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HEALTH: **NANOTECHNOLOGY FOR HEALTH**

OPINIONS

Nanotech for health is not just about disease

Guillermo Foladori

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In developing countries nanotechnology for health should improve living conditions not just treat disease, says *Guillermo Foladori.*

Development related to water purification could be a key application of nanotechnology
Flickr/Water, Sanitation and Hygiene Photos

If nanotechnology is to play an important role in developing countries' health systems, two conditions need to be fulfilled. Research and development (R&D) must target the main health problems in each country. And developing countries that face similar challenges should form a strategic R&D alliance, preferably with a common fund set up by governments to finance R&D relevant to their needs.

When it comes to nanotechnologies and the health sector in developing countries, some issues simply cannot be ignored.

First, we must remember that health policies are not just about curing disease, but about keeping people healthy. The main health problems have socioeconomic and lifestyle causes, and they cannot be solved by technology alone, however sophisticated it may be.

Second, people often suppose that new technologies are more efficient than old ones, and that the cure with high-technology treatments will be faster than with alternative and complementary medicines. But the increased use of alternative medicines, even with a minimal or non-existent budget for R&D in these areas, suggests the "silver bullet" approach that prevails within mainstream drug development is not necessarily the best.

Third, nanotechnology research is increasingly expensive and tends to be concentrated in developed countries. Nanotechnologies remain mainly in the hands of major pharmaceutical companies with interests in diseases — and markets — that can pay for expensive treatments.

Should developing countries opt out?

Does that then mean it would be better for developing countries to stay out of R&D in nanotechnology for health? No! It is not wise to stay out of global developments in science and technology. Instead, every effort should be made to channel R&D towards solving the most important problems facing the populations of developing countries.

But that is not straightforward.
When a company shows interest in production, it is aiming at those who can afford to pay. This means that their production models for a new medicine, medical device or diagnostic device is oriented towards the most affluent, deepening inequity and blocking development. New technologies won't help development if they lack a strong

strategy linking research, production and consumption. Fortunately, examples of this kind of strategy already exist in public health sectors in some developing countries.

Cuba, for example, has researched, and now produces several vaccines and serums for use by its own population — and even exports some. When its own production capacity was overloaded in the early 1990s, Cuba established collaborative production agreements for meningitis B vaccine with Brazil. Such examples can provide a model for nanohealth.

Individualised and expensive

Nanotechnologies are increasingly present in all health areas. Usually, the application is in diagnosis, supplements or implants, and pharmaceutical products. Nano diagnostic devices usually have several virtues, including speed, their ability to diagnose *in situ* (raising the possibility of prompt alerts), and precision and individualised diagnosis. It is not yet clear, though, whether these advantages will also work on a mass scale among poor people.

Supplements and implants are another fast-growing branch of nanotechnology. But costs make them less likely to become a solution for the vast majority of the population in developing countries.

And pharmaceutical companies often particularly look to research into nanotechnologies to individualise medicines according to genetic information and individual analysis, which also makes them less appropriate for mass application.

A preventive approach to health

Perhaps the nanotechnology application areas most likely to benefit poor populations and trigger development relate to water purification, clean environments and waste processing, and to vaccines and devices that make transporting, storing and applying them easier. Put simply, nanotechnologies that improve living conditions could have massive benefits for health.

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This article is part of a spotlight on Nanotechnology for health.