



THE SEARCH FOR HEALTH SOLUTIONS MUST BE BROADENED

NAUFAL/GETTY IMAGES

Human health has improved dramatically over the last century: life expectancy has doubled, childhood and maternal mortality have fallen, and common communicable diseases are in decline. Science has played an instrumental role in these improvements.

However, glaring gaps exist in our current approach to address the extant human health challenges, and our preparedness to face emerging issues in the global interconnected world of the twenty-first century.

Major challenges exist in the realm of human health. Recent macro-level data on human health and development have unveiled large disparities between and within countries. Many low- and middle-income countries (LMICs) still struggle with high rates of poverty, undernutrition and communicable diseases.

Many new and complex issues affect human health. Threats to the environment, water shortages, anti-microbial resistance, ageing of populations, growing burdens of chronic non-communicable diseases (NCDs), such as diabetes, cardiovascular diseases, cancers, and mental health disorders, all have a profound impact on global human health.

Investments in biomedical science seem to have diminishing returns. For example, 71 new cancer drugs were approved between 2001 and 2012. They improved overall patient survival by just 2.1 months,

but substantially increased cost and side effects with the cost of cancer drugs a very significant variable.

The use of expensive therapies with marginal benefits for their approved indications and for unproven indications is contributing to the rising cost of cancer care. We believe that expensive therapies are stifling progress. The promises of genomics, proteomics, and metabolomics — despite enormous investments — are largely still unfulfilled. Further large gains in life expectancy seem unlikely, necessitating an emphasis on quality of life and human development. How can science address these seemingly formidable challenges?

We argue that in order to address these challenges, science will need to undergo a paradigm shift. Researchers must aim to expeditiously improve human health worldwide. The scientific community needs to step beyond basic biomedical sciences and holistically address behavioural, social, economic, environmental, and policy contexts to improve health.

There are two prevalent approaches to scientific advancement: curiosity-driven — impelled primarily by intellectual curiosity — and need-driven, guided by objectively measured and perceived needs in communities. The tension between them is particularly relevant in low- and middle-income countries (LMICs), which have scarce resources for science and large,

WE NEED A STRATEGIC VISION THAT UTILIZES CURIOSITY AND NEED.

diverse health needs, but where researchers face substantial pressure from powerful stakeholders like external donors and private for-profit interests.

Twenty-first century health and human development requires greater emphasis on need-driven science. We need a strategic vision that utilizes curiosity and need as part of a whole, guided by basic principles that unify science with health and human development.

We can use robust surveillance systems to systematically map health priorities at global, national and sub-national levels. Two good examples are the Global Burden of Disease (GBD) study and the Nutrition Dashboard Project. These data need to be made widely available, and accessible to policymakers.

Researchers need to address issues that are high health burden priorities. For example, hypertension is a leading risk factor for death and kills more than 9 million people annually worldwide. Controlling it can save more lives than any other clinical intervention. Tools to diagnose hypertension are easily available and multiple inexpensive medications exist to treat it. Yet hypertension detection rates remain low and among those with diagnosed hypertension in both lower- and higher-income countries, fewer than half have reasonable control of their blood pressure.

Focusing on healthcare systems and delivery can address such challenges. We also need to

Yogeshwar V. Kalkonde *Society for Education, Action and Research in Community Health, Gadchiroli, India*
Devaki Nambiar *The George Institute for Global Health, New Delhi, India*
Prashanth Nuggehalli Srinivas *Institute of Public Health, Bengaluru, India*
K.M. Venkat Narayan *Emory University, Atlanta, USA*

pay more attention to structural and macro-economic drivers of common health issues, such as powerful industrial interests driving environmental degradation, unplanned urban sprawl, tobacco, processed and sugar-laden foods.

Many of the human health problems that we face are exceedingly complex. We need collaborative multidisciplinary approaches to solve them. A recent example is the development of a rotavirus vaccine. Rotavirus causes between 75,000-122,000 deaths each year in India. A team effort — involving clinicians, virologists, epidemiologists, a biotech company and a publicly funded governmental organisation, universities, and a philanthropic organisation from India and the United States — led to the successful development of an effective and inexpensive vaccine.

Health researchers need to view communities not as passive recipients of their work, but as engaged co-creators. There are several successful exam-

ples in India where involving community health workers and implementing participatory learning and action have led to substantial reductions in infant mortality.

Researchers need to work closely with policymakers and implementers to translate research findings to improve health services. Implementing public health policies based on scientific evidence can bring big rewards. For example, the use of palm oil — a cheap option for cooking — leads to increased serum cholesterol levels. When the government of Mauritius initiated a programme to switch people from palm oil to soya bean oil, serum cholesterol levels were significantly reduced in the community.

Equity and ethics need to be weighted more heavily among success metrics to guide science for health and human development, particularly when considering disadvantaged populations who often do not have a voice in determining research priorities.

Also, profound ethical

EQUITY AND ETHICS NEED TO BE WEIGHTED MORE HEAVILY AMONG SUCCESS METRICS.

questions will emerge as new and powerful technologies evolve to achieve solutions once considered unachievable. Many of these will force shifts in social and cultural norms and legal structures. We will need continuous conversation between scientists and society as an integral part of using science for human development.

We are in one of the most exciting eras in human history. In the last century, science and technology have brought unprecedented health gains. Most of those gains have originated in areas of science outside biomedicine, and this is likely to be even more frequent in the coming century. To improve human health, we will have to pay great attention to population needs and direct scientific research from a core vision of human development.

Strong and independent national institutions, similar to the US National Academies of Science, Engineering, and Medicine, can help keep the vision and focus on human development. We urgently require more funding for need-driven science aimed at human health, and to integrate basic and population health sciences towards this end.

The Wellcome Trust/DBT India Alliance is an example of such efforts. Good health and well-being is crucial for human development, as articulated in the United Nations' Sustainable Development Goals. Realizing that aspiration will need in ample measure the wisdom of Goethe: "Knowing is not enough, we must apply. Willing is not enough, we must do." 

TIM GAINEV/JALAMY

