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bmj.com News: NHS boards see telehealth only as a means of saving money, warns expert (*BMJ* 2012;345:e4633)

Telehealth for long term conditions

Latest evidence doesn't warrant full scale roll-out but more careful exploration

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Almost 50 years of innovation in telehealth have seen great progress in tackling a wide range of conditions using a variety of technologies and covering a wide range of outcomes. Although this work shows great promise, it also creates challenges for interpretation. The uncertainties in defining terms like "telehealth" reflect broader difficulties in interpreting the complex interplay of technology, service designs, clinical input, and patient involvement. New studies can challenge existing findings as much as they corroborate them. For example, two recent large scale trials of telehealth for heart failure found no benefit,[1 2] whereas previous meta-analyses suggested reductions in mortality.[3-5] To this we can now add the initial findings of one of the largest telehealth and telecare studies ever conducted: the UK Whole System Demonstrator trial summarised in this issue (p 16).[6]

Telehealth does not just "work" or "not work." Particular interventions may be successful, but this depends on many factors, including the specific contributions of the type of technology and of the context, such as the willingness and ability of clinical staff to change their care processes; the disease stage and severity of disease in the patients involved, their social backgrounds, and their needs and expectations; the predictive power of any monitoring data that are collected; and, indeed, the endpoints that are used to specify success.[4 7] The research agenda established by systematic reviews of telehealth consistently argues for study designs that can generate insights into the active components within the black box of telehealth interventions.[8 9] Although factors that might be important for successful telehealth can be described (box), we need more clarity on how to interpret the relative contributions of these elements.

The highlight of the initial findings is reduced mortality in patients offered telehealth—an absolute reduction of 3.7% (4.6% *v* 8.3%; odds ratio 0.54, 0.39 to 0.75), or about 60 lives over a 12 month period.[6] This welcome finding needs a plausible explanation, especially because numbers of admissions were essentially unaltered in the intervention group, and existing evidence on the impact of telehealth on mortality is either mixed or lacking.[1 2 7 10]

The demonstrator trial combines three conditions—diabetes, chronic obstructive pulmonary disease (COPD), and heart failure—and was powered on a pooled analysis of effect. However, this strategy deserves further thought. For example, in England, the number of annual hospital admissions where diabetes is recorded as the primary diagnosis is about half that of admissions for COPD, despite diabetes being more than twice as prevalent. Telehealth related changes for patients with COPD might, therefore, have a greater effect on pooled estimates of hospital activity, particularly when the relative excess of patients with COPD in the demonstrator study group (compared with population prevalence) is taken into account. Furthermore, only a third of those invited to participate did so. Is telehealth particularly attractive for patients with COPD, and if so, why? There will also be questions, particularly if the pooled economic analysis (due to be published soon) is unfavourable, about whether targeting particular groups, perhaps by disease severity, might have been advantageous.

Does the demonstrator trial provide convincing evidence for commissioning a national roll-out of telehealth? Probably not, although we recommend caution until the full data are released. Does it provide justification for the UK Department of Health's plan to bring telehealth and telecare to three million people with long term conditions and complex care needs not to proceed?[11] Equally not: the evidence base is essentially unchanged and uncertainties remain. The difficulty of interpreting complex studies with nuanced findings, like the demonstrator trial, does not make decision making easy, but neither does it mean that the research is unnecessary.

Some unanswered questions will need new trials, but others can be dealt with by other routes. For example, the wealth of data generated by telemonitoring combined with data from electronic health records provides an important opportunity for large scale observational analyses, and that could include the 3millionlives plan.[12] Policy makers, commissioners, and guideline developers should help ensure that the research agenda focuses on areas where telehealth shows most promise.

GABRIEL SZABO/GUZELIAN

Remote doctoring is not clearly effective or worthwhile

Key considerations for telehealth interventions

Interventions should:

- Enable a disease management strategy for a specific group of patients
- Be able to enhance quality of life and clinical outcomes
- Promote convenience for patients and clinicians
- Support meaningful clinical care, using tools such as decision support
- If possible allow patients to use their own smart phones or computers for monitoring
- Be easy to use for patients and clinicians
- Be accessible to those with disabilities, limited dexterity, and those who do not speak English
- Be integrated into clinical computer systems
- Be backed up by training, monitoring, and technical support for participants
- Be designed to be gradually integrated into standard pathways for care. Interventions should replace, rather than add to, existing ways of working

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RESEARCH, p 16
FEATURE, p 20

bmj.com/podcasts

BMJ assistant editor Helen MacDonald speaks to Li Ming Wen, lead author of the linked research paper

Prevention of obesity through home visiting up to the age of 2 years

A promising but costly approach

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In the United Kingdom, a quarter of children are already overweight by the time they start school at the age of 5 years.[1] Primary prevention therefore needs to start well before school age, particularly because heavy babies and rapid weight gain at this time are associated with the development of obesity later in life.[2] Yet most research efforts are still focused on school aged children.[3] In the linked study, however, Wen and colleagues have carried out a trial of an intervention programme aimed at infants.[4]

The study is important for two reasons: firstly, because the authors show that it is possible to engage young mothers, at least in Australia, in an obesity prevention programme during pregnancy; and, secondly, for the results they have achieved. They report that babies who participated in the intervention had lower body mass index (BMI) measures at the age of 2 years than those in the control group. They also found measurable differences in vegetable consumption, using food for reward, TV viewing, and mothers' lifestyles.

The literature suggests that the medical model whereby health professionals instruct patients on a course of action is limited in its value as a motivator for change.[5] Yet the programme used by Wen and colleagues—Healthy Beginnings—adopted a very structured approach where each visit followed a set agenda and parents were "taught" about healthy infant child rearing practices. The focus was on specific messages: "breast is best," "no solids for me until 6 months," "I eat a variety of fruit and vegetables every day," "only water in my cup," "I am part of an active family." Parenting skills and style were not identified as key components, so whether the programme equips parents to face the challenges of maintaining a healthy lifestyle once children reach a more independent and opinionated stage of life is yet to be seen.

Despite its structured approach, the programme is one that cannot easily be taken "off the peg." The training was extensive and provided the nurses with in depth expertise about early childhood development—emotional as well as psychomotor, a framework for observing infant behaviour, modulation techniques, and research methodology, as well as healthy family lifestyle behaviours.

CRISTINA PEDRAZZINI/SPL

Several factors in pregnancy are now thought to be associated with child obesity,[7] and some, such as nutritional quality of the diet, smoking, and weight gain, are potentially modifiable

It is no mean task to conduct a randomised controlled trial of this nature. More than 600 mothers were recruited in just 12 months from socially disadvantaged areas in Sydney; the 75% retention rate across both groups is an achievement in itself. The anthropometric findings, presented as change in BMI (rather than BMI z scores as is usual in children), are equivalent to less than half a centile space on the UK 1990 BMI charts. It is too early to say if this is clinically significant and whether the differences will translate into a long term reduction in obesity. Encouragingly, there was a trend towards fewer children in the intervention group being overweight or obese. Alongside the anthropometric measures, there were differences in eating behaviour and time spent watching TV or playing computer games, which are hugely important, because these early lifestyle habits track into later childhood and beyond.[6]

The study raises a number of questions. Several factors in pregnancy are now thought to be associated with child obesity,[7] and some, such as nutritional quality of the diet, smoking, and weight gain, are potentially modifiable. Might we do better by starting to intervene even earlier in life? Pregnancy is a time when many women adopt healthier habits to benefit their unborn child, so programmes like Healthy Beginnings might consider yet earlier intervention. The researchers might also consider extending its remit beyond first time mothers. Contrary to expectation we have found that mothers with older children may be especially open to receiving support, particularly if their previous children have had excess weight gain or eating problems.[8]

The question of cost is important. Eight home visits over 24 months is not an insignificant call on resources. The UK Healthy Child Programme (the national health promotion programme) has been reduced to essentially three health reviews in the first two years.[9] The concept of a universal programme offering eight home visits is far beyond the scope of current health visiting services. If nothing else, this trial indicates that tackling primary prevention of obesity requires considerable investment in time, training, and resources.

Wen and colleagues' study shows that it is possible to conduct a randomised controlled trial of a home intervention and achieve promising results. Follow-up of the cohort in the long term is essential to see if the intervention results in a measurable reduction in obesity and morbidity. In the meantime, it is becoming clear that if we are to work towards primary prevention of obesity through interventions in the early years we need highly trained staff with adequate time and resources to work effectively with mothers of infants.

Competing interests: MR is academic lead for HENRY, Health Nutrition for the Really Young, a training organisation that aims to help community and health professionals work more effectively around obesity prevention, and she is co-principal investigator of EMPOWER, a specialist health visitor intervention for babies at high risk of obesity.

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RESEARCH, p 17

Aristolochic acid was classified as a human carcinogen by the International Agency for Research on Cancer, and regulatory authorities in Europe, North America, and several other regions issued alerts or instituted import bans

Aristolochic acid nephropathy

A disease that could be prevented through more careful regulation of herbal products

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More than 20 years ago a Belgian report described nine women with rapidly progressive fibrosing interstitial nephritis who either required dialysis or showed progressive renal impairment.[1] All of the women had taken a slimming regimen that included herbs of the Aristolochia family, which have been known to be nephrotoxic and carcinogenic since the 1980s. Within five years, this group of nephrologists identified more than 100 patients with aristolochic acid nephropathy, almost half of whom were later found also to have tumours of the upper urinary tract.[2] Case reports and series from around the world followed.[3] Aristolochic acid was classified as a human carcinogen by the International Agency for Research on Cancer, and regulatory authorities in Europe, North America, and several other regions issued alerts or instituted import bans. However, these regulatory measures have been wholly inadequate at eliminating this preventable disease, with a recent report describing 300 cases of aristolochic acid nephropathy from a single centre in Beijing.[4]

Herbs that contain aristolochic acid are often found in traditional Chinese preparations, particularly—although not exclusively—in those with fang ji and mu tong as listed ingredients, often as a result of inadvertent adulteration.[5] Epidemiological surveys from the People's Republic of China have shown that chronic kidney disease is becoming more prevalent, with more than 100 million people in this region now estimated to be affected.[6] It can be difficult to identify potential sources of aristolochic acid in traditional remedies, making the contribution of this substance to the epidemic of chronic kidney disease a challenge to estimate. A recent analysis of the Taiwan national health insurance database found that about 40% of Taiwanese people had consumed products either known or likely to contain aristolochic acid between 1997 and 2003, with a marked dose-response relation between estimated aristolochic acid exposure and risk of end stage renal disease and urothelial cancer (Pu Y. Aristolochia-related nephropathy and urothelial carcinoma. Abstract presented at Aristolochia-related nephropathy and urothelial cancer, Taipei, 7 January 2012). The medicinal use of most plant species that contain aristolochic acid has been banned in Hong Kong, Taiwan, Malaysia, and mainland China, although certain products containing this compound are still permitted in China under the supervision of Chinese medicine practitioners. In some parts of the world the extent of human exposure to aristolochic acid is still not known. Plants that contain aristolochic acid are used in folk medicine in India and parts of Africa.[5] Although the risk of nephropathy and cancer increases with dose and cumulative exposure, current evidence does not allow the definition of a safe dose.

SAM K TRAN/SPL

Aristolochia clematitis

Another dimension in the growing appreciation of aristolochic acid as an important cause of kidney disease and cancer worldwide has come with its identification as the causative agent of Balkan endemic nephropathy, a form of tubulointerstitial renal disease associated with cancer that affects tens of thousands of patients in the Danube basin. The contamination of wheat flour in affected villages by the seeds of the weed *Aristolochia clematitis* was first noted in 1969.[7]

Despite measures to regulate aristolochic acid in Western countries, cases of aristolochic acid related nephropathy continue to occur, and patients are able to take products containing aristolochic acid for many years. A recent Australian report described an ultimately fatal case of aristolochic acid related nephropathy in a patient who took herbal products bought by mail order even after a 2002 ban on products suspected of containing the substance.[8]

In the United States, herbal medicinal products are still classified as "dietary supplements" and are regulated by the Dietary Supplement Health Education Act of 1994. The Food and Drug Administration issued an alert in 2001 warning consumers and the herbal medicine industry of the dangers of aristolochic acid; although some products containing aristolochic acid have been seized, consumers in the US and worldwide can still obtain many products freely over the internet. The regulatory framework in the European Union is somewhat more comprehensive—the 2004 Traditional Herbal Products Directive requires that all traditional herbal drugs are registered and approved, with a demonstration of safety and efficacy. However, a recent investigation by the Medicines and Healthcare Products Regulatory Authority in the United Kingdom showed that aristolochic acid was still present in preparations of various herbal remedies,[9] and the judge in a recent UK court case recommended that the supply of this substance be more closely regulated.[10]

Although it is challenging to regulate a global market in herbal medicinal products, the threat to public health posed by products that contain aristolochic acid highlights the importance of ensuring that comprehensive listings of ingredients must be made mandatory for herbal products and data must be collected on their effects. National agencies should improve their surveillance of internet outlets and regularly test available products. The public also needs to be more aware of the potential risks associated with the unregulated use of herbal medicines. Coordinated international action could help to ensure that aristolochic acid nephropathy is eradicated.

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A non-interrupted supply of drugs is key. However, a more supportive environment may be the best approach to helping patients overcome challenges to adherence

Promoting long term adherence to antiretroviral treatment

Patient support and community interventions probably offer the best returns

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While funders start to backtrack on financial commitments to tackling the AIDS epidemic,[1] the HIV research community is rallying because important steps are currently being taken in treatment, prevention, and the combination of the two.[2] Not since antiretroviral treatment first became available have expectations been so high that its widespread use can break the back of the global AIDS pandemic. Research into an HIV vaccination has been funded for more than a decade, but long term antiretroviral treatment is still the most effective biomedical prevention tool available.[2]

For antiretroviral treatment to work as a preventive measure, however, patients must consistently adhere to treatment, yet our understanding of how to achieve widespread optimal adherence is still limited. Most people who take antiretroviral drugs reside in Africa—currently, more people in the small country of Zambia (283 000) are taking these drugs than in the whole of the United States (268 000).[3] Although most patients in Africa adhere extremely well to treatment,[4] a proportion of patients do not. It is important that all patients are adherent to avoid the emergence of drug resistance, because it is not clear that first line drug combinations that are widely used in resource limited settings offer adequate protection against drug resistant strains.[5] On a positive note, the risk of treatment failure declines with increased duration of disease suppression with antiretroviral drugs, regardless of level of adherence,[6] which means that less expensive first line regimens can be used for longer and transmission to others prevented.[2]

Extensive research has examined interventions aimed at reminding patients to take their drugs, through memory tricks, beepers, or direct observation.[7] However, emerging evidence indicates that these techniques may not work well, and that efforts should be channelled in a new direction. Patients with poor adherence to long term treatment usually experience major impediments to healthy behaviour in their lives. For example, when patients are unable to provide food for their family or schooling for their children their own health may become a secondary concern. When patients have not disclosed their HIV status to a partner it may be difficult for them to collect their drugs or maintain their drug taking schedule. Even if patients want to adhere to treatment they may not be able to when pharmacies are out of stock.[8] In such cases, reminders to take drugs may be redundant and may even reinforce a self perception of failure.

GIACOMO PIROZZI/SPL

Consistent adherence to ART is needed for it to work

A non-interrupted supply of drugs is key. However, a more supportive environment may be the best approach to helping patients overcome challenges to adherence. The authors of a qualitative study on adherence in sub-Saharan Africa termed such an approach—social support networks that encourage patients to be vigilant about their health—the social capital of adherence.[9] This may explain why patients who have disclosed their HIV status to their partners have high levels of adherence and why interventions aimed at community level involvement in adherence result in relatively low levels of mortality and loss to follow-up.[2 10] A two year follow-up of community antiretroviral treatment group care in rural Mozambique found 92% adherence, mortality at just 2%, and that only 0.2% of patients were lost to follow-up.[10] These excellent outcomes are the result of a programme that encourages self sufficiency and mutual support, a very different approach to the more usual health worker intervention for adherence.

Agencies such as the AIDS Support Organization (TASO) and the Family Treatment Fund in Uganda, as well as AMPATH in Kenya, have long been aware of what drives adherence and have launched initiatives that have included microfinance opportunities, skills training, and drama groups to promote positive living and encourage healthy social behaviours.

Can advances in technology help with adherence to treatment? There is excitement about harnessing technology to provide reminders, support, or monitoring systems for adherence.[7] Most recently, mobile phone communications between health workers and patients resulted in improved adherence and viral suppression.[11] It is unclear whether improvements were due to the reminders or the support of health workers. Real time drug adherence monitors, which record removal of a patient's drug bottle cap, are an innovative step towards monitoring patients who are difficult to reach. Such monitors are unlikely to be widely implemented because of high costs, and possible opposition from patients, but they may be useful for patients with specific challenges.[12] The use of technology to facilitate social support may be a powerful approach.

Research into adherence to antiretroviral treatment should now move towards testing interventions that could make a difference. Few randomised trials have evaluated support strategies and their effects on adherence. However, because long term adherence is necessary for treating HIV and preventing transmission, and as funding becomes uncertain, it is increasingly important to harness social capital because it is cheap and adaptable to local environments, and it probably offers the best return on investment in terms of conferring clinically important health benefits.

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Half of people over 65 years of age have at least three coexisting chronic conditions

Beyond diagnosis: rising to the multimorbidity challenge

Urgently needs radical shifts in research, evidence based guidance, and healthcare

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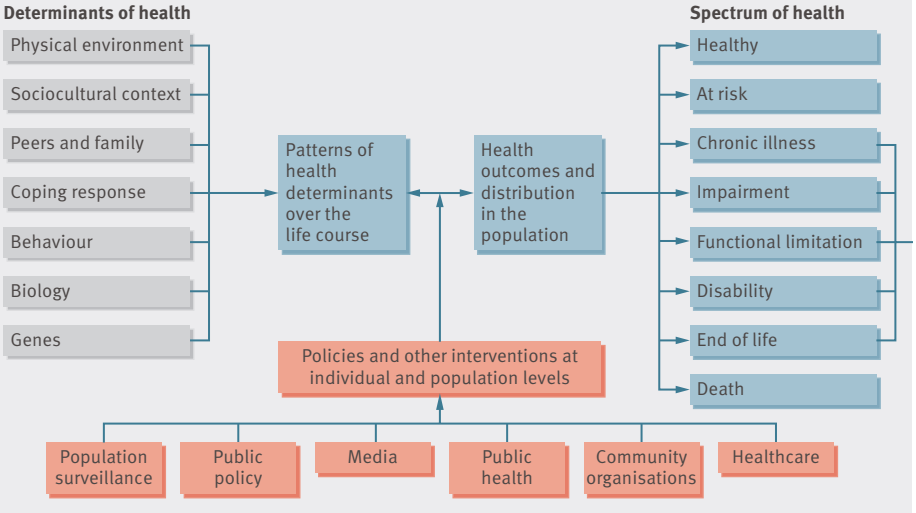
Box 1 | Summary of the Institute of Medicine report, *Living Well with Chronic Illness*[1]

This detailed literature review uses exemplar conditions including arthritis, survivorship after cancer, chronic pain, dementia, depression, type 2 diabetes, post-traumatic disabling conditions, schizophrenia, and vision and hearing loss to give broad recommendations. Its main recommendations are:

- Resources should be used wisely in the current financially difficult environment. The Centers for Disease Control and Prevention should focus on a select range of diseases
- Research and programme evaluation should provide better scientific and economic evidence on the effectiveness of chronic disease programmes and models of care
- Focus on quality of life outcome measures for research and programme evaluation and on interventions that reduce the disparity in healthcare that leads to inequity in outcomes
- Take a more coordinated approach to meeting both health and social needs that facilitate collaboration between population health, clinical, and non-health services, employers, and community organisations
- Collect better data for surveillance of chronic illnesses as well as the effect of interventions and models of care on patient reported quality of life outcomes. The report makes specific recommendations for the use and sharing of information from electronic medical records on coexisting chronic illnesses
- Engage in research on the effects of preventive and lifestyle interventions on both quality of life for people with existing illness and primary prevention. Find ways to implement prevention effectively



In January 2012 the Institute of Medicine in the United States published the report of a consensus study on living well with chronic illness. The report made 17 recommendations for public health approaches to chronic disease prevention, surveillance, data gathering, and chronic disease management programmes that would help improve quality of life and functioning and reduce disability.[1] Although the report makes some interesting recommendations (box 1), particularly about research in chronic disease, and displays a welcome shift in emphasis to "living well" rather than reducing mortality, it falls short of making the necessary paradigm shift from a disease based model to one that focuses on care for patients. This shift in thinking is urgently needed to provide good care for patients with multiple comorbidities.

The medical profession faces substantial challenges in caring for patients with chronic comorbidity well. The taxonomy of diseases with which we work has accrued piecemeal over the centuries. Some diagnostic labels have proved immensely useful, others much less so.[2] With the development of numerous biomarkers for disease, diagnosis has become increasingly detached from symptoms, to the detriment of those with chronic illness.

Comorbidity is seen in patients of all ages. Half of people over 65 years of age have at least three coexisting chronic conditions. One in five has five or more. Although the proportion of patients who have comorbidities increases in older age groups, the largest numbers of patients with multiple comorbidities are under 65.[3] More than half of patients attending primary care in the UK have multiple chronic conditions, and such patients take up an even greater proportion of consultations.[4] In a study of Medicare beneficiaries, the proportion of patients with more than five treated conditions increased from 31% to 50% from 1987 to 2002.[5] The age adjusted prevalences for hyperlipidaemia, osteoporosis, and mental disorders increased even more steeply. It is also worth noting that the diagnoses that are most rapidly on the rise are those for which new drug treatments are available.

In recent years the single disease model has become an end in itself as disease management frameworks and targets for single conditions have become embedded in evidence based guidance and care pathways. Focus has shifted from patients and their experience of diseases to measuring parameters of the diseases themselves. Although evidence based models of single diseases in isolation work well for patients with one disease, they can lead to "siloing" of care for people with multiple conditions, and this can result in chaotic care. One study found that applying individual disease guidelines to a patient with five chronic conditions would result in the prescription of 19 doses of 12 different drugs, taken at five time points during the day, and carrying the risk of 10 attendant interactions or adverse events.[6] Care that is "measurably better" may be meaningfully worse and a nightmare for the patient.

Box 2 | Summary points

The piecemeal rise of diagnostic labels and biomarkers for illness has led to diagnosis that is often detached from symptoms

Current single disease approaches to research and guidelines encourages "siloing" of care that can be harmful, complex, and time consuming for patients with chronic comorbidity, and burdensome for health systems

Research rarely investigates, and guidelines rarely support, complex and difficult decisions about when to stop or not give treatments

Care for patients with chronic comorbid illness must be more closely driven by patients' individual experience of illness and treatment effects, and their priorities for care

Shifts in the frameworks of research, guidance, and funding, in addition to changes in the values and technologies underpinning healthcare systems, are needed to ensure care that focuses on the person rather than management that focuses on diseases

Adverse events related to drugs are among the top five causes of death in US hospitals, and rates of hospital admission for this indication in people over 65 are estimated at 17%. This is an important, expensive, and iatrogenic source of morbidity in people with multiple chronic conditions that is invisible in recommendations for care in chronic illness. Research, guidelines, and models of care seldom support the complex and difficult decisions about which treatments should not be given or when to stop treatment. The use of guidelines as standards enshrines polypharmacy and therapeutic positivism because this approach measures and evaluates quality of care by counting how often treatments are given, rather than not given. Largely ignored are the problems of adverse drug effects, and the value of a patient centred approach to care. However, prioritising these are the key to reducing morbidity and mortality in patients with chronic comorbidity and to tackling a financial burden that is crippling health systems.[7-9]

Chronic illness is characterised by its variability.[10 11] Recommendations in guidelines are often based on the average response in study populations that are usually selected to be free of comorbidity and polypharmacy. Applying such evidence to the treatment of those with comorbidity who are taking a variety of drugs reduces benefit to an unknown extent and increases the potential for harm. The evidence base for the effect of treatments in the context of comorbidity is poor and does not account for variability in the genesis, expression, and progression of illness; the interaction of illnesses; the physiological damage caused by the stress from life events; and the impact of biopsychosocial interventions.[10-12] There are few studies in the very elderly. In this group, explanatory models and interventions extrapolated from studies of younger patients do not necessarily work or match patients' priorities for care.[13-15]

Healthcare systems that are underpinned by strong generalist primary care produce better health outcomes for patients with chronic illness at lower cost and with less health inequality than those that are not.[9] Specialists provide better condition specific care measured by guideline adherence for patients with single conditions, but generalists provide better care for those with multiple conditions.[9] This may be because generalist care is pragmatic and iterative, and it is based around the symptoms, values, and priorities of the particular person rather than particular diseases. Generalist care has the potential for "quaternary prevention"—that is, protecting patients from gratuitous diagnostic labels, tests, and treatments that offer no benefit with regard to mortality and morbidity and are driven by misplaced goodwill or commercial interests.[12] However, all these attributes are being rapidly eroded in the face of payment by results and a system that evaluates the quality of care and of doctors on the basis of siloed adherence to evidence based guidelines for single diseases. This move carries the potential to disempower doctors and patients and prevent them from using their observation of individual responses and needs.

There is a pressing need to reverse the current trend towards management of individual diseases in silos so that care of patients with chronic comorbid illness is much more closely driven by their particular symptoms, needs, and treatment effects and their own priorities for care. An improvement in health status must be seen not as an end in itself but as the means to fulfilment and possibility in the life of the patient. Furthermore, healthcare systems need to start to value and provide adequate support for the kind of iterative generalist care that focuses more on the person than on the disease entity and the necessary variation this entails. This would place equal value on the art of "not doing"—making complex decisions not to give treatments, not to order tests, and to stop current treatments when in the best interests of the patient.

To achieve this, uncomfortable shifts in research, evidence based guidance, and systems and funding of care are needed (box 2). While routinely collected data are useful for research, they almost invariably comprise data linked to single diagnoses, and information from the real world testing of treatment effects and systems of care among huge numbers of patients with multiple illnesses remains largely invisible. Technologies such as electronic medical records that include patient input are potentially useful in dealing with these problems, but only if both their form and function go beyond diagnostic labels and make visible the patients' individual symptomatic pattern of comorbidity along with their identified priorities for care. If patients with chronic comorbidity are to get the best from medical care, there is an urgent need for these different ways of thinking—beyond diagnoses. In the words of William Osler: "It is more important to know what type of person has the disease than to know what type of disease the person has."

Competing interests: DM is paid for work as a member of the Pharmacology and Therapeutic Products Advisory Committee (PTAC), which provides independent clinical advice to PHARMAC, the New Zealand government drug management agency; DM is one of the founders of a global website that enables patients to access information on the adverse effects of treatment and to report such effects (RxISK.org).

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