

Chapter 4

**Comprehensive strategies to reduce
the burden of chronic diseases**

- ♦ What are the best ways to reduce the burden of chronic disease?

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Part 1

Management of chronic disease

Key policy points

- 1 Systems of chronic disease care in high-income countries are largely uncoordinated and fragmented, with many patients receiving treatment that fails to meet recommended standards and results in high rates of medical errors; the situation is far worse in low-income countries.
- 2 One major challenge is to reorient healthcare from acute, episodic care to long-term, patient-centred management; there are dangers in transposing current models of care in high-income countries, especially the US model, to resource-poor settings.
- 3 The emphasis on narrow, vertical and highly biomedical models of intervention (Selective Primary Health Care) has been a barrier to scaling up prevention and treatment interventions that focus on interconnected health risks and outcomes, such as those with HIV/AIDS and CVD.
- 4 Practical approaches to scaling up chronic disease treatment and access can build on existing logistic routes and facilities used to deliver and monitor antiretroviral therapy and directly-observed therapy.
- 5 Markets alone are unlikely to transform health systems into models of care that are appropriate for helping people with long-term illness.

Key practice points

- 1 There is a need to rethink how we train and learn medicine and public health in order to break out of the smallpox paradigm that focuses on a limited set of magic-bullet interventions.
- 2 Until the 1960s medical care had little effect on chronic disease, as the greatest health gains came about as a consequence of improvements in housing, sanitation, safe water, improved nutrition, employment, wages, and education. The future scope of personal care to contribute to extend human life, in the absence of a major unanticipated breakthrough, is likely to be limited. The main healthcare challenge is to ensure that those who can benefit from existing knowledge are able to do so.
- 3 We should be critical of unproven strategies to shift health service planning from need to demand, turning patients into consumers, and transforming health into a private market good.

1 Caring for persons with chronic disease: the role of 2 the healthcare system

3 Let's flash back to the story of one of public health's biggest successes: the campaign to eradicate
4 smallpox. A moderately contagious disease, causing painful fluid-filled blisters, smallpox killed
5 about one out of every four victims. Those who survived were never the same; most had severe
6 scarring, blindness, or deformed limbs. No effective treatment was ever developed, but in 1796
7 the microbiologist Edward Jenner found that an injection of a similar disease, cowpox, could
8 provide immunity. This effective vaccine, together with improving living conditions, enabled
9 several European countries and the US to eliminate smallpox by the early 1900s. Nevertheless,
10 throughout the 20th century, smallpox killed more than 300 million people, mainly in low-
11 income countries (198).

12 Recognizing the gross unfairness of avoidable deaths due to smallpox when cheap, preventative
13 strategies were available, in 1958 the Russian health minister, Viktor Zhakov, called on the World
14 Health Assembly to launch a major initiative to eradicate smallpox. A global plan was approved
15 the next year, but little action was taken for another decade. In the 1960s smallpox continued
16 to infect 10–15 million people and cause about 2 million deaths each year, until 1967, when
17 WHO invested \$2 million per year to set up an international Smallpox Eradication Unit. The
18 Smallpox Eradication team, led by American physician Donald Henderson, had a global mandate
19 to implement a comprehensive strategy to identify cases aggressively, isolate infected patients,
20 and mass vaccinate close relatives (estimated to cost about \$0.14 per capita) (199). Within
21 a decade smallpox was eradicated (200).

22 Unfortunately, such a heroic scenario will never work for chronic diseases. Beyond the obvious
23 point that no single treatment exists that can prevent or cure chronic diseases, the daily realities
24 of managing chronic diseases are far more complex. Doctors alone cannot solve chronic diseases,
25 but have to work with patients to manage chronic diseases together so that the disease does not
26 lead to painful complications like amputations or blindness. Not just the patients but entire com-
27 munities are the scope of treatment, as the causes of chronic diseases are deeply embedded in the
28 current and unhealthy way that modern societies are being engineered (see Chapter 2).

29 So far, however, the global responses to rising chronic diseases have continued to perpetuate
30 what has been called a smallpox paradigm, involving a focus on seeking to eradicate diseases using
31 drugs and medical technology (201). In the smallpox paradigm, well-functioning healthcare sys-
32 tems to care for patients are not needed, because teams of Western scientists can administer a few
33 key, low-cost technological interventions that can save millions of lives. To date, smallpox is the
34 only infectious disease to have been conquered using this approach, as other eradicable infections
35 (such as polio, measles, malaria, and TB) continue to kill. Yet the smallpox vision and its ambition
36 to get rid of human disease using a medical approach dominates global health thinking (an impe-
37 rialist discourse that has links to the colonial mantra that Europeans had a moral duty to conquer
38 and enlighten people from their primitive darkness) (201). Shortly after the last case of smallpox
39 occurred in 1977 in Somalia, WHO launched its major 'Health for All' strategy, declaring boldly
40 that 90% of all human disease could be prevented through a series of low-cost interventions.

41 These health fantasies are inappropriate models for building health systems. Their focus, prin-
42 cipally on acute, medically-oriented care, has been perpetuated by a private-sector focused model
43 of health system development relying on donor funding (in the case of the world's most deprived
44 countries), markets, and a lingering quest for magic bullet solutions. In practice, this paradigm
45 has meant that real healthcare system needs have fallen by the wayside, including basic things like
46 training people, paying them, organizing an administrative and logistical system for delivering
47 drugs and care, and establishing health centres and hospitals in deprived areas.

Box 4.1 State of chronic disease management in Africa

How are chronic diseases currently managed in the routine healthcare settings of African countries? In brief, badly. Anecdotal reviews point to poorly managed healthcare systems with frequent stock interruptions of essential drugs. Untreated hypertension is blamed for high rates of stroke morbidity and mortality in urban and rural Tanzania and rural South Africa. Only a small proportion of patients with epilepsy receive drug treatment at any one time, mainly due to poor healthcare delivery systems and unavailability of drugs. Even in specialist centres, asthma patients are given substandard care and have poor access to essential medications. There is a growing burden of diabetes mellitus and its associated complications, and many patients with type 1 diabetes mellitus have extremely short life expectancies. Some of us know from personal experience of running routine diabetes and hypertension clinics in African hospitals that there are no formalized systems of recording how many patients have been diagnosed and started on therapy, how many are retained on therapy, or what proportion have died or developed complications. We treat patients with whatever drugs are available, and consider that our mission is accomplished. In summary, unstructured and unmonitored clinical care and little information about morbidity or mortality from chronic diseases are mostly the norm in sub-Saharan Africa.

Source: <http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0050124>.

1 Reflecting decades of neglecting the health system's needs, the current state of chronic disease
2 care in resource-poor settings is, for lack of a better phrase, appalling. Doctors scrap together
3 chronic disease medicines, at least when they are available, often making up care regimens on the
4 fly for patients who they may see only once or twice, typically when it is already too late to make
5 a difference (see Box 4.1). Patients, when they think doctors can actually help them (which at
6 times is questionable), are often stuck paying for costly care themselves. In many cases the patients,
7 rather than waiting in long lines for affordable public care, choose to take matters into their own
8 hands, seeking care outside the healthcare system, such as herbal remedies (in richer countries) or
9 traditional healers (in poorer countries).

10 Indeed, the challenge is not just among resource-poor countries. In the US, where money is
11 plenty, technology is the most advanced in the world, and the government has made improving
12 chronic disease care its top healthcare priority, chronic care has been described as 'severely under-
13 developed', 'underfunded', and 'fragmented' (202, 203). The majority of people who live with
14 chronic diseases receive care that fails to meet basic medical guidelines. Surveys of chronic disease
15 patients indicated that over one-third were unable to afford a necessary service, one-fifth found
16 that those necessary services were simply unavailable, and another 13% felt the quality of chronic
17 disease services was so poor that they were not worthwhile. Only about 3% US state health budg-
18 ets actually is used to address what made people sick from chronic diseases in the first place. As
19 the Centers for Disease Control and Prevention (CDC) put it: 'the nation's public health system
20 framework is severely underdeveloped to address the tremendous burden of chronic disease . . .
21 Coordinated and comprehensive national chronic disease prevention efforts have not been nearly
22 adequately or systematically applied' (202) (see Figure 4.1).

23 The challenge of designing societies and care systems that meet current health demands is
24 therefore substantial in all regions of the world. Neither rich nor poor countries can afford to
25 continue along the path they have followed. But the most intractable problems are in resource-
26 deprived settings: the countries with the worst burdens of disease have the fewest resources to
27 address them. It is a paradox known as the 'inverse care law', as displayed in Figure 4.2 plotting

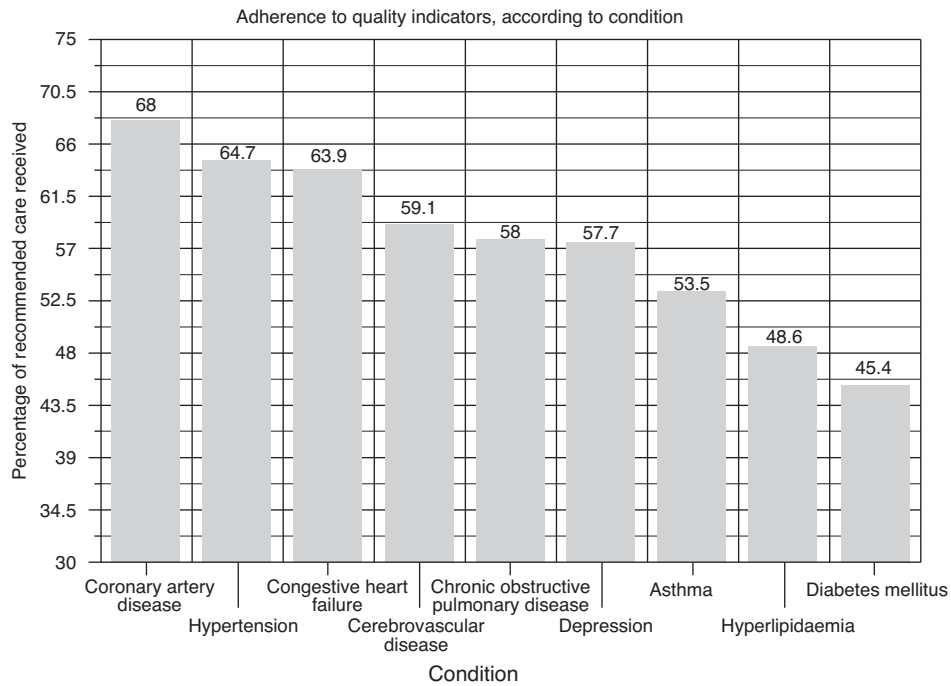


Fig. 4.1 The quality of healthcare delivered to adults in the United States.

Source: Data from McGlynn EA, Asch SM, Adams J, et al. The quality of healthcare delivered to adults in the United States. *New England Journal of Medicine* 2003; **348**:2635–45.

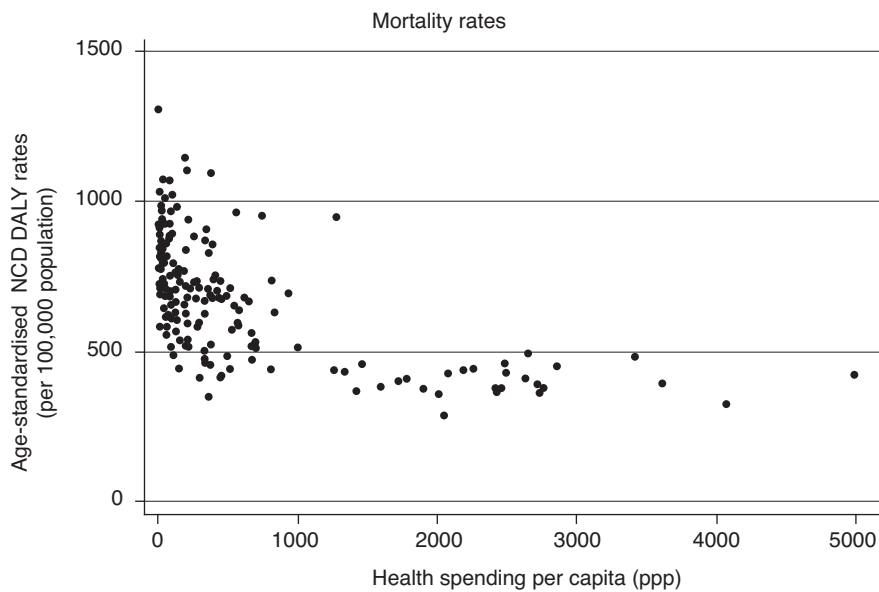


Fig. 4.2 Inverse care law and chronic diseases, 164 countries, 2004.

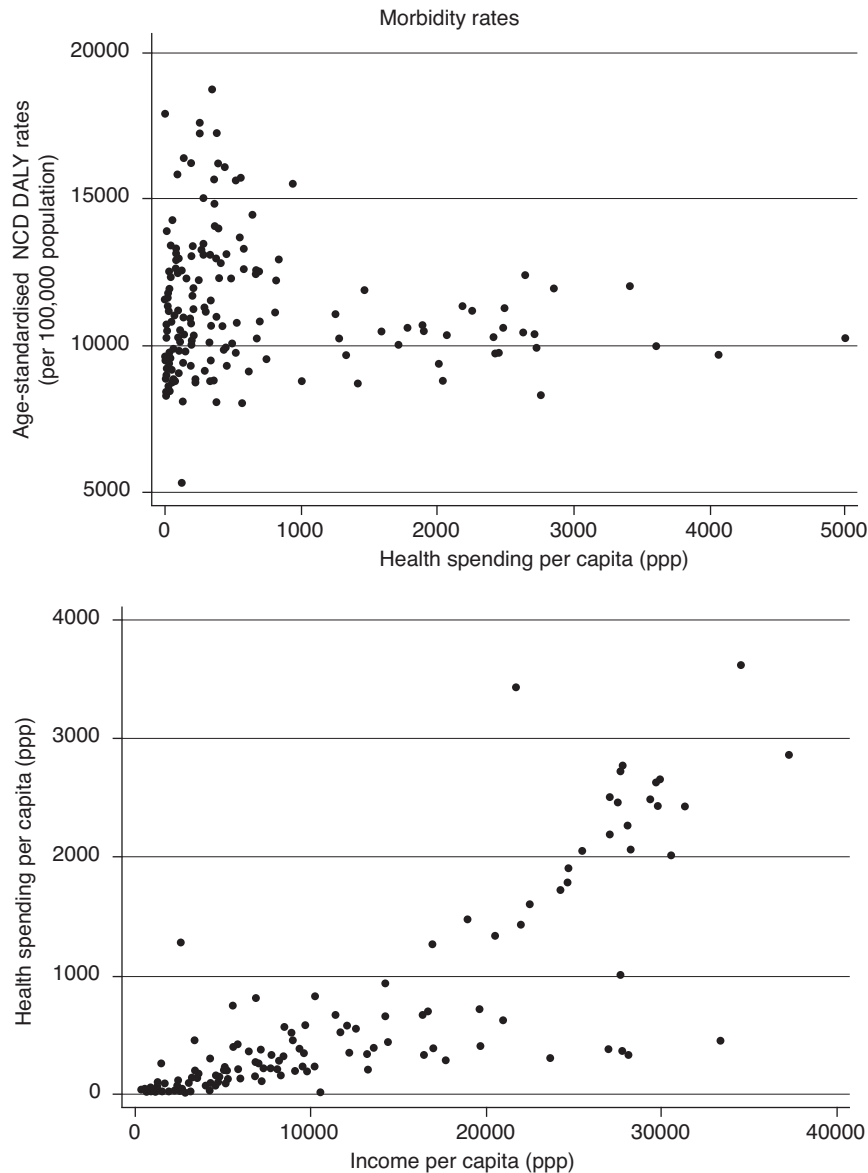


Fig. 4.2 (Continued)

- 1 health spending per capita against the age-standardized burden of chronic diseases ($r = -0.61$,
- 2 $p < 0.001$, 191 countries).
- 3 What can we do to adapt existing care systems to be more appropriate for dealing with society's
- 4 increasingly chronic needs?
- 5 The rest of this chapter addresses these questions in two parts. The first half discusses the
- 6 approaches to caring for persons with chronic diseases. The second half assesses the potential to
- 7 prevent people from getting sick in the first place by acting on the underlying social determinants
- 8 of chronic diseases. In the first half of the chapter, we provide a brief historical overview of how
- 9 medical care systems came to focus on a narrow set of medical challenges, relying on curative

1 approaches to infectious diseases (the smallpox paradigm). Then, we set out an alternative chronic
 2 care model of healthcare that is better designed for people living with chronic diseases, what we call
 3 liberatory medicine. After reviewing the context of health system development, namely the debate
 4 between Primary Health Care and the interim Selective Primary Health Care strategy, the rest of
 5 the section discusses ways of transforming existing systems to the chronic care model. We also
 6 consider how to deliver chronic care to people in real-life clinical settings as well as to find the
 7 money to pay for it. We conclude with a note of caution about relying too heavily on market-driven
 8 healthcare and medical interventions in attempts to extend human life and alleviate suffering.

9 **A brief history of the development of healthcare systems: the** 10 **focus on acute care . . .**

11 Healthcare systems grew out of informal systems of social protection at the turn of the 19th century.
 12 It was a period of major social and economic transformations—the Industrial Revolution—that
 13 created ‘winners’ and ‘losers’; as documented by authors like Charles Dickens, it was the best of
 14 times for a few and the worst of times for the rest. Among those for whom it was the worst, life
 15 was short, brutal, and sickly, with a life expectancy of less than 40 years of age. Both rich and poor
 16 had only about a 50/50 chance of their health improving after an encounter with a doctor, yet
 17 significant inequalities in health existed, as the rich were able to avoid infectious diseases through
 18 patterns of geographic segregation, for example, by living at higher altitudes and less densely
 19 populated settings, limiting rates of contact with pathogens such as cholera. Medical care, if it
 20 could be called that, was provided through private, voluntary philanthropy, often bundled
 21 with other social services, such as financial relief or food rations. In the US, churches and non-
 22 governmental organizations (NGOs), like the American Red Cross, delivered these welfare
 23 services. In places like the UK, these services were state-sponsored, legally mandated by Poor
 24 Laws, and provided through so-called workhouses for paupers (then a legal term describing
 25 impoverished, jobless people). These informal systems gave way when the ‘welfare state’, including
 26 the National Health Service, was introduced in the UK in 1948.

27 Infectious diseases were the dominant threat to public health during this period. Appropriately,
 28 these healthcare systems were designed to focus on acute events, requiring advanced, but
 29 episodic, clinical care. With the discovery of sulfonamides in the 1930s, and its strongly protective
 30 effects on bacterial infections such as streptococci, and subsequently penicillin (by accident) in
 31 1928, medicine could begin to aim to cure disease. Driven by a combination of scientific progress
 32 (especially laboratory science, imaging, asepsis, and pharmacology, including anaesthesia),
 33 healthcare systems rapidly expanded. The early 20th century also marked a transition from guilds
 34 to professions; doctors emerged as one of the most powerful professions, setting up the American
 35 Medical Association and basing their social standing on their command of the biological and
 36 pharmacological sciences (204). These forces came together in the development of hospitals as
 37 the epicentre of care, where doctors were ‘captains of the ship’, commanding teams of nurses,
 38 caretakers, and even secretaries. In this system patients played a minor role, bringing little to the
 39 clinic other than their illness.

40 An alternative model was experimented with in Russia, which, shortly after the October
 41 Revolution to communism, adopted the first universal healthcare system in 1918, the so-called
 42 ‘Semashko’ system. Its basic principles were government responsibility for health; universal
 43 access to free services; a preventive approach to social diseases; quality professional care; a close
 44 relation between science and medical practice; and continuity of care between health promotion,
 45 treatment, and rehabilitation. Despite rhetoric prioritizing healthcare, such as Lenin’s statements
 46 about typhus that ‘if communism does not destroy the louse, the louse will destroy communism’,

1 the system was grossly underfunded. Health was allocated money according to the principle of
 2 ‘leftovers’, as defence and military sectors took the first major cut of state spending and whatever
 3 remained went to health (205). In practice, the system also emphasized specialist care (all doctors
 4 were specialists) in hospitals (like other sectors of the economy there was a tendency towards
 5 gigantism). Although the Semashko system had remarkable success, being one of the first coun-
 6 tries to eradicate smallpox and maintaining very low rates of tuberculosis until the 1990s, it failed
 7 to keep pace with the West in addressing heart disease in the 1960s (206).

8 These healthcare systems, with their focus on infectious diseases, were spread to the Latin
 9 American, Africa, and Asian countries by major European colonizers, Britain and France (see
 10 Chapter 7). Referred to as systems of ‘imperial medicine’, they imported the basic features of
 11 Western models, centring on acute care, but with an added emphasis on maintaining the health of
 12 troops (who would soon leave) against indigenous seasonal threats like malaria and hookworm.
 13 Those countries with stronger ties to the Soviet Union, such as Ethiopia, incorporated the Semashko
 14 principles to a greater extent; reflected in Ethiopia’s decision to provide free medical care to the
 15 needy in 1977 (albeit less than half the population were found to have access in the year 2000).

16 *Clue 1: Historically, healthcare systems have been set up in a period when acute, infectious diseases*
 17 *were dominant. This has resulted in a focus on the smallpox paradigm.*

18 **Breaking down the acute, infectious disease care paradigm**

19 Each of these historical systems of care for infectious diseases, as put in practice, are poorly suited
 20 to the challenges of chronic diseases, for three reasons. First, the medical approach to caring for
 21 people with chronic diseases is not curative, but instead aims to halt the progressive degeneration
 22 that chronic diseases cause, a strategy referred to as ‘maintenance management’. For example,
 23 type 2 diabetes patients who need renal dialysis will require a lifetime of services, which are often
 24 to be provided in accessible, local settings and outside of hospitals. We may not be able to cure
 25 chronic diseases, but may be able to prevent, postpone, and lessen avoidable suffering.

26 Second, chronic diseases come with extensive complications and co-morbidities, requiring
 27 extensive coordination and management. During a person’s lifetime, most people will experience
 28 more than one chronic disease, especially for people living in rich countries. For example, most
 29 men who live to average life expectancy will experience prostate cancer, but are more likely to
 30 succumb to CVD. In cases when morbidities coexist, the patient does not simply have diabetes
 31 and slight allergy or increased susceptibility to colds, but a combination of major conditions
 32 that require unique treatments to be coordinated by healthcare providers. Such interrelated
 33 conditions can leave patients to be ‘ping-ponged’ from one specialist to another, receiving treat-
 34 ments that can potentially compromise care of other conditions, often with little coordination or
 35 oversight. It is not uncommon for persons over the age of 65 to be taking more than 20 different
 36 medications in a complicated sequence on a daily basis, creating risks of adverse interactions and
 37 risks of medically-induced causes of illness (iatrogenic causes).

38 Third, the marked differences in each patient’s biological circumstances require treatment
 39 regimens that are tailored to their specific needs. Such differences can also be social in nature.
 40 Ethnic minority and low socioeconomic status patients are known to adhere less well to treatment,
 41 increasing their risk of debilitating complications and morbidities. Strategies, to be successful, also
 42 have to consider how to address not just the patient’s biology but environmental circumstances
 43 that lead to what doctors call a ‘revolving door’, whereby patients cycle in and out of the doctor’s
 44 office for seemingly avoidable health problems and complications of chronic diseases.

45 *Clue 2: Current healthcare systems are inappropriate for caring for people living with chronic diseases.*

46 What is an appropriate alternative system of care that could be implemented in daily medical
 47 practice?

1 **Restructuring toward chronic disease care models:** 2 **liberatory medicine**

3 When a patient visits a doctor, the encounter traditionally plays out as follows: the patient
 4 describes a set of symptoms, often involving pain or discomfort; then the doctor evaluates the
 5 patient’s symptoms, making a final diagnosis and prescribing medication, procedures, or addi-
 6 tional diagnostic tests. It is analogous to what sociologist Paolo Freire called a ‘banking system’
 7 approach to education: students open their mouths, and teachers deposit information (207).

8 Dealing with chronic diseases, however, requires a new model that puts patients at the centre,
 9 in view of the importance of the patient’s day-to-day management of their condition and the need
 10 for adhering to treatment standards. Chronic diseases shift the burden of achieving successful
 11 treatment from doctors to their patients. Freire alternatively called for a broader model of educa-
 12 tion, what he termed ‘liberatory education’, envisioning an exchange of information between
 13 teacher and student that put them on equal footing. In its broadest sense, education is ‘any act or
 14 experience that has a formative effect on the mind, character or physical ability of an individual’.
 15 In other words, the best kind of chronic disease care can be viewed as an education.

16 *Clue 3: The best kind of chronic care is an education.*

17 This vision is commonly referred to as a ‘chronic disease care’ model (CCM) (208). While the
 18 specific components of CCM vary (for example, the International Chronic Care Model), it is
 19 generally designed to offer a holistic treatment of patient needs. The main model, developed by
 20 Edward Wagner, emphasizes the following aspects (Figure 4.3):

- 21 1 Continuity of care;
- 22 2 Preventing unnecessary hospitalization;
- 23 3 Coordinating and integrating care services;

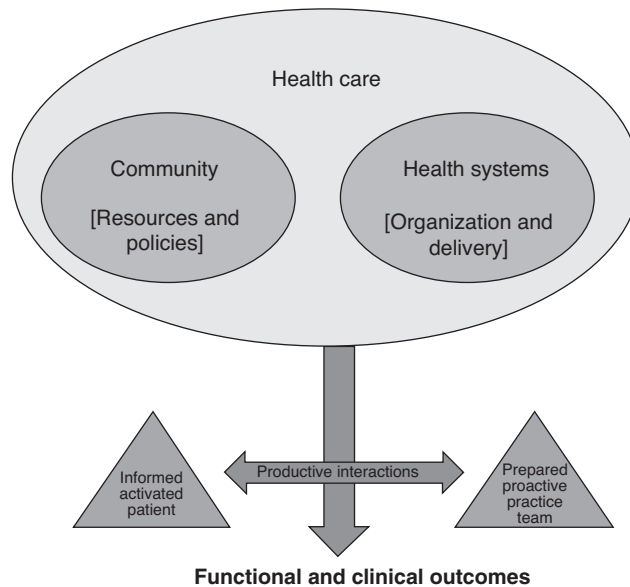


Fig. 4.3 Model for improvement of chronic illness care.

Source: Adapted from Wagner EH. Chronic disease management: What will it take to improve care for chronic illness? *Effective Clinical Practice* 1998; 1:2–4.

1 4 Empowering patients to know about and manage their conditions (self-care); and

2 5 Joint decision-making between doctors and patients (collaborative care).

3 A more compact way of viewing the model emphasizes the three ‘C’s of the CCM: Continuity,
4 Coordination, and Collaboration. We regard the CCM as a model of liberatory medicine,¹
5 because, much like liberatory education, it empowers patients to play active roles in defining their
6 care needs and establishes a reciprocal relationship between doctor and patients.

7 *Strategy 1: On the supplier-side, chronic care models emphasize continuity of care, preventing*
8 *hospitalizations, and coordinating and integrating care services. On the patient-side, these models*
9 *give patients and their families a greater voice in defining their care needs and finding appropriate*
10 *solutions.*

11 Implementing this approach requires a substantial change to the status quo (209).

12 Doctors, rather than playing the role of the expert, caring for patients sick in hospitals beds,
13 would operate more like managers, coordinating a range of care services for multiple conditions.
14 Similar to how a financial planner might help a family plan ahead for a healthy retirement, doctors
15 would help their patients plan for a long, healthy life. In fact, doctors may be overqualified for the
16 skill-set required; relying on a team-based approach, including nurse practitioners or physicians
17 assistants, could provide more personnel needed to invest time and care for helping patients
18 manage a lifetime of chronic disease.

19 Clinical consultations, traditionally a one-on-one encounter with a doctor, might be with
20 nurses, dieticians, or counsellors, or even possibly all three at the same time. On the patient side,
21 they would involve an entire family, so to identify the barriers to appropriate, long-term management
22 of household chronic disease risks.

23 Instead of a medical clinic, the doctor’s office would aim to create a kind of ‘medical home’,
24 a place where families can see one main doctor who coordinates the patient’s care (usually clinics
25 are constructed in architectural ways that reinforce divides between patients and practitioners).
26 For most doctors, especially those in training, the hospital is the starting point, where all the
27 action occurs. But for people working in public health, the hospital is the end point, the sign of a
28 failure to prevent sickness.

29 *Strategy 2: Changing the status quo involves changing roles for doctors to manage long-term care,*
30 *a team-based approach, and creating a medical home.*

31 However desirable the CCM may sound, a note of caution is in order. First, the CCM in its
32 entirety has not been tested. We cannot point to any clear-cut success stories of large-scale imple-
33 mentation of all components of the CCM in practice (although some successes in establishing
34 medical homes for children with genetic defects have been reported). Yet, as Wagner and Groves
35 put it, ‘the efficacy of coordinated and patient centred care is established, but now is the time to
36 test its effectiveness’ (208). Second, relying more heavily on knowledge in care can also disadvantage
37 people with less education or who are illiterate or have disabilities or language barriers; people can
38 also be flawed in their self-assessments and management approaches. Third, shifting more duties
39 of care onto patients without providing support or health education could lead to unintended
40 harms. One example is the shift from providing mental healthcare in institutions to community
41 settings in the 1980s. It was indeed an agreed upon measure, but, unfortunately, the resources
42 for providing community care were not provided. In the US, deinstitutionalization of mental
43 health hospitals in a period of rising social inequality under President Reagan led to a rising
44 number of homeless persons and stigma of persons who have mental disorders (210). Fourth,
45 there are those who oppose such an approach on ethical grounds; just as the ‘nanny state’ should
46 not interfere with people’s lifestyle choices, so do some doctors argue that they should similarly
47 avoid attempting to promote health through lifestyle modification relating to physical activity or
48 unhealthy diet (211).

1 Even if there was robust evidence that the CCM would improve chronic disease outcomes,
 2 major social, political, economic, and cultural barriers exist to transforming health systems.
 3 One contemporary example is the major political challenge in the US simply to put in place a
 4 healthcare system that provides insurance for the majority of its population. In terms of
 5 achieving reform towards a CCM model, the greatest barrier to change is funding. Current
 6 reimbursement structures have been designed with interests of doctors, not patients (212).
 7 Often they reward doctors based on numbers of physician–patient encounters and pay higher
 8 salaries for specialty care. The second barrier is the conservative values in the medical profes-
 9 sion. Doctors cherish their salaries and their professional autonomy; there are fears among
 10 them that the CCM could reduce both. A third barrier is technological. Considerable research,
 11 supported by pharmaceutical companies, has been invested in finding expensive (and profitable)
 12 medical technologies for treating chronic diseases. Few, if any, of these expensive kinds of
 13 medical care and technologies being developed are appropriate or can simply be transposed to
 14 resource-poor settings. A fourth barrier is administrative capacity. Re-orienting an entire system
 15 requires resources; who will be assigned the role to develop the blueprints for re-engineering the
 16 systems of medical care?

17 Another key barrier is cultural: it is difficult to change the way people do things, changing their
 18 habits. Doctors are not prepared, and often not interested, in the daily, more pedestrian realities
 19 of coordinating chronic disease care. In managing chronic diseases, there are no medical heroes
 20 who save lives on the operating table. A related barrier is that many medical professionals have
 21 focused their entire lives on pulling bodies out of the river, often at the expense of an understand-
 22 ing of the factors that operate upstream. Of those doctors who obtain public health perspectives,
 23 most acquire them through professional channels linked to infectious disease control, perpetuat-
 24 ing an acute-care model of public health. Similarly, patients are not taught to manage their
 25 illnesses, and, in the context of brief doctor visits, it is difficult to factor time in for such learning.
 26 One strategy for overcoming these barriers draws inspiration from models of community-based
 27 care, outlined in the case study in the introduction to Chapter 1.

28 Public Health Theorem: current systems of care cannot be changed without making someone
 29 worse off

30 *Clue 4: There are substantial professional, institutional, and commercial barriers to transforming*
 31 *healthcare systems to focus on preventative and chronic care models.*

32 A final barrier, the system’s current organization and resources, is one of the most substantial.
 33 It determines who pays, who delivers, and, ultimately, who gets chronic disease care, so it is
 34 worth addressing it in greater detail—as expressed in the debate between Primary and Selective
 35 Health Care.

36 **The context of chronic disease care: primary health care** 37 **and selective primary healthcare**

38 In Figure 4.2 we showed that the poorer a country is, the fewer public resources it has for health.
 39 An important corollary is that the poorer a country is, the greater the burden of paying for care is
 40 placed on the poor (with high degrees of out-of-pocket spending).

41 These two challenges have been an overarching struggle for the field of public health. As Nobel
 42 economist Gunnar Myrdal famously noted in the 1950s, ‘people are sick because they are poor,
 43 and people are poor because they are sick’. In short, poor people are almost always the sickest,
 44 have the fewest resources, and are expected to pay the most for their care. How can we design
 45 more equitable systems of public health so that poor people do not face the dual disadvantage of
 46 poverty and a lifetime of disease?

1 Restructuring health systems into chronic care models is part of this struggle. The debate
 2 centres on how to address poor health in resource-poor settings. One model calls for providing
 3 universal access to a comprehensive set of sanitation, hygiene, education, and broader public
 4 health interventions (a horizontal model). An alternative model disputes this approach, arguing
 5 it is far too expensive, instead recommending a limited set of technical interventions that could
 6 yield the greatest health gains at low cost for the populations at greatest risk of specific diseases
 7 (a vertical model). The former model, backed by WHO in the 1970s, came against powerful
 8 (albeit indirect) opposition from the World Bank.

9 In 1978, the WHO's *Declaration of the Alma-Ata* outlined its Primary Health Care (PHC)
 10 model, building on a predecessor WHO-UNICEF report, *Alternative Approaches to Meeting Basic*
 11 *Health Needs in Developing Countries* (1975). By 'alternative', the report meant a shift from
 12 narrow disease-specific interventions to a focus on building health systems:

13 Primary health care is essential health care based on practical, scientifically sound and socially
 14 acceptable methods and technology made universally accessible to individuals and families in the
 15 community through their full participation and at a cost the community and country can afford
 16 to maintain at every stage of their development in the spirit of self-reliance and self-determination.
 17 It forms an integral part both of the country's health system, of which it is the central function and
 18 main focus, and of the overall social and economic development of the community. It is the first level
 19 of contact of individuals, the family and community with the national health system bringing health
 20 care as close as possible to where people live and work, and constitutes the first element of a continuing
 21 health care process.

22 Like the CCM, the PHC model envisioned a coordinated approach to healthcare, focusing on
 23 preventing hospitalizations, resisting overspecialization, empowering patients, and sharing
 24 decision-making between doctors and patients. PHC drew on examples of successful primary
 25 healthcare experiences in Bangladesh, China, Cuba, India, Niger, Nigeria, Tanzania, Venezuela,
 26 and Yugoslavia (213). With the slogan 'Health for All by the Year 2000', PHC developed into
 27 WHO's *Health for All* platform, set out at the first international conference of health promotion
 28 in the *Ottawa Charter* (WHO 1986). At the original Alma-Ata conference, H. Mahler of WHO
 29 cast the challenge in bold terms:

30 Are you ready to introduce, if necessary, radical changes in the existing health delivery system so that
 31 it properly supports [primary health care] as the overriding health priority? Are you ready to fight
 32 the political and technical battles required to overcome any social and economic obstacles and
 33 professional resistance to the universal introduction of primary health care?

34 Ultimately, the PHC model was endorsed by all 134 countries and 67 international organizations
 35 attending the conference at Alma-Ata, USSR.

36 The delegates may have been ready and willing, but were unable to implement PHC. By the
 37 1990s, the Structural Adjustment policies of the World Bank and IMF were fully in place (see
 38 Chapter 2), and countries were obligated to follow the macroeconomic advice of these institu-
 39 tions, as they were mired in debt after the Volcker Shock of the 1980s. At the time the World
 40 Bank's economic model focused heavily on privatization and low inflation targets, approaches
 41 that were inconsistent with the expanded role of the state required to deliver the WHO's Primary
 42 Health Care model. Instead, the World Bank invented an alternative model focusing on market
 43 principles, which came to be known as Selective Primary Health Care (154), regarding health as
 44 individual responsibility and healthcare as a private good. Responding to WHO, the World Bank
 45 wrote: 'The goal set at Alma Ata is above reproach, yet its very scope makes it unattainable because
 46 of the cost and numbers of trained personnel required. Indeed, the World Bank has estimated
 47 that it would cost billions of dollars to provide minimal, basic (not comprehensive health services)

1 by the year 2000 for all the poor in developing countries'. The World Bank concluded that com-
 2 prehensive PHC 'in the near future remains unlikely'; the effectiveness of basic PHC 'has not been
 3 clearly established'; and that the financial investment for sanitation and clean water 'is enormous'
 4 (214); and as such, it instead proposed that market principles and choosing interventions based
 5 on cost-effectiveness criteria could bring about more efficient delivery of health services. In gen-
 6 eral, it would focus on 'magic-bullet' style solutions to infectious diseases. As the authors explained
 7 in their seminal paper 'Selective Primary Health Care: An interim strategy for disease control'
 8 (215):

9 Faced with the vast number of health problems of mankind, one immediately becomes aware that all
 10 of them cannot be attacked simultaneously. In many regions priorities for instituting control measures
 11 must be assigned. And measures that use the limited human and financial resources available most
 12 effectively and efficiently must be chosen. Health planning for the developing world thus requires
 13 two essential steps: selection of diseases for control and evaluation of different levels of medical
 14 intervention from the most comprehensive to the most selective . . .

15 Its original set of recommended 'best-buy' approaches was eventually reduced to four interven-
 16 tions, known as GOBI, which stood for Growth monitoring, Oral rehydration techniques, Breast
 17 feeding, and Immunization. These were easy to monitor and evaluate, and had clear, measurable
 18 targets.

19 Powerful groups, doctors, UNICEF and the US, backed the World Bank's Selective Health Care
 20 Model and its vertical principles, contributing to WHO's ultimate defeat, as Selective Primary
 21 Health Care prevailed (see Chapter 5.2). Box 4.2 describes some of its implications for health
 22 system reform in the Philippines.

23 *Clue 5: Transforming care systems to be more appropriate for delivering chronic care is part of a*
 24 *broader struggle to implement Primary Health Care. Over the past three decades the dominant*
 25 *global health institutions have sought to maintain a focus on quick-fix, magic bullet solutions,*
 26 *using an Alternative Selective Primary Health Care model.*

27 **Finding ways to deliver and pay for chronic disease care**

28 Even though 'Health for All by the Year 2000' failed, to many people working in public health
 29 PHC (and, within it, CCM) remains the major public health goal. In 1997 the Pan American
 30 Health Organization (PAHO) revived calls for 'Health for All for the 21st Century' (216), echoed
 31 more recently by the call of the WHO Commission on the Social Determinants of Health to
 32 return to the Alma Ata principles (1).

33 Principles of PHC are represented in prevailing approaches to scaling-up treatment of HIV and
 34 TB. Previously an acute death sentence, HIV is now a chronic disease; requiring approaches for
 35 clinical management similar to the CCM. Both HIV/AIDS and chronic diseases have long-term
 36 and potentially debilitating clinical manifestations that result in physical and mental disability.
 37 Both require systems of long-term care and management, with patients playing greater roles in
 38 the success of treatment. Hence, it is worth briefly reviewing the approach to HIV management,
 39 as those models set the groundwork for improving chronic disease care in resource-deprived
 40 communities.

41 **Adapting existing HIV and tuberculosis clinics to meet** 42 **rising chronic care needs**

43 In the 1980s and 1990s, as part of Selective Primary Health Care, approaches to HIV intervention,
 44 guided by cost-effectiveness criteria, focused on the lowest cost, easiest to implement interventions

Box 4.2 From Primary Health Care to Selective Primary Health Care: the case of the Philippines

In 1981 the Philippines was one of the first countries to adopt PHC. International publications heralded the ‘impressive achievements [that] have been attained in this sector by contrast with reversals in many other sectors of the economy’ (Philips 1986).

This situation began to change with the transition to democracy in 1986 and indebtedness to western financial institutions. Concerns about another dictator contributed to privatization and decentralization reforms that greatly shrunk the role of the state in financing and providing healthcare. Between 1980 and 1999, the Philippines underwent continual Structural Adjustment, receiving more than nine loans with extensive conditionalities (Bello 1999). Tariffs were nearly cut in half, resulting in a rapid drop in Gross National Product; firms went bankrupt and costs of living became more expensive. By 1987, over half of the government’s budget went to repaying its \$26 billion debt. Families living under the poverty line reached 46.5% and inequalities rose.

To save money in a period of austerity, PHC was discarded in favour of Selective Primary Health Care. Services were devolved to the local level to relieve state budget pressure. Overall public funding shrank; in 1991 healthcare was 2.7% of GNP, and private funds accounted for about three-fifths of all spending.

Coordination of health services collapsed. Legally, they were delegated from provincial to the municipal level, but no one told the municipalities this had happened or what to do. For example, several years after malaria-control was devolved to the local level, the local officials were still under the impression that provinces were responsible for the programmes.

After provincial governments stopped asking rural health units for the plans, the rural health units stopped planning. As one scholar put it, the rural health planning system ‘withered away’ (Espino 2004). A multi-agency UN study found that no funds were budgeted locally for TB control, concluding ‘The role of the state had been reduced to a situation where it neither pursued the interest of the public nor protected the individual against harm caused by the behaviours of others. Effective disease control cannot be implemented without strong and functioning health systems and health system performance cannot be improved without considering which purpose the system is to serve’.

The health system has yet to fully recover. In 2004 at the World Social Forum, Filipino participants noted ‘Public health is becoming a commodity. “Cost effectiveness” is becoming the criteria for determining who gets health care’. Yet, today, grassroots organizing is forming to resist the inequitable developments over the past two decades. As one director of community health education in Northern Philippines put it, ‘We are organizing on the grassroots level, establishing community health programmes that include traditional medicines. What we are seeing is a global policy, a worldwide effort to privatize healthcare. It’s important, therefore, to build a global response’.

Sources: Bello W. Should developing countries push to decommission the IMF? *Far Eastern Economic Review* 1999; December; Diokno B. *A Policymaker’s Guide for the Use of Central-Local Transfers: The Philippine Case*. Manila: University of the Philippines Economics Foundation, 1995; Espino F, Beltran M, Carisma B. Malaria control through municipalities in the Philippines: struggling with the mandate of decentralized health programme management. *International Journal of Health Planning and Management* 2004; **19**:S1; Lakshminarayanan R. Decentralization and its implications for reproductive health: the Philippines Experience. *Reproductive Health Matters* 2003; **11**(21): 96–107; Lim J, Montes M. Structure of employment and structural adjustment in the Philippines. *Journal of Development Studies* 2000; **36**:149–181; Perez J. Health worker benefits in a period of broad civil service reform: The Philippine experience. Philippine Department of Health: Director, Health Intelligence and Local Government Assistance and Monitoring Services, 2004; Phillips DR. Primary health care in the Philippines: banking on the barangays? *Social Science and Medicine* 1986; **23**(10):1105–17.

1 (including condom distribution, abstinence programmes, and information interventions).
 2 Treatment was regarded as too expensive. Many HIV control advocates, concerned about the
 3 apparent failures of these preventative approaches, instead argued that HIV treatment was a basic
 4 human right and the best means of prevention. Public health doctors, like Paul Farmer, launched
 5 radical programmes of providing treatment to all patients, irrespective of the cost, in clinics in
 6 Haiti. Its model was largely a success, spreading to other parts of the world. It challenged the
 7 prevailing views in WHO, ultimately winning and leading to WHO's 3×5 Initiative (to treat
 8 3 million people by 2005, a goal ultimately achieved after the target date).

9 The antiretroviral (ART) treatment model is successfully being applied in many communities.
 10 In poor countries, such as Malawi where incomes average less than US \$200 per year, more than
 11 145,000 HIV-positive patients have successfully initiated ART. Box 4.3 describes the major com-
 12 ponents: training personnel to run ART facilities; monitoring at local facilities, support by national
 13 supervision to maintain quality standards and track patient outcomes; and engagement with the
 14 private sector (217), and summarizes how they can be adapted to providing effective chronic care
 15 in deprived settings.

16 A second model is the WHO directly observed therapy (directly observed short-course therapy,
 17 DOTS) framework used to control TB and prevent drug-resistance. It is called DOTS because a
 18 care practitioner watches the patient take the medicine to ensure they adhere to treatment for at
 19 least 8–10 months (although there is evidence that patients, especially prison populations, find
 20 ways to fool the doctors). Unlike ART, treatment is not lifelong, but there is a need for long-term
 21 monitoring and special follow-ups, because patients are at lifelong risk of reactivation of disease
 22 (similar to chronic disease patients who live with behavioural or clinical risk factors). TB manage-
 23 ment requires continuity of care, coordination, and collaboration with patients, especially
 24 in order to avoid developing drug-resistance strains. Between 1995 and 2005 DOTS expanded to
 25 190 countries, and 26 million people, most of them impoverished, were successfully treated with
 26 standardized anti-tuberculosis drug regimens (218).

27 Importantly, unlike the original vertical GOBI interventions of Selective Primary Health Care,
 28 DOTS and ART have built significant capacity, infrastructure, and delivery channels for medica-
 29 tions. These networks can be expanded on to deliver medications like insulin to diabetes patients.
 30 Unfortunately, this is not yet happening. For example, in Liberia's government-run HIV hospi-
 31 tals, patients now have access to top-of-the-line HIV care (medicines, monitoring equipment,
 32 and diagnostics), but lack access to even the most basic primary care medications for diabetes
 33 such as insulin.

34 Such initiatives could tap opportunities to take advantage of synergies in controlling coexisting
 35 epidemics, like HIV/AIDS and CVD or diabetes and TB. They could also emphasize the underly-
 36 ing social causes of illness, such as tobacco in the case of TB, HIV, COPD, and CVD. Joined up
 37 approaches have historical precedents, reflected in, for example, the 1950s specialized clinics in
 38 the UK which were established for dual treatment of 'tuberculous diabetics' (2, 219).

39 *Strategy 3: Chronic disease care models can be built on the foundations of chronic infectious disease*
 40 *care clinics, such as antiretroviral and directly-observed therapy clinics for HIV/AIDS and TB.*

41 **How to pay for care: the role of markets and states**

42 Efforts to improve access to medicines and transform systems to the CCM will not occur sponta-
 43 neously. They will require concerted, organized efforts by doctors, hospitals, and health ministers,
 44 supported by political commitments at the highest level. Yet, today, there are two main settings
 45 where there is an implicit expectation that healthcare consumers, choosing health through mar-
 46 kets, will themselves bring about these desirable changes. This heavy reliance on market forces to

Box 4.3 How to extend existing system capacity to deliver effective chronic care: the case of ART clinics in Malawi

Training personnel to run chronic care facilities

In case of ART clinics, all clinicians and nurses as well as community health workers (CHWs) have been formally trained through government courses or NGO courses (http://model.pih.org/accompagnateurs_curriculum). Engaged community health workers (CHWs) is a key components case-finding in local communities. Robust training and capacity building for voluntary counselling is key. WHO guidelines for CHWs now include surveys of smoking status, blood pressure, and BMI in case detection for NCDs as a pathway for seeking cost-effective medical care and/or treatments.

Access to low-cost medicines: role of public and private sector

The case of HIV and ART teaches us that generics are nearly 11 times cheaper than brand names. These medicines, including those listed on the National Essential Medicines list (NEML), tend to be stocked in more places than those that aren't. Hence, public sector should strive to supply generic medicines on NEML if possible, including for NCDs. Private sector and innovator brands should also play a role, as seen from the HIV experience, through i) free drug donation schemes and ii) donation of reduced retail of diagnostics for case-detection and monitoring. The cost of medicines remains a costly barrier as 1 month of secondary prevention (aspirin, beta-blocker, ACE inhibitor, and statin) for patients with established CVD could cost as much as 18 days' wages in Malawi, motivating heightened ministerial, public sector, private sector, and community action on reducing costs of NCD drugs.

Monitoring patient outcomes at local facilities

For patients on treatment at the facility where they have been registered, a record is made of their regimen and CHWs provide the first-line of detection for secondary outcomes such as ambulatory status, work capability, adverse effects, and drug adherence measured by pill counts. The master card (for the patient) and the register (for the clinic) make follow-up (i.e. 12 months, 24 months, 36 months, and so on) facile and provide a chronological patient record. Education and awareness on the defined outcomes and side effects are a vital component of the programme. It is important to have good inclusion criteria and define the 'basic minimum package' as a key set of interventions that are a high standard and enforce equity. The CHW model of delivering care and for monitoring of side effects and referral if needed has been proven for chronic care Malawi.

National supervision of local facilities to maintain quality and surveil national outcomes

Evaluation of the local programmes and clinics is an important part of chronic care. In Malawi, the HIV Unit of the Ministry of Health and its partners supervise and monitor ART facilities every quarter. Using a structured supervision and monitoring form, the supervising teams check the accuracy of the quarterly and cumulative data, the quality of registers and master cards, and drug stocks in pharmacies. The data is fed back to the Ministry of Health for changes.

Source: Adapted from Mendis S, Fukino K, Cameron A, et al. The availability and affordability of selected essential medicines for chronic diseases in six low- and middle-income countries. *Bulletin of the World Health Organization* 2007; **85**: 279–88.

1 provide healthcare occurs in one case by design, the other from a lack of resources. These groups
2 are, respectively, the US and low-income countries.

3 The US system relies heavily on market elements such as ‘consumer choice’, managed care, and
4 diagnosis-related groups. It often boasts of having the ‘best healthcare in the world’. Indeed, the
5 US does have the best healthcare technology for those who can access it. After age 65, when patients
6 become eligible for Medicare (a universal health system for the elderly), cancer survival rates out-
7 perform Europe. Thus, that part of the American health system which is publicly funded, and at a
8 significantly higher level of funding than in Europe, does deliver high-quality care. There are,
9 alternatively, few positive things to say about chronic disease systems in low-income countries, as
10 summarized in Box 4.1. Medical care is inefficient, inequitable, of poor quality, and generally
11 unresponsive to patient and community needs. Costs of care are a leading cause of impoverish-
12 ment, causing patients to routinely face a lethal dilemma: face bankruptcy or forego life.

13 Yet the worst features of this system apply not only to these low-income countries. In the US
14 too, healthcare costs are a source of catastrophic expenditure, accounting for one out of every two
15 bankruptcies. The US consistently lags behind Europe in amenable mortality (220) and outcomes
16 for those too young to receive Medicare coverage are significantly worse than in Europe (221).
17 It is also a clear outlier in terms of overall spending—spending the most, while getting the least.
18 WHO rankings, albeit contentious, put the US among the middle-income countries in terms
19 of health system equity (222). Furthermore, several impoverished communities in the US experi-
20 ence higher rates of infectious disease, psychosis, and premature births than sub-Saharan Africa
21 (20, 223).

22 These results are not surprising. In a seminal paper from 1963, the Nobel Laureate economist
23 Kenneth Arrow had demonstrated that free markets do not work for healthcare because the need
24 for medical treatments and services is unpredictable (requiring insurance systems) while at the
25 same time, informed and rational individuals face difficulties in making decisions in their own
26 best interests, instead requiring expert advice (preventing experiential comparison shopping for
27 prices of services of the same quality) (224). As stated by another Nobel Laureate economist Paul
28 Krugman, ‘there are no examples of successful healthcare based on the principles of the free market’
29 (225). As Reich notes, ‘if the state is going to expand the role of the market in health-care, then
30 paradoxically it must also expand the role of the state in regulating it. Otherwise, marketization is
31 likely to produce unintended and undesired consequences’ (226).

32 Thus, there are dangers not just to importing Western lifestyles, but also Western medical and
33 health system solutions. The risks can be seen in the US model’s emphasis on high-price, special-
34 ist care to cope with rising diabetes (4). In the span of 5 years, the medical costs of diabetes more
35 than doubled, from \$44 billion to \$92 billion. Despite this outpouring of resources, individual
36 receive only a fraction of the chronic disease care they need. The largest fraction of diabetes
37 expenditures covered hospital admissions for the treatment of long-term complications, such as
38 heart disease, stroke, blindness, renal failure, and lower-limb amputations. At least 7% of these
39 diabetes-related hospitalizations were estimated to have been avoidable (227). Only a small
40 fraction of the resources devoted to the care of diabetes-related complications are spent for strat-
41 egies that can help avoid obesity and diabetes in the first place (4).

42 *Clue 6: There is danger in exporting US models of market-driven, acute-oriented medical care.*

43 In the context of such high spending in the US, there are constant debates about whether
44 healthcare money is going down the drain or even being counterproductive. Remarkable varia-
45 tions in spending on the elderly have been observed across the US, by as much as a factor of two
46 across Texas cities, such as McAllen and El Paso (228). However, this additional money appears

1 to be unrelated to quality: people living in the high-cost regions of the US get more tests, see more
 2 specialists, and spend more time in hospitals and intensive care units, yet these people do not
 3 display better health outcomes (229). Patients report having no desire for this ‘excess’ care (230),
 4 and about 20–30% receive bad care (i.e. contraindicated) (231). Such practices could be fatal:
 5 ‘iatrogenic’ causes of deaths—medical errors—are one of the top five causes of death in the US,
 6 estimated to kill about 225,000 people each year (232–236).

7 Many of the high-priced tertiary and specialist-care treatments driving growth of medical
 8 spending in the US are poorly suited for developing health systems. The race is on for the pill to
 9 control obesity, with pharmaceutical companies betting heavily on potential market prospects
 10 (237). While this occurs, bariatric surgery is seen by many as the only proven means of reducing
 11 the impact of severe obesity (238). Evidence of how this view is spreading worldwide can be seen
 12 in the recent formation of the Asia-Pacific Bariatric Surgery group by surgeons from 11 Asian
 13 countries (239). Driven by pharmaceutical companies and commercial interests, research fund-
 14 ing agencies favour medical and surgical solutions over health promotion and health system
 15 interventions and policies. It is therefore not surprising that relatively few large-scale, communi-
 16 ty-based and systems-oriented approaches to address chronic disease risk factors have been
 17 undertaken.

18 Avoiding the mistakes of the US will also mean finding ways to open generic markets for a
 19 range of pharmaceuticals instead of sinking considerable economic resources into expensive
 20 forms of care. The patent-based US pharmaceutical industry, among the most profitable indus-
 21 tries in the world at three times the profit as a percentage of revenue as the Fortune 500, spends
 22 27% of its revenues on marketing and only 11% on research and development (240). Much of this
 23 research is taxpayer-funded, developed in public universities through national grants, but then
 24 privatized by industry for two decades of patent protection. One pharmaceutical company execu-
 25 tive noted that poor countries constitute so little of the revenue market that the entire African
 26 marketplace amounts to ‘three days’ fluctuation in exchange rates’. If this is true, then supplying
 27 essential medicines by generic companies (as demonstrated by the HIV antiretroviral case) will
 28 not affect these companies revenues and could even benefit them in the long run by opening new
 29 markets.

30 The overemphasis on expensive medical cures rather than prevention is also evident in our
 31 research priorities. Billions of dollars have poured into genetic research, yet even the world’s top
 32 geneticists predict it will have limited impact on a very limited number of diseases. Most other
 33 medical research is designed to mitigate the impact of already-existing disease, such as chemo-
 34 therapy, rather than avert its incidence. The research on truly preventative initiatives demon-
 35 strates that they have limited efficacy at the individual level, particularly among the poor who
 36 have the greatest burden of disease. It is often noted that the pharmaceutical industry focuses
 37 most of its research on chronic disease related care; however, little, if any, of this development is
 38 appropriate for resource-poor countries.

39 Despite its obvious shortcomings, the inefficient, market-driven and acute-care focused health
 40 system model of the US is being spread by a global health financing mechanisms that deliver
 41 most health funding to resource-poor countries from Western donors. In low-income countries
 42 as much as half of all healthcare spending comes from aid from other countries, NGOs, or global
 43 institutions like WHO or the World Bank. For example, in Bhutan 48% and in Tanzania 35%
 44 of health system spending came from donors (20). The vast majority of this funding goes to
 45 infectious diseases, focusing on technical quick-fix, GOBI-style interventions—impeding the
 46 necessary transformation of health systems to a CCM approach (see Chapter 5). The emphasis
 47 tends to be on private, market-based solutions to global health problems. In both rich and poor
 48 countries, there is need to be critical of unproven strategies to shift health service planning

1 from need to demand, turning patients into consumers, and transforming health into a private
2 market good.

3 *Strategy 4: Markets work well for delivering cans of tuna (itself questionable given overfishing), but*
4 *not chronic healthcare. Relying on markets alone is unlikely to transform health systems to models*
5 *of care that are appropriate for caring for people with long-term illness.*

6 **A note of scepticism about the effect of healthcare** 7 **on population health**

8 So far we have operated under an assumption that improving systems of chronic disease care
9 could make a significant difference to a population's chronic disease burden. However, this is by
10 no means a foregone conclusion.

11 Historically there has been scepticism about its contribution to population health. Writing in
12 the 1960s, McKeown argued that most of the improvements in mortality over the previous cen-
13 tury and a half had preceded the introduction of effective medical care and were instead due to
14 improved living conditions, in particular nutrition (241). In the 1970s, Cochrane and colleagues
15 attempted to evaluate the impact of health spending on health outcomes, finding little or no effect
16 of medical care on mortality rates across countries (242). There is considerable historical evidence
17 that the major declines in infectious diseases predated the development of effective medicines and
18 were instead due to a combination of improved living conditions and public health measures
19 such as improved sanitation. It was only in the late 1940s and 1950s that effective and safe drugs
20 became available to prolong life for those suffering from many common diseases. Initially antibi-
21 otics, followed by a growing list of treatments for chronic diseases, such as hypertension and
22 chronic obstructive airways disease, as well as others that, while less obviously life saving, greatly
23 improved quality of life, such as non-steroidal anti-inflammatory drugs for arthritis and neu-
24 roleptics and antidepressants for severe mental illness. At the same time, the development of new
25 and safe vaccines greatly reduced the risk of a number of potentially life-threatening or disabling
26 diseases, such as measles and polio. However, until the 1960s, the greatest health gains came
27 about as a consequence of factors outside the health system, and in particular improvements in
28 housing, sanitation, safe water and food supplies, improved nutrition, employment, wages, and
29 education, which caused a steady improvement in living standards.

30 Consequently, it was only from the mid-1960s onward that healthcare really began to make a
31 difference to overall mortality rates: a phenomenon observable from a comparison of the UK,
32 where modern healthcare was being introduced, and the Soviet Union, where it was not. By the
33 1980s, it became possible to estimate its actual contribution to mortality, using the new concept
34 of avoidable mortality (that is, mortality that should not occur in the presence of timely and effec-
35 tive healthcare). Conceived in the US, it identified that portion of mortality that should be ame-
36 nable to medical intervention. This was subsequently adapted by researchers in Europe and is
37 now used widely in comparisons of healthcare performance. Deaths from these causes have fallen
38 markedly in recent decades in European countries, to a substantially greater degree than other
39 causes of death, and much faster than in the US. Consequently, they now account for only 7–10%
40 of all deaths across Europe. In the rest of the world avoidable mortality due to chronic diseases
41 contributes to a higher proportion of deaths, albeit never beyond 20%.

42 Nonetheless, considerable variations remain in mortality amenable to medical care and, in
43 general, the countries of Central and Eastern Europe, and especially the countries of the former
44 Soviet Union, still lag far behind. However, the implication is that while future developments in
45 personal care may be able to contribute more to the relief of disability, the scope of contribution
46 to longevity by curing disease, in the absence of some major unanticipated breakthrough, is likely

1 to be limited and the main challenge must be to ensure that those who can benefit from existing
2 knowledge are able to do so.

3 *Clue 7: Only a small fraction of differences in population chronic disease experience can be explained*
4 *by healthcare. It is unlikely that improving healthcare alone will be sufficient to address rising*
5 *chronic diseases.*

6 **Summary**

7 Returning to the challenge at the beginning of this chapter: how can chronic disease care be
8 improved in resource-poor settings if standards are inadequate in rich countries?

9 In this first half of the chapter, we briefly reviewed the history of healthcare systems, identifying
10 how they were set up in a period dominated by acute, infectious care needs.

11 These models are inappropriate for caring for people with chronic diseases, for several reasons.
12 First, people who live with chronic diseases are not simply passive bodies requiring medical
13 intervention, but individuals whose disease and risk are products of their environment. Most
14 people will have not one but multiple chronic diseases in their lifetime, requiring flexible regi-
15 mens of care that can be tailored to each patient's differing biological and social circumstances.
16 Second, many doctors find the common cycle of failed treatments and recurring illness extremely
17 frustrating—a point we return to in the next section about upstream and downstream causes of
18 poor health and intervention. Finally, doctors alone cannot solve chronic diseases through medical
19 cures; patients have to play a greater role in sharing knowledge about their conditions and the
20 challenges in managing them—engaging in collaborative care.

21 How might an alternative, exchange-based care model play out in practice? Instead of a tradi-
22 tional medical scenario where the doctor examines the patient and determines what to do, a more
23 reciprocal encounter would play out as follows: the patient describes a series of complaints and
24 symptoms; the doctor evaluates the patient's symptoms and makes a diagnosis. The patient asks
25 about what the diagnosis means for day-to-day life. The doctor explains and sets out a series of
26 treatment options as well as the potential long-term, debilitating risks of various courses of
27 action. The patient takes time to think about the preferred strategy, possibly returning for a future
28 consultation. Then the patient discusses again with the doctor what he/she has decided, when the
29 doctor asks the patient to identify what obstacles he/she might face in trying to follow the treat-
30 ment plan. They jointly decide ways of monitoring the patient's progress so that the doctor will
31 know if the patient has been unable to follow the agreed upon care strategy.

32 These alternative models of chronic care emphasize continuity, coordination, and collabora-
33 tion. The best kind of chronic care is an education. Such 'liberatory care' models of can empower
34 patients to play a more active role in defining their care needs while doctors play a supportive role,
35 helping patients and their families plan effectively for managing illness throughout the life
36 course.

37 Achieving the chronic care model is a major change to the status quo. Both rich and poor coun-
38 tries face significant challenges in restructuring their healthcare systems. Currently, systems of
39 chronic disease care in high-income countries are uncoordinated and fragmented. Many patients
40 receive treatment that fails to meet recommended standards, resulting in high rates of medical
41 errors; the situation is far worse in low-income countries.

42 Change will not be easy. One of the major barriers to restructuring has been resistance of the
43 medical profession and the influence of pharmaceutical companies. Especially in the US, there is
44 an overemphasis on expensive, medical care rather than interventions that could prevent people
45 from becoming sick in the first place. Despite its limitations, this model continues to be exported

1 to resource-poor countries through systems of global health aid and pressures from the financial
2 community to keep health spending low.

3 It is especially unlikely that change will be forthcoming without directed action by public health
4 leaders. Yet, by following the US model, there has been an excessive reliance on markets to achieve
5 these public health goals. It is as though the global health community has learned the wrong les-
6 sons from the obvious shortcomings of the US systems. Markets work well for cans of tuna, but
7 not healthcare. Relying on markets alone is unlikely to transform health systems to models of care
8 that are appropriate for caring for people with long-term illness. Unfortunately, in the context of
9 the privatization of global health and decades of continual Structural Adjustment programmes, as
10 described in Chapter 2, the public sector has been deprived of the necessary resources.

11 All of these challenges are embedded in a broader debate about how health systems in resource-
12 poor countries should develop. In the 1970s to 1980s, WHO set out a model of health system
13 development known as Primary Health Care which focused on providing universal access to a
14 comprehensive set of preventative and treatment services to populations (a horizontal model). Its
15 key values were equity, community empowerment and prevention. Disputing this approach,
16 economists as the World Bank proposed a Selective PHC model, arguing the WHO's PHC model
17 would be far too expensive. They drew upon the successes of the campaign to eradicate smallpox,
18 instead recommending a limited set of technical interventions that could yield the greatest health
19 gains at low cost for the populations at greatest risk (a vertical model). Its core elements were
20 efficiency, cost-effectiveness, and medical and technical intervention (as returned to in the next
21 half of the chapter). From the outset the World Bank's Selective PHC was pitched as an alterna-
22 tive, interim model of global health. Three decades later, the vertical, low-cost, technical model
23 continues to be the dominant paradigm guiding the development of public health systems.

24 Of course, neither model is perfect. A truly comprehensive public health system would likely
25 incorporate both horizontal and vertical components. Each aspect can reinforce the other. For
26 example, the infrastructure built up through a horizontal, system-wide approach will make it
27 easier to deliver effective vertical interventions when needed in response to short-term health
28 threats such as disease outbreaks.

29 Combining elements of both systems, the dominant minimalist and vertical models of public
30 health have been recently challenged by long-term conditions, such as HIV/AIDS and episodic
31 diseases, such as TB, that require coordinated care. In response to pressure from advocates (as
32 described in Chapter 5), substantial capacity has been set up in resource-deprived settings to
33 deliver antiretroviral and directly observed short-course therapy. These clinics and health staff
34 provide the key entry points for building health systems that can care for persons living with
35 chronic care needs, including chronic diseases.

36 In closing, we note that it would be unrealistic to expect that improving chronic care alone
37 would achieve substantial health gains. Until the 1960s medical care had little effect on chronic
38 disease, as the greatest health gains came about as a consequence of improvements in housing,
39 sanitation, safe water, improved nutrition, employment, wages, and education. In the future, the
40 scope of personal medical care to extend human life, in the absence of a major unanticipated
41 breakthrough, is likely to be limited. The main challenge of chronic care systems is to ensure that
42 those who can benefit from existing knowledge are able to do so.

43 Alternatively, in line with Geoffrey Rose's principles of public health, much greater gains could
44 be achieved by acting on societal determinants. Reducing the avoidable inequalities in chronic
45 disease outcomes would improve longevity and quality of life much more than giving people
46 access to all the best medications in the world. What some of these strategies are and how they
47 could be implemented is the topic of the next half of this chapter.

1 Part 2

2 **Prevention of chronic diseases**

Key policy points

- 1 The most promising (and low-cost) interventions require reverse-engineering of some of the changes in society that have led more people to become ill. Structural interventions that address unhealthy environments can help make it easy for people to be healthy.
- 2 There tends to be an overemphasis on individual medical and education interventions, attempting to reshape people's bodies and minds to fit increasingly toxic societies.
- 3 The key magic bullets that exist for reducing chronic disease include: medicines such as the polypill (a potentially effective combination of low-dose drugs to lower blood pressure and cholesterol and provide a protective vitamin, folic acid); regulations to lower salt, sugar, and fat content of food; and fiscal interventions such as tobacco, alcohol, and food taxes. These interventions can be viewed as 'best-buys' because they are highly cost-effective and, in the cases of taxes, can be cost-saving.
- 4 Interventions will never be simple to do when vested interests stand to lose profits from them. Even the most basic interventions, such as tobacco control, have proven to be extremely challenging.
- 5 Analogous to the chronic care model, participatory, community-based approaches aim to achieve a balance of power among experts and patients and their communities in sharing values and setting priorities. Community-led interventions offer one possible way to tailor the management of chronic diseases to individual communities.

Key practice points

- 1 We often falsely leap to the conclusion that the prevention of chronic diseases is only a matter of education. This assumes a great deal of agency and choice among the affected population. When designing interventions for a community, we must recognize the constraints to human behaviour. The limited effectiveness of education interventions relates to the fact that they fail to address the circumstances that lead people to choose unhealthy options.
- 2 In spite of evidence from randomized controlled trials that individual interventions can reduce individual consumption of salt, sugar, and fats and increase physical activity, it cannot simply be assumed that scaling up these approaches to the population level will achieve health gains. Even the simplest interventions are highly contested from a medical and logistical standpoint.
- 3 Many low-cost pharmacological interventions could be delivered more widely at low cost, including blood glucose monitoring, antihypertensives, lipid control, aspirin use, and regular screening for some chronic conditions.

Key practice points *(continued)*

4 Gaps in evidence should not stop us from starting the process of joining with communities to decide key priorities, identify risks, and search for appropriate strategies for intervention, as experts help set up experiments, replicate them, and learn from their successes and failures while building the evidence base.

1 Preventing chronic disease: the role of broader society

2 A good doctor working in South Africa went for a summer walk down the river, when suddenly he
3 noticed a man in the water, gasping for breath on the verge of drowning. Alarmed, the good doctor,
4 who had sworn his life to the Hippocratic oath, reached out to pull the dying man from the river.
5 The doctor knew what to do, using his emergency care skills to resuscitate the patient, and after a
6 few minutes the man was regaining consciousness. Relieved, the doctor called his colleagues back
7 at the clinic to get the man to the hospital for diagnostic tests, and then continued on his walk.

8 After carrying on his walk about 5 minutes, to his surprise, the doctor saw yet another man
9 floating down the river, nearing death. Again, in fulfilling his moral duty, the doctor stopped to
10 rescue the man. This time, as the man came back to his senses, he tried to explain something to the
11 doctor, but the good doctor could not understand what the man was saying. Clearly, he needed to
12 get to the hospital to have a neurological examination, so the doctor once again sent for help.

13 The doctor continued on his riverside walk, turning a corner, when this time he saw two men
14 and a woman drowning. What could he do! Rushing to save the woman, he knew the two other
15 men would likely die. Just about this time the doctor spotted a villager nearby and began calling
16 for help. Fortunately, the villager spoke the same language, and soon the doctor was explaining to
17 him how he could save one of the other two men. After they saved the man and woman, they
18 stopped for a moment to mourn the third man. If only there had been another villager here, the
19 doctor thought to himself. As the doctor seemed distressed by his thoughts, the villager eventually
20 broke the silence, asking ‘good doctor, didn’t you know there is a crazy man on the bridge a few
21 miles upstream who throws people in the river? If you are concerned about these dying people,
22 you should go to the head of the river to stop this killer’.

23 This story captures what prevention is all about. The practice of public health seeks to identify
24 the underlying causes of health that lie upstream from where doctors work. What good does it do
25 to pull more bodies out of the river, only to return them to the society that made them sick in
26 the first place? It is always better to prevent poor health than to step in when it is already too late
27 (although oddly enough some people do argue for deliberate human sacrifice, a point which
28 we addressed earlier in this book).

29 Healthcare is society’s last line of defence, picking up the pieces when all other supports have
30 failed. Even the best standards of care in the world would not be able to stop their rising incidence
31 of chronic diseases because, just a few miles upstream, people are throwing more bodies into
32 the river. Big Tobacco is the most well-known serial killer on the bridge, but Big Food also has
33 claimed many lives, and government leaders and health decision-makers are equally guilty for not
34 intervening in a timely manner (see Chapter 2).

35 Troubled by the growing numbers of bodies they see, doctors have begun calling for help
36 (for example, see Figure 5.1 in Chapter 5 about the growing calls to action). Too bogged down
37 saving patients who come into their offices they rarely can make it all the way upstream. Their
38 voices are being heard by leaders, but still go unanswered. Ministers of health from Uganda, for
39 example, say, ‘We know what to do [about chronic diseases]. We have no budget’ (World Diabetes
40 Foundation 2010).

1 The powerful incentives driving the development of healthcare and public health centre on
 2 medical models of care. More patients are pulled out of the river and into the medical system,
 3 feeding the interests of the pharmaceutical sector, while preventative approaches tend to be
 4 neglected.

5 In this chapter we discuss what we know and don't know about how to act upstream to prevent
 6 people from suffering from avoidable chronic diseases. In the first section, we cover a range of
 7 interventions, spanning individual medical treatments to population-wide policies. In consider-
 8 ing what works, we must not just look to what is effective from a medical and public health per-
 9 spective, but also to what can be achieved within limited budgets and existing political structures.
 10 Thus, in the second section, we consider how to choose appropriate interventions to reduce the
 11 burden of chronic diseases, contrasting prioritization based on cost-effectiveness criteria with
 12 community-driven systems of setting priorities. In particular, we focus on how community-led
 13 interventions, tackling the upstream killers, staffed with community health workers, responding
 14 to the doctors' cries for help, provides a democratic model to empower communities to address
 15 their ever-changing health needs. In the third and final section, we draw together the insights of
 16 the entire chapter in a case study of how community interventions could work on the ground.

17 **What works to prevent chronic disease?**

18 Before proceeding we need to take a moment to set out a broader definition of the health system
 19 than we used in the previous half of this chapter. Often when the public thinks about health, they
 20 think about the medical care system. More appropriately, this component of the health system
 21 involving health professionals should be called the sick care system, because it deals with people
 22 once they are already drowning in the river.

23 The full health system covers the full range of things that make people healthy, not just those
 24 that protect them once they are already ill. This reflects how WHO defines health as 'a state of
 25 complete physical, mental, and social well-being and not merely the absence of disease or infir-
 26 mity' (although it has been argued that this can only be achieved at orgasm or through the help of
 27 mind altering drugs). As set out in the embedded hierarchical model of Chapter 2, what makes
 28 people healthy includes a broad set of factors, including the agricultural system, providing incen-
 29 tives or disincentives to farmers to grow fruits and vegetables; urban planners who can build
 30 healthy cities with cycle lanes and sports fields for play or instead emphasize the dominance of the
 31 automobile; owners of restaurants, supermarkets, and other food outlets that can give customers
 32 the information they need to make healthier choices; private industry, that could use advanced
 33 tactics to market unhealthy or healthy products to kids.

34 **Evidence about the effectiveness of chronic disease interventions**

35 In public health a common assumption is that prevention is better than the cure. But how much
 36 do we know about what actually can be done upstream to prevent someone from getting sick?

37 It might seem logical to categorize our interventions into prevention and treatment, but where
 38 does prevention end and treatment begin? Systems that do attempt to classify treatment and pre-
 39 vention into so-called primary, secondary, tertiary, and quaternary components are somewhat
 40 arbitrary; in some cases what is classically thought of as treatment, such as treating HIV-positive
 41 patients with ART, is in fact one of the most effective strategies at population prevention. When
 42 it comes to an infectious agent, there is a clear difference; either you have been exposed to a disease-
 43 causing agent, initiating the disease process, or you have not. Of course, chronic diseases do not
 44 spread (although there is growing evidence of their social communicability), but the analogy
 45 nonetheless holds—it may be more effective to reduce morbidity by giving patients a pill combining

1 drugs to reduce cholesterol and blood pressure (so-called ‘polypill’) than trying to modify life-
 2 styles. Tobacco can be ‘treated’ using tobacco cessation aides (such as nicotine replacement
 3 therapy) or ‘prevented’ using taxes. To the extent that the chronic disease process is degenerative,
 4 as risk accumulates over the life course, all treatment is prevention in the sense that intervention
 5 aims to prevent debilitating sequelae of the disease. To some degree, prevention and treatment is
 6 a false dichotomy—ultimately the aim is to reduce risks and promote good health by whichever
 7 policies can be feasibly implemented.

8 The gold-standard for evidence about reducing risks, either through prevention or treatment,
 9 comes from the randomized controlled trials. This enables researchers to isolate whether a treat-
 10 ment (such as eating more fruits and vegetables) actually improves an outcome (such as reducing
 11 the risk of a heart attack). Randomization is important because, if done correctly, it evenly dis-
 12 tributes across both groups all possible major differences that could be driving the changes seen
 13 other than the treatment itself (i.e. removing confounding by some other factor that is related to
 14 both the exposure and outcome). For example, people who use tobacco might also eat too few
 15 fruits and vegetables so that the researchers accidentally observe fruits and vegetables have a bigger
 16 effect than they actually do because they failed to account for risks caused by tobacco.

17 Many randomized controlled trials have provided strong evidence that reducing exposure to
 18 the key risk factors can decrease risks of chronic diseases. For example, dietary changes that have
 19 been shown to lower risk of CVD include decreasing saturated fat intake; increasing consumption
 20 of linoleic acid, fish and fish oils, vegetables and fruits, and potassium; and maintaining low to
 21 moderate intake of alcohol (34, 243). Moderate levels of physical activity, including brisk walking
 22 or 20 minutes of exercise per day, have also been convincingly found to decrease the risk coronary
 23 heart disease, stroke, some cancers, type 2 diabetes, osteoporosis, high blood pressure, and high
 24 cholesterol (244).

25 These studies give us a strong evidence base for action, but do these findings apply in the real
 26 world? What we learn from a highly selected clinical setting may not easily translate into effective
 27 intervention in people’s environments and household situations (a so-called settings-bias). The
 28 results of randomized controlled trials can literally disappear in real-life settings.

29 Some of the strongest evidence that health improves when people are able to reduce their risk
 30 behaviours in their environments comes from studies of smokers. One study, for example, found
 31 that smokers who successfully quit experienced drops in risk of developing CVD by up to 36%
 32 (245). However, a few studies have found unintended and adverse effects of individual efforts to
 33 lose weight. One study found that people who tried to lose weight without medical supervision
 34 had higher risks of death, thought to relate to the stress involved in rapidly changing lifestyles or
 35 the pressure from peers and family members. These unintended consequences relate to a general
 36 problem in epidemiology: the real world is not like the laboratory (see for example the debate
 37 about salt reduction in Box 4.4). To overcome these challenges, there is a need to do randomized
 38 experiments in more real life, generalizeable settings.

39 *Strategy 1: Conducting randomized experiments in real-life settings, not just laboratories, can*
 40 *improve our confidence in their ability to be effective when scaled up to communities and entire*
 41 *populations.*

42 Nonetheless, apart from a few exceptions, there is a strong evidence base showing that reducing
 43 people’s exposure to risk factors of chronic disease can achieve major gains in individual health.

44 *Clue 1: Randomized-controlled trials provide strong evidence that when people successfully reduce*
 45 *their exposure to risks of chronic diseases their health improves.*

46 How can these behavioural changes, desirable from a public health perspective, be achieved and
 47 extended to entire populations?

Box 4.4 Debates about salt intervention

Since the 1970s there has been debate about whether salt causes hypertension and, as a result, CVD. Many epidemiologists, commenting in the late 1980s, felt that ‘I don’t accept salt and hypertension . . . If you really look at the data, it’s very unclear what the facts are’ (28). However, more and more observational studies, such as the Framingham Heart Study, began to provide evidence that salt was strongly correlated with hypertension, which was also found to occur in many patients who had CVD. Extrapolating from these findings, researchers began suggesting that in the US alone between 194,000 and 392,000 quality-adjusted life years and US \$10–24 billion in healthcare costs could be saved. Commenting in *The New England Journal of Medicine*, researchers called it ‘compelling evidence for public health action to reduce salt intake’ (246). Other doctors and epidemiologists disagree (most of whom are funded by the industry-sponsored Salt Institute). They pointed out the randomized controlled trials focused on lowering blood pressure among a small group of the population (247). Other trials that the researchers did not consider had found that the level of salt reduction needed to lower blood pressure would also increase nerve activity, decrease insulin sensitivity (increasing risk of diabetes), and, in fact, could increase blood pressure (by activating the renin–angiotensin system and stimulating aldosterone). They also had shown that in some patients, reduced salt intake resulted in increased risk of being put in the hospital and even dying. They also note that, despite rising population consumption of salt over the past three decades, people’s biological levels of salt have stayed about the same. This happens because of homeostatic mechanisms that ensure salt intake equals salt output, like an internal ‘salt clock’ that maintains an equilibrium. As a result, it is possible that any intervention would be neutralized and a colossal waste of time and money. On social grounds, the researchers question how overall calorie intake might be affected, noting that individuals might compensate by consuming more of what they were eating before (potentially increasing obesity rates) or switch to fattier or more sugary foods (potentially cancelling out the reduced CVD from salt reduction or even increasing diabetes rates). Thus, researchers suggest that, instead of the ‘rash route’ the public health community should follow the cautious path. Moreover, some public health researchers deplore such a singular focus on salt, felt to be a diversion from tobacco or unhealthy diet, and caution about an ‘over-zealous and non-tested policy actions against salt intake’ (248), calling for more ‘comprehensive lifestyle and pharmacological approaches for multiple risk factor control for prevention of vascular diseases’. For more details see the special series in *International Journal of Epidemiology*.

1 Individual and population interventions

2 Consider, for example, how to reduce cardiovascular risks. One approach is to deliver mass quan-
 3 tities of preventative medicines. Another approach is to deliver mass quantities of a product like
 4 steel-cut oats, rich in fibre, and proven to reduce risks of developing CVD. A third approach is to
 5 focus on people’s societal and environmental conditions that make unhealthy choices the easiest
 6 choices. If we could figure out how to eliminate the avoidable inequalities in chronic diseases by
 7 social class or education, the reductions in the levels of chronic diseases would be greater than the
 8 first two strategies (1). Each approach plays a role.

9 In general the public health strategies target two kinds of groups: high-risk individuals and
 10 entire populations. We discuss each in turn.

1 Individual-level interventions

2 When asked, ‘what is the evidence that individual interventions can reduce a population’s
3 consumption of salt, sugar, fats and increase physical activity?’, one editor of a top epidemiology
4 journal said explicitly, ‘I don’t know of any’. As a recent systematic review of multiple interven-
5 tions using counselling or education to reduce risks of CVD concluded, they have ‘no effect on
6 mortality . . . [and] limited utility in the general population’ (249). Similar evidence has emerged
7 from systematic reviews of education-based interventions on childhood obesity and consumption
8 of fizzy drinks.

9 This is unsurprising. As described in Chapter 2, the main causes of rising chronic diseases are
10 largely beyond individual control, so even though individuals can change their behaviours, they
11 are attempting to fight against an environment that provides disincentives to do so. However, with
12 this caveat in mind, there is evidence that some interventions—both clinical and education—can
13 help individuals modify their risky behaviours.

14 Medical interventions

15 We cannot cover all the drugs and medical solutions being proposed for treating diabetes, heart
16 disease and other chronic diseases, so instead we discuss two: the polypill and tobacco cessation
17 therapy.

18 Faced with the prospect of rising chronic diseases in resource-deprived settings, researchers
19 have been struggling to find a low-cost way to prevent premature deaths. Unlike malnutrition, no
20 clear magic-bullet like oral rehydration therapy existed for chronic diseases. However, in 2003,
21 two researchers, Wald and Law, proposed one such medical magic-bullet, the ‘polypill’. It would
22 combine a statin to lower cholesterol, three drugs to lower blood pressure, aspirin, and a key
23 vitamin, folic acid. Controversially, the researchers estimated that if everyone over age 55 and
24 who had CVD took the drug it could prevent more than four out of every five heart attacks and
25 strokes (250), increasing the years of disease-free life by over a decade. Such remarkable results led
26 some researchers to call for adding it to the water supply in low-income countries, or even offer-
27 ing it for sale at fast-food outlets. Since all the medications are off-patent, the costs of providing
28 these essential medicines would be very low (but this also means that pharmaceutical companies
29 may not try to encourage their use if it could diminish their profitability). Whether patients will
30 actually heed their doctor’s advice and take the medicines is a problem, but this adherence
31 to what doctors suggest improves because patients only need to take one daily pill instead of a
32 complex regimen of five or six at alternating times and days.

33 To date, the polypill has neither been fully tested nor rolled out in countries. One component
34 of the pill, aspirin, has been found to cause negative health consequences when taken continuously.
35 Other side effects caused by the long-term use of the polypill and its six interacting components
36 are unknown. Many people in public health find the medicalized and magic-bullet approach of
37 the polypill to CVD prevention preposterous. A tongue-in-cheek article in the *British Medical*
38 *Journal* proposed the ‘polymeal’, including a daily regimen of wine, fish, dark chocolate, fruits,
39 vegetables, garlic, and almonds (251), as a ‘tastier and safer alternative to the polypill’.

40 A similar pursuit of a medical magic bullet is occurring with smoking. Realizing that it is very
41 difficult for people to quit, especially those who are disadvantaged, pharmaceutical companies
42 developed nicotine-replacement drugs and other quitting aids. These drugs do help, but the vast
43 majority of successful quitters do so without medicine (252). These cessation technologies could
44 be an element of a comprehensive tobacco reduction strategy, but they should not substitute for
45 tackling the tobacco companies that got people hooked in the first place.

46 *Strategy 2: Quick-fix medical solutions can reduce risks of chronic disease, but should not substitute*
47 *for addressing the upstream causes that place people at risk.*

1 Information and education interventions

2 Slightly further upstream from medical interventions on people's bodies are approaches that
 3 attempt to reach their minds. The classic public health campaign to prevent chronic diseases is to
 4 tell people what is good for them: Eat more fruit and vegetables. Brush your teeth. Watch your
 5 weight. Wash your hands. (Unsurprisingly critics, such as the Centre for Consumer Freedom,
 6 often think public health practitioners are secretly calling for a 'nanny state'). Indeed, these kinds
 7 of policies can be quite intrusive and reinforce a divide between the public health experts (who
 8 know better) and the populations whom they seek to serve.

9 These recommendations can make a difference in some cases. One of the most successful exam-
 10 ples of education-based prevention is to brush teeth. From early life parents teach children what
 11 to do, routine dental checkups take place, and the consequences of failing to brush teeth are
 12 immediately apparent when children get cavities or toothaches. To some extent this model works
 13 for chronic diseases risk factors. Studies found that when doctors tell their patients they should
 14 quit smoking, they sometimes do (245). Similarly, over the past 10 years clinical trials have shown
 15 that when doctors recommend weight loss, a healthier diet, and exercise, people are in some cases
 16 able to change their behaviours.

17 When they are successfully able to do so, especially among high-risk groups, the risk of the
 18 incidence of type 2 diabetes significantly drops (253). Table 4.1 summarizes a few studies that
 19 have reported successes in getting people to change their behaviours. Attempts to modify people's
 20 lifestyles tend to be most effective when they target both diet and physical activity, mobilized
 21 social support, use established behavioural change techniques, and stay in frequent contact with
 22 people (254).

23 The effects of such brief interventions can be substantial. Randomized controlled trials from
 24 the US, Finland, Japan, China, and India found that high-risk persons (such as impaired glucose
 25 tolerance) who began exercising moderately, about 20 minutes per day, and eating a healthier had
 26 a greater reduction in risk of developing diabetes (more than 50% in several studies) than taking
 27 a series of preventative drugs (254).

28 *Clue 2: When public health education interventions successfully lead people to eat healthier diets and*
 29 *be more physically active, their risk of chronic diseases drops significantly, often by as much, if not*
 30 *more, than as occurs through medical interventions.*

31 Information interventions rely on strong assumptions about people's ability to change in the
 32 context of an unhealthy environment. Different groups have varying abilities to convert information
 33 into positive behavioural change (a notion referred to as 'self-efficacy'). When research revealed that
 34 tobacco was a cause of lung cancer, inequalities in tobacco use and tobacco-related deaths began to
 35 emerge by socioeconomic status. Subsequently, it was found that while both rich and poor desired
 36 to quit smoking in places like the UK, the rich were much more successful at actually doing so.

37 Whenever interventions rely on people to act based on information and education, underlying
 38 differences in their capabilities and resources for converting this knowledge into behaviour
 39 change can lead to a net result in widening health inequalities (a point returned to in discussions
 40 about the effects of nutrition labelling). Individualized, education- and awareness-oriented
 41 approaches, as well as high-risk screening and targeting, may widen socioeconomic inequalities
 42 since they are better understood (and thus heeded) by higher-educated, higher-income groups
 43 (58, 255).

44 *Clue 3: Information interventions can widen inequalities in health because higher education groups*
 45 *tend to be more capable of modifying their behaviours than lower education groups.*

46 Consistent with psychological theories of behaviour, however, few public health information
 47 and education interventions have been found to have an effect on people's behaviour when

Table 4.1 Outcomes of selected randomized clinical trials that aimed to prevent diabetes by modifying people's behaviours

Study	Duration of intervention (years)	Behavioural goals	Weight loss achieved at 1 year (kg)	Risk reduction
Chinese Da Qing IGT and Diabetes Study (294)	6	Weight loss + maintenance of a healthy diet + exercise	NR	Diet 31% Exercise 46% Both 42%
Finnish Diabetes Prevention Study (DPS) (295)	4	5% weight loss on low-fat, high-fibre diet + 30 min exercise per day	4.2	58%
Diabetes Prevention Program (USA) (296)	2.8	7% weight loss + 150 min exercise per week	7	58%
Japanese Trial (297)	4	Reduction in BMI to $\leq 22 \text{ kg/m}^2$ by 30–40 min exercise per day	2.5	67.4%
Indian Diabetes Prevention Program IDPP-1 (298)	3	Weight maintenance by diet low in refined carbohydrates and fat + 30 min exercise per day	0	28.5%
Diabetes Prevention Program (USA) (296)	10	7% weight loss + 150 min exercise per week, with additional lifestyle support as compared to original DPP study	—	Lifestyle group 34% Metformin group 18%

Source: Adapted from (253) Notes: DPP, Diabetes Prevention Program; NR, not reported.

1 delivered in isolation. For example, one study of Thailand found that knowing more about the
 2 risks of smoking had no effect on the decision to smoke. Information campaigns can also be
 3 manipulated, as with Philip Morris's campaigns aimed at adolescents, in which children inter-
 4 preted the 'smoking is only for adults' message as encouragement to act out their grown-up aspira-
 5 tions. Stressing the need to avoid an undesirable behaviour can perversely make people more likely
 6 to do it (256). Moreover, as discussed in Chapter 5, these interventions could backfire politically,
 7 making it easy to blame sick people by spreading a myth that they could have easily avoided their
 8 health problems through a combination of individual will and the right information.

9 A social reason for limited effectiveness of education interventions relates to the fact that they
 10 fail to address the circumstances that lead people to choose unhealthy options. An implicit
 11 assumption of the education campaigns is that people smoke or drink because they do not under-
 12 stand the risks to their health. Instead, many people who abuse alcohol to self-medicate (257).
 13 Substance abuse is most prevalent among those faced with depression and anxiety, making it dif-
 14 ficult to decide which came first, the drugs or the mental health problems. No amount of educa-
 15 tion would solve this kind of drug abuse without addressing the chronic stressors that cause
 16 people to use tobacco and abuse alcohol. Other reasons relate to differences in ways people living
 17 pay day-to-pay day in resource-poor settings tend to value the present more than the future as
 18 compared with persons who have greater economic security (what has been called a 'dictatorship
 19 of the present'). Recently some creative approaches for overcoming these barriers have been
 20 devised that tap into insights from behavioural psychology and economics (see Box 4.5).

Box 4.5 Enhancing information interventions with insights from behavioural psychology and economics

A common, mistaken view underpinning educational interventions is that people make decisions based on carefully and dispassionately weighing the evidence. This is especially untrue in regard to smoking, where addiction plays a key role. Many smokers continually say ‘I will quit tomorrow’, but tomorrow never comes (the hyperbolic time discount problem, see Chapter 3). One famous anecdote is that of Ulysses in the Iliad. His boat was approaching the Sirens—famed for their beautiful, alluring song that would enchant men, who they would subsequently devour. He longed to hear the Siren’s voice, but knew he could not withstand the deadly temptation, so he had his men tie him to the mast of the ship to protect himself against, well, himself.

Recently some creative approaches have been developed to help people do what they say they want to do. In one programme, people make a commitment to a healthy behavioural change (e.g. quitting smoking, weight loss, healthier eating) and wager against themselves in order to stick to the plan. Another innovative programme was set up by a local bank to create savings accounts for people that were trying to quit smoking. Each day, the amount of money that would have been spent on cigarettes was deposited into the account. At the end of the programme, successful quitters received the lump sum saved. Unsuccessful quitters, however, lost all their savings. These strategies create disincentives to renegeing on a commitment to change and found been found to increase people’s likelihood of exercising or quitting smoking given that they have decided they wish to do so (256, 258, 259).

Other strategies seek to make healthy choices the default choices at restaurants and supermarkets, so that people have consciously to choose to be unhealthy (affecting their availability and effective price). Studies found, for example, that organ donors were much greater in US states where people were organ donors unless they opted out of the programme. Similarly, coffee shops which make lattes using semi-skimmed or skimmed milk, unless people specifically request whole milk, are passively encouraging healthier choices. Another example is in urban design. If the elevator is central, people are unlikely to search for the stairs located to the side. But when stairs are more convenient, people are more likely to use them. These kinds of approaches could be thought of as white glove kinds of policy initiatives to achieving behavioural change (256).

1 In the context of limited availability of healthy choices, education offers very little help. What
2 good does it do to tell someone to eat fruits and vegetables if there is simply a lack of fresh supplies
3 in their neighbourhood?

4 We must also bear in mind that public health information campaigns are but one small piece
5 of information in an environment where people are bombarded with conflicting messages
6 designed to generate profits. Marketing of food products has been shown to have significant
7 effects on people’s behaviour, both in the real world and the experimental setting (see Chapter 2).
8 Whatever public health interventions seek to influence the behaviour of individuals is likely being
9 counteracted by a much more powerful set of existing interventions that aim to encourage people
10 to make unhealthy choices and consume larger quantities.

11 *Clue 4: Information campaigns cannot address structural barriers to healthy diets, such as the*
12 *unavailability of healthy foods or their relatively high price.*

13 *Clue 5: Public health information interventions to encourage healthy choices tend to be overpowered*
14 *by marketing campaigns that encourage people to make unhealthy choices.*

1 **Population-wide interventions**

2 As the famous epidemiologist Geoffrey Rose noted, ‘The efforts of individuals are only likely to be
 3 effective when they are working with the societal trends’ (1985). When the root causes of rising
 4 chronic diseases are at the societal level (as outlined in Chapter 2), it follows that the solutions
 5 should also be directed at entire societies. Such approaches can help make it easy for people to be
 6 healthy (while doing nothing continues to maintain the unhealthy status quo). This sounds like a
 7 great theoretical idea—but can it be delivered to populations as an intervention?

8 Here we provide a few concrete examples of how magic-bullets in health policy, such as taxes,
 9 subsidies, and regulation can powerfully affect the main economic risk factors of unhealthy diet
 10 set out in Chapter 2, including price, availability, and marketing. We then cover a series of urban
 11 and architectural design intervention identified by WHO as helping people regain control of the
 12 way their societies are being built, re-engineering them to be healthier and suited to people’s
 13 changing lives.

14 **Fiscal interventions—taxes and subsidies**

15 Just as price is one of the most powerful determinants of whether to make a risky decision, so are
 16 financial interventions among the most powerful levers of public health intervention. Two main
 17 types of financial policies can be used to influence price: taxation and subsidies.

18 Tax and price policies applied to tobacco and alcohol products in many countries have pro-
 19 vided persuasive evidence that they decrease consumption. ‘Sin’ taxes on tobacco are the single
 20 most effective intervention to reduce demand for tobacco. One study estimates that a price
 21 increase of 10% would reduce smoking by about 4% in high-income countries and by about 8%
 22 in low-income and middle-income countries (260). It has been estimated that a 70% increase in
 23 the price of tobacco could prevent up to a quarter of all smoking-related deaths worldwide (261),
 24 with the added benefit that increasing tobacco taxes by 10% generally leads to increases in gov-
 25 ernment tobacco tax revenues of nearly 7% (262). In the UK, tobacco taxes make up nearly 80%
 26 of the price of a packet of cigarettes, but most resource-poor countries have tax rates below 50%,
 27 leaving considerable scope for intervention.

28 Applying these taxes to alcohol or food is more challenging than tobacco because they are not
 29 global bads. Food taxes are now being called for in a variety of forms as ‘junk food tax’, ‘calorie
 30 tax’, ‘luxury tax’, or ‘fat tax’, but have yet to be implemented. One exception is Romania, which
 31 in 2010 became the first country to implement a junk-food tax on snacks and crisps, cakes and the
 32 candy-making industry, soda, and fast-food products. One article reported that fizzy drink
 33 consumption decreases by 7.8% for every 10% increase in price (83), estimating that a penny-
 34 per-ounce excise tax could raise \$1.2 billion in New York State alone.

35 One important limitation of taxes is that they tend to impact most the incomes of the poor.
 36 However, as discussed in Chapter 3, there is surprising evidence that the poor report being
 37 happier as a result of these interventions, as the state helps them achieve their desired goals of
 38 breaking addiction that they could not achieve without additional support.

39 An alternative approach is to use subsidies to promote healthier choices (a ‘carrot’). One US
 40 community-based study found that price reductions of low-fat snacks sold in vending machines
 41 in secondary schools and worksites in Minnesota resulted in substantially higher sales of these
 42 foods compared to usual price conditions (263), even though average vending machine profits
 43 were not significantly affected.

44 It is also possible to target suppliers to discourage production of unhealthy foods. There are few
 45 successful examples. One problem is that the effectiveness of supply-side mechanisms depends on
 46 how readily substitutes are available. For example, attempts to curb tobacco supply are frustrated

1 by industry-supported initiatives to smuggle tobacco from neighbouring countries (also used to
2 circumvent taxes) (see Chapter 7.1).

3 Another instrument is a price floor, especially important for alcohol control, given ‘all-you-
4 can-drink’ specials in bars at rock-bottom prices. This also prevents supermarkets from using
5 alcohol as a loss leader to attract customers. Maintaining a minimum price can help avoid giving
6 desperate substance abusers an easy means to harm themselves (and others).

7 Other types of fiscal instruments exist, such as conditional-cash transfers, which are becoming
8 increasingly popular as a mechanism to give people direct incentives to be healthy.

9 In general, fiscal instruments work extremely well. Its success is indicated by the vigorous
10 response of tobacco and food companies to avoid any interference with the price of their product.

11 *Strategy 3: Fiscal interventions to increase the price of unhealthy foods (using taxes) and decrease the*
12 *price of healthy foods (using subsidies) are among the most powerful public-health interventions*
13 *for preventing chronic diseases.*

14 Regulatory interventions

15 Public health’s second main weapon is regulation to maintain sanitation and hygiene. Regulation
16 gives a mandate to conduct audits. In rich countries, this occurs in most food industries (for exam-
17 ple, noting Upton Sinclair’s descriptions of conditions in the meat-packing industries). To regulate
18 successfully, the state has to be free of influence from those who they are regulating (typically cor-
19 porations). Unfortunately, this is often not the case. The Food and Drug Administration and
20 Environmental Protection Agency both have revolving doors of industry executives and top
21 federal appointments to positions in these agencies.

22 The alternative situation is for the industry to regulate itself. Self-regulation is the industry’s
23 preferred solution. To crowd out public regulation, many industries implement price floors,
24 nutritional changes, or marketing restrictions (see Chapter 6). These efforts aim to prevent the
25 state from introducing taxes or regulating their practices, prospects viewed as typically being
26 more stringent.

27 Here we describe bans and providing information as two examples.

28 Banning risk factors or limiting their use

29 Bans can limit the harm that products can cause to others, such as second-hand smoke, and to
30 reduce people’s access to with the means of self-harm, such as binge drinking. These strategies
31 decrease availability (increasing their effective price), making unhealthy options more difficult to
32 choose.

33 Do bans work? There is now convincing evidence that banning tobacco in public spaces reduce
34 heart attacks. In 2004, a small study conducted in Helena, Montana, USA found that hospitaliza-
35 tions due to heart attacks decreased during the 6-month long smoking ban, compared to rates
36 before the ban was implemented and after the ban was lifted (264). Rates in a comparative com-
37 munity without a smoking ban (a type of ‘control’ group) did not decrease during that same time,
38 further supporting the causal role of the smoking ban in reducing heart attacks. Similar results
39 have been observed in diverse settings, including Italy (265) and New York 202); few studies of
40 bans in low-income countries have been done but one can imagine similar effects.

41 Are they feasible? Restaurant owners initially opposed smoking bans, on grounds that their
42 profits would be diminished. In most settings this has proven to be wrong—in fact, profits rose as
43 many people who avoided restaurants or bars because of undesirable second-hand smoke were
44 liberated to partake and enjoy public spaces without having their health suffer.

45 In an effort to reduce tobacco use, WHO used its treaty-making powers for the first time to put
46 in place an international framework that signatory countries would agree to implement and allow

1 independent audits of the outcomes of their activities (the Framework Convention on Tobacco
 2 Control) (34). Several countries are now implementing nationwide smoking bans in public and
 3 work places (including bars and restaurants). In 2004, Ireland was the first country to enact a
 4 workplace smoking ban. Norway, Scotland, and England have since followed. However, the
 5 FCTC is an example of the limits of voluntary, self-regulation and, as such, the WHO has no
 6 authority to enforce it. As of 2009, fewer than 6% of signatory countries had implemented the
 7 bans on tobacco use in public spaces to which they had agreed.

8 Regulatory approaches also exist to prevent manipulation of children by advertising. Strategies
 9 include removing fizzy drinks from school vending machines, limiting the density of fast food
 10 restaurants in neighbourhoods (decreasing availability), and requiring chain restaurants to offer
 11 ‘healthy’ alternatives. Some local authorities are banning trans fats from restaurants and seeking
 12 to regulate the sugar and salt content of foods.

13 One radical example of banning a risk factor was Gorbachev’s antialcohol campaign in the
 14 Soviet Union between 1985 and 1987. Remarkable improvements in alcohol-related mortality
 15 occurred, as age-standardized death rates dropped in half during the ban. Diseases related to
 16 alcohol, suicide, CVD, and TB also fell markedly among working-age men, as life expectancy rose
 17 by 3 years. One of the most successful initiatives in public health history in the past half-century,
 18 it was also one of the most unpopular, in part contributing to Gorbachev’s political ouster in the
 19 1990s (266).

20 *Strategy 4: Banning a risk factor or reducing its availability is a powerful intervention to prevent*
 21 *chronic disease.*

22 **Providing information and curbing misinformation**

23 When people lack access to information to make decisions that reflect the priority they place on
 24 being healthy, competitive markets will fail to price them appropriately (see Chapter 3). To fix
 25 this problem, regulations can label foods so that people better understand their calorie content
 26 and health implications. Even if only a few people respond, it can potentially drive changes
 27 through the marketplace to affect producers and suppliers. Restaurants, for example, might not
 28 sell enough of an unhealthy product, taking it off the menu. Or more consumption of the healthier
 29 products could lead to prices falling. As noted above, these strategies tend to widen health
 30 inequalities, as typically the best educated groups are able to find, understand and change their
 31 behaviour in light of new information.

32 Examples include posting calorie counts on fast-food menu boards or labelling foods with a
 33 ‘red light’ if they contain high levels of fat or sugar. Providing information in restaurants is
 34 particularly important because in places like the US people eat about one-third of their food away
 35 from home, where they spend close to half of their food budgets.

36 Consider a common dilemma that you might face when trying to decide between a burger and
 37 a pasta dish. Both have the same price, and both are equally tasty. If you knew that the pasta had
 38 twice the calories, salt and fat (owing to a sauce used), you would likely choose the burger, or per-
 39 haps ask for the sauce on the side. Of course, some people might be indifferent to this information
 40 and continue to choose the unhealthy option even if they know it is unhealthy. But the basic idea
 41 is that those people who know it is healthy will respond, markets will react, lowering prices and,
 42 possibly, driving unhealthy products off the menus. These processes help people make healthy
 43 choices easier choices for themselves and others.

44 Does labelling food lead people to make healthier choices? So far, the results have been mixed.
 45 Studies of restaurants indicate that the extent to which people look at nutritional information
 46 depends on where it is placed and the size of the font (267). None of the restaurants studied
 47 thus far has reported a drop in profits, and some have reported increases (268, 269). The groups

1 who make decisions also matter. Restaurants with wealthier clientele appear to report the greatest
 2 reductions in calories consumed (269). In some cases, while parents did not change what
 3 they purchased for themselves at fast-food restaurants, their decisions on behalf of their children
 4 did reduce their calories consumed by more than 100 calories per meal when labelling was
 5 present (270).

6 Lastly, we point to efforts to curb misinformation by marketers. This happens all the time, to
 7 such an extent that we sometimes fail to pay attention. A classic piece of misinformation is called
 8 the ‘puff’, an advertising slogan that is clearly false, such as ‘We have the best fish and chips in
 9 Britain’. One egregious form of misinformation is marketing products to people who are incapa-
 10 ble of making informed decisions, especially children. This has provided scope to ban advertising
 11 to children in order to protect them from manipulation. It started with banning cartoon-style
 12 images, like Joe Camel, to children, but has extended to advertising fast-food on children’s TV
 13 programmes. This is spurred by evidence that children who are more greatly exposed to junk food
 14 ads on television have higher risks of childhood obesity (271).

15 Many of the approaches described above seem simple to do. But whenever vested interests,
 16 typically tobacco, food, or pharmaceutical companies, stand to lose profits from them, the imple-
 17 mentation will not be straightforward. As seen with tobacco control, at every juncture, industry
 18 attempted to frustrate the expansion of effective public health policies to tax and ban cigarettes.
 19 The companies produced fraudulent studies and shifted debates to issues that were peripheral to
 20 their core interests of getting people hooked on nicotine. So far, by supporting an elaborate sys-
 21 tem of smuggling and new, unregulated tobacco products, as well as offering gratuitous financial
 22 support and cultivating friendships with finance and agriculture ministers they have been able to
 23 stay a step ahead of public health efforts to curb tobacco in resource-deprived settings. We are at
 24 the early stages of a much longer process to catch up with food and alcohol industries.

25 *Strategy 5: Regulating food, tobacco, and alcohol marketing practices can curb misinformation and*
 26 *psychological manipulation of dietary choices—especially among children—thereby preventing*
 27 *chronic disease.*

28 **Broader social policy interventions: health in all policies**

29 So far we have focused on interventions that affect proximal risks. We can venture further
 30 upstream, examining the broader choices about society and welfare that can affect people’s risks.

31 One common slogan in public health is not just ‘Health for All’ but ‘Health in All’ policies
 32 (272), pointing out that ‘every minister is a health minister’. These calls draw on the observation
 33 that many of the causes of the risk factors are beyond the control of the formal healthcare system.
 34 Commonly they are referred to as intersectoral policies, because they integrate the work of many
 35 non-health sectors that provide crucial inputs to health.

36 There is substantial evidence that social policies outside the healthcare system can have a
 37 powerful, albeit indirect, influence on the more proximal drivers of chronic disease risk, such as
 38 price, availability, and marketing. This can be clearly seen in urban design practices.

39 **Urban planning and transportation policies**

40 Cities have been engineered in unhealthy ways, so that when people move en masse from the
 41 countryside to the city centre the risks of chronic diseases increases. Several tried and tested
 42 approaches can steer urban development to encourage healthy behaviour. One recent WHO
 43 review found that the most important elements of the urban environment for determining if
 44 people would be physically active were whether parks and green spaces were available, attractive,

1 and safe; public buildings and daily amenities (such as post offices, banks, libraries, supermarkets
 2 and grocery stores, and restaurants) were nearby, and there existed a functioning and desirable
 3 public-transportation system (273).

4 Many of these factors were determined by how streets were laid out. For example, street design
 5 can emphasize bikes over cars or vice versa. One example to make it easier and safer to cycle is an
 6 intervention to promote physical activity in Bogota, Columbia (Ciclovía). In 1995 city leaders
 7 invested resources in improving public transit and building accessible sidewalks and cycleways
 8 (building about 260 km of pathway and 16 bicycle routes by 2009). City planners also closed
 9 about 120 km of roadways on Sundays, leaving these streets free for use by pedestrians and bicy-
 10 clists. Unsurprisingly, travel by car dropped from 17% to 12% during peak travel times in the
 11 working week, as people chose to walk or bike to work (274).

12 A remarkable example of a combination of healthy urban planning and transportation policies
 13 comes from Curitiba, the fastest-growing city in Brazil during the 1970s. Prior to its rapid growth,
 14 urban planners developed an innovative public transport system starting in 1965. The planners
 15 specifically set out to build environments that took account of locations and densities of homes,
 16 work, recreation, transport, and public services to optimize the opportunities for being physically
 17 active (275). Unsurprisingly, people travelled less frequently by car: in Curitiba, gasoline usage is
 18 approximately 30% lower than in other Latin American countries and air pollution is among the
 19 lowest in the country (276).

20 The preceding examples of how planners decided to close certain areas to provide opportunities
 21 for activity or design areas for specific activities are types of zoning regulation. These policies can
 22 create or limit the availability of healthy products and activities. Zoning regulations can, for
 23 example, prohibit fast-food chains from opening new branches near schools. This is important
 24 because the concentration of fast-food restaurants within walking distance of schools correlates
 25 with increased risk of childhood obesity (277, 278). Similarly, they can prevent pubs from being
 26 located alongside each other, found to prevent binge drinking in hotspots.

27 Urban designers can also provide resources to encourage physical activity. In addition to build-
 28 ing sidewalks or cycle lanes, they can provide the means of physical activity, such as by providing
 29 free public bicycles. For example, in summer 2007, the Socialist mayor of Paris, Bertrand Delanoë,
 30 implemented the Velib public bicycle rental programme, which provided 10,000 bicycles availa-
 31 ble for rental at low cost at 750 automated rental stations throughout the city. Since that time the
 32 number of bikes has grown to 20,000 bicycles and 1639 stations, with one station approximately
 33 every 300 meters throughout the city. The programme has been embraced both by Parisians (who
 34 use the bicycles for daily commuting as well as for leisure) and tourists (who use the bicycles to
 35 explore Paris) alike. In the first year, there were approximately 27.5 million bike trips made, most
 36 of which were daily commutes.²

37 In short, urban planning can harness uncontrolled forces of rapid urbanization, but requires
 38 foresight by policymakers as well as public resources and investment. The benefits could be sub-
 39 stantial over the long run, redesigning societies to be safer, have a stronger sense of community,
 40 and be healthier. Unfortunately, this needed public capacity to wrestle back control of social
 41 development and provide public goods like parks has been crucially lacking in resource-deprived
 42 countries, precisely where the fastest and most dangerous urbanization of poverty is taking place.

43 *Clue 6: Urban planning can steer urban development so to prevent chronic diseases or pose*
 44 *additional risks.*

45 *Strategy 6: Several strategies are immediately available to urban planners for preventing chronic*
 46 *diseases, such as providing bicycles and cycle-ways as well as zoning development so to limit the*
 47 *availability of unhealthy fast-food and alcohol outlets.*

1 Social protection and the welfare system

2 The expansion of social welfare tends to coincide with the development of health systems. Starting
3 with financial relief to the unemployment, social welfare systems offer services and protection
4 to people against the risks across the life course (including housing support, unemployment
5 insurance, old-age pensions, disability support). However, they also provide public resources
6 to improve the quality of people's lives, counteracting some of the harmful aspects of society's
7 current engineering.

8 These social programmes offer substantial protection against chronic disease risks. For example,
9 family-support programmes, a type of social welfare policy, can provide more time to mothers to
10 cook healthy meals for their children and encourage active play. Although people are less active
11 overall, they are in fact choosing to exercise more than ever in their free time to prevent obesity.
12 In the US, for example, people's leisure time has declined as hours worked has risen; overall,
13 Americans work more than 20 additional days out of the year than their European counterparts.
14 Social supports can give people more control of their lives.

15 Social protections can also help prevent people from initiating risky behaviours in response to
16 psychological stressors. Active labour market programmes can help people who lose jobs get back
17 to work faster as well as prevent them from becoming depressed, abusing drugs, and experiencing
18 heart attacks or strokes. A growing body of evidence reveals that social protections can improve
19 many health-related outcomes, both infectious and chronic, in several cases more so than health-
20 care spending for alcohol-related mortality and intentional causes of death (279, 280).

21 *Clue 7: Social spending on family support, housing subsidies, job reintegration programmes, survivor*
22 *benefits, and disability support can prevent chronic diseases.*

23 Since the 1970s WHO and a plethora of other organizations have called for intersectoral,
24 whole-of-government approaches to promoting health, including social protections. Why aren't
25 they being implemented?

26 In practice these approaches are politically difficult to achieve. One problem is that people
27 working in the health system often try to engage other sectors as a mendicant: 'Please education,
28 will you help promote health? Please agriculture, will you realize that your subsidies are worsen-
29 ing health? Please finance ministers, will you invest in the public health system?' Studies show that
30 intersectoral action is most likely to happen when there is clear mutual benefit and clearly defined
31 roles about who should take the lead (281). It sounds obvious, but rarely happens. Perversely,
32 incentives mitigate against it. Organizations are too busy with their own agendas; there can be
33 countervailing arguments and vested interests; and leaders in public health, protecting their own
34 fiefdoms, might be reluctant to give up responsibility to a different part of government.

35 *Clue 8: Activities to prevent chronic diseases across multiple sectors are most likely to occur when*
36 *there are clearly defined roles for each group, mutual benefits, budgetary support for planning, and*
37 *an institutional basis for engagement.*

38 How do we choose appropriate interventions? Cost-effectiveness 39 versus community-driven approaches

40 Thus far we have covered interventions ranging from individual medical therapy to the global
41 legal frameworks. The next logical question is how can we implement the most effective interven-
42 tions to save the most lives and reduce suffering?

43 The pursuit of an answer dominates thinking in public health, but it is actually not the question
44 driving public health policy. Instead, the issue most central to people in power tends to be: 'how
45 can we save the most lives at low cost?' and 'how do we decide which few among the range of
46 interventions to implement?'

1 Here we return to the debate about Selective Primary Health Care, as its reliance on the
 2 technology of cost-effectiveness embodies this policy tradition. Building on its successful drive to
 3 help eradicate smallpox in the 1970s, the Rockefeller Foundation launched a project, Good
 4 Health At Low Cost, in the 1980s to identify why some countries were doing better with fewer
 5 resources (cajoled as ‘Good Health In Spite of Poverty’ (282)). The project, led by the architects
 6 of Selective Primary Health Care (283), concluded that poor countries simply could not afford
 7 PHC on the basis of cost-effectiveness considerations:

8 The selective approach to controlling endemic disease in the developing countries is potentially the
 9 most cost-effective type of medical intervention. On the basis of high morbidity and mortality and
 10 of feasibility of control, a circumscribed number of diseases are selected for prevention in a clearly
 11 defined population. Since few programmes based on this selective model of prevention and treatment
 12 have been attempted. The following approach is proposed. The principal recipients of care would
 13 be children up to three years old and women in the childbearing years. The care provided would be
 14 measles and diphtheria-pertussis tetanus vaccination for children over six months old, tetanus toxoid
 15 to all women of childbearing age, encouragement of long-term breast feeding, provision of chloro-
 16 quine for episodes of fever in children under three years old in areas where malaria is prevalent and,
 17 finally, oral rehydration packets and instruction.

18 This emphasis on deciding what to do to promote health based on economic considerations
 19 was not new. It could be traced back to the period of resource scarcity during the Great Depression.
 20 Policymakers wanted to know how to do more with less money. Methods for answering these
 21 questions, to show how much public investment returned to society, were originally developed in
 22 departments of defence, but soon extended to all areas of the public sector.

23 In the WHO’s 2000 World Health Report the cost-effectiveness paradigm played a central role
 24 in judging the performance of medical care systems. Three main criteria were employed: effec-
 25 tiveness, responsiveness and fairness of financing. Central to the values informing the WHO
 26 report’s model and vision of healthcare systems were studies of cost-effectiveness. According to
 27 this view, the role of healthcare systems was to provide healthcare services that could help the
 28 most people at the lowest cost. As the lead author stated, ‘our emphasis is not on more money for
 29 health but on more health for money’ (284).

30 To assist this process of choosing appropriate interventions, the authors of the WHO World
 31 Health Report created a metric to evaluate health systems along multiple indicators of
 32 service performance. However, by collapsing numerous difficult-to-assess statistics into one
 33 common health system indicator, the WHO report resulted in some difficult results to interpret.
 34 Haiti’s health system was given the same ‘score’ as China’s, and several systems experiencing
 35 significant patient complaints, access deficits, and poor patient outcomes received high scores
 36 without it being clear what factored into such a score. Spain, ranked surprisingly high, was at the
 37 time experiencing civil riots in response to its poor quality of healthcare (285).

38 The WHO report came under vigorous critiques from both the left and right, with the most
 39 significant of which were by Vincent Navarro, focusing on the values expressed in the report’s
 40 measurements and methods. First, the report’s measure of effectiveness was based on health; but
 41 the greater health was viewed as an indicator of better healthcare, an assumption which cannot be
 42 made (see Chapter 2 and discussion above). Second, the report’s measure of responsiveness led to
 43 a radical shift of planning from people’s needs to market demand. It focused on responsive
 44 consumers in the market, driving up quality in healthcare. Thus, the US was deemed the most
 45 responsive healthcare system. As the report stated, countries should give more importance to
 46 reforms that aim at ‘making money follow the patient, shifting away from simply giving providers
 47 budgets, which in turn are often determined by supposed needs’ (222, 285). Third, the report
 48 judged fairness by the percentage spent on healthcare by different income groups. According to

1 such a measure, massive inequalities could persist in a ‘fair’ system, such as when the poor in
 2 Brazil spend 10% of their income (a few US cents) and the rich spend 10% (amounting to several
 3 million dollars). While the report acknowledged that regulating the private sector was an impor-
 4 tant challenge facing health systems, it advocated a regulatory model put forward by Enthoven
 5 (who inspired the Thatcher-era privatization reforms).

6 The focus on cost-effectiveness in Selective Primary Health Care is sometimes used to legiti-
 7 mate a focus on infectious diseases. It is often argued that treating chronic diseases are too costly
 8 compared with infectious diseases. For example, World Bank authors argue that if chronic disease
 9 are seen as consequences of affluence and old age and are expensive to treat given their very
 10 chronic nature, we should not bother with them conditions at all. People see how expensive
 11 cardiac care is in rich countries, hear about how they are breaking the bank, and wonder how it
 12 could possibly be contemplated in poor countries. At the same time, people see countries like
 13 Cuba put an emphasis on developing advanced tertiary care, yet at times lack basic equipment,
 14 like surgical gloves.

15 However, even working within a cost-effectiveness paradigm, the common assertions that
 16 chronic diseases are too costly to treat are untenable. Two types of economic studies reveal this:
 17 cost-effectiveness and cost–benefit analysis. (Others exist, such as broader measures of cost-utility
 18 analysis, but we bracket them here.) These typically assess the cost per unit of health benefit,
 19 typically in disability- or quality-adjusted life years. One commonly used international threshold
 20 says that an intervention is cost-effective if it saves one disability-adjusted life year at the price of
 21 \$30,000 USD. Another one that is applied regards an intervention to be a good buy if it saves one
 22 disability-adjusted life year for less than a country’s average income per capita.

23 Nearly all of the interventions discussed above are as, if not more, cost-effective than many avail-
 24 able infectious disease interventions (286). In fact, some of them are among the most affordable
 25 and cost-savings strategies available to politicians. Tobacco and alcohol taxes, for example, can be
 26 a clear win-win: reduced healthcare costs, increased government tax revenues. (The situation is
 27 slightly more complicated in countries which export tobacco as part of the trade specialization
 28 model discussed in Chapter 2.) Several medical interventions are cost-effective, including tobacco-
 29 cessation programmes, contextually appropriate mass-media education campaigns to improve
 30 diet, community-based physical activity programmes, and secondary prevention through pharma-
 31 cological interventions (such as the diabetes reduction programmes). Many of these are below US
 32 \$1000 per disability-adjusted life year saved. Salt reduction to levels recommended by WHO are
 33 estimated to cost about US \$0.04–0.32 and prevent about 8.5 million deaths over 10 years (287).

34 Yet, the net costs are sometimes disputed. Some critics argue that reducing a risk factor will
 35 extend life, leading to an overall rise in the medical care a person consumes. Countering this argu-
 36 ment, it was proposed that by reducing the degree of sickness a person experiences (morbidity),
 37 that overall costs would be lower. Firing back, other people question this model, wondering
 38 whether it is realistic for people to live healthy lives until they reach to their average lifespan, then
 39 go out like light bulbs—the most affordable way to die (28).

40 Sometimes there is great difficulty in estimating the full costs and benefits, more of an art than
 41 a science. How do you count the costs of agricultural policies that subsidize unhealthy foods?
 42 They help farmers, but harm public health. How do you quantify people’s lost freedom, in terms
 43 of changes in market choices, or altered property values when commodity prices change? How do
 44 the spin-off benefits, such as better education when children eat healthier foods, get included in
 45 the equation? Another challenge is figuring out what is the alternative scenario. Is the drug cost-
 46 effective to not treating patients at all or once they have reached an advanced stage of disease?
 47 Often these latter scenarios are the case in resource-deprived countries.

1 As another example, school-based education interventions are often estimated to be ineffective
 2 in cost terms because they take decades for the health benefits to accrue. Does it make sense to do
 3 nothing to protect children because it is simply cost-ineffective? Cost-effectiveness, with its focus
 4 on immediate impacts, has a bias towards downstream, medical interventions and magic-bullet
 5 policies or medicines, rather than focusing on structural reforms to the societal risks that increase
 6 people's risk in the first place.

7 Returning to the World Health Report, the emphasis on 'more health for money' over 'more
 8 money for health' mistakenly treats these two approaches as a zero-sum game. In fact, choosing
 9 a strategy that initially gets less health for money, such as helping children, could yield more
 10 money for health in the long run, both by saving money in the future and by creating political
 11 space to attract more resources (increasing the amount of money available for intervening, see
 12 Chapter 5). Further, squabbling over a small pool of resources, however scientific it might seem
 13 to practitioners of cost-effectiveness, could perversely make that pool of resources smaller, as
 14 policymakers may come to view public health resources being ineffectively allocated or scientifi-
 15 cally imprecise.

16 Debates continue; what is clear is that for every cost-effectiveness study, counterpoints will be
 17 raised and assumptions questioned. It is not as clear-cut a scientific means for selecting policy as
 18 its advocates would like decision-makers to believe.

19 *Clue 9: Taxes on tobacco, alcohol, and junk-food are among the most highly cost-effective interventions*
 20 *available and typically are cost-saving because they generate revenue.*

21 *Clue 10: Regulations to reduce salts, sugars, and fats are also highly cost-effective.*

22 *Clue 11: Defining the costs, effects, and counterfactual in cost-effectiveness studies is a difficult task*
 23 *which involves many assumptions of debatable validity.*

24 *Clue 12: An overemphasis on cost-effectiveness as a decision-making criterion can result in the neglect*
 25 *of interventions that can yield significant benefits in the future (such as prioritizing immediate,*
 26 *quick-fix approaches over longer-term early childhood interventions).*

27 *Clue 13: Despite clear evidence that chronic disease interventions are highly cost-effective, it cannot*
 28 *be assumed that they will work in resource-poor settings.*

29 **Community-based, -participatory, and -driven interventions**

30 The inverse of the cost-effectiveness paradigm, whereby a set of Western scientists define the
 31 costs, effects, and set of appropriate interventions in a fixed budget, is the classic PHC mantra—
 32 power to patients and their communities. This tradition has been most visibly taken up by a
 33 growing body of work on community-driven interventions (288). Rather than focusing on
 34 pre-conceived models developed outside of communities by Western experts, community-driven
 35 approaches recognize that those most affected by disease also have their own thoughts, opinions,
 36 and locally-contextualized perspectives about how to reduce their risk.

37 We regard community-driven interventions as an illustration of liberatory medicine because it
 38 enables communities to define their needs and methods for solving problems, while working
 39 closely with experts in public health and medicine. While community participation has become a
 40 buzzword in development circles, this generally involves focus groups or a survey incorporated
 41 into the planning of an already-developed development programme. In contrast, true participa-
 42 tion actually involves giving community members the power to describe the ideas behind
 43 programmes, their logistics, and evaluation (i.e. community-driven). Few community driven
 44 interventions have been tried. However, community-based interventions, with elements of

1 community participation, have been applied to a range of health issues, spanning individual
2 medical treatment to underlying social determinants of health (289).

3 Often touted as the first and most effective chronic disease population intervention to date, the
4 Finnish North Karelia project exemplified important features of the community-based
5 participatory model (there is debate about the extent of community participation in the design of
6 the project). Giving voice to communities, the public health community employed mass media,
7 education, community organizing, and environmental change to identify and act on the causes of
8 CVD. From the programme's start in 1972 to long-term follow-up in 1995, the community of
9 North Karelia experienced reduction in mortality rates due to CVD by three-quarters among
10 working-age populations, a remarkable outcome. However, the apparent success of North Karelia
11 has been critiqued. Its community's rates of decline in CVD were similarly experienced in other
12 regions of North Karelia and occurred in periods of economic downturn and stagnation (290)
13 (see Chapter 2).

14 Shortly after the early effects of the North Karelia Project were reported, several well-known
15 community-based interventions took place in the US including the Stanford Five-City Project,
16 the Minnesota Heart Health Project, and the Pawtucket Heart Health Project, although, unlike
17 North Karelia, they were mainly education interventions applied at the community level. These
18 projects failed to reproduce the apparent success of the North Karelia project. While strategies
19 focused on education, mass media campaigns, community organizing, and social marketing,
20 results encouraged alternative methods for accelerating change. Final reports from Minnesota
21 Heart Health Project and Pawtucket Heart Health Project suggested the potential benefits of
22 partnering the education and social marketing used in their studies with structural strategies
23 focused on macro-oriented policy and environmental changes. Drawing insights from these
24 successes and failures of community programmes, WHO began recommending that community-
25 based approaches integrate policy and environmental changes with education and social market-
26 ing. The most recent and important example of this approach is the PepsiCo Foundation (initially
27 sponsored by its subsidiary company, Dole) funded Shape-Up Somerville Project. Academics
28 teamed up with communities in diverse settings to seek community-defined ways to prevent
29 childhood obesity. The project team reported that the intervention community had less weight
30 gain in children over the 8-month study period (289). Another project in France, translated from
31 French as 'Together, let's prevent obesity in children', applied a community-based approach to
32 communicate the importance of healthy eating and active lifestyles, successfully reducing child-
33 hood obesity rates by 9% The programme is now being extended to 200 towns throughout
34 Europe and being applied in Mexico.

35 Nearly all community-based initiatives for chronic diseases have been in high-income
36 countries, with a few important exceptions we discuss here. Among the most cited examples in
37 middle-income countries are the Isfahan Healthy Heart Program in Iran and the Agita São Paulo
38 programme in Brazil (extended recently to some other Latin American countries). Both followed
39 a community-based approach (but were not led by the community) and emphasized structural
40 interventions, but in practice emphasized education-based modification of lifestyles, mainly
41 through promoting exercise and teaching people about how to make healthier food choices.

42 The Isfahan Healthy Heart Program, a comprehensive community-based program started in
43 1999 in Iran, a country known for its historical embrace of PHC principles (291). Strategies
44 included a broad range of interventions from policy changes in food production to television
45 shows promoting physical activity, targeting both high-risk groups and entire populations.
46 After 4 years the Isfahan Healthy Heart Program achieved significant increases in the percentage
47 of individuals with a healthy diet and mean lifestyle score (a composite score combining smoking

1 status, nutrition, and physical activity levels); no significant change was reported individually for
 2 daily smoking, daily physical activity energy expenditure, or leisure time physical activity. Isfahan
 3 Healthy Heart Program applied a universal, predetermined package of specific interventions, but
 4 provided scope for tailoring the appropriate package to the needs, culture, and lifestyle of the
 5 community. For example, the community in Isfahan identified that the use of hydrogenated oils
 6 in cooking was a large contributor to consumption of trans fatty acids in the regional diet.
 7 Responding to these community priorities, Isfahan Healthy Heart Program included an emphasis
 8 on switching to healthier cooking oils, focusing on women.

9 Such small-scale approaches can deliver real change in resource-deprived communities. The
 10 second example is Agita São Paulo, meaning ‘Move São Paulo’ in Brazil’s São Paulo state.
 11 The programme is a multi-level physical activity initiative aimed at increasing the public’s knowl-
 12 edge of benefits of physical activity. Agita has widespread reach, with close to three-fifths of the
 13 population reporting having heard about the programme and over one-third knowing its pur-
 14 pose. Physical activity levels have increased because of the programme (292), which was also
 15 found to be cost-effective. The World Bank estimated that scaling it up could save one disability-
 16 adjusted life year for US \$247. The programme, described further in Chapter 7.4, is being extended
 17 throughout Latin America.

18 The programmes in Isfahan and São Paulo have resulted in significant improvements to public
 19 health, but aside from being focused on middle-income nations, the benefits within these coun-
 20 tries have been seen mainly among the more affluent sectors of society. The Agita programme has
 21 mostly benefited those who are employed, who have private insurance, are literate, or have access
 22 to schools. The Isfahan programme similarly has had relatively low efficacy among women, those
 23 with low educational status, and those who live in rural areas.

24 Projects are underway to assess whether community-based or community-driven prevention
 25 programmes can similarly reduce risks of chronic diseases. One example is Community
 26 Interventions for Health, an industry-funded project to design, implement, and evaluate inter-
 27 ventions in China, India, and Mexico. Using a mapping tool, the researchers collect and integrate
 28 information about the accessibility, availability, and affordability of dietary products, physical
 29 activity, and tobacco to identify ‘hot spots’ for intervention implementation. Community mem-
 30 bers and researchers work together to map environmental risks. This can help mobilize commu-
 31 nities around shared risks. For example, Chinese communities identified a need for labelling
 32 foods. Together with the Community Interventions for Health-China team, community mem-
 33 bers began building a case for intervention, lobbying governments, and has now partnered with
 34 government authorities to design and implement a national food labelling scheme.

35 Despite gaps in the evidence base, this process of community-led decisions about what to do
 36 and how to do it, in combination with experts who experiment and replicate policies while help-
 37 ing accumulate evidence, is one way how resource-limited communities can address the rising
 38 burden of chronic diseases while building a more equitable society.

39 *Clue 14: Innovative projects that begin in low-income communities can spread to high-income*
 40 *settings and vice-versa.*

41 *Strategy 7: Community-led decisions about what interventions to do and how to implement*
 42 *them, in combination with experts who experiment and replicate policies while helping build the*
 43 *evidence base, can effectively address the rising burden of chronic diseases at low cost in resource-*
 44 *poor communities.*

45 In the next section, we describe the logistics of how to implement community-driven interventions
 46 in a resource-poor setting.

1 **Putting it all together: a global agenda for local** 2 **programme development**

3 We return to the first chapter, where we described the risk to women of COPD in a small South
4 Asian farming community. This story provides several important lessons about how to manage
5 chronic diseases in resource-poor settings, from identifying the leading causes of avoidable death
6 to intervening using community-driven, cost-effective strategies.

7 **Identifying local causes, priorities and solutions—community** 8 **epidemiology**

9 It should not be assumed that because the US and Europe have had greater familiarity with
10 chronic diseases, their models of intervention are necessarily the most appropriate in other
11 settings. In most of the world, COPD is a result of tobacco smoking. Yet, in this agricultural
12 community, the main cause was indoor air pollution.

13 Had the doctors simply emphasized a narrow set of interventions, such as smoking bans or
14 tobacco education efforts as in the US and Europe, they would have failed to address the majority
15 of COPD cases. Tapping community-specific knowledge was a crucial step to identifying the local
16 causes of disease. Investigating community-specific risks and potential interventions involves
17 taking a close look at the daily realities of the risks and living experiences of patients.

18 Community epidemiology overcomes the false dichotomy of ‘rich country versus poor
19 country’ solutions, often limited funding for poor communities under the premise that quick-fix,
20 easy-to-do interventions are ‘appropriate technology’ for the poor, whereas comprehensive
21 interventions can only be done in rich nations. Rather, such an approach is needed to support
22 groups ranging from a rural community in South Asia to diabetic patients in the Bronx to slum
23 dwellers with high rates of CVD in Cape Town.

24 *Strategy 8: Community-based approaches offer one possible way to tailor investigations of chronic*
25 *disease causes and their management to individual communities.*

26 **Addressing the structural causes of poor health**

27 The most commonly implemented public health interventions in resource-denied communities
28 do not affect the balance of resources, but merely provide educational messages. If the physicians
29 in the South Asian example solely lectured women on the risk of smoke inhalation, as opposed to
30 building chimneys above their stoves, could we have expected a reduction in COPD rates in their
31 community?

32 Many of the poorest people affected by chronic diseases are also exposed to risks, such as smoke
33 and stoves that cause respiratory disease, that are inescapable in the context of poverty. Addressing
34 these factors grounded in the daily realities of poverty requires material resources, such as greater
35 access to improved household appliances, power, or agricultural technologies (to avert ‘slash
36 and burn’ agriculture or incineration of trash, two sources of daily smoke inhalation in poor
37 communities).

38 Greater reductions in chronic disease rates among poorer households have been observed when
39 actual resource allocations to the poor have increased, permitting greater freedoms to control
40 one’s lifestyle. For example, the Oxford Health Alliance’s Community Intervention for Health
41 programme targets not only education, but also changes to living and working environments,
42 such as building exercise facilities in public parks, and changing economic incentives by reducing
43 taxes on healthy foods and creating farmers’ markets. These have established greater efficacy in
44 four field trials than education-only interventions.

1 *Strategy 9: Reverse-engineering the development of unhealthy societies can have a much greater*
 2 *impact on health than information and education interventions that ask individuals to adapt to*
 3 *unhealthy circumstances.*

4 **Defining the means and ends of community-based programmes**

5 The starting point of intervention is often unrealistic. The health fantasies to reduce the burden
 6 of disease by 90%, albeit often cited, provide little help in practice. WHO's broad definition of
 7 health has been critiqued as 'utterly unrealistic'. As one former director of Médecins Sans
 8 Frontières put it: 'For WHO, health does not consist of the absence of disease or handicaps; it is
 9 the state of complete well-being, physical, mental, and social . . . It has nothing to do with the
 10 concrete world, with real people, with actual diseases, or with typical expectations about health'.

11 It is crucial to set out specific policies for achieving specific goals. Even when these ideas are set
 12 out, however, they can be the subject of dispute. One concrete perspective was recently elaborated
 13 by Dr Giles (a pseudo-name has been used to conceal the identity of the doctor) of the Rockefeller
 14 Foundation, arguing that 'Our goal . . . is not to achieve immortality, or to extend our lives
 15 beyond normal ranges'. He pointed out that in spite of great advances to living conditions and
 16 medical technology people over the age of 65 are not living much longer than they have before.
 17 Instead, more people should have an opportunity for a reasonably long life, instead of dying too
 18 young from avoidable causes, so that the average lifespan increases. He continued:

19 'Our objective is that we can prevent diseases for the duration of a normal lifetime. That is, we can
 20 be born and experience a good childhood, a healthy young adulthood, and be free of disease until a
 21 reasonably old age, when our bodies should arrive at a point where they essentially fall apart and we
 22 disappear instead of being a burden. And at this achievement of medical research, this prevention of
 23 the diseases we now face, we will be saving millions of dollars in averted medical bills along the way'.

24 This is an extreme version of a goal referred to as the compression of morbidity (see Chapter 1),
 25 which aims to reduce the period in which people suffer before dying. According to it, people will
 26 live to their natural age, then, as one epidemiologist said it, 'drop like flies' (28).

27 One fallacy in Dr. Giles' statement is the oft-cited claim that primary prevention will save
 28 money. In reality, averting diseases among youth and young adults may avert those immediate
 29 costs, but people will become ill of other diseases at older ages, contributing other costs, often
 30 more expensive costs. We may prevent measles in infants, and TB in young adults, but then these
 31 saved lives will face heart disease after retirement or cancer and strokes when elderly. Unsurprisingly,
 32 a series of studies have found that reducing obesity, over the course of a lifetime, noting 'prevention
 33 [is] no cure for rising healthcare expenditure' (293).

34 We could attempt to create massive cost-effectiveness studies to determine exactly what to do,
 35 but the metrics of quality-adjusted life years and disability-adjusted life years that we calculate to
 36 generate these studies are highly subject to judgement and modelling assumptions, often lacking
 37 statistical validity or reproducibility among researchers, particularly when they are manipulated
 38 to show that the researchers' own intervention is necessarily cost-effective (as described in
 39 preceding sections).

40 Rather than focusing on cost-effectiveness and lifetimes, one goal is to reduce the avoidable
 41 suffering resulting from disease through a community-specific focus. From this perspective,
 42 saving money is not its own virtue; rather, we will spend money, but can do so reasonably, with
 43 the reduction of human suffering as our goal. Just as with education, public health is 'sunk cost'
 44 whose benefit will not be reaped in direct economic results, but only in diffuse community-wide,
 45 long-term ones. Some of the money may go to primary prevention, but we must acknowledge the
 46 limited efficacy observed among primary prevention initiatives. People will get sick, and our goal

1 must include mitigating the severity of their disease and the suffering that results from it, for both
 2 themselves, and their families and communities. Diabetic patients often lose limbs, or die prema-
 3 turely, adversely impacting upon their ability to act as parents, as employees, and as contributors
 4 to community life. Individuals addicted to tobacco regularly spend money on cigarettes that
 5 would otherwise go towards education of themselves or their family members, and towards better
 6 quality housing, food, or social opportunities (see Chapter 3).

7 *Clue 15: People will get sick no matter what we do.*

8 *Strategy 10: One key goal of interventions is to reduce the levels of avoidable and unfair suffering due*
 9 *to chronic diseases (as often indicated by social inequalities in health).*

10 If we adopt this perspective that our goal should be to reduce the avoidable suffering resulting
 11 from disease through a community-specific focus, how can we develop chronic disease preven-
 12 tion and management programmes in settings that have been denied healthcare resources?

13 **Building on commonalities in managing non-communicable and** 14 **infectious diseases among the rural poor**

15 What practical steps should we take to construct and administer chronic disease management
 16 programmes? What should be the focus of such programmes, who will administer them, what
 17 will be their day-to-day operations, and how will we know if they're effective?

18 These questions are increasingly being posed to a growing body of 'operations researchers',
 19 who make a living by testing projects in many different communities. An abundance of acronyms
 20 for new programmes, claims about which projects are 'models', and competing publications
 21 and pamphlets have appeared from dozens of agencies, non-profit, and institutional groups.
 22 The result has been a complex web of instructions about how we should proceed in a diverse mix
 23 of environments and populations. Unfortunately, little of this knowledge provides practical guid-
 24 ance about how to address chronic diseases among the world's most deprived communities.

25 At the time of this writing, most interventions for chronic diseases have demonstrated limited
 26 efficacy and been subject to testing over only short durations. Of these studies, most have been
 27 conducted in high-income and middle-income countries; only a few have been done in urban
 28 locales of poorer countries, and rarely include the rural poor who constitute the majority of the
 29 world's population and the largest population facing chronic disease risks.

30 The most widely-studied models of disease prevention and care for the rural poor focus on
 31 managing infectious diseases. In the cases of TB and HIV treatment, these serve as potential tem-
 32 plates for chronic disease, as these conditions are effectively chronic. TB treatment requires at
 33 least 6 months of daily therapy, and HIV treatment currently involves a lifetime of therapy.
 34 Diabetes and pulmonary disease treatment, and the care of many chronic heart diseases, share
 35 these requirements. The most commonly assessed form of therapeutic delivery in the community
 36 is DOTS, in which patients are supervised during daily administration of medications. Several
 37 DOTS programmes achieve among the highest treatment success rates in impoverished settings
 38 for both HIV and TB.

39 Many successful community-based infectious disease programmes rely on community health
 40 workers to deliver care. Rather than a more paternalistic focus on daily supervision in a clinic,
 41 these programmes appear oriented towards delivering care near or at patients' homes, reducing
 42 the transportation and associated cost barriers to adhere to sometimes complex medication regi-
 43 mens. They also provide a daily nursing supporter who can provide emotional, informational,
 44 and psychological support to patients through the course of illness.

45 Community health worker programmes are commonly used not only for TB and HIV therapy,
 46 but also for maternal and child health programmes, the treatment of basic respiratory infections,
 47 and malnutrition or diarrhoea treatment programmes. Why not chronic diseases?

1 The advantage of this approach is that it is already being introduced rapidly and extensively
 2 into the poorest rural populations on all continents. As a result of the extensive initiatives to
 3 introduce ART and TB therapy into poor communities, community health workers are trained
 4 and deployed in hundreds of settings, often with carefully coordinated systems for ongoing train-
 5 ing, payment, retention, and evaluation. To create a parallel system for chronic diseases may be a
 6 waste, particularly as the same households faced by infectious diseases and maternal and child
 7 care problems addressed by community workers are often the same households facing the burden
 8 of chronic diseases.

9 The most effective community health worker programmes in sub-Saharan African countries
 10 have revealed that they are most effective when providing preventative services. Health education
 11 alone appears to strip community workers of respect in the community and autonomy, whereas
 12 permitting them to deliver medical treatments with some visible curative potential, as simple as
 13 oral rehydration salts, bolsters their community position and, as a result, long-term sustenance of
 14 delivery programmes.

15 There has long been a mantra that the rich countries get doctors; poor countries get community
 16 health workers. An important caveat is that community health workers do not replace qualified
 17 medical practitioners, but rather serve as an auxiliary to existing health clinics and hospitals. This
 18 frees up time for doctors to focus on specialized tasks, while allowing for community-based follow-
 19 up treatments, medication dispensation, earlier diagnosis and triage. This is especially important
 20 to dispersed rural populations who would otherwise face barriers to accessing care and pharma-
 21 ceuticals required for managing chronic disease on a daily basis.

22 All countries, rich and poor, can take advantage of the potential to mobilize community health
 23 workers to respond to the challenge of chronic diseases in unhealthy societies. Their involvement
 24 can help transform healthcare systems to a preventative, patient-centred delivery system—
 25 a chronic care model—of long-term care.

26 *Strategy 11: Community health workers can be mobilized in both rich and poor settings to deliver*
 27 *chronic care that is tailored to the needs of communities.*

28 **Keeping track: creating the metrics for good outcomes**

29 Irrespective of how chronic care is delivered, it is vital that programmes are responsible to the
 30 communities they serve. Part of this responsibility is to evaluate their performance and improve
 31 critical deficits in service. In the current era of Millennium Development Goals, cost-effectiveness
 32 analyses, and complex health system indicators, most metrics of health programme performance
 33 are far removed from actual day-to-day logistical concerns of clinical and public health services.
 34 While complex metrics may be useful for detailed epidemiologic analysis, they risk being
 35 fundamentally undemocratic and excluding communities in shared efforts to improve local
 36 programmes and care services.

37 Simple, easy-to-measure metrics, which can be collected and understood by healthcare workers
 38 with potentially limited educational backgrounds, are likely more appropriate. For example,
 39 syndromic surveillance by tracking basic symptom complaints, number of vials of drugs used,
 40 number of clinic visits attended, number of times visits were missed due to transportation costs
 41 or other issues, can serve as replicable indicators of how well a home-based diabetes or COPD
 42 programme is working. The key to such simple indicators is that they provide a constructive criti-
 43 cism of programme logistics, so that their presentation at community meetings or to community
 44 health staff provides a clear indication of where programmes must improve from year to year.

45 For those regions with more extensive infrastructure, laboratory-based programme indicators
 46 can be used to track individual patient outcomes, such as the change in the haemoglobin A1c of
 47 diabetic patients or spirometry ratings among COPD patients (clinical indicators of disease control).

1 But there are rarely indicators of programme performance at a population level for chronic diseases;
 2 usually full prevalence studies, requiring extensive resources and are rarely if ever performed, are
 3 used to track population disease status. Household surveys of laboratory indicators not only
 4 monitor individual patient performance, but also provide a sense of the population-level changes
 5 in risks of time. For example, cross-sectional surveys of the haemoglobin A1c levels among
 6 randomly chosen households over time can provide a population-level indication of diabetes
 7 control. Community spirometry clinics, similarly, can track lung disease outcomes, just as blood
 8 pressure clinics at markets can obtain random comparable samples to evaluate prevalence of
 9 hypertension in a community.

10 *Strategy 12: Community-based epidemiologic approaches can keep track of successes and failures*
 11 *using simple metrics so to create awareness of chronic diseases, identify emerging needs, and ensure*
 12 *responsibility to communities.*

13 Summary

14 All scientific work is incomplete . . . That does not confer upon us a freedom to ignore the knowledge
 15 we already have, or to postpone the action that it appears to command at a given time.

16 Austin Bradford Hill, 1965

17 In public health, debates have long occurred about the merits of upstream and downstream
 18 approaches. What good is it to heal an ill person but send them back to the environment that
 19 made them sick in the first place? Approaches that focus on unhealthy environments can help
 20 make it easy for people to be healthy (while doing nothing continues to make it more difficult for
 21 people to be healthy).

22 It seems sensible that any comprehensive control strategy must focus on prevention. There is,
 23 unfortunately, little evidence that individual interventions can be scaled up to improve the health
 24 of populations. This is because the real world is often not like clinical settings. Here the lack of a
 25 biological model, as discussed in Chapter 1, and the lack of a theoretical model of human behaviour,
 26 can mean that even the most efficacious interventions may be ineffective or lead to unintended
 27 consequences when applied to an entire population.

28 Part of the problem is that we often falsely leap to the conclusion that the prevention of NCDs
 29 is a matter of education. This assumes a great deal of agency and choice among the affected popu-
 30 lation. When designing interventions for poorer members of a community, such as the women
 31 affected by indoor air pollution, we must recognize the constraints to human behaviour. Structural
 32 interventions that have directly targeted the burdens of living in poverty and stresses associated
 33 with it have been observed to have the greatest effectiveness at mitigating tobacco and alcohol
 34 (and other drug) use among the poor.

35 Instead, some of the most promising (and low-cost) interventions require reverse-engineering
 36 some of the changes in society that have led more people to become ill. Taxes and regulations are
 37 the two most powerful levers of public health interventions, helping make healthy choices the
 38 easy choices.

39 Urban planning can also harness uncontrolled forces of rapid urbanization, but requires fore-
 40 sight by policymakers as well as public resources and investment. The benefits could be substan-
 41 tial over the long run, redesigning societies to be safer, have a stronger sense of community, and
 42 resources for being healthy. Unfortunately, this needed public capacity to wrestle back control of
 43 social development and provide public goods like parks has been crucially lacking in resource-
 44 deprived countries, precisely where the fastest and most dangerous urbanization of poverty is
 45 taking place (a point returned in the country case studies of Chapter 7).

1 Many of the approaches described above seem clearly beneficial and easy to do. However effective and cost-effective they appear, they face opposing vested interests and formidable political barriers. It cannot be assumed that interventions are simple to do when vested interests stand to lose profits from them. Even the most basic interventions, such as tobacco control, have proven to be extremely challenging. At every juncture, industry attempted to frustrate the expansion of effective public health policies to tax and ban cigarettes. So far, by supporting an elaborate system of smuggling and new, unregulated tobacco products, they have been able to stay a step ahead of public health. In cases where there has been political support, it is unclear that actual action on the ground occurs. When health information campaigns were implemented to raise awareness among youth about risks of tobacco, the industry attempted to frustrate efforts at all turns, making it seem 'cool' to engage in an unhealthy behaviour. With regard to food and alcohol we are at the early stages of a much longer process to catch up.

2 How do we choose among the range of possible interventions?

3 One option is for scientists to define the costs, effects, and set of appropriate interventions in a fixed budget. Usually the criterion is cost-effectiveness. It is not so clear-cut as a scientific criterion for choosing policy as its advocates would like decision-makers to believe. For example, choosing a strategy that initially gets less health for money, such as helping children, could yield more money for health in the long run, both by saving money in the future and by creating political space to attract more resources (increasing the amount of money available for intervening, as discussed in Chapter 5 in summaries of strategies used to prevent HIV).

4 An alternative strategy, embodying the principles of PHC, is to let communities decide. Only by undergoing a process of self-determination, jointly with experts, can lasting change be achieved, breaking the cycle of dependency and illness. Analogous to the chronic care model as applied to doctor–patient relationships, participatory, community-based approaches aim to achieve a balance of power among experts and patients and their communities in sharing values and setting priorities.

5 Nonetheless, to our knowledge, no existing studies have compared actual chronic disease management programmes among the rural poor. Testing alternative models of programme delivery for chronic diseases in poor rural communities could help ascertain which logistical models of care delivery can have the greatest impact. These types of metrics are only now being evaluated in a few pilot projects—their results are still pending at the time of this writing. The sphere of testing and operations research remains largely empty and available for public health and medical researchers to engage with rural poor communities as they encounter NCDs.

6 Despite these remaining gaps in the evidence base, there is robust evidence that something can be done at reasonably low cost through community-led interventions. Experts will continue to squabble over the relative merits and cost-effectiveness of programmes. This is wasting time. The price of inaction on tobacco numbers billions of deaths. We can begin working with communities now. Treatment can lead to prevention; prevention can lead to treatment; there are many sequences to action. The key is to start.

7 Weak health systems add to the challenge of getting these programmes off the ground. Where there is little or no surveillance, interventions are like driving without a dashboard. With surveillance we can adjust our speed and fine-tune action. But this should not stop us from starting the process of joining with communities to decide key priorities, identify risks, and strategies for intervention, as experts help set up experiments, replicate them, and learn from their successes and failures while building the evidence.

8 The next chapter about the political economy of NCDs considers these substantial challenges to increasing the priority and action on NCDs, reviewing how past social movements have overcome these barriers to achieve remarkable improvements in public health.

1 Endnotes

- 2 1 This is not to be confused with liberation medicine, a different movement building on traditional healers
3 and religious practices of medicine combined with faith-based intervention approaches.
- 4 2 The programme is financed by JCDecaux Advertising, which invested nearly \$142 million in start-up costs,
5 in exchange for free advertising throughout the city of Paris (this is why rental costs can be kept so low).
6 However, costly problems that have been encountered include vandalism and theft.