GLOBAL DIFFUSION OF HEALTHCARE INNOVATION
ACCELERATING THE JOURNEY

Report of the Global Diffusion of Healthcare Innovation (GDHI) Working Group 2015

Professor the Lord Darzi of Denham, PC, KBE, FRS
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FOREWORD

Healthcare innovations – whether they are high-tech or low-tech, policies, practices or products, or in low-, middle- or high-income countries – provide the potential to improve patient and population health outcomes, increase efficiency or effectiveness, and generate opportunities for improved societal wellbeing.

For this potential to result in real impact and to provide benefits to patients, organizations and wider society, new innovations must find their way into widespread use as quickly and safely as possible. Some innovations, despite their social value, are left unadopted because there are simply too many obstacles which organizations do not adequately plan for and manage.

The Global Diffusion of Healthcare Innovation (GDHI) Working Group started this ongoing program of work to try to understand better the factors that can foster the more rapid adoption of healthcare innovations. In this current study, we examined in detail eight distinctly different innovations from different parts of the world, each of which has successfully diffused an innovation in a relatively short period of time and achieved tangible widespread benefits.

We found that certain elements seem essential to more rapid diffusion, regardless of the nature of the innovation. By incorporating these as part of an active program of diffusion, organizations will be better placed to overcome the obstacles, transform their systems and bring value more rapidly to patients and the wider population.

We hope this report will help deepen the collective understanding of what can be done to foster more rapid adoption of new healthcare innovations and provide useful guidance for health leaders who are embarking on the diffusion journey within their own health systems.

Professor the Lord Darzi of Denham, PC, KBE, FRS
Executive Chair, WISH, Qatar Foundation
Director, Institute of Global Health Innovation, Imperial College London

Greg Parston, PhD
Programme Director, WISH, Qatar Foundation
Executive Advisor to the Director, Institute of Global Health Innovation,
Imperial College London

Julie McQueen
Head of Global Diffusion of Healthcare Innovation, WISH, Qatar Foundation
Policy Fellow, Innovation Studies, Institute of Global Health Innovation
Imperial College London

Professor the Lord Darzi of Denham   Greg Parston, PhD   Julie McQueen

EXECUTIVE SUMMARY

Policymakers and healthcare leaders around the world are wrestling with the problem of how to accelerate the take-up of new healthcare innovations. Although a great deal of research has been done on the topic of innovation diffusion, there is still insufficient understanding of how organizations can exploit innovation attributes, address the barriers, effectively plan adoption, and manage necessary organizational change.

This latest research – part of the ongoing GDHI study – seeks to deepen our understanding of the factors that can facilitate more systematic and rapid uptake of new policies, products and practices to improve patient or community health outcomes, accessibility, efficiency and cost-effectiveness of care delivery. It aims to build on the initial learning about the GDHI framework that identified three levels of influence on the pace and spread of the diffusion of healthcare innovation: healthcare systems' characteristics; institutional enablers of innovation; and frontline behaviors. We hope to better understand how health systems can harness the enablers and foster the frontline behaviors identified in our earlier work, to more rapidly diffuse healthcare innovations and drive transformational system change.

Using a case study approach, we investigated eight successful examples of rapid innovation diffusion. We wanted to gain the perspective of policymakers, health system leaders, clinicians and other professionals inside health systems that have effectively managed the adoption and diffusion process for a specific innovation and to learn from their good practices. The case studies are:

- Human Papillomavirus (HPV) Vaccination Program, Argentina.

- Picture Archiving and Communication Systems (PACS) Programme, England.

- National Vitamin A Program (NVAP), Nepal.

- Integrated care, Singapore.

- Vision Zero road safety policy, Sweden.

- Health insurance exchange, Rhode Island, United States.

- TeamSTEPPS, United States.

- Programme Mwana, Zambia.

In each case, the way innovations were conceived and how they were diffused varied and all have followed different paths. But regardless of the process and patterns of diffusion across the distinct innovations, and in spite of the many challenges encountered along the way, in every case the innovations diffused rapidly and each one achieved a tangible benefit.

Critical enablers

We learned that the success or failure of implementation and diffusion across a health system does not depend primarily on the attributes of the innovation or the characteristics of the individual adopter. Rather it is due to the multiple and complex interactions between the enablers and frontline behaviors that arise in particular healthcare contexts and settings. In every case, four particular enablers were critical to success:

1. **Vision, strategy and leadership:** Every case had a clear vision which described the desired future around which all stakeholders could align; a well-defined strategy to execute the vision; and strong, effective leadership to build support for the vision and deliver the change.

2. **A specific organization, program or initiative to promote diffusion:** A special purpose program, organization or network of organizations was created or already in place to provide the impetus, co-ordination, resources and structures that facilitated diffusion of the innovation.

3. **Funding for research, development and diffusion:** Funding was made available to develop, pilot, evaluate, and/or scale-up diffusions. Initial funding generally came from the government, non-government organizations (NGOs) and other donors, sometimes combined with in-kind support from multiple parties.

4. **Communication channels and networks across healthcare, other industries and the public:** Effective communication and linkages across stakeholders helped to ensure that all were working towards a common goal and sharing insights on what as working well or not so well.

Based on the evidence from the case studies, we believe that priority should be given to cultivating these four critical enablers. The absence of any one could have negative repercussions for the scale and pace of the take-up of the innovation.

Frontline behaviors

We also observed from the case studies that, while all the frontline behaviors were important, in several cases, two in particular provided a strong impetus for change:

1. **Engaging the public to create social demand for innovation:** In some cases, this involved creating a sense of urgency around the need for change to address a specific problem; in others, it meant educating people about the inherent benefits or addressing any concerns they may have about the purpose and efficacy of the innovation.

2. **Making adequate time and space for learning and adopting new ways of working:** In most of the cases, organizations built in sufficient time for learning, networking, rethinking workflows, adopting new processes or technologies, and even changing organizational structure and culture in the early stages of diffusion.

The diffusion journey

The diffusion journey is not an easy one and, in most cases, is not quick. Each journey begins from a starting point that is unique to the individual health system – depending on the nature of the innovation, the number and type of stakeholders involved and the characteristics of the health system – and there are often significant barriers to overcome along the way. Despite the common importance of the four enablers and the presence of all the frontline behaviors in our eight case studies, there is no single path to prescribe for successful accelerated diffusion.

However, our case studies show that a carefully planned and guided change program with a dedicated support structure can overcome obstacles, transform systems and bring value more rapidly to clinicians, patients, healthcare organizations, insurers and payers, and the wider society. The successful diffusion of innovations in each of our case studies involved:

- Defining and communicating a vision of the desired future.

- Engaging and preparing people for change.

- Identifying and overcoming the inevitable barriers that are encountered along the way.

- Putting the planned change into action.

- Embedding change within the organizational culture.

Perhaps most importantly, we have learned that diffusion is a journey of organizational change, incorporating many steps and different paths, which needs careful planning and discriminating execution. There is significant literature and research on the phases of organizational change management which have direct application to the diffusion journey.

What is crucial for leaders of the diffusion process is to map the intended phases of the journey, consider which of the enablers and frontline behaviors to leverage and when, learn from the success of others, and be prepared to adapt when needed. Above all, diffusion of healthcare innovation should be seen as a change management exercise that requires dedicated resource, skills and application.

BACKGROUND AND METHODOLOGY

At a time when we face increasingly complex healthcare challenges – such as the rising incidence of chronic illness, global epidemics, an aging population and soaring costs – we need innovative healthcare solutions more than ever.

In the last few decades, health services around the world have seen a proliferation of innovations aimed at enhancing life expectancy, quality of life, preventative care, diagnostic and treatment options, as well as the efficiency and cost effectiveness of healthcare systems. Yet experience shows that it is simply taking too long for many of these new ideas to become prevalent practice. Even where evidence-based innovations are successfully adopted in a hospital or clinic, they often fail to spread more widely across the health system.

Policymakers and healthcare leaders are wrestling with the problem of how to accelerate the take-up of new innovations and increase the scale of diffusion. A number of analytical frameworks have been created that focus on the attributes of innovations, the characteristics of groups of adopters, the decision-making process, and wider contextual and environmental factors. These frameworks can help forecast the likelihood of, but do not guarantee, successful diffusion. The barriers to diffusion are also well covered in healthcare literature[1]. But there remains insufficient understanding of how organizations can exploit innovation attributes, address the barriers, effectively plan adoption and manage necessary organizational change.
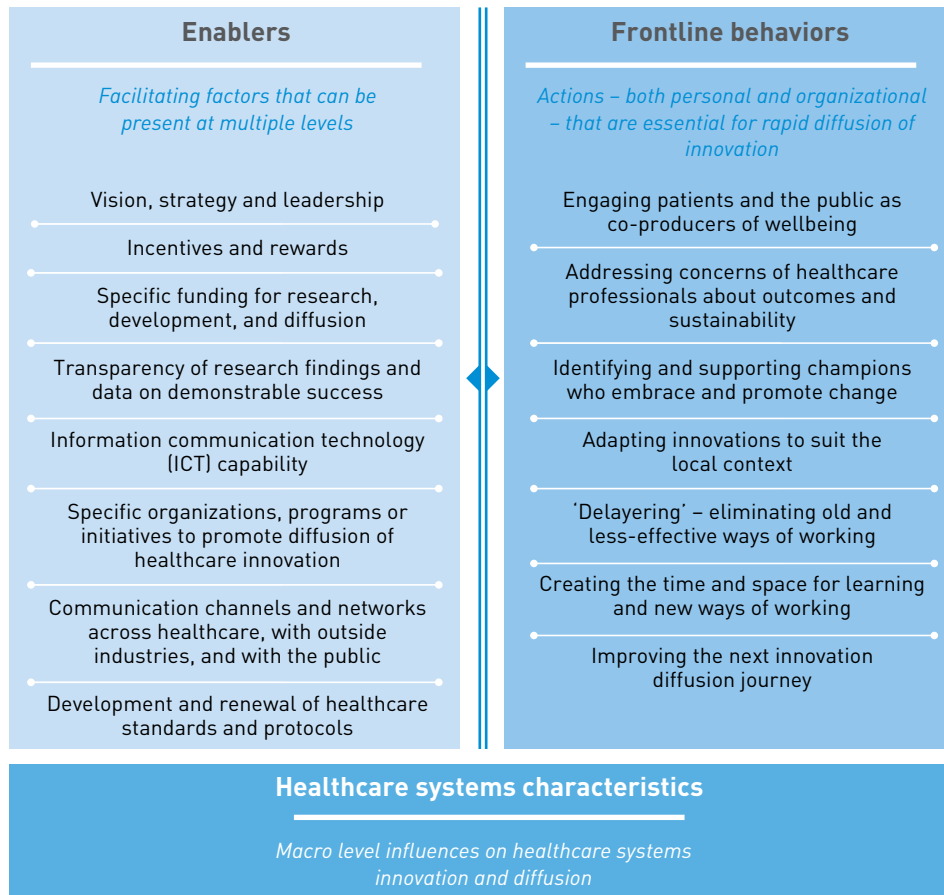
The GDHI study is an ongoing research program that seeks to deepen our understanding of the factors that can facilitate the rapid adoption and diffusion of innovations across health systems. Our aim is to build a strong evidence base for learning so that others can adopt successful practices in their own healthcare organizations to achieve a more systematic and rapid take-up of new policies, products and ways of working that result in improved patient and community outcomes.

The GDHI framework was developed through reviews of literature and case studies and a series of in-depth interviews, undertaken by the Institute of Global Health Innovation (IGHI), Imperial College London. In its 2013 study,[2] IGHI identified three levels of influence on the pace and spread of the diffusion of healthcare innovation:

- **Healthcare systems characteristics**, which set a context within which healthcare innovators can flourish or struggle. They include the economic, political, legal and regulatory environment, as well as the size and structures of health systems.

- **Enablers** of innovation, which can be initiated through corporate or government action. Enablers can be 'soft' – such as clearly articulated visions about the tangible impacts of innovations – or 'hard' – like financial rewards that spur the take-up and spread of innovations across health systems.

- **Frontline behaviors** (previously labeled 'cultural dynamics'), which represent actions, beliefs and practices of the policymakers, healthcare organizations and professionals that manage change and deliver healthcare at the point of care.

These behaviors range from engagement of the public on the benefits of clinical advances to the systematic elimination of old ways of working.

Figure 1: Framework for GDHI

Enablers	Frontline behaviors
Facilitating factors that can be present at multiple levels	*Actions – both personal and organizational – that are essential for rapid diffusion of innovation*
Vision, strategy and leadership	Engaging patients and the public as co-producers of wellbeing
Incentives and rewards	Addressing concerns of healthcare professionals about outcomes and sustainability
Specific funding for research, development, and diffusion	Identifying and supporting champions who embrace and promote change
Transparency of research findings and data on demonstrable success	Adapting innovations to suit the local context
Information communication technology (ICT) capability	'Delayering' – eliminating old and less-effective ways of working
Specific organizations, programs or initiatives to promote diffusion of healthcare innovation	Creating the time and space for learning and new ways of working
Communication channels and networks across healthcare, with outside industries, and with the public	Improving the next innovation diffusion journey
Development and renewal of healthcare standards and protocols	

Healthcare systems characteristics

Macro level influences on healthcare systems innovation and diffusion

Building on this framework, a subsequent study in 2013, *Global Diffusion of Healthcare Innovation (GDHI)*,[3] was undertaken by Ipsos MORI with the support of IGHI. Through qualitative interviews with healthcare experts and an extensive quantitative survey of health professionals in eight countries (Australia, Brazil, England, India, Qatar, South Africa, Spain and the United States), the study assessed the comparative importance and prevalence of the framework's influencing factors in each of the countries studied.

In this current study, we wanted to build on our initial learning about the framework to understand better how health systems can harness the enablers and foster the frontline behaviors to more rapidly diffuse new healthcare innovations and drive transformational system change. The study was commissioned by Qatar Foundation and undertaken by the non-profit research institute, RTI International, in partnership with IGHI.

Using a case study approach, we looked at eight successful examples of relatively rapid innovation diffusion. We wanted to gain the perspective of policymakers, health system leaders, clinicians and other professionals inside health systems that have

effectively managed the adoption and diffusion process for a specific innovation and to learn from their good practices.

Specifically, the study's key aims were to:

- Trace the 'diffusion journey' that health systems and organizations go through to deepen our understanding of the factors that accelerate progress.

- Assess the relative importance of each of the enablers in contributing to a positive impact, in terms of improved health outcomes, greater efficiency and better patient experience.

- Provide guidance for policymakers and practitioners to help them create the conditions and foster behaviors that facilitate more rapid and effective system-wide change.

Given the many different contexts and variables of different health systems, we know that there is not any one typical model for health innovation diffusion; health systems and leaders will take different paths depending on the nature of the innovation and the characteristics of the system. However, by undertaking in-depth cross-case analysis, building a rich picture of each case from an extensive collection of qualitative and quantitative data, we were able to examine commonalities, differences and associations that informed our understanding of the required conditions for successful diffusion, regardless of country or system differences.

After considering more than 70 potential cases, we selected eight (see Figure 2) for in-depth research that met our specified criteria that all should:

- Address a significant issue of public health.

- Fit within our broad definition of innovation, covering products (for example, new technology, inventions, drugs), practices (ways of working, clinical protocols, workforce changes, etc) and policies (government or organizational actions that regulate or influence the use of products and practices).

- Have been implemented relatively rapidly and on a significant scale at a system-wide level; in some cases, this means nationwide, but in others it applies to diffusion across a region or a specific population group (eg children aged under five).

- Present clear evidence that the innovation has a positive and attributable impact on population health outcomes, accessibility, efficiency or cost-effectiveness of care delivery.

Two other important considerations in our selection were: the relevance of the innovation and its potential for transfer to other geographies or population groups; and our desire to include a range of high-, middle- and low-income countries with different health system structures.

Case study methodology

This year's GDHI study was based primarily on qualitative research and analysis, using a multiple case study approach to explore examples of leading practice in the diffusion of healthcare innovations. This approach enables in-depth, multifaceted explorations of complex issues in their real-life settings.

We began by undertaking an initial literature review and environmental scanning exercise to identify examples of innovations that had successfully diffused across a healthcare system. We also sought input from a number of global health experts from a wide range of organizations, including health providers, international NGOs, academic institutions, medical technologies and service providers, healthcare consultants, and international research and policy organizations. After creating a list of more than 70 potential case studies, the research team went through a rigorous process to select eight for in-depth research, based on a number of criteria including the strength of evidence of their effectiveness and scale of diffusion.
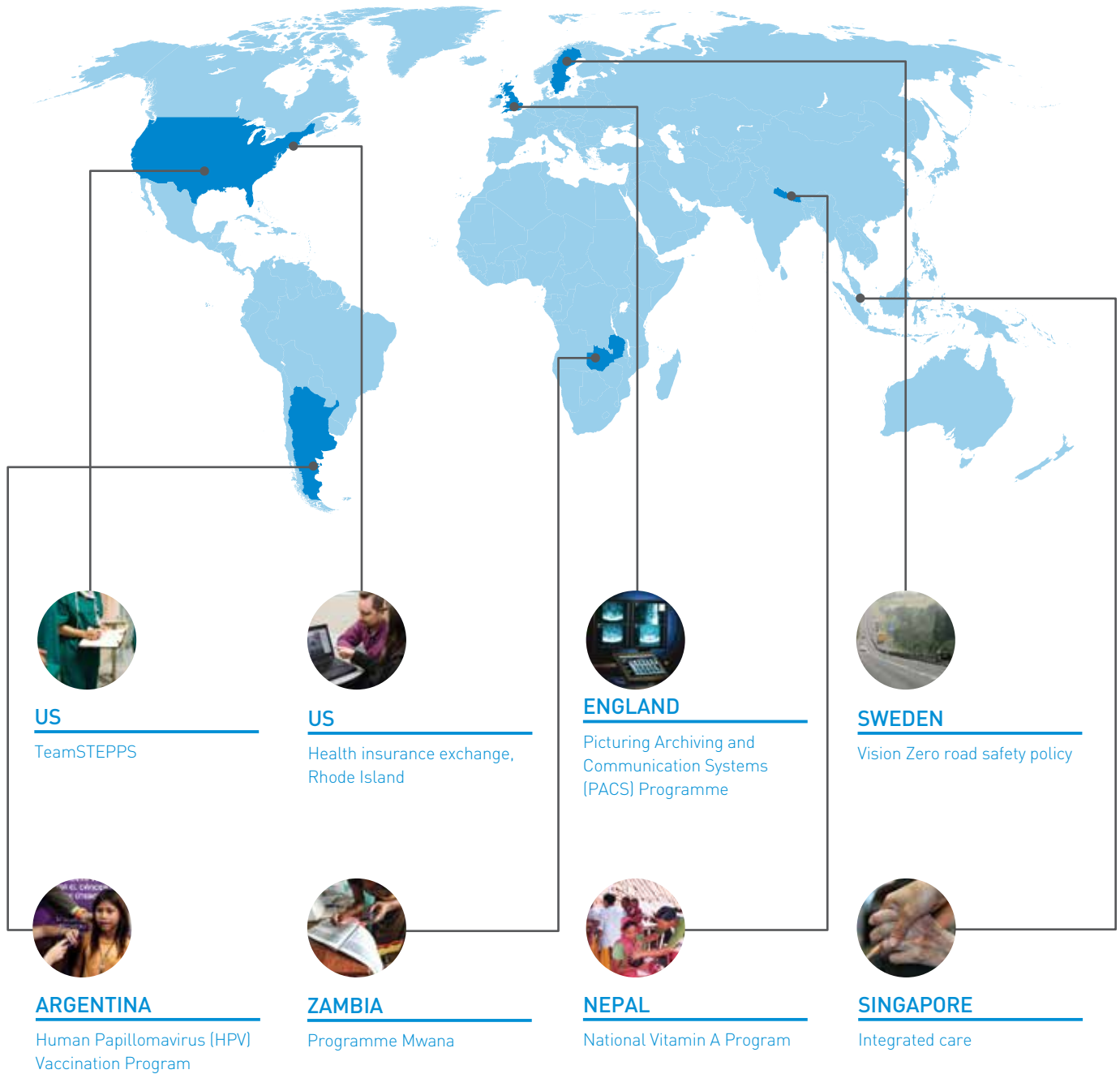
Each case study analysis was conducted by a team of two – an interviewer and a note-taker – during September and October 2014, using a semi-structured interview and discussion guide. Most interviews were conducted in person and several by telephone or Skype. Each team interviewed between 11 and 23 individuals, with a total of 115 respondents across all eight case studies. Interviewees included thought leaders, innovation champions, government officials, representatives of dedicated non-profit organizations, providers, researchers and other individuals responsible for development and diffusion of the selected innovations. All interviews were recorded to supplement the detailed notes taken. Notes were used to perform content analyses to identify key themes using inductive and deductive techniques. The draft of each case study was shared with two or three select interviewees for validation of findings.

Each of the cases provides insights into:

- The nature of the innovation and the perceived need or opportunity that it was designed to address.

- The wider context and environment the diffusion occurred in.

- The critical factors that facilitated faster progress and how these were managed.

- Evidence of the impact the innovation has had on the health system.

Summaries of the case studies can be found at the end of this report.[4]

Figure 2: Eight GDHI case studies

US
TeamSTEPPS

US
Health insurance exchange,
Rhode Island

ENGLAND
Picturing Archiving and
Communication Systems
(PACS) Programme

SWEDEN
Vision Zero road safety policy

ARGENTINA
Human Papillomavirus (HPV)
Vaccination Program

ZAMBIA
Programme Mwana

NEPAL
National Vitamin A Program

SINGAPORE
Integrated care

Fighting vaccine preventable disease in Argentina: the Human Papillomavirus (HPV) Vaccination Program

Argentina's Ministry of Health (MOH) launched a targeted immunization program to prevent cervical cancer, a disease that kills about 1,800 Argentine women a year. The HPV vaccine became available in Argentina in 2006, but only through the private sector and at a very high cost. In February 2011, the Argentine President announced that the HPV vaccine would be included in the national immunization schedule, making it available free of charge to the target population – all 11-year-old girls in Argentina – through a national program. The program was launched just eight months later in October 2011.

Guided by a clear vision and strategy, which was overseen by a dedicated agency within the MOH, the National Program for the Control of Immunopreventable Diseases (ProNaCEI), the vaccine dissemination program is fully funded by the Argentine Government, with the vaccine purchased at a reduced rate through the revolving fund of the Pan American Health Organization. A major focus of the diffusion effort was to raise awareness of the vaccine and its benefits among the public and healthcare providers. Given the sensitivity of the topic, messages were carefully framed to promote the idea that the vaccine would help girls to have a better future. Each province developed its own strategy for how best to reach the target population in the local context, including through health centers, schools, and community health workers visiting houses personally.

More than 500,000 girls received the full three-dose vaccine series between the start of the program and February 2014. For this cohort alone, the campaign is expected to help prevent more than 9,000 cases of cervical cancer and avert 4,000 deaths. National coverage rates, which were negligible, have increased to 88 percent of 11-year-old girls receiving at least one dose of the vaccine and 52 percent receiving the recommended three doses.

Deploying medical imaging analysis tools in England: the Picture Archiving and Communication Systems (PACS) Programme

Between September 2004 and December 2007, the national PACS Programme deployed PACS to 128 National Health Service (NHS) hospital trusts (75 percent of the total) across England that did not already use the systems. PACS replaced the old method of film-based medical imaging with a digital system that allows images to be stored electronically and viewed on screen. PACS offers benefits in terms of operational efficiency, the speed of sharing images with other clinicians, new image analysis capabilities, and opportunities to enhance patient care.

The PACS Programme was part of the National Programme for Information Technology (NPfIT), which was launched in 2002 to upgrade and expand the NHS IT infrastructure. The program featured a national leadership structure that paired technical and clinical directors. These directors implemented a command and control strategy that delegated technical direction to regional deputy directors and then to local implementation teams. The PACS Programme used stakeholder working groups and communications channels to allow national and regional leaders to gather feedback and improve program delivery. Local implementation teams served as champions to coach and prepare their colleagues for a transition that had film-based imaging cease one day and digital imaging begin the next day.

In just over three years, all hospital trusts across England were using PACS. The central data stores contained 640 million images, and approximately 10 million more images were being added every week. For the hospital trusts that did not have PACS previously, one expenditure line in their budgets was collectively reduced by £35 million (US $55 million) per year.

Saving lives with nutrient supplements in Nepal: National Vitamin A Program (NVAP)

Nepal's NVAP is a policy innovation to combat vitamin A deficiency, which is the leading cause of blindness in children and directly associated with increased child mortality. The program was initiated following a research phase that developed the base of evidence around the benefits of vitamin A supplementation. It was conceived from a partnership between a number of international and national stakeholders who shared an overall vision to reduce child mortality and blindness. The Nepal Technical Assistance Group (NTAG) was established as an NGO to implement, co-ordinate and lead the initiative. Implementation began in 1993 and the program was scaled-up in phases, covering all 75 districts by 2002. Initial funding was provided by USAID and the United Nations Children's Fund (Unicef).

The program targets all pre-school-age children (six months to 60 months) by administering vitamin A supplements two times per year. The supplement is given to children by the 49,000 Female Community Health Volunteers (FCHVs), a role that was established in the early 1990s for community-based family planning activities.

The NVAP also includes an important education element which aims to encourage local communities to produce and consume foods rich in vitamin A. With support from NTAG and district and community-level healthcare staff, the FCHVs work with communities through strategies that include vitamin A educational sessions, cooking demonstrations and public media campaigns, including local parades and entertainment in remote areas. Evaluation and monitoring activities, including micronutrient surveys in each district, are embedded into the NVAP and results are used to assess coverage and identify gaps.

The evidence has shown a 26 percent reduction in mortality for children under five years of age in districts where supplementation is provided. With coverage of the program close to 90 percent annually, Unicef estimates that the NVAP averts 12,000 deaths per year.

Integrating care in Singapore

Integrated care is a policy innovation which has been implemented through the Agency for Integrated Care (AIC) to address Singapore's rapidly aging population and a range of challenges in its health and social care systems. AIC's vision is to create "a vibrant Care Community enabling people to live well and age gracefully".

Following on from a number of previous efforts to develop integrated care in Singapore, the AIC was created in 2008. In 2009 it was incorporated as a private limited company under the Ministry of Health Holdings (MOHH), which enables it to have greater operational autonomy and innovate and act faster than most government agencies. The AIC works at an intermediate level of the health and social care system, bridging the gap between the macro-level policymakers at the MOH and the Ministry overseeing social care services, and the micro-level frontline health and social care facilities and professionals in the intermediate and long-term care (ILTC) and primary care sectors.

The AIC grew rapidly in the years after its founding with the number of employees rising from about 30 in 2009 to nearly 500 in 2014. It has developed and expanded a number of integrated care programs and services, working with individual and institutional providers throughout the ILTC sector to improve their capacity to care for an increasing number of elderly patients and to improve the quality of care provided. The programs and services provided by the AIC are diverse and often overlap, work together and reinforce each other.

The integration of care that has been achieved by AIC has had measurable success in improving care outcomes while reducing costs. For example, one of its programs, SPICE, was found to reduce caregiver stress by 42 percent, hospital admissions by 67 percent, and emergency department visits by 50 percent.

Improving traffic safety in Sweden: Vision Zero

Vision Zero is an ambitious Swedish road safety policy which is based on the premise that no one should be killed or seriously injured in a road traffic accident. The development of the policy began in 1995 and it was adopted as a long-term goal by the Swedish Parliament in 1997. Vision Zero represents a fundamental shift in road safety thinking. It aims to support the development of a transport system that is better able to accommodate inevitable human error. It recognizes that the responsibility for safe transport is shared between individuals using the road and the system designers, which include policymakers, planners, state and municipal road authorities, driving schools, police, vehicle manufacturers, employers, insurers, transport companies and health providers.

Vision Zero piloted a number of road safety interventions, including changes in road designs (such as the '2+1' highway, separated by a crash barrier to oncoming traffic) to demonstrate their effectiveness and build support for the policy. The Swedish Road Administration (SRA) was designated as the responsible agency for Vision Zero, with a dedicated traffic safety unit, but it worked collaboratively with many other stakeholders – such as municipal governments, vehicle manufacturers, and police – to implement change. The SRA (now the Swedish Transport Administration) regularly monitors progress in meeting interim targets and shares data with other stakeholders so they can understand their role in achieving the wider goals.

Since 2000, Sweden has seen traffic fatalities decrease by over 50 percent, despite an increase in passenger vehicle traffic volumes. The number of fatalities per billion kilometers traveled in passenger vehicles fell from 10.05 in 2000 to 4.45 in 2012. This decrease is equivalent to 2,569 lives saved over the period.

Extending health insurance coverage: Rhode Island health insurance exchange

Rhode Island developed a state-based health insurance exchange through Health-Source RI in response to the high percentage of the state's population that was uninsured or underinsured. The US Patient Protection and Affordable Care Act (ACA) of 2010 required states to have an operational, web-based health insurance exchange. After the Rhode Island state legislature failed to pass health insurance exchange legislation in 2011, HealthSource RI was established by an Executive Order of the Governor. It operates as an agency of the state Government.

The Government implemented an open-door policy to engage a wide range of stakeholders in providing input and employed a range of strategies and channels to educate consumers about the new marketplace.

The HealthSource RI website went live for open enrollment on October 1, 2013, as required by ACA. The agency works with health insurance companies to provide price and feature comparisons on its website for consumers, increasing transparency and promoting competition between health insurance companies to improve affordability. It also works with small businesses to offer health benefits to employees for lower premiums than they could access on their own. HealthSource RI is notable for its success in ICT applications, including the consumer website and its contact center, both essential for the operations, marketing, and diffusion of the health insurance exchange.

The implementation of the health insurance exchange has extended coverage of affordable healthcare to previously underserved groups. In just a few months, 41 percent of the potential health insurance marketplace population had enrolled for health insurance. HealthSource RI is also starting to see a reduction in the cost of some plans as a result of negotiations by the agency and insurers dropping their prices in response to a more transparent marketplace and the price comparison function offered by the website.

Communicating effectively to improve patient care in the US: TeamSTEPPS

Much medical harm has been linked to poor teamwork and communication among healthcare teams in the US, where as many as 98,000 people die in hospitals each year as a result of preventable medical errors.

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS®) was created as an evidence-based teamwork and communication program focused on improving team performance. Initially developed and piloted by the Department of Defense (DOD) in 2004/2005, it has since been promoted by the DOD and Agency for Healthcare Research and Quality (AHRQ) as a means of preventing medical errors by transforming safety culture and behaviors within healthcare.

AHRQ has established and sponsored eight regional training centers across the US, which are co-ordinated by a dedicated, federally supported NGO to facilitate diffusion of the innovation. Since 2007, more than 10,000 individuals have become TeamSTEPPS master trainers through training at the regional centers and DOD facilities, bringing more effective models of working to hospitals. TeamSTEPPS has diffused to at least 17 other countries and the curriculum has been translated into multiple languages.

The TeamSTEPPS curriculum is based on team structure and four core skill areas: leadership, communication, situation monitoring, and mutual support. The program challenges current behaviors and practices in institutions and provides tools for establishing new teamwork and communication standards and protocols to sustain the changes in organizational culture and provider behavior.

Numerous studies report improved organizational and clinical outcomes following implementation, such as reduced perinatal morbidity, decreased medication and transfusion errors, reduced operating room surgical mortality, and decreased hospital-acquired pressure ulcers. Also, many healthcare systems have cited sizeable cost savings through decreased malpractice claims as a result of TeamSTEPPS implementation.

Speeding infants' access to HIV treatment in Zambia: Programme Mwana

Programme Mwana is a nationwide mobile health (mHealth) program that was implemented by the Zambian Ministry of Health (MOH) to expedite HIV test result delivery and improve neonatal care. Zambia's high rate of HIV prevalence (12.7 percent) and overburdened health system create a challenging environment in which to control the HIV epidemic. Early infant diagnosis (EID) of HIV is limited by a rural and often migratory population; long distances between health facilities, villages, and laboratories; and long turnaround times for testing.

Programme Mwana leverages high cell phone literacy to facilitate communication between central labs, where the tests are processed, and healthcare workers, who deliver the results to caregivers. Mwana enables community health agents and healthcare workers to use their personal cell phones to receive patients' EID results by text message, receive appointment reminders, and communicate with each other.

Programme Mwana was developed through a collaboration with Unicef, the Zambia Center for Applied Health Research and Development, the Clinton Health Access Initiatives, and the Zambian Ministry of Health. The platform was designed in 2010 and piloted in 31 health facilities across three regions. Demonstrated success led to formal approval from the MOH for national expansion, which commenced in 2011. The system is now operational in more than 1,000 health clinics across Zambia.

An evaluation conducted during piloting demonstrated Mwana's ability to cut turnaround time for EID results by nearly 50 percent, from 44.2 to 26.7 days. To date, no rigorous evaluations of health impact exist, although anecdotal evidence suggests that Mwana's increased notification of EID results may have moved children into antiretroviral therapy more quickly and encouraged more caregivers to have their infants tested.

Realizing the benefits of innovation diffusion

In each case study, how the various facilitating factors were conceived and how they were diffused followed different paths. In England, for example, the roll-out of a PACS Programme across all English NHS trusts was managed by a national program team and delivered in a relatively short three-year time frame. In Nepal, the provision of vitamin A supplements was carried out through a phased and gradual implementation over 10 years, with local district health offices and FCHVs playing a key role in building community participation and ownership. In Singapore, the process of diffusing innovations in integrated care is an ongoing one, with the AIC continuing to pilot promising new programs that can help achieve its overall vision of improving care outcomes.

Regardless of the process and patterns of diffusion of innovation across the eight distinct innovations, and in spite of the many challenges encountered along the way, every innovation diffused on a significant scale relatively rapidly. By challenging the local status quo and envisioning a better future, each one had achieved significant tangible benefits. In some cases, value was created by introducing new policies, practices, or products that otherwise would not have been adopted – or would have been adopted at some distant point in the future. In other cases, the diffusion program accelerated the rate of progress, steepening the adoption curve of a socially advantageous innovation, and speeding up life-saving treatments and efficient modes of working.

In the following section we examine the enablers and the frontline behaviors that were key contributors to the success of the eight case studies.

Finally, we consider how the selective application of the enablers and frontline behaviors in the GDHI framework can help health policymakers, clinical professionals and managers improve the diffusion journey to spread healthcare innovations widely and more rapidly across their health systems. And we suggest a roadmap for change to improve health outcomes and achieve greater efficiencies and better patient experience.

THE FACILITATORS OF ACCELERATED DIFFUSION

Refining the language of the GDHI framework

Our in-depth assessment of the eight case studies provides rich contextual data to help us validate and refine the GDHI framework. We found no evidence to suggest that there are any additional significant enablers or frontline behaviors affecting diffusion of innovation that had not been identified by experts in our previous studies. However, we did develop a more nuanced understanding of the various facilitation factors and these are reflected in some minor changes in the language used in the framework, as reflected in Figure 1.

The critical enablers of healthcare innovation diffusion

Through the case studies, we wanted to explore the relative importance of the enablers previously identified in the GDHI framework from the perspective of stakeholders that have been personally and actively involved in the diffusion of a specific innovation across a health system.

Based on what we learned through in-depth interviews with the stakeholders in each case study, we assessed the role and influence of the eight enablers in driving diffusion, using the following key. The results are shown in Figure 3.

Key to assessment of enablers:

● = Enabler is either not present or applicable to the case

◐ = Enabler is in place but not a significant factor

◑ = Enabler is a minor contributing factor

◕ = Enabler is a moderate contributing factor

● = Enabler is a strong contributing factor

Figure 3: Examining the relative contribution of enablers

LEVEL OF CONTRIBUTION
(five-level scale shown as pie symbols increasing from lowest to highest contribution)

Enabler	HPV Vaccine (Argentina)	PACS (England)	Vitamin A (Nepal)	Integrated care (Singapore)	Vision Zero (Sweden)	Rhode Island Health Insurance Exchange (US)	Team STEPPS (US)	Programme Mwana (Zambia)
Vision, strategy and leadership	full	full	full	full	full	full	full	full
Incentives and rewards	half	low	low	half	low	full	low	half
Specific funding for research, development and diffusion	full	full	full	full	full	full	half	full
Transparency of research findings and data on demonstrable success	3/4	3/4	full	half	full	half	3/4	3/4
Information and communications technology capability	low	3/4	lowest	3/4	low	full	3/4	full
Specific organization or program to identify and promote healthcare innovation	full	full	full	full	full	full	full	full
Communication channels and networks across healthcare, with outside industries and with the public	full	3/4	full	full	full	full	3/4	full
Development and renewal of healthcare standards and protocols	half	lowest	low	full	lowest	lowest	full	low

Findings from the survey of healthcare professionals in our previous study demonstrated specific common frontline behaviors in all of the countries examined. However, experts interviewed in different countries cited different enablers as being most important to the diffusion of healthcare innovation. In the US, for example, incentives and rewards were seen as having the most important role; experts in Spain noted the importance of vision, strategy and leadership; and in England, standards and protocols were prioritized. Only ICT capability was regarded as important everywhere. In half of the countries studied, four enablers – vision and strategy, a specific resource to promote diffusion, communication channels, and standards and protocols – were cited as being least important to the diffusion of innovation over the previous five years.

In contrast to these expert perceptions in our earlier study, our observations of actual diffusion in the current research show that four of the eight enablers stand out as being essential to successful rapid diffusion across all eight case studies, regardless of country or type of innovation:

1. Vision, strategy and leadership.

2. A specific, organization, program or initiative to promote diffusion.

3. Specific funding for research, development and diffusion.

4. Communication channels and networks across healthcare, other industries and the public.

1. Vision, strategy and leadership

In every case we looked at, there was evidence of a clear vision which described a desired future around which all stakeholders could align. There was also a well-defined strategy to execute the vision, and strong, effective leadership to build support and deliver the change. In Rhode Island, for example, the Governor and Lieutenant Governor shared a vision to provide citizens with improved access to high-quality and co-ordinated healthcare at an affordable cost. They single-mindedly pursued this vision – even after the state legislature had failed to pass health insurance exchange legislation – through a strategy of establishing advisory groups, engaging a broad range of stakeholders to contribute to design and development, conducting extensive customer outreach and hiring essential skilled staff to manage the change. Similarly, in Argentina, the HPV Vaccination Program benefitted from strong advocacy at the highest political levels. The vision – to reduce the incidence of cervical cancer – was carefully formulated, with clear messaging that was used as the basis for communications with the public and health professionals.

2. A specific organization, program or initiative to promote diffusion

We observed in all of the cases that a special purpose program, organization or network of organizations was created or already in place to provide the impetus,

co-ordination, resources and structures that facilitated diffusion of the innovation. In Singapore, for example, the AIC was created to develop and diffuse new integrated care concepts. Operating as a private limited corporation owned by the Government, the AIC acts as a platform for sharing ideas across the health and social sectors; stimulates innovation and develops pilot programs; and works closely with the Government to implement its policies and with health and social care providers to develop new services and capabilities. In the US, a dedicated NGO was tasked with overseeing national implementation of TeamSTEPPS. The NGO receives direction from the AHRQ but is responsible for administration and oversight of regional training centers, technical assistance and maintenance of peer networking activities.

3. Funding for research, development and diffusion

In all eight case studies, funding was made available to develop, pilot, evaluate and/or scale-up diffusions. Initial funding generally came from the government, NGOs and other donors, sometimes in combination with in-kind support from multiple parties. In the case of Programme Mwana in Zambia, for example, the diffusion of the text messaging platform was made possible by financial support from the MOH and a number of other implementing partners and donors, including international NGOs who paid for technical development and text messages, and other local partners who contributed funding to scale-up the project in their respective regions. In Singapore, the AIC used a variety of funding sources, including MOH and other government funds, for developing and testing its pilot programs, usually over a five-year time frame. It also leveraged other alternative sources of funding, including taxes from casino gambling.

4. Communication channels and networks across healthcare, other industries and the public

Effective communication and linkages with other organizations helped to ensure that all stakeholders were working towards a common goal and sharing insights on what worked well and what needed improvement.

The PACS Programme in England, for example, held regular regional stakeholder working group meetings, led by clinical directors and attended by senior clinicians and PACS administrators, local service providers and other key stakeholders. The meetings provided important opportunities for clinical engagement and information sharing, reviewing lessons learned related to the deployment and troubleshooting any problems that arose.

In Sweden, a number of forums have been created as platforms for sharing knowledge, discussing countermeasures and stimulating stakeholder contributions. Government transport bodies, local authorities, car manufacturers and others, meet regularly to share knowledge and explore new ways of working together to improve safety. Stakeholders also come together at annual conferences to review progress against targets and discuss further safety measures for which they will later be held accountable.

Stakeholders interviewed in our current research regarded these four enablers as consistently important contributors to successful diffusion, across all the case studies. The four enablers have a particularly powerful impact when they work together.

In Nepal, for example, the NVAP was conceived as the result of a partnership between many national and international stakeholders, including government departments, researchers and several NGOs. It was guided by a strong vision – to reduce child blindness and mortality – supported by a strong scientific evidence base on the effectiveness of the supplements. This helped to secure funding for the early stages of diffusion, primarily from international donors. The various stakeholders worked collaboratively to plan and design the policy. This led to the formation of an NGO specifically tasked with developing the diffusion strategy and providing technical support for implementation. Communication with all stakeholders, including the public was critical to building capability and public advocacy. Together, all four enablers combined to overcome barriers and ensure the successful diffusion of the program across the country.
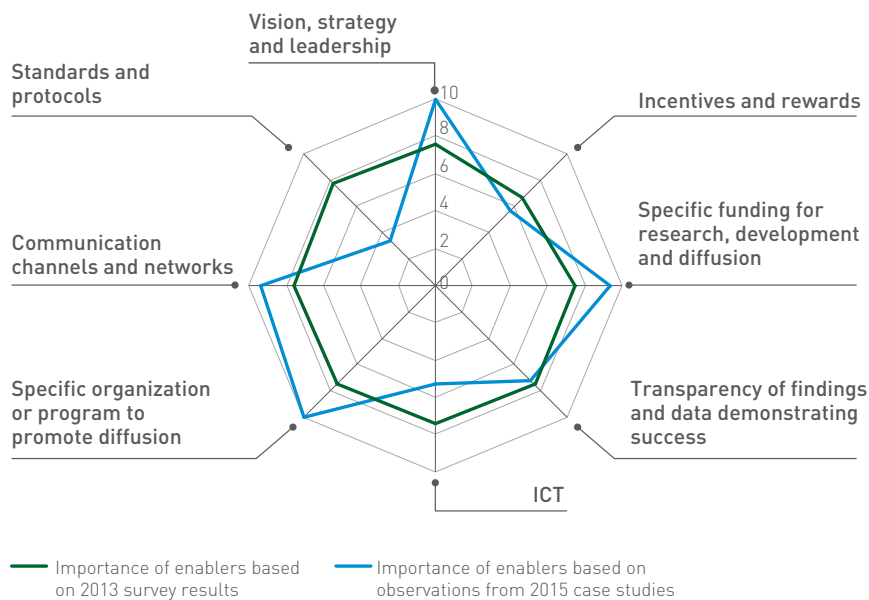
Based on our observations from the case studies, we believe that some form of each of these four enablers needs to be present to drive rapid adoption of healthcare innovation. Also, as we discuss below, the four enablers facilitate the acceptance and practice of many of the critical frontline behaviors.

Figure 4: Comparison of importance placed on enablers, based on survey of healthcare professionals (2013) and observations from case studies (2014)

Figure 4 illustrates the difference between the enablers that were perceived as most important to diffusion of healthcare innovations by healthcare professionals surveyed in our 2013 study and those that actually emerged as the strongest influencers based on the current case studies of the successful innovations.

Although not statistically comparable, these linear profiles show quite clearly the difference between the general observations of surveyed healthcare leaders and the actual experiences of stakeholders personally and actively involved in diffusing innovations across a health system. While it may be true that all enablers can be useful facilitators of rapid diffusion of innovation, and that some may be more relevant in some countries or health system economies than others, astute application of the four critical enablers is what facilitated success in all eight of the case studies.

— Importance of enablers based on 2013 survey results
— Importance of enablers based on observations from 2015 case studies

(In order to depict these differences graphically, we assigned a numeric value of zero to four for the five criteria used to assess the influence of each enabler on each case study and calculated the average score. To allow for comparability with the 2013 survey findings, which were based on a ten-point scale, we adjusted the average score by multiplying it by 2.5. The final scores were applied to a web diagram depicting the importance of enablers identified during the 2013 study based on the perceived level of importance of each enabler.)

Of course, policymakers and organizational leaders will want to critically examine all of the enablers in relation to their own context and circumstances to understand if any are likely to be 'strong' or 'moderate' contributors. Based on the evidence from the case studies, however, it would seem that priority should be given to cultivating these four essential enablers, as the absence of any one could have negative repercussions for the scale and pace of take-up of the diffusion. Considering the factors that have helped the success of other projects reduces the risk of wasting funds on ineffective approaches.

Health experts interviewed in our 2013 study indicated that the role of ICT was important in helping to support the spread of innovation in all of the countries studied. In our current case studies, however, ICT had little or no role in four diffusion journeys. ICT capabilities could be a key facilitating factor, depending on the nature of the innovation and system-wide context, but we observe that health leaders may need to be more discerning in considering the role and importance of ICT in the diffusion process. In practice, ICT can absorb funding and management time that could more effectively be invested elsewhere.

Fostering behavioral change at the frontline

Adoption of healthcare innovation often fails because individuals and organizations do not adopt the necessary behaviors at the frontline to successfully implement the new policy, product or practice.

We found in our previous study that, despite the very different contexts within which healthcare professionals work, there was broad commonality across all the countries examined on the most prominent frontline behaviors. Those that are more 'relational' – supporting champions, engaging patients and the public, and addressing the concerns of health professionals – were found to be significantly more prevalent than those that require 'hard' organizational changes to working practices, including adapting innovations for the local context, creating time and space for learning and eliminating old ways of working.

Our current case study research confirms our belief that all of the behaviors are important. Where innovations were largely aimed at health professionals or other frontline staff, we learned that personnel were engaged early in the process to increase acceptance or address any concerns. In the case of Programme Mwana, for example, the move towards using personal mobile technology in a professional work setting required a shift in attitude for users unaccustomed to using a personal device for work. Discussions with clinic staff and community health workers early in the development process helped in formulating the design of the program, corroborated the perceived need and secured the buy-in of the program's users. Their acceptance was strengthened as the program evolved to incorporate user feedback. For example, the 'chat' feature that allowed messaging between clinic staff and district health workers was developed after health workers suggested that this enhanced communication could improve co-ordination and help them perform their jobs more effectively.

We noted that 'delayering' – or eliminating old or ineffective ways of working – was another important requirement. In the case of TeamSTEPPS, for example, healthcare teams were required to sometimes radically change their old way of working, eliminating practices which contributed to failures in teamwork and communication and adopting new, practical tools to improve patient safety. Organizations conduct in situ simulations to allow healthcare teams to practice teamwork, communication and clinical management skills in their usual setting. The simulations help the team identify and address latent threats and system issues by eliminating unsafe or inappropriate practices. Recent studies have shown that these simulations improve unit safety culture, patient outcomes and team performance, and reduce adverse events.

In other cases, we observed that strategies for innovation diffusion were adapted for the local context to help achieve widespread take-up. In Argentina, for example, in developing its strategy and messaging for promoting the HPV vaccine, the MOH carefully studied the experiences of other countries and made adjustments that they believed would enhance the likelihood of success in Argentina (for example, de-emphasizing the connection between HPV and sexual activity). Local adaptation was also encouraged within Argentina. Each province developed its own strategy for delivering the vaccine to the public through the most appropriate channels (for example, schools or clinics). The team responsible for developing the communications campaign also worked with communications specialists at the provincial level to support them in developing campaigns tailored to their own regions. Given the demographic and economic diversity of the country, these local adaptations were very important in increasing take-up of the vaccine.

While we believe that all the frontline behaviors are important, evidence of some of the behaviors was more prominent in some cases than in others, suggesting that they also should be actively cultivated to accelerate diffusion. These are: engaging the public to create a 'market for change'; and creating time and space for learning.

Engaging the public to create a 'market for change'

In the case studies where patients and the public were the end users, recipients or direct beneficiaries of the innovation, we found that they played a crucial role in driving change. Engagement with the public – whether undertaken directly by the originator of the innovation, the organization managing the change or through other channels such as health professionals or the media – helped create demand for the innovation, or what one interviewee termed "a market for change". In some cases, engagement involved creating a sense of urgency around the need for change to address a specific problem; in others, it meant educating people about the inherent benefits or addressing any concerns they had about the purpose and efficacy of the innovation.

In Nepal, for example, the use of creative and unconventional outreach strategies to raise awareness and provide nutritional education in each district was a key factor contributing to the success of the NVAP. These marketing and community engagement activities – particularly in the absence of more sophisticated communication technologies in remote areas – created an atmosphere of increased demand for vitamin A, but also for various other public health services. For example, street drummers and magicians incorporated educational messages about vitamin A into their performances; songs about vitamin A were broadcast on local radio stations; and seeds were distributed so that people could grow their own fruit and vegetable crops in their kitchen gardens. By encouraging active community participation and ownership over improvement in children's health, the NVAP came to be seen as a community program, rather than a government program.

In Argentina, convincing parents that they should get their daughters vaccinated was fundamental to achieving widespread diffusion of the HPV vaccine. A great deal of effort was put into educational campaigns, through media and healthcare providers, to generate public support for the vaccination. Community meetings were held throughout the country, involving pediatricians, vaccinators and members of the public, to address people's concerns. Messages centered on the vaccine as a 'right and a responsibility' and promoted the idea that it would contribute to women's future health and wellbeing. Ultimately, one of the biggest challenges turned out to be excess demand, as program staff received pressure from parents to vaccinate girls outside the original cohorts.

In Sweden, Vision Zero specifically called on road users to make powerful demands on the designers of the transport system – such as car manufacturers, public transport companies and road authorities – to improve safety. Over time, a more informed public, with heightened safety expectations and access to better consumer information, has exerted market pressure on designers. The creation of the European New Car Assessment Programme or 'Euro NCAP', for example, created a way for the public to access independent consumer information about the safety performance of cars and to make more informed decisions about their purchases. This has led vehicle manufacturers to undertake safety improvements that go beyond the minimum standards set. The use of test results in manufacturers' marketing has helped create continuous improvements, driven by market pressures.

In all of these cases, the role of the public in creating demand for change was central to the successful diffusion of the innovation. Public involvement was facilitated by having a clear strategy which included active public engagement and education, a specific organization or program responsible for driving the change, and effective communications channels and networks.

Creating time and space for learning

Much has been written about innovation diffusion curves,[5] which represent the speed of take-up across a system or population, from 'early adopters' to 'laggards', with benefits increasing over time.
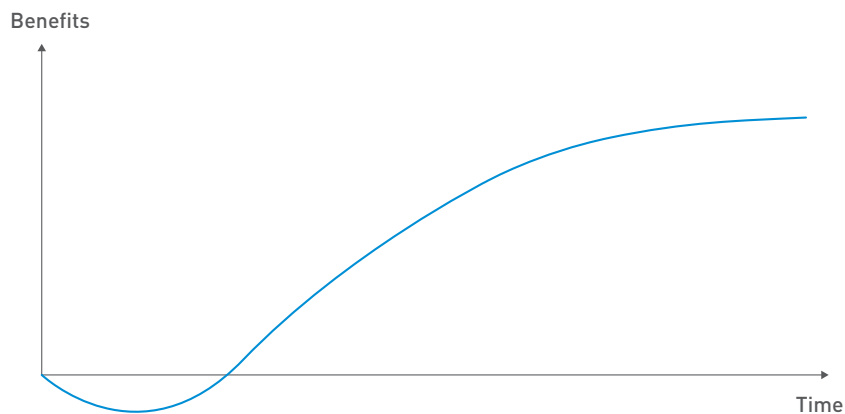
From our case studies, we have observed that progressing quickly along the 'benefit curve' requires careful planning and, where necessary, adjustment through the diffusion journey. The spread of new innovations often requires the introduction of new skills and capabilities, new ways of working, new roles and sometimes organizational restructuring to accommodate the change. The cost of initiating diffusion – in money, time and, in the early stages, disruptions to normal practice – is not insubstantial. In some cases, there may actually be a short period where the health system experiences a counterintuitive fall in productivity and efficiency before later improvements occur (see Figure 5).

Many healthcare systems make the mistake of allocating insufficient resources to organizational and process change in the early stages of implementation and diffusion, often underestimating the amount of time and effort needed for these activities. Failure to plan for this means that the 'benefit curve' will not rise as quickly.

Our observations from the case studies show that it is vital for policymakers and health system leaders to recognize and plan for this pattern of transformation and, in the early stages of diffusion, build in time for learning, networking, redefining roles and job descriptions, adapting workflows and changing organizational structure and culture. To achieve this, a clear strategy and implementation plan is needed, supported by a dedicated organization, program or initiative with resources to support training and development, and sufficient funding to invest in the diffusion process through the early stages.

Figure 5: The diffusion benefit curve (achievement of value over time)

Figure 5 shows the diffusion benefit curve. There is likely to be a short period where net value is lost as diffusion is initiated, due to disruptions to existing work patterns, time required for training and other associated organizational changes.

Source: Global Diffusion of Healthcare Innovation (GDHI) Working Group

For example, the PACS Programme in England, which rolled out PACS systems to 128 hospital trusts in a three-year period, represented a significant change management effort. The program, which was part of the broader NHS Connecting for Health initiative, benefited from a dedicated program management team and sufficient funding to drive the diffusion. The team, which included both technical and clinical directors, provided the necessary structure, human capital and co-ordination to guide the deployment across the country.

The program did not allow for a gradual phasing in of the digital technology. The switch from film to digital had to happen over a couple of days in each hospital. As a result, careful planning and preparation was needed in each hospital to ease the transition. Each hospital created a project implementation team tasked with interfacing with relevant local service providers and managing the workflow changes that the program would require. Hospitals had to be ready to receive the new systems – with time and schedule cleared – and adequate resources had to be dedicated throughout the planning and transition period. Radiologists received one-to-one training for two to three hours, supplemented by an e-learning package, and each project implementation lead identified a master trainer to manage further training using a cascade model, where trained masters provide the same training to other personnel. The preparation and foresight that went into the planning of the program helped to ensure that each hospital managed the change with limited disruption to normal services.

In a number of other cases, time was spent at the beginning testing and piloting innovations in their relevant settings to learn about what worked and did not work in different situations. In Zambia, for instance, the development team spent time working together on the text messaging system for Programme Mwana, before splitting into two teams, with one designing in the clinic setting and the other in the lab setting. It was thought that developing a functional system had to be carried out 'on the ground' in a workplace setting if the system was to be effectively assimilated

into the workflows of rural clinics. The leadership team allowed time to make sure that the new system worked effectively by piloting in three regions, over a seven-month period, before approving national roll-out. The scale-up allowed time for clinic-based training of all clinic staff and community health workers, again using a cascade training model with a pool of master trainers.

PUTTING PACE INTO THE DIFFUSION JOURNEY

The diffusion journey – from identifying the initial opportunity for change through to adoption of a new innovation across a health system – is not easy and, in most cases, is not quick. Each journey begins from a starting point that is unique to the individual health system – depending on the nature of the innovation, the number and type of stakeholders involved and the characteristics of the health system – and there are often significant barriers to overcome along the way.

While systematic research and randomized control trials may prove the efficacy of an innovation, this alone does not ensure successful diffusion. It is evident from our case studies that a carefully planned and guided change program with a dedicated support structure is necessary to bring it to scale and achieve widespread diffusion. Putting in place an active program of diffusion can overcome obstacles, transform systems and bring value more rapidly to clinicians, patients, healthcare organizations, insurers and payers, and the wider society.

Our learning from the case studies has shown that those health systems that have been successful in diffusing innovations rapidly – certainly more quickly than the commonly acknowledged time delay in translational research – have a good grasp of the facilitating factors that exist in their particular contexts and settings, the multiple interactions between them, and the role they can play at different stages of the diffusion journey. In each case, the key stakeholders have planned their journey carefully, exploiting the relevant enablers and cultivating the appropriate behaviors along the way to achieve more rapid and successful diffusion.

Building organizational capacity for change

Much of the existing literature on innovation diffusion theory has focused on the characteristics of innovations that make them more or less appealing to other potential adopters, the characteristics that make them more or less likely to adopt an innovation, and what Everett Rogers called the "Innovation-Decision Process".[6] But it is after the decision to adopt (or reject) an innovation – in what Rogers identifies as the implementation and confirmation stages – that much of the hard work begins. And yet, little has been written in innovation diffusion literature about the actual diffusion itself.

The successful diffusion of innovations in each of our case studies involved:

- Defining and communicating a vision of the desired future.

- Engaging and preparing people for change.

- Identifying and overcoming the inevitable barriers that are encountered along the way.

- Putting the planned change into action.

- Embedding change within the organizational culture.

The successful accelerated diffusion of healthcare innovation was largely about organizational change.

Numerous organizational change models have been developed over recent decades to help organizations understand the challenges and successfully navigate the change process. One of the world's leading thinkers in this area, Professor John Kotter of Harvard Business School, observed that almost 70 percent of transformation efforts fail because organizations do not have a consistent, holistic approach to changing themselves and because they fail to engage their workforces effectively. Change management is an exercise involving people, processes, technology, relationships and incentives, as appropriate, to achieve desired goals.
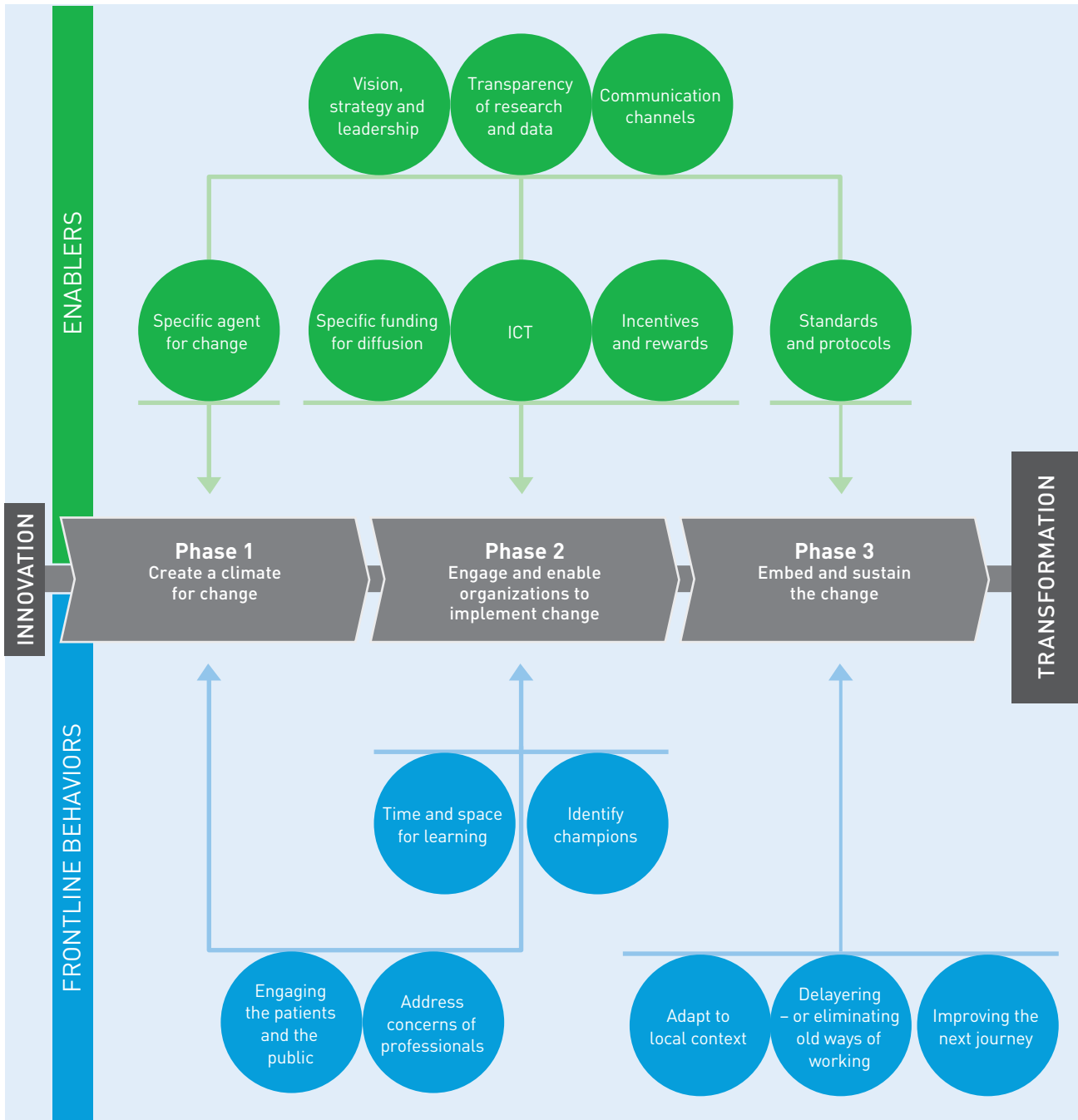
Kotter's change management model,[7] which has been widely used in healthcare, identifies eight steps that move organizations successfully from a current way of doing business to a desired future state. These steps are grouped into three phases:

1. Creating a climate for change.

2. Engaging and enabling the whole organization.

3. Implementing and sustaining the changes.[8]

From our analysis of the eight case studies, it is clear that diffusion of innovation is in fact a complex change management process and not merely the aggregation of random individual adoptions of new products, practices or policies. Analyzing and reflecting on the eight case studies, we find that the phases of Kotter's model of the change process provide a useful way to think about the diffusion journey and to consider how the selective application of each of the enablers and frontline behaviors in the GDHI framework can be exploited and managed to help organizations move more rapidly towards system transformation.

Figure 6 illustrates the three phases of Kotter's model and the influencing role that we believe each of the enablers and frontline behaviors can play in each phase, allowing us to associate the parts of the GDHI framework along a dynamic path of change or diffusion.

Figure 6: Phases of the diffusion journey

The three phases of the diffusion journey

Phase 1: Create a climate for change

The first phase involves creating favorable conditions for change. Unless stakeholders understand the need for a new innovation or the opportunity it creates, they may cling to the status quo, to what they know and can control. Organizational change experts argue that resistance to change can only be overcome by the combination of dissatisfaction with the current state, a clear vision of how things could be and knowledge of the first practical steps to achieve the vision.[9] Receptiveness is greater: if staff perceive that the current situation is intolerable or unsustainable; if the innovation, and expected impact, has been assessed and is seen to have a relative advantage; and if supporters of the innovation are able to influence its detractors to reduce resistance to change through tangible results.

Crucially, in order to instill a sense of purpose and accountability, health systems and organizations need to create *a clear, compelling vision* that describes a better future and appeals to people's values – whether health professionals, patients, the wider population or other stakeholders. The vision should incorporate a collective sense of what the desirable future looks like, in clear and measurable terms which stakeholders can use to align and understand their own roles in the desired future state.

Transparency of research findings – such as scientific evidence that verifies the efficacy of new treatments or technologies, or data that illustrates the extent of a public health problem – will help to convince stakeholders of the need for innovation. Organizations must also make plans to put in place appropriate systems to *monitor and evaluate the diffusion process and the impact of the innovation* over time. In the initial stage, prior to actual implementation, it may also be important to capture baseline performance measures as the basis for monitoring progress. The circulation and useful application of this knowledge and information depends on good *communication channels* and the existence of organizational and interpersonal networks across the health system, with other industries and with the public, as demonstrated in the Nepal case study.

The health systems and organizations that we studied have successfully diffused innovations and have worked extremely hard to *engage health professionals and other frontline staff* to communicate the case for change and the potential benefits. This engagement needs to start early and continue throughout the change process. It is important to address any concerns but also to manage expectations about the change ahead.

Similarly, adopting strategies and initiatives that *engage the public* around the need for change can help in gaining wider acceptance. At this stage in the journey, pressure from patients and the public can play a vital role in generating demand – or creating a market – for a new innovation and developing the climate and conditions for change, as demonstrated in the Nepal, Argentina and Sweden case studies.

The creation of a *dedicated program or initiative*, often managed by a specific organization or network of organizations, can help to translate the vision into a reality by providing the impetus, co-ordination, resources and structures that help diffuse the innovation throughout the system. One stakeholder, commenting on the need for a specific dedicated authority and responsibility for diffusion, said, "If you make everyone responsible for uptake, no one will be".

The leaders of the program must have the commitment, credibility, influence and capacity to mobilize change, as well as the necessary technical, communication and project management skills. In each case we looked at, there was a clear vision and a dedicated program or organization to help create an enabling environment and drive diffusion across the system.

As part of the program design and communication process, careful consideration needs to be given to which resources can put the diffusion into operation and affect the achievement of the vision. In some cases, this may require the mobilization of multisector partnerships. In Zambia, for example, diffusion was facilitated by collaboration between NGOs, international donors, and other local implementing partners. In Nepal, where there was limited local health infrastructure, logistical barriers were overcome by leveraging the existing network of FCHVs who were already well-embedded in the local communities.

Phase 2: Engage and enable organizations to implement change

The second phase of change focuses on empowering and equipping staff and other stakeholders to make change possible. It also involves identifying the barriers that may be impeding change and taking action to overcome them. A number of the enablers and frontline behaviors can help facilitate this phase of the journey.

Our research shows that if there is *dedicated and continuing funding* for implementation, innovations are more likely to be adopted and implemented as routine. We noted earlier that some organizations are creative in sourcing funds for innovation diffusion. In some cases, health systems have leveraged support from the international donor community; in others, national or regional governments have made funding available for innovations that were expected to benefit a specific target population.

There also needs to be a *clear strategy* to achieve the vision, taking into account external constraints and internal capabilities. Implementation plans should be communicated widely to stakeholder groups so that they understand how the change will affect them and what part they are expected to play in achieving the vision.

In this phase in particular, *strong and charismatic leaders or champions* – at political and organizational level and especially from the clinical frontline – are needed to make the case for change and build wider support for the vision. Champions believe in the vision, embrace change and help build support across the whole organization through their advocacy and demonstrated use. Sweden's Vision Zero provides an

excellent example of strong leadership and advocacy in pursuing a radical new transport policy and overcoming opposition from initially skeptical stakeholders.

Communication, which remains vital, is facilitated by linkages across the health system, and beyond, and the existence of *formal and informal networks* that enable change leaders to *engage with health professionals and other stakeholders, including patients and the public*. This is most effective when leaders tailor their messages and use appropriate channels to reach their different targeted audience as demonstrated in the Argentine HPV Vaccination Program.

But engagement is not simply about communication; it also entails clinicians' and other stakeholders' active involvement in planning change, designing solutions and guiding implementation to improve usability and increase buy-in. As the Rhode Island case study shows, an innovation that is centrally developed is more likely to be widely and successfully adopted locally if the views and experiences of potential frontline users are incorporated in the planning.

Uncertainty about the outcomes of the innovation still can be an obstacle to change. This can often be overcome by *monitoring progress and demonstrating early wins*, for example, from pilot projects or the achievement of short-term targets. Targets should be achievable, results should be made clearly visible to all stakeholders and progress should be celebrated. The piloting of Programme Mwana in Zambia, for example, provided the evidence base for the program's effectiveness and was an important driver of its rapid scale-up.

The path to implementation will inevitably face other challenges along the way. A successful diffusion process anticipates potential barriers and adopts countermeasures to address them early in the planning stage. Sometimes this means identifying and addressing systemic weaknesses or barriers to progress – for example, the absence of appropriate incentives or information for users to adopt the innovation.

Certainly one of the key barriers to diffusing innovations is that the risks and benefits are not always distributed evenly across a system. *Incentives and rewards* need to be carefully tailored to the context of the system and appeal to the interests and values of potential adopters. These are not only financial. In many situations, including most of our case studies, potential adopters are motivated by intrinsic personal or professional values.

In Nepal, the FCHVs who provided vitamin A supplements were motivated by the opportunity for personal growth, respect and visibility within their communities. In Zambia, clinic workers were driven by the speed with which they could provide test results to mothers and so help them diagnose and treat HIV in a timely manner. And in TeamSTEPPS, adopters were motivated by the desire to align their treatments and working practices with evidence-based research and proven best practice.

We noted earlier that *ICT* may not always be an essential enabler but, in some cases, it is a critical element of the diffusion process and needs to be prioritized. For example, Rhode Island's success in developing a robust technical foundation for its health

insurance exchange, which aligned with the overarching vision and objectives, was due to its detailed planning and ability to bring in staff and contractors with the right ICT skills and experience. In cases where ICT is an important enabler, the development of ICT capabilities and organization-wide change management must proceed in parallel.

A heavy workload and a shortage of resources at the frontline are concerns for health professionals when introducing a new innovation. Sufficient *time and space for learning* – rethinking workflows and adopting new processes or technologies – needs to be factored in to the implementation plan to manage any short-term disruptions. Sharing lessons learned and information among different stakeholder groups as it becomes available throughout the process can help to avert potential problems. When required job changes are clear, high-quality training materials are available, and timely on-the-job training is provided, more rapid and sustained benefits are more likely to be achieved. The PACS case in England, for example, devoted time to local learning, albeit in a very short time frame.

Phase 3: Embed and sustain the change

In the final phase of change, adaptation of the innovation to reap the benefits, continued monitoring of the process and its impact, and the consolidation of gains to embed change in the culture of the organization or health system are all crucial.

To achieve the vision and meet the objectives set for the change program, health systems will often have to *rethink their traditional way of working*, particularly where innovations are incompatible with existing products or processes. It is vital to understand the impact of the innovation and to consider what adjustments need to be made to fully realize the potential benefits.

In some cases, innovations that have been developed in other systems or countries may need to be adapted to fit with the demands or constraints of a different local context. Health systems that are able to *adapt and customize the innovation* itself or the mechanism for diffusing it are most likely to increase local acceptance and accelerate the journey to successful diffusion. In the case of TeamSTEPPS, for example, customization was embedded in the program materials and tools, which allowed for adaptations of the innovation to local environments, facilitating local ownership and buy-in. And in Argentina, each province developed its own strategy, based on the local context, for delivering the vaccine to the public, while public awareness campaigns were also tailored to the different regions.

Over time, new innovations, once widely diffused, will lead to the development of *new standards and protocols*, which helps embed the innovation within the system and create the foundation for further improvements. In Singapore, for example, one of the goals of the integrated care policy is to develop standards and guidelines for independent long-term care providers to improve quality of care in that sector. AIC staff help providers to meet the new standards, to ensure they can be used to improve quality and do not discourage providers. Moreover, these efforts have improved the reputation of providers among hospital staff and the general public and so have

helped to diffuse integrated care across Singapore much more quickly than would have been possible otherwise.

At this phase of the change process, organizations should continue to *monitor progress, make results transparent and celebrate successes*. It is important, as innovations diffuse, to harvest and then routinely and widely publicize the benefits. As well as ongoing monitoring and evaluation, this also requires the creation of avenues for feeding information back to the various stakeholders. This is a vital stage in the process as showcasing and celebrating successes helps build momentum for the ongoing journey. Moreover, regular examination of performance can provide insights that influence further planning, decision-making and the direction of change. This is particularly evident in Sweden, where annual conferences are held to discuss results and share data on progress in meeting Vision Zero targets and determine what future action can be taken in pursuit of the longer-term goal.

The sustainability of the diffusion program, particularly in terms of leadership and resources, is another important consideration. In some of the cases, diffusion benefited from initial donor funding and in-kind support in the early stages of planning and implementation. But as external support diminishes, organizations need to plan for the long term future. In Nepal, for example, the Government, anticipating the end of funding from USAID and Unicef, has assumed ownership of NVAP, developing a five year action plan and allocating funding for NVAP activities to guarantee the program's sustainability.

Those health systems that have been successful in diffusing a specific innovation often find that they are able to reap broader benefits over time as acceptance of change becomes embedded in their organizational culture. In this way, they are able to *improve the next diffusion journey*.

Creating a roadmap for change

Our eight case studies on innovation diffusion have demonstrated the significant benefits that can be achieved relatively quickly by putting in place an active program of diffusion and giving careful consideration to the facilitating factors that can accelerate progress. It is apparent that some enablers and some behaviors are more important at different steps of the journey. Some apply throughout the process.

Importantly, we have learned that diffusion is a journey of organizational change, which incorporates many steps and movements, sometimes back and forth, and which needs planning and discriminating execution. Clinical leadership is essential, but what is crucial for leaders of the diffusion process is to map the journey of change, to consider which enablers and which frontline behaviors to leverage and when, to learn from the success of others and to be prepared to adapt when needed.

Above all, diffusion of healthcare innovation is a change management exercise that requires dedicated resource, skills and application. The four critical enablers in our case studies can be construed as the key elements of a change management agency.

Yet, despite the common importance of the four enablers and the presence of all the frontline behaviors in our eight case studies, there is no single path to prescribe for successful accelerated diffusion. The starting point and the nature of the journey will be different in every case, depending on the nature of the innovation, the stakeholders involved and the national context and culture. But we believe the application of appropriate enablers and behaviors through the phases of change presents a helpful template to guide a more rapid journey from innovation to transformation.

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D = dissatisfaction with the current state, V = vision of a desirable future state,
F = first concrete steps and R = resistance.

CASE STUDY SUMMARIES

HUMAN PAPILLOMAVIRUS (HPV) VACCINATION

COUNTRY
Argentina

TYPE OF INNOVATION
Policy and product

BUDGET
Not available

YEAR OF INCEPTION
2011

OVERVIEW
The human papillomavirus (HPV) vaccine is provided free of charge through the public sector to all 11-year-old girls in Argentina as part of a comprehensive program to prevent cervical cancer.

THE INNOVATION

Most cervical cancers are caused by HPV, which is a sexually transmitted virus. There are many types of HPV, but just two (types 16 and 18) cause more than 70 percent of cervical cancers. Two vaccines have been developed to protect against HPV:

- The bivalent vaccine protects against types 16 and 18.
- The quadrivalent vaccine protects against types 16 and 18, as well as types 6 and 11, which cause genital warts.

Until 2014, three doses were recommended for both vaccines; in 2014, the recommendation changed to two doses for girls under 15 years of age. The vaccines are most effective when administered before the start of sexual activity.

Starting in 2011, the Argentine Ministry of Health (MOH) began to provide the bivalent HPV vaccine free of charge to all 11-year-old girls through the public sector. The vaccine is part of a comprehensive program to reduce cervical cancer: the program promotes the HPV vaccine for girls and Pap tests (cervical screening) for their mothers. The MOH developed a campaign to raise awareness of the vaccine and its benefits among the public and healthcare providers. Strategies to reach the target population vary across provinces, but the three main approaches used are: health centers and hospitals; schools; and community health workers going house-to-house.

CONTEXT

- In Argentina, 50% of the population is covered by public health insurance, approximately 10 percent has private health insurance, and the remaining 40 percent has no health insurance.
- The public health system is largely decentralized. Each of the 23 provinces is responsible for the delivery of basic health services, including vaccines.
- Argentina is pro-immunization, and the Government made vaccinations a priority in 2003. Thirteen of the 19 vaccines in the national immunization program have been added since 2003.

DIFFUSION JOURNEY

2006
The quadrivalent HPV vaccine is approved for use in Argentina.

2007
The bivalent HPV vaccine is approved for use in Argentina.

2006–2011
The HPV vaccine is available through the private sector at a high cost.

February 2011
The Argentine President Cristina Kirchner announces that the HPV vaccine would be added to the national immunization program.

October 2011
The free provision of the bivalent HPV vaccine through the public sector begins.

2011–2013
During this period, 88 percent of 11-year-old girls receive at least one dose of the HPV vaccine, and 52 percent receive all three doses. Coverage varies across provinces, but some provinces achieve rates close to or above 90 percent for all three doses.

2014
The program begins to use the quadrivalent vaccine.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

VISION, STRATEGY AND LEADERSHIP

INCENTIVES AND REWARDS

SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION

TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS

INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY

SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION

COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC

DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership

The vision for the HPV vaccine was carefully formulated and underlays all communications with the public. The Argentine MOH developed a comprehensive strategy for the program, which has strong support from the highest levels of government.

Specific funding

The Argentine Government has made a commitment to fund the program fully to provide the vaccine free to all 11-year-old girls in Argentina. The availability of the vaccine at a reduced cost through the Pan American Health Organization (PAHO) revolving fund makes the cost manageable.

Specific organisations or programs

The National Program for the Control of Immunopreventable Diseases (ProNaCEI) is responsible for all vaccination programs in Argentina, and manages and oversees all activities related to the diffusion of the HPV vaccine.

Communication channels and networks

ProNaCEI used the media and meetings with healthcare professionals to generate support for the program. Professional organizations such as the Argentine Society of Pediatrics used their networks to disseminate information to their members.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Engaging patients and the public

The MOH conducted an extensive public awareness campaign, carefully developing messages to build public support for the vaccine. Communication tools included: radio and television spots; interviews with the press; community meetings; and training healthcare providers and journalists to communicate effectively with the public.

Addressing concerns of healthcare professionals

Healthcare professionals have a strong influence on their patients' attitudes towards vaccines. To gain the support of healthcare professionals, ProNaCEI organized meetings with them throughout the country, and professional societies provided information through their networks.

Adapting to suit the local context

ProNaCEI studied the approaches used in other countries to disseminate the HPV vaccine and developed its own approach to suit the local context. In Argentina, each province developed its own strategy for dissemination and tailored communications materials.

Improving the next innovation journey

The HPV vaccine is part of an ongoing journey to diffuse vaccines in Argentina. The success of the HPV vaccine program was made easier because of other vaccines that had been introduced previously, and in turn it will contribute to the development and take-up of other vaccines in the future.

IMPACT

- Between the start of the program in October 2011 and February 2014, 52 percent of the target population received all three doses of the vaccine. RTI International figures show that this corresponds to 507,846 girls.

- RTI International estimates show that the HPV vaccinations will prevent an estimated 9,436 cases of cervical cancer and 4,246 deaths, which corresponds to 87,045 life-years gained.

PICTURE ARCHIVING AND COMMUNICATION SYSTEMS (PACS) PROGRAMME

COUNTRY
England

TYPE OF INNOVATION
Product

BUDGET
£885 million ($1.4 billion) over 10 years

YEAR OF INCEPTION
2004

OVERVIEW
Between 2004 and 2007, the Picture Archiving and Communication Systems (PACS) Programme deployed PACS in 128 National Health Service (NHS) hospital trusts (75 percent of the total) across England that did not already have them. PACS replaced film-based imaging (an image used for medical diagnosis such as ultrasound and magnetic resonance imaging or MRI) with a software system for the analysis, management and communication of digital medical images.

THE INNOVATION

The PACS Programme was a centrally driven initiative for the NHS, which in a little over three years delivered PACS to hospitals that did not already have them. PACS is a system for the analysis, management, and communication of digital medical images and replaces film in radiology departments. It offers many benefits such as: operational efficiency; the speed of sharing images with other clinicians; new image analysis capacity; and opportunities to improve patient care.

The National Programme for Information Technology (NPfIT) was launched in 2002 to upgrade and expand the NHS IT infrastructure. The goal was to improve health services and patient care through the use of technology. Unfortunately, parts of the NPfIT experienced serious delays and technical challenges. The PACS Programme was added to the NPfIT scope in an effort to deploy more mature technologies.

Under a national leadership structure that included technical and clinical directors, the program implemented a command and control strategy that passed on technical direction to regional deputy directors and then on to local implementation teams. Although the strategy was centrally driven and there was little local adaptation, it did offer meaningful mechanisms for communication and transparency. Local implementation teams served as champions to coach and prepare their colleagues for the move from film-based imaging one day to using digital imaging the next day.

CONTEXT

- England has a single-payer, universal-access health system and healthcare is free at the point of care for all permanent residents.
- In the late 1990s, the NHS's information technology was considered to be behind the times; the Government believed a large cash infusion and a co-ordinated program were necessary for upgrading the technology infrastructure for English hospitals.
- The model used for the national PACS implementation in England originally divided the country into five major geographical areas ('clusters'), each serviced by a centrally contracted local service provider (LSP) which then procured a preferred PACS.

DIFFUSION JOURNEY

1998
NPfIT is developed as an idea under the Labour Government to improve healthcare through technology.

2002
NPfIT is launched to provide electronic: health records; appointment booking; prescribing; and a foundational infrastructure to support IT applications at national and regional levels.

2003
PACS is added to the NPfIT's work program after delays and challenges with initial NPfIT technologies.

2004
The PACS Programme is launched.

2005
11 NHS hospital trusts receive PACS under the PACS Programme.

2006
54 NHS hospital trusts receive PACS.

2007
63 NHS hospital trusts receive PACS.

2010
Connecting for Health, in collaboration with Sectra Burnbank, develop an online image exchange portal capable of sharing images and data between NHS hospitals.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

VISION, STRATEGY AND LEADERSHIP

INCENTIVES AND REWARDS

SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION

TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS

INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY

SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION

COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC

DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership	Funding for research, development and diffusion	Specific organizations or programs	Communication channels and networks
The PACS program sat within NPfIT and the vision of the program was well communicated to individual hospitals via their policies and strategies. The program implemented a command and control strategy that cascaded technical direction to regional deputy directors and then to local implementation teams.	Diffusion would not have progressed at such a rapid pace without the $1.4 billion (£885 million) allocated to the PACS Programme over 10 years. This funding ensured that the program had the necessary infrastructure and management for a successful diffusion.	The program provided the necessary structure, staffing and co-ordination to guide the use of sophisticated information systems in hospitals whose readiness to integrate new technology varied as much as the economic strength of their region.	The program used stakeholder working groups and communications channels to allow national and regional leaders to capture feedback and improve program delivery. Regional meetings were held every six weeks and involved a diverse group of attendees including clinicians, PACS administrators and vendor representatives.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Creating the time and space for learning and new ways of working	Eliminate old ways of working	Adapting to suit the local context
The project implementation teams at individual hospitals communicated the vision and advantages of the program to clinicians. These teams were comprised of enthusiastic individuals who outlined the need for change to the hospital community.	PACS replaced x-ray film with digital images and provided new tools for image analysis and opportunities for collaboration. It was a complete substitute for the former technology and was implemented in two days in each hospital.	Concerted efforts by national, regional, and local hospital teams to engage clinical staff consistently and repeatedly were integral to ensure the program was implemented effectively. The purpose of the engagement was to discuss how their workflows would be affected, what could and could not be done, and what remedial action could be taken when there are challenges and delays.

IMPACT

- In less than four years, by December 2007, all 171 hospital trusts across England were live with PACS.
- The number of patients waiting six weeks or more for imaging services dropped from over 100,000 in spring 2007 to under 1,000 in spring 2009.

- The average cost saving on consumables for film-based imaging was about $425,000 per year for each hospital trust.
- Radiologists interviewed for this study surmised that, without the program, it is likely that many

English hospitals would not have PACS today, especially those in disadvantaged areas of the country.

NATIONAL VITAMIN A PROGRAM

COUNTRY
Nepal

TYPE OF INNOVATION
Policy

BUDGET
$1.2 million

YEAR OF INCEPTION
1993

OVERVIEW
The National Vitamin A Program (NVAP) is a policy innovation aimed at reducing child blindness and mortality from vitamin A deficiency. The NVAP provides biannual vitamin A supplements and community-based nutrition education.

THE INNOVATION

The NVAP was conceived from a partnership among many international and national stakeholders. A non-governmental organization called the Nepal Technical Assistance Group (NTAG) was established to implement, co-ordinate and lead the initiative. The program was scaled up in phases to cover all 75 districts in Nepal over 10 years.

The program targets pre-school-age children (six months to 60 months) by administering vitamin A supplements two times per year. The supplement is given to children by the 49,000 Female Community Health Volunteers (FCHVs), a role that was established in the early 1990s for community-based family planning activities.

The NVAP also includes an important education element, which aims to encourage local communities to produce and consume foods rich in vitamin A. With support from NTAG and district- and community-level healthcare staff, the FCHVs work with communities through strategies that include vitamin A educational sessions, cooking demonstrations and public media campaigns.

NTAG spearheads program monitoring by carrying out small-scale surveys in each district that estimate how many children received the supplement. In addition, the Nepal Government periodically implements a nationwide micronutrient survey and uses the results to monitor changes in vitamin A deficiency.

CONTEXT

Country with culturally and linguistically diverse population.

- Thirteen percent of children under four years of age were vitamin A deficient prior to NVAP.
- The country's difficult, mountainous terrain and limited infrastructure for transportation, communications, and the healthcare delivery system pose many challenges to public health initiatives. The health system consists of both public and private components and is managed through national and district-level policy.
- External donor organizations are important influencers and financers of healthcare delivery in Nepal and played an instrumental role in NVAP. While these donors continue to support many activities in the country, NVAP is now nearly free of external donor support.

DIFFUSION JOURNEY

1992
An international workshop reviews vitamin A trial evidence; a Johns Hopkins University vitamin A research team convenes stakeholders in Nepal to present evidence for a supplementation program.

1993
The vitamin A research findings from studies in Nepal are published; NTAG is established; and the NVAP starts in eight districts.

1996
Maoist insurgency begins. The NVAP covers 32 districts by the end of year.

1997
The Nepal Government conducts the first micronutrient survey.

1999
Deworming tablets are added to the NVAP campaign.

2002
NVAP covers all 75 districts.

2010
The Nepal MOH establishes the Five-Year Action Plan for NVAP, through which the Government will assume full financial responsibility for the program.

2015
A micronutrient survey is planned to assess vitamin A deficiency levels and re-assess the need for supplementation.

✓ ENABLERS

The enablers that were viewed as the strongest contributors are described below:

VISION, STRATEGY AND LEADERSHIP

INCENTIVES AND REWARDS

SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION

TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS

INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY

SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION

COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC

DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership

From the start, the NVAP had a very strong vision spearheaded by the Johns Hopkins University research team, and developed through successful multisector collaboration in Nepal (with the ministries of health, education and agriculture), and with external funders such as the United Nations Children's Fund (Unicef) and the US Agency for International Development (USAID).

Specific funding

The NVAP received extensive funding from international donors over the first two decades. More recently, however, the program has achieved financial independence from external donors and sustained coverage through increased government investment.

Transparency of research findings and data on demonstrable success

Continuous monitoring activities have been built in to the NVAP. Micronutrient surveys are administered in each district, allowing for the active use of data from before, during and after vitamin A has been administered to assess coverage and address gaps in the program.

Specific organizations or programs

The NTAG was established to develop a strategy and provide leadership, oversight, co-ordination across stakeholders, technical support and appropriate local resources for the program. It designs and leads all NVAP training efforts and is responsible for monitoring activities.

Communication channels and networks

Serving as a main channel for co-ordination across stakeholders, the Ministry of Health and Population (MOHP) Child Health Division and NTAG crafted the infrastructure for policy implementation, organizing a task force to collaboratively engage international donors (USAID, Unicef and AusAID), NGOs, and governmental organizations.

★ FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Engaging patients and the public

The NVAP engaged the public through the use of FCHVs, whose activities helped to generate public demand for the supplement.

Creating the time and space for learning and new ways of working

The NVAP dedicated time and space to train FCHVs and district staff by using a train-the-trainer approach. The training used pictorials to overcome literacy barriers and incorporated games and songs to facilitate learning during the training.

Adapting to suit the local context

Community outreach strategies were adapted to suit the local context of each district and community. Educational activities were conducted in the local language of each village and modified for cultural nuances of Nepal's many ethnic groups.

The program effectively supported FCHVs as community-based champions who embraced innovation and promoted change

The FCHVs received effective training and resources and implemented various strategies to maintain their motivation.

◎ IMPACT

- Evidence shows a 26 percent reduction in mortality for children under five years of age in districts where the supplement was given.
- NVAP coverage averages 95 percent annually. Supplementation averts an estimated 12,000 deaths per year.

- Core program costs for the national program (ie, those that relate to unchanging behaviors over time, at a 70 percent coverage rate) have been estimated at $1.27 per child aged 6 to 60 months. Using this coverage estimator, the same study suggests

that NVAP translated to healthcare system-wide savings of $1.5 million, on the assumption that there is less need for healthcare services if the incidence of disease is reduced.

INTEGRATED CARE

COUNTRY
Singapore

TYPE OF INNOVATION
Policy

BUDGET
Not available

YEAR OF INCEPTION
2009

OVERVIEW
Integrated care is a policy innovation implemented through an independent Agency for Integrated Care (AIC) to address Singapore's rapidly aging population and a range of challenges in its health and social care systems. The AIC's vision is to create "a vibrant Care Community enabling people to live well and age gracefully".

THE INNOVATION

The AIC works to integrate care delivery by bridging the gap between policymakers at the Ministry of Health (MOH) and the Ministry overseeing social care services, and the frontline health and social care facilities and professionals in the intermediate and long-term care (ILTC) and primary care sectors. AIC staff work with providers to improve their capacity to care for an increasing number of patients, improve quality of care and implement new programs.

Integrated care includes a range of programs and services that often overlap, work together, spread and reinforce each other. In 2014, Singapore's integrated care programs and services were clustered in eight areas: (1) improving care transitions and co-ordination; (2) improving care for people with severe chronic diseases and at the end of life; (3) strengthening the ILTC sector; (4) improving the primary care sector; (5) expanding capacity for home care; (6) working towards integrated community living and aging in place, including supporting the care-givers; (7) improving community mental health; and (8) fostering regional health system collaboration.

CONTEXT

Singapore is a high-income country with a rapidly aging population. The country's leaders have sought to address this demographic shift through various government initiatives. Integrated care is one of the policy innovations intended to address the aging population and a variety of problems that the Government identified in Singapore's health and social care system that hamper its ability to respond to the aging population.

These problems include: fragmentation; domination by hospitals; poorly co-ordinated discharge planning from hospitals; lack of capacity of ILTC providers; limited availability of community-based services; lack of incentives for patients to choose primary care doctors rather than specialists; and sub-optimal control of chronic diseases at the primary care level.

DIFFUSION JOURNEY

1992
Care Liaison Service formed in MOH.

2001
Integrated Care Service created in MOH.

2008
ACTION program pilot begins.

2009
The AIC is incorporated under MOH Holdings and has about 30 staff members.

2010
Start up of Integrated Referral Management System (IRMS), Pharmacy Outreach Program (POP), and Singapore Program for Integrated Care for the Elderly (SPICE).

2011
The Community Mental Health (CMH) portfolio is added to the AIC. The Holistic Care for Medically Advanced Patients (HOME) program begins and the Advanced Care Planning (ACP) program starts up with a focus on acute care hospitals.

2012
The Community Health Assist Scheme (CHAS) is added to the AIC. The Regional Engagement and Integration Teams (REITs) are created to assist Regional Health Systems with integrating care. The AIC also develops iCommunity@ North, a regional mental health network. ACTION receives funding from MOH, IRMS expands to cover additional ILTC providers. AIC Learning Institute starts up.

2013
Social aged care functions are shifted to the AIC, along with 60 members of staff from Centre for Enabled Living.

2014
- CHAS has 1.2 million Singaporeans enrolled.
- ACTION has about 100 care co-ordinators.
- SPICE program has eight centers.
- HOME program has served 984 patients.
- ACP program expanded to ILTC providers.
- The AIC Learning Institute has offered 357 courses.
- The AIC organizational structure includes nine Divisions and five REITs.
- The AIC has almost 500 staff.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

VISION, STRATEGY AND LEADERSHIP

INCENTIVES AND REWARDS

SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION

TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS

INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY

SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION

COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC

DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership	Specific organizations or programs	Specific funding	Communication channels and networks	Development and renewal of healthcare standards and protocols
Singapore's MOH established the vision for expanding integrated care. MOH then developed a strategy and set up the AIC as an independent agency. This vision and strategy have been strongly reinforced through the leadership of the AIC's chief executive and senior staff.	AIC is a private limited corporation owned by MOH Holdings with the purpose of developing and diffusing integrated care concepts and promoting innovation in ILTC and primary care. This status allows the AIC to have more operational autonomy, and to innovate and act faster than most government agencies, while maintaining a social mission.	AIC obtains funding from MOH and other sources for pilot programs and testing new care models. It has been successful in channeling large amounts of funding into the ILTC and primary care sectors.	AIC staff make extensive use of informal networks with MOH staff, ILTC staff, staff in hospitals and other providers. The AIC uses websites and meetings with providers to boost participation in its integrated care programs and services.	A goal of the integrated care policy is to facilitate development of standards and guidelines for ILTC providers to improve quality of care. AIC staff also help ILTC providers to meet the new standards. These efforts have improved the reputations of ILTC providers and helped to diffuse integrated care across Singapore.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Identifying and supporting champions who embrace and promote change	Creating the time and space for learning and new ways of working	Eliminate old ways of working	Engaging patients and the public	Improving the next innovation journey
The AIC chief executive has been a champion for integrated care since the AIC's founding in 2009. Other champions include the division directors and leaders of ILTC provider organizations that are implementing integrated care.	The AIC's role in securing funding for new pilot programs has been essential to enable the development of new integrated care programs, some of which have required years to design, test and revise before becoming established with permanent funding.	One of the goals of integrated care is to improve ILTC and primary care and to shift patients away from more expensive hospital and nursing home care to outpatient care and "ageing in place". This allows elderly people to age while they continue to live at home or in their communities.	Singapore's integrated care programs have a strong emphasis on patient and family education and empowerment. The aim is to improve the quality of care for people with chronic diseases and to promote independent living for elderly people.	Singapore's integrated care policy has increased the capacity of many ILTC providers, enhanced the roles of primary care providers and set higher standards for both sectors. By meeting the needs of different constituencies the integrated care policy is building support nationwide.

IMPACT

Examples of the impact of AIC programs include:

- The AIC's ACTION program to improve transitions of care from hospitals reduced the number of readmissions to hospital by 27 percent and emergency department visits by 16 percent in the six months following an initial hospital discharge. Cost savings were estimated at S$3.4 million.
- An assessment of the AIC's SPICE program to improve care for the frail elderly found that over a six-month period caregiver stress was reduced by 42 percent; hospital admissions decreased 67 percent; and the number of emergency department visits fell by 50 percent.

VISION ZERO ROAD SAFETY POLICY

COUNTRY
Sweden

TYPE OF INNOVATION
Policy

BUDGET
$1.25 billion (SEK 8.5 billion) over 10 years

YEAR OF INCEPTION
1997

OVERVIEW
Vision Zero is an ambitious transportation policy that set the long-term goal that 'no one will be killed or seriously injured as a consequence of traffic accidents'. Vision Zero shifted the responsibility for safety away from the road user and towards the road system and the vehicles that use it.

THE INNOVATION
Vision Zero, which has a target of zero road traffic fatalities and severe injuries, is based on four key principles:

- **Ethics:** It is unacceptable for people to be killed or injured in the road traffic system.
- **Human capability and tolerance:** Accidents cannot be avoided completely due to human fallibility. It is necessary to design a system that minimizes the opportunity for error and the harm done when errors occur.
- **Responsibility:** Vision Zero puts increased responsibility for road safety on the 'system designer' over and above the road user.
- **System-wide approach:** It is critical to view the system as a whole and ensure that all components are functioning well together. This includes roads, vehicles, road users, and the environment.

Vision Zero has involved multiple stakeholders throughout its design and development, including both road users and the 'system designers'. These include policymakers, state and municipal road authorities, police, vehicle manufacturers, professional transport companies and health providers.

In order to achieve the Vision Zero targets, a number of interventions and strategies have been implemented including:

- Changes in road design such as '2+1 roads', median barriers and roundabouts.
- Reductions in and enforcement of speed limits achieved by using interventions such as safety cameras.
- Improvements to vehicle safety such as seatbelt reminders and electronic stability control.

CONTEXT

- Road safety has long been viewed as a national priority in Sweden. The country's long history of road safety research provides a strong basis for Vision Zero implementation and interventions.
- In Sweden, the Swedish Transport Administration is responsible for the

planning, building and operation of national roads (around 100,000 km), while local municipalities administer more than 40,000 km of urban and rural roads. The Swedish Transport Agency has overall responsibility for regulation of the transport system and driver licensing.

DIFFUSION JOURNEY

1995
A team at the Swedish Road Administration (SRA) begins working on Vision Zero policy development. Engagement with multiple stakeholders commences.

1997
Vision Zero is passed by a large majority in the Swedish Parliament and an interim target is set to reduce deaths by 50 percent by the year 2007.

1998
The first 2+1 road opens in the north of Sweden; municipalities gain right to change speed limits on certain roads.

1999
An 11-point plan for addressing road traffic safety and the key strategies to address the interim targets is introduced by the Swedish Government.

2000
A Commission of Inquiry into Road Traffic Responsibility is set up to review shared institutional responsibilities and the establishment of a new Traffic Safety Inspectorate.

2000–2001
En Route to Vision Zero, a pilot for Vision Zero interventions, takes place in Trollhatten.

2003
A Road Traffic Safety Inspectorate is set up to help implement Vision Zero.

2006
The roll-out of a large scale safety camera program starts.

2007
The SRA proposes new interim targets for the next 10 years. A new system of 'management by objectives' is proposed that includes interim targets and annual results conferences.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

LEVEL OF CONTRIBUTION

VISION, STRATEGY AND LEADERSHIP	INCENTIVES AND REWARDS	SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION	TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS	INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY	SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION	COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC	DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership

The 'vision' of Vision Zero was clear, though ambitious. There were strong champions for the policy, including senior figures from the SRA and the Minister for Transport. Although there was no formal strategy for implementation and diffusion, the road administration was able to use selective interventions and build support through pilot projects.

Specific funding

Sweden has a long tradition of investing significant funds in road safety research and encouraging collaboration between industry and academic institutions. In 1999, the SRA received a $1.25 billion allocation for a 10-year period for road safety.

Transparency of research findings and data on demonstrable success

Performance against Vision Zero targets is monitored regularly through the 'management by results' process. Data is shared with all stakeholders at annual results conferences so that they are able to identify actions that can contribute to further improvement.

Specific organizations or programs

A traffic safety unit was created in the SRA after Vision Zero was passed in Parliament. The unit had a highly committed team of around 12 people working to implement the policy across the country. The work was later carried on through the Road Traffic Safety Inspectorate.

Communication channels and networks

Effective networks and linkages have been established by the Swedish Government to encourage different traffic stakeholders to co-ordinate their activities better. For example, this has included forums such as the National Road Safety Assembly; participation at annual results conferences; and collaborative activities to tackle specific safety problems.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Engaging the public

Vision Zero engaged with the public before and after its launch via the media and also through local municipalities. The public is now better informed and able to exert pressure on system designers, such as public transport companies and vehicle manufacturers, to improve road safety.

Address concerns of professionals

The Vision Zero team at the traffic safety unit engaged with a wide variety of stakeholders that included local government, vehicle manufacturers, professional bodies, the police and hospitals. The team worked hard to overcome resistance and build support by demonstrating the positive outcomes of different interventions.

Adapting to suit the local context

While the concept of Vision Zero originated in Sweden as a national policy, implementation is adapted at municipality level, depending on the local context and needs. There have also been successful adaptations of the policy in other countries including: Norway; Australia; some US states; and New York City.

Eliminate old ways of working

Vision Zero introduced new strategies and interventions, which included building 2+1 roads rather than motorways. With a clear evidence base to support their effectiveness, road designers and engineers were convinced of the new approach and began to adopt the new design principles.

DIFFUSION JOURNEY (CONTINUED)

2009
A new target of 50 percent reduction in fatalities and 25 percent reduction in serious injuries is set from 2007 to 2020. The Road Traffic Safety Inspectorate is closed and responsibilities passed to the Swedish Transport Agency.

2010
The SRA is merged with the railway administration to create the Swedish Transport Administration.

2012
ISO39001 introduced as a new standard for road traffic safety management.

IMPACT

Results published by Trafikanalys showed that the number of annual traffic fatalities fell by more than 50 percent, from a peak of 591 in 2000 to 285 in 2012, with a low of 266 in 2010.

The number of fatalities per billion kilometers traveled in passenger vehicles fell by an average of 6.5 percent per year between 2000 and 2012, from 10.05 in 2000 to 4.45 in 2012.

Fatalities per 100,000 population fell from 6.5 to 3 over the period.

Specific Vision Zero affiliated interventions are thought to have had an impact on traffic safety outcomes. It has been estimated that the installation of median cable barriers prevented around 30 deaths and 120 serious injuries between 1998 and 2005.

HEALTH INSURANCE EXCHANGE

COUNTRY
United States (US),
State of Rhode Island

TYPE OF INNOVATION
Policy

BUDGET
$17 million to $23 million

YEAR OF INCEPTION
2011

OVERVIEW
HealthSource RI is a state-based health insurance exchange which was created in response to the high percentage of the state's population that was uninsured or underinsured. Its mission is to: negotiate for high-quality, affordable health insurance options on behalf of individuals and small businesses; and be a robust resource for all Rhode Islanders and businesses to learn about and compare the quality and affordability of their health insurance options and enroll in coverage.

THE INNOVATION

The US Congress passed the Patient Protection and Affordable Care Act (ACA) in 2010, requiring states to have an operational, web-based health insurance exchange. HealthSource RI was established by an Executive Order from the Governor, after the state legislature was unable to pass legislation to form the health insurance exchange. It operates as an agency of the Government of the State of Rhode Island through a division of the state's executive department.

HealthSource RI works with health insurance companies to provide a range of choices for health insurance. The exchange allows consumers to compare prices and benefits of various health insurance plans, thus increasing transparency and promoting competition between health insurance companies to improve affordability. Health insurance plans offered through the exchange are eligible for federal government subsidies or tax credits. Small businesses can

also use HealthSource RI to compare the prices and benefits of various health insurance plans for their employees.

The health insurance exchange targets working age individuals and families not eligible for employer-based health insurance coverage. This could be because the individuals are unemployed, self-employed (eg independent professionals) or working for an employer that does not offer health insurance benefits.

CONTEXT

In 2013, about 12 percent of Rhode Island citizens did not have any healthcare insurance coverage. Without health insurance, Rhode Islanders often delay seeking healthcare such as primary care and preventive services. This results in more frequent use of high-cost services such as emergency departments, which

increases costs for the state government and taxpayers.

Health insurance costs for Rhode Island employers have risen steadily, and many employers are left struggling or unable to provide health benefits for their employees.

DIFFUSION JOURNEY

March 2010
US Congress passes the ACA and President Obama signs it into law.

November 2010
A new Governor is elected, and the Lieutenant Governor is re-elected and starts planning for a state-based health insurance exchange.

September 2011
The Governor establishes the Rhode Island health insurance exchange by executive order.

July 2012
A director is employed to lead HealthSource RI.

May 2013
The HealthSource RI marketing request for proposal (RFP) is released, and the HealthSource RI customer outreach RFP is released.

July 2013
The marketing and outreach contract is signed and the HealthSource RI website launched to staff.

October 2013
The HealthSource RI system and website are opened to the public on 1 October 2013, and open enrollment for individuals begins for 2014. The HealthSource RI contact center is launched. Small business enrollment begins on a year-round basis.

March 2014
Open enrollment for individuals ends for 2014.

November 2014
Open enrollment for individuals begins for 2015. Those covered in 2014 are not auto-enrolled, but required to review new options and actively renew.

December 2014
By the end of December almost 80 percent of 2014 enrollees have re-enrolled.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

| VISION, STRATEGY AND LEADERSHIP | INCENTIVES AND REWARDS | SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION | TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS | INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY | SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION | COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC | DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS |

Vision, strategy and leadership	Specific funding	ICT capability	Specific organizations or programs	Communication channels and networks	Incentives and reward
The Lieutenant Governor of Rhode Island provided the vision and leadership to establish the health insurance exchange. HealthSource RI's director set out an ambitious strategy for stakeholder engagement, service design, customer outreach and education, and ICT systems development to achieve the vision.	The ACA provided grant funding from the federal government for the development, testing and initial implementation of the health insurance exchange.	The health insurance exchange is notable for its success in ICT applications (eg consumer website and contact center), which were essential for the operation, marketing and diffusion of the exchange.	The development of HealthSource RI as the organizational vehicle was a key element for the implementation of the health insurance exchange.	The government implemented an open-door policy for community, business, and health system stakeholders to provide input to the early stages of planning and used a number of communication channels, including a "listening tour" to engage the public.	Opportunities to reduce the cost of health insurance for individuals and small businesses have been a clear incentive for enrollment in the health insurance exchange.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Engaging patients and the public	Creating the time and space for learning and new ways of working	Eliminate old ways of working	Improving the next innovation journey
HealthSource RI staff used various outreach strategies to educate consumers about health insurance issues and help them feel confident in making choices about health insurance.	HealthSource RI operated like a startup company but faced practical issues of operating within state government systems and processes. It used several strategies to overcome barriers such as hiring some staff as contractors and others with state government experience, establishing informal networks with state agencies, and pre-qualifying vendors to speed procurement.	The role of health insurance brokers has changed as HealthSource RI provides more transparent pricing data and information on health insurance plans and options. Their new role adds new types of value for small businesses such as advising on a broader range of human resources management issues, assisting with procedures for selecting health insurance and assisting with insurance forms.	As more HealthSource RI annual open enrollment cycles take place the benefits are more broadly publicized and understood by the Rhode Island public, and the scheme's visibility and role as a catalyst for health system reform and citizen education and empowerment expand steadily.

IMPACT

- Rhode Island enrolled 41 percent of its potential health insurance marketplace population through HealthSource RI, a figure that is the third-highest percentage among all 50 US states.

- Overall, the rate of uninsurance in Rhode Island was reduced from about 12 percent in 2013 to 5 percent in 2014.

- One health insurance plan is offered for 2015 at a 14 percent reduced price over the 2014 rate.

TEAMSTEPPS

COUNTRY
United States (US)

TYPE OF INNOVATION
Practice

BUDGET
$2 million

YEAR OF INCEPTION
2005

OVERVIEW
Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is an evidence-based teamwork and communi-cation program focused on improving team perfor-mance. TeamSTEPPS seeks to prevent medical errors by transforming safety culture and behaviors in healthcare organizations. The program was developed and piloted by the US Department of Defense (DOD) through a federal partnership with the Agency for Healthcare Research and Quality (AHRQ).

THE INNOVATION

In 1999, the Institute of Medicine estimated that at least 44,000 people, and as many as 98,000, die in hospitals each year as a result of preventable medical errors in the United States, at an estimated cost of between $17 billion and $29 billion. Much of the medical harm that occurs is linked to poor teamwork and ineffective communication.

The DOD developed and piloted TeamSTEPPS in 2005. The TeamSTEPPS curriculum is based on team structure and four core skill areas: leadership, communication, situation monitoring, and mutual support. An organization adopts TeamSTEPPS in three phases:

1. Assessment.

2. Planning, training, and implementation.

3. Sustainment.

In 2006, DOD and AHRQ released the program to the general public. At the same time, AHRQ also established and sponsored eight regional training centers across the country to facilitate the diffusion of this innovation. The centers were co-ordinated by a dedicated, federally-supported non-governmental agency.

Organizations that adopt TeamSTEPPS select a core group of leaders to attend TeamSTEPPS training, who then become Master Trainers. Using a train-the-trainer model, the Master Trainers then implement TeamSTEPPS locally.

CONTEXT

- AHRQ is an agency of the US Department of Health and Human Services that seeks to produce evidence to make healthcare safer, higher quality, more accessible, equitable and affordable.

- The DOD Patient Safety Program seeks to create a culture of patient safety and quality in the Military Health System (MHS). It does this by building organizational commitment and capacity to implement and sustain a safety culture to protect the health of MHS patients.

DIFFUSION JOURNEY

1999
The Institute of Medicine's *To Err Is Human* report is published, linking medical error to failures in teamwork and communication.

2001
Congress mandates the DOD to establish the Patient Safety Program to oversee implementation of a healthcare team co-ordination program across all DOD sites.

2005
TeamSTEPPS curriculum is developed by AHRQ and DOD.

2006
TeamSTEPPS is launched to the public.

2007
TeamSTEPPS National Implementation Program begins.

2008–2014
More than 10,000 providers become TeamSTEPPS Master Trainers.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

VISION, STRATEGY AND LEADERSHIP

INCENTIVES AND REWARDS

SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION

TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS

INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY

SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION

COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC

DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS

Vision, strategy and leadership

DOD and AHRQ collaborated on TeamSTEPPS with a vision to improve healthcare quality, safety and efficiency through improved teamwork and communication. Program strategies were designed to make it accessible, customizable and free of branding.

Incentives and rewards

The visibility of program benefits to frontline providers and leadership serve as incentives and rewards for this innovation.

Development and renewal of healthcare standards and protocols

TeamSTEPPS challenges current behaviors and practices in institutions and provides tools for establishing new teamwork and communication standards and protocols. The curriculum and tools can be adapted by individual units and care settings to fit their specific culture and workflow.

Specific organizations or programs

The national TeamSTEPPS program is co-ordinated by a non-governmental agency which receives direction from AHRQ. It is responsible for administration and oversight of the six regional training centers, technical assistance and maintenance of peer-networking activities through multiple communication channels.

Communication channels and networks

A non-governmental co-ordinating agency convenes an annual TeamSTEPPS national conference, hosts a website, publishes a newsletter and sponsors a discussion forum. All of this celebrates successes and provides additional platforms for learning and sustainability.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Creating the time and space for learning and new ways of working

TeamSTEPPS implementation requires time to train and to sustain new behaviors. The program uses a train-the-trainer approach where trainees learn new skills at the regional training centers and then train local staff. Organizations practice teamwork, communication and clinical management skills in their usual setting with available resources.

Eliminate old ways of working

Delayering is the central component of this innovation. The program replaces ineffective teamwork and communication behaviors with standardized, clear and effective teamwork and communication techniques.

Adapting to suit the local context

TeamSTEPPS curriculum encourages customization to local environments and can be implemented with different levels of resources in a variety of settings. It acknowledges that teamwork and communication must be adjusted to diverse clinical conditions and local settings.

Identifying and supporting champions who embrace and promote change

Local champions are vital to implementation and sustainability of the program as they train, demonstrate, support, coach and monitor the new behaviors of their team members.

IMPACT

Since 2006, more than 10,000 individuals in the US have become TeamSTEPPS Master Trainers. TeamSTEPPS has diffused to at least 16 other countries, and the curriculum has been translated into multiple languages.

Many healthcare systems state that they have made sizeable cost savings through decreased malpractice (negligence) claims as result of TeamSTEPPS implementation. One hospital stated that it reduced medical malpractice expenses by 2.5 percent.

Numerous studies report improved organizational and clinical outcomes following TeamSTEPPS implementation, including:

- Reduced perinatal morbidity by 37 percent.
- Reduced operating room surgical mortality (from 2.7 percent to 1 percent) and morbidity (from 20 percent to 11 percent).
- Decreased falls with injury by 50 percent.
- Decreased hospital-acquired pressure ulcers by 85 percent.
- Decreased central line acquired bloodstream infections by 100 percent.

PROGRAMME MWANA MOBILE HEALTH PLATFORM

COUNTRY
Zambia

TYPE OF INNOVATION
Practice

BUDGET
Low $ millions

YEAR OF INCEPTION
2009

OVERVIEW
Programme Mwana is a mobile health system that uses text messaging to deliver infant HIV test results to healthcare facilities and send reminders about neonatal care appointments.

The goal of the program is to improve health outcomes by putting HIV-positive infants onto antiretroviral therapy (ART) as quickly as possible and by reminding caregivers to bring infants to neonatal care appointments.

THE INNOVATION

Zambia has the seventh highest HIV prevalence rate in the world. Programme Mwana leverages high cell phone ownership and literacy to speed up infant HIV test result reporting and remind caregivers about infants' neonatal care appointments.

Blood samples used for early infant diagnosis (EID) of HIV have to be transported to one of only three testing laboratories in the country. The return journey for paper test results can take more than two months. Some results never arrive. An evaluation of an early pilot for Mwana found that using text messaging to return results cut the turnaround time by nearly 50 percent.

Built on Unicef's customizable RapidSMS platform, Mwana has three applications:

- **Results 160:** HIV test results are transmitted from central laboratories to healthcare workers to notify them that test results can be retrieved by text message for infants in their catchment area.

- **RemindMi:** Allows healthcare workers to log birth registrations and reminds them of critical neonatal follow-up appointments for infants in their catchment area.
- **Chat:** Facilitates the exchange of messages among healthcare workers and district and provincial health officials.

Programme Mwana was created by Unicef, the Clinton Health Access Initiative (CHAI), the Zambia Center for Applied Health Research and Development (ZCAHRD) and the Zambia Ministry of Health (MOH).

Development and piloting proceeded collaboratively before transitioning ownership to the MOH, which directed nationwide expansion.

CONTEXT

- Zambia's universal access healthcare system is overburdened and routinely experiences funding and staffing shortages.
- Despite prevention efforts and an active donor presence, the HIV prevalence rate has remained stable at around 13 percent. Transmission of HIV from mother to child can occur at any time during pregnancy, labor

and breastfeeding. Left untreated, HIV transmits at a rate of between 15 and 45 percent.
- High cell phone literacy and penetration in the Zambian market have minimized barriers to use of Mwana's simple, text message interface by clinic employees and community health workers.

DIFFUSION JOURNEY

2008
A CHAI study reports on the excessive waiting time for infant HIV test results.

Project ideation begins separately at Unicef, CHAI, and ZCAHRD.

2009
Collaboration between Unicef, CHAI, ZCAHRD, and MOH begins.

Unicef submits the Programme Mwana proposal to global headquarters and conducts needs assessments.

Technical development of the mHealth system begins late in 2009.

The mHealth technical working group is established.

2010
The MOH approves plans to pilot Programme Mwana.

Piloting begins, ultimately including 31 health facilities in Southern and Luapula Provinces.

2011
Pilot results are presented to MOH, and the Deputy Minister of Health formally announces the nationwide expansion of Programme Mwana.

MOH implements centrally-co-ordinated expansion strategy that leverages implementing partners' networks and resources in different regions of the country.

ENABLERS

The enablers that were viewed as the strongest contributors are described below:

| VISION, STRATEGY AND LEADERSHIP | INCENTIVES AND REWARDS | SPECIFIC FUNDING FOR RESEARCH, DEVELOPMENT AND DIFFUSION | TRANSPARENCY OF RESEARCH FINDINGS AND DATA ON DEMONSTRABLE SUCCESS | INFORMATION COMMUNICATIONS TECHNOLOGY CAPABILITY | SPECIFIC ORGANIZATIONS, PROGRAMS, OR INITIATIVES TO PROMOTE DIFFUSION OF HEALTHCARE INNOVATION | COMMUNICATION CHANNELS ACROSS HEALTHCARE, WITH OUTSIDE INDUSTRIES, AND WITH THE PUBLIC | DEVELOPMENT AND RENEWAL OF HEALTHCARE STANDARDS AND PROTOCOLS |

Vision, strategy and leadership	Funding for research, development and diffusion	Transparency of research findings and data on demonstrable success	ICT capability	Specific organizationa or programs	Communication channels and networks across healthcare, with outside industries and with the public
Mwana emerged from the shared vision of Unicef, CHAI, ZCAHRD and the Zambian Government. The Zambian Government used a centrally-co-ordinated rapid expansion strategy to maximise the advantages of the partners' assets and relationships in different regions of the country.	Funding and resources were contributed by Unicef, MOH, Ministry of Community Development, Mother and Child Health (MCDMCH), and implementing partners.	Prior to nationwide expansion, a successful pilot was conducted. The success of the pilot was measured and these findings shared with the MOH. In addition, Mwana includes a real-time dashboard that is available online for performance monitoring.	Mwana leverages Zambia's high cell phone usage and literacy as well as the availability of cell network coverage in much of the country.	Unicef, ZCAHRD, and CHAI worked together to pilot the program and, under the leadership of the MOH's ICT department, expand the program across Zambia. This collaboration provided the driving force for a nationwide scale-up.	The mHealth technical working group, chaired initially by MOH, brought together the key partners involved in Mwana's expansion, and facilitated collaboration and discussion of issues and strategy in a central forum.

FRONTLINE BEHAVIORS

The frontline behaviors that were viewed as the most important are outlined below:

Address concerns of professionals	Adapting to suit the local context	Creating the time and space for learning and new ways of working	Improving the next journey
MOH leaders' carefully considered risk, sustainability, effectiveness and the ability of Mwana to work with other programs before it was approved for expansion. Needs and feasibility assessments were conducted to ensure that Mwana would integrate with pre-existing workflows.	Technical development was conducted in rural health facilities to ensure Mwana would function in even the most inhospitable locations. Continuing local needs assessments led to the addition of a chat feature at the request of health facility workers.	Scale up involved clinic-based training of all clinic employees and community health workers. When receiving Mwana training, health facility workers were able to acquire actual HIV test results they had been waiting for.	Mwana brought together stakeholders in the mHealth technical working group which continues to act as a forum for all mHealth initiatives in Zambia.

IMPACT

2012–2013
Program expansion plans continue nationwide.

2014
Programme Mwana moves to the newly formed MCDMCH.

More than 1,000 health facilities nationwide are linked to Mwana.

- In four years, Programme Mwana reached 1,038 facilities across Zambia.
- An evaluation of Programme Mwana's pilot demonstrates a 50 percent decrease in turnaround time. In addition, average results reporting times fell from 66.8 to 35.0 days.

- Anecdotal evidence suggests that Mwana may have had additional effects on: patient confidence in the public health system's ability to diagnose infant HIV in a timely manner; demand for testing and antiretroviral therapy; and demand for neonatal care appointments.

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GDHI RESEARCH TEAM

RTI International

Ellen Wilson, RTI Project Director

Alan O'Connor, Senior Economist

Asta Sorensen, Senior Scientist

Michael Trisolini, Senior Director

IGHI Centre for Health Policy

Julie McQueen, Head of GDHI, WISH and Policy Fellow – Innovation Studies, IGHI

Hannah Patel, Programme Support Officer, WISH

Greg Parston, Program Director, WISH and Executive Advisor to the Director, IGHI

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