a total blended funding of \$16 million, the goal is to provide high-quality affordable care and improve the health status of people in the lower Blackstone Valley, especially those with the most complex medical, behavioral and social needs.

Execution: The Neighborhood Health Station uses centralized electronic medical record-keeping to provide various health services including diagnostic and pharmacy with coordinated care from BVCHC staff. It accepts insurance and allows payment on a sliding scale for residents who can't afford care.

Impact: Having served 6,500 people in 2019, the Neighborhood Health Station expects to increase to 16,000 people by December 2021. The program helped reduce adolescent pregnancy by 24% and EMS use by 15%. It aims to enroll 90% of residents for optimal health and well-being.

MEDIUM-TERM ACTION #2

Establish the basis for a learning system of health

While a truly comprehensive health data sharing system will be a multi-year effort, formulating the execution strategy and coordinating organizations is an important first step. At the center of such a strategy is interoperable data which will provide real-time science insights. During the height of COVID-19, clinicians and health systems were trying to learn in real-time via communication with colleagues in countries such as China and Italy. There were many unknowns and gaps since it was a novel virus. It was hard to share and coordinate as well as to understand and gain knowledge from the health records for treatment. There has been interest in moving towards a “learning health care system” that could accomplish both. As published in the National Academy of Sciences, a “learning health care system” is able to consider “how health care is structured to develop and to apply evidence—from health profession training and infrastructure development to advances in research methodology, patient engagement, payment schemes and measurement—and highlights opportunities for the creation of a sustainable learning health care system that gets the right care to people when they need it and then captures the results for improvement.”⁴⁴

- Convene health innovators, funders, health systems and public health leaders to develop a core strategy for a regional data-sharing system that includes clinical and logistical data points.** A multi-sector group should collaborate to establish standardized data-sharing guidelines across their systems, including private sector partners. The system should empower the overall health ecosystem to become a learning health care system that can respond to new threats in real-time. Bidirectional flow of information (such as from leadership to participating organizations), predictive analytics based on surveillance data and the development and expansion of application programming interfaces (APIs) that allow consumers to own, access and use their health data will allow for data interoperability across the system of health. Real-world evidence, which leverages observational data (e.g., claims data, connected device data, etc.), can supplement clinical data and deepen insights gathered from patient health data to provide better health care. The ability to effectively monitor logistical data, such as bed capacity, will make it easier to manage patient transfers and surge capacity during a health crisis. There are opportunities to examine regional efficiencies so that one coordinated system can function. It also provides an opportunity to modernize state lab data sharing and capture processes.
- Determine a path to a connected system of health and incorporate non-traditional data sources.** Identify additional participants (e.g., payers, nonprofits) that can contribute to and benefit from predictive data analytics via collaboration with health systems and public health departments. Identify innovative technologies (e.g., wastewater testing) that can indicate public health trends and potential threats. In combination, these data sources can be used to improve population health monitoring.

CASE STUDY EXAMPLE

Supporting Community Care and Reducing Demand on Accident and Emergency Services. United Kingdom⁴⁵

Overview: The United Kingdom had a notable increase in demand for accident and injury services. In 2016 the University of Sheffield started a project to link together data from different hospitals to build a better picture of how accident and emergency services in the region were functioning. This data allowed the researchers to understand the flow of patients, the most common health issues and provided insight into coordinated improvements.

Execution: Researchers are doing the project with de-identified information to look at patterns of service and different outcomes by patient group as well as to look at who could benefit from different care approaches.

Impact: The work is particularly focused on improving outcomes for elderly and vulnerable populations; although still conducted on the research side, it exemplifies use of data across systems to improve coordination and access.

CASE STUDY EXAMPLE

Determine a path to connect ecosystems and incorporate technological innovations.

Examples include: wastewater testing,⁴⁶ New York City considering sewage testing,⁴⁷ New York City using technology to track coronavirus⁴⁸

Overview: With swab tests still plagued by capacity issues, inaccuracy and slow turn-around, testing wastewater for the novel coronavirus' genetic signature could give communities a faster way to spot the virus. Studies in the U.S. and the Netherlands, among others, have demonstrated the ability to pick up a signal (e.g., traces of the virus) from samples collected about a week before the first clinical case appears.

Execution: Steps involved building a surveillance network and engaging in additional research needed to implement testing. The National Academies' Water Science and Technology Board sends wastewater samples (gathered by several utilities) to participating labs that run analyses, compare results and agree on best practices. The system works by comparing what is expected in an area over time. If a particular area shows more cases than expected, a signal is sent to health departments.

Impact: In New York City, the Test & Trace Corps have begun early integration with SaTScan. This software, originally designed to track Legionnaires' disease or serious food-borne illnesses, has been modified to serve as an early detection system for community COVID-19 outbreaks. Data about community outbreaks can be refreshed daily and can help public-health officials make quick decisions. The technology does not yet have the ability to estimate the number of people affected by the virus, but there have been early successes in tracking outbreaks. For example, wastewater testing can detect a coronavirus cluster following a private event.

MEDIUM-TERM ACTION #3

Encourage public-private partnerships to address SDOH

Services that focus on SDOH for vulnerable populations are largely delivered through nonprofit organizations or the government and are typically not formally connected to the health care system. Community health would likely be better served by moving from direct government contracts to public-private partnerships with community health providers. This would likely provide easier, more efficient access to preventative health care.

- **Convene leaders across the public and private sector to create a roadmap on how to incentivize public-private partnerships focused on health innovation and SDOH.** Such a taskforce could be responsible for working with organizations that already have a footprint in vulnerable communities. The taskforce could build a bidirectional, comprehensive health data sharing system that includes inputs from a wide array of providers, nonprofits, etc. to build a holistic view of an individual's health. The taskforce could help steward data to ensure privacy and oversee data analysis related to SDOH and community health needs which could inform areas of prioritization at a larger regional level versus actions by just one health system.

"[A] well-functioning risk market is the incentive. If it were easier for physicians in the city to take risks, they would have more incentive to push for interoperability on the operations side."

—Expert Stakeholder

CASE STUDY EXAMPLE

Finance Public Health Challenge Funds by consolidating private and public funding sources.

Project One for All, San Diego^{49,50}

Overview: Project One For All is an extensive effort to provide intensive wraparound services to homeless individuals with serious mental illness. This effort uses a coordinated approach that includes a mechanism for county resources to be matched with individuals in need, and a method for cities, local housing authorities and nonprofit organizations to pair with county resources

In 2015, it was estimated that more than 18% of San Diego's 8,500 homeless people were suffering from a serious mental illness. The Board of Supervisors approved a series of recommendations from the San Diego County Health and Human Services Agency (SDHHS) to ensure those individuals had access to intensive treatment services paired with housing. Funding partners were Mental Health Services, SDHHS, the cities of Carlsbad and Oceanside, San Diego County, state and federal funds and San Diego's housing authorities. The county invested \$16 million in 2016 and \$19 million in 2017. Funding came from a mix of sources, including the Mental Health Services Act and state and federal funds. In addition, county and city housing authorities contributed \$4 million in housing vouchers in 2016 and \$9 million in 2017.

Execution: Project One partnered with the Regional Continuum of Care Council, housing authorities, cities and the private sector. Wraparound treatment services were expanded and performance management was used to track progress.

Impact: 1,387 homeless individuals were housed with treatment. This resulted in fewer hospitalizations, emergency calls for transport and law enforcement responses to psychiatric emergencies.

MEDIUM-TERM ACTION #4

Convene a group of health care, business and government leaders to investigate the potential to improve supply chain redundancy and expand participation in group purchasing organizations to additional entities considered front line workers such as small business owners, food service and other entities vital to keep services running.

Supply chains must be secure given that PPE and other supplies are often critical when responding to health emergencies. Working with major players in the region to take advantage of manufacturing capacity and purchasing power could be key to this effort.

- The New York metropolitan region could leverage the existing Group Purchasing Organizations (GPO) structure and look for additional ways to coordinate buying power. In response to the current PPE shortage, large providers have purchased directly from manufacturers or are already part of GPOs that can facilitate purchasing. Smaller providers are encouraged to join informal GPOs, but some have struggled to get adequate supplies.⁵¹ The existing GPOs struggled with supplying adequate PPE to all entities due to the sudden sharp increase in demand and GPO restraints on how much a provider can ramp up their ordering.⁵²

CASE STUDY EXAMPLE

Organize a regional Group Purchasing Organization.

Premier Inc. and 15 health systems address PPE shortage by acquiring stake in Prestige Ameritech⁵³

Overview: Prestige Ameritech represents a domestic supply chain of face masks and other PPE. The manufacturer sells 100% of its products to U.S. customers. In May 2020, Charlotte, North Carolina-based Premier Inc. and 15 health systems acquired a minority stake in the company. The arrangement represents a long-term strategy to invest in, or partner with, suppliers that source from multiple regions, as well as domestic markets, to reduce potential shortages in times of need.

Execution: Under the agreement, Premier Inc. members commit to purchase a portion of all face masks they use annually from Prestige Ameritech for up to six years, inclusive of a three-year renewal option.

Impact: This program aims to alleviate tension and reliance on other nations while supporting domestic or other manufacturers with capital and long-term contracts.

CASE STUDY EXAMPLE

Incentivize producers to manufacture locally for critical supplies.

Civica Rx, manufacturing generic drugs⁵⁴

Overview: Civica Rx is a nonprofit enterprise established in 2018 by health systems (CommonSpirit Health, HCA Healthcare, Intermountain Healthcare, Mayo Clinic, Providence St. Joseph Health, SSM Health and Trinity Health) and philanthropies (Gary and Mary West Foundation, Laura and John Arnold Foundation, and Peterson Center on Healthcare) to reduce chronic generic drug shortages and related high prices in the U.S.

Execution: The company's initial business plan was to produce 14 generic drugs for hospitals in 2019. It plans to bring more than 100 medications to market in five years through various manufacturing approaches such as partnerships, developing abbreviated new drug applications and by building its own manufacturing capability. Member hospital pharmacists and clinicians help prioritize the medications that Civica Rx produces.

Impact: More than 50 health systems are now Civica Rx members, representing more than 1,200 hospitals and over 30% of all licensed U.S. hospital beds. Civica Rx is already delivering 20 essential generic medications, 10 of which are currently being used to treat COVID-19 patients.

Future-Proof the Region

Long-term strategies and actions are needed—with a nod toward visionary thinking—for an equitable and resilient New York metropolitan region health system.

LONG-TERM ACTION #1

Reform Medicaid reimbursement

The state should continue its work to modernize Medicaid reimbursement with an action plan to expand access to Medicaid and reduce costs by transitioning to VBC.

- Incentivize and provide programmatic support to consumers to make lifestyle changes. Regularly screen patients for issues related to SDOH and ensure closed-loop referral to support services (so when a referral is made there is tracking and follow up to ensure the referral occurs and the need is met) that address identified needs. Give consumers an incentive to enroll in preventative care programs (e.g., employer-sponsored wellness programs, fitness memberships) and to make healthy lifestyle choices. Community-based resources can help explain the impact lifestyle choices can have on chronic-disease management.

CASE STUDY EXAMPLE

Incentivize consumers to make preventative lifestyle changes.

Steps to Health, King County, Seattle⁵⁵

Overview: Public Health — Seattle & King County (PHSKC) convened the Steps KC collaborative, which involved more than 75 organizations. These organizations worked together to promote a comprehensive approach that coordinated program, policy and system changes at the individual, family, clinical, school and community levels. The intent of Steps KC was to link improved service delivery with integrated community-based organizations to create a more seamless system of chronic disease prevention and treatment.

Execution: Interventions were organized broadly at two levels. The collaborative level included policy and systems change initiatives and efforts to better integrate the Steps KC-funded programs. The individual program level included programs ranging from group health promotion to intensive case management. The criteria included using evidence-based practices. A total of 14 new and/or expanded programs were funded, ranging from health education programs reaching large numbers with relatively low-intensity

interventions to intensive case management for individuals without connections to primary care.

Impact: The 14 direct service programs funded by Steps KC reached 8,180 community residents with medium and high-intensity interventions, and 63,780 residents with low-intensity interventions. It led to 40% fewer emergency room visits, a 38% improvement in diabetes control, a 41% increase in days with no asthma symptoms (from 8.6 to 12.1 days) and a 59% decrease in the percentage of patients who visited the emergency room for asthma (from 46% to 19%). Childhood asthma hospitalizations in the Steps-KC area declined 9.5% per year compared with 2.1% in the rest of King County.

LONG-TERM ACTION #2

Develop regional, cross-sector strategic plans for future disruptive events

Develop a regional response playbook informed by cross-sector input for broad types of crises and create a process to designate key leadership roles and coordinators. Establishing a crisis playbook that incorporates input from a broad cross-section of sectors can increase the speed and efficiency of an emergency response. The playbook should be broad enough to include responses for a range of crises (e.g., natural disasters, climate change, electrical-grid issues, terrorist events, pandemics) to ensure resiliency is built into the system. Key leaders, as well as roles and responsibilities of major stakeholders, should be determined across the public, private and nonprofit sectors. A key coordinator role should also be designated for each disaster scenario in order to reduce response times and ensure clear communication channels.

LONG-TERM ACTION #3

Encourage health systems, businesses and educational institutions to leverage their status as anchor institutions to support investments that improve underlying social, economic and environmental factors that impact health

Long term changes are needed to improve the underlying factors that impact health. Many of the same social, economic and environmental factors that created disproportionate impacts on COVID-19 outcomes affect other disease areas such as hypertension, diabetes, obesity, heart

disease and many other illnesses. The importance of these SDOH were mentioned throughout the interviews. Anchor institutions have been increasingly leveraging their presence in these communities to create community level change. Health care systems and others have been putting their operational and institutional resources to work in communities where they are located to address many of these equity issues.⁵⁶

Examine new opportunities post-COVID-19 to strengthen community health through existing or new community investments. There may be new opportunities to capitalize on unique investment opportunities that have emerged in the setting of COVID-19 such as newly available real estate that could be used for affordable housing, a key SDOH factor. Less than one-third of households have access to affordable housing, causing more than 50% of renters to delay medical treatments.^{57,58} As the real estate market recovers from the pandemic, there could be opportunities to repurpose distressed real estate.

Businesses also can pursue policies that strengthen local hiring and training practices, food procurement and workforces to support educational initiatives for younger generations. All of these investments help strengthen the local neighborhoods and create a stronger community at large.

CASE STUDY EXAMPLE

Encourage anchor institution investments to impact underlying issues of poor health.

Boston Medical Center (BMC) launched community investment⁵⁹

Overview: BMC launched a \$6.5 million investment initiative in 2017 to support affordable housing in Boston and to track how health care systems could reduce medical costs for families by improving housing security and community health over a five-year period.

Execution: BMC invested in a diverse group of community organizations and housing developers in Roxbury and Dorchester neighborhoods—where a large percentage of its patients live. These investments include \$1 million to Pine Street Inn and the Boston Health Care for the Homeless; a \$1 million no-interest loan and a \$400,000 operating subsidy to support a new healthy food market in a new housing development in Roxbury; and \$800,000 over four years to rehabilitate 35 units of Codman Square Neighborhood Development Corporation's housing.

Impact: The program is expected to improve community health, patient outcomes and reduce medical costs for its homeless patient population.

CASE STUDY EXAMPLE

Support existing upstream public health interventions that target health outcome disparities.

Rhode Island's Health Equity Zones⁶⁰

Overview: Rhode Island's Health Equity Zones create a platform for neighbors and community partners to address the root causes of uneven health outcomes at the local level. Each Health Equity Zone is led by a collaborative that represents the diverse makeup of the community. The Rhode Island Department of Health (RIDOH) provides communities with funding that enables these communities to work together—realigning staff, breaking down organizational silos and promoting cross-sector collaboration—to achieve shared goals for sustained community health and well-being. Grant funding from RIDOH is intended as a seed investment over a few years to build capacity and spark community development.

Execution: The approach recognizes that communities have different needs and assets to build upon. By aligning strategic investments with existing resources across sectors, each community addresses its unique needs, reduces disparities and stimulates economic growth. Rhode Island's Health Equity Zone initiative braids together funds from federal, state and local sources of prevention, categorical disease and population health to create place-based Health Equity Zones. These geographic areas are “designed to achieve health equity by eliminating health disparities and promoting healthy communities.”

Impact: Rhode Island's Health Equity Zone initiative has shown that a concerted focus on people and places can have an immediate impact at the local level. The Washington County Health Equity Zone provided evidence-based mental health, first aid and suicide-prevention training to more than 1,000 police officers, clergy, teachers, parents and staff of youth-serving organizations. It has received federal funding to partner with local hospitals, community health centers and residents to screen all patients for depression and to support health care staff in providing high-quality, timely and evidence-based care to patients who are at risk for suicide. The City of Providence Health Equity Zone trained staff at 11 city recreation centers in implementing a healthy eating policy to ensure healthy options and role modeling were available to city youth at all recreation centers.

CASE STUDY EXAMPLE

Repurpose unoccupied office space into housing and lift regulatory barriers.

Louisiana Permanent Supportive Housing⁶¹

Overview: The primary goal was to provide affordable housing and other services to people who suffer from severe and complex disabilities. Funding partners included Louisiana

Housing Corporation/Housing Authority, community development block grant programs, social services block grant programs, state-funded rental subsidies, federal rental assistance programs, housing development support from the Low-Income Housing Tax Credit, Medicaid, the U.S. Substance Abuse and Mental Health Services Administration and other sources. The initiative included 3,000 units of permanent supportive housing.

Execution: Rental subsidies reduced rental costs to 30% of household income. Fifteen agencies provided services outside of housing. Participants agreed to participate in pre-tenancy, move-in and ongoing tenancy supports.

Impact: About 2,700 households were served, of which 45% were homeless and more than 50% were chronically homeless. Ten percent of individuals/households served were in institutions; 37% of households in tenancy and pre-tenancy had one or more members with a substance abuse disorder; 54% of households displayed improved income; and homelessness declined by 68% between 2010 and 2016. Inpatient and emergency room use among adult tenants also declined post housing (2016). The program had a 95% tenancy rate among participants. As per the official website, preliminary data indicated a 25% reduction in Medicaid costs among people in the program.

CASE STUDY EXAMPLE

Repurpose old sites or buildings into residential complexes.

Los Angeles Adaptive Reuse Ordinance⁶²

Overview: The Los Angeles Adaptive Reuse Ordinance (ARO) is an incentive program designed to encourage the reuse of older buildings that are either vacant or not currently viable. Originally designed for the Downtown Los Angeles area, the program has been expanded to four other areas of the city.

Execution: Los Angeles enacted incentives to make zoning and building code standards more flexible and to streamline the regulatory process. Particularly, the removal of parking requirements had a significant impact on the success of the program. The city also established a task force aimed at cultivating expertise in adaptive reuse projects. This task force also helped expedite and facilitate permitting and plan review.

Impact: Since 1999, ARO has facilitated the conversion of historic and existing buildings into more than 14,000 new downtown residential housing units.

Call to Action

The COVID-19 pandemic has significantly disrupted daily life, from major economic impacts to substantial morbidity and mortality. At the same time, as highlighted in this report, it put a spotlight on many aspects of the current health care system that are due to shift. **The pandemic has created a pressing call to action to transform to a resilient system of health for the future.** There will be future disruptions and preparing for the future will help the health care system and the resulting economy stay strong during these challenges. As we heard throughout interviews with major CEOs of international companies, the challenges to the current health care system are interconnected between health care leaders, government leaders and beyond. As a result, the solutions are also interconnected and will require business, nonprofits, government and many other actors coming together for change.

Appendix A: Social Determinants of Health Deep Dive

Risk Methodology

FIGURE 10
Susceptibility risk

Inputs - ranked by highest contribution to weighted score in each group	Correlation with risk
Overall Health Risk-measure of overall population health risk	
Poor mental health days	Positive
Poor physical health days	Positive
% smokers in population	Positive
% of adults with diagnosed diabetes	Positive
Life expectancy	Negative
% obese in population	Positive
% of Medicare enrollees having an annual flu vaccination	Negative
% of people who lack adequate food access	Positive
Water quality indicator	Positive
Violent crime rate	Positive
Ratio of people living with a diagnosis of HIV infection	Positive
Economic Risk-measure of financial risk in the population	
% of population below poverty estimate	Positive
Median household income	Negative
% of population unemployed and looking for work	Positive
Demographic Risk-measure of the inability of individuals to self-care	
% of population that is 60+	Positive
% of population with a disability	Positive
% of population that is 75+	Positive

County/Borough	Rank (high to low risk)	Risk Score	County/Borough	Rank (high to low risk)	Risk Score
Bronx, NY	1	64.28	Litchfield, CT	17	37.24
Sullivan, NY	2	56.22	Rockland, NY	18	36.26
Essex, NJ	3	50.21	Union, NJ	19	35.47
Brooklyn, NY	4	48.35	Sussex, NJ	20	34.60
Ulster, NY	5	47.94	Middlesex, NJ	21	33.97
Ocean, NJ	6	46.95	Westchester, NY	22	32.95
New Haven, CT	7	43.90	Fairfield, CT	23	31.46
Orange, NY	8	42.80	Monmouth, NJ	24	31.01
Staten Island, NY	9	42.78	Suffolk, NY	25	30.68
Passaic, NJ	10	42.43	Bergen, NJ	26	30.08
Dutchess, NY	11	41.79	Putnam, NY	27	29.01
Queens, NY	12	41.16	Nassau, NY	28	28.25
Hudson, NJ	13	39.57	Morris, NJ	29	24.76
Mercer, NJ	14	38.37	Hunterdon, NJ	30	23.05
Warren, NJ	15	37.98	Somerset, NJ	31	22.81
Manhattan, NY	16	37.50			

Source: Deloitte D.SMaRT™

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region

FIGURE 11
Transmissibility risk

Inputs - ranked by highest contribution to weighted score in each group	Correlation with risk
Density Measurement Risk-measure of transmissibility due to population density affecting spread of infection	
Households per 1,000	Negative
Housing units per 100,000	Negative
% of households with overcrowding	Positive
% of population in institutionalized group quarters	Positive
% of housing structures with 10 or more units	Positive
Density of population	Positive
Homeownership	Negative
Density Movement Risk-measure of a county's tendency to move about and the subsequent change in density of spaces and places	
% of daytime population	Positive
% households with no vehicle	Positive
% of population who commute by public transit	Positive
% of workers who work outside of county of residence	Positive
% population enrolled in grades 9-12	Positive
% population enrolled in grades 1-4	Positive
% of workers who work at home	Negative
% population enrolled in undergraduate school	Positive
% population enrolled in graduate school	Positive
% population enrolled in grades 5-8	Positive
Infectivity Risk-A measure of the tendency of hospitals within the county to spread infectious diseases	
MRSA - infectious cases per 100,000	Positive
C. Diff - infectious cases per 100,000	Positive

County/Borough	Rank (high to low risk)	Risk Score
Bronx, NY	1	68.99
Manhattan, NY	2	62.35
Brooklyn, NY	3	58.52
Essex, NJ	4	52.32
Queens, NY	5	52.23
Passaic, NJ	6	51.70
Rockland, NY	7	49.73
Nassau, NY	8	49.62
Staten Island, NY	9	49.43
Hudson, NJ	10	47.57
Union, NJ	11	47.37
Orange, NY	12	46.25
Westchester, NY	13	44.77
Mercer, NJ	14	44.43
Morris, NJ	15	44.03
New Haven, CT	16	43.80

County/Borough	Rank (high to low risk)	Risk Score
Middlesex, NJ	17	43.42
Somerset, NJ	18	43.32
Bergen, NJ	19	43.02
Monmouth, NJ	20	42.87
Suffolk, NY	21	42.23
Warren, NJ	22	42.14
Ocean, NJ	23	42.00
Fairfield, CT	24	41.16
Dutchess, NY	25	41.15
Putnam, NY	26	41.07
Sullivan, NY	27	40.45
Hunterdon, NJ	28	40.15
Sussex, NJ	29	36.55
Ulster, NY	30	35.11
Litchfield, CT	31	33.96

Source: Deloitte D.SMaRT™

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region

FIGURE 12
Capacity risk

Inputs - ranked by highest contribution to weighted score in each group		Correlation with risk
Resource Availability Risk -measure of lack of health care resource availability to handle needs of the population		
Ratio of number of hospital beds for those hospitals to population		Negative
Average daily beds available		Negative
Ratio of total of health care workers to population		Negative
Ratio of total inpatient visits (how many beds are taken) to population		Positive
Ratio of hospitals that have satellite facilities to population		Negative
Ratio of number of hospitals within defined radius (currently 50 miles) to population		Negative
Ratio of total number of hospitals with telehealth capabilities to population		Negative
Ratio of total satellite facilities to population		Negative
# of FTE practitioners needed in the Health Professional Shortage Area (HPSA) so that it will achieve the population to practitioner target ratio		Positive
PCPs per 100,000		Negative
Number of primary care providers other than physicians per 100,000		Negative
Discharges for Ambulatory Care Sensitive Conditions per 100,000 Medicare Enrollees		Positive
% population < 65 who is uninsured		Positive
Health Professional Shortage Area (HPSA) Score developed by the National Health Service Corps (NHSC) in determining priorities for assignment of clinicians.		Positive
Whether county has emergency services		Negative
% people with health-related occupation in population		Negative
Quality of Care Risk -A measure of poor quality and efficiency of care provided by resources in and around the county		
Hospital overall rating		Negative
Readmission national comparison		Negative
Patient experience national comparison		Negative
Timeliness of care national comparison		Negative
Efficient use of medical imaging national comparison		Negative
Safety of care national comparison		Negative
Mortality national comparison		Positive
Effectiveness of care national comparison		Negative

County/Borough	Rank (high to low risk)	Risk Score	County/Borough	Rank (high to low risk)	Risk Score
Bronx, NY	1	89.85	Essex, NJ	17	78.00
Brooklyn, NY	2	89.37	Ocean, NJ	18	77.64
Queens, NY	3	88.21	Monmouth, NJ	19	77.06
Morris, NJ	4	85.24	Warren, NJ	20	76.82
Westchester, NY	5	84.59	Hudson, NJ	21	76.62
Manhattan, NY	6	81.70	Rockland, NY	22	76.36
Orange, NY	7	81.66	Bergen, NJ	23	75.77
Suffolk, NY	8	80.93	Passaic, NJ	24	75.51
Litchfield, CT	9	80.84	Staten Island, NY	25	74.53
New Haven, CT	10	80.69	Union, NJ	26	73.68
Middlesex, NJ	11	80.27	Sussex, NJ	27	72.60
Ulster, NY	12	79.96	Mercer, NJ	28	72.54
Sullivan, NY	13	79.62	Hunterdon, NJ	29	72.02
Dutchess, NY	14	79.38	Somerset, NJ	30	71.46
Fairfield, CT	15	79.30	Putnam, NY	31	69.18
Nassau, NY	16	78.75			

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

FIGURE 13
Resiliency risk

Inputs - ranked by highest contribution to weighted score in each group	Correlation with risk
Economic Resiliency Risk-measure of how weak the county's economy is and therefore how likely the population is to be financially hurt by business/school closures	
% of population in poverty	Positive
Median income of the population	Negative
% of population with employer sponsored insurance (as proxy for hourly vs. salaried workers)	Negative
% of the population unemployed	Positive
% of the population uninsured	Positive
% with some college education	Negative
Children in single-parent households	Positive
Number of social associations available	Positive

County/Borough	Rank (high to low risk)	Risk Score
Bronx, NY	1	96.20
Brooklyn, NY	2	63.70
Passaic, NJ	3	58.80
Essex, NJ	4	54.50
Sullivan, NY	5	51.90
Hudson, NJ	6	48.40
Queens, NY	7	47.70
New Haven, CT	8	26.20
Ulster, NY	9	25.80
Union, NJ	10	22.20
Ocean, NJ	11	18.00
Manhattan, NY	12	16.30
Orange, NY	13	14.80
Rockland, NY	14	13.40
Mercer, NJ	15	12.40
Staten Island, NY	16	9.20

County/Borough	Rank (high to low risk)	Risk Score
Fairfield, CT	17	7.10
Dutchess, NY	18	7.10
Westchester, NY	19	6.20
Middlesex, NJ	20	5.50
Litchfield, CT	21	5.30
Bergen, NJ	22	3.40
Warren, NJ	23	3.30
Suffolk, NY	24	3.00
Monmouth, NJ	25	2.10
Sussex, NJ	26	1.10
Nassau, NY	27	0.90
Putnam, NY	28	0.90
Morris, NJ	29	0.20
Somerset, NJ	30	0.20
Hunterdon, NJ	31	0.10

FIGURE 14
Economic vulnerability index

Inputs - ranked by highest contribution to weighted score in each group	Correlation with risk
Economic Vulnerability Index-measure of how the county's economy is to economic disruption	
Rank of industries by vulnerability to pandemic multiplied by the % of population employment by industry	Positive

County/Borough	Rank (high to low risk)	Risk Score
Passaic, NJ	1	82.75
Bronx, NY	2	82.54
Queens, NY	3	82.44
Litchfield, CT	4	82.28
Warren, NJ	5	82.06
Ulster, NY	6	82.00
Sullivan, NY	7	81.61
Sussex, NJ	8	81.37
Ocean, NJ	9	81.36
New Haven, CT	10	80.62
Dutchess, NY	11	80.49
Orange, NY	12	80.35
Putnam, NY	13	80.32
Union, NJ	14	80.26
Hudson, NJ	15	79.97
Bergen, NJ	16	79.76

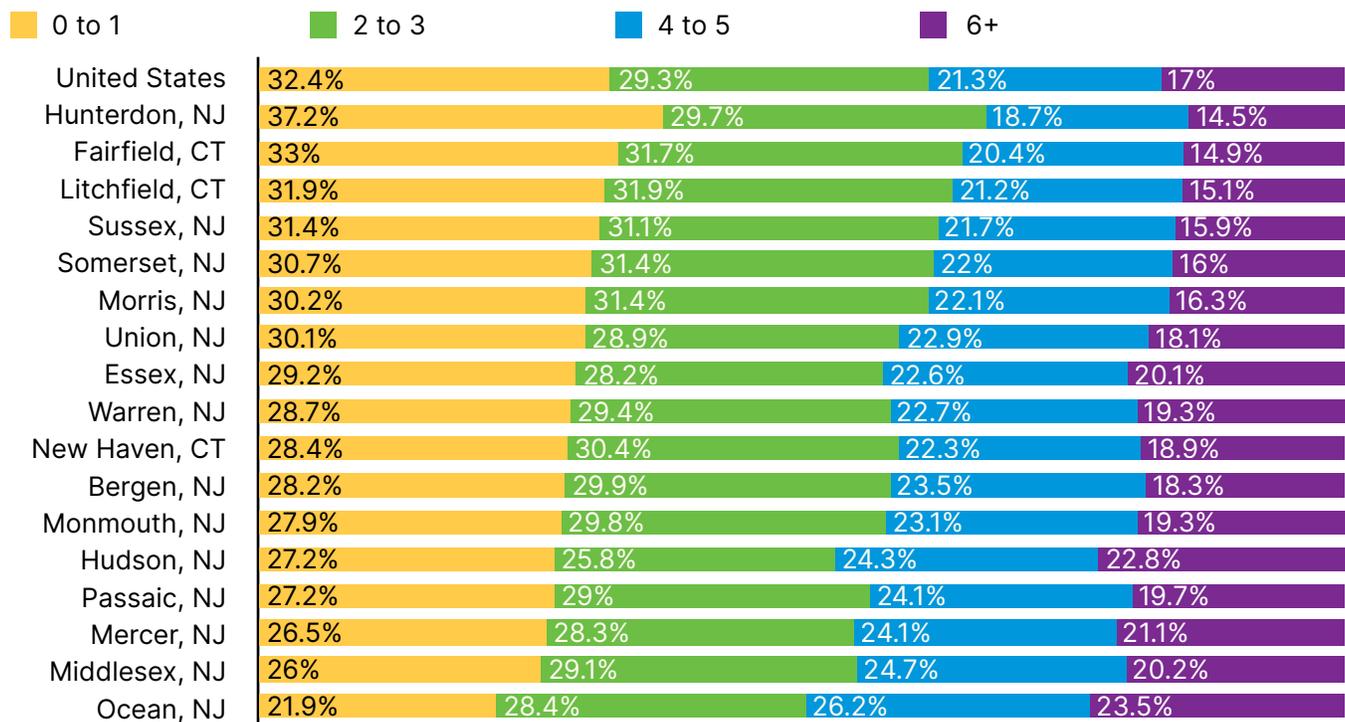
County/Borough	Rank (high to low risk)	Risk Score
Fairfield, CT	17	79.47
Suffolk, NY	18	79.42
Monmouth, NJ	19	79.31
Rockland, NY	20	78.90
Hunterdon, NJ	21	78.80
Essex, NJ	22	78.51
Middlesex, NJ	23	78.42
Brooklyn, NY	24	77.98
Westchester, NY	25	77.76
Morris, NJ	26	77.75
Somerset, NJ	27	77.23
Nassau, NY	28	77.14
Staten Island, NY	29	76.61
Mercer, NJ	30	76.41
Manhattan, NY	31	74.15

Comorbidities by State

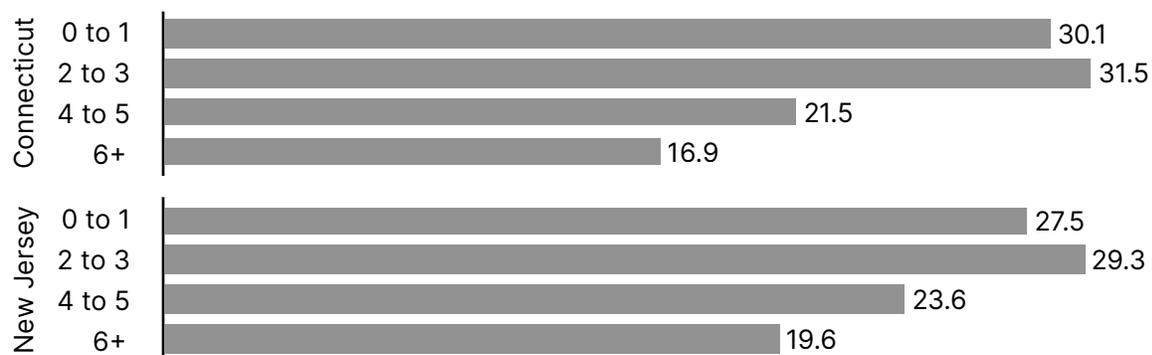
In all but one Connecticut and New Jersey county, 75% of the Medicare population has 2+ chronic conditions, making the population extremely susceptible to COVID-19.

FIGURE 15
Comorbidities among Connecticut and New Jersey Medicare beneficiaries

Counties by number of chronic conditions
(% of beneficiaries with number of conditions sorted by 0-1)



States by number of chronic conditions (% of beneficiaries)



Source: CMS (2017)

Hypertension by State

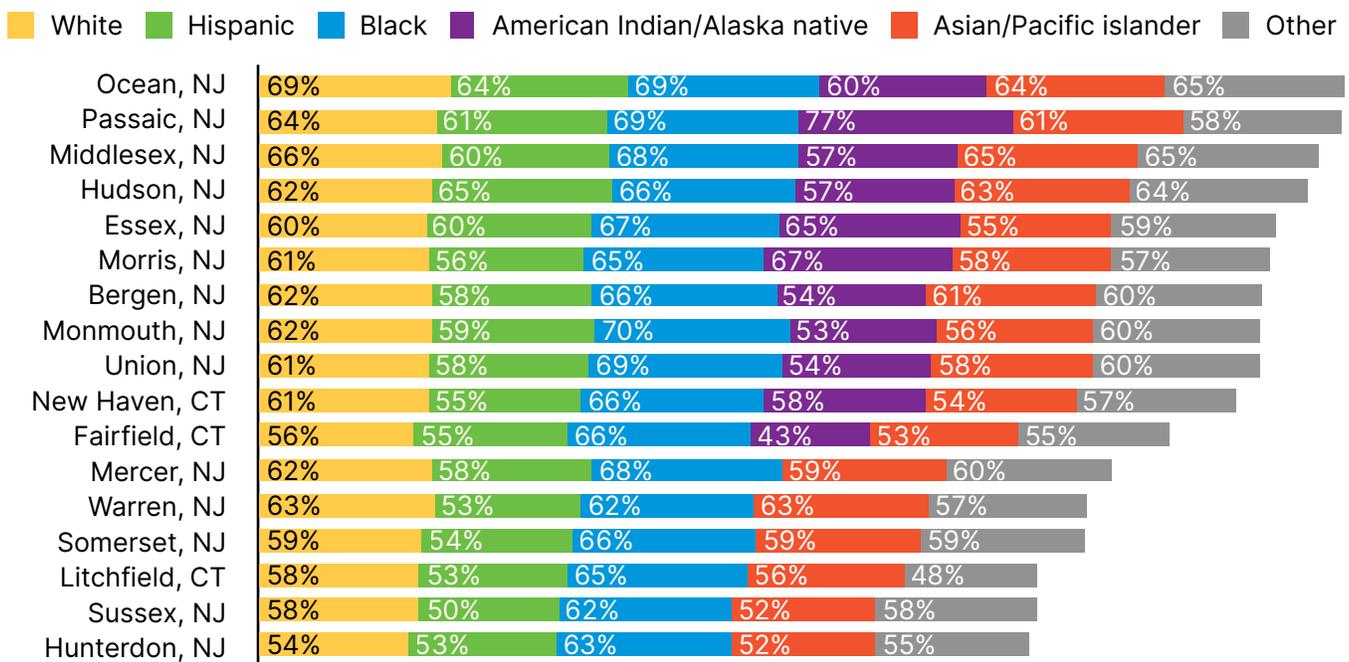
Of the Medicare population, hypertension mostly affects the Black population, but on average, it affects over half the total Medicare population.

Connecticut and New Jersey

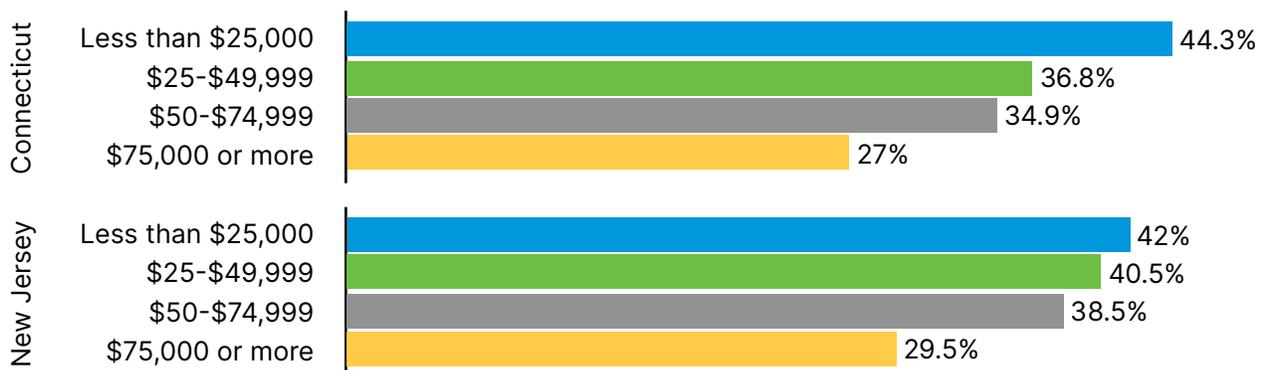
In Connecticut and New Jersey, hypertension is much more prevalent in residents with an annual income of less than \$50,000 compared to those with incomes greater than \$75,000.

FIGURE 16
Connecticut and New Jersey underlying conditions by race and income - hypertension

By Race - Medicare beneficiaries only (% of race with condition, sorted by total prevalence)



By income - Entire state population (% of income group with condition, sorted by income group)



Sources: CMS (2017); CDC BRFSS (2018), overall state view

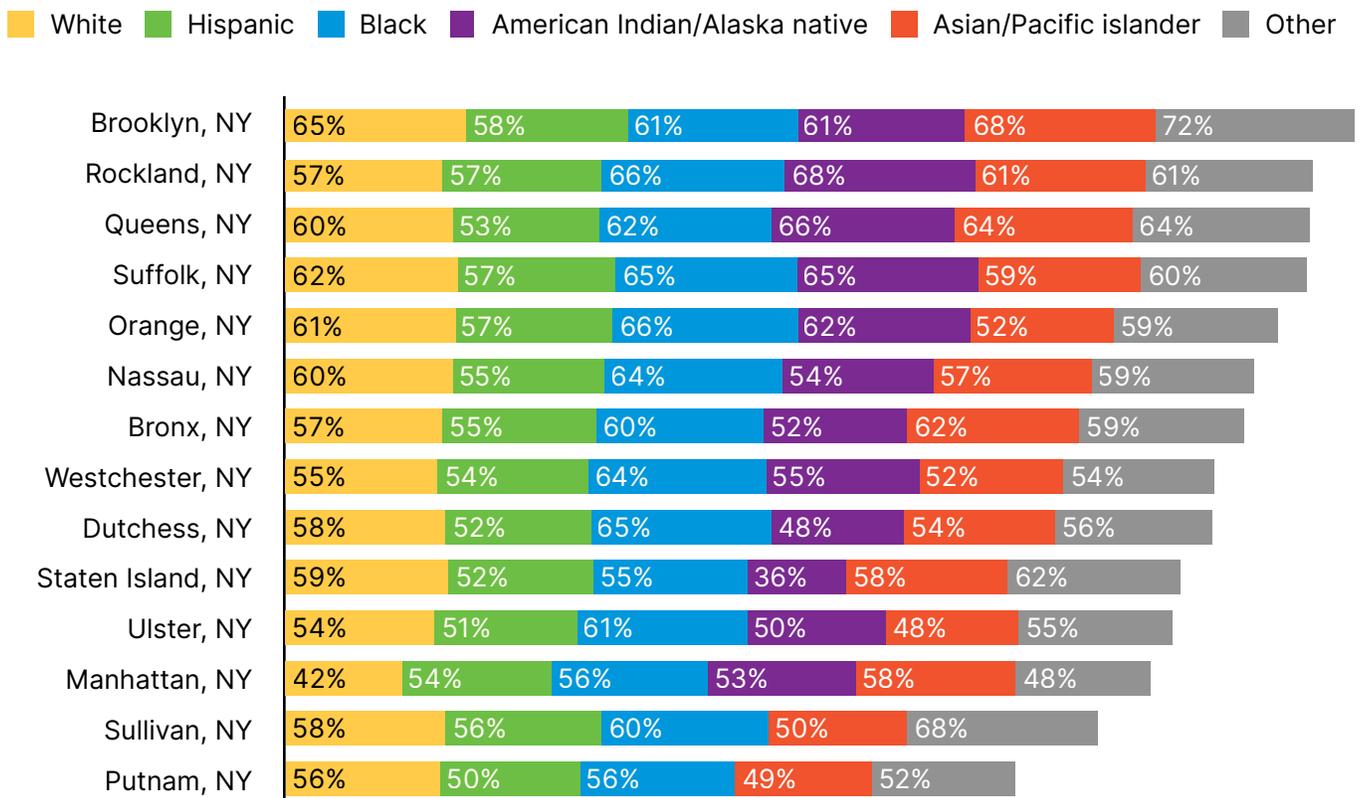
New York

Hypertension affects the smallest proportion of white Medicare beneficiaries in New York County (Manhattan) at 42%, but it affects more than 55% of the Black and Asian/Pacific Islander Medicare beneficiaries in the same county.

FIGURE 17

New York underlying conditions by race and income - hypertension

By Race - Medicare beneficiaries only (% of race with condition, sorted by total prevalence)



By income - Entire state population (% of income group with condition, sorted by income group)



Sources: CMS (2017); CDC BRFSS (2018), overall state view

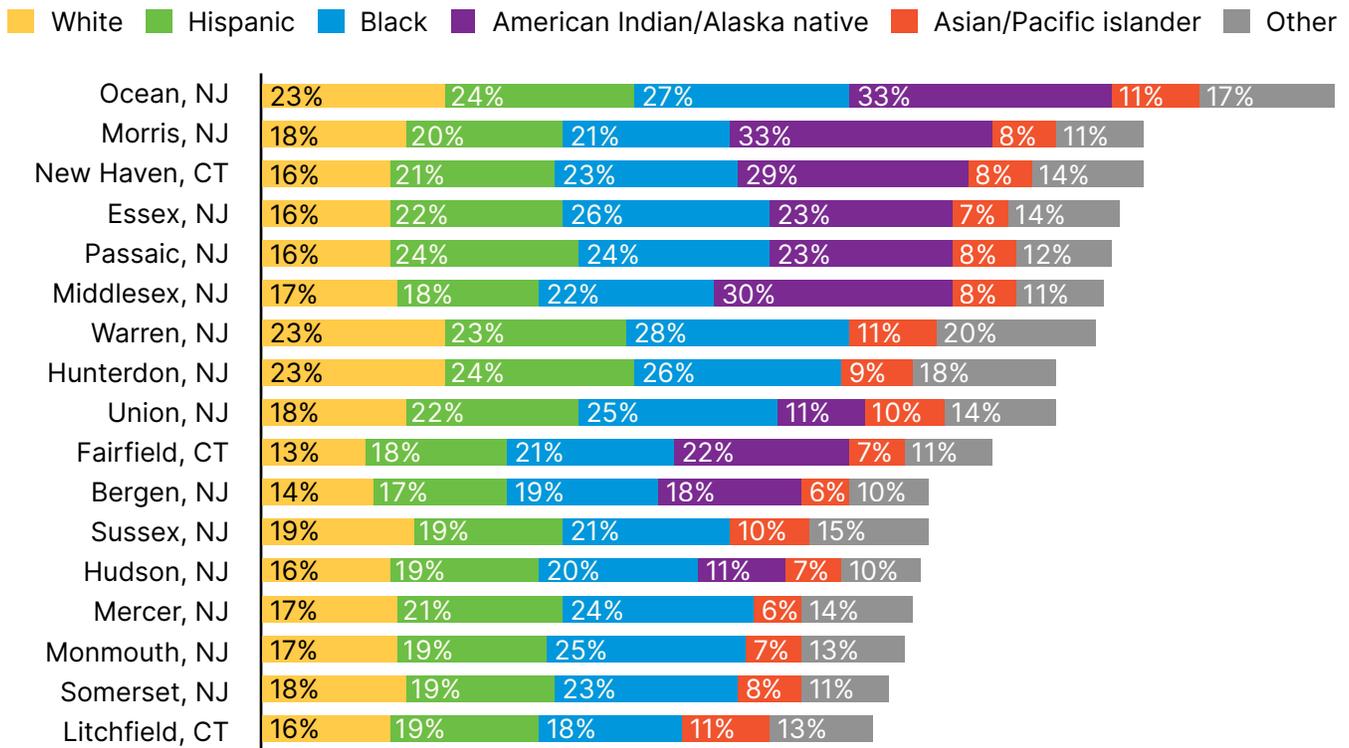
Obesity by State

Connecticut/New Jersey

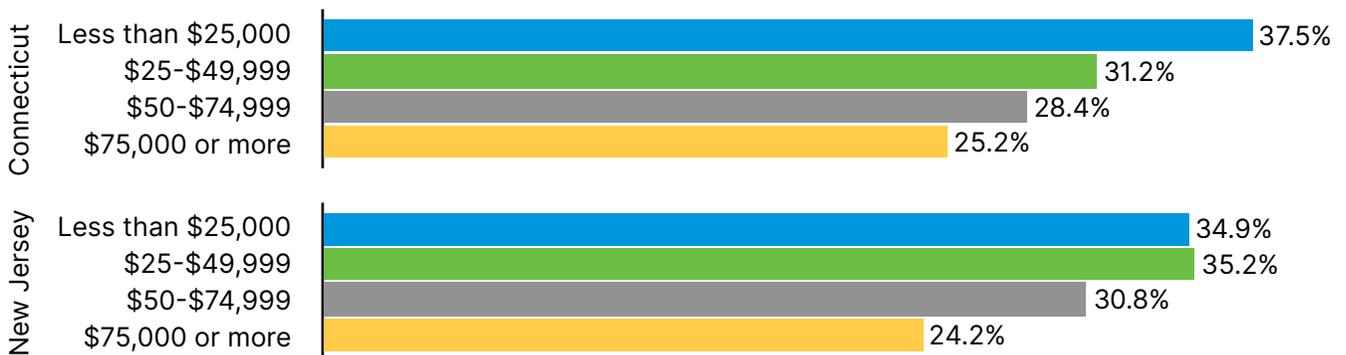
In each Connecticut and New Jersey county, obesity affects a greater or equal percentage of Hispanic and Black Medicare beneficiaries than whites, and Ocean County is affected by obesity significantly more than any other county.

FIGURE 18
Connecticut and New Jersey underlying conditions by race and income - obesity

By Race - Medicare beneficiaries only (% of race with condition, sorted by total prevalence)



By income - Entire state population (% of income group with condition, sorted by income group)



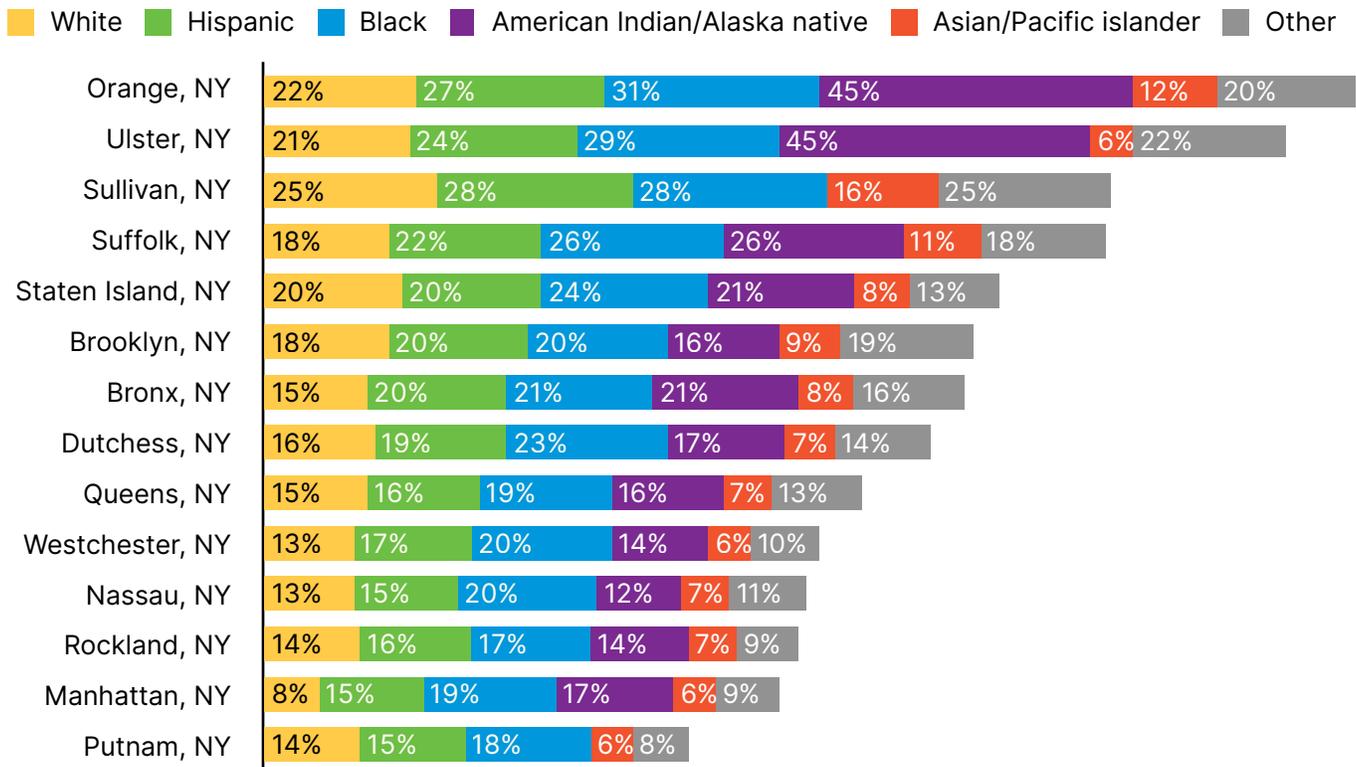
Sources: CMS (2017); CDC BRFSS (2018), overall state view

New York

Obesity appears to similarly affect New York state residents with an annual income less than \$75,000; however, residents with incomes greater than \$75,000, are affected considerably less.

FIGURE 19
New York underlying conditions by race and income - obesity

By Race - Medicare beneficiaries only (% of race with condition, sorted by total prevalence)



By income - Entire state population (% of income group with condition, sorted by income group)



Sources: CMS (2017); CDC BRFSS (2018), overall state view

Appendix B:

Analysis of Health Care Ecosystem

The New York metropolitan region's system of health includes a diverse set of players. The analyses below detail some of the forces at play in this arena.

Supply and Demand in the New York Metropolitan Region Health Care Ecosystem

Figure 20 compares the supply and demand within the health care ecosystem across different regions, including the New York metropolitan region, with the national average. The first chart shows the supply (across) of PCPs, ASCs, beds, ICU beds and post-acute locations per 1,000 people for each region (left). The second chart is broken into two sections. The left side shows the demand (across) for each region (left) for discharges per 1,000 people, occupancy percent, average length of stay, average daily census and full-time equivalents (FTEs) per bed. The right portion of the chart compares each region's demand metrics against the national average for demand and represents the delta between the two. A green arrow indicates where the region is benchmarking favorably, while a red arrow shows the region compares unfavorably to the national benchmark. Overall, the charts appear to show that the New York metropolitan region has a lower supply per 1,000 people but a higher demand for most of the metrics, as compared to the national average.

FIGURE 20
Supply and demand overview of New York metro region

Supply Per 1,000 Population					
Geography	Primary Care Physicians	ASCs	Beds	ICU Beds	Post Acute Locations
National	1.46	0.02	2.82	0.24	NA
Northeast	1.97	0.01	3.05	0.21	NA
Metro New York Area	▼ 0.88	▼ 0.01	▲ 2.91	▼ 0.19	0.04
Other Regional Benchmarks					
National	1.46	0.02	2.82	0.24	NA
South	1.26	0.02	2.95	0.26	NA
Midwest	1.59	0.01	3.08	0.26	NA
West	1.30	0.02	2.20	0.22	NA

Demand Metrics						Delta to National Benchmark				
Geography	Discharges per 1000	Occupancy %	Average Length of Stay	Average Daily Census	FTEs per Bed	Discharges per 1000	Occupancy %	Average Length of Stay	Average Daily Census	FTEs per Bed
National	111	66.2%	6.1	95	4.6					
Northeast	122	73.5%	6.7	129	5.6	11	7.3%	0.6	34	1.0
Metro New York Area	124	74.2%	6.8	203	6.2	▲ 13	▲ 8.1%	▼ 0.7	▲ 107	1.6
Other Regional Benchmarks						Other Regional Benchmarks				
South	115	65.5%	6.1	109	4.0	4	-0.7%	0.0	14	(0.6)
Midwest	116	61.3%	5.9	70	5.5	6	-4.9%	(0.2)	(26)	0.9
West	91	66.3%	5.9	75	3.9	(20)	0.2%	(0.3)	(21)	(0.7)

Source: Operational data sourced from AHA Annual Survey Database™ (2018); Financial data sourced from IBM Truven (2019)

Figure 21 compares financial metrics for health systems across different regions, including the New York metropolitan region, with the national average. The chart is broken into two sections. The first section shows several financial metrics for each region (net revenue, expenses, operating margin and average age of plant). The second section compares the financial metrics of each region to financial metrics in the Northeast and shows the delta between the two. A green arrow represents a favorable benchmark for the region, as compared to the Northeast, while a red arrow represents an unfavorable benchmark. The New York metropolitan region has higher expenses but lower revenue compared to the Northeast, ultimately resulting in a lower operating margin.

FIGURE 21
Financial benchmarking of New York metro region

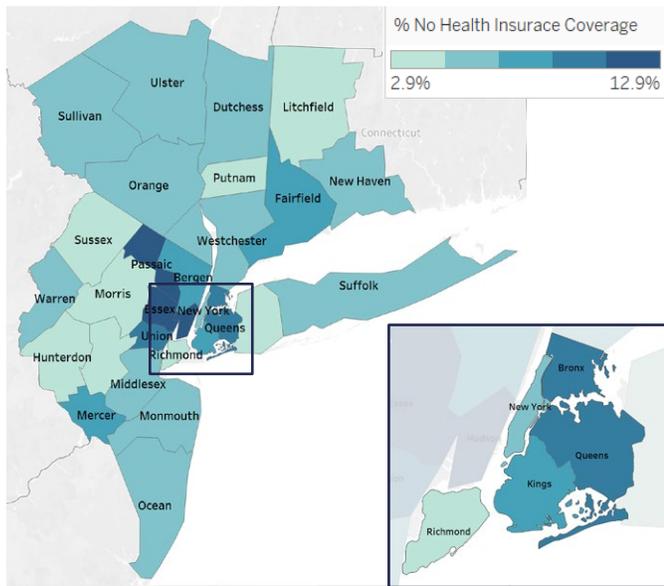
Financial Metrics								
	Net Revenue per Adjusted Discharge	Net Revenue per Adjusted Patient Day	Expense per Adjusted Discharge	Expense per Adjusted Patient Day	Total Labor Expense per Adjusted Discharge	Total Labor Expense per Adjusted Patient Day	EBITDA %	Average Age of Plant
National	\$16,898	\$2,822	\$16,910	\$2,824	\$6,258	\$1,045	-0.1%	11.7
Northeast	\$17,883	\$3,781	\$18,098	\$3,827	\$6,603	\$1,396	-1.2%	12.3
Metro New York Area	\$13,282	\$2,137	\$14,774	\$2,377	\$6,274	\$1,009	-11.2%	12.1
Other Regional Benchmarks								
South	\$14,499	\$1,174	\$15,565	\$1,260	\$6,208	\$503	-7.4%	12.0
Midwest	\$12,849	\$3,459	\$12,819	\$3,451	\$4,582	\$1,234	0.2%	11.1
West	\$21,058	\$3,418	\$19,658	\$3,191	\$7,213	\$1,171	6.6%	11.6

Delta to Northeast Benchmark								
	Net Revenue per Adjusted Discharge	Net Revenue per Adjusted Patient Day	Expense per Adjusted Discharge	Expense per Adjusted Patient Day	Total Labor Expense per Adjusted Discharge	Total Labor Expense per Adjusted Patient Day	EBITDA %	Average Age of Plant
National								
Northeast	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	-
Metro New York Area	▼ (\$4,601)	▼ (\$1,644)	▲ (\$3,324)	▲ (\$1,449)	▲ (\$329)	▲ (\$387)	▼ -10%	(0.2)
Other Regional Benchmarks								
South	\$14,499	\$1,174	\$15,565	\$1,260	\$6,208	\$503	-7.4%	12.0
Midwest	\$12,849	\$3,459	\$12,819	\$3,451	\$4,582	\$1,234	0.2%	11.1
West	\$21,058	\$3,418	\$19,658	\$3,191	\$7,213	\$1,171	6.6%	11.6

Source: Operational data sourced from AHA Annual Survey Database™ (2018); Financial data sourced from IBM Truven (2019)

Despite having higher demand than the Northeast region and the national average, significant percentages of the New York City population are uninsured, contributing to low revenue and high expenses (Figure 22).

FIGURE 22
New York metro region population without health insurance coverage



County/Borough	% of Population without Coverage
Passaic, NJ	12.90%
Hudson, NJ	11.90%
Essex, NJ	11.00%
Union, NJ	10.50%
Queens, NY	10.50%
Bronx, NY	9.70%
Brooklyn, NY	8.20%
Fairfield, CT	8.10%
Mercer, NJ	8.00%
Bergen, NJ	7.70%
Westchester, NY	6.80%
Warren, NJ	6.20%
Sullivan, NY	6.10%
Rockland, NY	6.10%
Middlesex, NJ	5.90%
Ulster, NY	5.90%
Ocean, NJ	5.80%
Manhattan, NY	5.80%
Suffolk, NY	5.40%
Orange, NY	5.20%
New Haven, CT	5.10%
Dutchess, NY	5.00%
Monmouth, NJ	5.00%
Staten Island, NY	4.90%
Nassau, NY	4.80%
Putnam, NY	4.60%
Litchfield, CT	4.50%
Morris, NJ	4.20%
Somerset, NJ	4.10%
Sussex, NJ	3.30%
Hunterdon, NJ	2.90%

"The business model for health care in New York is commercially insured patients subsidize government pay patients. Half the commercially insured patients in Brooklyn go to Manhattan so by definition, the subsidy and the business model doesn't work."

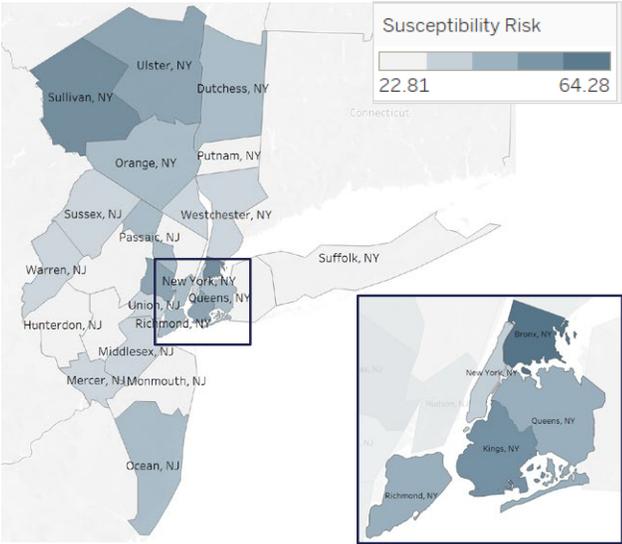
—Expert Stakeholder

Source: US Census Bureau (2018)

Community Risk: Local areas were evaluated using the following D.SMaRT™ Community Risk Metrics: susceptibility to complications, risks of disease transmission, health system capacity, resiliency and economic vulnerability. Higher values of each index are meant to signify higher levels of risk, which is attributable to several factors. Risk scores are based on inputs used to calculate the risk index.

Susceptibility risk focuses on a population’s vulnerability to severe infection and mortality from COVID-19. Some factors include, age, comorbidities, socioeconomic background, public safety, food security and water quality. Inputs to the risk score include the percentage of smokers in the population, people below the federal poverty level and people over the age of 60. Figure 23 shows that counties with high-risk populations, such as Bronx County and Essex County, each with 44% and 42% Black populations, respectively, have high susceptibility risk.

FIGURE 23
New York metro region susceptibility risk by county



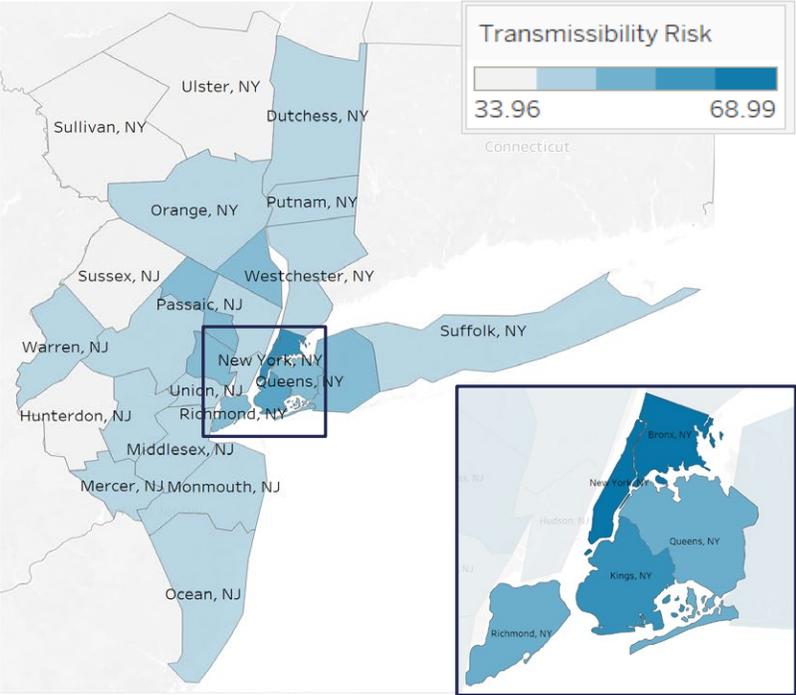
County/Borough	Highest Risk (Rank)
Bronx, NY	1
Sullivan, NY	2
Essex, NJ	3
Brooklyn, NY	4
Ulster, NY	5

County/Borough	Lowest Risk (Rank)
Putnam, NY	27
Nassau, NY	28
Morris, NJ	29
Hunterdon, NJ	30
Somerset, NJ	31

Source: Deloitte D.SMaRT™
Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

Transmissibility risk measures how likely an infection is to spread within the community due to factors such as density, homeownership, commutes and frequency of infection spread in hospitals. Inputs to the risk score include population density, percentage of households with no vehicle available and MRSA cases per 100,000. Figure 24 shows that counties with higher population densities, such as New York County (Manhattan), have higher transmissibility risk. New York County (Manhattan) has a population density of more than 71,000 people per square mile, compared to the region average of 1,800 people per square mile.

FIGURE 24
New York metro region transmissibility risk by county



Source: Deloitte D.SMaRT™

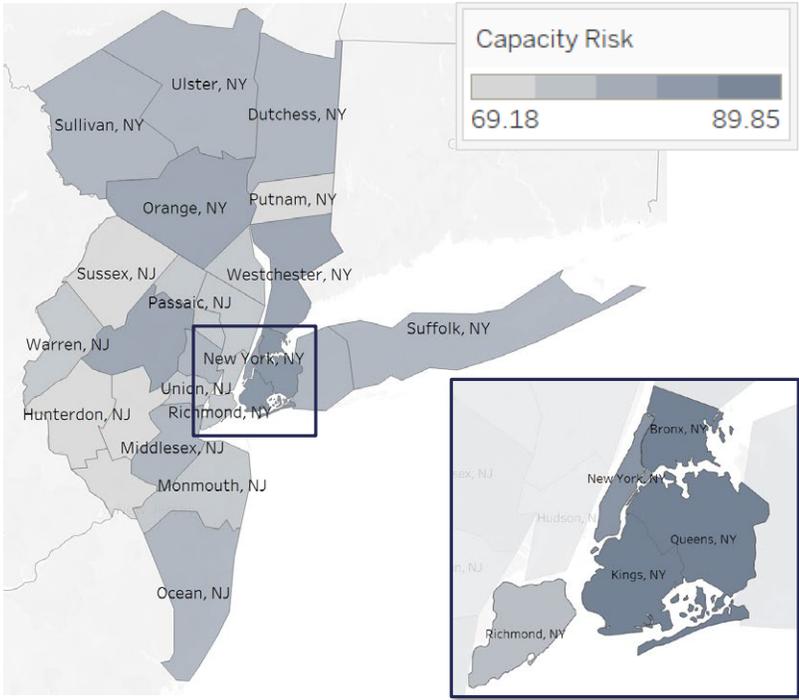
County/Borough	Highest Risk (Rank)
Bronx, NY	1
Manhattan, NY	2
Brooklyn, NY	3
Essex, NY	4
Queens, NY	5

County/Borough	Lowest Risk (Rank)
Sullivan, NY	27
Hunterdon, NJ	28
Sussex, NJ	29
Ulster, NY	30
Litchfield, CT	31

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

Capacity risk is indicative of each county’s health resources, which can help predict the likelihood of being unable to handle a large population of ill patients. Capacity risk includes hospital beds, number of health care providers, telehealth/telemedicine options, utilization of emergency services, etc. Inputs to the risk score include the ratio of health care workers to population, ratio of beds to population and each hospital’s overall rating. Figure 25 shows that a county with ample health resources has a lower capacity risk. According to the American Hospital Association, Bronx and Kings (Brooklyn) Counties have 0.59 and 0.67 PCPs per 1,000 people, respectively, compared to the U.S. average of 1.46 PCPs per 1,000.

FIGURE 25
New York metro region capacity factors by county



Source: Deloitte D.SMaRT™

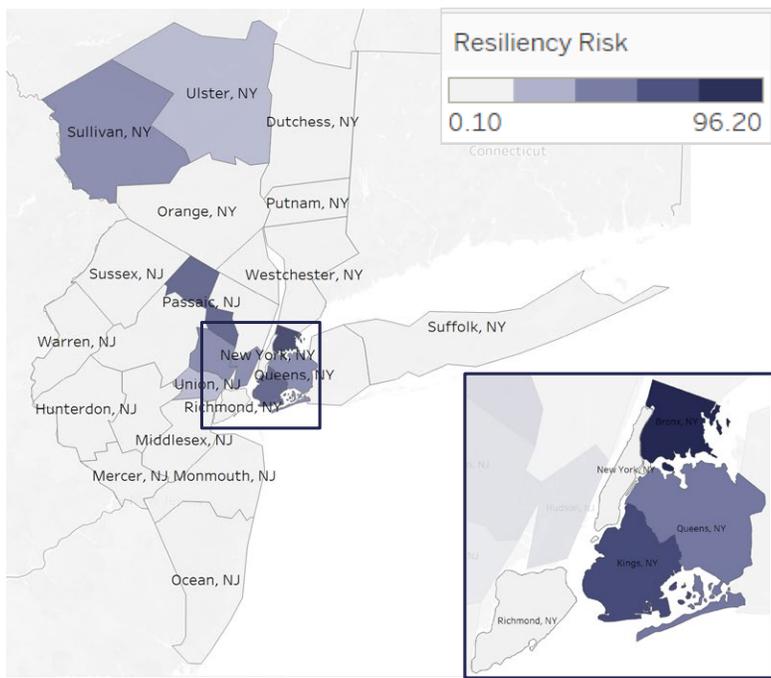
County/Borough	Highest Risk (Rank)
Bronx, NY	1
Brooklyn, NY	2
Queens, NY	3
Morris, NJ	4
Westchester, NY	5

County/Borough	Lowest Risk (Rank)
Sussex, NJ	27
Mercer, NJ	28
Hunterdon, NJ	29
Somerset, NJ	30
Putnam, NY	31

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

Resiliency risk factors measure a community’s ability to withstand extensive social distancing, socioeconomic status, ability work from home and social support levels. Inputs include population density, number of schools per county and number of single-parent households. Resiliency risk disproportionately increases in counties that have lower education levels. Figure 26 shows that nearly 30% of Bronx County’s population does not have at least a high school diploma, the highest rate of the metropolitan region.

FIGURE 26
New York metro region resiliency risk by county



Source: Deloitte D.SMaRT™

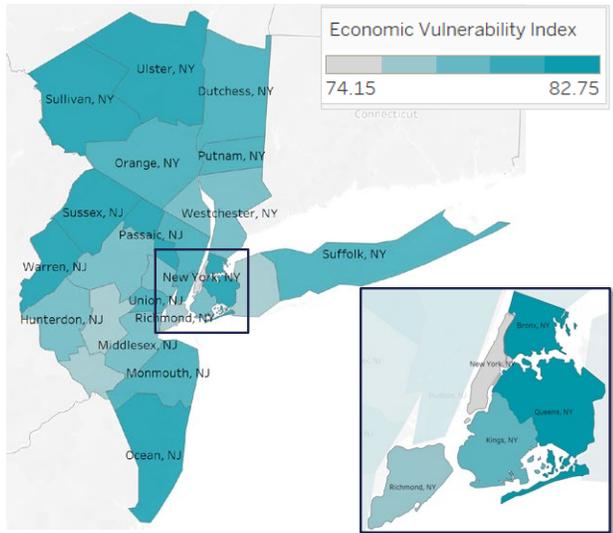
County/Borough	Highest Risk (Rank)
Bronx, NY	1
Brooklyn, NY	2
Passaic, NJ	3
Essex, NJ	4
Sullivan, NY	5

County/Borough	Lowest Risk (Rank)
Nassau, NY	27
Putnam, NY	28
Morris, NJ	29
Somerset, NJ	30
Hunterdon, NJ	31

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

Deloitte’s Economic Vulnerability Index measures the relative vulnerability of each U.S. county to economic disruption due to COVID-19 based on industries that employ people who live in the county. Inputs to the risk score include industries that are vulnerable to economic disruption. Industries are ranked based on their vulnerability to the pandemic. That ranking is then multiplied by the percentage of the population working in that industry. This provides a picture of how economically vulnerable a geography may be based on which industries dominate a county. Economic vulnerability is greatest in counties that have high unemployment and low median household incomes. Pre-COVID-19, Bronx County had the highest unemployment and lowest median household income of the New York metropolitan region at 5.7% and \$39,000, respectively (Figure 27).

FIGURE 27
New York metro region economic vulnerability by county



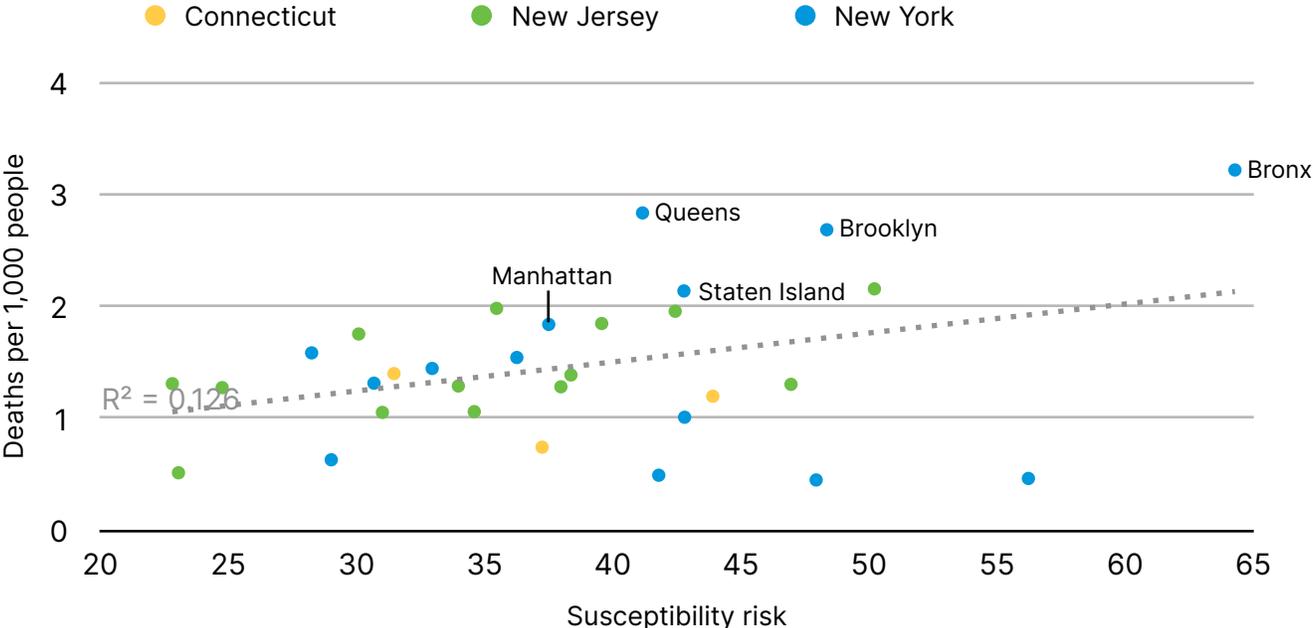
County/Borough	Highest Risk (Rank)
Passaic, NJ	1
Bronx, NY	2
Queens, NY	3
Litchfield, CT	4
Warren, NJ	5

County/Borough	Lowest Risk (Rank)
Somerset, NJ	27
Nassau, NY	28
Staten Island, NY	29
Mercer, NJ	30
Manhattan, NY	31

Source: Deloitte D.SMaRT™
Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region.

The five counties that make up New York City have high COVID-19 mortality rates (Figure 28). Bronx County is notable for its high susceptibility risk, which resulted in the highest number of deaths per 1,000 people. Even though correlation for the New York metropolitan region is not high ($R^2=0.126$), the impact of COVID-19 in Bronx County demonstrates how a high susceptibility risk can result in a high mortality rate compared to surrounding counties.

FIGURE 28
Susceptibility risk and COVID-19 mortality rate

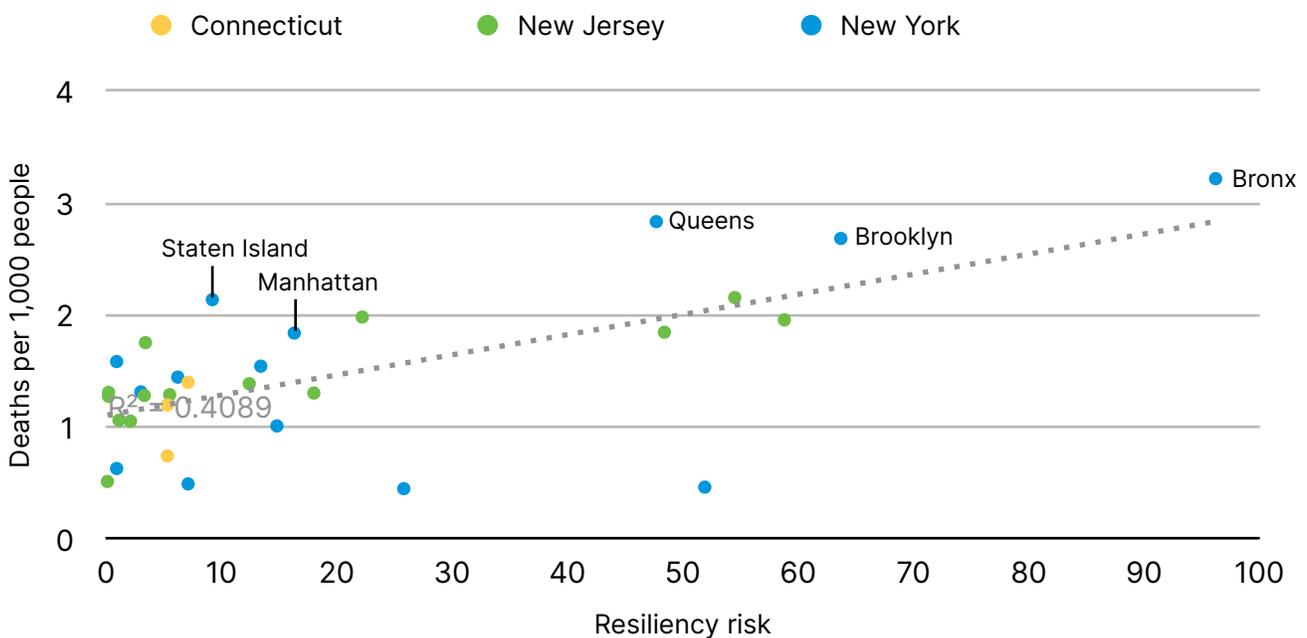


Source: Deloitte D.SMaRT™; COVID-19 mortality rates from USAFacts (as of 6/11/2020)
 Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region

Resiliency risk highlights gaps in income, employment and employer-sponsored insurance across populations in the New York metropolitan region. Richmond (Staten Island) and New York (Manhattan) Counties have the lowest resiliency risk and lowest mortality rates, whereas counties with the highest resiliency risk (Queens, Kings (Brooklyn) and Bronx) have the highest mortality rates (Figure 29). Counties that are more economically secure are more likely to have better access to preventative health care than less economically secure counties. Therefore, people who live in economically secure counties are less likely to experience significant health complications or be unable to afford care during a health crisis.

Similarly, the majority of New Jersey and Connecticut counties follow the trend shown by Richmond (Staten Island) and New York (Manhattan) Counties. The three New Jersey counties in the middle of resiliency risk with mortality rates of around 2 per 1,000 people are Passaic, Essex and Hudson counties.

FIGURE 29
Resilience risk/income and social associations deep dive

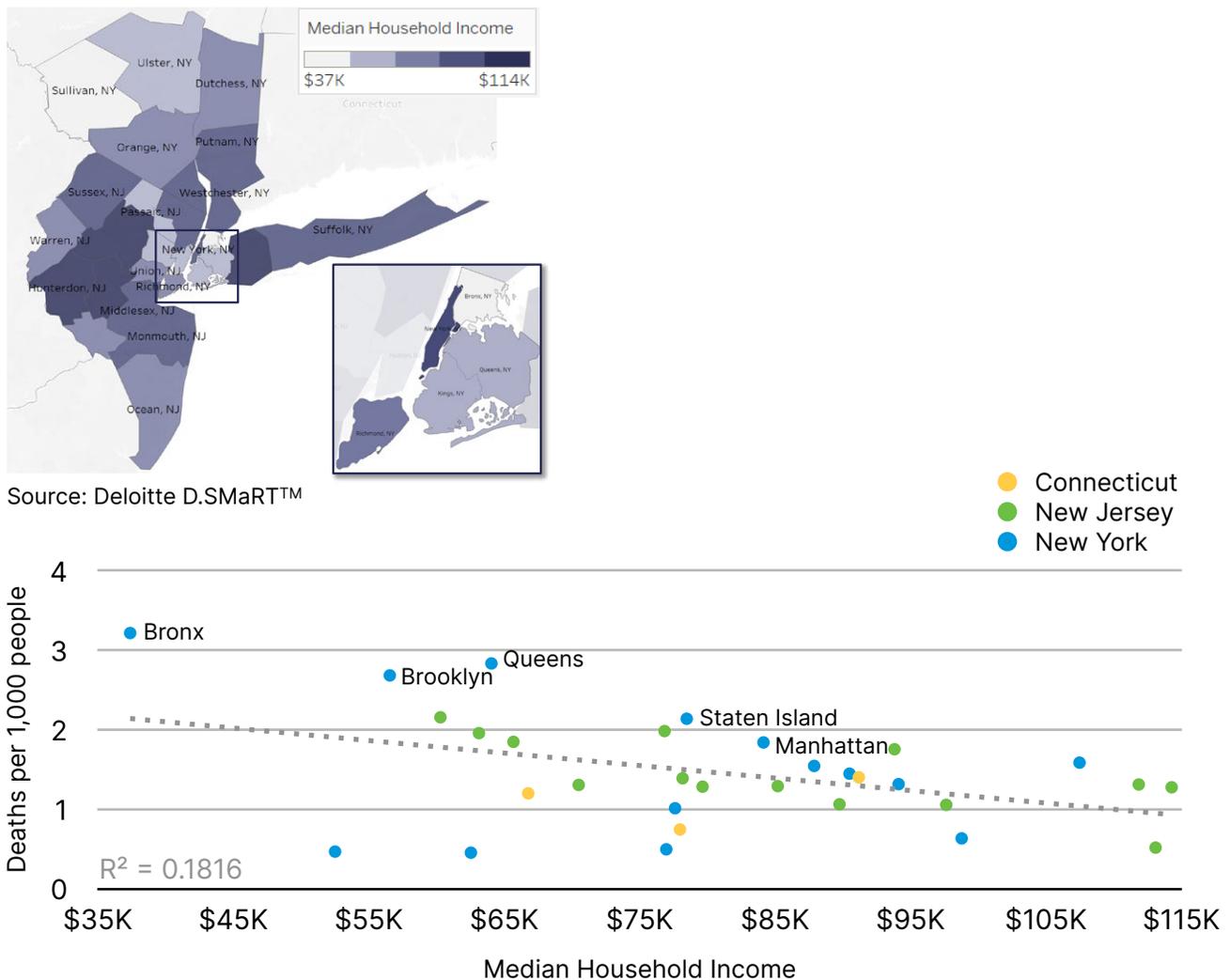


Sources: Deloitte D.SMaRT™; COVID-19 mortality rates from USAFacts (as of 6/11/2020)

Note: Index scores were used to provide relative county comparisons. Metrics may vary in relevance by region

Underscoring the trend shown above and diving further into resiliency risk, household income similarly demonstrates that higher-income households have lower mortality rates and lower-income households have higher mortality rates (Figure 30). People who live in lower-income households are more likely to have hourly wage vs. salaried jobs. Hourly wage jobs often do not offer the same level of health care coverage as higher-paying or salaried jobs. Additionally, it was less likely that individuals with lower incomes would be able to work from home and thus were often required to stay on the front lines during the acute response. Notably, Queens, Kings (Brooklyn) and Bronx Counties fall below a median household income of \$65,000 and have the highest mortality rates. This indicates that the income for these households, often with a high rate of overcrowding as discussed above, does not provide the economic resources to obtain the preventative care that can lower disease risk for individuals in the household.

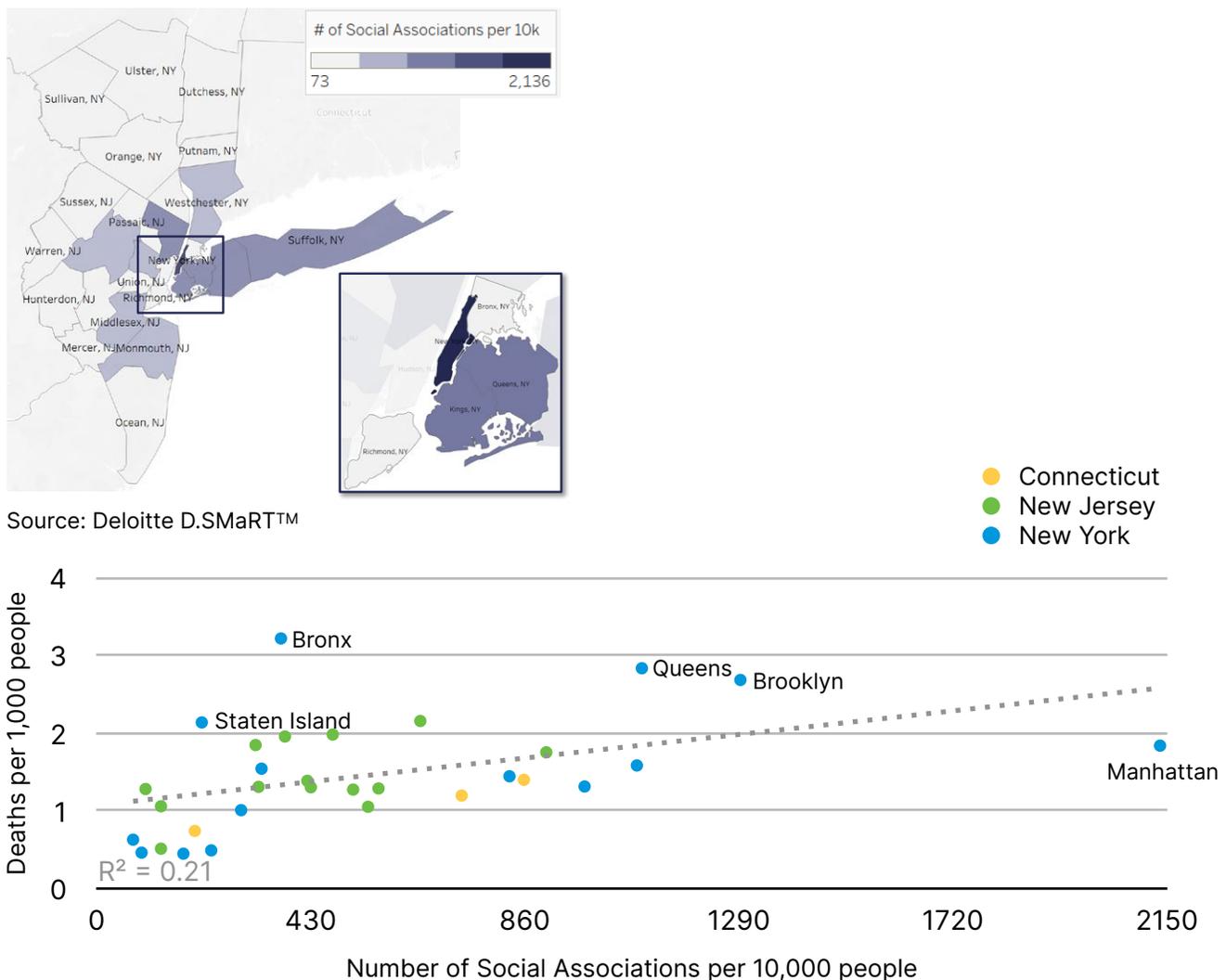
FIGURE 30
Household income and COVID-19 mortality rate



Sources: US Census Bureau - Small Area Income and Poverty Estimates (2018); COVID-19 mortality rates from USAFacts (as of 6/11/2020)

Individuals who have a high degree of social associations, such as involvement in community organizations, tend to have lower mortality rates and stronger networks, often leading to healthier life choices (Figure 31).⁶³ The above data indicate that people who live in New York County (Manhattan) have more social associations than any of the other 31 counties in metropolitan region. The high degree of social associations for New York County (Manhattan) appears to have a positive effect on mortality rates. It is notable that Queens and Kings (Brooklyn) Counties have a similar number of social associations, yet they have varying degrees of mortality. While the Bronx has a low degree of social associations, it has the highest mortality rate of any of the 31 counties, which is more likely due to other contributing factors previously discussed. Therefore, these data points underscore that social associations may be a contributing factor but are not strongly correlated to mortality rates from COVID-19 (e.g., $R=0.21$).

FIGURE 31
Social associations and COVID-19 mortality rate



Sources: US Census Bureau - County Business Patterns (2017); COVID-19 mortality rates from USAFacts (as of 6/11/2020)

Comorbidities and Population Health

The decline in population health can be highlighted by the prevalence of underlying conditions, or comorbidities, within the population. A study of COVID-19 hospitalizations in the New York metropolitan region determined the most common comorbidities were hypertension, obesity and diabetes.⁶⁴ This indicates that patients who have these underlying conditions were at significant risk given any encounter with a new disease. The data below paints a picture of the comorbidities of the New York metropolitan region population pre-COVID-19, highlighting the disparity in comorbidities by racial groups, which is often linked to underlying systemic issues and SDOH.

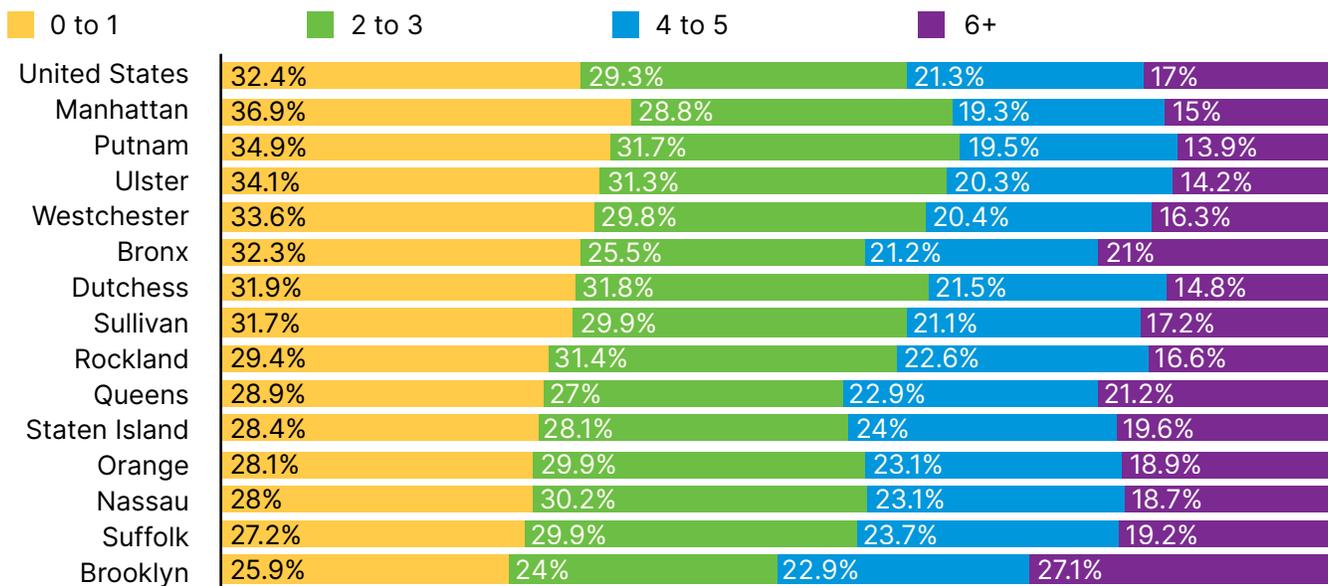
Comorbidities Among Medicare Beneficiaries

In Bronx, Kings (Brooklyn) and Queens Counties, one out of every five Medicare beneficiaries has 6+ chronic conditions, and 40.3% of New York state's (as a whole) Medicare population has 4+ chronic conditions (Figure 32).

FIGURE 32
Comorbidities among Medicare beneficiaries in the New York metro region

Counties by number of chronic conditions

% of beneficiaries with number of conditions sorted by 0-1



States by number of chronic conditions (% of beneficiaries)



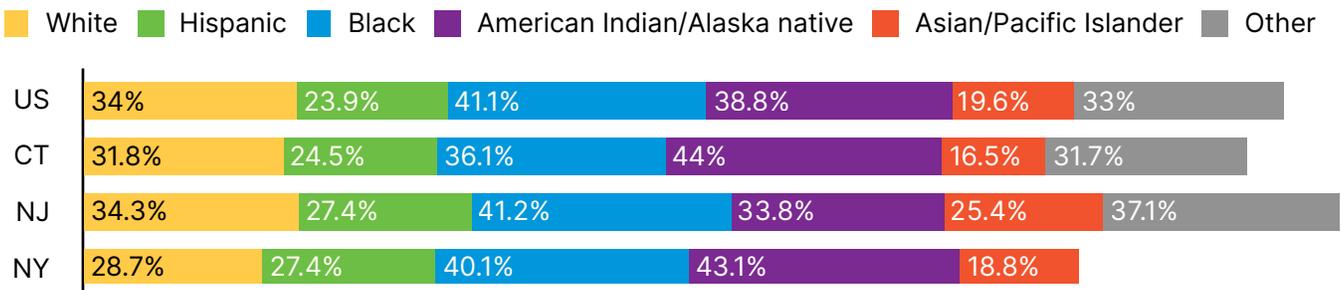
Source: CMS (2017)

Underlying Conditions: Hypertension

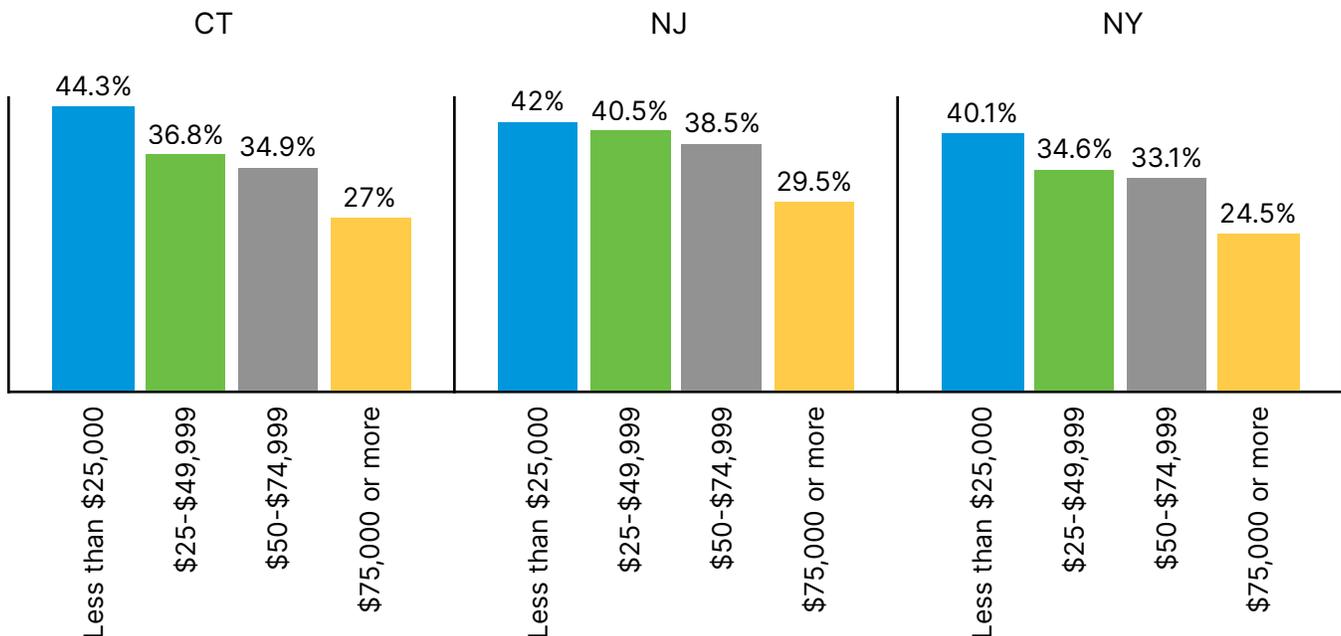
Across New York, New Jersey and Connecticut, Black and American Indian/Alaska native populations have a higher prevalence of hypertension than other racial groups (Figure 33). By income group, lower income populations show larger percentages of hypertension prevalence. Notably, for those with incomes <\$25,000 across the region, 40% or more have hypertension.

FIGURE 33
Underlying conditions in New York, New Jersey and Connecticut by race and income - hypertension

By race - Entire state population (% of race with condition, sorted by state)



By income - Entire state population (% of income group with condition, sorted by income group)



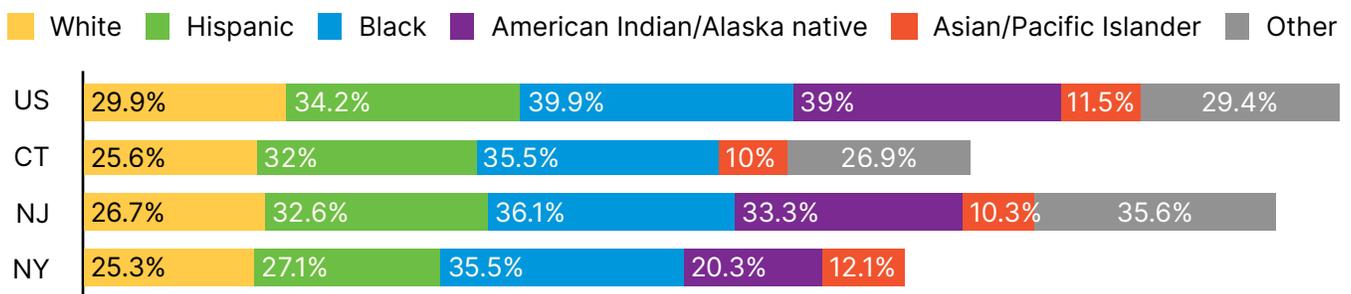
Source: CDC BRFSS (2018), overall state view

Underlying Conditions: Obesity

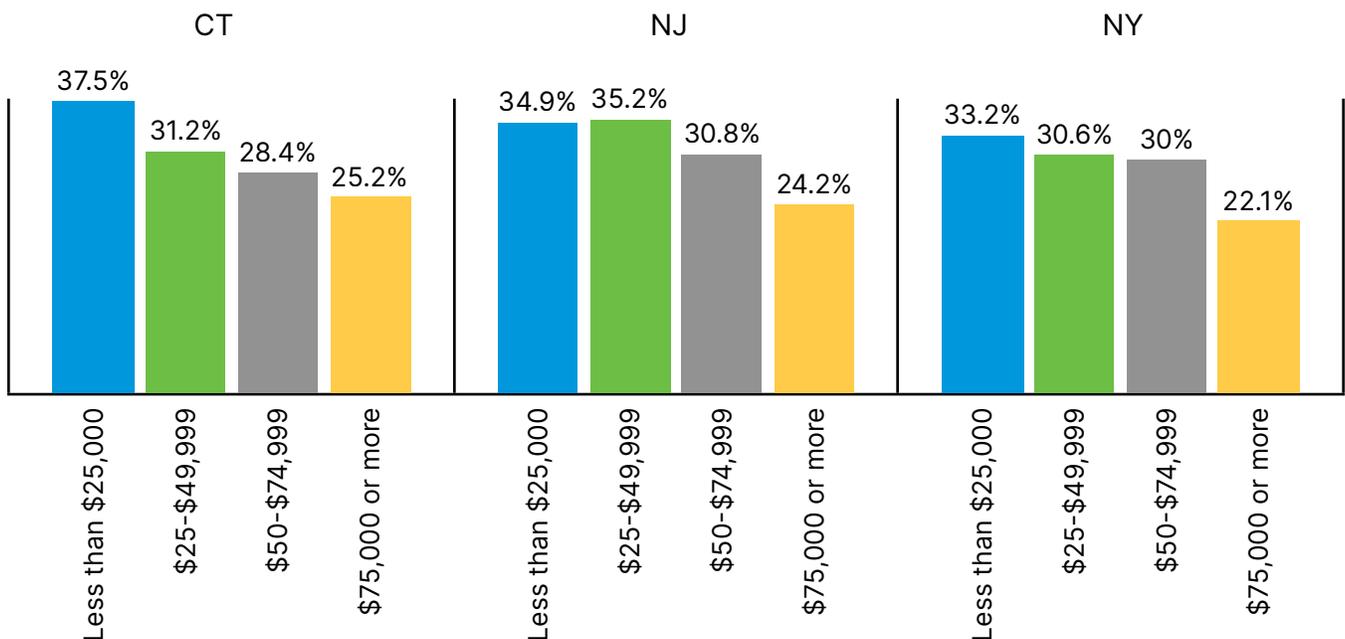
In the U.S. and in each of the states in the New York metropolitan region, Black populations show the highest prevalence of obesity with greater than 35% of the population having this condition in each geographic region (Figure 34). Like other underlying conditions, lower income populations show higher ratios of obesity prevalence with over 1/3 of those in the lowest income bracket (<\$25,000) having this condition in all three states of the New York metropolitan region.

FIGURE 34
Underlying conditions in New York, New Jersey and Connecticut by race and income - obesity

By race - Entire state population (% of race with condition, sorted by state)



By income - Entire state population (% of income group with condition, sorted by income group)



Source: CDC BRFSS (2018), overall state view

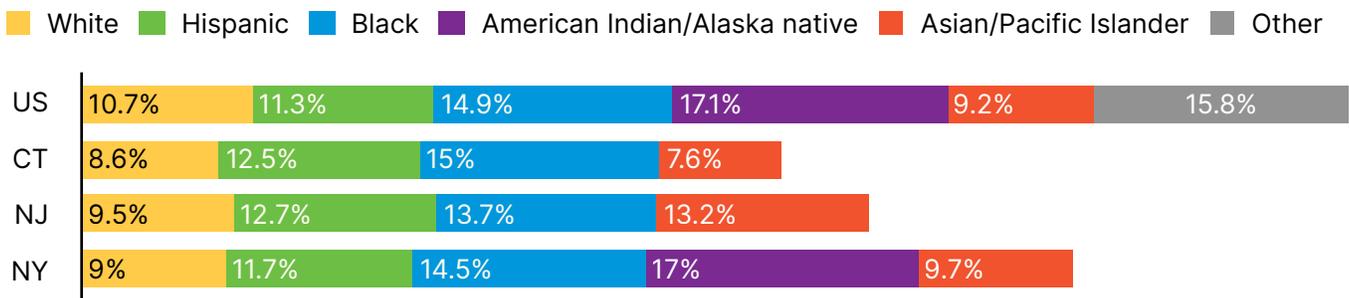
Underlying Conditions: Diabetes

Regardless of geography, Black, Hispanic and American Indian/Alaska native populations have the highest prevalence of diabetes, while white and Asian populations have among the lowest (Figure 35). In addition, diabetes and income are negatively correlated—as income increases, diabetes prevalence decreases.

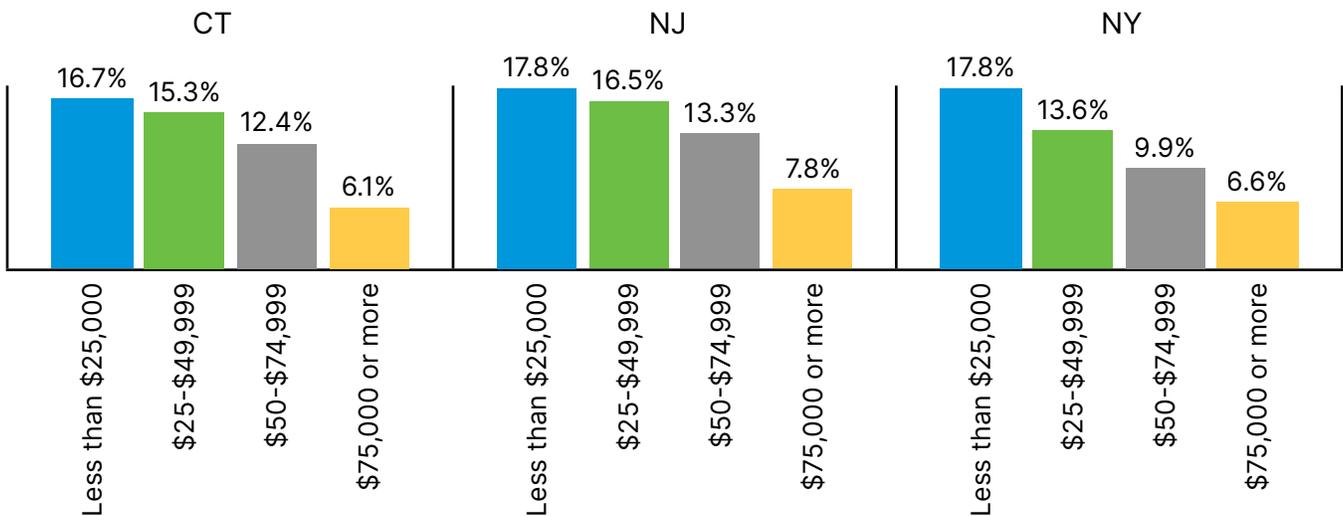
Diabetes affects a higher proportion of Medicare beneficiaries in non-white ethnic groups. Out of 14 New York state counties, the incidence of diabetes among Medicare beneficiaries is higher for Hispanic and Black groups in all but Kings County (Brooklyn), which happens to have the highest prevalence of diabetes amongst the counties.^{65,66}

FIGURE 35
Underlying conditions in New York, New Jersey and Connecticut by race and income - diabetes

By race - Entire state population (% of race with condition, sorted by state)



By income - Entire state population (% of income group with condition, sorted by income group)



Source: CDC BRFSS (2018), overall state view

Addressing Social Determinants of Health and community-based supports for vulnerable populations will be a key part of recovery

To understand these disparate outcomes, it is critical to look at the SDOH and understand what might be impacting a community's exposure and ability to respond to COVID-19. Throughout the interviews, these topics emerged as a key area for emphasis and recovery. The pandemic highlighted the importance of public health and access to housing, nutrition and education as underserved populations were disproportionately affected.

Social determinants that cause people to face poor health outcomes and stay in poverty were exacerbated by the pandemic. Low-income communities were especially vulnerable to underlying conditions and were disproportionately impacted by COVID-19 for multiple reasons. There was a greater influx of patients in the small, community hospitals that serve low-income populations, and these hospitals were less prepared than larger hospitals.

People who live in nursing homes are more vulnerable to COVID-19 because they live in close proximity of each other and often have underlying medical conditions. Black and Hispanic communities were vulnerable due to underlying systemic issues that have historically limited socioeconomic status and access to health care.

Addressing SDOH can help identify and treat health issues more efficiently, reducing longer-term impacts to care management. In addition, a specific focus on food access, housing and job security can reduce health care costs for individuals. For seniors, community services can lead to better care, socialization and more effective aging in place.

Further Analysis

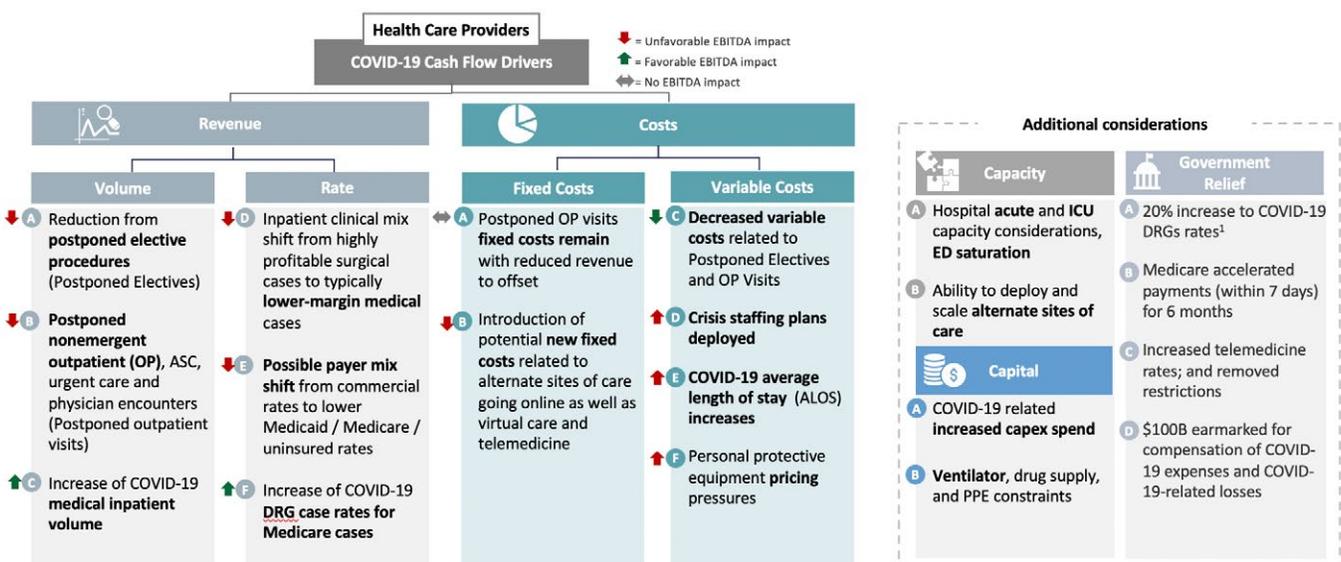
Consumer Behavior

The following are data points on consumer behavior during the COVID-19 pandemic.⁶⁷

- 20% of PCPs canceled in-person visits without consumer asking
- 28% of consumers canceled or delayed in-person visits for PCPs
- 19% of specialty care providers canceled in-person visits without consumer asking
- 19% of consumers canceled or delayed in-person visits for specialty care
- 8% of elective surgeries canceled in-person visits without consumer asking
- 7% of consumers canceled or delayed in-person visits for elective surgeries
- 17% of consumers opted to have virtual care visit for canceled PCP visits
- 14% of consumers did the same for canceled in-person specialty care visits

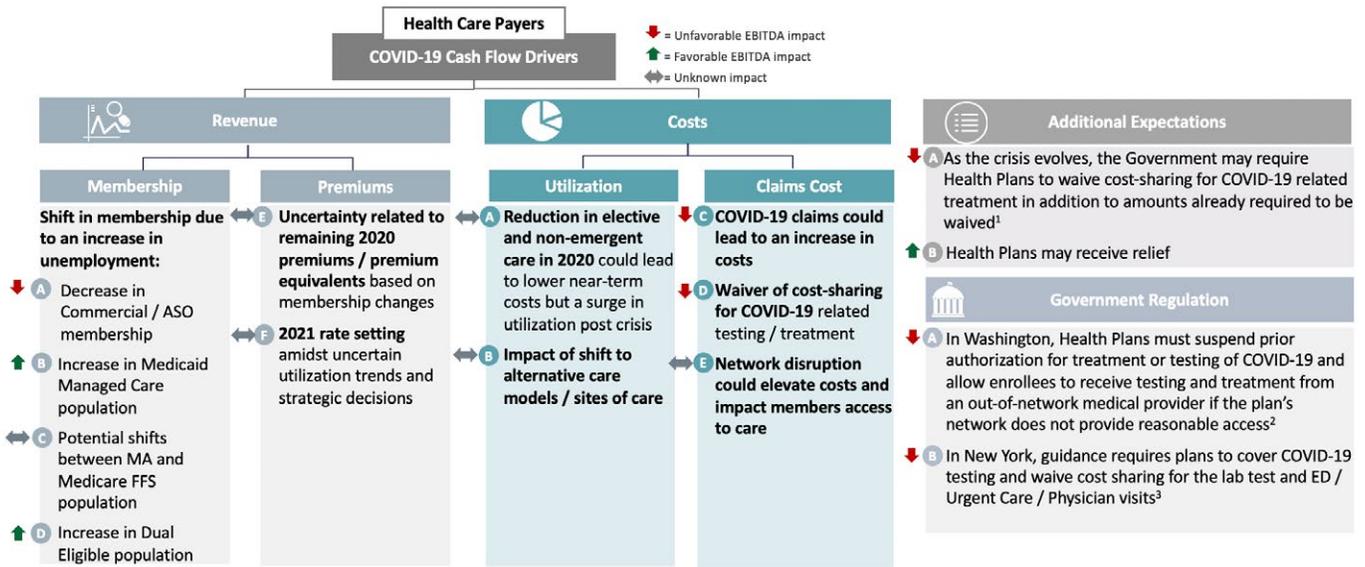
Financial Impact

FIGURE 36
Health care providers COVID-19 financial impact



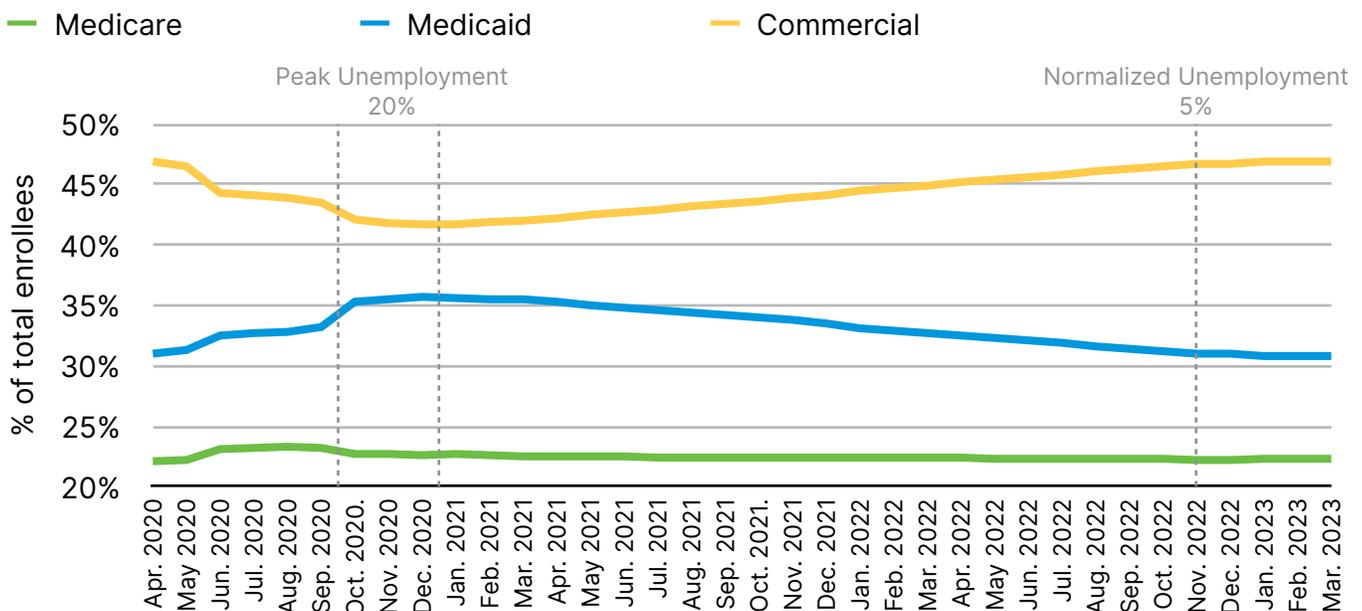
Source: Coronavirus Aid, Relief, and Economic Security Act (CARES Act) (Enacted March 27, 2020)

FIGURE 37
Health care payers COVID-19 financial impact



Sources: CMS may release guidance on waiving cost-sharing as a result of COVID-19 pandemic (2020); State of Washington, Office of Insurance Commissioner, Emergency Order No. 20-01 (3/5/2020); State of New York, Insurance Circular Letter No. 3 (3/3/2020)

FIGURE 38
New York metro region insurance payer mix estimated projections



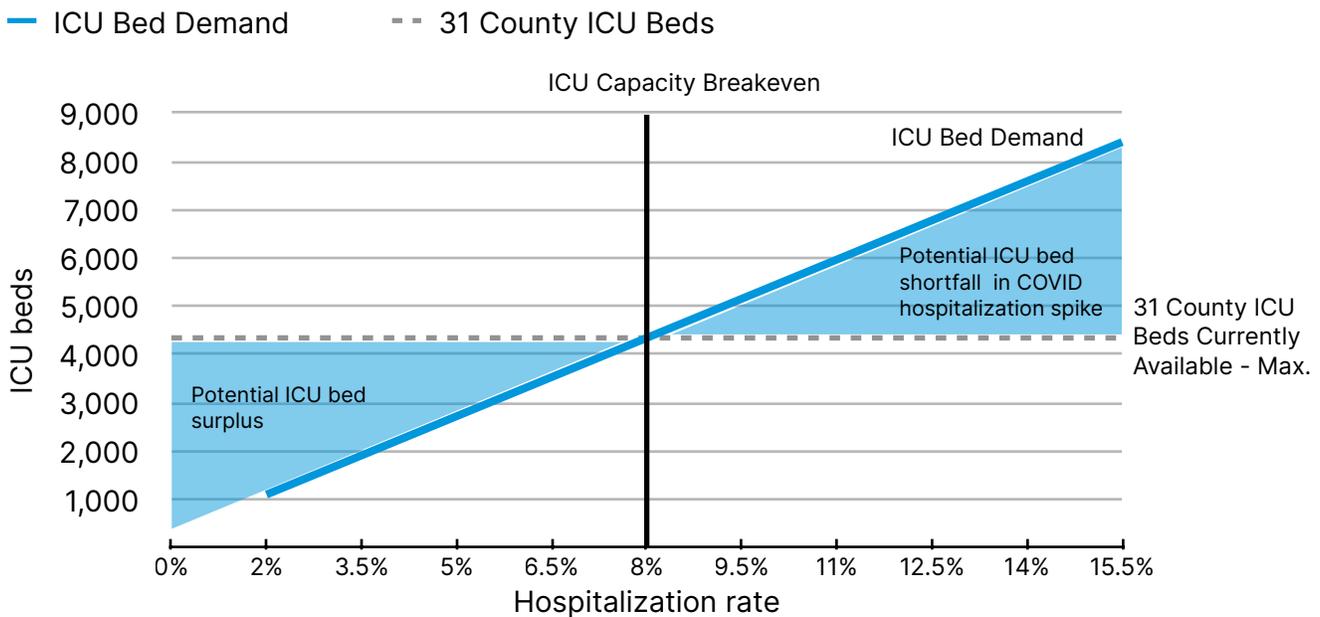
Source: Proprietary Deloitte intellectual property

New York Metropolitan Region Health Care – COVID-19 Hospitalization Impact and ICU Bed Sensitivity

If the hospitalization rate or rate of hospitalizations were to increase, there is a significant chance the 31-county region could have a deficit of ICU beds. If the COVID-19 hospitalization rate were to **increase above 8.0%**, the 31-county New York metropolitan region hospitals will be **deficient in ICU beds** (assuming a constant infection rate of 2.4%).

Decreased occupancy and emergent legal liabilities may cause long term revenue problems for skilled nursing facilities.

FIGURE 39
New York metro region COVID-19 hospitalization impact on ICU supply and demand



Source: CMS (2017)

References used for estimating cost of COVID-19 inpatient stays

FIGURE 40
Diagnosis Related Group (DRG) code descriptions

DRG Code	Description
193	Simple pneumonia and pleurisy with major complication or comorbidity (MCC)
194	Simple pneumonia and pleurisy with complication or comorbidity (CC)
195	Simple pneumonia and pleurisy without CC/MCC

FIGURE 41
Average estimated allowed amounts for COVID-19 patients requiring inpatient stays

Category	Major Complications (DRG 193)				Some Complications (DRG 194)				No Complications (DRG 195)			
	Total Cost	Commercial insurance	Medicare	Medicaid	Total Cost	Commercial insurance	Medicare	Medicaid	Total Cost	Commercial insurance	Medicare	Medicaid
Professional	\$7,788	\$3,598	\$2,369	\$1,705	\$7,788	\$3,598	\$2,369	\$1,705	\$7,788	\$3,598	\$2,369	\$1,705
6 days inpatient	\$66,522	\$35,157	\$10,001	\$7,201	\$45,480	\$24,036	\$7,076	\$5,095	\$34,698	\$18,338	\$5,337	\$3,843
Total estimated per patient	\$74,310	\$38,755	\$12,370	\$8,906	\$53,268	\$27,634	\$9,445	\$6,800	\$42,486	\$21,936	\$7,706	\$5,548

Source: FAIR Health (2020)

Notes: per FAIR Health: 'to assess the typical length of stay (LOS) in an inpatient facility, we calculated the LOS for each patient who stayed in an inpatient facility (using the admission date and discharge date), then calculated the geometric mean for those LOS'; per FAIR Health: 'A charge amount is the amount charged to a patient who is uninsured or obtaining an out-of-network service. An allowed amount is the total fee negotiated between an insurance plan and a provider for an in-network service. Thus, the allowed amount includes both the portion to be paid by the plan member and the portion to be paid by the plan.'

New York metropolitan region health care: COVID-19 impact assumptions and considerations

FIGURE 42
Key assumptions

	Low	Medium	High
Peak Unemployment	17.5%	20.0%	22.5%
% Shift in Commercial Members due to Unemployment	72.0%	72.0%	72.0%
% Unemployed Shifting to an Exchange Product	15.0%	15.0%	15.0%
% Unemployed Shifting to a Medicaid Product	60.0%	60.0%	60.0%
% Unemployed becoming Uninsured	25.0%	25.0%	25.0%
Annual Per Member per Month Premium and Administrative Cost Growth Rates	2.0%-3.0%	2.0%-3.0%	2.0%-3.0%
Peak COVID-19 Infection Rate	2.0%	2.4%	3.0%
% of COVID-19 Cases Requiring Hospitalization	2.8%-25.0%	2.8%-25.0%	2.8%-25.0%
% of COVID-19 Hospitalizations Resulting in ICU Stay	10.1%-43.0%	10.1%-43.0%	10.1%-43.0%
Peak Reduction in Inpatient Elective Procedures	45.0%	50.0%	55.0%

Key Considerations

- Analysis was prepared using 12/31/2019 data which was the latest publicly available data.
- Financial and membership data for health plans was sourced from SNL.com at the state level (NY, NJ and CT) which is a database for companies in regulated industries.
- Since data was unavailable at the county level, financial and membership data for the 31 counties was estimated using the state level data sourced from SNL.com and the population of 31 counties as a percentage of the total tri-state population.
- Analysis considers a second wave of infections beginning in late 2020 and lasting approximately four months (November 2020-February 2021).
- Analysis does not include any assumptions regarding cost sharing or capitation.
- The projections are illustrative and for discussion purposes only. Deloitte has no responsibility for the achievability of the results forecasted.
- Analysis relies on the assumptions' inputs which have been developed based on public and private (proprietary) information available.
- Analysis was prepared as of September 25, 2020.
- Peak COVID-19 infection rate informed by the actual number of confirmed cases over the total population. Indications from antibody testing are higher; however, antibody testing indications were not relied upon as the results only indicate whether the individual had a prior infection.

Sources: Truven Health Database, S&P Global SNL Database, FY18 American Hospital Association Annual Survey, Municipal Securities Rulemaking Board's Electronic Municipal Market Access (MSRB EMMA), and publicly available data from the Healthcare Association of New York State (HANYS).

Appendix C: Quantitative Deep Dive and Analysis

Health ecosystem overview

The New York metropolitan region is a prominent world leader for many industries, including health care. The region has three of the nation's top 15 hospitals and graduates roughly 11% of the physician workforce each year (Figure 43). There is an active entrepreneurial community working on health innovation, and the region leads in life sciences breakthrough therapies such as precision medicine. In 2018, compared to other U.S. metropolitan areas, the New York City Metropolitan Statistical Area (MSA) showed the second highest health care employment as a percentage of total employment at 12% (Table 1). For the 31-county New York metropolitan region (slightly different than the MSA) in 2019, 16% of jobs—roughly one out of every six—was in the health care industry.⁶⁸

TABLE 1

Employment across Major U.S. Metropolitan Statistical Areas⁶⁹

Metropolitan Statistical Areas (MSA)	Health care as a % of total employment
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	13%
New York-Newark-Jersey City, NY-NJ-PA	12%
Boston-Cambridge-Nashua, MA-NH	11%
Los Angeles-Long Beach-Anaheim, CA	11%
Chicago-Naperville-Elgin, IL-IN-WI	9%
Dallas-Fort Worth-Arlington, TX	9%
Houston-The Woodlands-Sugar Land, TX	9%
Miami-Fort Lauderdale-West Palm Beach, FL	9%
San Francisco-Oakland-Hayward, CA	9%
Atlanta-Sandy Springs-Roswell, GA	8%
Washington-Arlington-Alexandria, DC-VA-MD-WV	8%

Health encompasses a dynamic set of systems and is influenced by many social, economic and environmental factors. These SDOH (also known as drivers of health) have a profound impact on health outcomes and overall well-being. For instance, people who live within walking distance of each other might live nearly a decade longer than people who are more isolated.⁷⁰ Therefore, moving toward a “Resilient System of Health” requires a broader view of the types of organizations working to support health in the New York metropolitan region. Collectively, these players comprise the health care ecosystem and include:

- 1. Health Care and Academic Medical Centers (AMCs)** deliver a wide spectrum of patient care ranging from primary/family practice to acute inpatient stays to post-acute and end-of-life palliative care. Additionally, AMCs train nurses, physicians and other caregivers.
- 2. Payers** consist of commercial and government organizations that provide health coverage for individuals and families. Payers are the primary revenue source for health care providers because they pay for the majority of medical and pharmacy services rendered to their members.
- 3. Government** entities at the city, state and federal level consist of numerous departments responsible for providing licenses, building facilities, acting as payers (e.g., Medicare/Medicaid) and regulating services. In addition, the government acts as a public health authority to identify and mitigate risks to the population and provides funding and administration for select social welfare activity.
- 4. Investors** act as financiers for health care providers and disruptors/innovators by backing marketplace activity including business ventures, capital projects and the development of cutting-edge technology.
- 5. Disruptors and Innovators** are new market entrants that deliver products and services (e.g., technology, processes) that substantially increase efficiency and/or fulfill previously unmet demand.
- 6. Large non-health care employers** typically provide health coverage to their employees and their families. Some employers also offer additional health management and well-being benefits.
- 7. Retail** includes both physical and digital channels for non-medical health care via prescription and over-the-counter drugs, durable medical equipment, etc. These organizations act as the primary market for consumer self-directed well-being, including product/service segments (e.g., food and fitness).
- 8. Nonprofits** drive action on social causes and marketplace gaps that may not be economically viable through for-profit enterprises. These organizations range from well-endowed, globally active foundations to small community-based organizations.

Health care providers

While the New York metropolitan region is home to some of the nation's largest and most recognized health care providers, the concentration of facilities geographically makes it difficult for some people to access care.

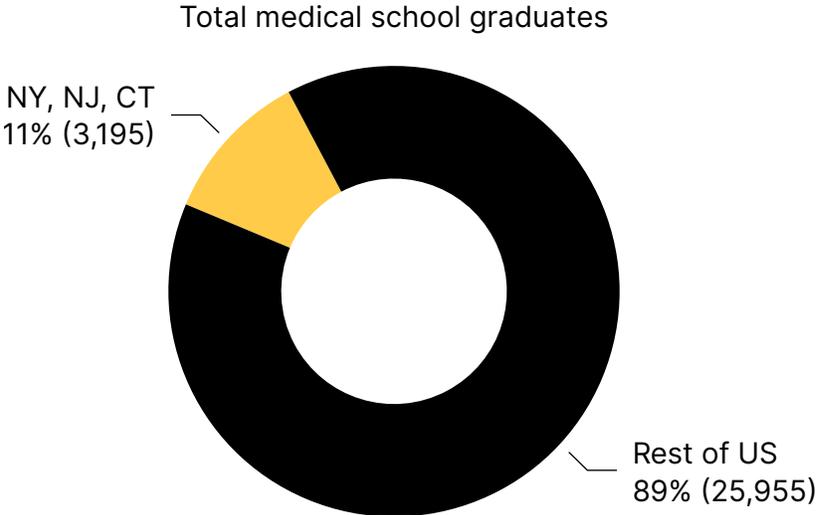
In the 31-county New York metropolitan region, there are approximately 63,500 licensed inpatient beds across 240+ hospitals; nearly 25,000 of these beds are held by six health systems (Table 2). These hospitals saw nearly 2.8 million discharges in 2018, which represents 8% of all discharges in the U.S.⁷¹

TABLE 2
Largest New York Metropolitan Region Health Systems by
Licensed Bed Size⁷²

System	Beds	Revenue
Northwell Health	6,185	\$12.5B
NYC Health + Hospitals	5,012	\$11.4B
NewYork-Presbyterian	4,222	\$9.0B
Montefiore	3,270	\$6.8B
Mount Sinai	3,140	\$5.2B
NYU Langone Health	3,128	\$7.8B

Medical schools in the tri-state region of New York, New Jersey and Connecticut produce many of the nation’s physicians. Four of the region’s academic medical centers are ranked in the nation’s top 20 hospitals (Figure 43). This prestigious list includes both NewYork-Presbyterian and Yale New Haven Health—AMCs ranked #1 in their respective states.

FIGURE 43
New York metro region academic medical centers landscape

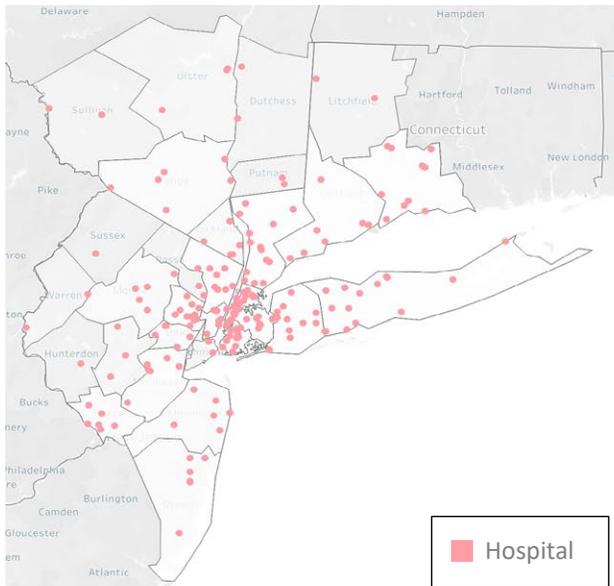


Rank	Academic Medical Center	Number of Beds
#1 NY/#5 US	NewYork-Presbyterian Hospital-Columbia and Cornell	2,586 beds
#2 NY/#9 US	NYU Langone Hospitals	1,152 beds
#3 NY/#14 US	Mount Sinai Hospital	1,181 beds
#1 CT/#20 US	Yale New Haven Hospital	1,424 beds
#6 NY	Montefiore Medical Center	1,553 beds
#8 NY	Long Island Jewish Medical Center	1,522 beds

Sources: KFF (2020); AHA Annual Survey Database™ (2018); U.S. News and World Report (2019)

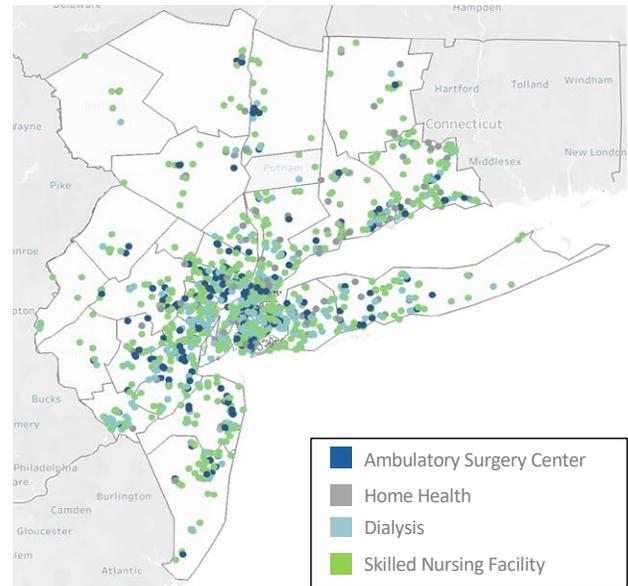
There are more than 200 hospitals and more than 1,500 ambulatory care sites in the New York metropolitan region with the distribution of acute and ambulatory providers generally reflecting the population density of the area (Figure 44 and Figure 45).

FIGURE 44
Acute provider distribution
across New York metro region



Sources: AHA Annual Survey Database™ (2018); Medicare (2020); State of CT (2020); State of NY (2020); State of NJ (2020)

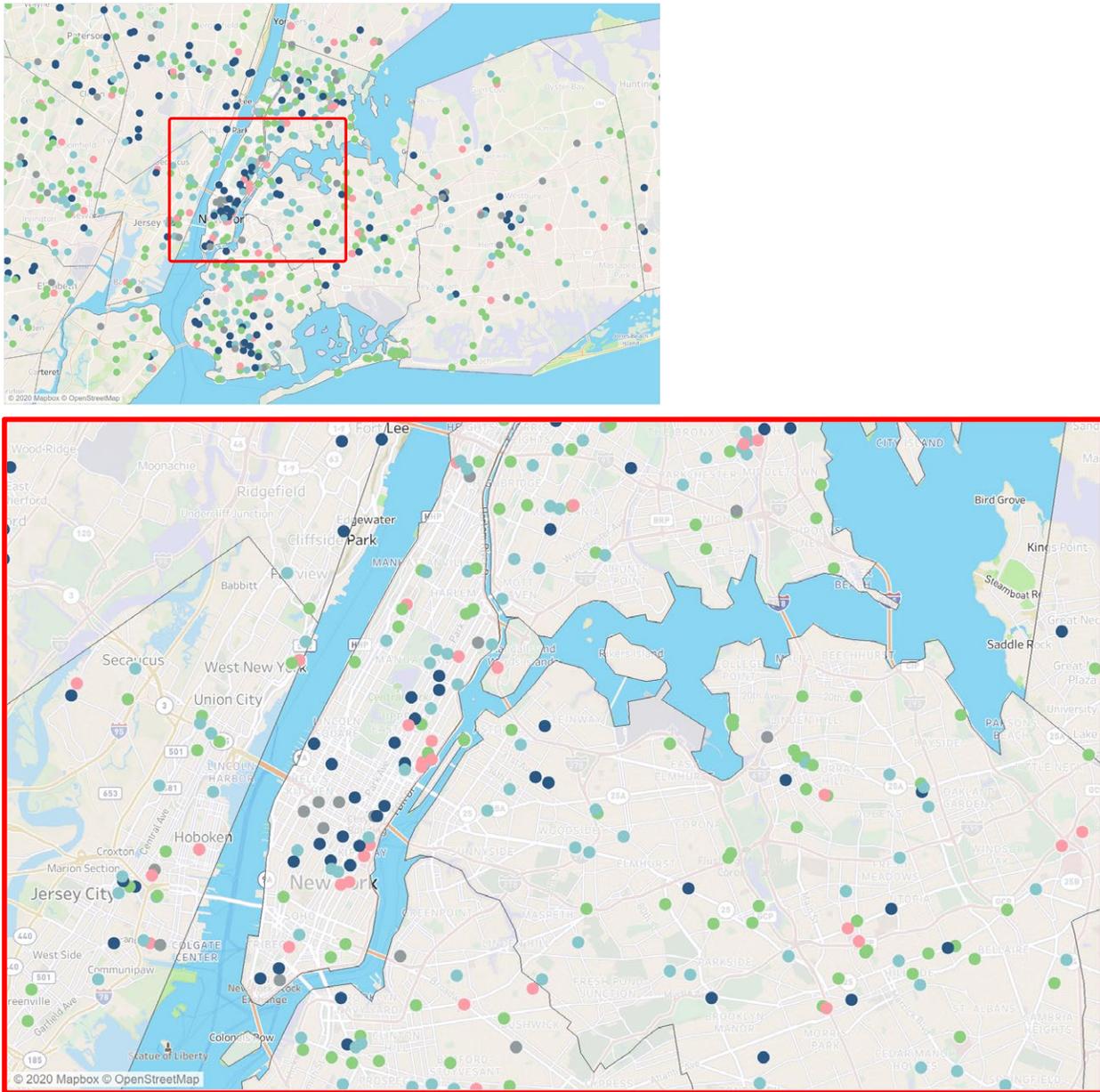
FIGURE 45
Ambulatory provider distribution
across
New York metro region



CDC BRFSS (2018), overall state view

In densely populated areas, geographically mapped care sites reflect disparities in access for in-person care in the Upper West Side of Manhattan and the outer boroughs. The provider distribution in Manhattan highlights specific areas where consumers must rely on various modes of transportation to receive in-person care versus being within walking distance. Available health care in the outer boroughs is sparse and residents might have to rely on a few neighborhood dialysis centers and skilled nursing facilities for care (Figure 46). This demonstrates the high concentration of acute care facilities in Manhattan that many New Yorkers travel to for emergency care.

FIGURE 46
 Provider distribution for New York City and Manhattan regions



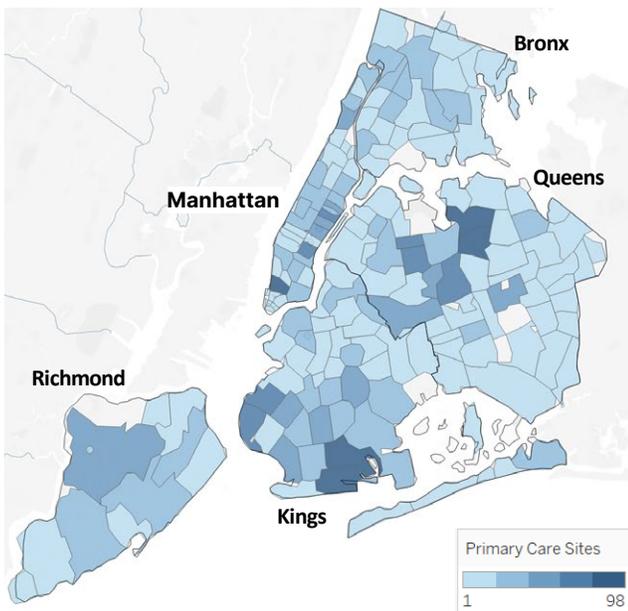
- Ambulatory Surgery Center
- Hospital
- Home Health
- Dialysis
- Skilled Nursing Facility

Sources: AHA Annual Survey Database™ (2018); Medicare (2020); State of CT (2020); State of NY (2020); State of NJ (2020)

Primary and Urgent Care Sites

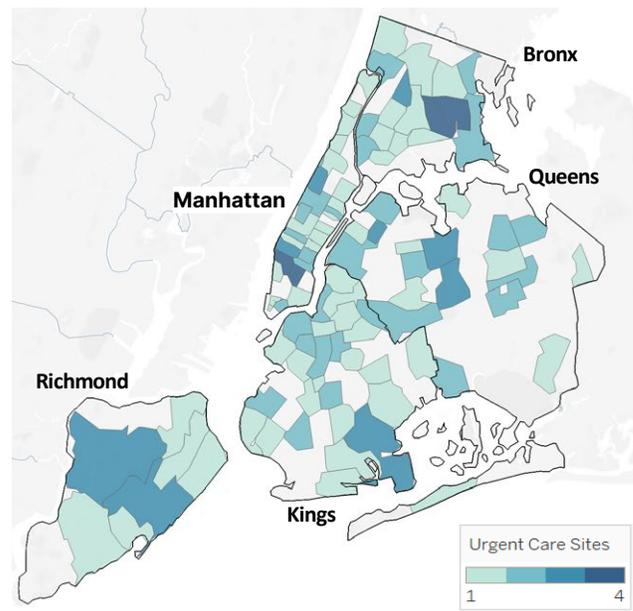
When looking specifically at primary and urgent care sites, the five counties of New York (Manhattan, Bronx, Kings (Brooklyn), Queens and Richmond (Staten Island)) have more than 3,700 primary care sites and more than 160 urgent care sites. The median number of primary and urgent care sites per ZIP code is 15 sites and one site, respectively, with some ZIP codes having no sites at all (Figure 47 and Figure 48).

FIGURE 47
Primary care sites by ZIP Code



Deloitte NetworkInsight™

FIGURE 48
Urgent care sites by ZIP Code



Deloitte NetworkInsight™

On average, hospitals and health systems in the 31-county New York metropolitan region have higher occupancy rates and attend to more patients than the observed benchmarks, but have fewer primary care physicians (PCPs), ambulatory surgery centers (ASCs) and ICU beds per 1,000 people. The 31-county New York metropolitan region has a significant supply and demand disparity; the region has less supply and greater demand than regional and national benchmarks.

On a case mix index (CMI) weighted basis, which adjusts for the complexity of the patient population served by a hospital or health system, the 31-county New York metropolitan region ranks favorably compared to regional and national benchmarks for expenses. However, operating margin lags all regions significantly. This is shown by the New York metropolitan region's negative operating margin (-11.2%), which lags the Northeast benchmark by 10%. This demonstrates a significant gap between the number of patients served and the amount of revenue generated (See Appendix B).

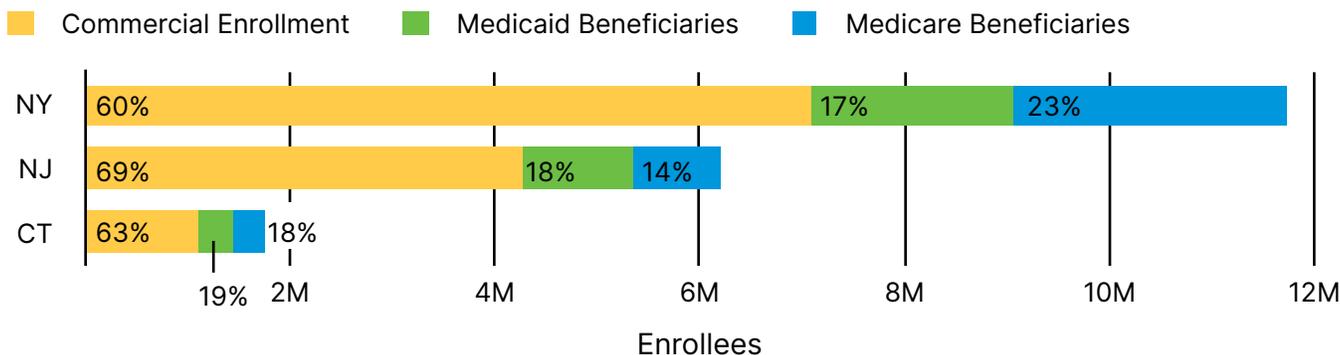
The pandemic created numerous challenges for the region’s hospitals and health systems. Deferred care, increased costs for treating COVID-19 patients and other operating challenges have resulted in an estimated one-year revenue loss between \$8.0 billion and \$10.3 billion with some large health systems experiencing operating losses exceeding \$350 million per month (See Figure 57, Opportunities for Action Detail – Financial).

Health care payers

While the New York metropolitan region has a smaller aggregate percentage of uninsured individuals than the rest of the nation, the region has a larger proportion of low-income households that lack health coverage of any kind and has a high population of Medicare and Medicaid beneficiaries.

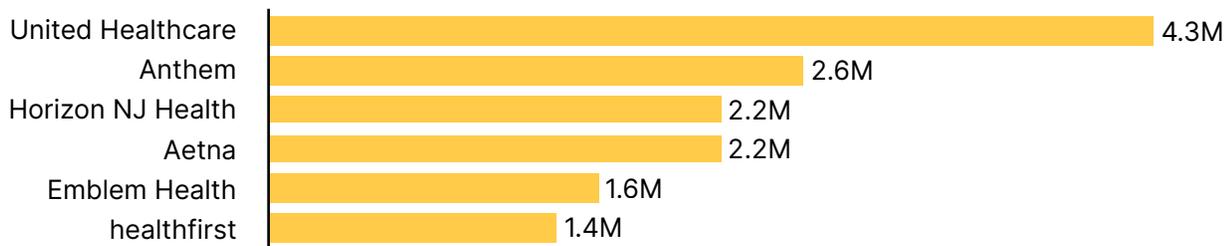
In the 31-county New York metropolitan region, an estimated 36.7% of the population has public coverage through either Medicaid or Medicare, while the U.S. average is 37.2% (Figure 49). The top six commercial payers collectively provide health coverage to 14.3 million members—more than 75% of private health insurance coverage in the New York metropolitan region (Figure 50).

FIGURE 49
Payer mix by state



Source: US Census Bureau (2018); Medicaid Beneficiaries include Veterans Affairs and Tricare

FIGURE 50
Largest New York metro region private payers by enrollment

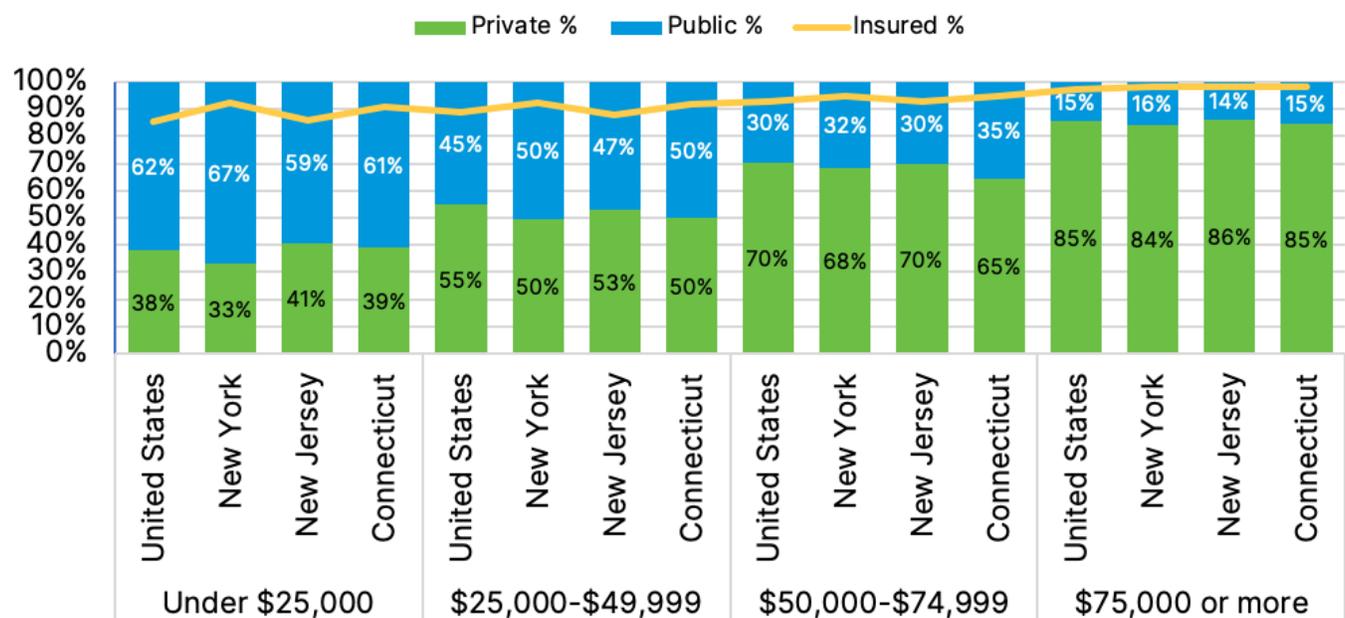


Note: Managed Enrollment includes Managed Medicare and Medicaid; Medicare Beneficiaries include Tricare; Some members may be enrolled in both private and public insurance

About 7.8% of the New York metropolitan region’s population lacks health coverage, compared to 9.4% of the national population, according to U.S. Census estimates. However, despite the lower uninsured population, the region has a similar percentage of government coverage when compared to the rest of the U.S. (See Figure 22 in Appendix B.)

Figure 51 shows the percent of households (by income) that are insured and the percent using public vs. private insurance. In the tri-state region, households with low incomes (<\$25,000) have the highest uninsured rates with roughly one of every seven New Jersey households (14%) having no coverage at all.

FIGURE 51
Private/public insurance mix by income

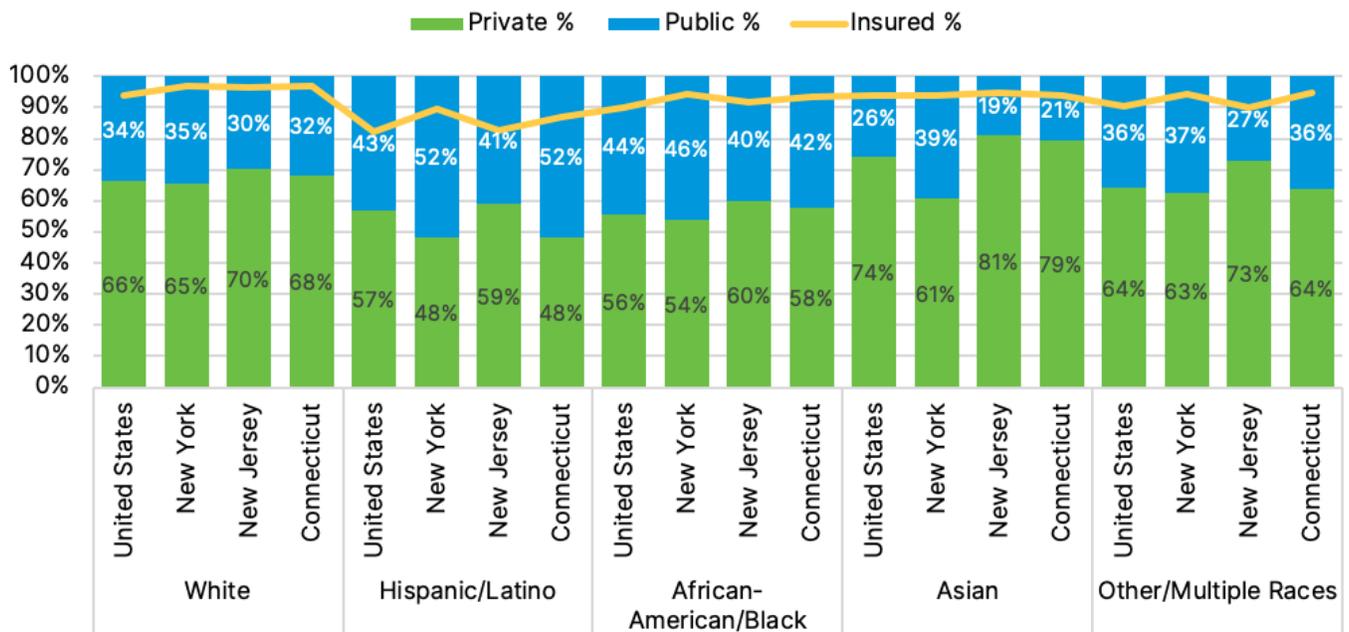


Source: SHADAC, RWJF (2018)

Note: Data is representative of the entire states, not just the 31-county tri-state area; Private Insurance includes employer and individual plans, public insurance includes Medicare and Medicaid

In the New York metropolitan region, Hispanic and Black populations have the highest uninsured levels and highest percentages of Medicaid and Medicare enrollment. Figure 52 shows the percentage of households, by race, that are insured and the percent using public vs. private insurance. Within each racial group, New York state has a slightly lower rate of private insurance compared to Connecticut and New Jersey and the U.S. as a whole. This is especially noticeable within New York’s Hispanic population, which has an 11% greater rate of public insurance compared to the Hispanic population in neighboring New Jersey. However, this population is insured at a higher rate in New York (90%) than New Jersey (82.5%), highlighting the larger percentage of the population in New York that relies on public insurance.

FIGURE 52
Private/public insurance mix by race



Source: SHADAC, RWJF (2018)

Note: Data is representative of the entire states, not just the 31-county tri-state area; Private Insurance includes employer and individual plans, public insurance includes Medicare and Medicaid

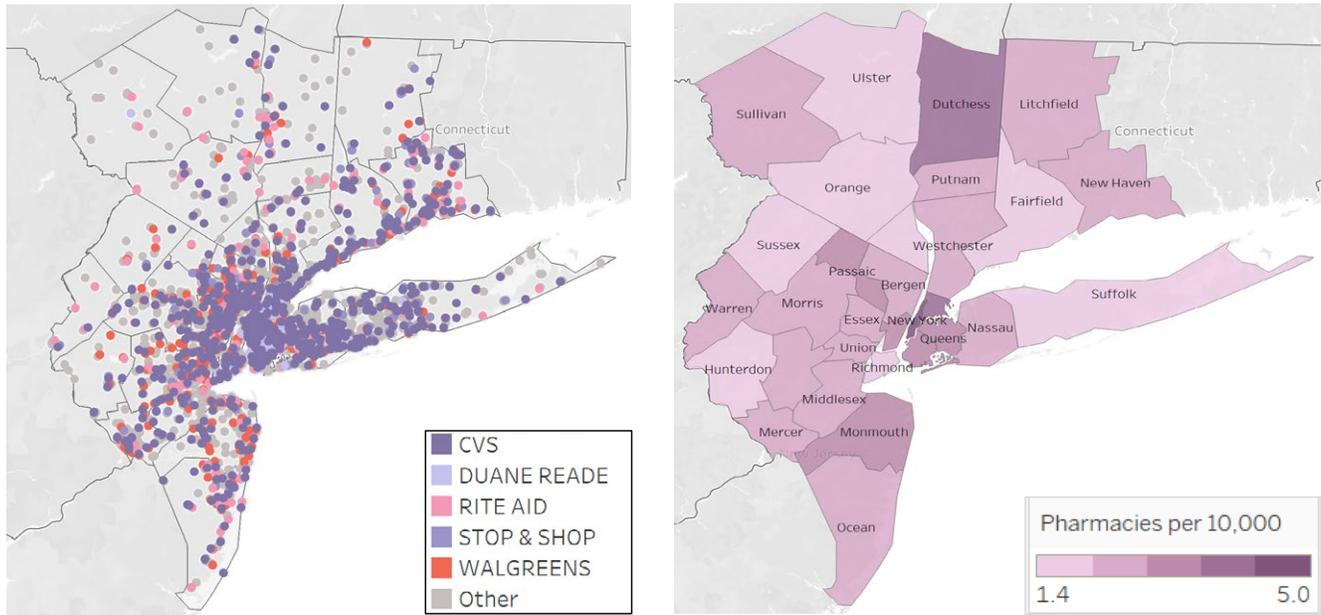
The COVID-19 pandemic also created challenges for payers as people lost their jobs and had to shift from commercial insurance plans to Medicaid. The estimated one-year revenue loss for payers in the New York metropolitan region ranges between \$1.4 billion to \$1.8 billion, while the estimated three-year revenue impact is more pronounced at \$3.3 billion to \$4.5 billion. (See Figure 57, Opportunities for Action Detail – Financial.)

Other ecosystem players

While the proliferation of retail pharmacies shows significant penetration in the New York metropolitan region, state regulations on the scope of services that can be provided blunt the potential positive impact on the SDOH.

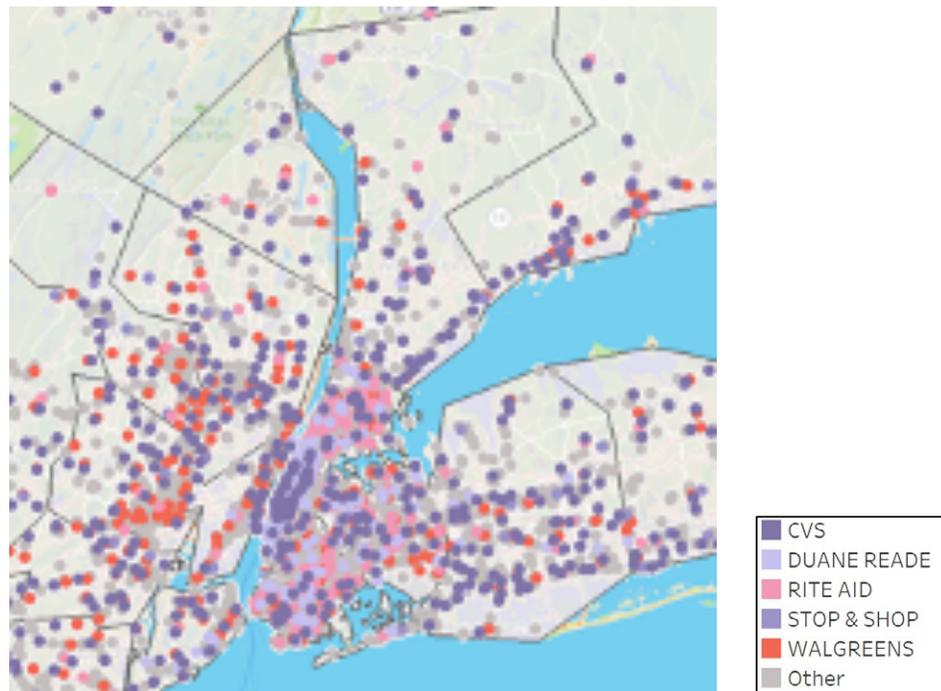
Retail pharmacies have more than 6,200 locations in the New York metropolitan region (Figure 53) with 2.8 pharmacies per 10,000 people on average as compared to 0.8 health care sites (e.g., acute and ambulatory) per 10,000 people. The top five companies represent 29% of all retail pharmacy locations and 46% of locations in New York County (Manhattan) (Figures 54 and Figure 55).

FIGURE 53
Retail pharmacy distribution and retail pharmacies per 10,000 people across New York metro region



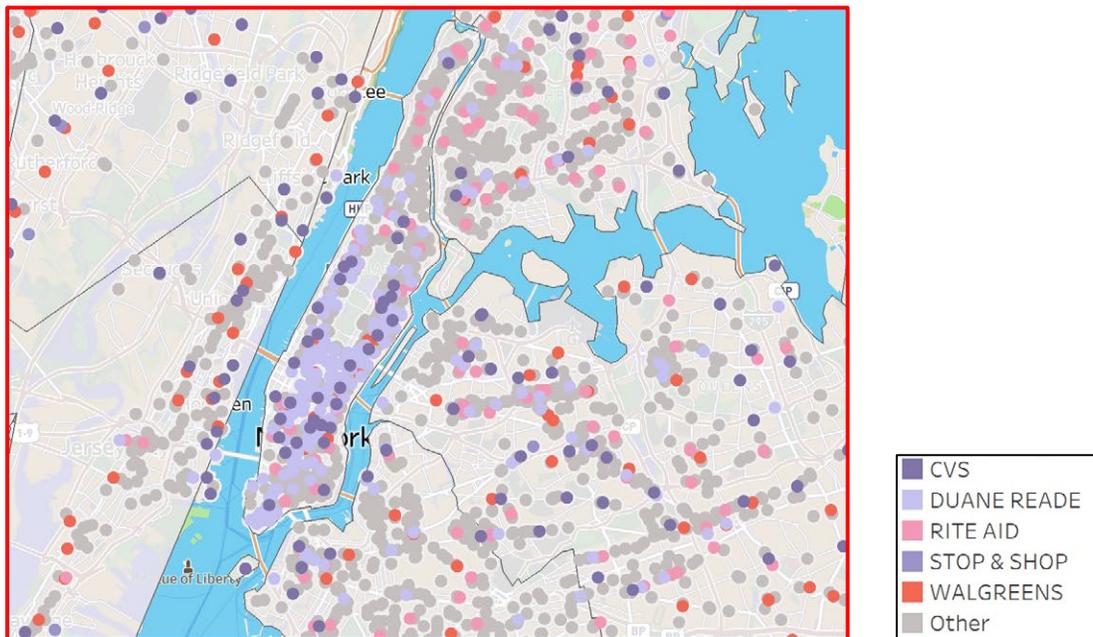
Sources: NY Department of Health and Mental Hygiene (2020); NJ Division of Consumer Affairs (2020); CT Data (May 2020)

FIGURE 54
Retail pharmacy distribution for New York City region



Sources: NY Department of Health and Mental Hygiene (2020); NJ Division of Consumer Affairs (2020); CT Data (May 2020)

FIGURE 55
Retail pharmacy distribution for Manhattan



Sources: NY Department of Health and Mental Hygiene (2020); NJ Division of Consumer Affairs (2020); CT Data (May 2020)

Nonprofits and foundations play a significant role in addressing social, economic and environmental factors, but stronger connections to a well-defined system of health could amplify the impact. Much of the nonprofit funds in the U.S are concentrated in the New York metropolitan region; 10 of the top 20 foundations by asset size are based in the tri-state region, representing more than \$30 billion in managed assets.⁷³ Since 2002, the city's Fund for Public Health has spent more than \$450 million on public health programs in New York City.⁷⁴

Investors and disruptors for the life sciences/health care industry are major players in the New York metropolitan region's economy. In 2019, health care and life science investors contributed \$2.6 billion in venture capital funding for 117 startups.⁷⁵ In the immediate wake of the pandemic, the region's connection to life sciences has become particularly pronounced—of the five companies selected by the federal government to accelerate production of a COVID-19 vaccine, three are based in the region.⁷⁶

Non-health care employers also play a major role in the health ecosystem. Not only do private organizations employ and financially support millions of New Yorkers, they are often the source of private health care insurance for employees and their families. With some of the largest companies in the world headquartered in New York City, the city represents a large job market of ~4.0 million as of August 2020, down from 4.7 million in 2019.⁷⁷ JPMorgan Chase, the largest

company headquartered in New York, employs more than 240,000 people worldwide.⁷⁸ In addition, the top five non-health care private sector employers in New York City collectively employ more than ~112,000 people locally.⁷⁹ Given the outsized role that employers play in the financing of health care, non-health care employers must be better engaged to provide the incentives that can support a more resilient system of health.

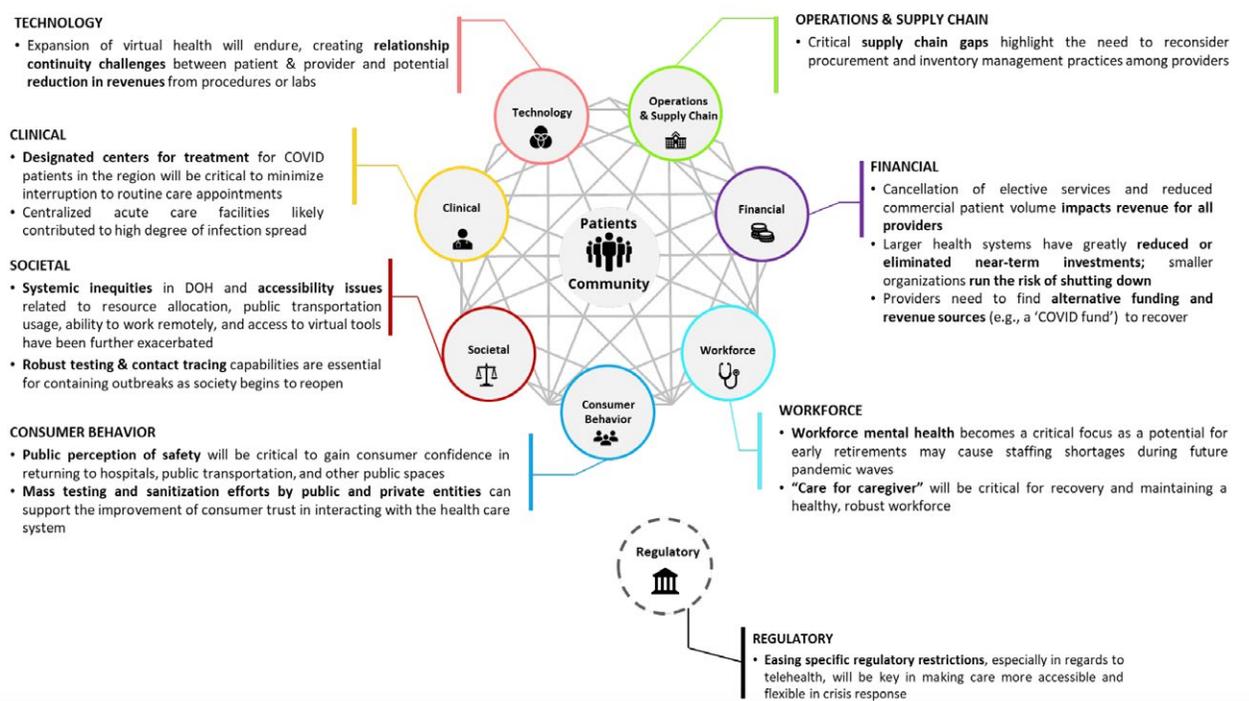
Government agencies, local and federal, are integral to the public health system. In just New York City alone, these agencies include the New York City Department of Health and Mental Hygiene (DOHMH), New York State Education Department (NYSED), U.S. Food and Drug Administration (FDA), U.S. Department of Health and Human Services (HHS), Centers for Disease Control and Prevention (CDC) and CMS. Ahead of the pandemic, DOHMH was collecting syndromic surveillance data from the area's providers and identifying a spike in flu-like symptoms. NYSED handles licenses and accreditation for universities, including the academic health systems. Agencies such as the FDA, HHS and CDC provide guidance for health safety, which was critical during the COVID-19 outbreak. In addition, New York state provides governmental social programs to support the most vulnerable, spending roughly \$3,600 on public welfare programs, \$1,200 on health and hospitals and \$148 on public health per capita each year.^{80,81} While the role of government in individuals' health can be a politically charged topic, the various agencies and departments that form the New York City public health system, if integrated more effectively, could provide a more cohesive structure for data sharing, reimbursement and coordination of the public health response in an emergency.

Appendix D: Qualitative Analysis

Overview of qualitative research

The qualitative data presented below is based on interviews with the 50+ stakeholders and experts identified as major leaders in the New York metropolitan region's health ecosystem. The research process began with identifying seven areas of focus—technology, clinical, societal, consumer behavior, operations and supply chain, financial and workforce—for organizing initial hypotheses. These hypotheses, which can be found in Figure 56 below, helped structure questions for the initial set of interviews. During the interviews, regulatory concerns were a major area of focus that was added to the list of initial hypotheses. Below is a summary of high-level findings from the interviews. Although many themes emerged, key areas of strategic action were elevated to inform the basis of the recommendations.

FIGURE 56
Initial framework for qualitative data analysis - initial hypotheses



As initial findings were analyzed, the framework was refined further. In order to focus in on actionable insights that could inform the report, the framework was built around six areas of “Opportunities for Action” (Figure 57). To determine the most salient takeaways from the interviews, the practicality and science-backed evidence behind each takeaway was considered. The Opportunities for Action below represent a high-level view of the analytical process and outcomes.

FIGURE 57
Revised framework for qualitative data analysis

Opportunities for Action	
Population and Public Health	<ul style="list-style-type: none"> • Public health has been underfunded in the past and will likely be adversely affected as the pandemic continues • The current financial structure for health care limits innovation and coverage, especially for disadvantaged populations • The health care reimbursement structure has caused quality care to be concentrated in areas with commercially insured patients • Supporting and empowering traditionally underserved communities is key to creating resilience • Reopening efforts will present significant public health challenges in terms of testing, tracing and general logistics
Technology and Data	<ul style="list-style-type: none"> • The pandemic exposed a long-standing lack of interoperability for clinical and logistical data • Data interoperability requires investment but is a critical component of a resilient system • Broadband access and adoption (meaning that it is affordable and families are able to use the service is important to ensure a connection to needed services)
Consumer	<ul style="list-style-type: none"> • Many consumers put their health care needs on hold during the pandemic due to safety concerns • Clear and transparent communication has become necessary to rebuild trust with consumers • COVID-19 hospitalizations will likely carry major financial implications for patients • Mental health will likely be a greater concern moving forward • The pandemic accelerated efforts to bring care to consumers; supporting this trend may also help support future resiliency
Operations	<ul style="list-style-type: none"> • Many frontline workers struggled with mental health, even before the pandemic • The pandemic significantly impacted the mental health and well-being of clinicians, which will likely have long lasting effects • Telehealth adoption rapidly increased during the pandemic response and will likely continue to grow, providing new data and insights • The pandemic response has emphasized the need for supply chain reform, especially regarding clear decision-making roles and collaboration across players
Financial	<ul style="list-style-type: none"> • Hospitals have been losing millions of dollars per day amid the pandemic • Many hospitals experienced sharp cost increases • Health care payers are facing an unexpected financial burdens in the wake of the pandemic • Federal funding to fight the pandemic was not enough for many ecosystem players
Regulatory	<ul style="list-style-type: none"> • The current regulatory framework limits innovation • Regulations were relaxed to rapidly respond to the crisis • The government has a major role to play in communications and in adjusting regulations appropriately in times of crisis • The pandemic exacerbated issues created by the current reimbursement structure and underscored the need for a value-based system

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Endnotes

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- 2 Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee (“DTTL”), its network of member firms and their related entities. DTTL and each of its member firms are legally separate and independent entities. DTTL (also referred to as “Deloitte Global”) does not provide services to clients. In the United States, Deloitte refers to one or more of the U.S. member firms of DTTL, their related entities that operate using the “Deloitte” name in the United States and their respective affiliates. Certain services may not be available to attest clients under the rules and regulations of public accounting. Please see www.deloitte.com/about to learn more about our global network of member firms.
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