Strategies for last mile implementation of global health technologies

Many global health technologies, including medical devices and interventions, have been developed specifically for low-resource settings, and aim to be of low cost, easy to use, and culturally appropriate.[1] Although their design, development, and clinical validation are often well funded, these devices commonly fail to reach scale of production and implementation in their intended markets.[2,3] Some international organisations have emphasised the ability of global health technologies to support universal health coverage.[4] However, the extremely difficult so-called last mile translation (eg, the final phase when the product is finally delivered to patients and providers) for existing, highly effective medical devices has to first be addressed to improve health-care in low-resource settings.

In 2009, WHO, after realising the shortfall in appropriate medical devices in developing countries, called for innovative health technologies to address the technological gap between health-care settings in developed and developing countries.[1,5] WHO's programme, the compendium of innovative health technologies for low-resource settings,[5] features some of the most promising global health technologies. Examples include a sleeping bag incubator to keep newborn babies warm, a breathing assistance device to prevent respiratory failure in premature babies, and phototherapy lights to prevent neonatal jaundice. Although WHO features these technologies, the responsibility for the quality, safety, and efficacy of each technology is with the developer or manufacturer.[5] Similarly, in 2012, the UN Commission on Life Saving Commodities produced a list of 13 low-cost, highly effective interventions to improve neonatal and maternal health, which included three medical devices: a female condom, neonatal resuscitation mask, and a syringe to administer antibiotics.[6] Both these programmes provide a clear picture of technologies that could potentially have a great effect on health in developing countries, but can also easily falter in the scale-up and commercialisation processes.

There are several barriers to the taking of existing global health technologies to market that range from problem identification and problem validation, and extend to last mile implementation. Many technologies are developed by individuals with strong engineering and technical skill, but who are often inexperienced in the commercialisation and business of medical devices that is necessary to scale-up the device. Often, inventors from developed countries find a dilemma in whether to seek regulatory approval in their own country, which might lead to changes in design, increases in cost of goods sold, and increased time to implementation. This dilemma is exacerbated by the decrease in investments in medical technologies during the past few years and the challenge of attracting investors to low-margin medical devices for global health. To secure international intellectual property protection, patent applications need to be filed in each country the device will be used in. Some international agreements exist, but these provide restricted protection, and operations outside of these regulations would be likely to prevent licensing agreements from being reached with medical device corporations and could restrict reverse innovation. Once these initial challenges are overcome, issues will remain for last mile implementation such as management of the supply chain—which includes components of procurement, distribution, and maintenance—and obstacles from affordability, biomedical engineering requirements for device maintenance, and adoption. These barriers show that last mile implementation of global health technologies is complex, and could be strengthened by policies to encourage inventors and investors to pursue innovation in global health technology.

To address these barriers, we propose a new funding structure that provides incentives for collaboration between developers of global health technologies and private-sector medical device companies that might have the infrastructure, expertise, and networks necessary to launch these devices into the environments they are designed for. The programme we envision would select promising health technologies, and link inventors and devices to a contracted multinational medical device company. This programme, subsidised by government or the non-profit sector, could then produce and distribute

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a set number of devices in designated low-resource regions. Our programme would provide a proof of principle for the translation process, knowledge about many unexplored components of the commercialisation process, and could be the necessary catalyst to upscale the entire specialty of global health technology. Additionally, we advocate increases to funds allocated directly to the commercialisation process for qualified global health technologies that have shown clinical efficacy, international recognition towards universally accepted regulatory standards in low-resource countries, and reciprocal intellectual property protection.

Improvements in access to health technologies will facilitate universal health coverage in both urban and rural settings in developing countries. Although we support continued investment into the development of new technologies for global health, there should be specific policies to support translation of needed and validated devices that have already been developed into common health practice, to break the stagnation in last mile translation of these global health technologies.

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