WORLD ECONOMIC FORUM

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White Paper

Human-Centric Health
Supplementary Case Studies

In collaboration with Willis Towers Watson

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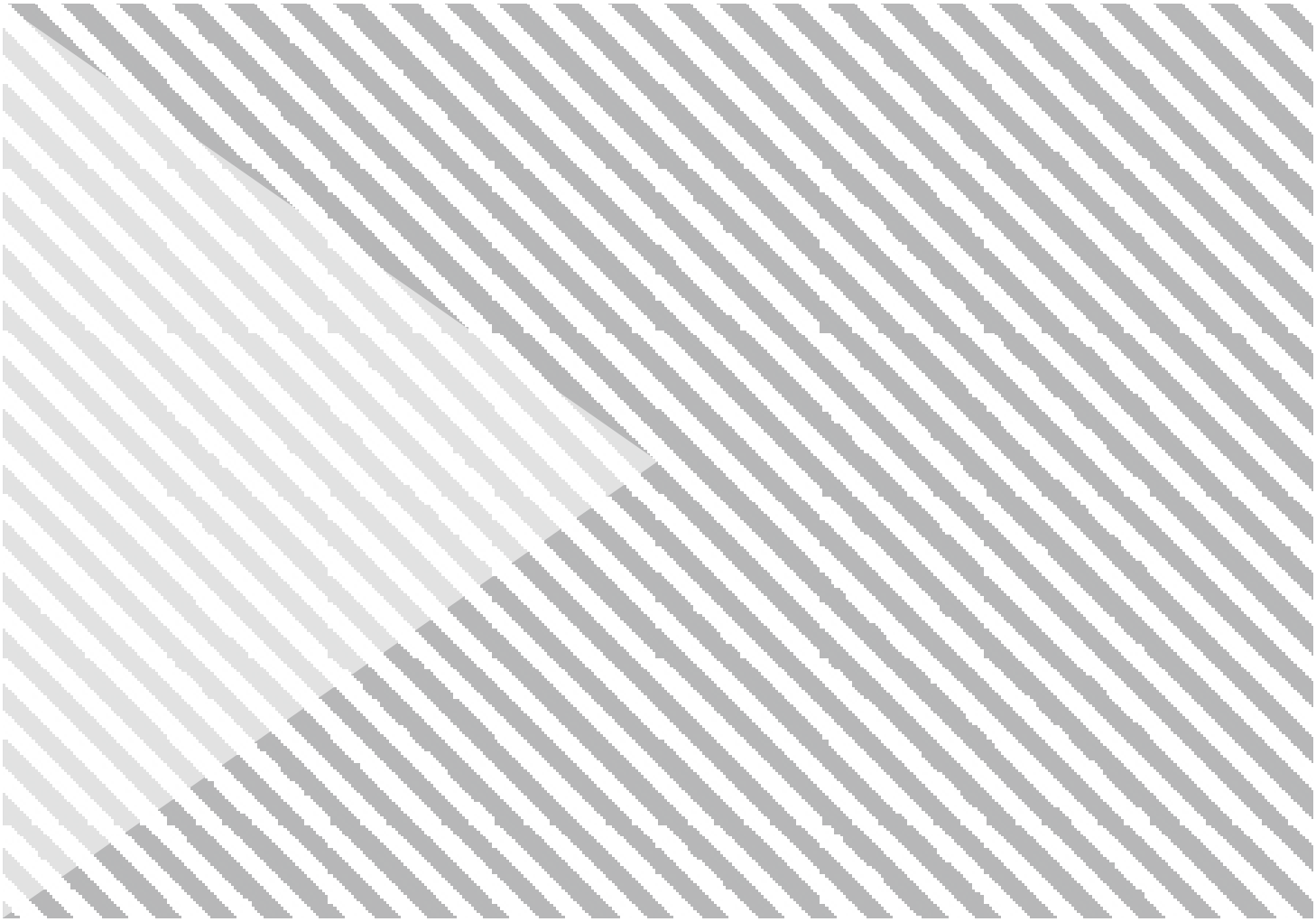

Introduction

Traditional approaches to dealing with non-communicable diseases (NCDs) have focused on medical care delivery to people with established disease conditions. Stakeholders* with an interest in reducing the impact of NCDs have tended to work independently. They often connect only intermittently, when goals happen to align. This strategy has not yielded the maximum benefit potentially available from the broad, deep array of organizations with resources to invest in reducing the global impact of NCDs.

The *Human-Centric Health* report, which this document supplements, describes how a human-centric health ecosystem (HCHE) can become a context for cooperation. The case studies in this document provide examples of how stakeholder organizations are moving towards the HCHE structure. Many are implementing bold and innovative solutions to prevent and treat NCDs, to address the risk factors that bring about the threat of disease, and to respond to the behavioural tendencies that influence individuals' perceptions and decisions. The case examples in this document cover a range of stakeholder types: from public corporations to government entities, from NGOs to academic institutions, from care-provider organizations to insurers. Together, the examples show how cooperation across organizations can profoundly change the way people understand NCDs and their risks. The case studies also illustrate how individuals can take the initiative, supported by an ecosystem rich in resources and information, to improve their own health and well-being.

* Individuals are clearly stakeholders in the HCHE. For our purposes, however, we use the term "stakeholders" to refer to businesses, government departments, non-governmental agencies, organizational participants and other groups (e.g., families) in the HCHE.

REF 271216

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Case study: Ahold Delhaize uses behavioural triggers to reduce sale of unhealthy products

Retailers make significant efforts to understand and map every aspect of the consumer experience, following rigorous research and testing. These efforts include using behavioural economics in the design of consumer engagement strategies, including how retailers respond to and drive a growing consumer demand for healthy products.

In 2014, for example, Tesco (the United Kingdom's leading retailer) responded to a customer survey showing that 65% of shoppers wanted confectionery removed from checkouts to help them make healthier choices when shopping. More than two-thirds also said this would help them choose healthier options for their children. Tesco removed sweets from the checkout areas of all stores. LIDL, another large retailer, followed suit across all its UK stores.

Ahold Delhaize, the giant retailer headquartered in the Netherlands, has also taken steps to reduce the number of unhealthy food products marketed to children. Ahold Delhaize operates in 11 countries with more than 6,500 stores and 21 local brands, and serves 50 million customers a week. As a result of ongoing dialogues with a range of stakeholders, including the Dutch Nutrition Society, the Dutch Heart Foundation and the Free University in Amsterdam, Ahold, through its Netherlands operating unit Albert Heijn, decided to tempt children and their parents with healthy choices instead of unhealthy ones, using the behavioural triggers for depletion and choice architecture.

To do this, it introduced the RockFrogs, a cartoon frog rock band that makes music and goes on adventures. The adventures are not explicitly about healthy eating, but the characters always choose healthy food and drink along the way. The characters appear in videos available online. The intention is to use the power of appealing stories to frame healthy messages suitable to Albert Heijn's young audience (three to eight years of age) and their parents.

The RockFrogs also appear on product packaging to make it more appealing to the supermarket's target audience. The characters are limited to products that meet the Dutch Green Tick health criteria, in categories with food items beneficial to health, such as fruit, vegetables and dairy. They cannot be used on products such as cookies or ice cream, or on those that do not meet strict limits for sugar, salt and saturated fat.

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Availability/Narrative
Diabetes/Metabolic syndrome		Choice architecture
		Depletion

Sources:
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Case study: Mobile-phone technology improves diabetes care in sub-Saharan Africa – two examples

The population of diabetics in sub-Saharan Africa is growing at twice the global rate and will nearly double, to almost 24 million, by 2030. Increased urbanization and adoption of Western styles of eating and living, along with better diagnosis, are major contributors. Dealing with this dramatic increase in diabetes calls for a comprehensive response from a well-integrated healthcare system. This poses a challenge, however, for low- and middle-income countries with limited human, financial and infrastructure resources.

Experiences in Kenya and South Africa provide examples of both the promises and the challenges associated with employing mobile-phone technology, especially in the follow-up and care of manifest disease.

To prevent heart disease and other complications from diabetes, a consortium of partners from North American academic medical centres (American/sub-Saharan Africa Network for Training and Education, or ASANTE) collaborated with local Kenyan physicians to develop a comprehensive diabetic care programme. Community health workers contacted patients weekly via cellphone and completed a standardized encounter form, the content of which was entered into a shared database. Clinical staff used each patient's summary information to guide rapid titration of insulin doses. Community workers then called the patients with revised doses and consulted them on any additional questions and concerns. Data from the first subset of patients indicated that those enrolled in the programme showed a decrease in A1C from a baseline of 13.18% to 10.5% after three to six months in the programme. This example shows how framing and appealing to loss aversion can encourage participation and help people overcome an optimism bias.

In South Africa, the Power to Prevent Program, an effort targeted at African-Americans in the United States, was adapted for use in South African townships. The goal of the programme was to test a system of ongoing peer support, embedded in what was described as "a low-cost wraparound system offering diagnosis, links to care and ongoing patient education with tools for lifestyle change".

This approach is consistent with the principle of using paraprofessional community health workers to extend care for chronic NCDs beyond what healthcare professionals can offer.

The programme had three principal components:
- A series of 12 educational group sessions addressing improved eating, exercising and abstention from alcohol and drugs
- Daily mobile-phone probes asking about health
- Text messaging between programme participants ("Diabetes Buddies") to support changes in life management

The 22 participating women received text messages via mobile phone daily. The messages asked about their adherence to healthy behaviours. All 22 participants had been diagnosed with diabetes (all but one with the type 2 form). The participants were asked to report their behaviours by responding via text message to the research team. DPS Health, a mobile technology company, programmed each phone so that the messages (both question probes and responses) passed through a central server, allowing each contact to be monitored in real time. Daily data uploading cost less than half a US cent, minimizing the expense of monitoring. On average, the research team sent one text message a day to each participant. Buddies also exchanged an average of 123 text messages among themselves weekly, independent of the probes, giving each other frequent advice and moral support.

On the one hand, at the overall level, the study did not show many significant changes in the health of the participating women. On the other hand, the researchers concluded: "The qualitative impact of the programme was substantial". The women continued to meet on their own a year later. All 22 participants continued to participate and the group added members over time. Women who could not walk to the group meetings at the beginning of the programme were able to walk by the third or fourth session. In summary, the research team said: "This pilot reflects a model that could be a prototype of peer support and intervention that could be sustained at a community or neighbourhood level".

NCDs	Risk factors	Behavioural triggers
Heart disease	Tobacco use	Loss aversion
Lung disease	Unhealthy diet	Framing
Diabetes/Metabolic syndrome	Physical inactivity	Social norms
	Harmful use of alcohol	Optimism

Sources:
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Case study: Cambridge Holdings – Health and the built environment

Cambridge Holdings is a US-based retail estate company that develops, owns and manages medical facilities and health-enhancing mixed-use neighborhoods. Cambridge applies architectural and design methods to build facilities that contribute to health and health improvement. The organization has focused specifically on two key threats to health and well-being: unhealthy diet and lack of physical exercise. Cambridge has also identified indoor air pollution as a significant health risk. Asthma-related illnesses account for 13 million school days missed each year in the US. People spend as much as 90% of their time indoors, where pollutants can reach concentrations between two and five times greater than outdoor levels.

Creating an environment that incorporates health as part of the design (a form of choice architecture) involves such features as restored green spaces, green rooftops, high-filtration heating and air-conditioning systems and complete streets. Complete streets are designed and built to enable safe access for all users, regardless of age, ability or mode of transport.

Incorporating health concepts into the built environment also requires partnerships with other businesses that support and promote health and well-being, such as farm-to-table restaurants.

ONEC1TY Nashville, in Tennessee, is a signature Cambridge project. ONEC1TY is currently under construction and is designed to be a vibrant urban community serving as a centre of technology-enabled commercial, residential, research and retail activity. ONEC1TY will reinforce the theme that mindful healthy living can be an attainable social goal.

NCDs	Risk factors	Behavioural triggers
Cancer	Unhealthy diet	Social norms
Cardiovascular disease	Physical inactivity	Choice architecture
Diabetes		
Chronic respiratory disease		

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ONEC1TY. About ONEC1TY. (2016). http://www.onec1tynashville.com/about/
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Case study: Using education to treat malnourished children through daily routine

More than one-third of the world's population suffers from two dichotomous yet related nutritional disorders: while 2 billion are obese or overweight, as many as 800 million are chronically undernourished. Undernourished children perform poorly in school, contribute less to local economies and, when adults, may not be able to provide sufficient resources to their families. Poorly nourished mothers are more likely to have underweight children who, in turn, have an increased risk of physical and cognitive impairment.

Centro de Recuperação e Educação Nutricional (CREN) was established in 1989 to study the effects of undernutrition and healthcare deficiencies in Brazil's rural favelas. CREN has performed nutritional and socioeconomic surveys, explored primary healthcare interventions for poor communities and established a hospital and outpatient clinic in these rural areas.

CREN's interventions have led to two important observations concerning children's health among these rural populations:

- Chronic childhood undernutrition leads to adult obesity.
- Stunting caused by undernutrition increases risk of chronic diseases, including hypertension, cardiovascular disease, diabetes and osteoporosis.

These conclusions, observed in families under CREN research, have since been supported by other research.

To tackle the problem of poor nutrition among children, CREN launched an initiative providing five nutritious meals a day to malnourished children, essentially placing them in supervised care for 10 hours to promote healthy eating habits. The day-hospital intervention focuses on individual behaviour change, incorporating the person's cultural and familial history into a programme that includes nutritional education and coaching sessions that take place between meals. The work incorporates the children's families, nurses and physicians, teachers and nutritionists into a regimented schedule of events, ensuring that a consistent routine is followed from Monday to Friday, from 07.30 to 17.30.

CREN has conducted several studies to evaluate the results of this intervention, demonstrating that this method has proven more efficient than traditional clinical approaches. The day-hospital programme promotes total recovery in stunted children's stature and weight deficiency, full recovery of body composition with normalization of lean body mass and decreased fat, improvement in pancreatic function and bone quality, as well as reduction of the stress hormone cortisol.

Researchers at CREN estimate that this rigorous intervention prevents about 228 months (19 years) of NCD onset. A typical stay at CREN's day-hospital lasts 22 months and costs about $15,000, making this a seemingly costly intervention. However, the treatment is aimed at fostering lasting lifestyle change, the benefits of which extend not only to the child but also to family and community members.

NCDs	Risk factors	Behavioural triggers
Diabetes/Metabolic syndrome	Unhealthy diet	Choice architecture/Default
Cardiovascular disease		Framing
Cancer		Social norms

Sources:
Dobbs, R., Sawers, C., Thompson, F., Manyika, J., Woetzel, J., Child, P., McKenna, S. & Spatharou, A. Overcoming obesity: An initial economic analysis. *McKinsey Global Institute.* (2014).
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Case study: CORE Foods makes health the bottom line

Obtaining healthy food can be a challenge in major cities in both high-income and low-income countries. CORE Foods in Oakland, California (across the bay from San Francisco), has set about addressing the problem with a simple, twofold strategy: serve nourishing organic foods and reinvest profits into this mission. As they express it: "Your health is the only bottom line".

CORE Foods got its start in the packaged food business. Its oatmeal food bars, featured at retailers like Whole Foods in the United States, are made exclusively with fruit, seeds, nuts and grains. CORE Foods stocks only food items that use no corn syrup, salt, flour, oil, additives or preservatives. It purchases only organic ingredients from farmers who are at the "cutting edge of sustainability". One key to the company's strategy is its status as a certified B (benefit) corporation. B corporations are for-profit organizations that incorporate benefiting society, workers, the community and the environment into their legally defined objectives. This status allows a company to pursue social goals (like producing and selling only healthy food) rather than focusing solely on generating a financial return.

CORE Foods used a Kickstarter campaign to fund an expansion into the restaurant business, with what the company calls "the world's first produce-only restaurant". The first CORE Kitchen is now open in downtown Oakland. The menu features such items as a collard leaf burrito with potatoes and avocado, and a sweet potato black bean patty topped with BBQ sauce. CORE's restaurant takes advantage of present bias – people want healthy foods that are easily accessible and require little or no preparation. CORE makes healthy eating convenient (choice architecture) and provides a meeting place for like-minded food-conscious consumers. If the first location succeeds, CORE has plans to expand nationwide, with locations in major cities across the US.

In 2015, besides achieving $1.7 million in revenue (of which 8% was reinvested in the business), CORE Foods:

- Served 634,000 healthy meals
- Supported production of 139,000 pounds of organic food
- Achieved a carbon offset of 720 tons

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Present bias
Lung disease		Social norms
Cancer		Choice architecture
Diabetes/Metabolic syndrome		

Sources:
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Kickstarter. CORE Kitchen: The world's most nourishing restaurant. (2015). https://www.kickstarter.com/projects/1764790454/core-kitchen-the-worlds-most-nourishing-restaurant

Case study: Diabetes Prevention Program (DPP) connects government, non-profit and companies

Obesity continues to be a growing global problem. In the US, obesity rates exceed 20% of adults in all 50 states. Some estimates suggest that one-third of Americans will have diabetes by 2050. Further, two-thirds of Americans are overweight and as many as 86 million have metabolic syndrome, increasing their risk of diabetes and heart disease.

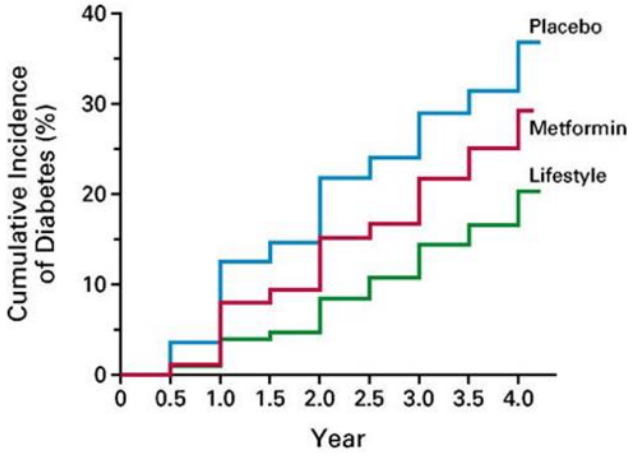
The Diabetes Prevention Program (DPP) was initially funded by the National Institutes of Health. The programme incorporated three treatment arms: lifestyle intervention; treatment with the medication metformin; and usual care. Treatment with metformin decreased onset of diabetes by 31% over almost three years. By comparison, the lifestyle intervention – a series of 16 classes over 16 weeks – decreased onset of diabetes by 58%, a result that surprised even the researchers. Participants succeeded in losing, on average, almost 5% of their body weight, making this an especially effective non-surgical approach to obesity. Weight loss has been consistently associated with the largest decrease in risk of conversion to diabetes.

DPPs help participants overcome the optimism bias that can lead them to think they will avoid bad outcomes. The programmes also use loss aversion, narratives and stories and the social norms of the group to encourage participants to adopt healthier behaviours. Framing the small incremental changes required for healthier outcomes helps maintain high participation in the intervention.

The DPP curriculum has been published by the Centers for Disease Control and Prevention in the US, which also offers a certification to non-profits and companies wishing to administer the programme. The DPP has been rolled out in more than 200 YMCAs across the US and in a number of other countries. Researchers have estimated that expansion of this intervention could produce savings of as much as $15 billion over a decade.

A number of companies, including Newtopia, Omada, Retrofit and United HealthCare have commercialized the DPP. In many instances, they have converted the in-person meetings to mobile applications without sacrificing the important social network element of the intervention. Participants in the lifestyle intervention group – those receiving intensive individual counselling and motivational support on effective diet, exercise and behaviour modification – reduced their risk of developing diabetes by 58%. This finding was true across all participating ethnic groups and for both men and women. Lifestyle changes worked particularly well for participants aged 60 and over, reducing their risk by 71%. About 5% of the lifestyle intervention group developed diabetes each year during the study period, compared with 11% of those in the placebo group.

Figure 1: Cumulative incidence of diabetes according to study group



DPP lifestyle programme reduced likelihood of conversion to diabetes by 58% over three years.

Source: Knowler, W.C., Barrett-Connor, E., Fowler, S., Hamman, R.F., Lachin, J.M., Walker, A.E. & Nathan, D.M. Diabetes Prevention Program. Research Group. Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin. *N Eng J Med.* 346(6), 393-403 (2002). https://www.ncbi.nlm.nih.gov/pubmed/11832527

NCDs	Risk factors	Behavioural triggers
Heart disease	Tobacco use	Loss aversion
Diabetes/Metabolic syndrome	Unhealthy diet	Framing
	Sedentary lifestyle	Availability/Narrative
		Optimism
		Social norms

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Case study: Preventing childhood obesity through cross-sector partnerships

Worldwide obesity has nearly doubled since 1980. In Europe, one in five children is considered obese. One in three obese children will remain obese into adulthood, leading to such preventable conditions as diabetes and cardiovascular diseases.

EPODE – Ensemble Prévenons l'Obésité Des Enfants (Together Let's Prevent Childhood Obesity) – is a community-based intervention programme that enables communities to implement effective and sustainable strategies to prevent childhood obesity while minimizing social and cultural stigmatization. Originally established in 1992 in France, EPODE has become widespread, implemented in more than 500 communities in 29 countries. The success of the programme led to the creation in 2011 of the EPODE International Network, a means for members to share knowledge, expertise and practices.

The programme is implemented through the use of social marketing and a local project manager. It promotes a step-by-step learning approach to incorporate healthy lifestyle choices that suit the needs of all socio-economic groups. The project manager collaborates with and mobilizes multiple stakeholders through a local steering committee and community networks to change the micro and macro environment. These approaches take advantage of, and help to reinforce, social norms supporting health.

Driven by the local project manager, campaigns are developed through cross-sector partnerships. EPODE aims to reduce obesity by targeting three key areas with the involvement of government, private sector, civil society and academia:

- Healthy eating
- Active play
- Quality sleep

The EPODE approach also uses social marketing techniques, which have become widespread in community-based obesity prevention programmes, to promote healthier behaviours. Studies indicate that interventions using social marketing techniques have achieved improvements in risk behaviours. EPODE also gives participants quick access to enjoyable food (present bias) and uses choice architecture to make healthier choices easy.

The programme requires anthropometric measurements, along with process and output indicator reviews at central (country), local and individual levels. To assist with monitoring and evaluation, the EPODE European Network involves four universities: Free University of Amsterdam, University of Ghent, University of Lille 2 and University of Saragossa. Since the launch of the programme in 2011, childhood obesity has dropped by 22% in Belgium and 10% in France in pilot towns, compared with control towns.

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Present bias
Diabetes/Metabolic syndrome		Choice architecture
		Social norms

Sources:
Borys, J-M., Le Bodo, Y., Jebb, S.A., Seidell, J.C., Summerbell, C., Richard, D., De Henauw, S., Moreno, L.A., Romon, M., Visscher, T.L.S., Raffin, S. & Swinburn, B. EPODE approach for childhood obesity prevention: methods, progress and international development. Obes Rev. 13(4), 299-315 (2012).
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Case study: Ginger.io's technology as a cost-effective solution for mental health

According to the World Health Organization (WHO), the number of people suffering from anxiety and depression globally rose from 416 million in 1990 to 615 million in 2013. Mental health conditions take many forms, including:

- Anxiety and stress – 80% of workers say they feel stress on the job and nearly half say they need help in learning how to manage this stress.
- Perinatal depression – about one-third of new mothers are at risk.
- Comorbidity – the majority of patients with chronic heart disease and diabetes suffer from accompanying mental health issues.

At present, most responses to mental health issues focus on treatment rather than on prevention or reduction of stigma. Access to behavioural health services is often poor and some are reluctant to seek behavioural health services.

Ginger.io, a San Francisco-based digital mental health platform, uses a combination of smartphone technology, data science and clinical services to create personalized delivery of mental healthcare. Through a smartphone app, users can learn about coping strategies developed by medical experts, assess their current state and obtain additional mental health support as needed. These features can help people internalize a narrative of successful treatment. Individuals can also access a licensed therapist or board-certified psychiatrist, via video, who can refer to the patient's data to provide proactive and immediate care. Ginger.io makes access to mental health support easy, in part by eliminating the investment of time and effort required to travel to a therapist's office (focusing on the behavioural triggers of present bias, choice architecture and loss aversion).

The Ginger.io platform tracks statistics and general usage patterns of texts and phone calls and uses GPS to track movement. The combination of data (gathered passively, without conscious effort from the individual) makes it possible to map people's behaviours and produce insights into an individual's mood over time.

In employer settings, Ginger.io reports:

- Installation of the app for up to one-quarter of the employee population
- Reduction of up to one-third in the relative cost of care, per actual employee receiving care
- Among those receiving care, more than half showing at least a partial response (30% drop in symptom severity) over eight weeks

Use of mobile applications to track behavioural health parameters and offer participants early access to services can prevent mental illness exacerbations and improve lives and productivity.

NCDs	Risk factors	Behavioural triggers
Mental illness	Harmful use of alcohol	Present bias
		Loss aversion
		Choice architecture
		Availability/Narrative

Sources:
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Case study: GlaxoSmithKline and care organization partner to help smokers quit

Only 3%-5% of people who try to quit smoking on their own actually succeed. In an effort to improve this percentage, GlaxoSmithKline (GSK) has collaborated with the non-profit National Jewish Health Quitline programme, QuitLogix, for more than 10 years. QuitLogix provides tobacco cessation support for Quitline programmes in US states. QuitLogix services are government-paid as part of anti-tobacco public health initiatives and offered at no cost to participants. The QuitLogix programme includes:

- Tobacco cessation coaches available 17 hours a day, seven days a week, year-round
- Up to five proactive coaching sessions with unlimited support calls
- A full pharmacotherapy programme, including nicotine replacement therapy (NRT) in various formulations, as well as coordination of pharmacy benefits and a web-based eCoach programme that offers information for participants, as well as text messaging, email and a mobile app available 24 hours a day

Participants enrol in the programme online or by phone. A coach partners with the participant to develop a customized tobacco cessation plan that includes setting a quit date, identifying tobacco-use triggers, managing cravings and addressing relapses. National Jewish Health faculty provides oversight and training of coaches and staff.

From 2003 to 2016, 1.2 million participants enrolled in the QuitLogix programme. Among people who received pharmacotherapy, quit rates were 37%, compared with a little more than 20% for those who did not receive pharmacotherapy support. Upon screening, 80% received some form of NRT.

More than 400,000 participants have quit tobacco over the 13 years of the programme. Approximately 35% of those engaged in QuitLogix quit and remained tobacco-free six months later. QuitLogix uses a number of behavioural triggers to achieve these results: overcoming optimism bias among smokers convinced they won't be harmed by smoking; implementing choice architecture to make participation easy; framing to make quitting seem more achievable; success stories to help encourage persistence in the programme.

The collaboration between National Jewish Health, state public health systems and GSK reinforces the importance of public-private collaboration aimed at helping to prevent, reduce and end tobacco use.

NCDs	Risk factors	Behavioural triggers
Heart disease	Tobacco use	Framing
Chronic respiratory disease		Availability/Narrative
Cancer		Choice architecture
Diabetes/Metabolic syndrome		Optimism
Mental health		

Sources:
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Case study: Clean cookstoves prevent NCDs in low-resource settings

More than three billion people worldwide rely on solid fuels to cook. The widespread use of open fires and traditional cookstoves is a significant source of health and environmental problems globally. Household air pollution is associated with stroke, heart disease, lung disease, lung cancer and pneumonia and is the cause of more than four million deaths worldwide per year – more than HIV, malaria and tuberculosis combined. Lower-income countries experience the majority of the burden of disease associated with household air pollution. Rural areas that have limited access to affordable clean cooking fuels experience a particularly heavy impact.

The Global Alliance for Clean Cookstoves (GACC) is the leading institution seeking to promote the adoption of clean cooking solutions. The GACC has implemented the use of cleaner cookstoves and fuels in more than 50 million households globally and has improved awareness of the devastating health, environmental and financial consequences of household air pollution.

The impact of efforts by the GACC is particularly evident in the GACC's eight focus countries, which include Kenya. In Kenya, 84% of the population uses solid fuels for cooking; 36 million people are affected by household air pollution. Kenya suffers a heavy burden of respiratory illnesses, with an estimated 15,000 deaths per year associated with household air pollution. Almost a quarter of children aged six to 35 months have experienced an acute respiratory problem within the previous two weeks. To tackle this, the GACC is working with such partners as the Clean Cookstoves Association of Kenya (CCAK), Kenya's Ministry of Environment, Water and Natural Resources and the Ministry of Health to promote the adoption of clean cookstoves and fuels by five million households by 2020.

With the support of the GACC, Envirofit International has sought to transform the development of household and commercial energy technologies for people living in extreme energy poverty. The organization has designed a product line of aesthetically pleasing, high-performance cookstoves tailored to the needs of households in emerging and underdeveloped markets. Envirofit has supplied 1.2 million stoves globally and 200,000 in Kenya since 2010. The Envirofit clean cookstoves reduce smoke and toxic emissions by up to 80% and cost between $25 and $50.

The GACC programme capitalizes on loss-aversion behaviour by keep the price of stoves as low as possible and uses framing and present bias to emphasize the ease and speed of transition to a cleaner technology. Involvement of the local community evokes social norms.

NCDs	Risk factors	Behavioural triggers
Heart disease	Air pollution	Present bias
Lung disease		Loss aversion
Cancer		Framing
		Choice architecture
		Social norms

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Case study: Healthy Retail SF supports small food stores

Despite its high real estate values and growing tech-driven wealth, San Francisco still has some neighbourhoods that are food deserts – areas with too few grocery retailers and insufficient access to healthy food. The city has responded with an initiative called Healthy Retail SF. The programme, operated by San Francisco's Office of Economic and Workforce Development, helps merchants boost their business by providing increased access to healthy, fresh and affordable foods, and denormalizing such unhealthy products as tobacco and alcohol. The initiative gives owners of small stores $15,000-$20,000 to buy new displays, refrigerators and computerized sales systems. Store proprietors can also get help with merchandising and advertising their newly upgraded inventory.

The programme relies on choice architecture (making healthy food a default decision requiring little investment of energy) and social norms (capitalizing on the high profile of healthy-food retailers in the community).

Since its inception in 2013, Healthy Retail SF store transformations have produced both economic and health-related results. In 2016, the programme reported that, over the three-year period:

- Participating retailers had recorded increased sales of 25% per store.
- Total sales increased by an average of more than $5,000 per store per month.
- On average, each store sold more than 615 units of produce more per month.
- More than 11,000 additional units of produce were provided to local communities per month.
- Display space for fruit, vegetables and healthy produce had increased, while display space for liquor, tobacco and other unhealthy food products decreased.

Some store owners have become vocal proponents for the programme. One programme participant says: "Even when someone does come in and tries to buy candy, I say, 'Why don't you grab a banana or an apple? It's sweet and delicious, but you get more benefit from it'. I'm a good salesman".

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Social norms
Lung disease	Tobacco use	Choice architecture
Cancer		Depletion
Diabetes/Metabolic syndrome		

Sources:
Health Retail SF: Building Healthy Corner Stores and Healthy Communities. http://www.healthyretailsf.org/
Healthy Retail SF. Report. (2016). http://oewd.org/sites/default/files/Documents/HRSF_Package_8.5x11-v9.pdf
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Case study: Kaiser Permanente Thriving Schools aims to improve the health of students, staff and teachers

Kaiser Permanente, one of the largest non-profit healthcare organizations in the United States, has long recognized the importance of schools as an epicentre for impact on health and well-being in communities. In 2013, Kaiser Permanente launched the Thriving Schools programme, a partnership with several other leading organizations working to support policy, systems and environmental changes in schools. The goal is to shift the default behaviours of students, staff and teachers. The initiative aims to influence behaviour change in support of healthy eating and physical activity, with an added focus on social and emotional wellness. The programme places particular emphasis on support for school employees, whose needs are often less addressed by school health programmes but who can act as influential role models. Currently, Thriving Schools reaches 115 districts across Kaiser Permanente service areas. Through its partnership with the Alliance for a Healthier Generation, the programme reaches 21 districts including 332 schools.

At Seaton Elementary School in Washington DC, where nearly all students come from low-income families and have limited safe areas for physical activity, Thriving Schools and the Alliance for a Healthier Generation work together with school administration to implement behaviour-change interventions. With grant support from Kaiser Permanente, Seaton hired a second physical education teacher and adjusted school schedules to ensure that all students receive 150 minutes of physical education every week. The school has also restructured its meal programme to meet Department of Agriculture (USDA) nutritional standards and offers healthy cooking classes and tastings to spark interest in more nutritious offerings.

In the San Leandro Unified School District of California, Thriving Schools supported the efforts of the district's Employee Wellness Committee to ensure that the health and well-being of school staff receives suitable emphasis. The Committee, composed of district leaders and unions, coordinated a district-wide effort to remodel school staff breakrooms to provide a welcoming space for staff to meet and recharge and instituted programmatic opportunities such as stress-reduction trainings to enhance staff wellness.

Thriving Schools highlights the opportunity to use choice architecture to make it easy for participants to exercise and eat well. The programme's framing of healthy decisions makes these seem inviting and socially compatible rather than unfamiliar and intimidating.

Noncommunicable disease	Risk factors	Behavioural triggers
Cardiovascular disease	Unhealthy diet	Framing
Mental illness	Physical inactivity	Availability/Narrative
Diabetes/Metabolic syndrome		Social norms
		Choice architecture

Sources:
Kaiser Permanente. Thriving Schools: A Partnership for Health Students, Staff & Teachers. http://thrivingschools.kaiserpermanente.org/

Case study: Solving the challenge of childhood obesity within a generation

The World Health Organization (WHO) recently estimated that, by 2025, 70 million infants and young children will be overweight or obese. This represents an increase of close to 25 million over a decade, with the developing regions of the world experiencing significantly higher rates of increase than higher-income countries, many of which already suffer from a significant burden of disease associated with overweight and obese populations.

Overweight and obese children are highly likely to remain overweight into adulthood. They are at a higher risk than healthy-weight individuals to develop type 2 diabetes, cardiovascular disease or metabolic syndrome at a younger age, often dying prematurely or living with disability. In the United States, more than two-thirds of adults and approximately one-third of children are considered overweight or obese. With high healthcare costs and losses to productivity, the economic impacts of obesity are severe. Among obese 10-year-olds alone, this equates to $14 billion in lifetime medical costs.

The mission of the Let's Move! initiative, founded in 2010 by First Lady Michelle Obama, is to address the challenge of childhood obesity within a generation. Let's Move! aims to mobilize parents, schools, healthcare professionals, faith-based and community-based organizations, private sector companies and elected officials from all levels of government. Let's Move! has designed and developed a series of comprehensive wellness initiatives across the US. These promote healthy eating, physical activity and a culture of wellness. The initiatives make it easier to eat healthy food and exercise (choice architecture), frame changes as achievable and call on the power of social connections.

Over the past six years, a range of initiatives has been implemented, with the help of public-private partnerships and the establishment of strong relationships with local stakeholders within communities across the country. Initiatives include:

- Let's Move! Cities, Towns and Counties
- Let's Move! Child Care
- Let's Move! Active Schools
- Let's Move! Museums & Gardens
- Chefs Move to Schools
- Let's Move! Faith and Communities
- Let's Move! Outside
- Let's Move! in Indian Country
- Let's Move! Salad Bars to Schools

One in four Americans now lives in a community that has committed to the five Let's Move! Cities, Towns and Counties goals, improving access to physical activity, healthy foods and walkability in their communities. Eleven million children now benefit from school-time physical activity, while 3.4 million children have daily access to salad bars in schools. Among younger children in day care, improved conditions that promote health and wellness have been made available to 1.6 million children. They benefit from reduced screen time, improved meals and more opportunities for physical activity.

Let's Move!, along with other programmes, may be having the desired effect on childhood obesity. Recent studies indicate that the rate at which overweight and obesity has been growing in the past 30 years or so has decelerated significantly in some regions and among specific demographic groups. In the past 10 years in the US there has been no significant increase in obesity among children or adults. Let's Move! provides one example of a successful attempt at promoting good health by addressing key risk factors of disease at a young age. The organization believes that nationwide mobilization of key stakeholders through positive relationships and messages is a critical element to the success of this kind of public health intervention.

NCDs	Risk factors	Behavioural triggers
Diabetes/Metabolic syndrome	Unhealthy diet	Choice architecture/Default
Cardiovascular disease		Social norms
		Framing

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Case study: *Ciclovías* promote physical activity, yield benefits at low cost

The *Ciclovía recreativa* is a community-based mass programme in which streets are temporarily closed to motor vehicles, allowing exclusive access to individuals for leisure and physical activities. These programmes use choice architecture to make exercising easy and encourage group social activity to increase participation. Currently, *Ciclovía* programmes exist in at least 16 countries in the Americas and the Caribbean. Funding for the programme can come from any one of several sources: general municipal budgets, sports and recreation department funds, private sponsors and, in the case of Bogotá, Colombia, a tax added to all citizens' phone bills.

In 2011, a team of researchers published an economic analysis of the programmes in four cities: Bogotá and Medellín, Colombia; Guadalajara, Mexico; and San Francisco, California. Operational costs considered in the analysis included permanent employee salaries and logistical and technical support. Variable costs encompassed elements like traffic cones, security tape, lane dividers, bags, batteries, first aid kits and salaries for field employees. The analysis also took into account user costs such as the expenses associated with the equipment that each user must buy to engage in *Ciclovía* leisure activities. The research team defined the direct health benefit from the programme as the amount of money that a physically active adult would save in annual direct health and medical costs for preventing chronic diseases.

The annual cost in US dollars per capita of the programmes was: $6 for Bogota, $23.40 for Medellín, $6.50 for Guadalajara and $70.50 for San Francisco. These investments yielded an impressive financial benefit, producing benefits per dollar of 3.23-4.26 for Bogotá, 1.83 for Medellín, 1.02-1.23 for Guadalajara and 2.32 for San Francisco. The researchers concluded: "The very low per user costs of the *Ciclovías* in comparison with other programmes for physical activity promotion are striking. Clearly using existing infrastructure built and maintained for motorized transport contributes substantially to the positive cost-benefit ratio. The large number of users, and the potential for an even greater proportion of urban populations to participate in *Ciclovías* due to the ubiquitous presence of road networks and their relative underutilization during certain hours suggests that with appropriate multisectoral partnerships, political support and effective management and promotion, many more cities can support *Ciclovías*".

NCDs	Risk factors	Behavioural triggers
Heart disease	Physical inactivity	Choice architecture/Default
Diabetes/Metabolic syndrome		Social norms
Mental illness		
Cancer		

Sources:
Heath, G.W., Parra, D.C., Sarmiento, O.L., Andersen, L.B., Owen, N., Goenka, S., Montest, F. & Brownson, R.C. Evidence-based intervention in physical activity: lessons from around the world. *Lancet*. 380, (2012).
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Case study: Cities changing diabetes

The rise in urban diabetes is one of today's great global health and social challenges. By 2040, almost half a billion people with diabetes will live in cities. In Copenhagen, Denmark, the number of people with diabetes is expected to double by 2040 if no action is taken. Despite relatively high diagnosis (74%) and treatment (98%) rates, many vulnerable, hard-to-engage citizens risk developing diabetes and related NCDs.

Copenhagen's diabetes challenge was mapped qualitatively through a semi-ethnographic "vulnerability assessment" of social factors and cultural determinants of health. The research identified groups of citizens and neighbourhoods with particular needs and led to the identification of four joint action pilots to supplement city actions. The action plan intends to use a number of behavioural precepts, including social norms and choice architecture, to engage vulnerable groups and communities. The research insights also informed an update of the city's diabetes strategy, following an insights-to-action format.

In the near future, the project plans to measure success through the inclusion of diabetes as a high priority for the city's health agenda and for health concerns, especially diabetes, to be incorporated into the agendas of those designing and managing cities for the future. The long-term objective is to monitor and lower the prevalence of diabetes, reduce related health complications and empower citizens (especially those that are vulnerable or hard to reach) to lead long and healthy lives. Programme success will help realize the city's health mantra, "'Enjoy Life, Copenhageners".

Copenhagen's effort is part of a global partnership platform for cross-disciplinary and cross-sector collaboration. Partners include the City of Copenhagen Health and Care Administration, the University of Copenhagen Department of Public Health, the Danish Diabetes Association, Steno Diabetes Center Health Promotion Research and Novo Nordisk.

NCDs	Risk factors	Behavioural triggers
Diabetes	Tobacco use	Social norms
	Unhealthy diet	Choice architecture
	Physical inactivity	
	Harmful use of alcohol	

Source: Cities Changing Diabetes. Copenhagen. (2016). http://www.citieschangingdiabetes.com/cities/copenhagen.html

Case study: Turning internet use into an ally in the fight against NCDs

Across 18 Spanish-speaking Latin American and Caribbean countries[1], 43.1% of people use the internet, though almost three-quarters of Latin America's internet users come from just four countries: Argentina, Brazil, Colombia and Mexico. Broad access gives national health authorities the ability to establish conversations and share public health messages that help educate individuals and trigger improvements in health behaviour through the use of framing and availability narrative. The following four areas offer opportunities for improved internet-based health engagement in the region.

1. **Using social media to increase engagement**
   Approximately 91% of the online broadband community in Latin America uses Facebook. This penetration offers national health authorities great potential to provide access to information. In Brazil, for instance, the top three most followed pages relate to football and music. These non-traditional stakeholders should be able to champion health promotion. In combination with technology, the approach makes use of social norms as a trigger for change, as long as messages appropriately reflect local relevance and content, which studies indicate are main barriers to internet use in the region.
2. **Improving access to the internet**
   In 2014, Brazil passed its Marco Civil, a civil rights framework for the internet. This set of new internet and privacy laws is an important development for Latin America. The new regulations are already shaping and changing the liability landscape for internet intermediaries. Intermediaries will have to integrate these changes and uncertainties into their business models and risk analyses and be prepared to evolve. Ultimately, a freer and more robust internet model should improve individual access and yield opportunities for promotion of health improvement initiatives.
3. **Improving access to existing information**
   Use of search engines such as Google, Yahoo and Bing are an important consideration for dissemination of information. Google controls 64% of searches, one out of 20 of which is related to health. Having useful content and materials well-positioned in search engine results, and prioritizing healthy actions in listings, represents a significant opportunity for enhanced communication on health-improvement topics.
4. **Improving quality and availability of information**
   Of the 13 leading causes of death identified in Spanish-speaking Latin America and the Caribbean, six (colorectal cancer, breast cancer, prostate cancer, hepatic cirrhosis, hypertensive heart disease and Alzheimer's) do not appear within the first 10 Google search results. Better access to information provided by ministries of health concerning both prevention and treatment of high-impact diseases will engender a sense of trust and improve individual decision-making.

NCDs	Risk factors	Behavioural triggers
Cardiovascular disease	Tobacco use	Framing
Chronic respiratory disease	Unhealthy diet	Social norms
Diabetes	Physical inactivity	Choice architecture
Cancer	Harmful use of alcohol	
Mental health		

Sources:
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Case study: Integrating maternal health and mental care in South Africa

Common mental disorders such as anxiety and depression are the third leading cause of disease globally for women aged 14 to 44 years. By 2030, these conditions are expected to rise to first place, ranking above heart disease and road traffic injuries. A recent review reveals that maternal mental disorders are approximately three times more prevalent in low- and middle-income countries than in high-income countries.

Despite high levels of antenatal and postnatal depression, there is no routine screening or treatment of maternal mental disorders in primary care settings in South Africa. Antenatal care focuses predominantly on physical examination. During the post-partum period, the healthcare focus commonly shifts to the infant for immunization, growth monitoring and HIV testing. The lack of integration among maternal health services, child health services and mental health services in primary care creates a gap in the screening and treatment of maternal mental disorders.

In response to this need, the Perinatal Mental Health Project (PMHP), based at the Mowbray Maternity Hospital in the Western Cape Province of South Africa, integrated a maternal mental health programme into the antenatal care process. Midwives in the hospital's Midwives Obstetric Unit are trained to screen women routinely for maternal mood disorders during their antenatal visits. Women deemed to be at high risk for depression or other disorders are referred for on-site counselling, which may coincide with subsequent antenatal visits.

From July 2008 to the end of June 2011, 90% of the women who attended the facility for primary care were offered mental health screening; 95% of those accepted the screening. Of the women screened, about one-third qualified for referral to a counsellor and 62% of those who qualified agreed to be referred. A 2011 analysis of self-reported data from a sample of women receiving counselling showed that, six to 10 weeks post-partum, 88% reported an improvement in their presenting problem and 80% reported to be coping at least adequately. About three-quarters reported a positive mood at the time of the phone assessment.

In low-resource primary care settings, where common mental disorders are often overlooked, using choice architecture to integrate screening into routine antenatal procedures can narrow the treatment gap significantly. Universal screening allows for early detection of psychological distress in most cases. Women who meet the criteria may then be immediately referred to counsellors and the need for specialist care may be mitigated. The ultimate goal of the programme is to make this kind of one-stop care a normal protocol in the process of medical treatment.

NCDs	Risk factors	Behavioural triggers
Mental illness	Unhealthy diet	Choice architecture/Default
	Harmful use of alcohol	Social norms
	Physical inactivity	

Source:
Honikman, S. *et al.* Stepped Care for Maternal Mental Health: A Case Study of the Perinatal Mental Health Project tin South Africa. *PLoS Medicine*. 9(5), (2012).

Case study: Technology from Philips encourages behaviour change

Studies suggest that obstructive sleep apnoea (OSA) raises heart rate and increases blood pressure, placing stress on the heart and increasing the likelihood of hypertension, heart disease, stroke and diabetes. A continuous positive airway pressure (CPAP) device is often the preferred response to OSA. However, adherence to CPAP therapy has proven to be poorer than adherence to HIV medications, which suggests it is among the most difficult treatments to tolerate.

DreamMapper, a mobile application and website from Philips Respironics, is designed to improve adherence to treatment by using psychological models of behaviour change. DreamMapper focuses specifically on creating a sense of urgency (loss aversion), using results to create a narrative of success (availability) and building confidence (optimism).

Adherence to therapy was measured using internal microprocessors housed within the therapy devices and modem and wireless technology. Data was communicated daily to a central server, to the healthcare providers and to the patients themselves. Measurements were reported at 90 days, as this is when many insurers determine whether they will pay for the medical devices, based on patient engagement and usage.

Data was analysed from more than 170,000 individuals, some of whom used DreamMapper and some of whom did not. Adherence at 90 days was significantly better in the technology group (78.5%) than in the non-technology group (62.6%). Adherence improved even more among patients who were considered strugglers with the therapy in the first two weeks (46% for DreamMapper users, compared with 12% for non-DreamMapper patients).

NCDs	Risk factors	Behavioural triggers
Cardiovascular disease	Tobacco use	Loss aversion Availability/Narrative
Diabetes/Metabolic syndrome	Unhealthy diet	Optimism
	Physical inactivity	

Sources:
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Case study: Secure storage of pesticides in India to prevent suicide

Historically, the health and financial burden of mental illness has received less attention than the impacts associated with such NCDs as cancer and cardiovascular disease. However, in terms of disability-adjusted life years (DALYs), depression is the fourth leading cause of disease burden globally. Suicide accounts for almost one million deaths annually worldwide and is the second leading cause of death among 15 to 29-year-olds. Roughly 30% of all global suicides result from pesticide self-poisoning, most of which occurs in rural agricultural areas. Restricting access to pesticides as the means with which people commit suicide has the potential to improve suicide prevention efforts.

India, whose agricultural sector makes up 50% of the nation's workforce, suffers from one of the highest rates of suicide in the world (20.9 suicides per 100,000 people). Suicides among Indian farmers, who are particularly vulnerable to the financial stress and uncertainty of farming, account for approximately 11% of all suicides in India.

Two recent studies in the southern Indian states of Tamil Nadu and Telengana investigated the impact on suicide reduction of introducing secure pesticide storage for farmers in rural villages. Secure storage reduces pesticide availability and increases the effort required to get access (using depletion to reduce suicide). The first study evaluated the effect that a centralized secure pesticide storage facility would have in reducing pesticide-associated suicides among three farming villages in southern India. Farmers were provided with a supervised facility in which they could safely store their pesticides, away from other community members. The programme incorporated a qualitative component, including focus groups on such key topics as safe storage and disposal of pesticides, use of the secure storage facility for pesticides and implications for mental health and suicide. As a result of the effort, pesticide storage safety improved, broad pesticide exposure decreased and overall suicide rates declined.

Building on this study, Syngenta, the global agribusiness company, sponsored a study investigating the benefits of secure pesticide storage boxes for farmers in Telangana, which experiences among the highest suicide rates in India. Syngenta produces agrochemicals, including the pesticides that are commonly used in suicides in India, and therefore has a significant role to play in both the health and development of farming communities. Six villages, each with populations of around 5,000, were divided into a control group and an intervention group. Pesticide storage, which is traditionally done in the house or in the farmer's fields but rarely in storage facilities, was moved to secure storage boxes provided to households in the intervention villages. Field workers visited the intervention villages twice monthly to educate farmers about the benefit of storing pesticides in the secure boxes at all times. Adherence to safe storage was high and the majority of households found the storage box a useful addition.

These studies demonstrate that community-wide adoption of new methods for safe pesticide storage can occur when supported by company involvement, education and community leader participation. Continued study of the suicide prevention programme in India should be undertaken. If results prove repeatedly successful, the programme should pave the way for similar suicide reduction efforts in farming communities elsewhere.

NCDs	Risk factors	Behavioural triggers
Mental illness		Choice architecture/Default Depletion

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Case study: Unilever's Lamplighter programme focuses on employee wellness

Unilever has implemented the Lamplighter programme, an employee wellness approach that uses health-risk assessments alongside exercise, nutrition and mental resilience interventions to help employees improve their health and well-being. The programme currently operates in 46 countries, covering more than 35,000 Unilever employees. It includes global standards on medical and occupational health, non-smoking and mental well-being and can be tailored to each country's particular context and major causes of ill health among employees. The adaptability of the programme is particularly important for an organization with employees around the world.

Using information from an employee health-risk assessment, participants work with the Lamplighter programme to develop a personal well-being plan that incorporates four components:

- Nutrition – Tailored nutritional advice to improve diet and reduce cholesterol and blood pressure
- Exercise – Personal exercise plan
- Mental resilience – Online tool that employees can use to monitor and improve stress and resilience
- Reassessment – six-month follow-up with employee

Choice architecture ensures that employees can readily participate in the programme. The programme frames outcomes as tailored and achievable and helps people overcome the optimism bias that sometimes hinders individual engagement in health improvement efforts. In the short term, the programme has proven to be effective in reducing overall health risk within the Unilever employee population, as well as in improving employee engagement, morale and productivity. In the longer term, the programme aims to lower healthcare costs.

NCDs	Risk factors	Behavioural triggers
Cardiovascular disease	Unhealthy diet	Framing
Chronic respiratory disease	Physical inactivity	Choice architecture/Default
Diabetes/Metabolic syndrome		Optimism
Mental illness		
Cancer		

Sources:
GBC Health. Case Study of the Month – Unilever: Lamplighter Program. (2016). http://gbchealth.org/newsletters/cs-unilever/
Unilever. Improving employee health, nutrition & well-being. (2016). https://www.unilever.com/sustainable-living/the-sustainable-living-plan/enhancing-livelihoods/fairness-in-the-workplace/improving-employee-health-nutrition-and-well-being/

Case study: Health Life Clubs in Brazil

In 2014-2015, the Brazilian health market experienced a significant increase in medical costs (17%, compared with real inflation of 10%). This was attributed to the combined effects of an economic crisis, increasingly strict regulation and existing "fee-for-service" payment contracts between health maintenance organizations and health insurance companies and providers.

To combat the increases, United HealthCare (UHC) partnered with Amil Assistência Médica Internacional S.A. Historically, Amil operated a traditional care model, which typically had neither nursing nor primary care capabilities. Most doctors were paid by the hour, with productivity incentives to see more patients. These units offered no care coordination and individuals booked directly with specialists.

In 2016, UHC and Amil undertook a set of specific actions:

- Changed traditional care units to Health Life Clubs (HLCs) staffed with family doctors, nurses and health coaches
- Implemented electronic health records
- Created a process to direct patients from hospitalization, urgent care facilities and call centres to HLCs
- Developed a set of key performance indicators
- Developed an improved performance-based incentive strategy

The change to HLCs included the creation of a "living room" ambience offering internet access, sofas, books and journals. In 2017, the HLCs will add multi-use rooms for such activities as cooking classes, physical activity classes and tobacco cessation groups. The approach seeks to use social norms to engage individuals in a broad set of activities aimed at improving their health.

As well as offering consultations with care coordination teams made up of health agents, nurses and doctors, individuals also have access to specialists, such as cardiologists, endocrinologists, psychologists, physiotherapists and nutritionists.

The HLC programme offers convenient access to highly desirable services, taking advantage of present bias and choice architecture. HLCs can act as a gathering place, allowing social norms to drive health-focused behaviour.

In the short term, UHC and Amil are measuring success by tracking patient volumes and usage patterns, such as the number of consultations with family doctors compared with consultations with ambulatory services. In the long term, key measures will focus on economics, particularly the cost per HLC member per month.

NCDs	Risk factors	Behavioural triggers
Heart disease	Tobacco use	Social norms
Chronic respiratory disease	Unhealthy diet	Choice architecture
Cancer	Physical inactivity	Present bias
Diabetes/Metabolic syndrome		
Mental health		

Source:
UnitedHealthcare Global. Global Markets: Brazil. (2016). http://www.uhcglobal.com/global-markets/brazil/

Case study: Food banks contribute to diabetes care

As the diabetes epidemic has worsened, food banks in the United States have emerged as partners with healthcare providers in the effort to address both food insecurity and the effects of diet on diabetes. Food banks procure and distribute supplies to local food pantries, which in turn provide items directly to clients in need. Feeding America, the nation's largest hunger-relief organization, supplies a network of nearly 200 food banks. One-third of Feeding America's client households report having a member with diabetes. Moreover, although food pantries were originally established to meet emergency needs, food insecurity has become a chronic problem in the US. Thus, many food pantries serve the same clients repeatedly over months or even years. Pantries are often located in the neighbourhoods with highest need, reaching vulnerable and marginalized populations (including people who have infrequent access to medical care).

Between February 2012 and March 2014, a team headed by Hilary Seligman, Associate Professor of Medicine and of Epidemiology and Biostatistics at the University of California, San Francisco (UCSF), studied the effectiveness of using the food bank network to provide clients with diabetes-appropriate food, blood-sugar monitoring, primary-care referral and self-management support. The team enrolled 687 food pantry clients who suffered from diabetes and were clients of food banks in three cities in Texas, California and Ohio. During the enrolment period, food bank staff provided pre-packed boxes containing whole grains, lean meat, beans, low-sodium vegetables, no-sugar-added fruit and shelf-stable dairy products. The boxes were supplemented with perishable items, including fresh produce, milk, yoghurt, cheese, bread and frozen lean meat. Staff also conducted free diabetes screening for all adults queuing for food at partner food pantries. The team used surveys to assess self-management behaviours and determine how often the study participants put off buying food to purchase medicine, or vice versa. Addressing this unfortunate trade-off can take advantage of the loss aversion behavioural trigger.

Pre/post-study comparisons showed improvements in glycaemic control (haemoglobin A1C decreased from 8.11% to 7.96%), fruit and vegetable intake (which increased from 2.8 servings to 3.1 servings per day) and reported self-efficacy in disease management and medication adherence.

Feeding America exploits present bias and choice architecture triggers by making healthy food an effective default. Food banks also act as gathering places, calling into play social norms in support of behaviour change. Although food banks and their associated food pantries are non-traditional settings for diabetes support, the UCSF pilot study suggests their involvement is a promising approach to improving health in vulnerable populations.

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Present bias
Diabetes/Metabolic syndrome		Loss aversion
		Social norms
		Choice architecture

Sources:
Allday, E. Helping Hand with Diet – And Diabetes. *San Francisco Chronicle*. 210, A1, A9 (2016).
Seligman, H.K. *et al.* A Pilot Food Bank Intervention Featuring Diabetes-Appropriate Food Improved Glycemic Control Among Clients In Three States. *Health Affairs*. 34(11), 1956-1963 (2015).

Case study: Good oral health can reduce NCD risk

Improvements in oral health can reduce the risk of related NCDs. Intervention to encourage good oral health in children can be especially important. For example, a team of researchers evaluated the effect of a two-year oral health education programme conducted among three-year-old Chinese children in the Beijing region. Oral health education sessions were conducted for the test children monthly and for their parents semiannually, framing a compelling context for attention to oral care. Children in the test kindergarten brushed their teeth twice daily with fluoridated toothpaste under the supervision of kindergarten teachers, establishing a simple choice architecture. The control populations received no oral health education and performed no supervised tooth-brushing.

An evaluation conducted at the end of the programme indicated that the test group had approximately 31% fewer decayed, missing and filled teeth than the control group. In addition, a significantly higher percentage of children in the test group than in the control group reported brushing their teeth twice a day (87.6% versus 69%).

Given the links between oral health and NCDs, dentistry professionals can play an important role in identifying and providing care and counsel to individuals at risk. For example, a dentist who notices that a patient with diabetes smokes could inform the patient of the links between tobacco use and oral cancer. The dentist could also explain that tobacco use can increase diabetes complications, including periodontal disease, and strongly urge the patient to see a primary care physician for further diagnosis and treatment.

NCDs	Risk factors	Behavioural triggers
Heart disease	Unhealthy diet	Framing
Diabetes/Metabolic syndrome	Tobacco use	Choice architecture
	Harmful use of alcohol	Social norms

Source:
Rong, W.S, Bian, J.Y., Wang, W.J. & Wang, J.D. Effectiveness of an oral health education and caries prevention program in kindergartens in China. *Community Dent Oral Epidemiol*. 31(6), 412-416 (2003).

Case study: Vitality's programme to increase physical activity and improve lifestyle behaviour

Physical inactivity contributes significantly to the development of NCDs. Programmes targeted at promoting physical activity take many forms and include such initiatives as local walk-to-school campaigns and employer-sponsored workplace challenges. Involved stakeholders range from community groups to employers and governments. As the health ecosystem evolves toward a human-centric approach, behavioural economics, often using technology to encourage and reward healthy lifestyle behaviours, will play a more prominent role. The Vitality programme, an insurance-based incentives approach originating in South Africa, applies behavioural economics triggers to engage consumers in making healthier life decisions.

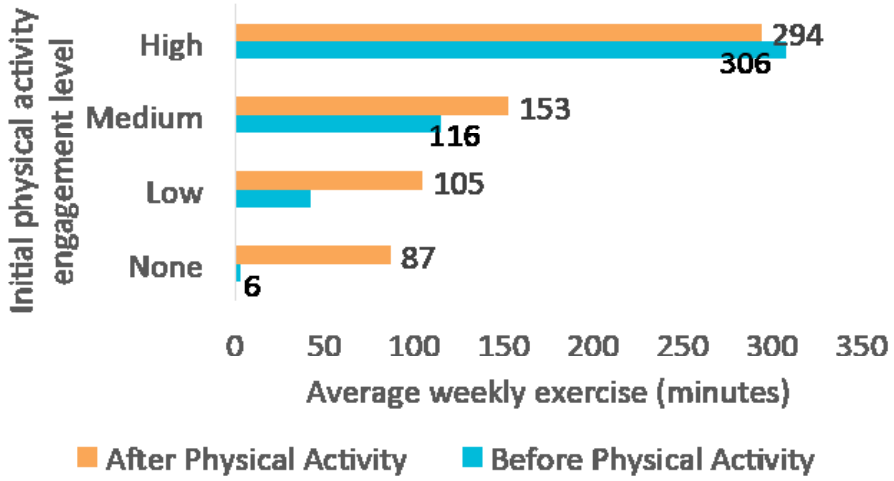
The Vitality programme breaks down long-term health improvement goals into achievable steps while providing rewards for small accomplishments. In a three-and-a-half-year engagement study, the programme identified an increase in healthy food purchases among members, reduced hospitalization and length of hospital stays and reduced medical and prescription costs per employee in participating companies.

The project report attributed these successes to high employee engagement within companies that:

- Promoted participation through a strong wellness communication strategy (capitalizing on information framing).
- Provided initial incentives and a platform that promoted ongoing rewards for healthy behaviours (recognizing employees' bias for current rewards).
- Recruited an internal wellness champion who helped establish a social norm of good health.
- Offered services such as on-site health screening (making these an easy and convenient default choice for employees).

The programme has also begun to take advantage of the role physical activity can play in triggering other healthy behaviours. A five-year study of more than 100,000 Vitality members in the US found increases in the average number of weekly minutes of physical activity among participants. The greatest change in activity occurred among the least active members, who experienced an increase of as much as 150% in their weekly minutes of activity (Figure 1).

Figure 1: Physical activity increases most among less-engaged Vitality members



Vitality members who initially reported no physical activity later saw the greatest boost in engagement in education, screening with Vitality Checks and prevention activities. The study also found that increased activity among members from the least-active group yielded the greatest improvement in Vitality Age, a composite measure used to assess overall health status and risk of death.

Vitality Active Rewards with Apple Watch (the VARWAW programme) builds on Vitality's behavioural economics framework. Members who achieve a physical activity target have their monthly device repayment waived (the behavioural trigger of loss aversion). This has produced a surge in physical activity engagement, including an increase of 27% to 45% in the average daily step count.

Vitality's results show how increased physical activity can precede improvements in other health-promoting behaviours and overall health status and thus may represent an effective early intervention.

NCDs	Risk factors	Behavioural triggers
Diabetes/Metabolic syndrome	Unhealthy diet	Framing
	Physical inactivity	Social norms
		Optimism
		Choice architecture/Default
		Loss aversion

Sources:
British Heart Foundation National Centre. Sharing Practice Booklet. Innovate to Activate: New Ways to Promote Physical Activity and Reduce Sedentary Behavior. http://www.bhfactive.org.uk/userfiles/Documents/CasestudybookletInnovatetoActivate.pdf
John Hancock Insurance and The Vitality Institute. Creating Shared Value From Better Health: A Whole New Approach to Life Insurance. (2015). http://www.thevitalitygroup.com/wp-content/uploads/2015/04/John-Hancock.pdf
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The Vitality Group. Insights from Vitality. Wearables at Work: A Technical Brief. (2014). http://www.thevitalitygroup.com/wp-content/uploads/2013/12/042014_VitalityInsights_WearablesAtWork.pdf

Case study: Use of technology and socialization to accelerate individual engagement in health

Zoojoo.be, a wellness platform start-up in India, uses existing social media, trusted social networks, gamification and behavioural economics to address risk factors for NCDs.

Zoojoo.be uses an online, cloud-based tool that allows individuals to identify small health-related challenges, such as drinking more water or going for a walk, and enables them to set personal goals. Once the challenge starts, the individual receives reminders that provide regular progress updates, contributing to optimism about success in achieving objectives. Participants can share results with friends and colleagues to celebrate individual and team success (building on the social element) and track progress through leader boards.

The company is currently working with Georgia State University in the US to incorporate such measures as sick leave into the results-tracking process.

NCDs	Risk factors	Behavioural triggers
Diabetes/Metabolic syndrome	Unhealthy diet	Social norms
	Physical inactivity	Optimism

Sources:
Keller, M. Social Media and Interpersonal Communication. *Social Work Today.* 13(3), 10 (2013). http://www.socialworktoday.com/archive/051313p10.shtml
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