

ANALYSIS

Innovate or die

Health systems must innovate to survive the pandemic of non-communicable disease but many innovations do not spread easily. **Paul Corrigan**, **Christopher Exeter**, and **Richard Smith** examine why this is so and how to help them spread

Paul Corrigan *adjunct professor*, Christopher Exeter *senior fellow*, Richard Smith *adjunct professor*

Imperial College Institute of Global Health Innovation, London SW7 2AZ, UK

The pandemic of non-communicable disease (NCD) affecting low and middle income countries is well recognised.^{1 2} In high income countries multiple chronic conditions already account for the lion's share of expenses.^{3 4} Health systems are threatened by the escalating costs of NCD and must innovate to keep their systems functioning and deliver improved care. We discuss the drivers and diffusion mechanisms needed to promote the spread of innovations using seven novel approaches to reducing the burden of NCD.

Examples of innovations to counter NCD

In preparing the report from which this article is derived we compiled over 200 innovations aimed at reducing the burden of NCD and categorised them under a new taxonomy (table 1).⁵ Box 1 describes how we devised the taxonomy and collected the innovations.

From our database we selected seven innovations (box 2) that illustrate different problems in spreading innovations, which we discuss below. All have evidence to support them, but as we deliberately selected early stage innovations, this mostly falls short of randomised trials. Clearly further evaluation is needed. Innovations that seem promising may not deliver value in the long term and resources may be wasted by pursuing them for too long.

Professionals may feel threatened

Diffusing new methods of service delivery for patients, such as nurse led care in Primary Care 101 or encouraging self management in the Tonga programme, are likely to prove most difficult in countries that have long established and well entrenched health systems. Community services led by non-physicians may be viewed as a threat, especially in countries where hospital care dominates. Hospital based services for patients with NCD enjoy high status in many systems, and the professionals who run them are likely to feel affronted by the suggestion that community based care led by non-physicians might be equally effective as well as cheaper. So long as community services remain local, clashes are avoidable, but

expanding community based services nationally, as the Chinese project aims to do, requires a new strategy to reassure or overcome the objections of existing service providers.

This must include a case for change that is scientifically sound and resonates with the public and, as far as possible, with clinicians. Evidence is needed that the new service can reduce mortality and morbidity and provide a return on investment. Leading professionals need to champion the new approach and to get patient groups to argue the case with existing providers.

Programmes that promote self management, such as the Tonga project for patients with asthma, tend to remain small because health professionals see them as a threat to job security.

Professionals may react defensively by questioning the safety of the new approach, which could undermine the confidence of patients and hinder the diffusion of innovations. Finding professionals who will argue in favour of self management is important.

Sound economic case for change

The widespread uptake of the polypill (containing aspirin, a statin, and folic acid) to prevent coronary heart disease could promote the sustainability of health systems by reducing the burden from stroke and myocardial infarction. Its role in secondary prevention is widely accepted, and trials are underway to test its role in primary prevention. If, as some studies suggest, half of heart attacks and strokes could be prevented, the savings would be enormous. But to be most cost effective polypills need to be manufactured in volume from the beginning (large scale production lowers unit cost) and adherence must be promoted.

Similarly, innovations to improve self management will help health systems only if potential savings are realised. Increasing patients' capacity to self manage in the Tonga asthma initiative resulted in a fall in emergency visits and hospital admissions. This suggests savings from rolling out this innovation may be appreciable and could free resources for other health activities. It's worth noting, however, that in many health systems, resources that are "saved" are often in different budgets from the investment and are not attributed to the initial investment.

Box 1: Identification and classification of innovations

The innovations used as case studies for the report *Countering Non Communicable Disease through Innovation* were collected using a variety of methods.⁵ These included a survey of members of the report's working group; case studies forwarded to the authors; and primary research undertaken by the authors.

We identified about 200 case studies and selected 12 for inclusion in the final report. The selection was not based on any classification of ranking but to ensure an adequate representation from across the taxonomy of innovations (table 1).

The taxonomy, devised by a subgroup of the report's working group, classifies interventions to tackle NCD by the principal ways they can be achieved (technology, medical devices, patients, civil society, organisational, etc) and by the underlying risk factors for NCD (biological, behavioural, social).

Box 2: Seven innovations to reduce the burden of non-communicable disease

Weqaya programme^{6,7}—The United Arab Emirates has measured the risk of cardiovascular disease in every Emirati citizen in Abu Dhabi aged over 18. The results are fed back to individuals together with advice on action to take. Anonymised data can be provided to the government, local authorities, and employers to develop and monitor public health and workplace programmes.

*China Rural Health Initiative*⁸—A platform to test low cost sustainable interventions for the prevention and management of cardiovascular disease in 120 villages in northern China, using village doctors (once known as "barefoot doctors") and community health workers.

Tonga asthma self management programme^{9,10}—The programme aims to enable patients to manage their condition with little or no clinical supervision. Patients are given instruction on using peak expiratory flow (PEF) meters, a plan on how to manage their asthma according to their PEF rates, and guidelines on how to respond to problems.

Polypill^{11,12}—The polypill combines drugs that work in different ways to reduce the risk of heart attack and stroke into one tablet. Trials have shown that the polypill will reduce blood pressure, blood lipids, and platelet stickiness as effectively as drugs given individually and that adherence is much improved. The polypill is available in several low and middle income countries but not yet in a high income country, although it may be licensed soon in the US for secondary prevention of cardiovascular disease. Some have advocated offering the polypill to everybody when they reach age 55 without any testing or monitoring.

*CollaboRhythm*¹³—A speech and touch controlled collaborative interface that can be accessed by phone, tablet, or computer and allows doctor and patient to make shared decisions based on the patient's data. Importantly, patients own their data, and everything they see in the doctor's office is available at home or when they visit another doctor or are travelling. The idea is that continuous monitoring helps patients to live a healthier life, making them less likely to need more intensive therapy.

Primary Care 101, South Africa^{14,15}—A set of evidence based guidelines that cover all the conditions likely to affect adults attending primary care clinics in South Africa. These clinics are staffed mainly by nurses, who have considerable experience of treating patients with HIV infection but little training in managing patients with NCD and other conditions common in primary care. Unlike most guidelines, they are symptom based rather than disease based. The nurses also receive non-didactic, case based training in their places of work.

Discovery Vitality, South Africa^{16,18}—The Vitality programme of the South African insurance company Discovery provides incentives for people to live a healthier life. Those in the programme begin with a full health review, which assigns them a "Vitality age" and prescribes a pathway to better health—covering disease management, smoking, mental health, preventive health, nutrition, and physical activity. The Vitality age is easy for patients to understand: a Vitality age higher than your chronological age is clearly a bad thing, and the reverse is clearly good. Through following their prescribed pathway, participants can reduce their Vitality age and earn Vitality points, which can be exchanged for benefits.

Most health systems undervalue new forms of communication between patient and medical staff, such as the CollaboRhythm platform. Use of mobile phones in healthcare is mainly being developed outside normal payment systems. If greater use of e-technologies reduces the need for face to face consultation it represents not just a challenge to orthodox methods but also, potentially, a loss of income for health professionals.

Consumer demand and social movements

Traditionally, healthcare is less driven by consumer demand than other activities, but this might be changing. Better self management offers people with NCD much greater control over their lives, less reliance on medical interventions, and reduced morbidity¹⁹—so patients are likely to want more of it. Some patient groups, notably in the UK the Richmond Group of Charities, are organising patients to demand more self management.²⁰

Innovations that use mobile phones to facilitate the search for diagnosis or treatment may become popular with patients and should diffuse easily and rapidly. Resistance to their use by health professionals, in high income countries in particular, will have to be overcome.

Similarly, uptake of the polypill could meet resistance from drug companies that see markets being undercut, and public health professionals, who regard the polypill as an alternative rather than a supplement to a healthy lifestyle. It might take an international clinical and social movement to establish its legitimacy. The argument will have to be made in different parts

of health systems and a wide range of champions mobilised, including patients, patient groups, clinicians, and scientists.

The advantage of social movements as agents of change is that they can challenge existing healthcare business models from the plausible perspective of a large patient population. They can also spur interest in and demand for a new model of disease prevention, which avoids having to mount an expensive marketing campaign.

Buy-in from local communities

In some Chinese communities many people still believe that developing cardiovascular disease is inevitable and interest in prevention is low. Strong public health leadership will be needed to convince the public that there will be benefits to health (and wealth) from adopting innovations in the China Rural Health Initiative.

Diffusion may also fail if the innovation seems to be imposed from outside. When the salt reduction and health promotion part of the project in China was implemented "community health educators" strove to represent themselves as local community leaders rather than as external agents.

New innovations also need to be promoted. Promoters must not assume that a national programme will gain the same support from community leaders as a successful local programme. When local leaders have less influence, communities may benefit from the help of social marketing organisations. Social marketing changes behaviour because precise messages reach targeted groups through specific channels of communication. This

segmentation is most useful when the innovation is focused on a high risk group, such as people with hypertension.

Over the past decade the communication and culture sector has been successful in changing the consumption behaviour of many hundreds of millions of people. Given this success the private sector has considerable expertise in the use of persuasive communications to change consumer behaviour, and it usually makes sense for government and health organisations to use their skills rather than try to change behaviour alone.

Patients add value

The innovations that we were sent show growing professional and public support for self management of NCD. The Tongan, Chinese, and CollaboRhythm examples suggest that patients can add considerable value to their healthcare by improving their capacity to self manage. But it requires investment in improving the capacity of patients and their communities to add that value.

If governments are to make the case for universal screening linked to targeted personal interventions, such as in the Weqaya project, they may need the support of relevant patient organisations. Visible government support for a health policy is necessary, but probably not sufficient to diffuse the innovations across the healthcare system.

Role of governments

New innovations, along with established service delivery models, depend on having an adequate workforce with the required skills. The China Rural Health Initiative teaches local primary healthcare workers to screen, classify, and manage high risk patients. It has also set up simple case management record systems within local clinics and a digitised central database and performance feedback system for health workers.

Governments need to assess the skills mix and distribution of their workforce, their resources for training, and ability to monitor performance. Attempts to introduce new national policies must also take account of local, regional, and cultural differences. Economic incentives may be more effective in poorer parts of country than in affluent areas, for example. Although village health workers in the Chinese initiative were prepared to take on the care of high risk patients, it cannot be guaranteed that workers in other areas will do the same.

Then there are regulatory considerations. In many countries, the use of medical devices is subject to regulation, but mobile communications and the increasing use of “apps” have given rise to new forms of screening, diagnosis, self management, and therapy, and these developments call for new types of regulation.

Finally, governments must take confidentiality of health data seriously—and be seen to be doing so. To succeed in scaling up universal interventions, such as the Weqaya cardiovascular risk assessment programme, governments need to engage with their populations and argue strongly for the benefits of collecting universal data, guarantee its security, and understand that individuals have a right to own their own data.

International organisations

Each national healthcare system has distinctive national and regional characteristics. Attempts to transplant innovations from one national system to another often fail. International organisations need to pay more attention to these national differences when advocating diffusion across nations. They also need to recognise the scope for promoting diffusion of

innovations from low and middle income countries, which promise much greater value for money and sustainability than those being pursued in high income countries.²¹

Businesses

Companies that insure their workforce against ill health and promote healthy behaviour benefit the company as well as individual workers. The same is true for health insurers. The South African insurance company Discovery is seeking to improve the health of its customers by providing them with incentives to do so. When incentives work, the insurer is encouraged to extend the programme to a larger section of the population. Competition between health insurance companies may promote the spread of incentives for behavioural change.

Conclusion

The NCD pandemic threatens the sustainability of health systems. They must identify and implement new evidence based policies to survive. But to have a major impact innovations must spread. Professionals, markets, consumers, governments, international organisations, and businesses can encourage the spread of innovation—but can also block spread. We need perhaps to spend less time studying innovations and more time studying—and when appropriate promoting—their spread.

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Members of the NCD working group: Paul Corrigan (cochair), Imperial College London; Richard Smith (cochair), UnitedHealth Chronic Disease Initiative; Stephen Bloom, Imperial College London; Richard Bohmer, Harvard Business School; Kacey Bonner, British Consulate-General, Los Angeles; Andres Cabrera, University of Granada; Catalina Denman Champion, El Colegio de Sonora, Mexico; Prabhakaran Dorairaj, Centre for Chronic Disease Control, India; Christopher Exeter, Imperial College London; Catherine Gordon, US Centers for Disease Control and Prevention; Sian Griffiths, Jockey Club School of Public Health and Primary Care, Chinese University of Hong Kong; John Grumitt, Diabetes UK and International Diabetes Federation; Christine Hancock, C3 Collaborating for Health; Oliver Harrison, Abu Dhabi Health Authority; Mike Hobday, Macmillan Cancer Support; Alex Jadad, Centre for Global E-Health Innovation, University of Toronto; Desmond Johnson, Imperial College London; Sneh Khemka, BUPA; Dinky Levitt, University of Cape Town; Lijing Yan, George Institute for Global Health, China; Michael Macdonnell, Global Health Policy Forum; Stephen MacMahon, George Institute for Global Health, Australia; Victor Matsudo, Physical Fitness Research Laboratory of Sao Caetano do Sul, Brazil; Sarah Morgan, KPMG; Andy Murdock, Lloydsparmacy; Venkat Narayan, Rollins School of Public Health; Robyn Norton, George Institute for Global Health,

Australia; Anand Parekh, US Department of Health and Human Services; Parashar Patel, Boston Scientific Corporation; Neil Pearce, London School of Hygiene and Tropical Medicine; Rodamni Peppas, Boston Scientific Corporation; Cristina Rabadan-Diehl, Office of Global Health, National Heart, Lung and Blood Institute, US National Institutes of Health; Hilary Thomas, KPMG; Denis Xavier, St. John's National Academy of Health Sciences, India.

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Table

Type of change	Type of risk factor		
	Biological	Behavioural	Social determinants
Biological technology	Polypill		
Information technology	Weqaya	Weqaya	
	CollaboRhythm	CollaboRhythm	
Medical devices	CollaboRhythm	CollaboRhythm	
Changes in workforce	China Rural Health Initiative	China Rural Health Initiative	China Rural Health Initiative
	Tonga asthma self management	Tonga asthma self management	
	Polypill	Primary care 101	
	Primary care 101	Discovery Vitality	
	Discovery Vitality		
Greater involvement of patients in their care	China Rural Health Initiative	China Rural Health Initiative	China Rural Health Initiative
	Tonga asthma self management	Tonga asthma self management	
	Discovery Vitality	Discovery Vitality	
Greater involvement of civil society in patient care	China Rural Health Initiative	China Rural Health Initiative	China Rural Health Initiative
	Tonga asthma self management		
	Weqaya		
Organisational processes	Tonga asthma self management	Weqaya	China Rural Health Initiative
	China Rural Health Initiative	Tonga asthma self management	Discovery Vitality
	Discovery Vitality	China Rural Health Initiative	
	Primary Care 101	Discovery Vitality	
	Weqaya	Primary Care 101	
Policy		Weqaya	

*See box 2 for descriptions of the innovations.