

## Leveraging information technology to bridge the health workforce gap

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According to some estimates, the world needs more than 4 million additional physicians, nurses, pharmacists, laboratory technicians, midwives, community health workers (CHWs) and other front-line health workers.<sup>1</sup> However, there is also a shortage of faculty that can provide high-quality training and mentorship for current training programmes<sup>2</sup> and continuing education opportunities for health workers. The use of new information and communication technologies (ICTs) can help to overcome these challenges.<sup>3,4</sup>

Recent global investments in fibre and wireless infrastructure, as well as innovations in e-learning, electronic health (eHealth) and mobile health (mHealth) and in the social media, can be leveraged to train, deploy, support and empower health workers.<sup>4-8</sup> The International Telecommunication Union estimates that, in only four years (2007–2011), mobile broadband subscriptions in the developing world increased by more than tenfold: from 43 million to 458 million. Mobile devices and internet access are becoming increasingly necessary professional tools for health-care workers at all levels in developing countries. New fibre and wireless infrastructure, as well as the rapid growth of computer processing power, provide an unprecedented opportunity to scale up health worker training and improve its quality, as well as to optimize health service delivery and strengthen health systems.

Over the past 20 years, learning management systems have contributed greatly to the tremendous expansion of e-learning. The past five years have also seen an increase in massive open online courses. eHealth technologies, including electronic medical records,

laboratory and pharmacy information systems, along with disease surveillance and supply chain information systems, are transforming health care. Mobile health (mHealth), which is the practice of medicine and public health supported by mobile devices, extends these systems to the most remote and inaccessible parts of the developing world. In addition, the same mobile devices used to optimize communication and support front-line health-care workers can be used to deploy multimedia training programmes and clinical decision support tools. The social media and the development of communities of practice have yet to be fully mobilized to support health workforce capacity building. The use of the social media by health workers has several potential benefits. Some examples are crowdsourcing of educational content, translations and localization (i.e. adaptation of the content to a particular region), peer-to-peer learning, joint problem solving and reflective practice. In addition, ICTs can strengthen communication between providers and patients, increase community support for health worker capacity building and heighten the demand for high-quality clinical services.

E-learning tools can support curriculum development and course scheduling and management in ways that are conducive to blended learning approaches and that take advantage of multiple learning environments. Such tools can also be linked with national health professional registration and licensure systems, as well as with health workforce planning, management and in-service training systems, to provide information and support to the health workforce throughout the health worker

lifecycle. Following pre-service training, ICTs can be used to optimize the work of a health-care provider – the use of electronic health records, clinical decision-making, supply chain management and service quality control are examples – and to facilitate mHealth communications, continuing education and the establishment of professional social networks.

Training methods based on video conferencing, webcasting, recording, localization and playback of training can enable global access to the very best educators and are more cost-effective than standard face-to-face educational programmes. Interactive content programmes that incorporate gaming and adaptive learning tools can also be used.<sup>9</sup> By enabling the development of virtual networks of learners, e-learning makes learning a community effort and facilitates the sharing of training content. Furthermore, since e-learning can take place in the community, at the point of care or at other convenient points, training costs are reduced and health-care providers can remain in their clinics and communities, where they are most needed, without disruption of health-care delivery.<sup>10</sup>

E-learning is not a second-rate alternative to traditional health worker education. It adds value and makes it possible to overcome the limitations of existing educational strategies. The goal of any health education strategy or curriculum should be to present the educational content and conduct the training in a manner that will enable all learners to acquire the clinical competencies they need. A blended learning strategy based on the use of ICTs, e-learning and other educational methods can achieve this objective.

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Despite the potential and opportunities described herein, several challenges must be addressed before ITCs and e-learning can be fully employed to build health-care worker capacity globally. Some of them have to do with the limitations of the ICT infrastructure and of the ICT and e-learning technologies themselves; others are cultural, societal and regulatory barriers.

Despite recent investments in fibre and wireless network infrastructure, two thirds of the world's population still lacks internet access and, even in communities with new network architecture, the cost of connectivity remains prohibitively high.<sup>11</sup> The number of highly trained ICT experts is also insufficient for health programmes and institutions to adequately staff their own network support teams. In addition, in many communities a lack of electric power is the main obstacle to the use of ICTs and mHealth tools. The use and scale up of ICTs in health programmes are also hindered by the absence of appropriate and enabling strategies, policies and standards, the lack of harmonization across communication systems and the poor interoperability of technologies and platforms.

Many medical faculty members and health programme staff are reluctant to modify or abandon traditional teaching and learning methods that have been essentially unchanged for decades. Incentives may be required to promote the uptake of e-learning strategies among these professionals, in addition to training in computers and e-learning tools. Furthermore, since women represent the majority of health-care providers, efforts to leverage ICTs to train health workers will have little impact unless computer literacy and access to ICTs are promoted among women.<sup>12</sup> Various ministries, especially the ministries of information technologies, education, finance and health, will need to better coordinate and synergize their missions in connection with the use of ICTs among health workers. In addition, several issues need to be addressed with respect to regulation on content sharing and the use of e-learning platforms for the certification and accreditation of health professionals. Use of the internet to share content, faculty members, lessons and best practices, as well as to build social networks of learners, could bring down the regulatory silos that limit cross-border collaboration in health education.

#### Box 1. Recommendations for training, empowering and supporting health workers in resource-limited settings through the use of information and communication technologies (ICTs)

- Ministries of health, education, finance and information technologies and communications must coordinate efforts to improve ICT infrastructure, expand broadband access and support e-learning initiatives in health professional institutions and health programmes.
- Ministries of health and health professional organizations must fully embrace e-learning through the establishment of standards and accreditation procedures that facilitate the certification and sharing of training programmes for students and of continuing education initiatives for health-care providers.
- Health professional institutions and health programmes should fully embrace e-learning and ICT innovations in training, supporting and empowering health workers at all levels.
- Computer literacy, particularly for women, should be a high-priority competency in all training programmes for health-care workers.
- Specific training of faculty and students in the use of e-learning platforms should be a priority for health professional schools.
- E-learning tools should be blended with other educational approaches designed to help all students achieve the necessary competencies.
- The full range of e-learning tools – learning management systems, massive open online courses, mHealth, the social media, webcasts, decision support tools, simulation training, adaptive learning platforms, etc. – should be utilized in the training of health professionals.
- All health training programmes should include self-evaluation and regular curricular updates to ensure that all students achieve the necessary clinical competencies, regardless of the educational strategies used.
- Support for innovative and sustainable e-learning programmes for health workers should be established through new public–private partnership models that engage the full range of stakeholders.
- The ICT workforce available in resource-limited communities needs to be greatly expanded to provide health programmes with highly qualified, affordable and innovative ICT support.

Governments and donors will need to be shown evidence that investments in ICTs and e-learning for health workers lead to programmatic cost savings, increased productivity and improved health outcomes. New models of public–private partnership are needed to ensure the scalability and sustainability of investments in ICTs for the support of health-care workers. Governments and donors will need to recognize that corporate partners expect public–private partnerships to lead to new business and new markets. Similarly, private sector partners will need to recognize that governments, donors, health programmes, institutions and communities will expect public–private partnerships to lead to sustainable improvements in programmatic efficiency, productivity and improved health outcomes.

We recommend several measures to train, empower and support health workers in resource-limited settings in Africa, Asia and Latin America through the use of ICTs (Box 1). ICTs are a global transformative force. E-learning and other ICT tools offer ways of bridging the global health workforce gap, but several challenges must be overcome. The ICT “train” has left the station. It

remains to be seen whether the global health workforce will ride along or remain behind. ■

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## A comprehensive health labour market framework for universal health coverage

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In many developed and developing countries, progress towards attaining UHC is hindered by the lack of a health workforce large enough and with the proper skills to deliver quality services to the entire population. Several factors accentuate the problems associated with health worker shortages, especially in low- and middle-income countries: maldistribution and migration of the workforce, inappropriate training, poor supervision, unregulated dual practice, imbalances in skill-mix composition, and reduced productivity and performance.<sup>1</sup> Such problems are, however, not limited to low- and middle-income countries; many high-income countries are likely to face severe shortages of health workers because of budget cuts for social services resulting from the global economic downturn. The ageing of the population puts further pressure on health systems by increasing the demand

for health care. Moreover, the changing dynamics of workforce migration, such as the increased exodus of workers from one developing country to another, pose a challenge for global health labour markets.<sup>2</sup>

### Comprehensive health workforce policies

To address the challenges described and attain UHC, countries will have to develop effective policies to optimize the supply of health workers. This can only be accomplished through comprehensive planning of the health workforce based on an in-depth analysis of the health labour market to understand the driving forces affecting workforce supply and demand, both within countries and at the global level.

Partial health workforce policies designed on the basis of needs-based estimates and focused on training more health workers are not sufficient in addressing health worker shortages. The needs-based approach consists of estimating the number of health workers required to meet the needs of the population. Although these estimates are useful to inform the demand of health workers, they are not enough to formulate effective health workforce policies because they ignore the dynamics of the health labour market.<sup>3</sup> Workforce shortages cannot be resolved by simply training more health workers; the health labour market conditions also have to be such that the newly-trained health workers can be absorbed into the health workforce. Otherwise, a fraction of them will migrate, work in another sector or remain unemployed and the resources

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