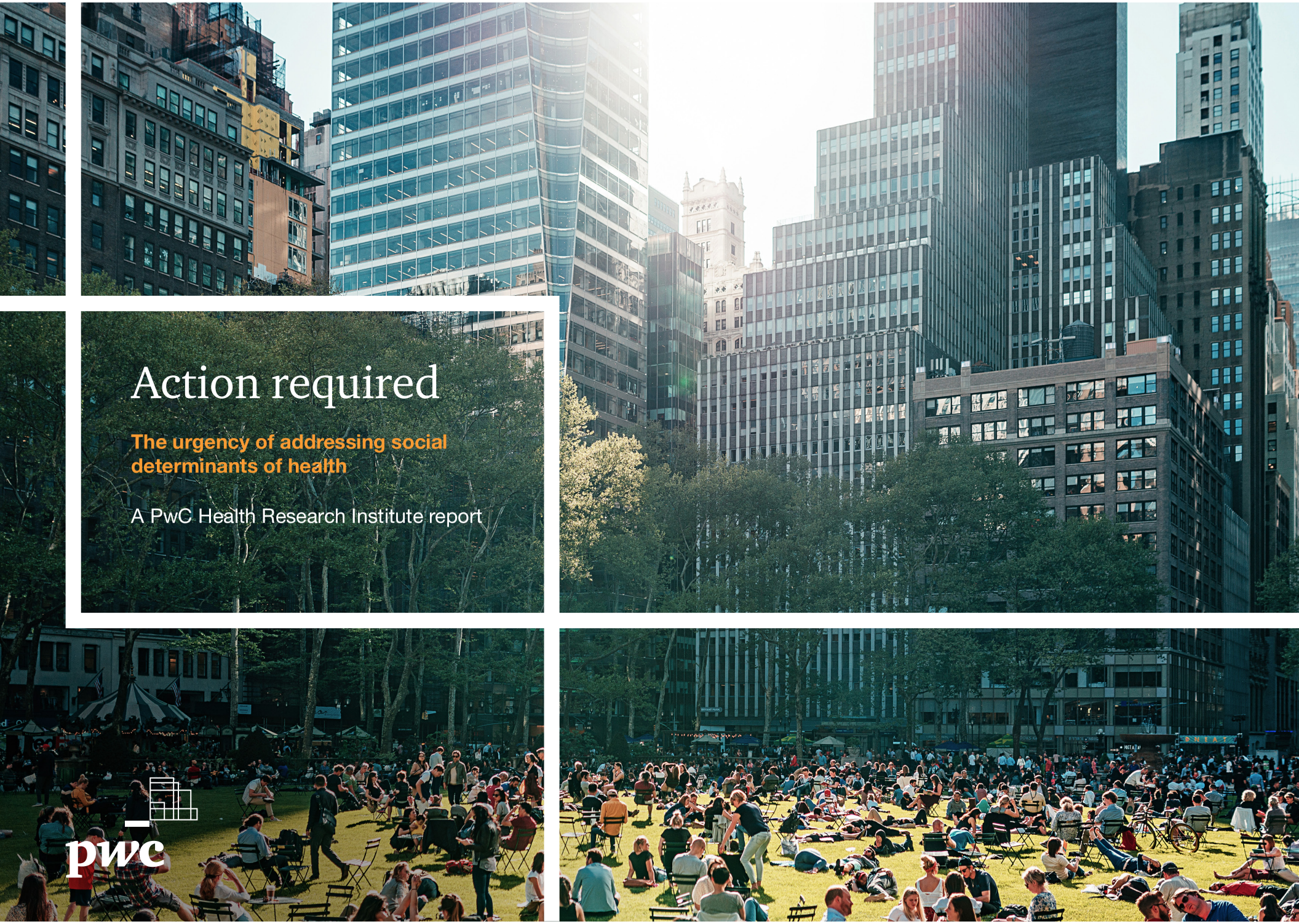
Action required

The urgency of addressing social determinants of health

A PwC Health Research Institute report



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The heart of the matter

Modern medicine, a marvel of technology and ingenuity, ushers in waves of progress that can add length and quality to human life. And yet certain powerful countervailing forces work against the efficacy of new treatments. The social determinants of health — often-ignored social factors such as employment; housing; income inequality; and level of access to clean water, education and transportation — undermine progress and can swamp the health systems that ignore them. Because even the most advanced medical interventions are rendered ineffective when people struggle with social isolation, income inequality, poor nutrition and pollution. As social factors counteract medical best practices, health systems often remain focussed on creating solutions at the wrong interaction point: after people are already sick and in crisis.

Countries have been spending more on healthcare every year — US$8.4tn across the globe.[1] Yet after decades of rising life expectancy and improving health outcomes, a modern health crisis is escalating, fuelled by soaring rates of obesity.[2] By 2025, the Organisation for Economic Co-operation and Development projects many countries will see obesity and overweight rates exceeding 68% of the population.[3]

Curing disease may seem more within reach than curing the underlying societal challenges of poverty, hunger or unemployment. But the increase in illnesses caused by people's behaviours and where they live and work could suffocate public and private budgets in both wealthy and poor countries. More important, our research and work in the field has led us to conclude that it is, in fact, possible to quantify the benefits and investment returns of an alternative approach that targets social factors. In England, a coalition focussing on housing achieved true cost savings for its healthcare system while simultaneously saving residents the trauma of an ambulance transport or a move to a nursing home. In the US, a nonprofit showed how its nutritious meal delivery service prevented crisis medical events for its elderly clients. In Australia, financial models illustrated how an investment of AU$124.3m over 14 years in a diabetes prevention campaign in Western Sydney could produce a financial benefit of AU$578m, on top of the broader improvement to health.[4]

The costs of inaction cannot be escaped. As governments, payors and communities demand more results for the money they are spending, forward-thinking leaders will seize the potential of social determinants of health to right the system so it can produce better outcomes for all. PwC's Health Research Institute (HRI) conducted a global survey in June 2019 of 8,000 people in eight territories, along with interviews of healthcare organisation leaders and an analysis of more than 20 case studies, to identify the five steps crucial to starting — and succeeding with — a social determinants approach to health strategy.

Partners spanning the health ecosystem — employers, pharmaceutical companies, hospitals, insurers and others — must build the collective will to bring together coalitions and to establish the framework to work collaboratively. Data analytics can spotlight the specific path to take towards true health for populations. Respecting and reflecting the community's wishes ensures that programmes are grounded in the reality of how people live and work. And as stakeholders develop programmes, they must continually use evidence to fine-tune and improve the way social determinants affect health. Pursuing this path is no longer optional; all players must act, or risk being swept under by the rising rates of illness.

68%

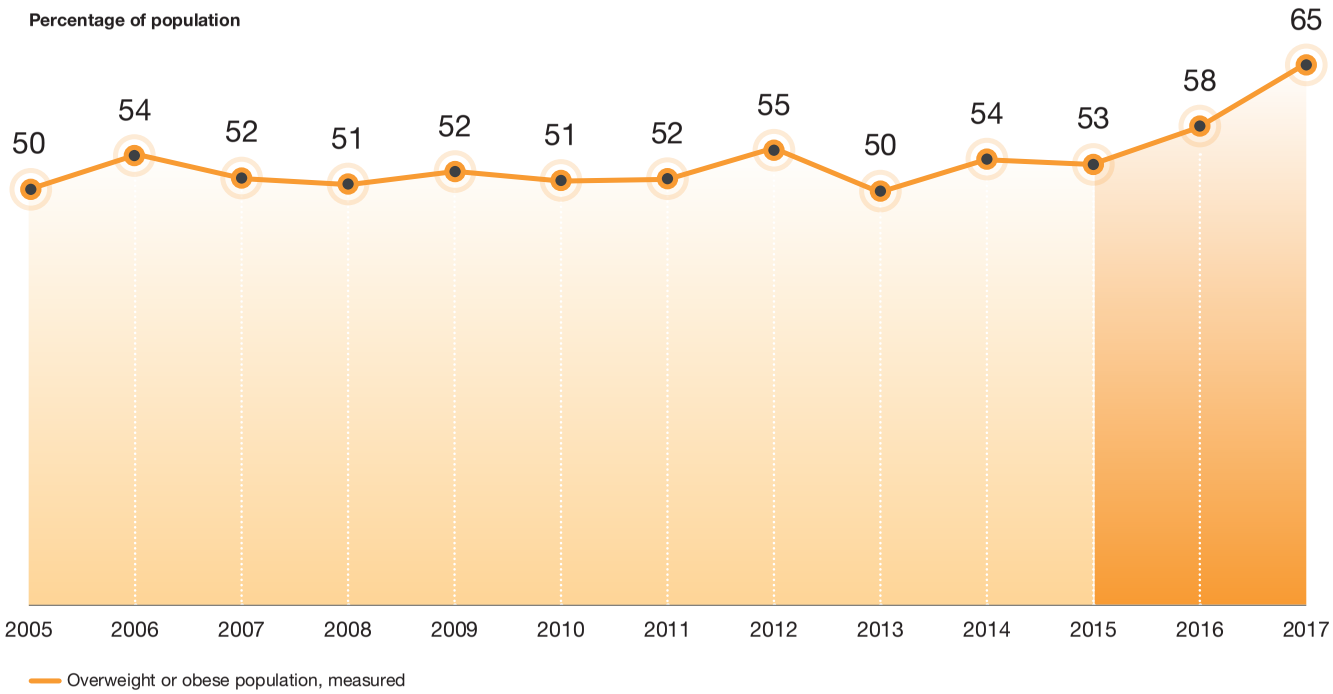
By 2025, the OECD projects many countries will see obesity and overweight rates exceeding 68% of the population.

Why aren't we healthier?

The case for a new social determinants of health approach

The world is growing wealthier. According to the World Bank, about 1.1bn fewer people are living in extreme poverty than in 1990.[5] But the greater wealth of nations doesn't always translate into the greater health of nations. Between 1990 and 2010, health spending by OECD countries nearly doubled.[6] And yet people are getting sicker across the world. Rates of chronic diseases such as cancer, diabetes and cardiovascular disease rose consistently from 2000 through 2016.[7] Nowhere is the looming threat to public health clearer than in the rising proportion of people considered overweight or obese. Since 2014, there has been an increase of more than 10 percentage points in the share of the population in OECD countries deemed overweight or obese, from 53.9% in 2014 to 65.2% in 2017 (see Exhibit 1). The epidemic of obesity makes people more prone to a slew of chronic health problems including diabetes, cardiovascular diseases and cancers.[9]

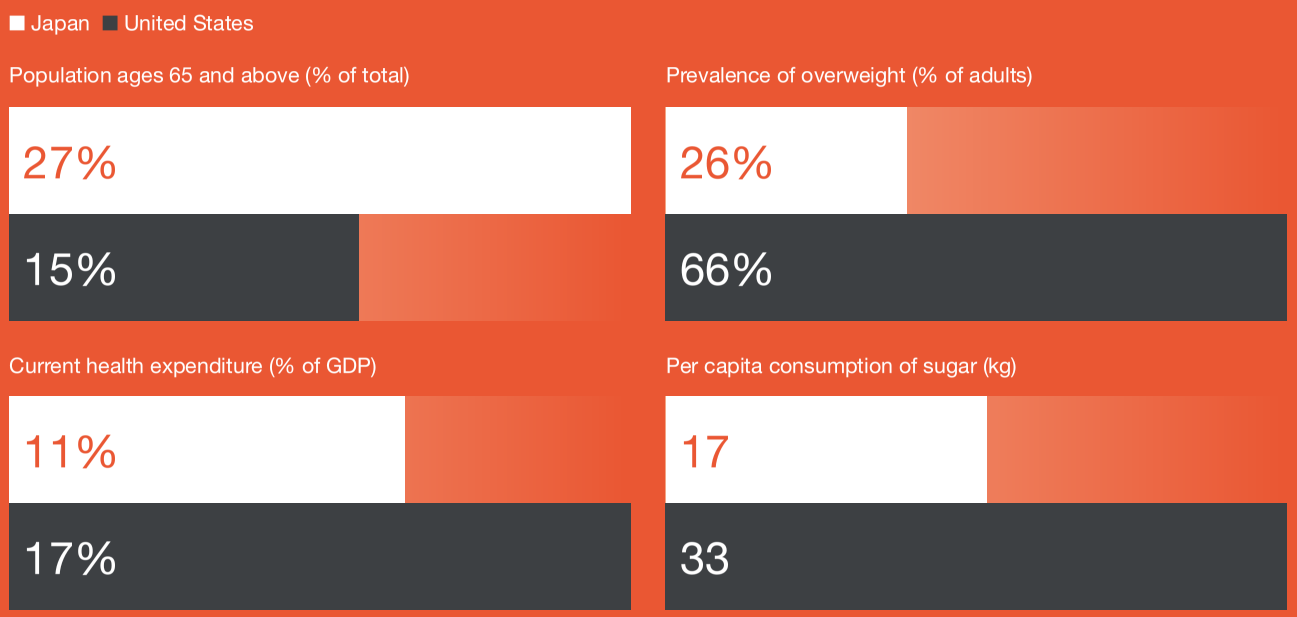
Exhibit 1: Evolution of overweight and obesity measurement averages for OECD countries, 2005–17



Note: Obese and overweight measurement is an average of OECD countries where data was available.
Source: PwC Health Research Institute analysis of OECD Health Statistics 2017

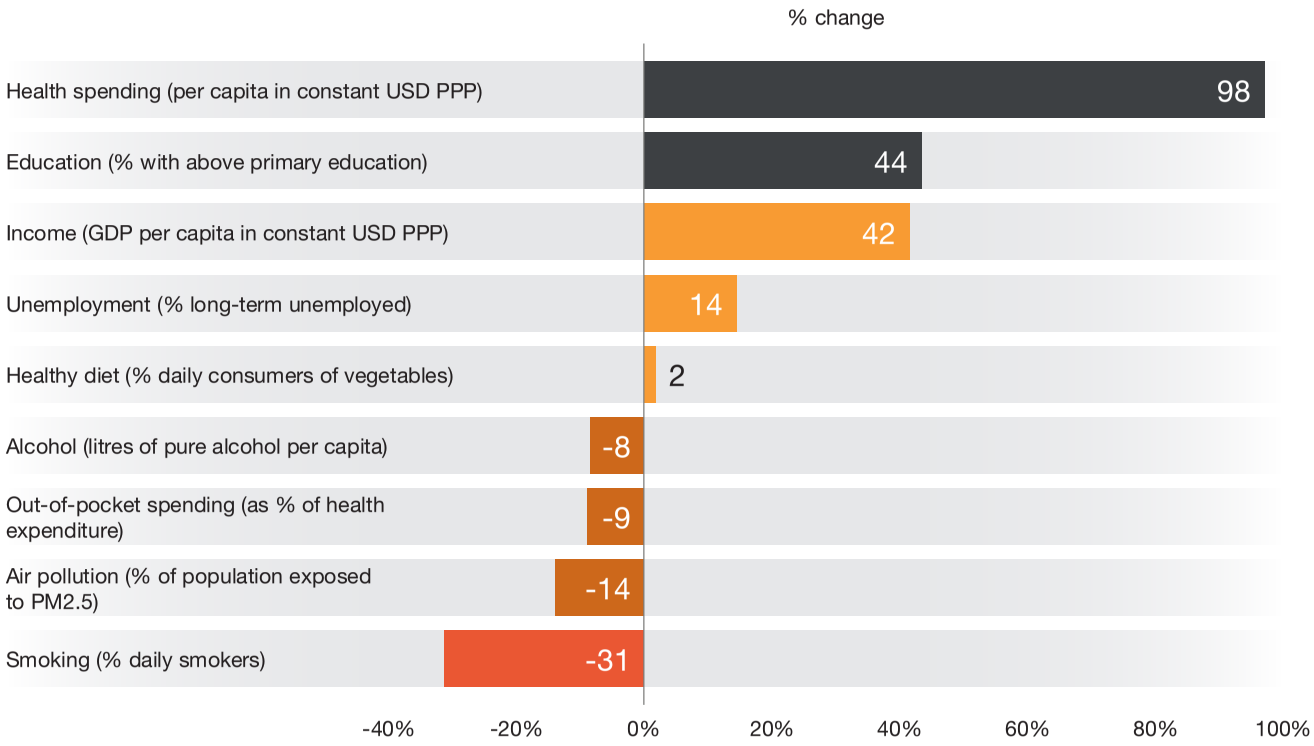
A comparison of outcomes and investments in Japan and the US, two of the world's most highly developed countries, shows how behaviours and environmental factors may have more of an impact on health than money spent.[10] In 2016, the US spent 17% of GDP on healthcare, while Japan spent just under 11% for its population, which includes a significantly higher proportion of people age 65 and above than the US.[11] But in the US, 66% of residents are overweight, as compared with only a quarter in Japan. And in the US, per capita sugar consumption is almost twice what it is in Japan (see Exhibit 2).[12]

Exhibit 2: Japan and US comparison across four health and economic dimensions



Source: PwC Health Research Institute analysis of Global Burden of Disease data, 2016; World Bank data, 2017; and Malmo University data on per capita sugar consumption, 2012

Exhibit 3: Evolution of the main determinants of life expectancy for OECD countries, 1990–2010



Note: PPP: Purchasing power parity; PM2.5: Particulate matter under 2.5 micrometres in diameter.

Source: OECD, 2017. Health at a glance, Chapter 2: https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2017_health_glance-2017-en

For all the investments already made in healthcare, countries have not been able to bring about the necessary societal shifts to encourage habits that could prevent chronic conditions from developing. Between 1990 and 2010 in the OECD, for example, smoking rates dropped 31%. But alcohol use fell only 8%, and the rate of daily vegetable consumption increased by just 2% (see Exhibit 3).[13] Consumers shoulder some blame, as 43% of respondents to PwC's 2019 HRI global social determinants of health consumer survey said they bore the greatest responsibility for addressing the behavioural, social and economic factors contributing to their health. But that doesn't mean they are doing anything about it, or that they even know what to do.

Social determinants such as employment status, income level, educational attainment, pollution levels and neighbourhood crime all affect how people experience the world and the choices they make (see Exhibit 4).[14] In PwC's 2019 HRI global consumer survey, one in five respondents indicated they could not afford a healthy lifestyle, and a similar share said they did not have the time to focus on healthy behaviours. In fact, clinical care, while vital, is responsible for only 20% of a person's health. The other 80% is attributable to health behaviours, the physical environment and socioeconomic conditions.[15]

Exhibit 4: Social determinants of health components

Source: Healthy People 2020, Social determinants of health overview

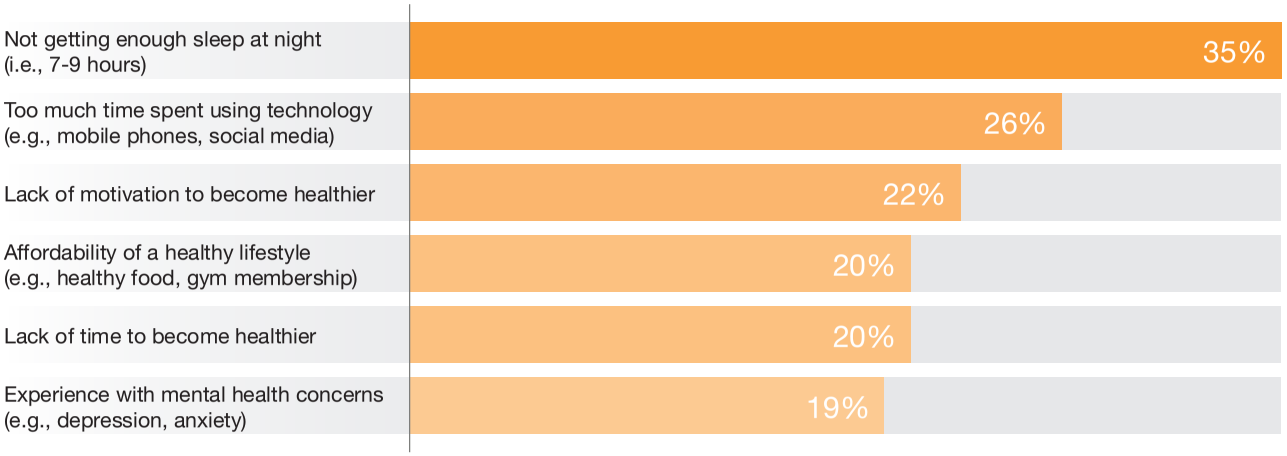
In a screen-filled, interconnected world, the state of our brains may be key to unlocking better health. Consumers say they are not getting enough sleep, are distracted by smartphones, lack motivation and struggle with mental health issues such as depression and anxiety — none of which sets the right frame of mind for healthy decision making. Thirty-five percent of PwC's 2019 HRI survey respondents cited a lack of sleep as a top impediment to adopting a healthy lifestyle, and more than a quarter said too much time with technology prevented healthy habits (see Exhibit 5). A host of social factors can feed the lack of sleep — working multiple jobs, caring for family members, lacking proper housing, suffering from stress.

Twenty-two percent of survey respondents who classified themselves as being in poor or very poor health said mental health concerns such as depression kept them from a healthier lifestyle. Organisations need to determine what programmes and campaigns will help consumers in this frenzied mindscape eliminate the obstacles to health and motivate people towards healthier behaviours.

In a time of robust medical discovery and treatments that seemed impossible a generation ago, the most effective strategy to improving healthcare may lie in a focus on root causes. Why do people get sick? Why do they engage in the behaviours that cause their health to suffer? And what environmental and social factors influence those behaviours? To be sure, any institution, or group of institutions, taking on a challenge as intractable as income inequality may seem an insurmountable task. But countries that have more inequality in income levels experience a higher rate of diabetes.[16] Existing business models, incentives and value chains may act as barriers to taking a different approach. Yet our research, work and conversations with industry leaders reveal that the data is available to build a case for urgent action, to identify where and how to conduct interventions and to inform the use of existing technology to amplify such efforts.

Exhibit 5: Not getting enough sleep is the leading barrier to adopting a healthy lifestyle

Which, if any, of the following challenges do you face in your daily life that impact your ability to adopt a healthy lifestyle (e.g., diet, exercise)?



Source: PwC Health Research Institute global consumer survey, June 2019

22%

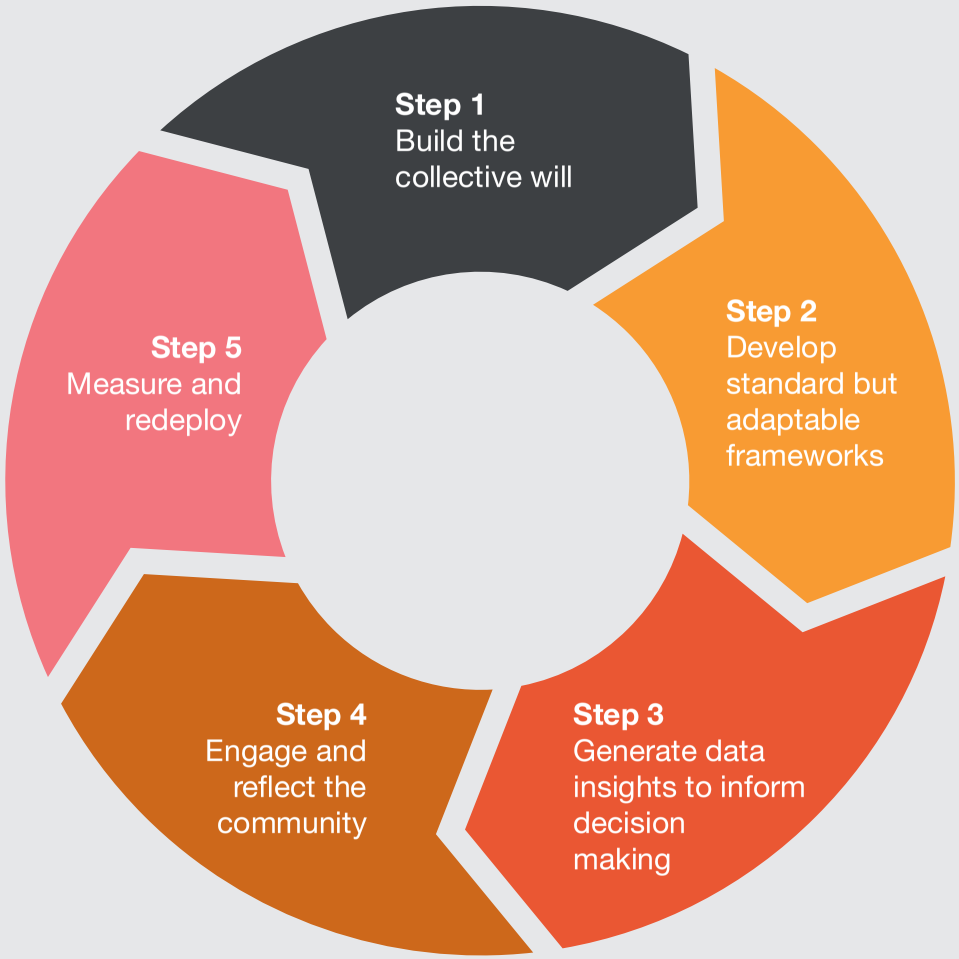
of survey respondents who classified themselves as being in poor or very poor health said mental health concerns such as depression kept them from a healthier lifestyle.

How to lead in social determinants of health

Five steps for bold action

A social determinants of health approach may fly in the face of how health systems were established and are operated. Many organisations lack the partnerships, experience or infrastructure needed. HRI analysed case studies from around the world to help organisations understand how to construct a winning social determinants of health plan. Following the five-step process (see Exhibit 6) can help stakeholders begin to make progress.

Exhibit 6: Five steps for social determinants of health action



Source: PwC

Step 1. Build the collective will

Ownership and responsibility are clear when true costs are understood.

One player alone cannot address the root causes of disease. But many players do not seem to be trying at all. More than one-third of respondents surveyed in PwC's 2019 HRI global consumer survey indicated they had not engaged in conversation with any stakeholders about the social, economic, behavioural and environmental factors affecting their health. Forty-three percent of consumers surveyed mentioned they had discussed those factors with physicians, but pharmacists, therapists, nurses and other health specialists are broaching the topic at a much lower level. This disparity highlights the huge opportunity to engage other health system workers in promoting conversation about social determinants of health.

It will take a coalition of partners who may need to stretch their roles, but leaders must find ways to show prospective partners how their goals meaningfully align. Constructing the right coalition also will require looking beyond the sector and traditional partners to consider the community groups, government agencies, universities, retailers, technology companies and new entrants that might contribute (see Exhibit 7).

Governments can act as conveners by mandating focus, adopting policies that encourage action, providing investment or creating incentives for players to lead. Articulating the overall costs to health systems and society can help motivate players. Faced with evidence

Exhibit 7: Addressing the social determinants of health requires collaboration within and across sectors

Ingredients for successful collaboration

- Similar motivations to solve the problem at hand
- Complementary capabilities, skill sets and resources
- Alignment on a central theory of change
- Shared vision of success and how it will be measured
- Solid foundation of trust-based relationships
- Clear roles and accountability

Source: PwC

that the estimated direct cost of medical care attributable to people being overweight and obese increased 61% from 2000 to 2008, Mexico in 2010 launched the National Agreement for Nutrition and Health campaign against obesity. This programme gathered five business groups and 15 federal agencies, including the ministries of health and education, to work together with a focus on the school-age population.[17]

In other cases, companies have stepped up as conveners. In the US, the digital health startup Healthify helps healthcare organisations find partners and coordinate to address social determinants of health. It recently announced a collaboration with Landmark Health to help connect its complex, chronic patients with medical, behavioural, social and palliative care.[18] Employers are recognising that a different approach is needed, and some are taking a more activist role.[19]

Although addressing social factors is not the primary responsibility of a health insurer, "there is a general social responsibility," said Dr. Isabella Erb-Herrmann, authorised representative of the Management Board of AOK Hessen, a large health insurance provider in Germany, in an interview with HRI. Healthcare organisations in Germany have started work on the National Action Plan Health Literacy for Germany to improve health literacy, which is a key social determinant of health.[20] But the effort requires a common goal "to make everyone understand this is nothing one single party can do on its own — it takes a cross-sectoral effort to do it," Erb-Herrmann said, adding that having facts and figures that cannot be disputed helps anchor partners in the discussion.

Though a social determinants of health focus can achieve tremendous savings for the overall system, the payoff may not be seen for years, and may stretch over two or even four election cycles. It is easy for a culture of defeatism to take over and dampen efforts. But coalitions can develop evidence-based public campaigns to win community buy-in that helps lessen some of the political risk involved in making the up-front investment. Media attention showing wide disparities in health status of different population segments also can increase political pressure to act. Additionally, coalitions can turn to alternative funding mechanisms, such as social impact bonds, which enable the risk to be shared by government and private stakeholders. Aligning public and private budgets from the health and social services sector can maximise every entity's spending and produce benefits for all.

Efforts to address social determinants of health often have not scaled beyond the pilot stage because of difficulties in quantifying the immediate and long-term value to risk-bearing stakeholders. However, by developing common frameworks and harnessing the power of data analytics, organisations can build the infrastructure that will produce evidence for the business case.

Case study:

What's in it for each partner?

Singapore Health Promotion Board

Goal: Reduce youth smoking rates

Impact: 30 percentage point reduction in smoking rates for targeted population

Key takeaways: Think creatively about who has the attention of the audience you need

When the Singapore Health Promotion Board (HPB) rolled out a plan in 2011 to offer education to at-risk youth who were smoking, it recognised that a top-down approach from government might not find a welcome audience among juveniles, and it would need to build the collective will beyond the internal effort. "While tobacco control policies could facilitate prevention, we were mindful that young persons picked up the habit usually due to peer pressure," Vasuki Utravathy, Senior Deputy Director for the HPB, told HRI. "Collaborating with partners who had access to a number of adolescents outside the traditional school settings was important to HPB."

The project was a natural fit for Singapore Boys and Girls homes, residential centres for youth, which were eager to reduce smoking violations.[21] HPB also involved two organisations that worked on improving education, Mendaki and the Singapore Indian Development Association (SINDA), to create a partnership addressing youth smoking. But Utravathy said the incentives were not as clearly spelled out for SINDA and MENDAKI, and therefore they were not as active in the initiative as the Boys and Girls homes, demonstrating the sometimes difficult nature of coalition-building. Because it was vital for volunteers to reflect the community, the partnership trained people from various racial and ethnic backgrounds. The groups attracted young participants to weekly meetings through programming such as a futsal clinic that could show how smoking affected one's stamina during a game.

In six months, the board found that the rate of smoking in the study cohort fell from 40% to 10%, a significant reduction.[22] "Meeting the adolescents' social needs — for example, the need to belong to a group of futsal players, the need to look good — [was] important in ensuring attendances in the health activities," Utravathy said.

Can social determinants strengthen pharma's strategy under new pricing models?

Half of global biopharmaceutical executives surveyed by HRI in February 2019 said traditional drug pricing practices were unsustainable, and 90% said the healthcare system would be challenged to afford the next wave of innovative medicines in the absence of fundamental changes to drug evaluation and payment models.[23] As drug pricing comes under scrutiny from politicians, policymakers and consumers, pharmaceutical and life sciences companies have started experimenting with value-based models, which tie the price of medications to clinical or economic outcomes. In March, GWQ ServicePlus, a German health insurance fund group, struck a health outcomes–based contract with Novartis for its CAR-T cell therapy, Kymriah. This agreement requires Novartis to repay some of the €320,000 (US$360,000) per-patient cost if survival outcomes are not met within a defined time frame.[24]

Drug companies entering into health outcomes–based contracts have more of a stake in making sure patients are able to take all their medications as prescribed, and in addressing obstacles such as cost and health literacy that may prevent them from doing so. The manufacturer also may have an interest in making sure that poor diet or lack of exercise does not contribute to poor health, preventing treatments from working. Pharma companies may learn from early work done by organisations such as Pfizer to experiment with social determinants. Pfizer's Oncology Together programme links patients with social workers who can help connect them to emotional support as well as help with transportation, work or financial issues.[25]

Step 2. Develop standard but adaptable frameworks

Coalition partners should adopt a common framework to clear obstacles and fast-track efforts to work together.

Once they have done the hard work of building coalitions, partners must overcome the everyday challenges of merging disparate workplaces with different missions, incentives and perspectives. Consumers expect that care should be better integrated to create a seamless experience; roughly one-third of respondents in a 2019 HRI global consumer survey indicated there was an opportunity to better connect healthcare and social services. The next vital step is therefore to build a guiding framework that will allow partners to work together effectively towards their common purpose. The framework should establish clear roles and set forth a common vocabulary, goals, definition of value and decision-making protocols so the team can move forwards on its road map for change.

Coalition leaders must be sure all partners are invested in, and agree on, the common purpose. They should set clear expectations and establish a common language, because the terminology used for social determinants of health intervention measurements can differ within and outside an organisation. The leaders should be clear about how members will achieve change, and the goals should demonstrate how the alignment of the partners' work benefits each player. Trust will play an important role. Agencies and organisations not only will have shared goals, but may share key data or contribute large sums of money. In some cases, efforts may have to overcome contentious histories or misconceptions about the other parties' work.

Even if all the partners come from one sector, such as government, they may still follow different protocols and procedures that could inhibit efforts to work together. In response to the methamphetamine crisis in Canada, for example, the overlapping entities working in mental health and addiction in Manitoba in 2018 reorganised the system in part to focus on issues such as decriminalising addiction and destigmatising mental health. The Shared Health Manitoba effort convened officials from justice, social services, education and health departments to better coordinate services for proactive prevention and screening measures and increased access to specialist care opportunities.[26]

Recognising each organisation's unique capabilities can lead to a stronger partnership. The Western Sydney Diabetes alliance, formed in 2012, unites more than 110 partners as varied as local health providers and a chain of food stores. "We are not medical professionals, we're not health professionals necessarily, but we can engage with all levels of government," said Sturt Eastwood, CEO of Diabetes NSW, one of the leaders of the coalition.[27] They can work on issues that "are politically sensitive in terms of the way areas are built out, what transport is available, what parks are available, what sorts of food locations and sorts of foods are available, and so we play a large role really in representing those politically sensitive roles that other parts of the initiative are unable to do."

Each effort needs a champion who will help unite partners. Regularly scheduled meetings that bring partners together to monitor progress are also crucial. Successful initiatives that have progressed beyond the discussion stage have been powered by key executives who kept the group moving forwards and established calendars of meetings and working groups that held partners accountable.

Case study:

The home as key to improving health

Housing and Health in Wakefield, England

Goal: Using housing to affect health outcomes

Impact: More patients kept from escalation to more costly forms of care

Key takeaways: Step into your partners' shoes to understand motivations and challenges

Wakefield District Housing (WDH), which owns more than 31,000 units in Yorkshire, England, has a crew of 'well-being coordinators' who work with frontline housing officers and service providers to solve tenant problems. In 2014, WDH expanded its efforts by working as part of a larger integrated coalition in Wakefield, Connecting Care, that is addressing social determinants of health.[28] The effort required understanding every member's perspective, developing common frameworks, and standardising data and other procedures to work effectively together.

Wakefield is known for poor overall health, including high rates of smoking and alcohol-related hospital admissions; 70% of the adult population in Wakefield carry excess weight.[29] And in the UK, there was growing recognition that housing could play a role in alleviating system health issues. The King's Fund found that heating homes to an acceptable level would save the National Health Service (NHS) around £848m (US$1.03bn) a year,[30] and that reducing falls in the home would save around £435m (US$531m) annually.

Connecting Care brings together WDH, the NHS Wakefield Clinical Commissioning Group governing local health services, the local council, mental health providers, hospitals and community organisations. The group started by agreeing on a common goal. Individual partners signed a vision statement that outlined six principles defining success for the undertaking. Members of the coalition took steps to understand partner organisations' work and motivation. An employee of one partner even spent time working within another partner organisation, which led to a new 'housing coordinators' project to help people who could not be discharged from acute care settings because of housing issues.[31]

Unified staff training and development helped the partners identify opportunities to maximise the visits being made by employees of partner organisations, and determine whether one worker going to interact with a client could take on another role to consolidate visits, said Darren Portman, WDH's Care and Health Manager, in an interview with HRI.

Sharing evidence with partners helped advance the coalition's goals. For example, WDH noticed that some tenants suffered from low-level mental health issues that did not rise to the level of crisis, and therefore did not qualify for services; however, these issues still affected their ability to pay rent or interact with neighbours. "They just fell through the gap. That's where we start to have conversations with our partners to say we need to plug that gap, and we're willing to do part of it, if you're willing to do part of it," said Sarah Roxby, WDH Associate Director of Health, Housing and Transformation, in an interview with HRI.

Estimates suggested that legal action against a tenant in breach of a lease would cost £6,000 (US$7,327) per case, and eventually some of those cases could worsen so those tenants would end up in higher-level services or in crisis, which is more expensive to the NHS.[32] Following discussions, WDH and NHS Wakefield Clinical Commissioning Group agreed to a 50-50 funding split for a 'mental health navigator' project that helped keep people in their homes and out of higher-level mental health services. The first-year evaluation showed the programme prevented 13% of tenancies from breaking down owing to mental health issues, according to Roxby.

Building a unified data system required developing protocols, ensuring data privacy and protection, and breaking down barriers to share information across organisations. The Personal Integrated Care (PIC) file, which went live in December 2017, provided a shared electronic care record for the multiple partner agencies.[33]

The district-wide concentration on housing and social determinants of health has translated into better outcomes for the system. In 2014–15, 38% of tenancies were terminated because of residents having to move into residential and nursing homes. In 2016, that proportion dropped to 14%, and in 2017, to 0%.[34] In 2017–18, 1,733 calls were received for tenant falls, but only 7% required an ambulance — saving the NHS more than £400,000 (US$488,436) per year and reducing pressure on ambulance and emergency services.[35] "They may not understand, at least at the start, why housing is at the table until we start to explain some of our work on a daily basis, and how we find challenges in helping people keep a roof over their head. And if we weren't helping people to keep a roof over their head, where would they end up?" said Roxby. "They would end up costing health partners more money."

Step 3. Generate data insights to inform decision making

Data analytics can guide your plan.

Selecting the programme investments most likely to spark health improvement can seem a mysterious endeavour. But leaders are finding that predictive analytics can illuminate areas to target that will mean less time and money wasted chasing ineffective interventions.

New Zealand has shifted to a 'social investment' approach, using data analysis to identify groups to target with earlier interventions that can improve overall well-being and reduce the need for social welfare programmes over their lifetime.[36] Australia is on a similar path. The Australian Priority Investment Approach to Welfare uses actuarial analysis based on government data to estimate overall future lifetime welfare costs and where the government can invest earlier in a person's life to improve quality of life and employment prospects, while reducing government costs for future healthcare.[37]

Multinational corporations, too, are using social determinants of health data strategies to improve health. Recognising the impact of poor health on worker productivity, global chemical company BASF in 2008 estimated the sick leave rate for employees in 2020 based on epidemiological factors (e.g., age, gender, risk factors for chronic diseases, smoking rates). Using predictive analytics to inform its strategy, the company targeted corporate health management programmes to prevent groups of employees from becoming sick or developing chronic conditions through preventive measures such as optional health checks. Since that analysis, "we found out that we have not had as much sick leave as we had calculated in the year 2008," said Dr. Stefan Webendoerfer, Vice President for Diagnostics and Health Promotion for BASF SE, in an interview with HRI. "We saw that if we catch them early, we can avoid some of the long-term leaves, too."

If coalitions don't have the data needed for such analysis, they can fill in gaps with nontraditional sources, such as consumer marketing data, data from wearable monitors, social interaction websites and survey data that looks at exercise, sleep habits or adherence to prescriptions. Partners will need to integrate platforms to make the information available and usable to all partners, while addressing cybersecurity and patient privacy concerns.

Organisations should simultaneously be improving data collection involving social determinants of health, using opportunities such as the adoption of new electronic medical record systems or upgrades to data systems to expand the categories of data collected. For example, recognising that it wanted a more effective gauge of patients' social isolation, CareMore Health, a US-based integrated care organisation, built a 'loneliness scale' that is part of the electronic medical record shared by doctors, social workers and dietitians.[38]

47%

of respondents to PwC's 2019 HRI global consumer survey indicated healthcare providers are not sharing predictions about what healthcare services these patients may need in the future considering their medical history.

Once data is assembled, key questions can be asked to provide road maps for responding to current and pending health challenges: How healthy is your community? What are the drivers of future poor health that might be addressed now? The answers increasingly lie in behaviours.

But how do you get people to actually change their behaviour to benefit their health? Predictive analytics can also be used to consider both individual behaviour and the behaviour of populations. Many consumers do feel some individual responsibility to make a change, but 47% of respondents to PwC's 2019 HRI global consumer survey indicated healthcare providers are not sharing predictions about what healthcare services these patients may need in the future considering their medical history. Even if people find the motivation, they often lack the information or tools to prevent chronic conditions. Organisations must use analytics to decipher who needs the information, and what interventions might best help them become healthier.

On an individual level, data on a patient's circulatory, respiratory, digestive, endocrine and renal systems can be used to create a digital mirror of the body's physiological systems and functions. Teams can mathematically represent how a person's future health will change over time. Behavioural science research can be used to create models that predict an individual's likely responses to different environmental, lifestyle or medical interventions. Predictive algorithms can forecast habits that will influence health, including diet, physical activity, sleep, medication adherence and medical care utilisation.

This approach can be extrapolated to an entire population for more powerful insights. With machine learning and simulation modelling, organisations can see how interventions play out on a pool of individuals in the context of their actual community and environment. For example, if a coalition that is focussed on improving health outcomes in a neighbourhood decides to build walking paths, how will that population react to that intervention? If the coalition opens a grocery store in an area where nutritious and fresh food choices have been limited, will that change people's eating habits in ways that could slow the rate of diabetes?

These strategies allow organisations to look at forecasts for how populations will respond in the first year, ten years down the line and over their lifetime, and to further quantify the impact of these investments, even prior to making financial commitments. Solutions can be micro to the individual, such as a ride-sharing connection programme, or macro to the population, such as a broad promotional campaign to push for more public transit stops. These insights will keep partners invested by quantifying the value in return on investment, treatment costs avoided and healthy years added.

Case study:

Data may reveal stronger impact

The Visiting Nurse Association of Texas (VNA) Meals on Wheels programme

Goal: Demonstrate overall impact of organisation on local healthcare costs and outcomes

Impact: VNA saves an estimated US$10.4m annually in health costs for its clients, and helps clients avoid traumatic crisis events and hospitalisation

Key takeaways: Use the data to tell your story

As one of the larger Meals on Wheels organisations in the US, VNA of Texas serves meals to 4,000 Dallas County residents Monday through Friday as part of its mission to help elderly people in North Texas maintain their independence.[39] National studies have indicated that a person receiving a delivered meal is healthier — not just because of the food, but because the delivery has a side benefit of providing social interaction. Anecdotally, the VNA staff knew clients were benefitting in ways beyond just the meal. But VNA lacked specific data insights into their own programming.

Using predictive analytics, the team simulated a virtual population matching clients served, pulling in data on gender, race and ethnicity, income and age. Another tool that creates a physiological virtual twin of the clientele was used to show how chronic disease progresses in the body and how the meals served by the programme contributed to the quality of life and slowed progression of disease. National research about the effect of Meals on Wheels on loneliness, rate of falls, malnutrition and weight was used to build the model. Within the simulated population, the team then ran through what happened to those who had Meals on Wheels services versus those who did not.

Across a number of chronic conditions such as diabetes, dementia, hypertension and congestive heart failure, the team was able to demonstrate a reduction in these conditions and in costs.[40] Moreover, those reductions had a domino effect, as clients avoiding hypertension are likely to avoid other health conditions. Overall, Meals on Wheels had a significant impact on reducing acute and expensive health events such as heart attacks and hospital readmissions. Reducing home health and skilled nursing facility utilisation also added to the local savings.[41]

For the clients who received the Meals on Wheels deliveries, the simulation suggested US$2,218 was saved in health costs annually per client, for a total estimated savings of US$10.4m annually, with an ROI of 48% on the meal investment.[42] But most important for the experience of the clients, the team's predictive analysis estimated clients would suffer 24 fewer heart attacks, 12 fewer congestive heart failure hospitalisations and 12 fewer strokes.[43]

Chris Culak, VNA's Vice President of Development, said the analysis vividly demonstrated to the organisation the real impact of its meals and created new opportunities for the VNA to tell its story and link it to value-based care. The VNA also saw benefits in answering the question of how it was making the community healthier and affecting healthcare costs. That data has proven helpful as it aims to increase donations and expand partnerships with healthcare organisations. Being able to show "the benefit of the meal to a person, how it reduces isolation and all these levels of chronic conditions they have, is eye-opening," Culak said.

Step 4. Engage and reflect the community

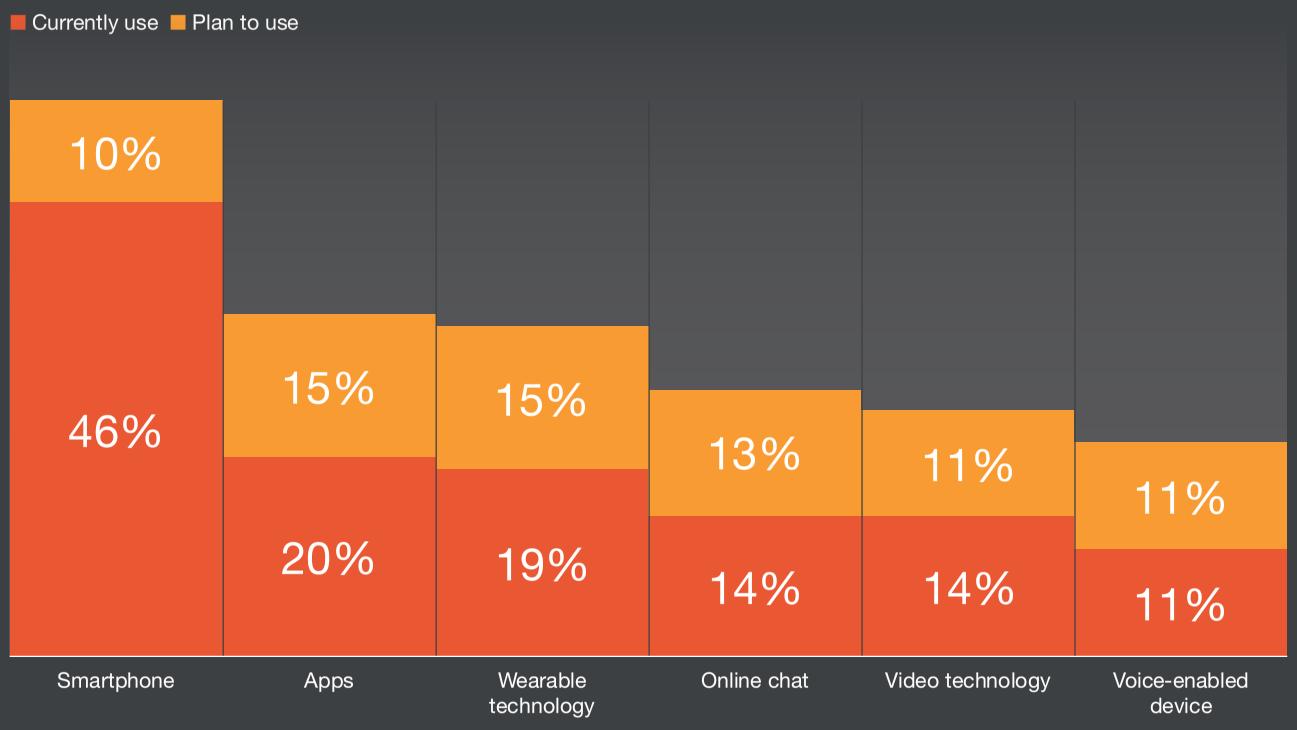
Social determinants of health programmes must be grounded in the reality of how people live and work.

Building the collective will, designing an effective framework and deploying data are all necessary steps — but they are not sufficient. The success of any social determinant of health strategy ultimately depends on the targeted community's response. Those carrying out the intervention must have the credibility and knowledge to work in the area so they can build trust in the population. Frontline health workers from rural India to suburban Canada know the true impediments to better health in the people they serve. Raveen Kalra, a community care coordinator in Ontario, Canada, likens each patient to an onion with many layers (the needs contributing to poor health), each of which requires a different service to address. She connects elderly patients with housekeeping and bathing assistance, exercise programmes, dementia care and more. "There are a lot of situations where I think, 'Wow, had I been involved earlier from a preventative point of view, and had people been able to access and been aware of community resources and healthcare services, their situation and outcomes in terms of their current predicament would be very different," Kalra said in an interview with HRI.

Partners should consider the conversations that these frontline workers will have and how they will be viewed in the community, whether it is with suspicion or respect. Systems and policymakers need to be mindful not only of cultural differences, but also of geographic disparities in resources seen between states and regions; life expectancy can be dramatically different for people living within the same country.

Exhibit 8: Consumers rely on smartphones when it comes to technology use for health

Which, if any, of the following technologies do you currently use to support your health?
Which, if any, of the following technologies do you plan to start using in the next 12 months to support your health?



Source: PwC Health Research Institute global consumer survey, June 2019

Technology holds significant potential to advance social determinants of health strategies and help healthcare organisations and governments reach rural areas or underserved neighbourhoods. Tricog, a startup in India, is increasing access to care through artificial intelligence and its Tricog ECG device, which connects healthcare workers to experts who can tell within minutes if a person is having a heart attack.[44]

Wearables can provide real-time data to healthcare teams that are remotely monitoring progress in patients. For example, Abilify MyCite is an ingestible sensor that transmits information to a wearable patch about whether the patient has taken their medication.[45] But technology can work only if it is embraced and trusted by the community members expected to use it (see Accredited Social Health Activist case study). Although 56% of HRI consumer survey respondents indicated they used or planned to use their smartphone to support their health, not everyone who needs to be engaged may have access to the chosen technology, or be tech savvy enough to use it (see Exhibit 8).

Coalitions also should think beyond traditional delivery structures and channels to consider retailers, technology providers, home health workers and educators. Expanding access points to places people frequent — retail health centres, grocery stores or community centres, for example — can also improve the success of these efforts.

In one US community in Texas's Rio Grande Valley known as "Diabetesville," a staggering two-thirds of the population were living with diabetes, diagnosed or undiagnosed. The towns suffered from a lack of primary care providers.[46] A coalition including the University of Texas formed to tackle the problem and placed screening and prevention programmes in locations where residents were, allowing them to check their blood glucose and blood pressure at retailers.[47] Community health workers visited people in their homes. The programme increased the health literacy of people who did not know they were at risk for chronic diseases, lowered the glycated haemoglobin (HbA1c) of patients with diabetes and reduced hospital/ER readmissions for the high utilisers.[48]

Case study:

Technology can amplify the work of community health workers

Accredited Social Health Activist (ASHA) workers in India

Goal: Reducing maternal and infant mortality rates

Impact: Significant reduction in the number of deaths of mothers and babies

Key takeaways: Technology can accelerate efforts to address social and economic factors influencing health

More than a decade into the implementation of India's female community health worker programme, Accredited Social Health Activist workers (ASHAs) continue to play a vital role at the primary care level in rural and urban areas. They remain rooted in the community and able to uniquely understand patients' needs. "These ASHAs belong to the village in which they reside; they are the chosen ones," said Dr. Rimy Khurana, Deputy General Manager with the National Health Authority in India.

Startups and policymakers are eyeing the potential of technology and telemedicine to help expand the impact of ASHAs. Government-issued tablets and mobile applications have helped them educate pregnant women and families on nutrition, hygiene and vaccination.[49] One technology effort, ReMiND (Reducing Maternal and Neonatal Deaths), uses a mobile health application to aid ASHA workers in educating the community and delivering care. A study projected that rolling out the application in Uttar Pradesh state would reduce maternal deaths by 312 and neonatal deaths by 149,468 over the 2011–20 period.[50]

The information an ASHA has on the community is unmatched, because she visits every household to gauge the health of the women and children and holds the entire medical record of her village, which she enters into the tablet. "In India, we have a lot of biases, which every culture has," Khurana said. "The ASHA is chosen from their community. She understands what the myths are and the beliefs are and she also knows how to overcome these beliefs. She is the one who can cross these cultural barriers. She's the one who knows their language."

In one region, an ASHA was able to determine the root cause of a large number of cases of goitre: the local staples included a non-iodised salt. In the region's own language with its own cultural touch points, and knowing the available local resources, the ASHA was able to provide the community with alternative options to solve the health issue.

Overall, ASHAs' impact has been felt in a nearly 50% reduction nationwide in the infant mortality rate, from 58 per 1,000 live births in 2005 to 30 per 1,000 live births in 2012, and a decrease in the maternal mortality rate from 301 per 100,000 in 2001 to 100 per 100,000 in 2012.[51]

Step 5. Measure and redeploy

Partners must use evidence to fine-tune and grow social determinants of health efforts and to keep partners accountable.

It is not easy to crack the code for what will help someone living in a food desert eat nutritious foods, or what will prompt a teen to put down the gaming controller and go for a walk, or what will motivate the middle-aged worker to turn off the computer and go to bed. Successful social determinants of health intervention campaigns are exercises in continual improvement, in which experience, data and insights are gathered and fed back into the system. Feedback enables the development of improved strategies and shows where partners need to build better social determinants of health capabilities or strengthen processes.

HRI completed a meta-analysis of more than 20 global case studies of a variety of organisation types to determine the metrics that were most prevalent in reporting progress for social determinants of health interventions. This analysis revealed two groupings of metrics used based on audience: financial and biological measurements (see Exhibit 9).

Projects need a combination of financial and biological measurements depending on the intervention type, cost and scale. A PwC case study for a US-based integrated care organisation considered financial and biological factors, looking at both the ROI and the social impact of two different interventions: (1) a grocery store in a food desert and (2) increased income and insurance. For both interventions, the organisation measured the healthy life years gained and medical cost savings and determined that employment and associated revitalisation would have a larger social impact than a grocery store.

In many cases, the community benefit of an organisation's participation in social determinants programming may be hidden, and can be brought to light through an ROI dashboard that also examines how the community benefit can be multiplied. As organisations use metrics to reveal gaps in business capabilities, they also need to build in accountability, such as incorporating expectations for internal leadership, making sure to address needs of coalition members and building social determinants considerations into contracts.

Exhibit 9: Summary of example financial and biological metrics

Financial	Biological
• **Medical cost savings** — individual cost savings associated with medical expenses for various medical events • **Cost benefit analysis** — the identification and analysis of the benefits and costs of specific health interventions or actions to determine the overall value of the interventions. This includes both direct and indirect benefits associated with an intervention. • **Return on investment** — measurement of the amount of return on a health-related intervention relative to the cost of the intervention • **Social return on investment** — evaluation of certain interventions showing the social impact (e.g., social, economic and environmental factors) • **Cost per health condition** — the direct and indirect costs associated with a health condition	• **Individual level markers (e.g., HbA1c, cholesterol, body mass index)** — various human body–specific metrics related to the human body's performance and efficiency • **Population health metrics (e.g., disability-adjusted life year, healthy life years, life expectancy, mortality)** — various human body metrics that are aggregated and assessed at a higher level

Source: PwC Health Research Institute analysis of global case studies

Case study:

Using data to inform design

Western Sydney Diabetes

Goal: Reducing the high prevalence of diabetes and prediabetes in Western Sydney

Impact: Increased screening, new protocols established for care

Key takeaways: Measure and reflect honestly on progress to improve future efforts

In Western Sydney (WS), where a person is 1.5 times as likely to develop type 2 diabetes as in the eastern suburbs and where more than half of the population is overweight, a few active clinical specialists started pushing for action in 2012.[52] Testing at Blacktown and Mount Druitt hospitals showed 17% of the population had diabetes and 30% had prediabetes.[53]

Led by the WS local health district, WS primary health care network, Diabetes New South Wales and other organisations, the alliance has grown its coalition significantly, to 113 members in 2018.[54] Its experiences show the importance of measuring and refining the plan (see Exhibit 10).

It was clear that social determinants were driving the discrepancies in health. Only 7.1% of people in Western Sydney eat recommended amounts of vegetables, and the population has lower incomes, relies more on cars, gets less physical activity and has fewer healthy food options than people in Australia generally.[55] The alliance's framework of action includes primary prevention efforts — improving the healthy food supply, increasing physical activity and improving the healthy built environment — and secondary prevention and management efforts, such as early detection of diabetes, building the capacity of general practitioners to manage diabetes and better self-management of diabetes. It also includes data monitoring to attract investment and inform public advocacy campaigns.[56]

The alliance set measurable goals, such as reducing the average weight of adults in Western Sydney by two kilograms (4.4 pounds), reducing HbA1C levels to less than 7% and reducing the prevalence to below the New South Wales state average in five years.[57] The coalition is working on a diabetes dashboard to evaluate which interventions are working and track trends in burden and cost.[58]

The initial data has helped the coalition create investment and strategic outlines that make a detailed case for the potential savings to the health system. The participation of determined and attuned partners has been a key factor in the integration work. "The Australian health sector doesn't necessarily work together particularly well. The various parts are funded differently and what that means is often there is a misalignment with client care and patient care," said Brendan Peek of the Western Sydney Primary Health Network.[59] "Our role is to try to bring that together and integrate those varying parts."[60]

A year-end review and a plan for the year ahead keeps the coalition reflecting on where it is making the most progress and where it needs to go, with honest assessments of where participation or funding has been disappointing and places ripe for future opportunity. For example, the alliance is now focussing on place-based approaches to develop the evidence that better shows the impact of a social determinants of health strategy in a smaller location.

Exhibit 10: Western Sydney diabetes initiative outcomes summary by report year

	2016	2017	2018
Outcome comparison	• 50 partners • 11,051 patients tested for HbA1c • Joint case conferences with 900 patients and 145 GPs	• 70+ partners • 35,000 patients tested for HbA1c, with a nurse appointed to follow up • Joint case conferences with additional 500 patients and 42 new GPs	• 113 partners • 70,000 patients tested for HbA1c • 60 new GPs involved in joint case conferences
Other outcomes	• Revealed true threat of diabetes to health system • Established better screening for complications • Identified benefit-cost ratio of keeping people with diabetes healthier to be 3-to-1 over seven years	• Business case made for investment opportunities • Advocacy campaign to encourage urban planning for livable communities • Blacktown focus launched with low-cost interventions to demonstrate effectiveness of place-based approach on smaller location	• Partnership launched with Australian Digital Health Agency for dashboard system, to increase data • Development of self-management app • Expanded place-based approach to two other localities

Source: PwC Health Research Institute analysis of Western Sydney Diabetes annual reports

60%

new GPs involved in joint case conferences

A call to action

Recommendations for an effective social determinants of health approach

It can seem daunting to imagine upending the healthcare systems of the world in order to tackle social determinants of health. But there are steps that healthcare stakeholders can start taking today. Organisations will have to stretch beyond their traditional comfort zones. There is a great deal of opportunity to help people improve their health through social determinants strategies. We have identified several best practices from around the globe that can accelerate progress.

Pursuing the following recommendations can help organisations start acting now to develop a more comprehensive approach.

- Find a convener to help bridge the gaps between social determinants of health partners. Whether it is a government agency, community organisation or health system, the convener can help structure the risk-bearing and outcome distribution across partnerships, while keeping all partners focussed on the short- and long-term outcomes of the project.
  - Identify a trusted organisation from the community, the private sector or a government agency to be the convener.
  - Identify organisations that may be at risk for health outcomes to help fund social determinant efforts. For example, in health systems that are largely privately funded, pharmaceutical companies and health providers may be more likely to invest.
  - Build in incentives for all partners — for those across a range of financial investment levels and for those who will experience different levels of benefit from the initiative.
- Be clear, and remove confusion early on. A framework that guides multiple organisations needs to be grounded in a common purpose, with a common vocabulary, clear roles and responsibilities, and an agreed-upon goal. Conduct regular in-person or virtual meetings to keep teams accountable and gather perspectives about each partner's work.
  - Develop the framework with all participants and receive input from all levels of the organisation.
  - Take people away from their associated work environment to develop the framework. Consider an off-site meeting to kick-start a campaign.
  - Revisit the framework periodically. Evaluate what is and what is not working.
  - Prioritise interventions, instead of trying to do everything at once.
- Technology is an accelerator that can be paired with process enablers. Platform integrations or analytic technologies such as machine learning and simulation modelling definitely can help organisations collect and interpret the data they have to drive insights about interventions. However, technology is not the sole means of driving change at an individual and population level. Other partners, community health workers and process enablers can propel efforts forwards as well and can prove vital to the overall delivery of the intervention.
  - Leverage consumer data and consumer segmentation to better identify the target population.
  - If the analytic technology or staff is not available within the organisation, consider partnering externally to build credibility quickly.
- Find your 'voice of the community' and empower consumers to make change. Embrace the value of nontraditional stakeholders and community change agents for each social determinants of health intervention. Consider cross-industry partners, patient advocates or community board representatives. Social media can also be employed to help groups understand the needs of the affected community or to provide these communities with the information and tools they need to, for example, stave off high blood pressure or diabetes.
  - Tailor the intervention with the community in mind. For instance, if the intended community group prefers mobile phones, use mobile interfaces.
  - Deploy social listening campaigns to better understand the needs and desires of communities.
- Take action with the budgets you have. Maximise current spending by making supply chain or hiring decisions that consider social determinants of health strategies, such as investing in local employment to help improve health outcomes as part of a social determinants of health campaign.
  - Develop a list of cost reduction opportunities and assess them for their fit with the social determinants of health strategy.
  - Train staff in skills that are cross-functional and can be provided to multiple organisation types (e.g., analytics).

A sense of urgency

A consideration of the way participants in the healthcare sector are working on the social determinants of health reveals a truth that may be uncomfortable to face. The pace of innovations that can change the course of treatments is staggering. Futuristic therapies, procedures, treatments and drugs will be commonplace and more accessible. But treatment alone won't ensure that the level of human health improves; it may not even guard against its decline. The reality is that our systems are not built or designed to truly achieve health for societies. If healthcare organisations and governments do not take greater account of the social determinants of health, nations will not fully realise the tremendous potential of those medical advancements. Bold action is required to rethink how all players in the healthcare ecosystem can work together not just to treat diseases, but to address the root causes of disease.

Endnotes

1 The Business Research Company, "Healthcare global market opportunities and strategies to 2022," accessed July 19, 2019, https://www.researchandmarkets.com/reports/4787550/healthcare-global-market-opportunities-and?utm_source=BW&utm_medium=PressRelease&utm_code=qfcn4b&utm_campaign=1269595+-+The+%2411.9+Trillion+Global+Healthcare+Market%3a+Key+Opportunities+%26+Strategies+(2014-2022)&utm_exec=joca220prd.

2 OECD, "Health at a glance 2017," https://www.oecd-ilibrary.org/docserver/health_glance-2017-en.pdf?expires=1553204473&id=id&accname=guest&checksum=DE1EDBDCAF0BA121124D6DF1E7A24086; International Diabetes Federation, "IDF Diabetes Atlas, Eighth Edition 2017," page 40, accessed July 25, 2019, https://diabetesatlas.org/IDF_Diabetes_Atlas_8e_interactive_EN/.

3 PwC Health Research Institute Analysis of OECD Health Statistics 2017, "Health at a glance 2017."

4 PwC, "New health: A vision for sustainability," July 2017, https://www.pwc.com/gx/en/healthcare/pdf/pwc-new-health-a-vision-for-sustainability.pdf.

5 The World Bank, "Poverty," accessed July 17, 2019, https://www.worldbank.org/en/topic/poverty/overview.

6 Note: Health spending grew by 98% from 1990 to 2010 (from US$ purchasing power parity (PPP) 1,624 in 1990 to US$ PPP 3,212 in 2010 in constant terms). OECD, "Health at a Glance 2017."

7 PwC Health Research Institute analysis of Global Burden of Disease (GBD) Study 2017. Note: Data representative of OECD countries (35 total). More detail regarding data sources here: http://ghdx.healthdata.org/gbd-2017; Centers for Disease Control and Prevention, "Adult obesity causes and consequences," accessed July 4, 2019, https://www.cdc.gov/obesity/adult/causes.html.

8 OECD, "Health at a Glance 2017," "Overweight and obesity among adults," accessed August 20, 2019, https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2017/overweight-and-obesity-among-adults_health_glance-2017-21-en.

9 OECD, "Health at a Glance 2017."

10 Mike Townsend, "3 lessons studying Japanese healthcare. America pay attention," accessed July 25, 2019, https://tincture.io/3-lessons-studying-japanese-healthcare-america-pay-attention-14e81a4f4002.

11 World Bank Data, 2017, https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS?locations=JP-US; PwC Health Research Institute analysis of Institute for Health Metrics and Evaluation, "Global Burden Disease Data," http://www.healthdata.org/gbd/data.

12 Malmo University, "Oral Health Country/Area Profile Project," 2012, https://www.mah.se/CAPP/Globalsugar/Sugar-Global-Data/.

13 OECD, "Health at a Glance 2017."

14 Healthy People 2020: Social determinants of health, accessed August 20, 2019, https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health.

15 PwC, "The case for intervening upstream," accessed February 2019, https://www.pwc.com/us/en/health-industries/health-services/assets/the-case-for-intervening-upstream.pdf; Robert Wood Johnson Foundation and University of Wisconsin Population Health Institute, "County health rankings model," accessed August 13, 2019, https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model.

16 PwC Health Research Institute analysis of Global Burden Disease Data and World Bank Data 2017. Our analysis shows that the Gini index is significantly and positively related to diabetes prevalence rate among the eight countries (Germany, Japan, United Kingdom, India, Australia, China, United States and Mexico).

17 World Health Organization, "Social determinants of health discussion paper 6," https://www.who.int/social_determinants/publications/SDH6.pdf.

18 Healthify, "About Us," https://www.healthify.us/healthify-insights/healthify-landmark-health-partnership-to-address-sdoh.

19 PwC, "The Future of Workplace Health," 2018, https://www.pwc.com/sg/en/publications/assets/healthcare-future-workplace-2018.pdf; PwC, "Medical cost trend: Behind the numbers 2020," 2019, https://www.pwc.com/us/en/industries/health-industries/library/behind-the-numbers.html.

20 Hertie School of Governance and Bielefeld University, "National Action Plan Health Literacy," April 2018, https://hertieschool-f4e6.kxcdn.com/fileadmin/2_Research/2_Research_directory/Research_projects/National_Action_Plan_Health_Literacy/National_Action_Plan_Health_Literacy.pdf.

21 Singapore Government Ministry of Social and Family Development, "Children and Young Persons Homes," https://www.msf.gov.sg/policies/Strong-and-Stable-Families/Nurturing-and-Protecting-the-Young/Child-Protection-Welfare/Pages/Children-and-Young-Persons-Homes.aspx.

22 PwC Health Research Institute interview with Vasuki Utravathy from Health Promotion Board, May 2019.

23 PwC Health Research Institute Global Biopharmaceutical Executive Survey, February 2019.

24 MapBioPharma, "Kymriah secures novel outcomes-based deal in Germany," accessed August 15, 2019, https://mapbiopharma.com/2019/03/kymriah-secures-novel-outcomes-based-deal-in-germany/.

25 Pfizer, "Pfizer launches novel programs to put important support services at the fingertips of cancer patients," October 5, 2017, https://www.pfizer.com/news/press-release/press-release-detail/pfizer_launches_novel_programs_to_put_important_support_services_at_the_fingertips_of_cancer_patients.

26 Shared Health Manitoba, accessed July 31, 2019, https://sharedhealthmb.ca/services/mental-health.

27 Western Sydney Diabetes, "Taking the heat out of our diabetes 'hotspot' in Western Sydney," YouTube video, posted by WebsEdgeHealth, 2019, https://www.youtube.com/watch?v=IGsTvrNh_Nc.

28 NHS Wakefield Clinical Commissioning Group, accessed July 19, 2019, https://www.wakefieldccg.nhs.uk/home/patient-in-wakefield/connecting-care/about-connecting-care/our-journey-so-far/.

29 Wakefield JSNA, "10 facts for Wakefield District," http://www.wakefieldjsna.co.uk/introduction-2/10-facts-for-wakefield-district/.

30 The King's Fund, "Housing and health," https://www.kingsfund.org.uk/sites/default/files/2018-03/Housing_and_health_final.pdf.

31 Connecting Care Wakefield District, "Housing, health and social care partnership update 2017-18," https://www.wakefieldccg.nhs.uk/fileadmin/site_setup/contentUploads/Connecting_Care/Housing_Health_and_Social_Care_Partnership_group_update.pdf.

32 PwC Health Research Institute interview with Darren Portman and Sarah Roxby from Wakefield District Housing, June 2019.

33 Connecting Care Wakefield District, "Transforming Local Care," https://www.wakefieldccg.nhs.uk/fileadmin/site_setup/contentUploads/Connecting_Care/Transforming_Local_Care_FINAL_18.pdf.

34 NHS England, "Serving up healthy housing," October 23, 2018, https://www.england.nhs.uk/blog/serving-up-healthy-housing/.

35 Wakefield District Housing, "Corporate responsibility statement 2017-18," https://www.wdh.co.uk/AboutUs/OurCommitmentTo/CorporateResponsibility/.

36 New Zealand Government, Social Investment Agency, accessed August 14, 2019, https://sia.govt.nz/.

37 Australian Government Department of Social Services, "Australian priority investment approach to welfare," accessed August 11, 2019, https://www.dss.gov.au/review-of-australias-welfare-system/australian-priority-investment-approach-to-welfare.

38 Kevin Truong, "How CareMore is tackling loneliness as a clinical issue," MedCity News, October 26, 2018, https://medcitynews.com/2018/10/how-caremore-is-tackling-loneliness-as-a-clinical-issue/.

39 VNA Texas, "What we do," accessed August 13, 2019, https://www.vnatexas.org/who-we-are/what-we-do.

40 VNA Texas, "Meals on Wheels Analysis," October 12, 2017, https://www.vnatexas.org/impact/Meals-on-Wheels-Analysis-2017.pdf.

41 VNA Texas, "Meals on Wheels Analysis."

42 VNA Texas, "Meals on Wheels Analysis."

43 VNA Texas, "Meals on Wheels Analysis."

44 Tricog, "About us," accessed July 4, 2019, https://www.tricog.com/about_us.html.

45 US Food and Drug Administration, "FDA approves pill sensor," Nov. 13, 2017, https://www.fda.gov/news-events/press-announcements/fda-approves-pill-sensor-digitally-tracks-if-patients-have-ingested-their-medication.

46 PwC, "Taking on Diabetesville," accessed July 19, 2019, https://www.pwc.com/us/en/industries/health-industries/library/doublejump/diabetesville.html.

47 PwC, "Taking on Diabetesville by reimagining healthcare," https://www.pwc.com/gx/en/about/stories-from-across-the-world/diabetesville.html.

48 PwC, "Touching lives, improving health," accessed July 19, 2019, https://www.pwc.com/us/en/about-us/corporate-responsibility/assets/pwc-hi-value-report.pdf.

49 PwC Health Research Institute interview with Rimy Khurana, June 2019.

50 "Cost effectiveness of mHealth intervention by community health workers for reducing maternal and newborn mortality in rural Uttar Pradesh, India," accessed July 19, 2019; https://link.springer.com/article/10.1186/s12962-018-0110-2.

51 "Strengthening Primary Health Care Through Asha Workers: A Novel Approach in India," accessed July 19, 2019; https://www.omicsonline.org/open-access/strengthening-primary-health-care-through-asha-workers-a-novel-approach-in-india-2167-1079.1000149.php?aid=25013.

52 Western Sydney Diabetes, "About Us," accessed August 11, 2019, https://www.westernsydneydiabetes.com.au/about-us; Western Sydney Diabetes, "Western Sydney hotspot," https://www.westernsydneydiabetes.com.au/western-sydney/western-sydney-hotspot.

53 Western Sydney Diabetes, "Western Sydney Diabetes Year-in-review 2018," https://www.westernsydneydiabetes.com.au/themes/default/basemedia/content/files/WSD_YIR_2018.pdf.

54 Western Sydney Diabetes, "Western Sydney Diabetes Year-in-review 2018."

55 Western Sydney Diabetes, "Western Sydney Diabetes Year-in-review 2016," https://www.westernsydneydiabetes.com.au/themes/default/basemedia/content/files/WSD_YearInReview_2016_web.pdf.

56 Western Sydney Diabetes, "Taking the heat out of our diabetes hotspot," https://www.westernsydneydiabetes.com.au/themes/default/basemedia/content/files/WSD_TakingHeat_DiabetesHotspot.pdf.

57 Western Sydney Diabetes, "Taking the heat out of our diabetes hotspot."

58 Western Sydney Diabetes, "Western Sydney Diabetes Plan 2019," https://www.westernsydneydiabetes.com.au/themes/default/basemedia/content/files/WSD_Plan_2019.pdf.

59 Western Sydney Diabetes, "Taking the heat out of our diabetes 'hotspot' in Western Sydney," YouTube video, posted by WebsEdgeHealth, 2019, https://www.youtube.com/watch?v=IGsTvrNh_Nc.

60 Western Sydney Diabetes, "Taking the heat out of our diabetes 'hotspot' in Western Sydney," YouTube video, posted by WebsEdgeHealth, 2019, https://www.youtube.com/watch?v=IGsTvrNh_Nc.

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About this research

PwC's Health Research Institute (HRI) identified five key components for social determinants of health intervention. Health systems, insurers, pharmaceutical and life science companies, and community and government-based organisations alike recognise the health and financial impact of the various social determinants of health topics on their members/patients/consumers. Many organisations have piloted or implemented a project to address the myriad factors, but do not have a sustainable, long-term approach. The report describes key components that organisations should consider for any social determinants of health intervention based on global case studies.

This report is based on the best available information through August 2019. HRI conducted several interviews from April through July 2019 with health industry executives, community organisation board members, and government-funded health and social service programmes about their perspectives on key social determinants of health intervention components.

Also included are findings from PwC's HRI 2019 global social determinants of health consumer survey of roughly 8,000 consumers across eight territories. HRI also examined government data sources, journal articles and conference proceedings in determining the key social determinants of health intervention components.

About the PwC network

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 158 countries with over 250,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

About PwC's Health Research Institute

As a healthcare executive, you face a dynamic industry. Powerful drivers — including surging consumerism, immense technological innovation and ever-evolving regulations — are reshaping the healthcare value chain. PwC's Health Research Institute (HRI) is here to help you navigate this change through primary research and collaborative exchange. A group of seasoned professionals, HRI is dedicated to delivering new intelligence, perspectives and analysis on trends affecting all corners of the new health economy. HRI research is independent and not sponsored by businesses, government institutions or other institutions.

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