Universal access to information for health professionals is a prerequisite for meeting the Millennium Development Goals and achieving Health for All. However, despite the promises of the information revolution, and some successful initiatives, there is little if any evidence that the majority of health professionals in the developing world are any better informed than they were 10 years ago. Lack of access to information remains a major barrier to knowledge-based health care in developing countries. The development of reliable, relevant, usable information can be represented as a system that requires cooperation among a wide range of professionals including health-care providers, policy makers, researchers, publishers, information professionals, indexers, and systematic reviewers. The system is not working because it is poorly understood, unmanaged, and under-resourced. This Public Health article proposes that WHO takes the lead in championing the goal of “Universal access to essential health-care information by 2015” or “Health Information for All”. Strategies for achieving universal access include funding for research into barriers to use of information, evaluation and replication of successful initiatives, support for interdisciplinary networks, information cycles, and communities of practice, and the formation of national policies on health information.

10 years ago, a meeting to review global access to health information concluded that most health professionals in developing countries had inadequate access to information and that the information available to them was often unreliable or irrelevant.1 At that time, there was optimism that, by 2004, all—or nearly all—health professionals in developing countries would have access to the information they needed to provide the most effective health care possible with the resources available. The world was at the cusp of the information age: information and communication technologies would mean that lack of access to reliable relevant information would no longer be a barrier to effective health care. Although other factors such as lack of drugs and infrastructure might hinder provision of health care, this would not be the case with information.

What then has been achieved in the past 10 years? What have we learnt? And if providing access to reliable information is the single most cost-effective and achievable strategy for sustainable improvement in health care,4 what steps can we now take to bring us nearer to health information for all (panel)?

What has been achieved?

Important progress has undoubtedly been made. Information and communication technologies are increasingly available; more and better content is available to a growing number of people, especially those in tertiary hospitals, academic institutions, and urban settings; there are more and better free resources on the internet; there is a larger and wider range of health-information support programmes; an international community has evolved that is committed to improving health-care information, with governments and other bodies in developing countries playing an increasingly active part; and politically, access to health-care information has become a key international development issue. Equitable and universal access to health-care information is recognised in the latest draft of WHO’s World Report on Knowledge for Better Health as an important part of worldwide strategies to reduce global disparities in health and to achieve the health-related Millennium Development Goals.

Progress has been patchy, both geographically (with sub-Saharan Africa generally falling far behind most other regions) and across different health sectors (specialist and academic health care is much better served with information than rural primary care), and overall there is little if any evidence that the majority of health professionals, especially those working in primary health care, are any better informed than they were 10 years ago. The few empirical studies we identified2 and many anecdotal reports suggest that lack of physical access to information (absent, slow, or unreliable internet connectivity, expensive paper, and high subscription cost of products) remains the major barrier to knowledge-based health care in developing countries.

However, there are now many successful initiatives that could be extended or replicated. An example is BIREME (http://www.bireme.org), the Latin American
and Caribbean Centre for Health Sciences Information. Established in 1967 following an agreement between the Pan American Health Organization (PAHO)/WHO and the Brazilian Government, BIREME has shown how significant government funding across a region can successfully overcome the phenomenon of the “lost science of the Third World”. In collaboration with the Foundation for the Support of Science of São Paulo (FAPESP) and the Chilean National Council of Sciences, BIREME set up SciELO (the Scientific Electronic Library Online, http://www.scielo.org), which was the first and is now one of the largest sources of free full-text access to health research information. BIREME also set up LILACS (http://lilacs.bvsalud.org), which indexes journals from Latin America and the Caribbean, and the Virtual Health Library (http://www.bvsalud.org), which provides free online access to a range of evidence-based resources that support health-care decisions.

EMRO (World Health Organization Eastern Mediterranean Regional Office) has also developed a raft of initiatives to improve access to health information and to build capacity in health research and the production and dissemination of health-information materials. It provides training for researchers at country and regional level, helps countries develop research policies, directly sponsors research, and has developed a regional journal as an avenue for dissemination and academic recognition. EMRO Index Medicus indexes over 310 journals in the region and is published in print, CD-ROM, and on the internet. EMRO maintains a database of locally produced books and journals from the region, maintains a core list of recommended resources for small libraries, and provides financial support for libraries to procure such core resources.

These initiatives, and many others, show what is possible given political support, international cooperation, clear leadership, good management, and adequate funds—and what might be possible for important initiatives such as the Association for Health Information and Libraries in Africa (http://www.ahila.org) and the African Index Medicus (http://www.who.int/lilac), which are currently struggling partly through lack of sustained national and international political and financial commitment.

What have we learnt?
The past 10 years have taught some crucial lessons. One is that “pull” is better than “push” when it comes to information transfer. The meeting 10 years ago to review global access to health information recognised the huge importance of information flows within and among developing countries and the limitations of pushing information to health-care professionals. A report of the meeting concluded that: “People in the developing world should be given the chance to say what they want rather than simply be sent information.” Despite growing understanding of the need for exchange of knowledge between countries and within regions, there is a continuing tendency to push information out to people rather than strengthening and responding to the pull of their information needs.

Another lesson is that sustainable development is achieved only through building local capacity. More and more initiatives have shown the wisdom of acting locally. Healthlink Worldwide (http://www.healthlink.org.uk) has shifted from being a publisher and distributor of international newsletters (Dialogue on Diarrhoea, AIDS Action, etc) to enabling developing country producers and distributors (publishers, ministries of health, library services, local and regional non-governmental organisations) to publish and distribute their own health learning materials. The Effective Health Care Alliance Programme’ helps individuals and groups in middle and low-income countries to prepare and update systematic reviews. INCLEN (the International Clinical Epidemiology Network; http://www.inclen.org) provides long-term funds, training, peer support, and mentoring to build capacity in clinical epidemiology in developing countries.

Thanks to the Council on Health Research for Development (COHRED) and the Global Forum for Health Research, we have learnt that less than 10% of health-research funding is targeted to the health problems that account for 90% of the global disease burden. This 10/90 gap is a fundamental cause of lack of access to relevant health information. It is exacerbated by problems in getting developing world research published, indexed, incorporated into systematic reviews, and integrated into accessible learning and reference materials. The 10/90 gap in research probably translates into a 1/99 gap in health information.

We have learnt that most health professionals still prefer print. We have also learnt that most health workers in developing countries will not or cannot pay for information themselves and that as much information as possible should therefore be free to use. In its draft report, WHO argues that “knowledge must be accessible to all in a form which is useful and can be acted upon by different people and groups”. Free access and “open access” initiatives have greatly improved availability of the biomedical literature, which is the crucial building block for evidence-based health care. In particular, HINARI (Health InterNetwork Access to Research Initiative; http://www.healthinternetwork.org), a partnership initiative led by WHO, now provides developing countries with access to nearly 2300 online journals. But we have also learnt that journals are one of the least useful information sources for health professionals in...
In information-rich industrialised countries, clinicians often rely largely on two or three essential information resources—basic reference and learning materials such as handbooks and drug formularies. A community health worker may find a single copy of Where there is no doctor,
 adapted and written in the local language more useful than access to thousands of international journals. More attention is needed to ensure free access to such resources for the vast majority of developing-world health professionals who work in primary and district care.

We have learnt that funders' behaviour is critical. Despite increasing recognition of the importance of information, communication, and networking, many funding agencies are reluctant to support these types of activity, whose impacts are more diffuse and less easy to define and measure than those of discrete, short-term "practical" projects. Funding agencies tend not to like providing small grants, and they often prefer to fund new rather than established programmes, even where these have been successful. As a result, health-information funding often falls between the cracks: between project-based and infrastructural support, between health and education, and between international and country approaches.

Finally, we have learnt about the existence and importance of local information cycles or communities of practice. Complete sustainable information cycles are those in which readers/users are also writers/contributors. A completely inclusive information cycle exists within the world of academic research, where all authors are readers and all readers are potential authors. But information cycles also exist, or can be established, between researchers, scientific publishers and editors, systematic reviewers, funders of research, health professionals, policy makers, and patients. These information cycles have the potential to greatly increase the relevance and reliability of information about health care, and to build skills, understanding, and ownership that will help to increase the use of that information. Experience at BIREME and elsewhere shows that local information cycles and communities of practice can be facilitated and strengthened by giving people the chance to use virtual forums, chat rooms, and discussion lists. HIF-net at WHO (http://www.inasp.info/health/hif-net) and the World Association of Medical Editors (http://www.wame.org) are examples of virtual communities of practice that have the potential to build local capacity in the developing world.

What needs to happen now?

It is not the place of this article to make detailed recommendations on the way forward. However, we suggest four broad issues around which future activity could be focused, and we propose a framework within which more detailed ideas could be formulated, implemented, and evaluated. The first issue is improved access to essential information for health professionals, such as drug formularies and evidence-based handbooks. This may best be achieved through strengthening of local and regional publishers, libraries, and information services. With access to electronic resources (and adequate financial support for training and equipment), libraries can make information available to end-users in a range of formats (printed, electronic, digital, and broadcast media). At the moment there are stark regional differences in library support. In many developing countries it is difficult, if not impossible, for librarians and others to find out—and certainly to afford—the full range of relevant publications available nationally or internationally. But much has been learned about the development of libraries and resource centres, particularly through the work of Healthlink Worldwide and its partners. WHO's Blue Trunk Library may be a model that should be replicated more widely; it has provided over 1000 mini-libraries for use by district hospitals and other frontline facilities, providing access to a selection of essential health-information materials.

The second issue is improved connectivity. Clinicians may still generally prefer paper, but among currently available technologies only the internet has the potential to deliver universal access to up-to-date health-care information. Connectivity is vital for efficient information flows among librarians, publishers, and all others responsible for developing and distributing materials. Internet connectivity has increased dramatically over the past 10 years, but it is still unavailable to most health professionals. Access to e-mail is spreading faster than the internet, especially in Africa. E-mail provides new possibilities for publishing and distributing practical health-care information and for networking with other health professionals, as evidenced by the success of regional networks (eg, AFRO-Nets; http://www.afronets.org), publisher networks (eg, Forum for African Medical Editors), librarian networks, and multidisciplinary health-information development networks (eg, HIF-net at WHO). E-mail has also enabled one-to-one communications, both professional and personal, facilitating development of relationships and reducing professional isolation.

Significant problems to overcome in some countries include inadequate power supply; lack of computer equipment and information technology support; the fact that the necessary software is mainly in English; lack of computer skills; and resistance to use of technology among health professionals. Improvements in connectivity will require a major global information communication technology initiative, which itself will require substantial and sustained financing.

The third issue is the need to identify and overcome barriers to the use of information in different settings.
A growing body of evidence, mainly from the developed world, suggests that access to information is necessary but not sufficient to change practice. Changing practice is by no means simple and remains a major challenge in the information-rich industrialised world. A survey in 2003 of nearly 7000 people in the USA, and review of their medical records, found that, over 2 years, participants received only 54% of recommended care. There is plenty of anecdotal evidence to suggest that this “know-do” gap is at least as great in developing as in developed countries.

Known and assumed barriers to using information in practice (many of which are also experienced by health professionals in developed countries) include: lack of awareness of what is available; lack of relevance of available information (not meeting people’s needs in terms of scope, style, language, or format); lack of time and incentives to use information; and lack of interpretation skills.

There are no simple solutions. Any attempts to overcome barriers to use of information should be based on good research into the nature of the barriers and evaluations of planned interventions. Training and peer support is likely to be key. As the amount of information available increases, health professionals will need critical appraisal skills to be able to distinguish unreliable from reliable sources of information. Librarians and producers of health-care materials need searching, critical appraisal, and computer skills. Researchers, systematic reviewers, journal editors, and indexers need to understand research design and to have skills in searching, critical appraisal, writing, and editing. Software and interface designers need to empower users so that they can exploit technologies to combine and mediate information and knowledge. Achieving all of this on a global scale will require major investment within countries, and the use of effective learning and peer support methodologies, whether face-to-face or virtual.

Our final issue on which future activity should focus is the need to improve the quality of health-care information in terms of its reliability, relevance, and usability. One barrier to use of information in practice—which may be more apparent in developing countries, but is still by no means unique to them—is the lack of demand for information. This may be related to factors such as a lack of reading culture; low motivation associated with poor working conditions and poor prospects for career development; lack of awareness of evidence-based health care; long-term professional isolation; or long-term lack of access to information leading to the view that whatever is available is adequate. But anecdotal evidence also suggests that lack of demand is related in part to the poor quality of much of the information available.

Creating reliable, relevant, and usable information for health professionals requires a series of activities. Within an evidence-based paradigm these can be represented as forming a virtuous cycle or system, each activity being dependent for its success on the activities before, each contributing to the success of the activities that follow (figure).

The figure is highly simplified; at every step there are various inputs and outputs, drivers and constraints, strengths and weaknesses. The system is not managed either locally or globally; it is largely unrecognised as a system and is severely under-resourced. As a result, the system is not working. Individual activities within it are taking place but haphazardly and in isolation, with many short circuits that significantly reduce the reliability, relevance, and usability of the information reaching health professionals and policy makers. For example, much research is still undertaken without a prior systematic review to check that the research is necessary, to learn from the methodology of previous studies, or to focus the research question; completed research is often disseminated without proper peer review; individual research studies are distributed to health professionals without being put into context of other research; many systematic reviews are still undertaken without careful consultation with health professionals and patients about which questions are most urgently in need of answers; many information resources are poorly evidence based and are not field tested on end-users to check that they meet their information needs; most of the information reaching health professionals in developing countries...
comes from producers in industrialised countries, without any attempt at localisation.

We suggest four main reasons for these short circuits. The first is lack of understanding about how the various actors can work together more effectively. Education and consultation among groups may be the best way to tackle this. The second reason is lack of capacity in the system—eg, the lack of systematic reviews addressing health-care issues in the developing world, the lack of good research on these issues (the 10/90 gap), and the shortage of people adequately trained and resourced to adapt material for local needs. This problem could be tackled by identifying and specifically supporting activities where local capacity is lacking. The third reason is the market. Commercial players in the system focus their efforts, for obvious reasons, on where the money is—in providing end-products to health professionals. Business models need to be found that distribute revenue more evenly around the system, reflecting the distribution of costs, to establish robust intermediate markets. The fourth reason is a lack of national public policies on health information that define national goals and priorities as well as promoting convergence of initiatives and resources.

The system is, in reality, a series of potential and actual local information cycles. These bring together (or could bring together) people working at different stages in the creation and dissemination of knowledge, within a hospital, a country, regionally, or globally. Support for such local information cycles would bring greater understanding of how to make the knowledge system work better in different settings and for different groups of people, and so improve the quality of information reaching health professionals.

A proposal

As a framework for taking things forward, we propose that WHO takes the lead in championing the goal of “Universal access to essential health-care information by 2015” or “Health information for All”. We suggest that WHO and its partners establish an international collaborative group along the lines of the Global Fund for AIDS, TB, and Malaria, which is coordinated by the UN, or the Global AIDS Vaccine Initiative coordinated by the Rockefeller Foundation. We envision that this group, which should include representatives of the major global funders, would create a pot of money—like a lottery fund—to be allocated to initiatives on a competitive basis in line with an overall strategy to achieve health information for all. This strategy could include calls for research into information needs and barriers to use of information; evaluation and replication of successful initiatives; support for local information cycles and communities of practice; and the formulation and establishment of national public policies on health information. The international collaborative group could be assisted by an independent advisory board made up of key representatives from all stages in the knowledge system, with the majority from developing countries. A small part of the fund could be devoted to networking and learning among the thousands of stakeholders worldwide who are working to improve access to health information in developing countries. This is important for many reasons: to strengthen cooperation, reduce duplication of effort, and to develop a shared understanding of the system in which we operate. Such networks are already in place at global (eg, HIF-net at WHO) and regional (eg, AHILA-net) levels, and country networks are now beginning to emerge (eg, Senegal-AHILA).

We call upon WHO and other organisations to commit to universal access to essential health-care information by 2015. We believe such access is a prerequisite to meeting the Millennium Development Goals and achieving Health for All; moreover, it is now, for the first time, realistically achievable.

Contributors

F Godlee and N Pakenham-Walsh wrote the report and devised the knowledge system diagram, with detailed input from all other authors. A Packer contributed the concept of local information cycles. All authors reviewed the final version.

Conflict of interest statement

FG is executive editor of Clinical Evidence, a compendium of evidence syntheses on the effects of health-care interventions, which is published by the BMJ Publishing Group and is available free online to users in low and very low income countries through the HINARI initiative. NP-W runs the INASP-Health programme, which aims to support cooperation, analysis, and advocacy among those working to improve access to reliable information for health-care workers in developing and transitional countries. INASP-Health is a programme of INASP (International Network for the Availability of Scientific Publications), a non-governmental organisation founded by the International Council for Science in 1992. INASP-Health activities are supported by the BMJ, Exchange (a UK Department for Internal Development-funded networking and learning programme on health communications), and WHO. DJN is editor of the South African Medical Journal, which is owned by the South African Medical Association. BC is senior editor on PLoS Biology and PLoS Medicine, two open-access journals published by the Public Library of Science, a not-for-profit organisation that is committed to making the scientific and medical literature a public resource. AP is director of BIREME/PAHO/WHO and operational coordinator of SciELO.

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