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TOWARDS A SCIENTIFIC BASIS FOR HEALTH SYSTEMS

“Health systems should nurture a stronger culture of learning and problem-solving to tackle the major health challenges of our times. This could be achieved through a greater understanding of how the diverse elements within a health system interact with each other, and by finding innovative ways to solve complex problems.”

(Tim Evans)

KEY MESSAGES

- Health systems in the developing world face major problems related to shortages, maldistribution and waste of financial, human, knowledge and other resources, and coverage shortfalls. There is increasing recognition by major health initiatives that many of their efforts to improve health share the same common health system constraints.
- Despite acknowledgement of its importance and potential to overcome health system constraints, health systems research suffers from a poor image and has been neglected and under-funded compared to other areas of health research.
- Key research issues and knowledge gaps pertaining to human resources, financing, health information and delivery of health services must be addressed in the context of more emphasis on broader health systems strengthening.
- Based on a readiness to reach beyond traditional academic disciplines, innovations, new methodologies and better tools should be developed for health systems research.
- A substantial programme to support the

Interesting numbers

1 million	Estimated number of additional health workers needed if the MDGs are to be achieved in sub-Saharan Africa.
2%	Percentage of global health expenditure in Africa, which carries 25% of the global burden of disease. In contrast, 90% of global health spending is in developed countries with 20% of the world's population.
2%	Percentage of countries in WHO's Africa and South-East Asia regions that have complete coverage of death registration data, as opposed to 75% in the European region.
0.71%	Percentage of papers on the subject of health systems and health services research in the year 2000 based on a search of Medline.
0.1%	Percentage allocated to health systems research as a portion of total health expenditure in developing countries.

(Sources for these numbers are given on the report web site: www.who.int/rpc/wr2004)

development of a new paradigm for research to strengthen health systems is required in the near term if health systems are to perform more effectively and improve health outcomes.

2.1 BOTTLENECKS AND CONSTRAINTS IN HEALTH SYSTEMS

The major constraints and challenges currently facing health systems in the developing world include: workforce shortages, limited financing, scant or poor quality health information, shortfalls in coverage of essential health services, problems with quality, and inability to scale up rapidly (1). The major constraints in these areas will be elaborated upon in this section.

HUMAN RESOURCES

Although most health systems spend the majority of their funds on the health workforce, there is a paradoxical absence of policy or programmatic discourse on this critical resource. Moreover, the workforce has suffered from being regarded as a recurrent cost that is to be minimized, rather than as a valued asset of the system that needs to be enriched. The idea that health systems are unable to function without workers sounds remarkably obvious but the realization that the workforce is critical to saving lives is often taken for granted and/or ignored. Recent evidence (see Figure 2.1) suggests, however, that more health workers can be associated with lower infant, child and maternal mortality.

Despite their importance to health achievement, there is a growing body of evidence pointing to a shortage of about four million health workers globally (2). In sub-Saharan Africa, where this shortage is most pronounced (see

Figure 2.1 Relationship between mortality and health workforce

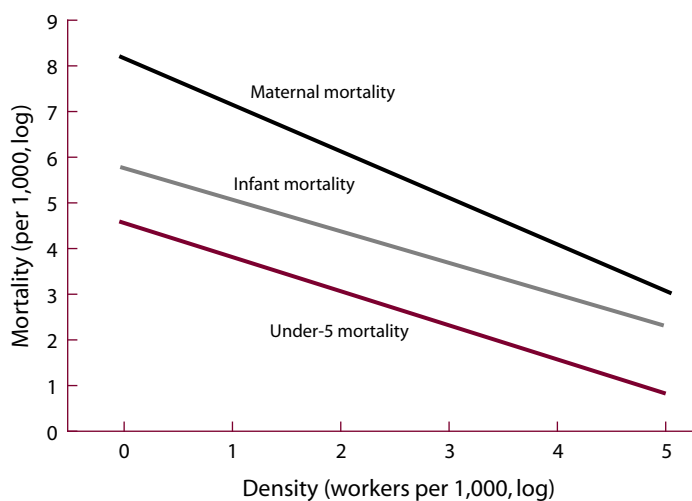
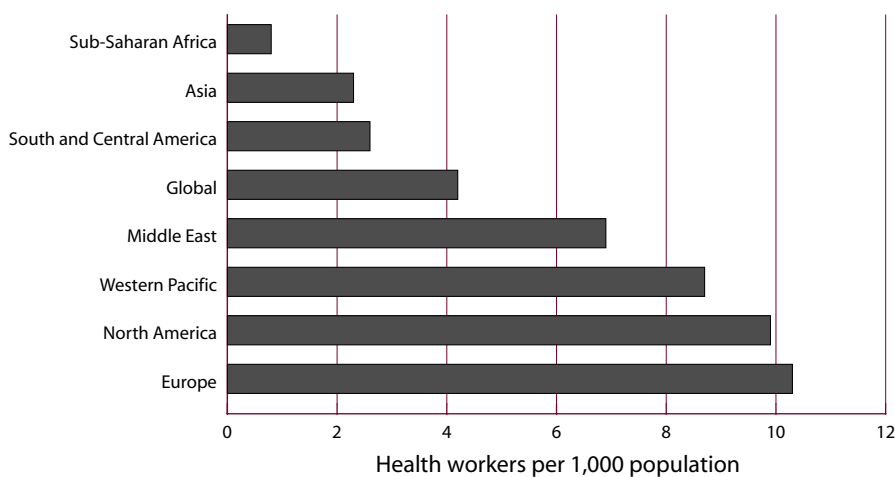


Figure 2.2), it is estimated that an additional one million health workers need to be mobilized if the MDGs are to be achieved. At the same time, countries in the Organisation for Economic Development and Cooperation (OECD), which represents much of the industrialized and developed world, are facing shortages of health workers too, mainly due to an expansion of the health sector. These shortfalls are being met increasingly by workers from poorer countries (3). In countries where health workers are already scarce, increasing migration is associated with the interruption of life-saving services sometimes referred to as “fatal flows” in the health workforce. The migration of health workers also occurs within countries (4) where nurses and doctors are lured away from the public sector by higher private sector pay, and the magnet of urban life depletes the workforce in rural areas.

Beyond these shortages, there are a number of factors that prevent health workers from having the best opportunities to improve health and alleviate suffering. Antiquated curricula in medical schools mean that professionals are often ill-equipped to respond to the needs of the population, creating a so-called “skills-gap”. The primary employers of health workers including governments, NGOs and the private sector often fail to provide “productive” working conditions. These range from irregular to inadequate pay, an absence of requisite supplies such as drugs and diagnostics, as well as a lack of incentives to encourage workers to serve in remote, isolated locations.

Finally, not enough is known about the demographics of health workers due to an absence of standard definitions for these workers and a lack of methods to accurately assess the size and composition of this workforce. Data on specific cadres such as community health workers or doctors and nurses working in the private sector, and breakdowns of these by gender, tend to be sketchy.

Figure 2.2 Health workforce by region



FINANCING

Not only a massive mobilization of human resources, but also substantial financial resources are needed for the health sector in a number of countries. The debate about achieving the MDGs for health in developing countries has raised questions about how big the health system needs to be to attain those targets. Various estimates within and across countries call for significantly more spending in the health sector. This recognition of the need to expand the health sector in poor countries along with the recent emergence of large international funds has raised fundamental questions as to whether the macroeconomic frameworks that have guided public spending across all social sectors in the past are appropriate for the health sector (5). Moreover, the availability of new funds raises new important issues related to the tracking of expenditures and the understanding of costs and benefits of alternative investments. Furthermore, the provision of treatment through new schemes, for example antiretroviral therapy for people living with HIV/AIDS, raises the issue of how the health system can sustain this expenditure in the long term.

Across most health systems, there is widespread agreement with the principle that a sick individual should be able to receive appropriate care without compromising their own or their family's livelihoods. Unfortunately, people in many countries have access to health care but only at great personal expense and, in many cases, they may be pushed into poverty. High levels of what is known as out-of-pocket payment can lead to financial catastrophe and impoverishment for many households. The proportion of households affected by this varies according to the health system characteristics of a country (6) (see Table 2.1). This poses an enormous challenge to develop fair ways of financing the health system. Despite considerable experience with alternative health financing schemes around the world, the prospects for measurable progress on this front are bleak, especially in the weakest economies. Sustainable financing of essential health services for the poor remains a major hurdle and many households struggle to pay for their own health care. One of the top priorities for health systems is to create a fair, long-term scheme to finance health systems. The ultimate goal would be universal coverage.

To help countries meet these challenges, it is important to find ways to routinely obtain information on key financing parameters. This includes information on how much is spent, by whom and for what, and whether households suffer catastrophic financial payments. It also includes information on the costs, effectiveness and implications for equity of using health resources in particular ways, something that is necessary to decide how best to achieve stated health system objectives.

HEALTH INFORMATION

On his first day of office in an address to staff of WHO, the new Director-General, Dr Lee Jong-wook, described health information as the "glue that holds health systems together". In remarks on the need to strengthen and integrate health information systems at country level, he noted that countries

Table 2.1 Out-of-pocket health payments, catastrophic payments and impoverishment, 59 countries, various years 1991–2000

Country	Share of households with catastrophic health expenditures (%)	Share of households impoverished by out-of-pocket payments for health (%)	Out-of-pocket payment share of total health expenditure (%)
Argentina	5.77	6.7	41.3
Azerbaijan	7.15	4.3	65.7
Bangladesh	1.21	3.4	53.7
Belgium	0.09	0.0	21.8
Brazil	10.27	5.1	61.3
Bulgaria	2.00	3.3	49.8
Cambodia	5.02	2.9	89.7
Canada	0.09	0.0	16.9
Colombia	6.26	3.3	41.5
Costa Rica	0.12	3.0	7.5
Croatia	0.20	1.2	9.5
Czech Republic	0.00	0.0	10.1
Denmark	0.07	0.0	13.7
Djibouti	0.32	1.8	39.2
Egypt	2.80	2.8	79.2
Estonia	0.31	3.7	20.2
Finland	0.44	0.1	25.7
France	0.01	0.1	11.5
Germany	0.03	0.0	10.2
Ghana	1.30	3.6	57.7
Greece	2.17	0.6	46.1
Guyana	0.60	5.1	22.8
Hungary	0.20	0.5	25.3
Iceland	0.30	0.0	20.3
Indonesia	1.26	1.7	76.8
Israel	0.35	0.4	24.0
Jamaica	1.86	5.0	29.3
Kyrgyzstan	0.62	0.4	36.2
Latvia	2.75	3.4	38.4
Lebanon	5.17	3.1	64.4
Lithuania	1.34	2.1	24.0
Mauritius	1.28	1.4	56.4
Mexico	1.54	1.3	43.2
Morocco	0.17	1.8	58.2
Namibia	0.11	1.2	10.8
Nicaragua	2.05	3.6	29.6
Norway	0.28	2.9	15.3
Panama	2.35	0.0	28.5
Paraguay	3.51	2.5	60.3
Peru	3.21	3.7	48.6
Philippines	0.78	2.7	48.5
Portugal	2.71	1.8	37.1
Republic of Korea	1.73	1.8	51.5
Romania	0.09	2.3	17.4
Senegal	0.55	2.0	70.3
Slovakia	0.00	0.1	4.1
Slovenia	0.06	1.6	11.3

continued

Table 2.1 Out-of-pocket health payments, catastrophic payments and impoverishment, 59 countries, various years 1991–2000 (continued)

Country	Share of households with catastrophic health expenditures (%)	Share of households impoverished by out-of-pocket payments for health (%)	Out-of-pocket payment share of total health expenditure (%)
South Africa	0.03	1.3	9.7
Spain	0.48	0.4	19.0
Sri Lanka	1.25	3.5	59.2
Sweden	0.18	0.3	19.0
Switzerland	0.57	0.1	16.8
Thailand	0.80	1.5	40.4
Ukraine	3.87	4.0	38.9
United Kingdom	0.04	0.2	4.6
United States of America	0.55	0.4	22.9
Viet Nam	10.45	7.7	80.8
Yemen	1.66	2.7	50.6
Zambia	2.29	1.9	47.8

Source: all variables estimated from households survey data, various years 1991–2000.

Reference: Xu K, Evans DB, Kawabata K, et al. Household catastrophic health expenditure: a multi-country analysis. *Lancet*, 2003, 362:111–117.

with the highest disease burden are the least likely to count births and deaths, and he concluded that “to make people count, we first need to be able to count people”. The “gold standard” of national registration systems currently covers only one third of estimated global mortality (1). Many countries cannot even count their dead (see Table 2.2).

As major initiatives get underway, such as the MDGs and the 3 by 5 strategy to provide antiretroviral therapy to 3 million people with HIV/AIDS by 2005, more information is needed on how to implement these programmes in developing countries. The many international and uncoordinated efforts to obtain this information represent the “perfect storm” that jeopardizes already fragile information systems in many developing countries (7). This is both a threat and an opportunity. From the potential destruction wrought by the storm rises an opportunity to reform and strengthen information systems. All key stakeholders must join forces to construct a robust platform through which quality information can flow in a more sustainable manner (7).

The aim of the health information system is to collect, process, report and use health information and knowledge to influence policy-making, programme

Table 2.2 Availability of death registration data in WHO Regions

Region	Usable data	Complete coverage	Total countries
Africa	4	1	46
Americas	32	14	35
South-East Asia	4	0	11
Europe	48	39	51
Eastern Mediterranean	7	4	22
Western Pacific	22	8	27
Total	117	66	192

Source: World Health Report 2003, World Health Organization.

action and research. In practice, country health information systems lack cohesion, having developed in a piecemeal way, fashioned by administrative, economic, legal or donor pressures. Responsibility for health information is sometimes spread across different ministries or institutions within a country. Special efforts are needed to ensure that the distribution of this information is coordinated properly and shared with the health sector.

Ministries and institutions, however, often resist coordinating this due to financial and administrative constraints. Counting births and deaths—a basic building block of the health information system—is generally the task of planning or interior ministries, rather than ministries of health.

Household surveys containing a wealth of health-related data are often carried out by national statistics offices and their links with health ministries are often weak. Data generated through the routine activities of health facilities, such as hospitals or clinics, may not be taken into consideration because this may be seen as being of low quality and having poor coverage. Moreover, in some countries the burgeoning private sector is often poorly regulated and does not provide essential data to the health authorities.

Into this already complex picture come new challenges to health systems and to health information systems. In the context of health sector reform and of decentralization, health systems are managed as closely to the population as possible, often at district level, in order to be more responsive to the needs of the people. This shift in functions between the central and peripheral levels generates new information needs and calls for an in-depth restructuring of information systems, with new requirements for collecting, processing, analysing and disseminating data. Interim reports on a wide range of health criteria as part of efforts to attain the MDGs to improve health in developing countries have exposed the weakness of country health information systems.

HEALTH SERVICES DELIVERY

The human, financial, information, and technical/material resources of a health system merge to provide health services. At present, this “merging” or in other words these “health services” fall far short of performance expectations of important health outcomes. Not only are populations in greatest need not receiving tried and tested treatment and medicines, but many health problems remain invisible. People who turn to the system for health care, sometimes at great personal expense, often fail to receive intended health benefits. This disappointing performance of the health system is of great concern and requires a more fundamental understanding of its complex determinants.

In many developing countries, the major health system constraint is the inability to rapidly scale up activities to meet contemporary health challenges. This is directly related to the broader issue of the organization of health services delivery and the tension that exists between single disease or vertical programme approaches and a more holistic approach to health-care delivery.

Ensuring equitable, universal access to health care—whether preventive, promotive or curative—is a key objective of health systems. Key constraints in

achieving this relate to low levels of coverage for many priority interventions, poor coordination and weak infrastructure. Conflicting agendas of donor programmes and diversion of trained workers into high-profile initiatives compound the problem in developing countries.

CONSTRAINTS IN THE CONTEXT OF MDGs

Efforts to achieve the MDGs pose special challenges to overburdened health systems. Table 2.3 lists the challenges and barriers to improving health service delivery identified in reviews of major health initiatives that attempt to make treatments for diseases like AIDS, tuberculosis and malaria—as well as vaccines and health information—more widely available (8). The table shows shortages of skilled health workers, lack of funds, shortages of medicines, inability to generate and use information, and inadequate public health information systems. Reviews of other programmes and initiatives dealing with noncommunicable diseases and injuries, for example, face similar systems constraints.

Current constraints facing health systems must therefore be seen beyond the lens of one specific health problem and more in the context of a need to consider broader health systems strengthening. There are increasing concerns that a singular emphasis on “vertical”, that is single-disease or single-intervention, programmes may no longer be adequate to deal with the entire spectrum of today’s global health challenges. The discourse involving major global health initiatives, such as Stop TB and 3 by 5, emphasizes their need to take into consideration the broader health system context, and to contribute to overall system strengthening (8). The increasing burden of noncommunicable diseases in the developing world, such as obesity, diabetes and cardiovascular disease, also underscores the need for broader, more comprehensive systems that are able to deal with the challenges of providing continuous care.

In recognition of this shift, broader health systems strengthening is a core principle of 3 by 5. To help developing countries achieve this goal, WHO has set up an HIV/AIDS and Health Systems Platform to complement other efforts in those countries to improve HIV/AIDS prevention and treatment.

This shift in emphasis to a more holistic approach poses some challenges for health services delivery as well as systems monitoring (see Section 2.4).

2.2 HEALTH SYSTEMS RESEARCH

Given the enormous challenges facing health systems today, a robust and sound research enterprise is critical in generating the knowledge needed to overcome these constraints. This area of research is referred to as health systems research.

WHAT IS HEALTH SYSTEMS RESEARCH?

Health systems research is defined as the generation and utilization of new knowledge to improve the way societies achieve their health goals. This may include the way they plan, manage and finance efforts to improve health, as

Table 2.3 Barriers and challenges to improving service delivery identified in reviews of major initiatives

	Maternal health	Child health	TB	Malaria	HIV/AIDS
<i>Community and household level</i>					
Demand-side barriers—individual: socioeconomic, gender effects on behaviour, access, use of care	✓	✓	✓	✓	✓
Demand-side barriers—community: absence of social pressures to improve access	✓		✓		✓
Stigma*	✓		✓		✓
<i>Health services delivery</i>					
Inequitable availability of services	✓	✓	✓	✓	✓
Multiple providers, public and private	✓	✓	✓	✓	✓
Provider behaviour to clients	✓	✓	✓	✓	✓
Case management: poor adherence, increasing drug resistance, adverse events	✓	✓	✓	✓	✓
Physical infrastructure, equipment	✓	✓	✓	✓	✓
Human resources availability and management, including payment mechanisms, quality of care, supervision	✓	✓	✓	✓	✓
Drug supplies, supply systems	✓	✓	✓	✓	✓
Service management capacity	✓	✓	✓	✓	✓
Referral and other communication failures	✓	✓	✓		
<i>Health sector policy, strategic management</i>					
High level political commitment to the specific problem or programme	✓	✓	✓		✓
Financial constraints, resource allocation	✓	✓	✓	✓	✓
Insufficient coordination between donors, non-governmental organisations, government bodies	✓	✓	✓	✓	✓
Regulation or legislation to affect both public and private actors	✓	✓	✓	✓	✓
Weak links between programmes leading to inefficiencies and competition for limited resources	✓	✓	✓	✓	
Sector-wide approaches, health-sector reforms	✓		✓		
Monitoring systems, use of information—public and private sector	✓	✓	✓	✓	✓
Public policies cutting across sectors					
Macroeconomic policies, poverty reduction strategies, civil service rules and reforms	✓	✓	✓		

TB = Tuberculosis

✓ Indicates challenge or barrier faced by that health priority

* Although stigma is not always perceived as a health-system issue, it is included here because health systems can reduce or increase stigma, depending on the way people are treated by providers and perhaps the availability of effective treatment.

Source: Travis P et al. Overcoming health systems constraints to achieve the Millennium Development Goals, *Lancet*, 2004, 364:900–906.

well as involving and engaging all interested sectors of society (9). Health systems research is essentially research that investigates strategies for improving health service delivery, including the use of sound evidence in developing such strategies and in shaping effective health policy. It may be applied both within institutions, communities and at district or national level.

TAKING STOCK OF HEALTH SYSTEMS RESEARCH

The need for more support and commitment to health systems research is not a new idea. The European Commission has been supporting health systems and policy research in developing countries through its International Scientific Cooperation programme, which was established in 1983 and is now known as INCO. These efforts have focused on socioeconomic factors, research for policy decisions, health care services intervention and research to action in reproductive health. WHO has been promoting the importance of health systems research for nearly 40 years (10) and had a dedicated Health Systems Research and Development Programme from 1989–1998 within its Division for Strengthening of Health Services. In the late 1980s, WHO even considered establishing a Special Programme on Health Systems Research and Development, following the model of Special Programmes on Tropical Disease Research (TDR) and Human Reproduction Research (HRP). Both TDR and HRP have also included health systems research in their portfolio of activities, especially those related to capacity building in countries.

The International Health Policy Programme (IHPP) was established between 1986 and 1998 and focused on establishing teams of researchers and policy-makers in developing countries (11). The World Health Assembly in 1990 recommended that WHO should integrate rather than compartmentalize health systems research and that “such an approach should include the appropriate components of WHO special programmes, national capacity building efforts, and an international health policy programme” (10). In 1996, a WHO report articulated a research agenda for health policy and systems development (12) addressing central issues of financing, public/private mix, decentralization, quality of health services and monitoring systems, among others. More recently, the Alliance for Health Policy and Systems Research (AHPSR), an initiative of the Global Forum for Health Research, was launched in 2000 to promote the generation, dissemination and use of knowledge for enhancing health system performance.

WHY HAS HEALTH SYSTEMS RESEARCH HAD A LIMITED IMPACT?

Why, despite these activities, and continuous acknowledgement of its importance, has progress in health systems research been slow?

As mentioned in Chapter 1, health systems research has traditionally been underfunded and relatively neglected compared to health and medical research in general. Also, it has largely failed to benefit from increases in investment in recent years for research into diseases of poverty. According to the most recent 10/90 Report on Health Research (2003–2004) (13), health systems research attracts less than one tenth of 1% of total health expenditure in low-income countries. Within the US National Institutes of Health, it has been estimated that less than 2% of the total research budget is allocated for health services research (14). In 1991, health services research accounted for only 0.27% of articles cited in Medline (9). This had increased to 0.71% in 2000 but still

represents a fraction of the total. Most of these articles were studies conducted in the developed world.

Health systems research has not always been successful in attracting the best minds, and seems unable to compete with scientific disciplines such as biomedical and clinical research which are seen as more glamorous and high-profile. Similarly, career prospects and advancement within academia seemed more limited for those choosing this career path. In large organizations dealing with health, such as ministries of health and WHO, administrative structures are often not conducive for allowing health systems research to flourish. Table 2.4 lists some of the possible reasons for this relative neglect including poor image, long timeframes, methodological constraints, context-specificity and inability to generalize, and difficulty in assessing the impact of the research (8).

As a scientific discipline, health systems research has not been successful in developing a frontier or cutting-edge image and has, at the same time, also had difficulty in bridging its more fundamental components with the more applied, problem-solving objectives. Importantly, health systems research has had difficulty in shaking off the image of being a diffuse and “fluffy” area of scientific research that is often perceived as lacking a sharp focus and direction. However, it is not all gloom, and two examples of health systems research that have had an impact at district and national levels are provided. In the context of health sector reform and decentralization in Tanzania, community-based participatory research conducted by the Tanzania Essential Health Interven-

Table 2.4 Some reasons for neglect of health systems research

- **Health systems have an image problem:** visible or emotive topics such as child deaths or polio campaigns engage stakeholders in ways that interventions for strengthening planning or accountability mechanisms do not.
- **Health systems research also has an image problem:** other forms of research such as basic science and drug discovery are prestigious while health systems research is seen as fluffy, pedestrian and applied. This attitude is caused by divergent views on the types of systems issues that can be researched, and to methodological challenges.
- **Divergent views on the types of questions amenable to scientific enquiry:** some believe that health system problems are primarily political, and therefore best solved using common sense rather than evidence.
- **Answers from such research can be slow to arrive and uncertain,** because of the long-term nature of health systems change, and the complex and indirect links to final outcomes.
- **Generalization can be difficult,** because the effects of interventions crucially depend on the environment in which they are implemented.
- **Health systems research may not have a disease-specific or intervention-specific focus,** so there are fewer research opportunities for research funding.
- **Disinterest and difficulty in assessment:** because the interventions are part of large messy reforms with strong political imperatives; systematic evaluations are difficult to design and may be difficult to defend.
- **Restricted research capacity, and a research workforce that is multi-disciplinary** and therefore does not have an obvious institutional home with clear career structures.
- **The right questions are not being asked:** improved understanding is needed about the types of research that really changes the way decision-makers think.

tions Project (TEHIP) resulted in a better match between disease burden and resource allocation at the district level (see Box 2.1). In Laos, rapid economic reforms led to a major problem with substandard and fake drugs on the market. Research performed by Lao and Swedish researchers in the area of access and quality of medicines was directly responsible for the adoption of a national drug policy in 1993, which was passed into law in 2000 (see Box 2.2).

The following section offers a potentially more targeted approach to health systems research by identifying knowledge gaps in the four core dimensions of health system performance where research can make an impact: human resources, financing, information and delivery of services.* The work of the Task Force on Health Systems Research Priorities (see Section 1.6) also identified 12 priority topics for health systems research (15).

2.3 WHAT ARE THE KNOWLEDGE GAPS IN HEALTH SYSTEMS?

Although health systems research cannot be expected to solve all of the problems facing health systems, it does have a central role to play. However, the priority research questions need to be identified and addressed in order to improve the knowledge base. Such topics may focus on noncommunicable diseases or on efforts underway to achieve the MDGs, but it is just as important to conduct research on the way a health system functions. Based on the health system constraints identified in a previous section, the knowledge gaps and research priorities in key health system functions will be described.

Regional perspective 1

Priority setting should occur mainly at sub-national (district), national or regional levels rather than at the global level. However, broad, global level priorities were deemed helpful for advocacy and for raising the visibility of health systems research.

HUMAN RESOURCES

A more solid knowledge and evidence base would help to inform the challenges associated with the health workforce. A recent priority setting workshop in human resources for health (HRH) research proposed that research should be organized around seven key themes (2):

1. Assessment, policy and planning
2. Managing size, skill mix and organization
3. Using incentives to improve performance

* Another key dimension of health systems is stewardship (18). Although this is not analysed in any great depth in this report, stewardship can be considered as an overarching function which guides human resources, financing, information and delivery of services. It should be mentioned, however, that it may, in and of itself, contain some knowledge gaps relating to public/private mix, managing change etc.

Box 2.1 How Tanzania is using research to reform its health system

The Tanzania Essential Health Interventions Project (TEHIP) was set up to find new ways to plan, set priorities and allocate resources as part of a major reform of the country's health-care system. Tanzanian researchers started research in 1997 in two of the country's 123 districts—Rufiji and Morogoro—as part of the project run by the Ministry of Health and Canada's International Development Research Centre. Latest data from a five-year follow-up of the project indicate a 54% reduction in infant mortality, a 47% reduction in under-five mortality and a 18% reduction in adult mortality.

The research project is focused on health systems, health behaviours, health impacts, and the research and development of planning tools. The initial aim was to evaluate the overall impact of health interventions in terms of burdens of disease and per capita cost. For example, the researchers found that in both Rufiji and Morogoro districts, malaria alone accounted for 30% of all healthy years of life lost due to deaths in 1996–1997. In response, government planners increased the budget for malaria prevention and treatment programmes from just 10% to 26% by 2000–2001 (see figure). The research also showed that children under five carried more than 60% of the total burden of disease in both districts, compared with 37% for adults.

Overall, the research has resulted in a better match between disease burden and health budget allocation (see figure). It also helped to develop tools to help district health management teams collect and analyse information, improve health service delivery, set priorities and allocate resources accordingly.

Burden of Disease Profiles draw from sentinel demographic surveillance areas to show health needs at the community level. District Health Accounts map district health budgets and expenditures in relation to the burden of disease and other criteria. The third tool, the Integrated Management Cascade, is a hierarchical communications and supervisory support

structure that delegates responsibilities within the health system. The fourth is the Community Driven Facility Rehabilitation, which aims to improve health service delivery, community responsibility and involvement.

Using these four tools, Rufiji and Morogoro districts have addressed their burden of disease by investing in several essential health interventions, such as the Integrated Management of Childhood Illnesses strategy, insecticide-treated bednets and the Safe Motherhood Initiative. By redirecting health spending using TEHIP's tools, both districts have cut their child mortality rate by more than 40% since the late 1990s.

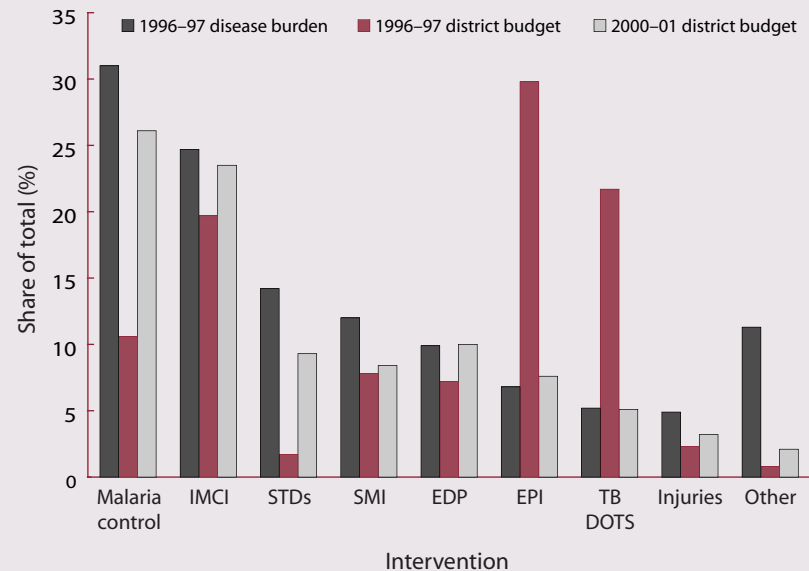
Tanzania has initiated similar per capita health funding in at least two thirds of the country through a new, sector-wide government-donor partnership. To promote

this evidence-based approach to health-care funding, TEHIP has printed manuals in English and Swahili and developed training courses with the Ministry of Health.

The government has started to introduce the cascade method to other districts and is poised to do the same with the facility rehabilitation tool as well. It is training officials in districts to use the tools that can help match a region's burden of disease profile with a corresponding budget. The goal is to have all the districts using these tools to allocate resources according to health priorities by the 2005 planning cycle.

Fixing Health Systems, published by the International Development Research Centre, Ottawa, Canada, in October 2004, and other resources on the project, are available at www.idrc.ca/tehip.

A better match between budget allocation and disease burden: health expenditures in Morogoro district 1996–97 and 2000–01



Legend

IMCI: Integrated Management of Childhood Illness

STDs: Sexually Transmitted Diseases

SMI: Safe Motherhood Initiative

EDP: Essential Drug Programme

EPI: Extended Programme on Immunization

TB DOTS: Tuberculosis Directly Observed Treatment, Short Course Strategy

4. Mobility
5. Educating and training
6. Legislation and regulation
7. Influence of political and macroeconomic contexts on the development of national HRH strategies and policies

Although these themes reasonably capture the scope of issues that are important in the management of the workforce, they do not reveal much about the nature of the research questions and their relative importance. Specifically, across each of these dimensions there is a set of fundamental and empirical

Box 2.2 Lao national drug policy

Economic reform in the Lao People's Democratic Republic in 1987 triggered the explosive growth in the pharmaceutical industry and the arrival of substandard and fake drugs on the market. It became easy to obtain drugs without prescriptions, pharmacy staff were not trained properly, patients overused antibiotics, and consumers were provided with little or no information when they bought medicines.

To tackle these problems, the Lao government—aided by the Swedish International Development and Cooperation Agency (SIDA) and in collaboration with various ministries, provincial health offices, health professional groups, the Lao Women's Union, NGOs, and donor agencies—developed a National Drug Policy (NDP). Launched in 1993, the goals were to:

- reduce the prevalence of substandard and fake drugs
- induce rational use of drugs and use of drugs relevant to the health-care needs of the population
- improve the quality of drug transactions between drug sellers and customers
- implement a quality assessment mechanism.

To improve the chances of the NDP's success, policy-makers adopted a multisectoral approach involving provinces, districts and villages. A stepwise model

for capacity building was designed so that, eventually, the programme could run without external assistance. Routine assessment using established indicators was considered of key importance to allow for evidence-based ongoing revision and informed decision-making. Institutional strengthening is promoted through learning experiences such as seminars and health systems research projects.

One other important factor has been the inter-institutional collaboration between a multidisciplinary group at the Division of International Health, Karolinska Institute in Sweden and the Lao Ministry of Health.

Ten years after the NDP was launched, the list of achievements has been impressive:

- During Phase I (1993–1995) a Food and Drug Quality Control Centre was established with trained laboratory staff, 123 inspectors were trained, the essential drug list was revised and the banned drug list elaborated.
- Phase II (1996–2000) brought the Phase I capacity-building activities to action through national implementation as well as boosted pilot implementation in the five major provinces. This involved additional training, technical assistance, equipment, and transport, as well as pharmacy inspections, standard

treatment guideline development, and monitoring of rational drug use.

- Evaluation studies during Phase II found drastic improvements in private pharmacy service quality from 1997–1999, provision of drug information to customers rose from 35% to 51% and the presence of substandard drugs dropped from 44% to 22% of random samples.
- Phase III (2001–2003) focused on continuing improvements through routine inspections and self-assessments, developing a self-financing system, and strengthening management capacity.

13 elements of revised Lao NDP, 2001

1. Law and regulation
2. Drug selection
3. Drug nomenclature
4. Quality assurance (registration, licensing, quality surveillance)
5. Drug advertising
6. Drug supply (procurement, distribution, storage)
7. Rational use of drugs
8. Strategy on drug economy
9. Traditional medicine
10. Operational research
11. Organization, management and monitoring of NDP
12. Human resources development
13. Technical cooperation

Source: National Drug Policy Programme, 1993–2003. Ministry of Health, Food and Drug Department, Vientiane, Lao PDR, 2003.

Rolf Wahlstrom and Goran Tomson. Personal communication.

research questions that must be addressed but have yet to register as research priorities. These include such things as: How does one assess the state of the health workforce? What is the optimal skill mix? How many workers are migrating and to where? How many health education institutions are there in a given country or region? Similarly, there is a series of more applied and contextually specific questions that should also register as credible research: How can worker productivity be enhanced in district health centres? What types of recruitment and incentive packages work for attracting and retaining workers in remote areas? How are two tiers of salaries managed among workers in a hospital introducing an AIDS treatment programme?

FINANCING

Health system financing is a broad area. It covers: inputs such as health expenditure, revenue collection, fund pooling and purchasing, and the measurement of key health system outcomes such as catastrophic health expenditures and impoverishment. Within the financing function, there are important unanswered research questions relating to the three sub-functions: revenue collection, pooling and purchasing, as well as to the interactions between them. Table 2.5 shows one perspective on research priorities for all these areas. Here, a distinction is made between research on inputs, the financing function, and outcome assessment and monitoring. It highlights some areas of contemporary interest including macro-financing issues and community participation in payment of health services and health insurance schemes.

HEALTH INFORMATION

The results generated by the health information system are needed to guide and complement health research, from the design of research projects to the interpretation of the findings. Conversely, health research can contribute significantly to the rapid enhancement of country information systems by identifying data dissemination strategies that enable information to be shared effectively to meet the needs of different groups and by developing ways to boost the demand for information and its use at various levels of the health care system. This can also be done by developing and testing data collection tools for use at the district level, and provide guidance on the most cost-effective strategies for generating sound data on inequities in health status and health-care coverage.

The achievement of the MDGs (described in Chapter 1) is heavily dependent on robust health systems to deliver health interventions to deal with tuberculosis, malaria, HIV/AIDS, child survival and maternal health. This raises additional issues in relation to health information:

- The need to develop a set of practical “core metrics” to monitor the status and capacity of health systems at the national and sub-national or district level, with special attention given to equity issues. One approach is through Service Availability Mapping (SAM), which is based on a rapid assessment

Table 2.5 Research priorities in health systems financing

<i>Health system financing area</i>	<i>Research needs and knowledge gaps</i>	<i>Comment</i>
<i>Inputs to health systems</i>	Strengthening national health accounts	More funds are needed for the institutionalization of routine evidence-bases and sound data collection.
	Development and testing of methods to track expenditure by use (e.g. by priority disease, population group, human resources etc.)	Need for improving research on and analysis of all disease-specific health expenditures, expenditures on human resources.
	Financing resources allocation	Need for improving decision-making on balanced health expenditures.
<i>Financing function—revenue collection and pooling</i>	Financing schemes and equity	Which financing scheme to implement for a sound and equitable universal coverage?
	The sustainability of health financing	How to sustain the financing of interventions without relying on donor funding? The search for financing self-sufficiency.
	Health insurance schemes—financing aspects	How to move to universal coverage? What is the role of community insurance in this process?
	Health insurance schemes—administrative and technical aspects	How to manage the administrative costs and the pooling of risks?
	Co-payments, user fees and exemptions	Community participation in the payment of health services: the cost of health services must remain affordable to ensure access to care, while it should prevent unnecessary use of services.
	Public and private mix	What is the role of private insurance schemes? Do they promote more equity?
<i>Financing function—purchasing</i>	The costs, effectiveness and impact on equity of undertaking interventions together, as in real life	Most research focuses on the costs and effects of interventions undertaken by themselves, rather than taking into account interactions. This does not help policy formulation. The impact on health inequalities of interventions also needs to be addressed.
	Human resources, incentives and the rationalization of health services	Health providers must be responsive and accountable to patients. Decisions on the most appropriate incentives to ensure this must be found.
<i>Measurement of key health system outcomes</i>	Routine monitoring and assessment of the impact of the health financing system on access to services. Information on which households face financial catastrophe and impoverishment because of health payment.	This information is critical to develop policies for risk protection.

Source: Evans DB, Health System Financing, Expenditure & Resource Allocation, World Health Organization, 2004.

tool administered through district health management teams that generates a visual representation of disparities in service provision between and within districts. Such a mapping exercise enables district and national planners to use data for public health decision-making.

- The need to develop indicators to monitor the progress to achievement of the MDGs themselves. A baseline of 1990 has been set to attain the MDGs by 2015. The health-related MDGs consist of a few health status indicators and a selected number of health programme coverage indicators. The primary focus on monitoring the MDGs has been on whether a country's indicator trends are on track or not. Research and development efforts are needed to promote better measurement of health-related MDGs and

related indicators, especially in low- and middle-income countries with a high burden of disease and poor data.

The Health Metrics Network (HMN) is a newly established global alliance dedicated to meeting the challenges described above. HMN aims to increase the availability and use of timely and accurate health information at sub-national, national and global levels by acting as a catalyst for joint funding and development of core country health information systems. Linking of network activities with the health research system at the country level is essential.

Developing adequate health information systems also means training health-care workers to collect such information. Routine health information in poor countries tends to be collected by large numbers of poorly trained workers, who frequently do not recognize the significance of data collection, or else, collect erroneous data. Research into improving data accuracy in this context would help ensure that data that has been processed would actually help in the assessment of a country's health needs. The efforts of the NGO INDEPTH to mine demographic information through a network of surveillance sites across Africa has yielded disproportionate dividends in understanding patterns of mortality and inequity in health (see Box 2.3).

Regional perspective 2

There is a major need for reliable and timely information on basic indicators pertaining to health systems. This requirement for health systems "benchmarks" was deemed crucial to monitoring and evaluating the achievement of the MDGs, and the performance of the system itself. Included in this is the need for research to develop benchmark indicators for human rights, ethics and equity.

HEALTH SERVICES DELIVERY

Little is known about how to scale up health services rapidly in the face of urgent public-health problems and to integrate "vertical", single-disease programmes into the broader health system. There is also a need to do more research on organization and delivery of health services. One priority area relates to developing effective and efficient approaches to dealing with populations that have special needs, such as dispersed rural populations and populations living in urban slums, particularly in order to improve their access to effective services.

More research needs to be done to find ways of helping health workers make sure patients are taking medicines. This knowledge is vital as anti-AIDS programmes are expanded to get antiretrovirals to millions of people who need them in developing countries. There is a need for more research on approaches to improving drug supplies, including cost-recovery schemes and interventions to improve prescribing and dispensing. These interventions should not be restricted to the formal health sector but also include drug retailers who are important providers of health-related products in many countries.

Another priority area is evaluating the development and implementation of strategies to ensure quality in the health system setting. In high-income countries a variety of methods have been used to improve the practice of health

Box 2.3 INDEPTH

To improve the health of the poor it is essential to have adequate information about their health status. Providing such information is the primary focus of the International Network of field sites with continuous Demographic Evaluation of Populations and their Health in developing countries, known as INDEPTH. Aimed at reducing the health inequities worldwide, this network works to maximize global community-based surveillance initiatives in resource-poor countries in the hope that this information might provide a better understanding of the health and social issues faced by these countries.

INDEPTH facilitates cross-site longitudinal health and social studies, introduces methodological and technical workshops, and builds institutional research capacity globally. To gather data on a given population, INDEPTH conducts comparative studies and exchanges experiences on important universal problems. It also

creates and shares regional health status assessments and evaluates health interventions in diverse socio-cultural and geographic environments. INDEPTH is also actively involved in recruiting and creating additional sites.

Surveillance data used by INDEPTH, known as the Demographic Surveillance System, offers a mechanism to help countries understand how the health of populations varies from one stage of the health transition in developing countries to another. Such data is also used to evaluate how health equity evolves over time in these countries.

The Demographic Surveillance System is a set of field and computing operations handling the follow-up of primary subjects, such as individuals, households and residential units, and all their related health and demographic factors within a specific geographic region. This system also defines risk and corresponding trends

in birth, death, and migration rates in a population over a certain period of time. The system's ability to track individuals over time has made it possible to conduct population-based controlled experiments on the impact that new drugs, vaccines and changes in health service delivery systems have had on morbidity and mortality. Such demographic surveillance has been invaluable in providing information on the correlation between social and economic status and health outcomes.

With 36 demographic surveillance system field sites in 19 countries in Africa, Asia, Oceania, and Central America, INDEPTH is essentially a scientific and policy forum for the development and assessment of health equity strategies catering to the needs of the developing world.

For more information visit: www.indepth-network.org

professionals, including clinical guidelines, continuing education, the use of computers in assisting diagnosis, and audit and feedback by professional societies. However, a very small proportion of such studies has been undertaken in low-income countries.

The rise of HIV/AIDS, tuberculosis, and malaria in tandem with noncommunicable diseases in many parts of the world has highlighted the need for better systems to manage chronic disease. This will require health systems to develop capacities to facilitate continuity of care, support self-management, and provide decision support for health workers that is consistent with scientific evidence and patient preferences. It should also ensure information systems that will provide, for example, timely reminders to health personnel and patients, and feedback on performance to health-care providers. Cost effective approaches to developing and implementing chronic disease management systems in low-income countries are urgently needed.

Regional perspective 3

A major priority for health systems research should be research into the development of policies for scaling up health services to meet contemporary health challenges (e.g. achieving the MDGs). It should include research on how to better integrate "vertical", single-disease programmes within the broader health system.

Regional perspective 4

Further research is needed on regulatory aspects, corruption and poor governance within health systems in resource-poor countries.

2.4 FUTURE CHALLENGES

NEW TOOLS AND METHODOLOGIES NEEDED

Few people appreciate how important it is to develop new tools and methodologies to tackle a given research problem or realize that new research can bridge gaps in current research. Systematic reviews, which are usually used to evaluate the effectiveness of health interventions, should also be used to evaluate the findings of research on health policy and health systems. Some work in this area to improve clinical practice, for example, should be acknowledged and built upon (16, 17). Shifting contexts of the environment in which health systems operate also necessitates a review of currently available research tools.

The previous sections have highlighted that information and core metrics to monitor the status and capacity of health systems at national and sub-national levels are critical for health systems research. Some work has already been done in this area (18) and various tools and methodologies have been developed. This includes, among others, CHOICE (CHOosing Interventions that are Cost-Effective), Marginal Budgeting for Bottlenecks (MBB), and tools for analysing the health workforce. However, considering the changing context and landscape of major global health problems, there is perhaps a need to revisit these tools and consider developing more practical, feasible and sustainable measures and benchmarks for health system functions that include building of national capacities to collect the necessary information.

Also, current methodologies in health systems research are often criticized for being less than rigorous and as sub-standard science. A gold standard methodological equivalent of the randomized controlled trial in clinical research, or the positive-negative control design of experimental biomedical research, continues to elude this field.

Part of the problem is that methodologies which were developed for other fields of research have been adopted in health systems research, even though they may be unsuitable or inappropriate. The answer does not lie in adapting or adopting these to the field of health systems research but rather in investing in innovative ways to study health systems. Some advances are already being made to create such new approaches.

While acknowledging that causal chains in public health interventions are complex, some have suggested that a “plausibility” approach may provide valid evidence of the impact of programmes or interventions (19). This would mean developing causal statements using observational designs with a comparison group. Methodologies are also becoming available to examine socioeconomic disparities in health conditions and service delivery (20). Such an approach, called “programme-incidence” or “coverage-inequality” analysis, facilitates

studies that aim to assess how well health programmes are reaching the poor. The latter approach is used to determine distribution of programme outputs across socioeconomic groups within the target population, instead of standard cost-benefit analysis where outputs are analysed relative to unit of input (21). Another example from Canada illustrates an innovative, multi-disciplinary effort to develop a conceptual framework to study social organization and its impact on health status (see Box 2.4).

RAISING THE PROFILE AND SENDING A SIGNAL

There is an inherent tension in health systems research between the need for more fundamental work to develop better tools and more robust conceptual frameworks and the preferred focus on more local, context-specific, applied and community-based participatory research. Clearly, both fundamental and local research are needed and should complement each other. And although the context-specific, local approach may seem more relevant, attention should also be given to fundamental research as it may disproportionately raise the profile of the field as a whole, thus sending a strong signal to the scientific community of a willingness to explore new vistas and novel ideas.

For this to happen, the development of new conceptual frameworks, tools and methodologies that reach beyond traditional scientific disciplines is needed. Health systems research must be ready to learn from the frontier areas of science in general, such as systems science, chaos theory, social organization research, bioinformatics, the use of “scenarios” and neural networks. For example, a major development in the post-genomics era is the emergence of systems biology as a key scientific discipline to understand complex interac-

Box 2.4 Studying how societies optimize human health and well-being

Inspired by the question: “Why are there persistent differences in the health of children within countries and between nations which cannot be attributed to the quality of health care or living standards?”, a project known as Successful Societies was launched in 2002 by the Canadian Institute for Advanced Research (CIAR).

This innovative research project explores the social processes underlying key health and human development outcomes within populations and, on a broader level, the social conditions that underpin the collective development of social communities on a national and local level.

Collective development refers to the capacity of society, at any level, to develop features fundamentally tied to social well-

being, including social equality, access to political participation, cultural tolerance, social inclusion, and access to education and employment.

The programme will attempt to seek answers to some key questions, including:

- What kind of social conditions matter?
- How do the social relations in a community affect the capacities and well-being of the individuals who are part of it?
- What types of social relations are most conducive to effective development, both of the community and of the people who live in it?

Drawing on experiences of diverse events such as the course of the AIDS epidemic in Africa, rates of crime in Chicago, and the fate of the Roma (gypsies)

in Europe, the strategies to be used will include mobilizing existing research, promoting interaction among scholars in various fields, and conducting new comparative empirical research to assess the impact of key features of social relations in local, national, and regional contexts.

Successful Societies brings together individuals working in cultural studies, epidemiology, developmental psychology, cultural and political sociology, philosophy, history, and areas on the boundary between economics and political science. The idea is to take an interdisciplinary exchange approach to advance the research frontier in theoretical and empirical terms.

For more information visit: www.ciar.ca

tion in biological systems. This field aims to “sift through a deluge of data in search of coherent patterns of stimulus and response” (22). The parallel with a health system is not far-fetched. The involvement of these disciplines would not only improve the standing of health systems research as a whole but also the quality of its science. At the same time as exploring these frontiers, however, health systems research must keep its feet firmly on the ground and interact more effectively with the broader health research system. This is the subject of Chapter 3.

Vannevar Bush’s *Endless Frontier* (23) (see Section 1.2) laid the foundations for the boom in basic scientific research in post-Second World War America. Now is the time to lay the foundations for a new era of research into health systems.

BUILDING CAPACITY

All the above must be complemented by a strong effort to build capacity and effective institutions for health systems research to flourish. Capacity building efforts should pay close attention to the role of mentors and teachers in nurturing the next generation of health systems researchers. Within institutions, an environment should be created that would attract the best people by providing attractive academic career structures, incentives (financial and otherwise), access to information, and opportunities to teach, do research, and participate in meetings and courses.

A CALL FOR ACTION

Health systems research is in need of a new paradigm. The future cannot be business as usual. For health systems research to be elevated to the same status as molecular biology and genomics, substantial and sustainable resources and support must be mobilized. A “grand challenges” approach should be considered for health systems research, as has been done with biomedical research, to develop interventions to deal with global health challenges (24).

However, it is not just about more funding. It requires a concomitant commitment and passion from the health systems research community itself, and a willingness to think creatively and be more open to new ideas. Unless this happens, health systems research may be unable to escape the den of scientific poverty and inequity.

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