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Why open source pharma is the path to both new and cheaper medicines

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Breaking the cycle in which only highly profitable drugs reach the market is not just the responsibility of government

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Open source pharma would provide a genuinely new, competing model for the discovery of new medicines. Photograph: Alamy Stock Photo

We can all agree that we have some life-saving medicines available to us. We may have benefited directly, or have family members who are benefiting at the moment.

Some medicines, however, are too expensive. Some don't work too well and there are, of course, many terrible diseases for which we have no medicines at all. These issues affect rich and poor nations alike.

It's tempting to shrug our shoulders at this point and think that that's just the way things are. But, when it comes to health, we really shouldn't. If medicines are too

expensive, we need to ask why. If there are diseases affecting millions of people where simple medicines would make a huge difference yet are unavailable, we need to look at where the failure lies. If we are facing a looming healthcare catastrophe, as we are with dementia and antimicrobial resistance, we need to take stock and ask if we're in the best shape to solve the problem before it hits us.

There has been a lot of talk about alternative ways of doing things. Ways of bringing medicines to market that are different and which might plug some of the gaps we face. For example, the UN said last year, after a long, worldwide consultation, that we should experiment with a model in which the price we pay for a medicine is not related to how much the medicine costs to create. This would solve the "access to medicines" problem but creates a new "how to fund it" problem.

In science, it's best to share. That's why we publish. It's meant to be the reason we patent things - to declare publicly what we've done in exchange for some exclusivity.

The thing about sharing is this: it's better the more you do it. I and others have shown that we can learn a lesson from software developers and share everything we're doing in real time in a so-called "open source" model. Anyone can chip in, there are no secrets. We all therefore learn from things that didn't work out and we don't duplicate each other.

At Open Source Malaria we're running a worldwide consortium in drug discovery and development that aligns closely with this way of working. We gain the benefits of working with scientists the world over to accelerate the science. The Medicines for Malaria Venture shares antimalarial molecules with everyone to catalyse new research directions. CO-ADD screens molecules from the community in the search for the next antibiotic and will share the data. The Structural Genomics Consortium works out the structures of biological molecules and release those structures to stimulate new approaches to curing disease; much of the public domain work is funded by the pharmaceutical industry.

There remains a very significant and reasonable camp of naysayers, who bring up a valuable point: That's all very well but, if there's no secrecy, then who is going to pay for all this work? How will you ever get a drug to market?

It is generally thought that if you have no secrecy - if everything is in the public domain - then you can't patent things. If you can't patent, then you can't have exclusivity and without exclusivity you will never recoup the money you poured into the research. A looming money problem at the end of the project means people are nervous about investing at the start.

This is no longer, in the modern world, a watertight sequence of reasoning but no matter. It dominates the psyche of everyone involved in discovering and developing new drugs. We recognise the benefits of open science. But we're in the shadow of all the current economic and legal structures of bringing a drug to market.

This dogma corners us. Is there an inherent misalignment between how we discover medicines and extracting the greatest public health benefit? Are we forever locked in a cycle where only highly profitable drugs reach the market, providing a glut of lifestyle drugs rather than anything we can use for Zika, for example?

The key feature of open source projects is that they are available to all. It's not government v company, public v private. It's inclusive of anyone who wants to participate and governed by clear rules around licensing. It's just a way of working. Again the software movement shows us this in action: significant private investment is seen in open source projects (like Android, Firefox etc) upon which a broad community builds. We've seen the same structure in Open Source Malaria: coalescence of experts, student crowdsourcing, key inputs from unexpected sources.

I published a paper on Wednesday with several colleagues from both public and private sectors that argues that open source has an important place in the future of how we create new medicines. That "open source pharma" would provide a genuinely new, competing model for the discovery of new medicines.

We all like competitions, right? Take a moment to remember: as things stand, we have only one general system of creating new drugs. Work in secret, patent, develop, set price with the approval of shareholders. It seems perverse to have no other major option. It's always healthy to have a competition of ideas: fossil v solar, Trump v Clinton, union v league.

Let's imagine someone discovers a new antibiotic. Let's say it's a molecule we all know already and we find it kills superbugs, and we tell the world about it straight away because our lab notebook is right there on the internet. The molecule works pretty well. We need to improve it a bit, then make sure it's safe for people to take and that it works when sick people take it. Then, once we're happy with it, we can put it on the market at a low cost, safe in the knowledge that society will make enormous profits. Profits derived not from cash sales but from there being fewer sick people.

As a member of the public, an open source pharma drug would be a real break from the past. You would, by definition, have access to all the information on the medicine that everyone else has. You would be able to see how well it performs. What possible side effects there are. Why the price is what it is. They say "sunlight is the best antibiotic". I'd suggest transparency is the best suppressor of spin.

Sounds great. The hitch? We have no precedent of this working yet. The initiatives I mentioned above are all in the early "discovery" phase. What we need is a precedent of a drug being taken through the more expensive later ("clinical") stages. And we don't have that.

Well, we have examples of patent-free medicines making a big difference to people's lives (such as the polio vaccine, or penicillin) but we don't have an example of a public domain ("born-open") molecule being taken all the way through to patients so that everyone can see all the details. We have the capability to do this, now that we have the internet, but nobody has ever done it. We share our ideas and work with the click of a button on Facebook but clam up when it comes to science.

We argue in our paper that the time has come to obtain a precedent by trialling some major open source pharma projects. Because, if it works, we'd then have our new competition of ideas, our alternative approach to the current way of doing things. Precedent would mean people would be happier to invest in the future, with clear understanding of the downstream economic and legal implications. This is not just the responsibility of government, it's the responsibility of us all. Open source methods are

by definition inclusive of everyone who wishes to participate. The private sector are some of the biggest supporters of open source initiatives.

The Montreal Neuro Institute recently pledged not to patent discoveries for five years and received a $20m investment to enact this vision. The Tata Trusts recently invested $3m in a foundation to pursue open source pharma in India. We need more of this if we are to execute major projects and learn from them. There are no reasons why open source approaches would not work if we have the courage of our convictions and we are emboldened by precedent.

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