



Rios
P A R T N E R S

Health of Health Index, 2022

A Rios Partners report

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ABOUT

Rios Partners

Founded in 2016, Rios Partners is committed to delivering high-impact, high-value, and transformative results for our clients.

We address our clients' most pressing and complex issues by developing a deep understanding of their needs, customers, employees, and partners to build solutions that are timely and relevant.

As a team, we know what it takes to move organizations forward with measurable, sustainable results.

Foreword

We know the importance of individual health, and the complexity of our health system. In 1900, global life expectancy at birth was about 48 years; today it is almost 79 years.¹ The US health system is an elaborate network of government research, pharma, providers, and payers, and is one of the most expensive healthcare systems in the world – health care is the nation’s largest private-sector industry, accounting for 13% of the total US workforce.² The Covid-19 pandemic has shown the power of the US health system, but also that vulnerabilities can have profound implications for health, economic progress, trust in governments, and social cohesion.

So how did we get here, how did we actually fare during the pandemic, and what is in store for us in the next few years? What new health technologies are becoming available, are more Americans covered by insurance, is the cost of health care continuing to increase, what is the state of our healthcare workers, is lifespan continuing to increase? How do different stakeholders – the US population, insurers, government, suppliers, etc. – influence and respond to changes in the health ecosystem?

To both explore the ecosystem and begin answering these questions, Rios Partners built an integrated set of metrics – the Health Ecosystem Index. This simple index aims to provide a holistic overview of the current state of American healthcare, track changes in health over time, and help identify areas where interventions are needed, as well as the effectiveness of interventions over time. Most important, this index aims to elicit discussions among stakeholders involved in the healthcare ecosystem. Throughout the report, we provide questions based on our findings to drive these discussions forward.

We hope this inaugural report spurs stakeholders to develop recommendations to improve care for patients and the efficiency of payers/providers, and increase the impact of innovation. We aim to roll out this index annually over the coming years, with plans for expansion to include comparing US health to other countries and regions.

Chan Harjivan

Rios Partners, Senior Advisor

¹ Centers for Disease Control

² Bureau of Labor Statistics

Executive Summary

The Health Ecosystem Index begins with three high-level metrics: the US population, which serves as a demand signal for other elements of the healthcare ecosystem; healthcare payers and providers, who finance and supply medical services; and research and development (R&D), which plays the crucial role of driving healthcare innovation.



Throughout, we use widely trusted and publicly available data sources to inform the lowest-level data points. We came to three major conclusions spanning these metrics:

- **Patient Population: Access – through public insurance expansion – on the rise, but engagement and outcomes show signs of concern.**³
- **Provider: Reduced competition in private insurance provision, provider shortages, and ongoing decline in infrastructure availability reflect worrying trends in healthcare supply.**⁴
- **Research & Development: R&D spending on the rise, and Covid-19 research resulted in record speed to output, but other indicators of R&D efficacy show declines.**⁵

These trends reveal the complex and dynamic nature of the US health ecosystem. While in some cases our findings demonstrate movement in undesirable directions, we hope that summarizing them in this format spurs policymakers and other stakeholders to answer the key underlying questions and take the appropriate steps to respond.

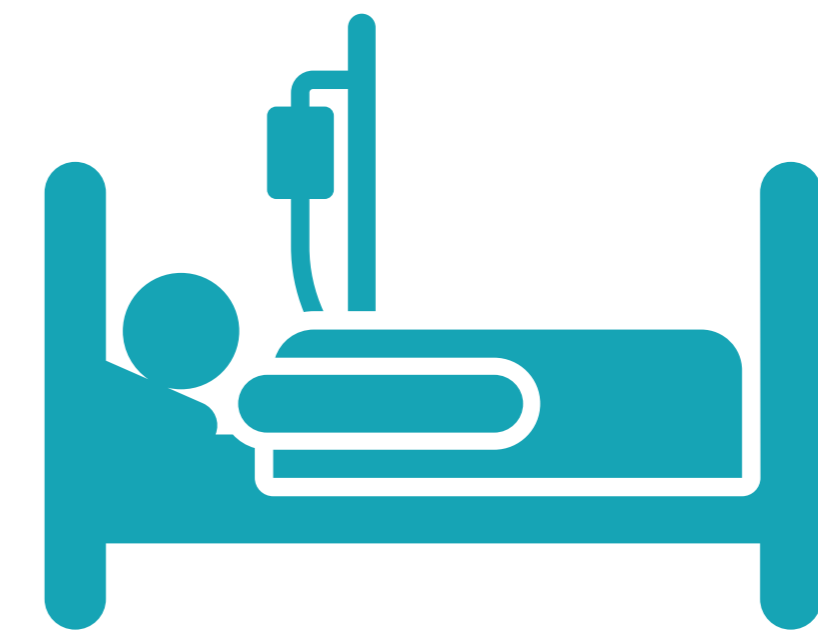
³ Insurance coverage up to 92% in 2020; but physician visits down to 2.7 per year and life expectancy at 76.1. Additional detail and analysis provided in Key Findings section.

⁴ More insurance markets highly concentrated than were in 2014; more than half of physician population is aged over 55; bed and hospital availability are down compared to previous years. Additional detail and analysis provided in Key Findings section.

⁵ R&D spending reached \$139 billion in 2021, but US is producing fewer highly cited publications compared to 2000, and impacts of Covid-19 on research productivity are yet to be determined. Additional detail and analysis provided in Key Findings section.

Patient Population

Access – through public insurance expansion – on the rise, but engagement and outcomes show signs of concern.



We first assess data on the population's access to, engagement with, and outcomes relating to healthcare in the US. These data points enable the tracking of a demand for healthcare engagement, which can then be compared to payer/provider and R&D data to assess the extent to which **population needs are sufficiently addressed** by the other elements of the health ecosystem.

Our exploration of key metrics related to the US population revealed that, while more Americans are insured than ever before, largely due to the Affordable Care Act, several troublesome signals are emerging in terms of engagement with healthcare providers: **reduced number of visits to the doctor per year, skipped consultations as a result of cost, and higher out-of-pocket expenditure on services per capita.**

Conversely, however, engagement with alternative healthcare sources – such as telehealth and individual monitoring of fitness through devices such as smartwatches – have increased. Overall, average life expectancy growth slowed in the 2010s, and declined in 2021 as a result of the Covid-19 pandemic

Overall, we observe an aggregate downward trend in our Patient Population metric.

Patient

-  The share of the US population with some form of insurance reached 92% in 2020, an approximately five percentage point increase since 2000⁶
-  Americans are paying more out of pocket for healthcare, from around \$1,077 per capita in 2000 to \$1,227 in 2020^{7,8}
-  The US ranked highest in the OECD in terms of the percentage of its population who skipped healthcare appointments due to cost in 2016⁹
-  Americans are visiting the doctor less often, with just 2.7 visits per year in 2020 compared to 4.8 in 2000
-  Overall life expectancy has stagnated since around 2010, and declined dramatically amid the Covid-19 pandemic, reaching 76.1 years in 2021
-  Maternal mortality has been on the rise in the US, from 14.5 in 2000 to 23.8 in 2020, per 100,000 live births¹⁰
-  The US' 2020 maternal mortality rate was the third highest among OECD countries for which data was available, with only Costa Rica and Mexico at higher rates
-  Infant mortality fell to 5.38 per 1,000 live births in 2019 from a 2000 high of 6.89
-  37% of adults used telemedicine services during 2021¹¹

⁶ Centers for Disease Control

⁷ Centers for Medicare/Medicaid Services

⁸ Figures in constant 2021 US\$

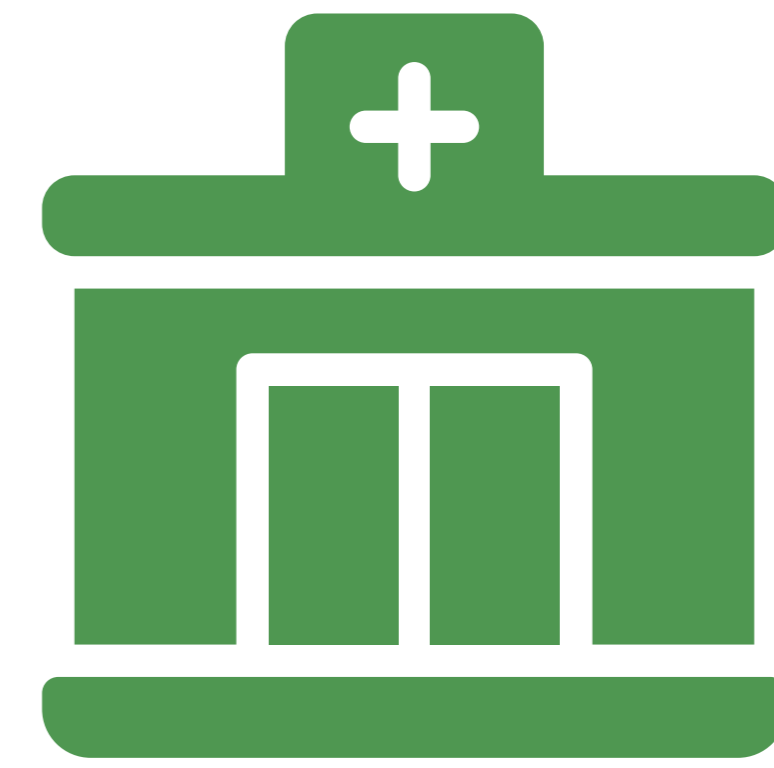
⁹ Organization for Economic Cooperation and Development

¹⁰ Centers for Disease Control

¹¹ Centers for Disease Control
(<https://www.cdc.gov/nchs/products/databriefs/db445.htm>)

Payer/ Provider

Key Payer/Provider Takeaway: Reduced insurance competition, provider shortages, and ongoing decline in infrastructure availability reflect worrying trends in supply of human capital and infrastructure.



Three groups manage the healthcare system and provide services.

There are the organizations that pay for healthcare services, such as insurance companies, Medicare, and Medicaid. Then there are the providers, the individuals and organizations that deliver healthcare services, such as doctors, nurses, hospitals, pharmacies and clinics.

Our analysis finds that the cost of healthcare in the US is high compared to a range of developed countries across the OECD. Many Americans struggle to afford the care they need. **Perceived causes for these high costs include high prices for prescription drugs and medical procedures, high administrative costs, and lack of price transparency, among a range of other potential factors.** Efforts to increase competition among insurers, especially new entrants, have the potential to reduce rising costs.

Total health consumption expenditure per patient is rising fast, especially when compared to peer countries. **This growth in absolute spending seems to demonstrate that the problem facing payers is not funding in and of itself, but rather the allocation and efficiency thereof.** New data tools to monitor high-risk populations and interventions, adopting technologies widespread in other industries and aligning incentives in risk bearing, offer low-risk opportunities.

The crisis relating to the shortage of healthcare workers was felt acutely in 2022. However, the shift in provider demographics is ongoing, reflected by steady increases in the proportion of doctors nearing retirement age in line with the broader population. **These changes signal human capital supply shortages on the horizon.** Finally, physical infrastructure availability in terms of both hospitals and beds has declined over the past two decades, with **likely impacts on patient access, especially in rural areas, and preparedness for high-demand events, such as a pandemic.** Filling this gap through improved efficiencies, reducing medical errors through better monitoring and training approaches, changing roles and types of providers, and introducing new technologies will all become more urgent.

Overall, we observe an aggregate downward trend in our Payer / Provider metric.

Payer/Provider

- ↓ The US' total expenditure on health has risen dramatically since 2000, from around \$2.2 trillion to around \$4.3 trillion in 2020^{12 13}
- ↓ The number of doctors who were aged over 55 in 2019 reached more than half of the total physician population (51.5%), up by 13.6 percentage points from 2007¹⁴
- 0.5 more physicians per 100,000 Americans graduated in 2021 than did in 2013, at 6.3¹⁵
- ↑ Physician support professions, such as Physician's Assistants, have grown dramatically, from just 26.3 per 100,000 in 2010 to 37.8 in 2020
- ↓ Key measures of physical infrastructure availability, such as the number of hospital beds per capita, are on the decline – down to around 2.77 beds per 1000 people in 2020 from a 2010 count of 3.04¹⁶
- In 2020, hospital care provision comprised 31% of US health expenditure, followed by physician and clinical services (20%) and prescription drug costs (8%). These positions are largely consistent with the breakdown of expenditure in 2000, despite the large increase in overall expenditure
- The US' outpatient expenditure, at 27% of total expenditure, was greater than the OECD mean of 26%¹⁷
- ↓ The US' expenditure in the hospital administration area was 8.9% in 2020, over five percentage points higher than the OECD average, and more than one percentage point higher than it was in 2010

¹² Center for Medicare/Medicaid Services

¹³ All figures in adjusted 2021 US\$

¹⁴ Association of American Medical Colleges

¹⁵ Association of American Medical Colleges

¹⁶ American Hospital Association

¹⁷ Organization for Economic Cooperation and Development

Research & Development

Key R&D Takeaway: R&D spending on the rise, and Covid-19 research resulted in record speed to output, but other indicators of R&D efficacy show declines.



R&D plays a critical role in the US healthcare system. It is conducted by a variety of organizations, including pharmaceutical companies, academic institutions, and government agencies. The US is home to leading research institutions and has a strong tradition of innovation in healthcare, which has led to many significant advances in the field.

Our findings indicate that although R&D spending has increased since 2000, **returns on investment in research are diminishing**. The US is losing its competitive edge, as it has moved from 2nd to 8th place in top 1% cited publication rankings. Strikingly, although publications have increased year over year (and by almost 40% since 2010), this increase does not translate into more Food and Drug Administration (FDA) approvals. Private spending, which is focused on phase 3 clinical trials, overtook public spending – which is more focused towards clinical research – in 2015. Financing models such as the Advanced Market Commitment used to de-risk the US Covid vaccine effort, improved collaboration frameworks between government-funded R&D and tech transfer to the private sector, and aligning funding to disease burden could all improve both lifespan and quality of that lifespan.

Overall, we observe an aggregate neutral trend in our R&D metric.

R&D

- ➔ Total R&D expenditure was up to approximately \$139 billion in 2021, with \$79 billion coming from private sources and \$60 billion coming from public sources. Compared to 2000, the total is up by around \$62 billion, but the private sector's share has increased from ~45% to 56%^{18,19}
- ⬇ The US' rank on the National Science Foundation's (NSF) index of countries with highly cited publications has fallen from 2nd in 1996 to 8th in 2016²⁰
- ➔ Since 2015, the FDA has approved between 40 and 60 new drugs per year, with two significant exceptions in 2016 (22 new drugs) and 2022 (37 new drugs)²¹
- ⬇ Recent research indicates that diseases with high costs per patient, high total medical expenses, and high mortality rates receive a relatively low proportion of National Institutes of Health (NIH) funding, compared to other conditions with lower costs
- ➔ Within the private sector, oncologics, diabetes, and autoimmune drugs received the highest proportions of research funding in 2019
- ➔ Coronaviruses have become a main topic of research, with \$4.9 billion allocated to NIH Covid-19 research alone.²² However, Covid-19 had separate impacts on research productivity in other areas. For instance, it may have impacted the propensity of researchers to initiate new projects or pursue collaborative research efforts

¹⁸ PhRMA Member Survey; Centers for Medicare/Medicaid Services

¹⁹ All figures in adjusted 2021 US\$

²⁰ National Science Foundation

²¹ Food and Drug Administration

²² National Institutes of Health

KEY FINDINGS

Key Findings Across Metrics

The relationship between payers, providers, and R&D is intertwined, with payers funding both the services provided by providers and the research that drives innovation that seeks to improve patient outcomes. We provide key interdependent findings across our metrics.

Summary of Key Findings

While more of the population is insured than ever before, patient engagement with traditional healthcare providers is declining

US population life expectancy stagnates, even as total health expenditure is rising

Maternal mortality is up since 2000, even as infant mortality rates decline

The proportion of doctors nearing retirement is growing, outpacing the rate of new medical graduates

Healthcare physical infrastructure is declining in availability, despite increases in expenditure

The majority of US healthcare consumption expenditure is dedicated to hospital care provision, physician and clinical services, and prescription drug costs, with inpatient care representing a lower proportion

Competition in the private sector is on the decline

Total R&D expenditure is rising, but outputs do not reflect this growth

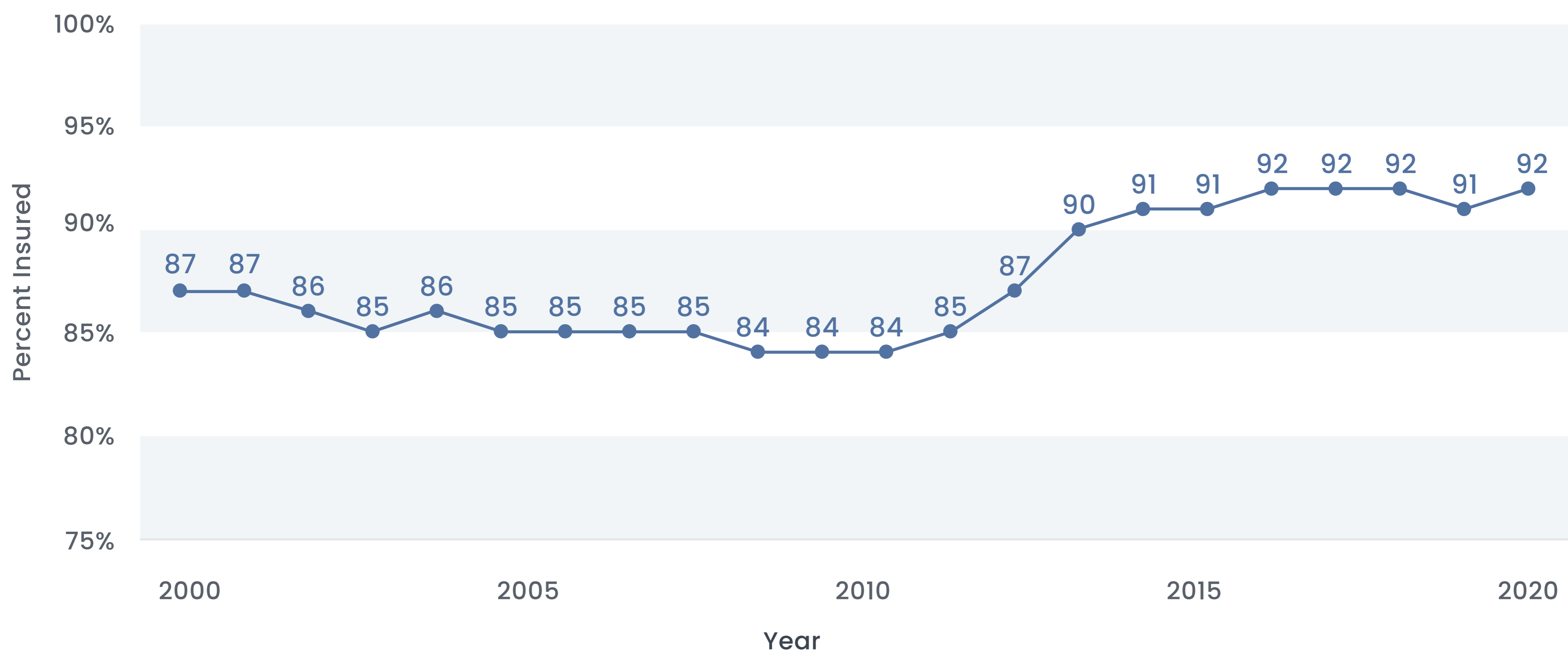
Private and public R&D efforts are not fully prioritizing a sufficient range of critical conditions affecting the US population

Covid-19 skyrocketed to the third most common cause of death in 2020, with major impacts on R&D

1. While more of the population is insured than ever before, patient engagement with traditional healthcare providers is declining

- ↑ The share of the US population with some form of insurance reached 92% in 2020, an approximately five percentage point increase since 2000²³
- ↓ However, Americans are paying more out of pocket for healthcare, from around \$1,077 per capita in 2000 to \$1,227 in 2020^{24 25}
- ↓ Perhaps as a result, the US ranked highest in the OECD in terms of the percentage of its population who skipped healthcare appointments due to cost in 2016²⁶
- ↓ Americans are visiting the doctor less often, with just 2.7 visits per year in 2020 compared to 4.8 in 2000²⁷

Figure 1: Percent insured in the US, 2000-2021



²³ Centers for Disease Control (<https://www.cdc.gov/nchs/fastats/health-insurance.htm>)

²⁴ Centers for Medicare/Medicaid Services (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData>)

²⁵ Figures in constant 2021 US\$

²⁶ Organization for Economic Cooperation and Development (<https://data.oecd.org/healthcare/doctors-consultations.htm>)

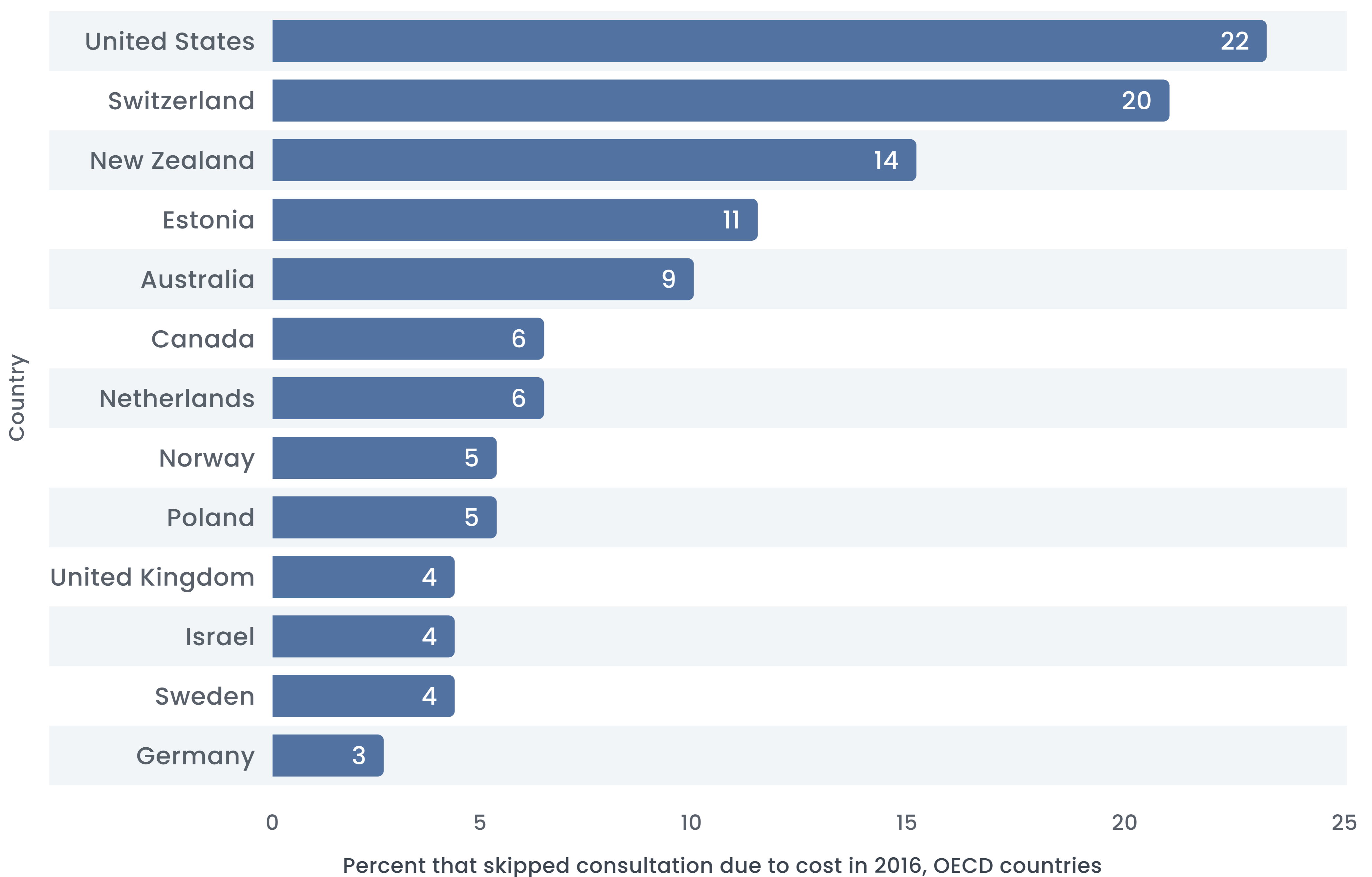
²⁷ Centers for Disease Control (<https://www.cdc.gov/nchs/fastats/physician-visits.htm>)

1. While more of the population is insured than ever before, patient engagement with traditional healthcare providers is declining

Aspects of the US population's engagement with healthcare services have been on the decline since the early 2000s, and may correlate with the decrease in patient outcomes that occurred over the same period. Despite the growth in the insured population, average annual in-person doctor visits have declined. Part of the explanation for this decrease may be that telehealth utilization is on the rise, particularly amid the pandemic, but such visits cannot fully substitute for in-person physician visits because physicians are often able to assess patients for ailments other than the primary purpose of the visit. Even prior to the pandemic, potentially resulting from a desire to reduce cost, other alternatives to the traditional hospital/doctor visit such as urgent care/retail health clinics represented significant shares of utilization, with around 30% of Americans having had at least one visit to such a clinic in 2019.²⁸

Multiple trends may factor into the decrease in engagement with healthcare. Even with increases in the percentage of the insured population, average out-of-pocket medical expenditures increased, and the US continues to rank highest among all OECD countries for people who skipped consultations due to an inability to pay, highlighting cost as a key factor.

Figure 2: Percent that skipped consultation due to cost in 2016, OECD countries



²⁸ Centers for Disease Control (<https://www.cdc.gov/nchs/products/databriefs/db409.htm>)

1. While more of the population is insured than ever before, patient engagement with traditional healthcare providers is declining

Cost may not be the only factor affecting this trend, however: others may include reduced trust in healthcare professionals, prior negative experiences engaging with the healthcare system,²⁹ and an increase in publicly available information/services which individuals can employ in an effort to self-diagnose (e.g., WebMD and similar online resources).

In reviewing these findings, stakeholders might consider the following:

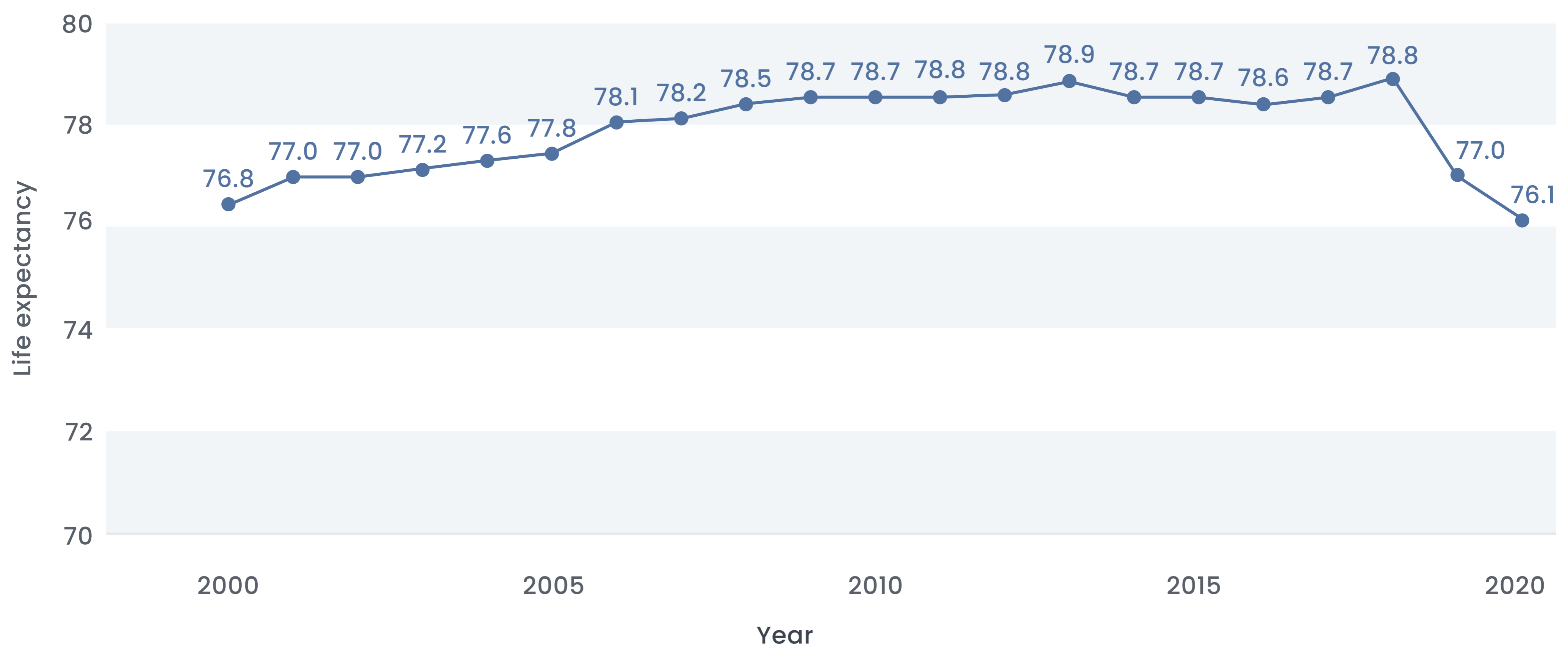
- What is driving reduced patient engagement with healthcare providers, despite growth in the insured population?
- What impact is reduced patient engagement having on health outcomes?
- If the impact is negative, what policy actions might help to improve engagement?

²⁹ Taber, J.M., Leyva, B., and Persoskie, A. (2015), Why do People Avoid Medical Care? A Qualitative Study Using National Data (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4351276/>)

2. US population life expectancy stagnates, even as total health expenditure is rising

-  The US' total expenditure on health has risen dramatically since 2000, from around \$2.2 trillion to around \$4.3 trillion in 2020 ^{30 31}
-  Conversely, overall life expectancy has stagnated since around 2010, and declined dramatically amid the Covid-19 pandemic, reaching 76.1 years in 2021 ³²
-  **Regional Focus:** At the state level, Hawaii, Washington and Minnesota had the highest life expectancies in 2020, with all three at 79.1 or higher. Mississippi and West Virginia were lowest, at less than 73 years in 2020

Figure 3: Life expectancy in the US, 2000-2021



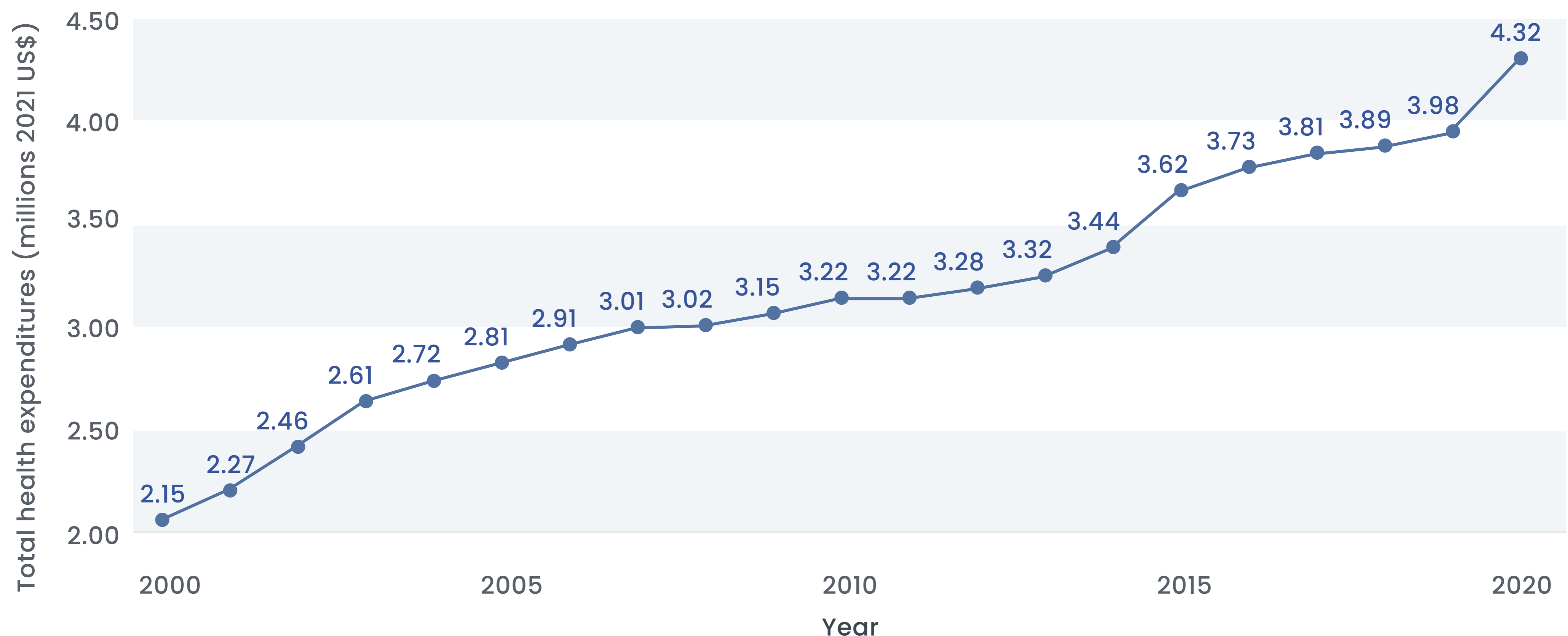
³⁰ Center for Medicare/Medicaid Services (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData>)

³¹ All figures in adjusted 2021 US\$

³² Centers for Disease Control (https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2022/20220831.htm)

2. US population life expectancy stagnates, even as total health expenditure is rising

Figure 4: Total health expenditure in the US, 2000-2020



It is a truism that US health expenditure is dramatically out of sorts with the rest of the developed world. A range of factors help explain the significant difference in expenditure, as well as its growth in recent years.

However, investment has not paid off in terms of one key outcome – American life expectancy at birth, which has largely stagnated since 2010 and dramatically declined during the Covid-19 pandemic. Factors impacting the US' relatively low life expectancy are various – for instance, the US has higher rates of obesity than many of its peer countries, which is a major contributor to heart disease, diabetes, and other leading causes of death.

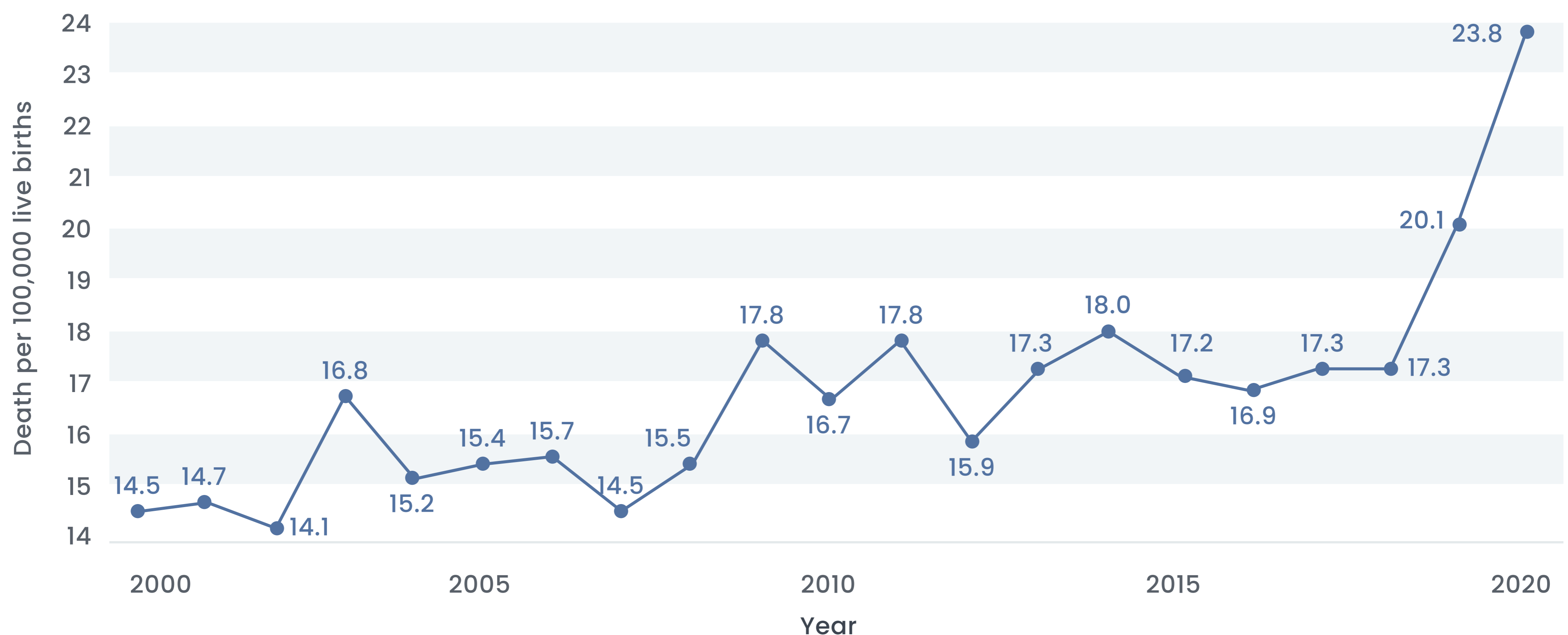
In reviewing these findings, stakeholders might consider the following:

- What factors are contributing to life expectancy stagnation? How might current policy be impacting undesirable outcomes?
- How might we reverse the life expectancy stagnation trend?
- How might we ensure that our investment in public health has the desired impacts in the short, medium, and long term?

3. Maternal mortality is up since 2000, even as infant mortality rates decline

- ↓ Maternal mortality has been on the rise in the US since 2000, from 14.5 to 23.8 in 2020, per 100,000 live births ³³
- ↓ The US' 2020 maternal mortality rate was the third highest among OECD countries for which data was available, with only Costa Rica and Mexico at higher rates ³⁴
- ↑ This increase is in contrast to the decline in infant mortality, which fell to 5.38 per 1,000 live births in 2019 from a 2000 high of 6.89 ³⁵
- ↓ Maternal mortality among non-Hispanic Black women was 31.8 deaths per 100,000 live births higher than the overall average, at 55.3 in 2020

Figure 5: Maternal mortality in the US, 2000–2020



The alarming rise in US maternal mortality – which has eclipsed that of a range of developed countries – is attributable to a number of factors. It is in part tied to trends in other health outcomes, particularly increases in obesity, diabetes, and chronic heart conditions, as well as striking racial disparity.³⁶ Non-standardized access to maternal healthcare, and reduced ability to deal with maternal complications in some areas of the country, are also contributors to the rise.

³³ Centers for Disease Control (<https://www.cdc.gov/reproductivehealth/maternal-mortality/index.html>)

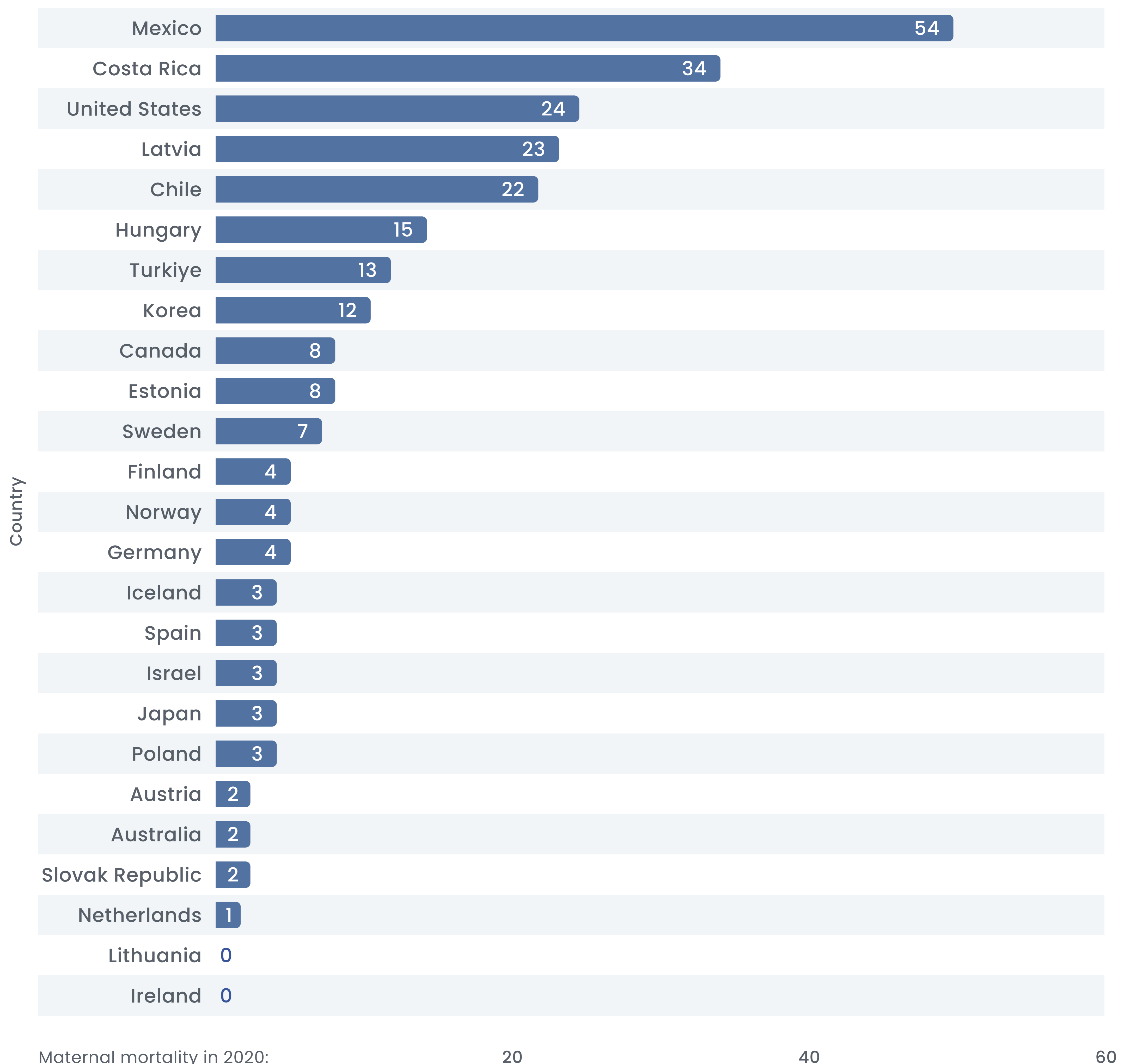
³⁴ Organization for Economic Cooperation and Development (<https://stats.oecd.org/index.aspx?queryid=30116>)

³⁵ Centers for Disease Control (<https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm>)

³⁶ Carroll, A.E. (2017), Why Is US Maternal Mortality Rising? (<https://jamanetwork.com/journals/jama/fullarticle/2645089>)

3. Maternal mortality is up since 2000, even as infant mortality rates decline

Figure 6: Maternal death per 100,000 live births in 2020, OECD countries



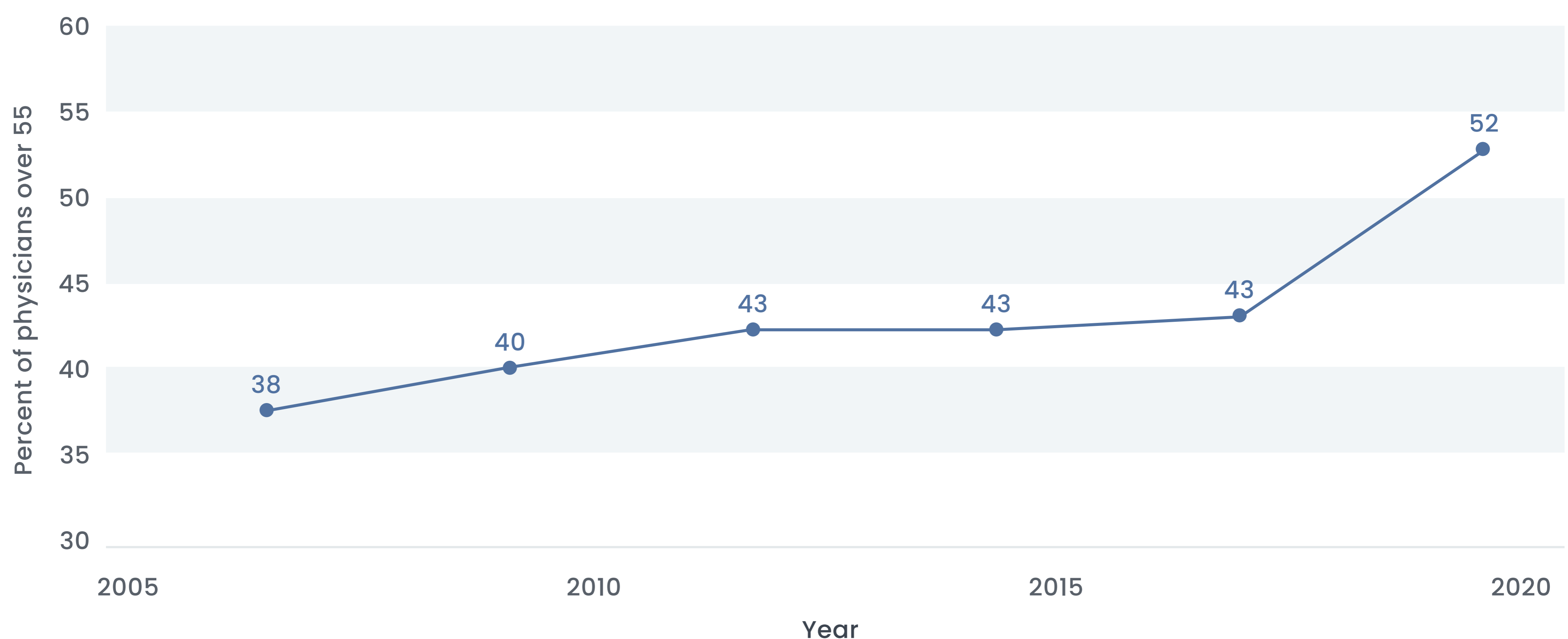
In reviewing these findings, stakeholders might consider the following:

- What factors are contributing to the rise in maternal mortality?
- What public health measures might be taken to curb these factors?
- Might additional R&D work on the matter lead to improvements?

4. The proportion of doctors nearing retirement is growing, outpacing the rate of new medical graduates

- ↓ The number of doctors who were aged over 55 in 2019 reached more than half of the total physician population (51.5%), up by 13.6 percentage points from 2007 ³⁷
- Only 0.5 more physicians per 100,000 Americans graduated in 2021 than did in 2013, at 6.3 ³⁸
- ↑ However, physician support professions, such as Physician's Assistants, have grown dramatically, from just 26.3 per 100,000 in 2010 to 37.8 in 2020 ³⁹

Figure 7: Percent of physicians aged over 55 in the US, 2007–2019



The growing proportion of the physician population nearing retirement may be a sign of coming human capital shortfalls. While the population of graduating physicians has grown year-on-year over the past decade, the rate is sluggish, with only 0.5 additional physicians per 100,000 Americans graduating in 2021 than did in 2013. This pace, in combination with the pace at which physicians are becoming inactive or retired, is not maintaining the speed of population growth and healthcare needs, especially as the US populace itself grows older.

Growth in adjunct health professions may help to curb the impact of the trend toward human capital decline, but it is unclear whether these roles will be sufficient to prevent a shortfall in the coming decades. According to the Association of American Medical Colleges, shortages by 2034 will range from 17,800–48,000 primary care physicians and 21,000–77,100 non-primary care physicians. ⁴⁰

³⁷ Association of American Medical Colleges (<https://www.aamc.org/data-reports/workforce/data/active-physicians-age-specialty-2021>)

³⁸ Association of American Medical Colleges (<https://www.aamc.org/data-reports/workforce/data/active-physicians-age-specialty-2021>)

³⁹ Centers for Disease Control (<https://www.cdc.gov/nchs/hus/topics/physicians.htm>)

⁴⁰ Association of American Medical Colleges (<https://www.aamc.org/media/54681/download>)

4. The proportion of doctors nearing retirement is growing, outpacing the rate of new medical graduates

Figure 8: Physicians graduating per 100,000 people in the US, 2013-2021






In this context, revisiting reduced patient engagement with providers will be important. While some segments of the patient population are increasingly utilizing alternative methods to access and engage with healthcare, others – such as older segments – continue to rely on traditional primary and non-primary care providers.

In reviewing these findings, stakeholders might consider the following:

- How might we stem the departure of doctors, nurses, and other providers from healthcare to other industries?
- What policy changes might mitigate against human capital shortfalls?

5. Healthcare physical infrastructure is declining in availability, despite increases in expenditure

-  Key measures of physical infrastructure availability, such as the number of hospital beds per capita, are on the decline – down to around 2.77 beds per 1,000 people in 2020 from a 2010 count of 3.04⁴¹
-  However, overall healthcare expenditure is on the rise, reaching almost triple its 2000 rate in 2020⁴²
-  **Regional Focus:** Washington DC, South Dakota, and North Dakota all had greater than 4 beds per 1,000 people in 2021, while Washington, Oregon, and New Mexico, in addition to eight other states, had fewer than 2.

The drop in hospital bed availability across the US is attributable to a range of factors, including increased investment in outpatient infrastructure and a deliberate effort to reduce excess consumption of inpatient services. Other factors, such as fewer inpatient procedures, may also be contributors to this trend – a combination of both top-down decisions and bottom-up market signals resulting in an overall decrease.

Figure 9: Beds per 1,000 people in the US, 2000–2020



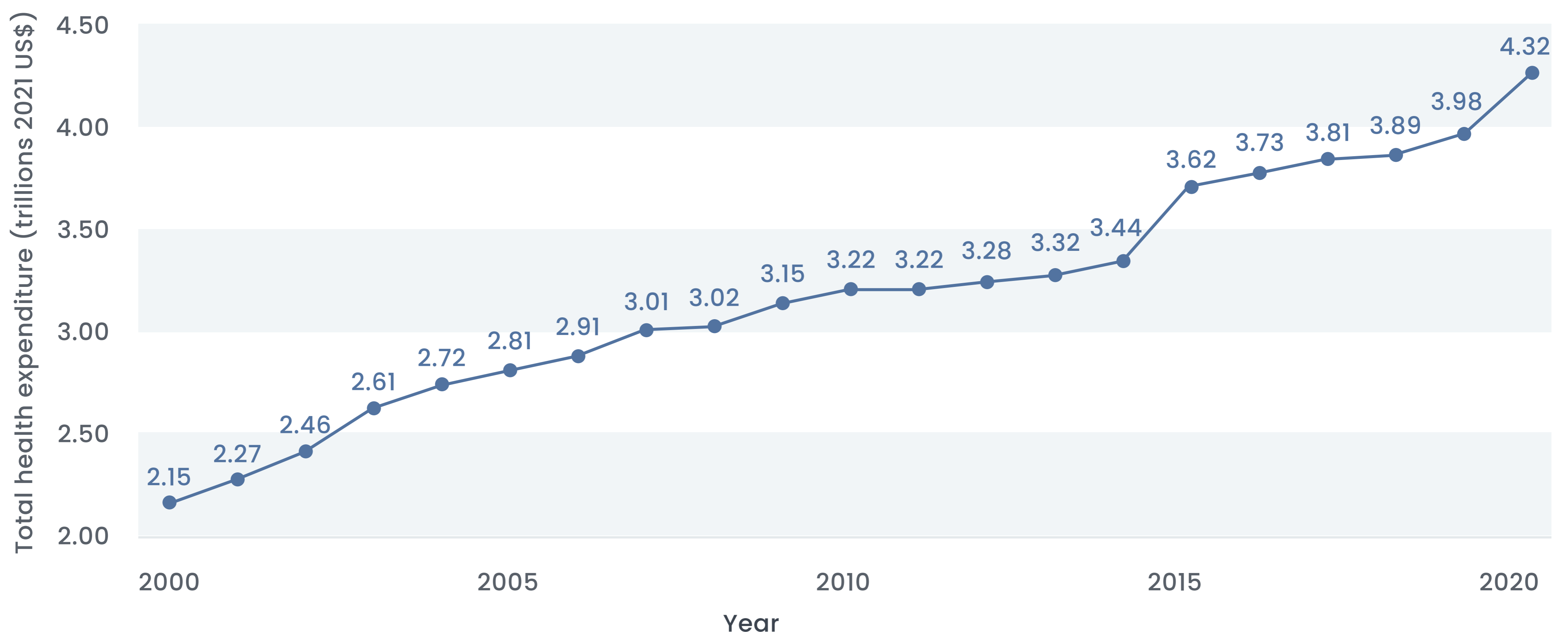
⁴¹ American Hospital Association (<https://www.aha.org/statistics/fast-facts-us-hospitals>)

⁴² Centers for Medicare/Medicaid Services (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData>)

5. Healthcare physical infrastructure is declining in availability, despite increases in expenditure

While the reduction is not necessarily a negative, given that hospital bed utilization has also fallen, it may leave the US more vulnerable than peer states to high-stress events such as epidemics, which cause spikes in the demand on infrastructure. Moving forward, finding a balance between the imperative to manage costs while hedging for high-utilization events akin to Covid-19 will be crucial. Relatedly, revisiting the population engagement metric in the context of infrastructure data is an important consideration for stakeholders.

Figure 10: Total health expenditure in the US, 2000–2020



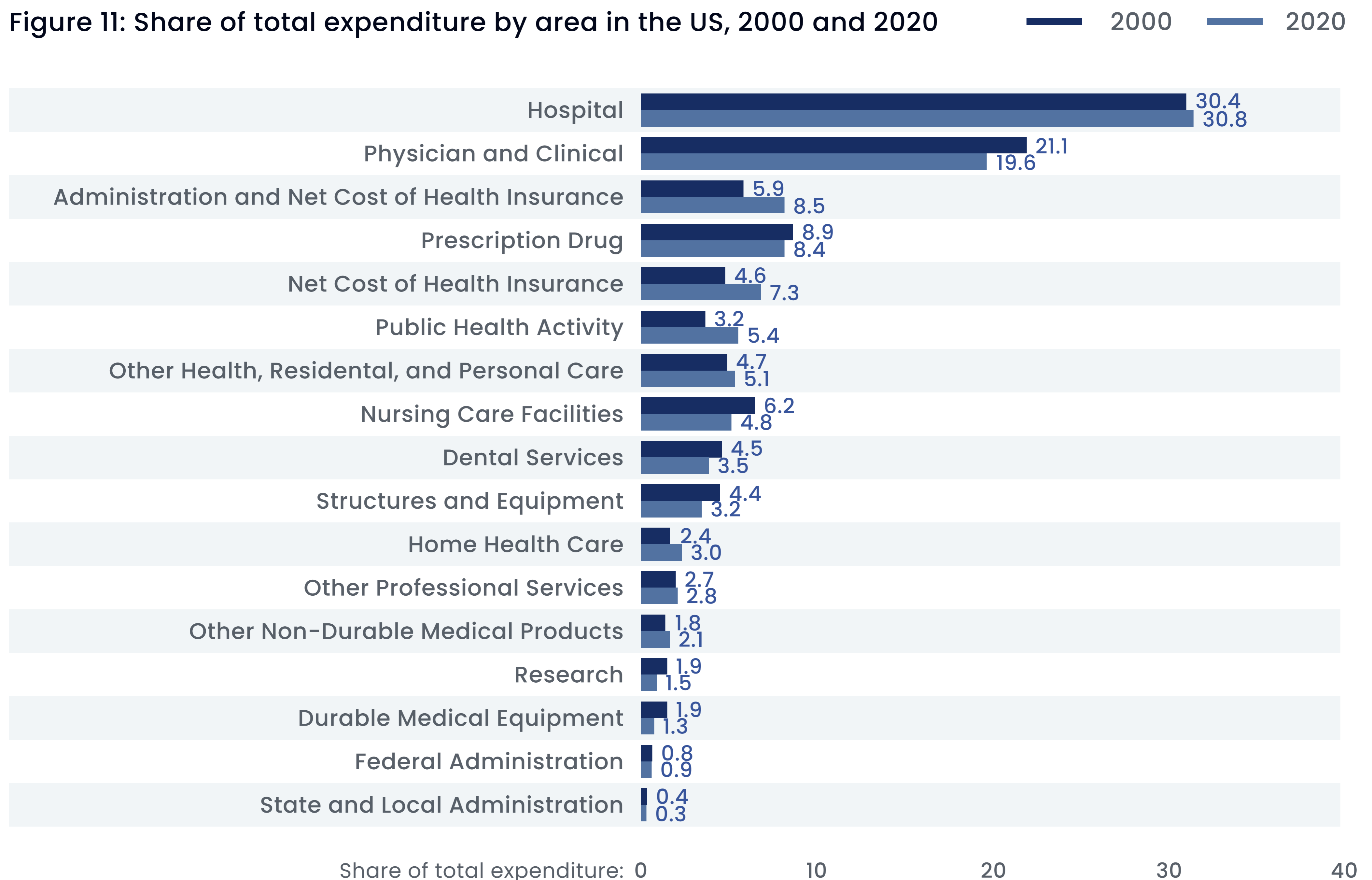
In reviewing these points, stakeholders might consider the following:

- Is the present count of beds per 1,000 people sufficient for current and future healthcare provision requirements?
- How might investment in infrastructure be right-sized without triggering increased induced demand for inpatient services?
- Given reduced overall patient engagement with healthcare, coming provider shortages, and the state of health infrastructure, what steps need to be taken to ensure that the US population has the healthcare services it needs over the coming decades?

6. The majority of US healthcare consumption expenditure is dedicated to hospital care provision, physician and clinical services, and prescription drug costs

- ➔ In 2020, hospital care provision comprised 31% of US health expenditure, followed by physician and clinical services (20%) and prescription drug costs (8%). These positions are largely consistent with the breakdown of expenditure in 2000, despite the large increase in overall expenditure
- ➔ The US' outpatient expenditure, at 27% of total expenditure, was greater than the OECD mean of 26%⁴³
- ⬇ However, the US' expenditure in the hospital administration area was 8.9% in 2020, over five percentage points higher than the OECD average, and more than one percentage point higher than it was in 2010⁴⁴

Figure 11: Share of total expenditure by area in the US, 2000 and 2020



⁴³ Organization for Economic Cooperation and Development (<https://stats.oecd.org/index.aspx?DataSetCode=SHA>)

⁴⁴ Bureau of Labor Statistics

6. The majority of US healthcare consumption expenditure is dedicated to hospital care provision, physician and clinical services, and prescription drug costs

In addition to being larger in absolute terms, total US healthcare expenditure is also distributed somewhat differently to that of its peer states in the OECD. Most notably, its share of spending on outpatient care outpaces the OECD average. While data on inpatient care for 2020 in the US was unavailable, the most recent figure – for 2018 – showed that US inpatient spending was drastically lower than the OECD average at 16.4%, compared to an average of 26.1%.

As previously noted, these differences in part stem from a deliberate effort to favor outpatient as opposed to inpatient care over the past several decades. Other differences, however, require additional investigation – in particular the gaps in administrative costs (where the US outpaces the average) and long-term care (where the US falls short).

The three largest spending categories in US healthcare, hospital care provision, physician/clinical services, and prescription drug costs, have remained in those positions over the past two decades, despite major increases in overall expenditure. Thus, while their proportions are broadly similar, the absolute spending in these three areas has grown significantly, raising questions around the extent to which US healthcare expenditure is returning smaller outputs to ever-higher dollar inputs.

Additionally, the distribution of US healthcare expenditure is out of sorts with its OECD peers in areas such as hospital administration, where the US outpaces other states by around five percentage points, a figure which has grown over the past decade.

In reviewing these points, stakeholders might consider the following:

- How might inflation in administrative costs be reduced?
- Is the present healthcare spending mix effectively proportioned to account for both current health needs and long-term requirements? If not, how might it be right-sized?
- Is the US getting the same ‘bang for its buck’ in healthcare as it did a decade or two ago? If not, how might this situation be rectified?

7. Competition in the private sector is on the decline

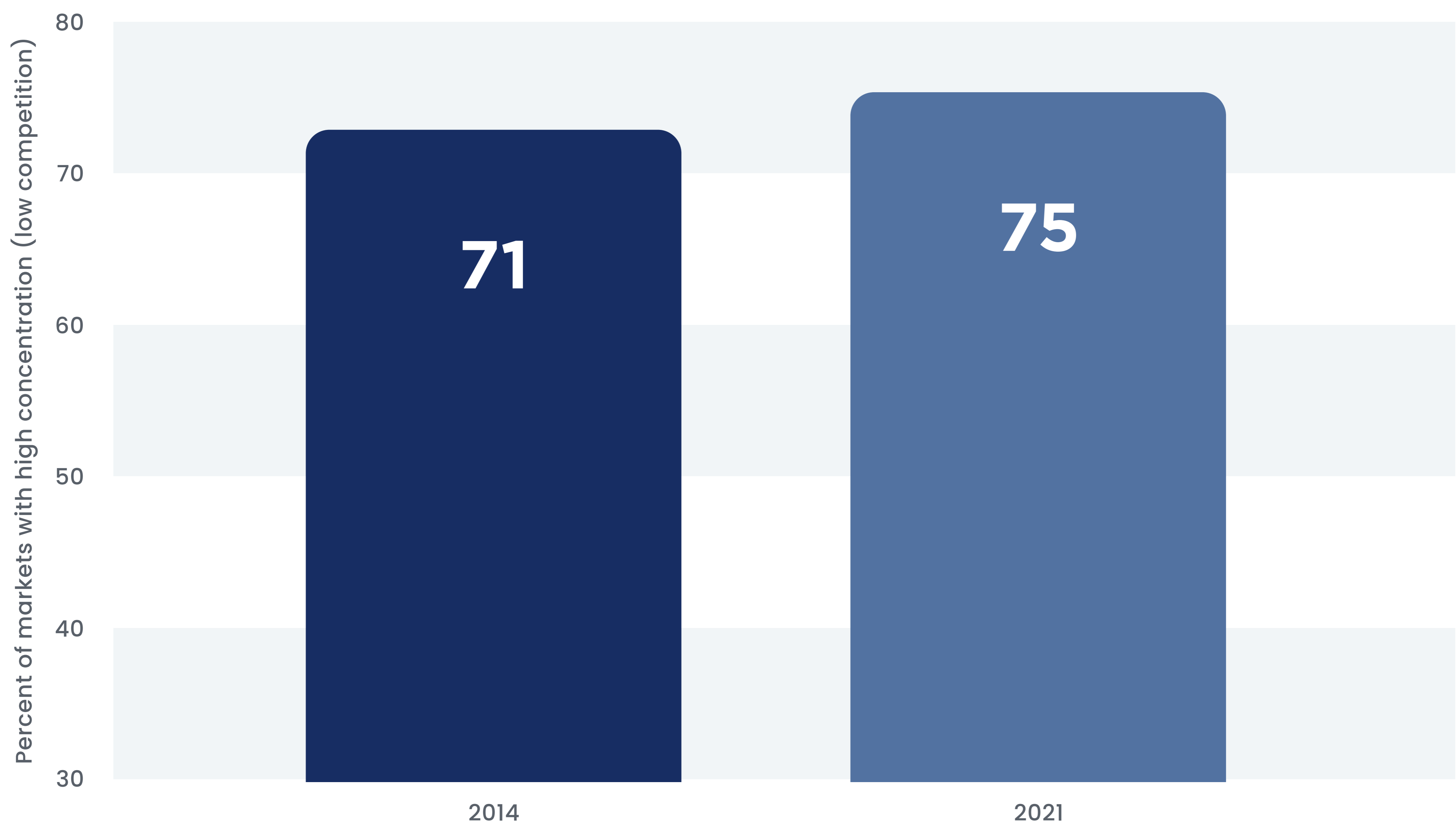


Competition across private health insurance markets has declined since 2014. In 2021, 75% of markets were highly concentrated, compared to 71% in 2014 ⁴⁵

State Focus: In 2021, Alabama, Michigan, and Louisiana were the least-competitive health insurance markets across the country ⁴⁶

Compared to 2014, more local markets have less-competitive health insurance markets. A range of factors contribute to these changes, including increased consolidation through mergers within the health insurance industry. While increased consolidation is not a strictly negative phenomenon, it grants firms greater market power, which enables them to engage in practices that are harmful to consumers, such as increasing premiums.

Figure 12: Health insurance market concentration percentage, 2014 and 2021



In assessing these findings, stakeholders might consider the following:

- To what extent is consolidation in the health industry affecting consumers?
- How might we mitigate or reverse harmful impacts of decreased competition in health insurance markets?

⁴⁵ American Medical Association (<https://www.ama-assn.org/delivering-care/patient-support-advocacy/competition-health-care-research>)

⁴⁶ Ibid

8. Total R&D expenditure is rising, but outputs do not reflect this growth

- ➔ Total R&D expenditure reached approximately \$139 billion in 2021, with \$79 billion coming from private sources and \$60 billion coming from public sources. Compared to 2000, the total is up by around \$62 billion, but the private sector's share has increased from ~45% to 56% ^{47 48}
- ⬇ The US' rank on the NSF's index of countries with highly cited publications has fallen from 2nd in 1996 to 8th in 2016 ⁴⁹
- ⬇ Since 2015, the FDA has approved between 40 and 60 new drugs per year, with two significant exceptions in 2016 (22 new drugs) and 2022 (37 new drugs) ⁵⁰

Figure 13: Private and public R&D expenditure in the US, 2000–2021



Although R&D spending in both private and public spheres has tripled in recent years, the US is losing its competitive edge: it has moved from 2nd to 8th place in the top 1% cited publication rankings. Strikingly, although publications have increased year over year (and by almost 40% since 2010), this increase resulted in almost a doubling of patents from 2000 to 2014 but did not translate into an increase in FDA approvals. Research publications are clearly not leading to new marketed innovations at the expected rate. Finally, private spending, which is generally more focused on phase 3 clinical trials, overtook public spending – which is generally more focused towards clinical research – in 2015.

⁴⁷ PhRMA Member Survey (may not comprehensively account for private sector research funding) (<https://phrma.org/resource-center/Topics/Research-and-Development/2022-PhRMA-Annual-Membership-Survey>); Centers for Medicare/Medicaid Services (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData>)

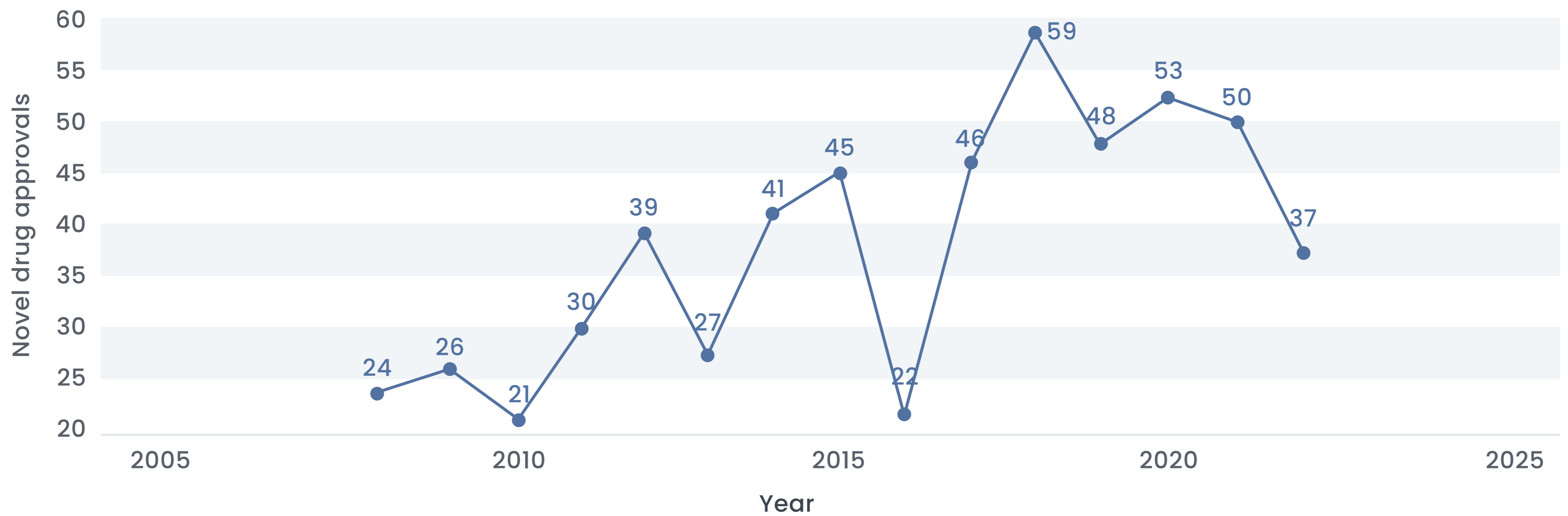
⁴⁸ All figures in adjusted 2021 US\$

⁴⁹ National Science Foundation (<https://nces.nsf.gov/pubs/nsb20206/impact-of-published-research>)

⁵⁰ Food and Drug Administration (<https://www.fda.gov/drugs/new-drugs-fda-cders-new-molecular-entities-and-new-therapeutic-biological-products/novel-drug-approvals-2022>)

8. Total R&D expenditure is rising, but outputs do not reflect this growth

Figure 14: Novel drug approvals in the US, 2008–2022



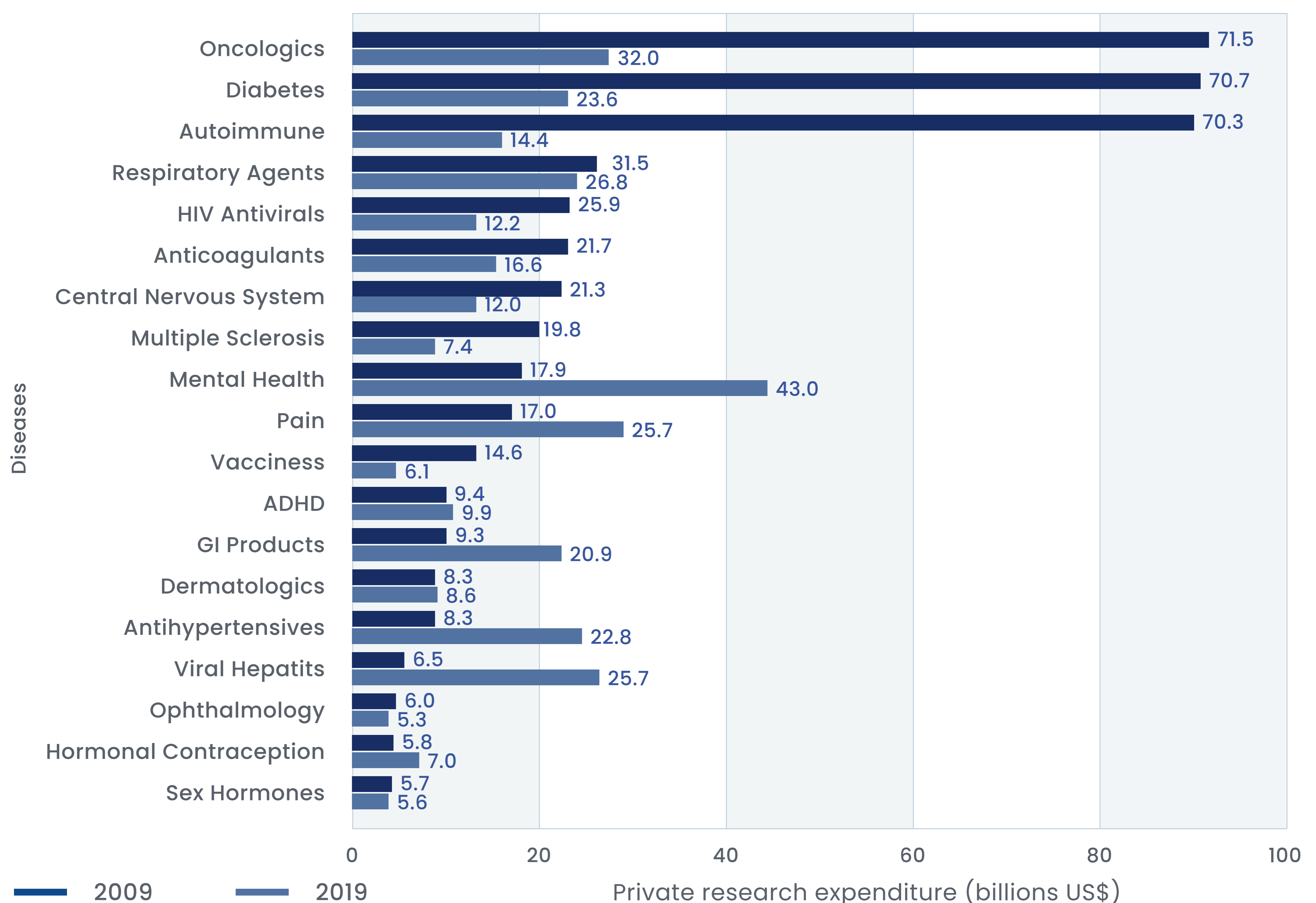
In reviewing these findings, stakeholders might consider the following:

- How do we improve not only the return on investment for R&D spending but also the US' competitiveness in research fields?
- How do we ensure a healthy future, if expenditures are not leading to market penetration of published findings?
- How do we facilitate the pipeline of paper to product?

9. Private and public R&D efforts may not be prioritizing a sufficient range of critical conditions affecting the US population

- ➔ Total R&D expenditure is up to approximately \$139 billion, with \$79 billion coming from private sources and \$60 billion coming from public sources⁵¹
- ⬇ However, recent research indicates that diseases with high costs per patient, high total medical expenses, and high mortality rates receive a relatively low proportion of NIH funding, compared to other conditions with lower costs⁵²
- ➔ Within the private sector, oncologics, diabetes, and autoimmune drugs received the highest proportions of research funding in 2019⁵³

Figure 16: Private research expenditure by therapeutic class, 2009 and 2019



⁵¹ PhRMA Member Survey (may not comprehensively account for private sector research funding) (<https://phrma.org/resource-center/Topics/Research-and-Development/2022-PhRMA-Annual-Membership-Survey>); Centers for Medicare/Medicaid Services (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData>)

⁵² [https://milkeninstitute.org/sites/default/files/reports-pdf/Health Innovation Gaps_Final_0.pdf](https://milkeninstitute.org/sites/default/files/reports-pdf/Health%20Innovation%20Gaps_Final_0.pdf)

⁵³ Congressional Budget Office report (<https://www.cbo.gov/system/files/2021-04/57025-Rx-RnD.pdf>)

9. Private and public R&D efforts may not be prioritizing a sufficient range of critical conditions affecting the US population

Figure 15: Private and public R&D expenditure in the US, 2000–2021



The disconnect between investment and return on investment bodes poorly for the future of innovation in healthcare. The 20th century has seen a massive increase in life expectancy due to medical innovations (such as sanitation, vaccines, antibiotics, and increased nutrition), from around 49 in 1900 to about 76 in the 2000s.

To continue increasing the average life expectancy, new innovations are required, but they are seemingly more and more difficult to attain, or more and more costly to generate. With the pipeline for innovations drying up, as new market approvals remain stable despite increased spending, the future of healthcare does not appear to be improving, despite massive spending increases.

In reviewing these findings, stakeholders should consider the following:

- Are investments in R&D appropriately targeted to critical healthcare needs?
- Is the current mix of private and public funding for R&D achieving desired outcomes? Are there potential conflicts between disparate sources?

10. Covid-19 skyrocketed to the third most common cause of death in 2020, with major impacts on R&D

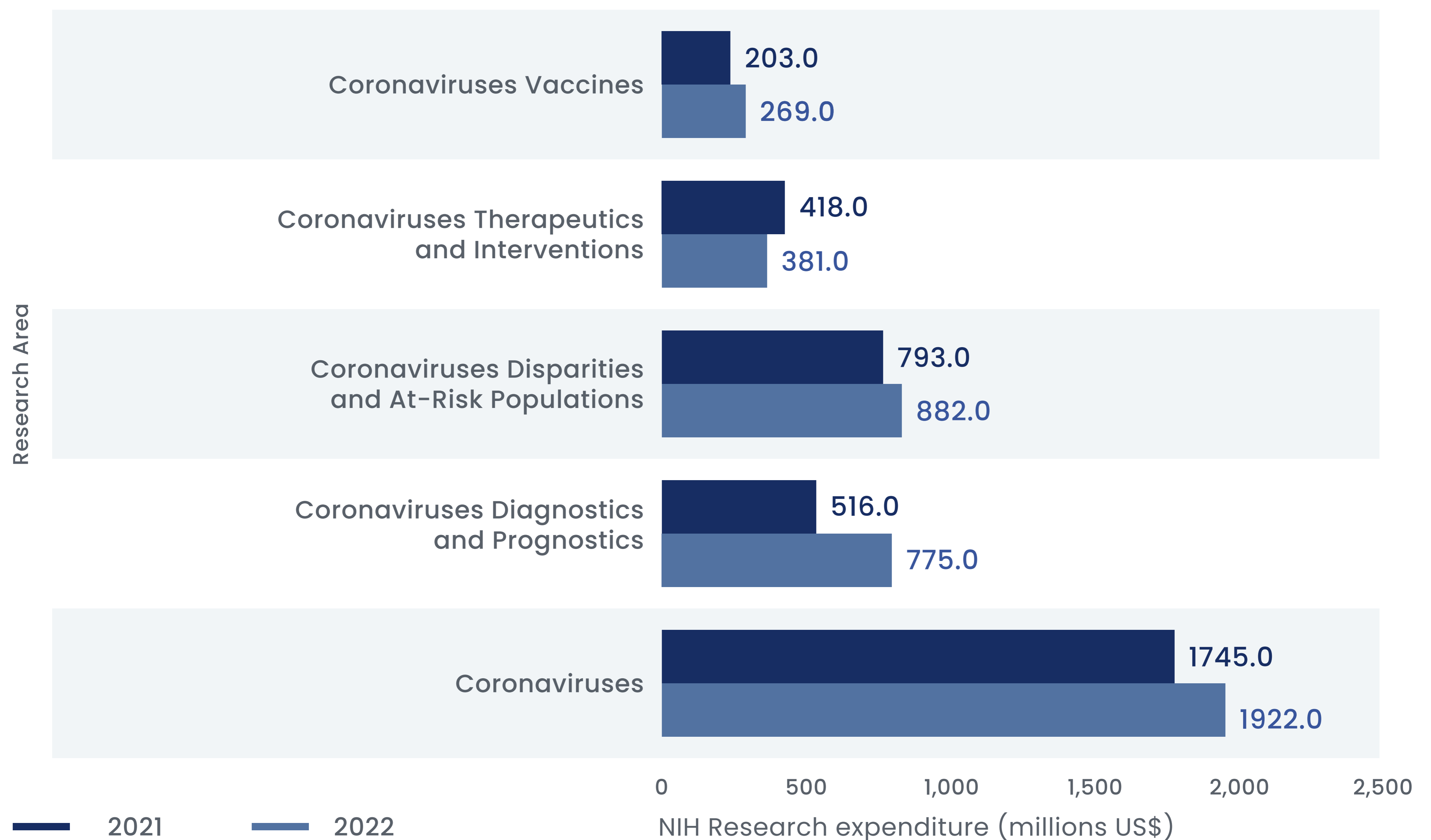


Coronaviruses have become a main topic of research, with \$3.6 billion (around 8% of overall funding) allocated to NIH Covid-19 research alone in 2022.⁵⁴ Speed to output for Covid-19 vaccinations was among the fastest in history⁵⁵



However, Covid-19 had separate impacts on research productivity in other areas. For instance, it may have impacted the propensity of researchers to initiate new efforts on the immune system or pursue collaborative research efforts⁵⁶

Figure 17: NIH research expenditure on coronavirus-related subjects, 2021 and 2022



⁵⁴ National Institutes of Health (<https://report.nih.gov/funding/categorical-spending#/>)

⁵⁵ National Institutes of Health (<https://covid19.nih.gov/nih-strategic-response-covid-19/decades-making-mrna-covid-19-vaccines#mrna-vaccines-for-covid19-ready-for-people>)

⁵⁶ Gao, et al. (2021), Potentially Long-Lasting Effects of the Pandemic on Scientists (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8548590/>)

10. Covid-19 skyrocketed to the third most common cause of death in 2020, with major impacts on R&D

It is difficult to overstate the impact of Covid-19, or the impressive speed at which the research and funding community responded to the crisis to produce effective vaccinations. A number of important takeaways can be drawn from the pandemic and its impact on R&D writ large. First, understanding and potentially replicating the vaccine development process to rapidly deploy life-saving treatments while balancing the risks of underdevelopment will be crucial to making progress on other critical-condition areas. Second, understanding how the dramatic boost to funding and research efforts on Covid-19 affected other areas of research, and research productivity more broadly, will continue to be a major priority for the research funding community.

In reviewing these findings, stakeholders should consider the following:

- How might the Covid-19 vaccine development model be standardized or replicated for other high-priority conditions and disease areas?
- How has Covid-19 more broadly affected research activities and productivity, and what actions might be taken to mitigate negative impacts?

CONCLUSIONS

Conclusion and Questions for Stakeholders

This report's aim is to share insights from publicly available data in a comprehensive integrated structure. We hope to stir conversation among stakeholders about the core issues and trends across the healthcare ecosystem, and drive change for the better.

Across the report, we have identified a number of questions to elicit these discussions among policymakers, healthcare industry leaders, and other interested stakeholders. For the sake of convenience, we list them below:

Population health access, engagement, and outcomes:

- What is driving reduced patient engagement with healthcare providers, despite growth in the insured population?
- What impact is reduced patient engagement having on health outcomes?
- If the impact is negative, what policy actions might help to improve engagement?
- What factors are contributing to life expectancy stagnation?
- How might we reverse the life expectancy stagnation trend?
- How might we ensure that our investment in public health has the desired impacts in the short, medium, and long term?
- What factors are contributing to the rise in maternal mortality?
- What public health measures might be taken to curb these factors?
- Might additional research and development work on the matter lead to improvements?

Payer/Provider human capital and physical infrastructure:

- How might we stem the departure of doctors, nurses, and other providers from healthcare to other industries?
- What policy changes might mitigate against human capital shortfalls?
- Is the present count of beds per 1,000 people sufficient for current and future healthcare provision requirements?
- How might investment in infrastructure be right-sized without triggering increased induced demand for inpatient services?
- How might inflation in administrative costs be reduced?
- Is the present healthcare spending mix effectively proportioned to account for both current health needs and long-term requirements? If not, how might it be right-sized?
- Is the US getting the same 'bang for its buck' in healthcare as it did a decade or two ago? If not, how might this situation be rectified?
- Given reduced overall patient engagement with healthcare, coming provider shortages, and the state of health infrastructure, what steps need to be taken to ensure that the US population has the healthcare services it needs over the coming decades?

CONCLUSIONS

Conclusion and Questions for Stakeholders

Innovation, research, and development:

- How do we improve not only the return on investment for R&D spending but also the US' competitiveness in research fields?
- How do we ensure a healthy future, if expenditures are not leading to market penetration of published findings?
- How do we facilitate the pipeline of paper to product?
- Are investments in R&D appropriately targeted to critical healthcare needs?
- Is the current mix of private and public funding for R&D achieving desired outcomes? Are there potential conflicts between disparate sources?
- How might the Covid-19 vaccine development model be standardized or replicated for other high-priority conditions and disease areas?
- How has Covid-19 more broadly affected research activities and productivity, and what actions might be taken to mitigate negative impacts?

Appendix

Data sources

Sources are cited throughout. This report primarily relies on data from governmental and international bodies listed below:

- The World Health Organization
- The National Institutes of Health
- The Centers for Disease Control
- The Centers for Medicare and Medicaid Services
- The Organization for Economic Cooperation and Development
- The Food and Drug Administration
- The Congressional Budget Office
- The National Science Foundation

Additionally, data from the following private or non-profit organizations is utilized:

- The American Hospital Association
- The Association of American Medical Colleges
- PhRMA
- The Milken Institute

We endeavored to employ widely trusted and authoritative sources for all data cited throughout the report, but cannot guarantee the accuracy of figures reported by the above organizations beyond their own assurances.

Methodology

Subsequent to data collection, data was analyzed and visualized using Microsoft Excel and the Stata software package. All monetary figures have been adjusted to constant 2021 US\$ utilizing the Bureau of Labor Statistics' consumer price index reporting.

Throughout the report, findings are reported with green, red, or yellow arrows. These arrows were assigned to each finding based on secondary research as well as consultation with various subject matter experts across the relevant fields.