Science and education as antidotes

On 23 March 2014, the World Health Organization (WHO) was notified of an outbreak of the Ebola virus disease in Guinea. By 8 August, the WHO had declared the epidemic to be a public health emergency of international concern. By then, the number of reported cases had reached 1440 with 826 deaths recorded.

Just 4 weeks later, the reported cases had more than doubled to 3069 and the deaths almost doubled to 1552. By then, the most affected countries were putting major efforts into campaigns aimed at control and awareness, with the support of WHO, the UN, Médecins Sans Frontières (MSF) and Western countries. But it was only when the number of reported cases had reached 9911 and the deaths numbered 4868, in October 2014, that the Chair of the African Union (AU) Commission, Nkosazana Dlamini-Zuma, set off to West Africa to visit the three countries at the heart of the Ebola crisis. Her visit came 6 months after the crisis began, and despite widespread concerns across Africa and the world that the epidemic could very quickly spread out of control. Well before the AU visit, the US Center for Disease Control and Prevention (CDC) estimated that infections could reach 1.4 million by February 2015. And in September 2014, at the end of a history of suspicion and violence, eight health and medical workers were killed in Guinea by a mob whose members believed that the workers were spreading Ebola. It is difficult, under these circumstances, to understand why the AU took so long to respond to a regional crisis that could easily become a continental disaster.

It is not surprising, then, that there has been a focus on the importance of science and education, on information and understanding, as ways of facing not just this, but other epidemics. Sound, functioning systems of public health and good information are clearly essential. But the roles that science and education can play should contribute to prevention and cure and, where necessary, to stemming the rates at which epidemics spread.

Closer to home than the centres of concern (although her speech was given in New York in late October), Minister of Science and Technology Naledi Pandor pointed to the role that science has played in eradicating polio and smallpox through the development and widespread use of drugs and vaccines. Her view is that without major efforts to promote, support and invest in the development of science, technology and medicine in Africa, the countries of the continent will not be able to assist in the effective transfer of technology into the continent from outside, nor will there be a drive to develop local innovation aimed at meeting 'local' needs. Of equal importance are the roles that science and technology need to play in ensuring that the Millennium Development Goals are met, so that the underlying causes of the spread of disease, including poverty and very low levels of medical care, are addressed.

Much the same can be said for education. Development sites tend to focus on immediate, crisis educative solutions, which are inevitably short term: radio broadcasts (a good idea for the most part); house-to-house dissemination of materials (possibly useful for literate households); and the provision of mobile phones and solar-powered tablets (an expensive option in countries without sufficient funds to deal with crises in the first instance). The more serious considerations are those that mirror Minister Pandor's call for science and technology to be taken seriously across the continent – taking primary education and literacy seriously. Both are expensive, but have longer-term, potentially preventative benefits. Primary school attendance rates in the three most affected countries – Guinea, Sierra Leone and Liberia – are difficult to determine but would seem to be 74%, 70% and 41%, respectively. This means that, in Guinea, a quarter of the children in the relevant age cohort are not in primary school, in Sierra Leone 30% and in Liberia almost 60%. Adult literacy rates are worse.

Nor is it just inadequate formal education that presents challenges. Community and tradition are closely interwoven so that deep-rooted cultural practices sometimes override the benefits that could possibly come from better education (especially public health education). Extended families share homes, cooking implements and facilities – so cultural norms have, in fact, contributed to the rapid spread of the virus. Yet it is also true that the school and adult education data are closely tied to poverty and joblessness, and imply an urgent need to address these shortcomings as part of a long-term programme aimed at ensuring that diseases are more quickly and easily controlled.

The various needs to drive rapid growth in science, technology, health and education are, however, drawn together into a critical nexus at the level of higher education – both on the African continent and in countries of the South and North that have the will to develop knowledge and skills that can feed directly back into the continent.

The Ebola epidemic has, as a consequence, received attention not just from the expected organisations (WHO, the CDC, the UN and MSF) but also from major international universities that are providing expertise in scientific, medical and public health areas. Yale has scientists from its Schools of Public Health and Medicine working in Liberia, while, in August 2014, researchers from the Broad Institute and Harvard published (in *Science*) their findings on 99 Ebola genomes, identifying mutations important for diagnostics and treatment. Oxford has made available, free of charge, research on Ebola published in 13 of its medically orientated journals, while the London School of Hygiene and Tropical Medicine, teamed with the Institute of Tropical Medicine in Antwerp, is assessing whether or not treatment with antibodies in the blood of Ebola survivors could help infected patients to fight off the disease.

These are all critical contributions of the kind that science and technology can make in limiting the effects of the current epidemic. The calls for, and implementation of, intensive public health and general education are equally important. In the longer term, the unknown consideration is whether or not the Ebola crisis, and the deaths of as yet unknown numbers of people in Africa and elsewhere, will be sufficient to ensure that Minister Pandor's words will be taken seriously and put into practice.

HOW TO CITE: Butler-Adam J. Science and education as antidotes. S Afr J Sci. 2014;110(11/12), Art. #a0087, 1 page. http://dx.doi.org/10.1590/sajs.2014/a0087