TRANSCRIPTION:

Overcoming economic obstacles to developing and accessing new medicines

Presented by Laurence Roope

BID

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Overcoming economic obstacles to developing and accessing new medicines

October 20, 2022

Presented by Laurence Roope

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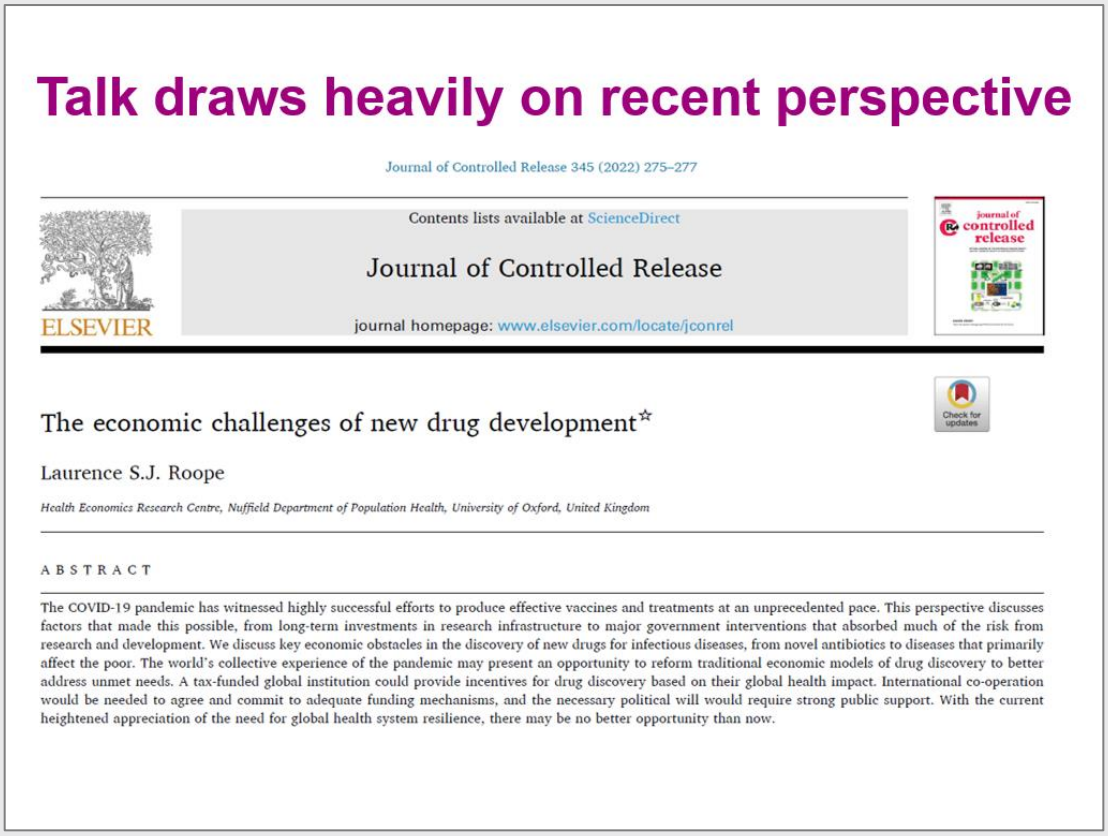
PRESENTATION

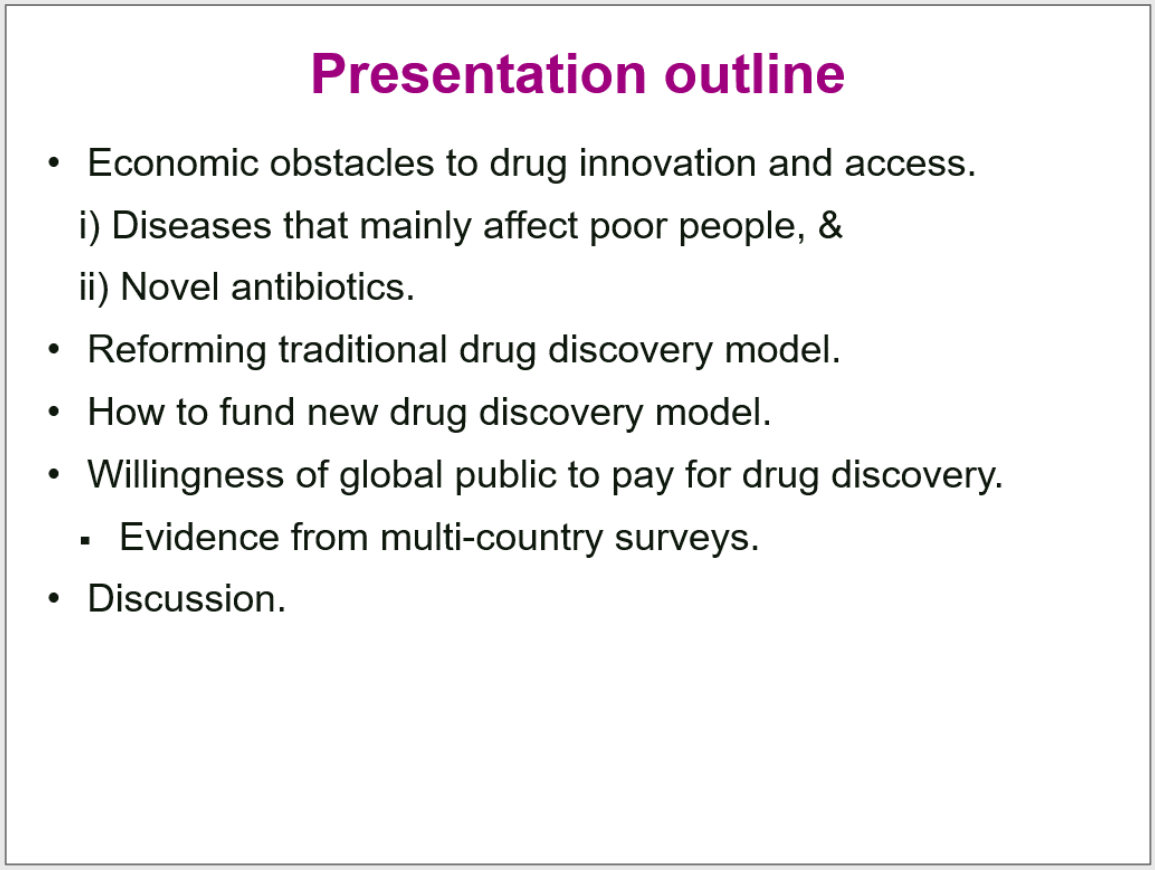
Introduction

Today´s talk is indeed on the topic of overcoming economic obstacles to developing and accessing new medicines.



Talk draws heavily on recent perspective

I should say right at the start that this talk draws very heavily on a perspective that I published a few months ago in the Journal of Controlled Release on this right topic: the economic challenges of new drug development, which also covers some of the access problems.



Presentation outline

So just as a brief outline of what I am going to talk through. I am going to begin by talking about the nature of the economic obstacles to drug innovation and access. And I am going to focus on two main issues. I mean of most interest for us today here I think is diseases that mainly affect poor people. But I am also going to talk a little bit about novel antibiotics and drug discovery for new antibiotics because some of the issues are very closely related. And I think these two problems have a common solution.

We are then going to move on to talking about reforming the traditional drug discovery model, which in some cases is not doing what we want it to. Then we will talk crucially about how to fund such a new drug discovery model and, of course, behind every funding mechanism ultimately it comes back to the general public and to taxpayers. So, we are also going to talk a little bit about some elements of recent country surveys that might give us at least some indication of the willingness of the global public to pay for new funding models that we are going to discuss.

Economic obstacles to drug innovation & access

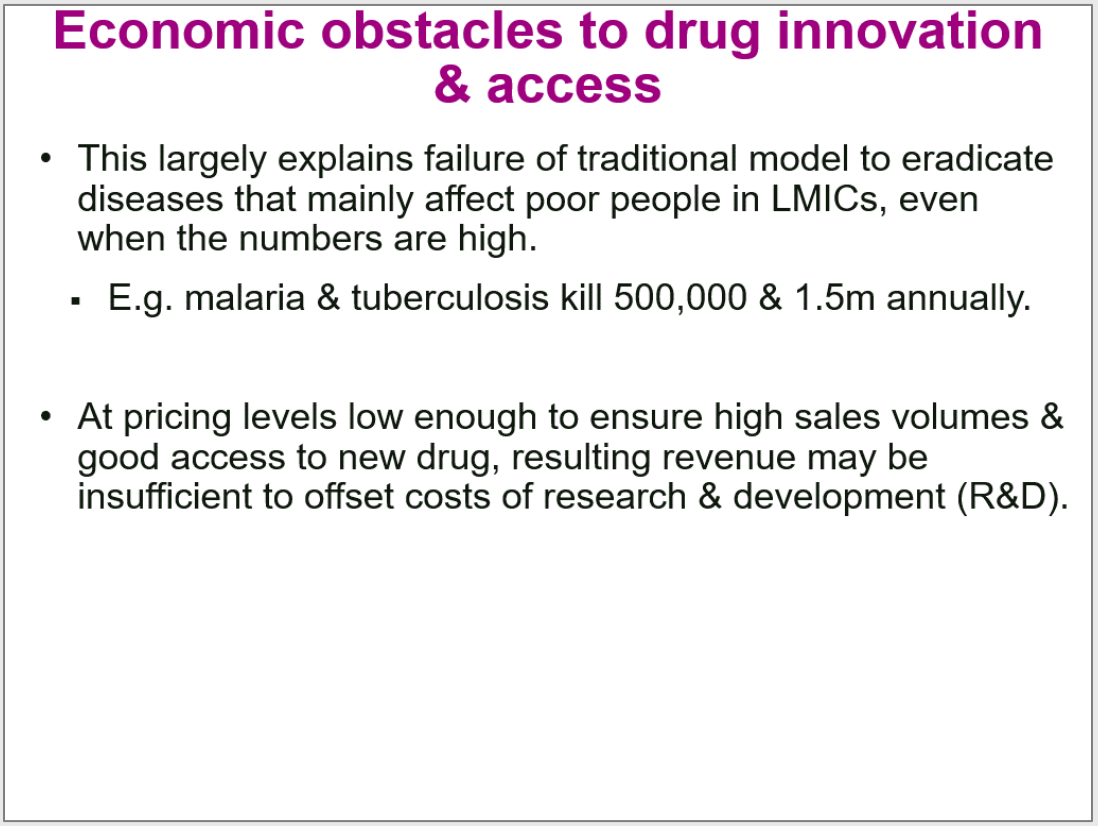
- From drug company perspective, most infectious diseases are low margin businesses.
- Remuneration for drug companies generally based on prices times volumes.
- May only be sufficient financial incentives to innovate if anticipated volumes, at above break-even price, are high.
- Even relatively high anticipated sales volumes may provide insufficient incentives if expected pricing is low.

Economic obstacles to drug innovation & access

Okay, starting off with economic obstacles basically; I suppose what I would say from the start (is that) we are going to be talking mostly about infectious diseases. I am going to say infectious diseases, I am certainly including parasitic diseases such as malaria, Leishmaniasis and so on, and not strictly communicable diseases. But from the perspective of a drug company, really most of these diseases are low-margin businesses. And it almost seems like a too obvious thing to state perhaps, but the remuneration for drug companies is almost always based on prices times volumes. That is, again, almost too obvious to state but actually that one simple fact I think really ultimately goes to the heart of the problem. That is what I am going to try to elaborate on in this talk.

So the cause of this is that there may only be sufficient financial incentives for drug innovation, if the anticipated volumes at above break-even price are high. From the point of view of remuneration for drug innovators it all comes down to prices and volumes. And even if the anticipated sales volume is relatively high, this still might not provide enough incentives for a drug company to decide to engage

in research and development for a potential new drug if they anticipate that the pricing is going to be too low.



Economic obstacles to drug innovation & access

And really this get to the crux of the problem of the failure of the traditional model to eradicate diseases that mainly affect poor people in lower middle-income countries. And this is the case even when some of the numbers are quite high, I mean, for example malaria and tuberculosis respectively kill around half a million and 1.5 million people each year. So, these are not small numbers. But, there are diseases that primarily affect poor people. And that puts a limit on the prices that are likely to be paid for these drugs. So at pricing levels, which are low enough to ensure high sales volumes and good access to a new drug, the issue is that the resulting revenue might not be sufficient, from the drug companies perspective, to offset the sometimes quiet considerable costs of research an development.

Economic obstacles: what about patents?

- Patent is a cornerstone of the traditional economic model.
- Aims to improve incentives for innovation.
- A patent provides a company exclusivity for a period of time to manufacture, market & sell new drug.
  - E.g., in the US, typically 20 years from filing date.
- By eradicating competition, this enables drug innovator to charge higher prices.
- Intent from societal perspective: accept short-term reduced access to drugs as price of better incentives for future innovation.

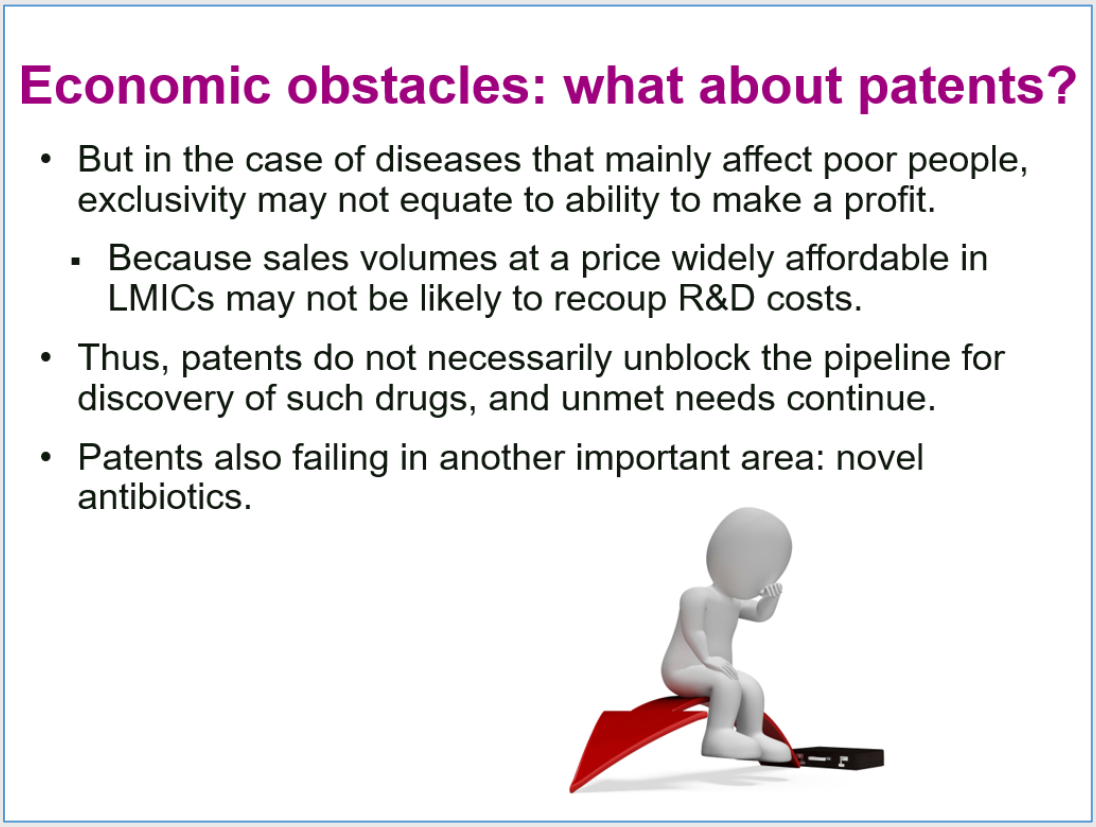
Economic obstacles: what about patents?

What about patents? Patents are of course very much a cornerstone of the traditionally economic model of discovery. And ultimately the idea behind a patent, perhaps, is not a bad thing. You know patents are there to provide incentives for innovation. And in some context, they do at least a reasonably good job to providing those incentives and of leading to innovation.

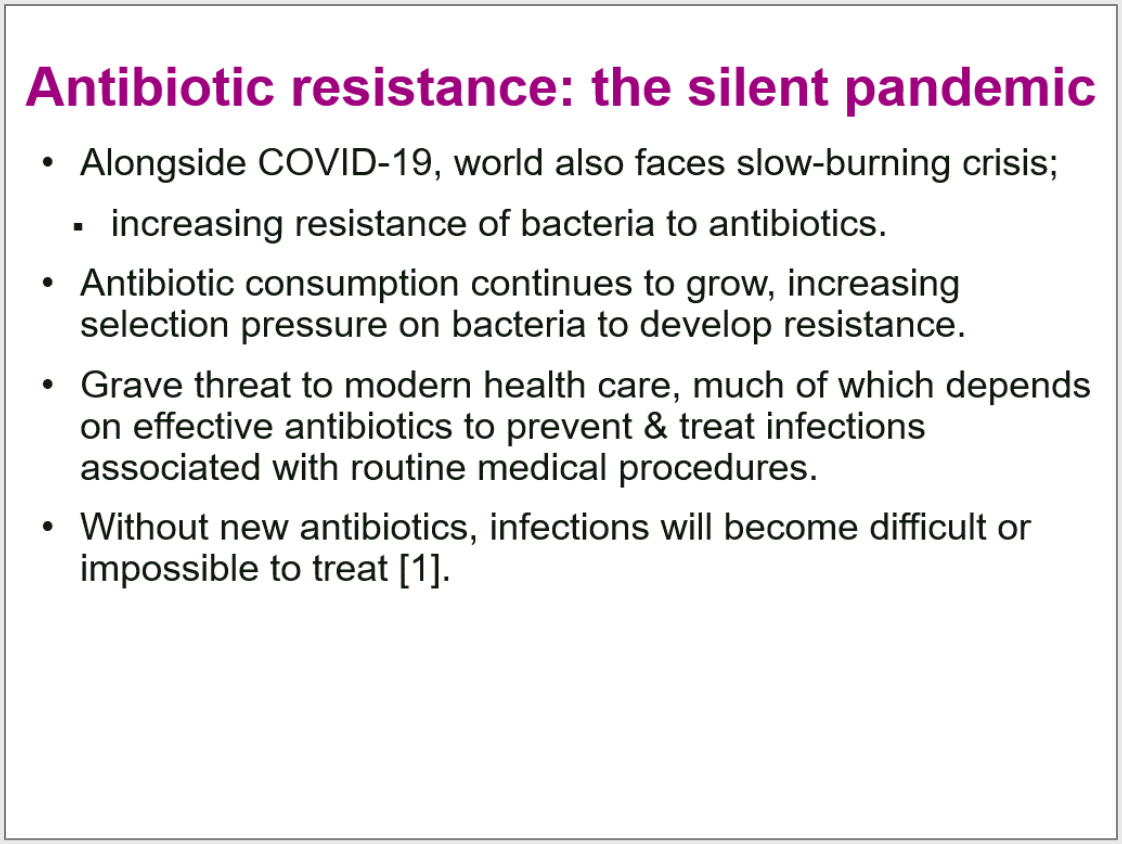
A patent provides a company basically a monopoly, usually for a period of around 20 years after they file the patent. And the idea behind this is– I mean probably anyone feels that monopolies are not a good idea per se – that by eradicating competition for the drug innovator for a period of twenty years, this enables them to charge pretty high prices because they have no competition and to try to make up, possibly, very large costs of research and development over this twenty-year period. And after this twenty-year period - extensions are sometimes possible - usually the market becomes open then to competition and generic medicines. So really the idea from a societal perspective of patents is that we accept some short-term reduced access to the drugs, due to the high prices, as the cost of leaving

better incentives for future innovation on drugs. So, the idea is that this is going to encourage firms to get involved in research and development. The thing is, while it may work in some contexts, it unfortunately does not solve the economic obstacles for diseases that primarily affect poor people. And the reason is that this monopoly that a patent holder has does not equate necessarily to the ability to make a profit. And again, this really comes down to prices and volumes. The fact is that at a sales volume at a price which is widely affordable in lower middle-income countries, and which therefore would provide good access to a new drug, this is not going to be likely to recoup research and development costs very often. And the cause of this is that patents do not necessarily unblock the pipeline for discovery of drugs. I am not suggesting that patents are necessarily the obstacle but definitely they don't remove the obstacle. The obstacle is this fact that the reward, the remuneration, is entirely based on prices and volumes.

Patents are also failing in another very important area. And that is novel antibiotics.



Economic obstacles: what about patents?

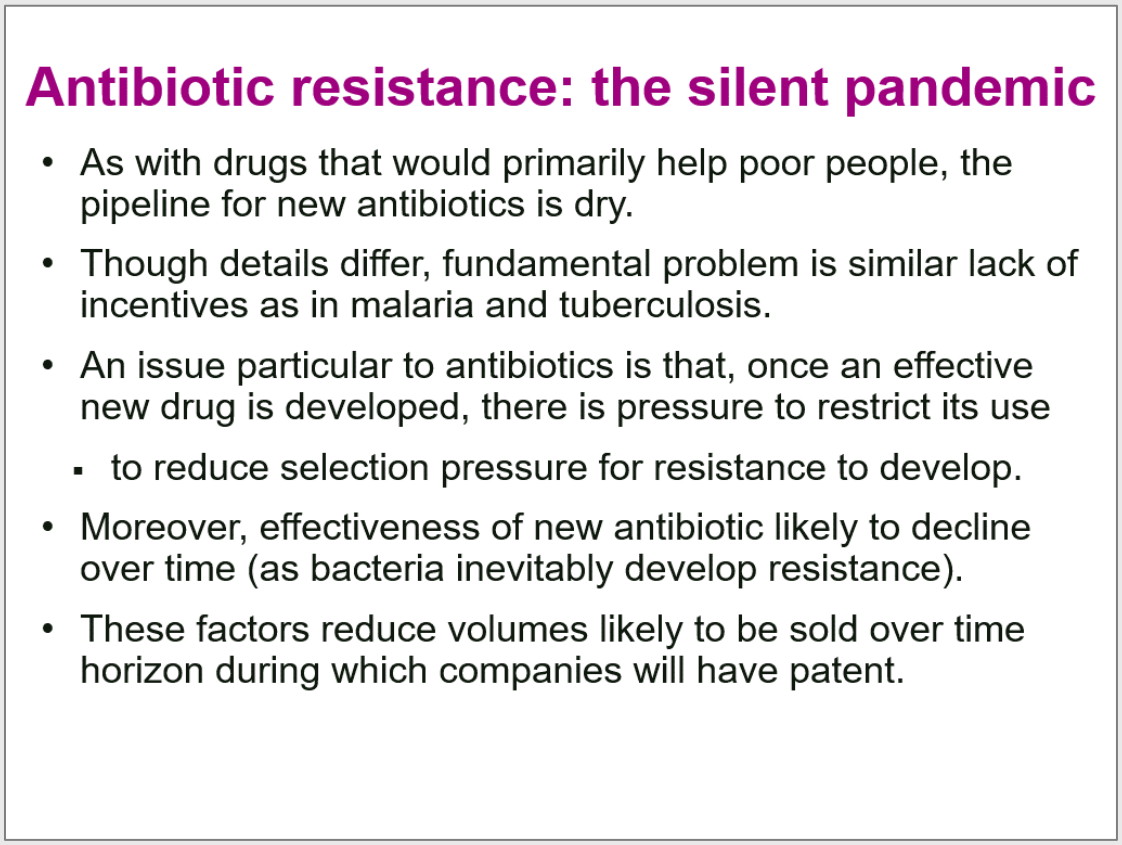


Antibiotic resistance: the silent pandemic

So, antibiotic resistance, the increasing resistance of bacteria to our stock of antibiotics is sometimes referred to as the silent pandemic. It is sometimes being set alongside COVID-19. We have also been facing this much more slow-burning crisis. And unlike the so-called diseases of the poor this is a problem that affects all countries including certainly high-income countries as well as low- and middle-income countries. The problem is as we consume more and more antibiotics and antibiotic consumptions continues to grow, despite the fact that many people yet don't have access to essential life-saving antibiotics, nevertheless overall antibiotic consumption continues to grow. This places increased selection pressure on bacteria to evolve such a way that they develop more resistance to antibiotics.

And this really poses a very serious threat to modern health care. It is not just about the inability to treat infectious diseases that go around but it is also because so much of modern medicine actually relies on use of antibiotics to prevent and treat infections that are associated with all sorts of routine

medical procedures, all sorts of surgeries, even things like cesarean sections or things such as chemotherapy for patients who are suffering from cancer and so on, very much relies on prophylactic preventative antibiotic use and also treatment of use in the healthcare setting. So, without new antibiotics, infections will become difficult or impossible to treat. This would not be necessarily such a problem if we kept creating more and more antibiotics. And there was a period when many antibiotics were developed but we are talking about several decades during which there has been no or very little movement in terms of developing new antibiotics. So, the problem is our existing stock of antibiotics more and more bacteria are becoming resistant to those and we are not developing new ones.



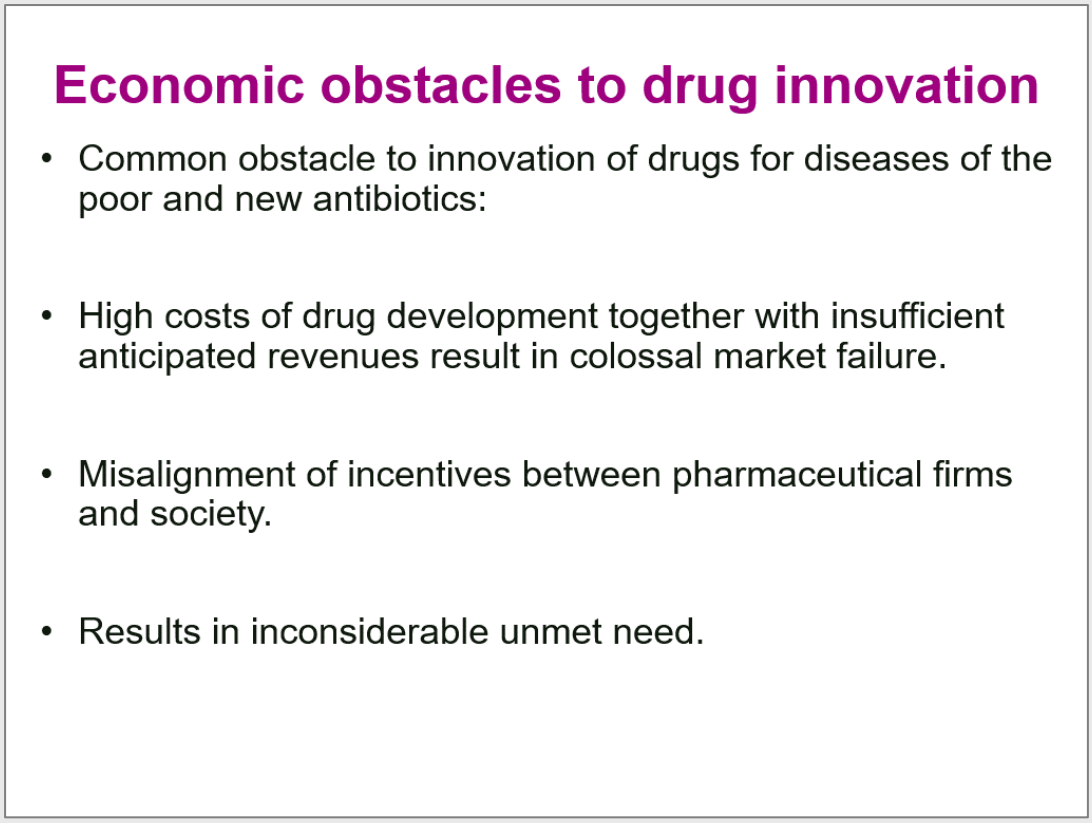
Antibiotic resistance: the silent pandemic

So as with drugs that would primarily help poor people, you know, diseases like malaria, tuberculosis and so on, the pipeline for new antibiotics is also running dry. Although the details do differ in some important ways, which I will discuss, nevertheless the fundamental problem is exactly the same. And that is that there is a similar lack of incentives as there are in diseases such as tuberculosis and malaria

and it boils down, once again, ultimately to this issue of prices and volume be it for slightly different reasons.

One issue that is particular to antibiotics is that once an effective new antibiotic is developed, and this is something in contrast certainly with other diseases, there is actually considerable pressure to restrict its use and the reason for that is that part of the reason that we want to develop completely new antibiotics is not necessarily that we want to have them straight away but we want to have them there in reserve so that, as our existing antibiotics they become less and less effective over time, we start using these new antibiotics for which bacteria are not yet resistant. So we want to try and hold them back almost as a last resort quite often that we can rely upon in the future. Now you can imagine that if you are a drug firm which is thinking about going into research and development project, and if your rewards are based entirely on the amounts that you sell and what you charge for them, you might be very concerned indeed that there is going to be someone that is trying to basically stop you from selling this new drug after you have put all the money into research and development. And this really is at the crux of the problem that is preventing a lot of research and development of new antibiotics and why we have not had really any substantial progress for such a long time.

To compound matters nevertheless, of course, the new antibiotic will be used to some extent and as it is used the effectiveness of the antibiotic will also decline over time as bacteria will inevitably develop some resistance to it. So these factors basically combined so that the volume that are likely be sold, over the twenty years or so that the company is likely to have a patent, is constraint and therefore the rewards. And in fact, the cause of that has been estimated that the net present value of the average research and development project for antibiotics actually makes a loss of around fifty million US dollars.



Economic obstacles to drug innovation

So really there is a common obstacle here to the innovation and the creation of new medicines, both for the so-called diseases of the poor and also for new antibiotics. And this is that the high cost of drug development together with insufficient anticipated revenues based on a prices and volumes model. There is also quite a massive market failure. And ultimately, I suppose what we can say is that the incentives that we gave the pharmaceutical firms simply are not well aligned with the incentives of society. And what we really need to do is to change the incentives that firms face in such a way that they are likely to lead to the outcomes that we want from a societal perspective. And in that case, of course, really that's a global health perspective. So at the moment we are not incentivizing firms to produce medicines for diseases of the poor or for novel antibiotics. And this is resulting in considerable unmet need.

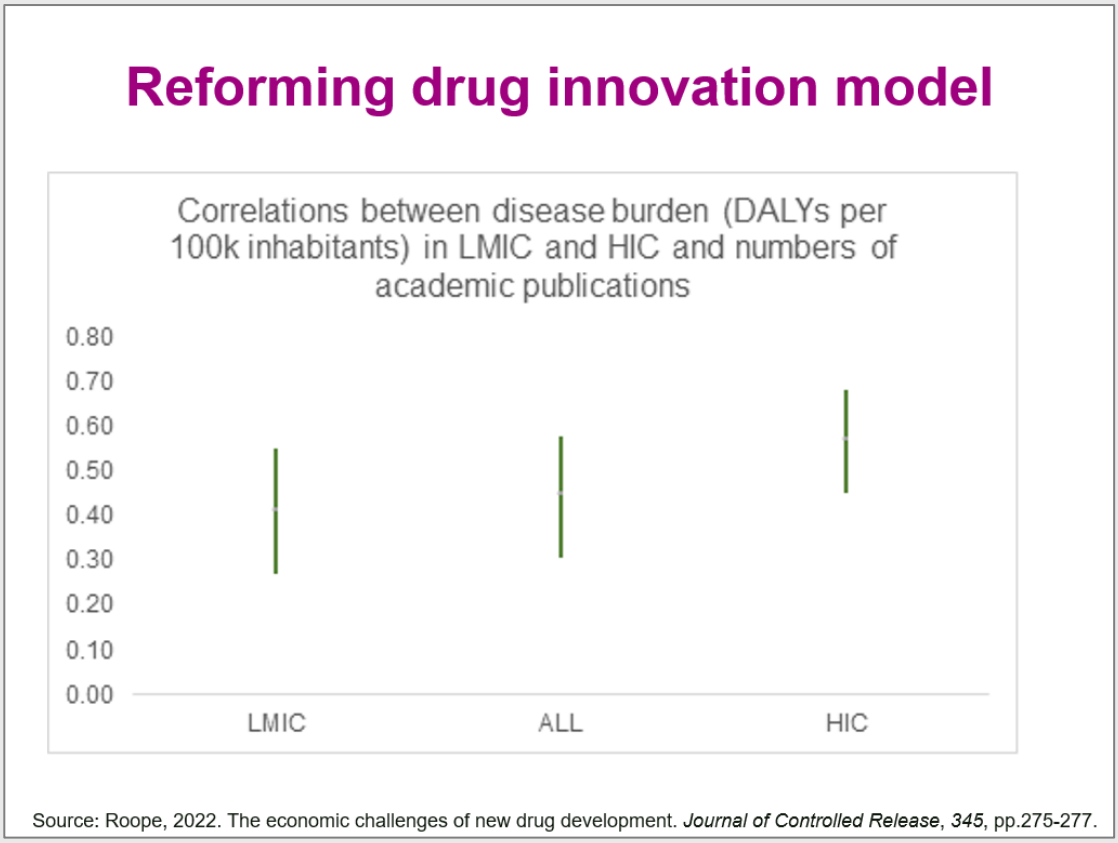
Reforming drug innovation model

- Widely recognised that incentivising novel antibiotic development needs both “push” and “pull” incentives.
- Same is needed to tackle diseases such as malaria & tuberculosis.
- “Push” incentives refer to government or regulatory interventions that bring down R&D costs.
  - reducing their financial risks & increasing probability of success.
- Research grants for targeted basic research could also help to address problem that high-burden diseases in LMICs are relatively under-studied in academia.

Reforming drug innovation model

So how are we going to reform the drug innovation model? Well, certainly over the last few years in the context of people who have been thinking about novel antibiotics particularly, it has really become increasingly and quite widely recognized that the process of rewards needs to change and that basically we need two types of incentives. First the “push” incentive and secondly “pull” incentives. The same I am arguing today applies to tackling diseases such as malaria, tuberculosis and other diseases that mainly affect poor people.

“Push” incentives refer to any kind of government or regulatory intervention that will bring down the cost for research and development, so anything really that will reduce the financial risk of research and development and increase the possibility of success. So, we are thinking here of things like grant subsidies or tax breaks. Another important “push” incentive that would help is giving research grants for targeted basic research and in particular this could help to address the problem that high-burden diseases in lower middle income countries are relatively understudied in academia, at least compared to diseases of high burden in high-income countries.



Reforming drug innovation model

So, if we look at this graph, for example, this shows the correlations between disease burden and numbers of academic publications in low- and middle-income countries versus in high-income countries. So, the disease burden here is measured in disability adjusted life years (DALYs) lost. So basically, due to a particular disease a number of life years are lost and life years also adjusted for disability for someone with a very severe disability who is still alive, nevertheless we consider the loss from that disability as well as the life years lost. So it is a very widely measure of disease burden. Now if we look across the diseases, if we look firstly just at high-income countries the correlation between disease burden and DALYs with numbers of academic publications on that disease, we find that there is a reasonably strong correlation, as we might expect. In low- and middle- income countries there is a reasonable correlation to it but it is not as strong as the correlation in high-income countries. So this suggests that, relatively speaking, there is some sort of skew towards studying diseases which primarily affect people in high-income countries, and some sort of leveling up in the form of more targeted

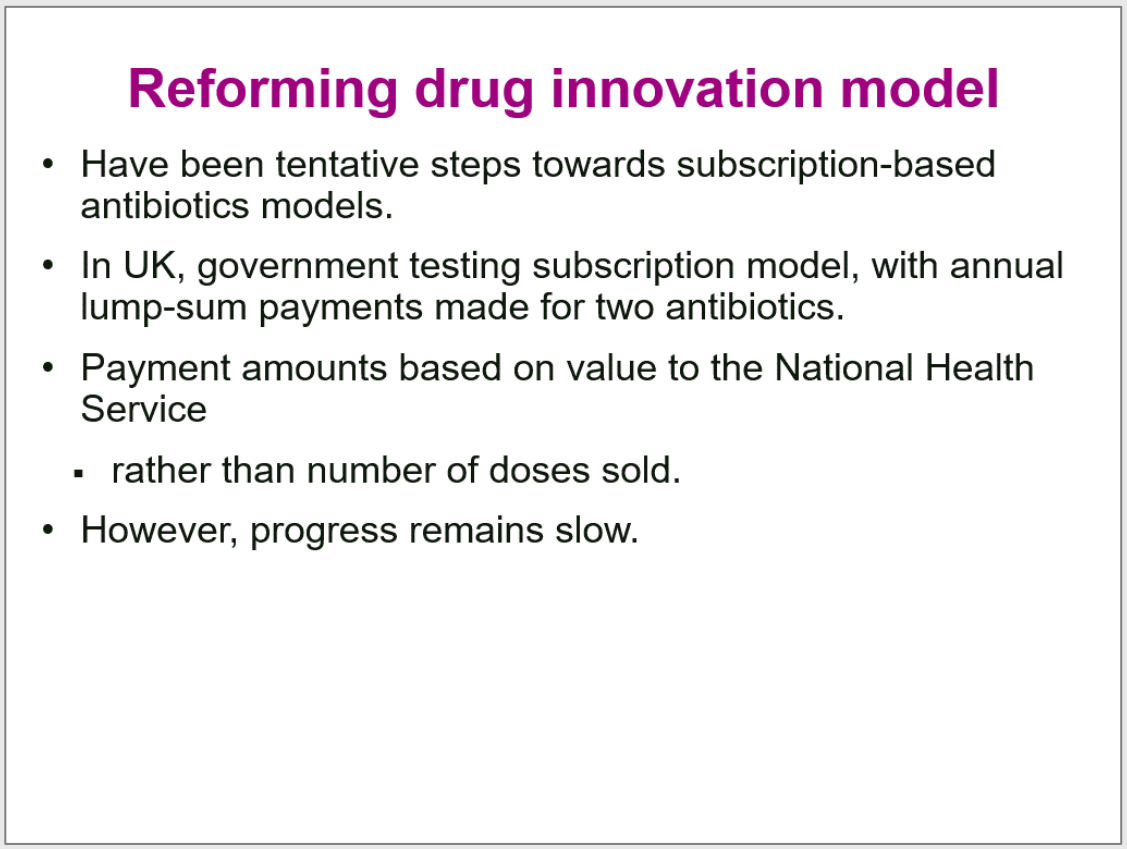
research grants, research funding could be quite an important "push" incentive there if we are thinking of diseases that mainly affect poor people.

Reforming drug innovation model

At least equally important, and perhaps I would say more important than getting the "push" incentives right, is getting the "pull" incentives right. "Pull" incentives are intended to ensure that once we do have a stage of effective drug development and research, that it would provide developers sufficient revenue for an attractive return on investment. So, the idea of pull incentives is that it is going to pull firms in to engage in research and development. The incentives have to be there so that in the future they believe they are going to get sufficient revenue that it is going to be a profitable project. This means that pull incentives need to be designed in such a way that they are incentives even where – especially today and what we are talking about - there are likely to be some combination of low prices or low sales volumes. So, in the case of diseases that affect primarily poor people prices we are going

to anticipate are going to be relatively low and in the case of antibiotics prices could also be low, but certainly volumes are likely to be low.

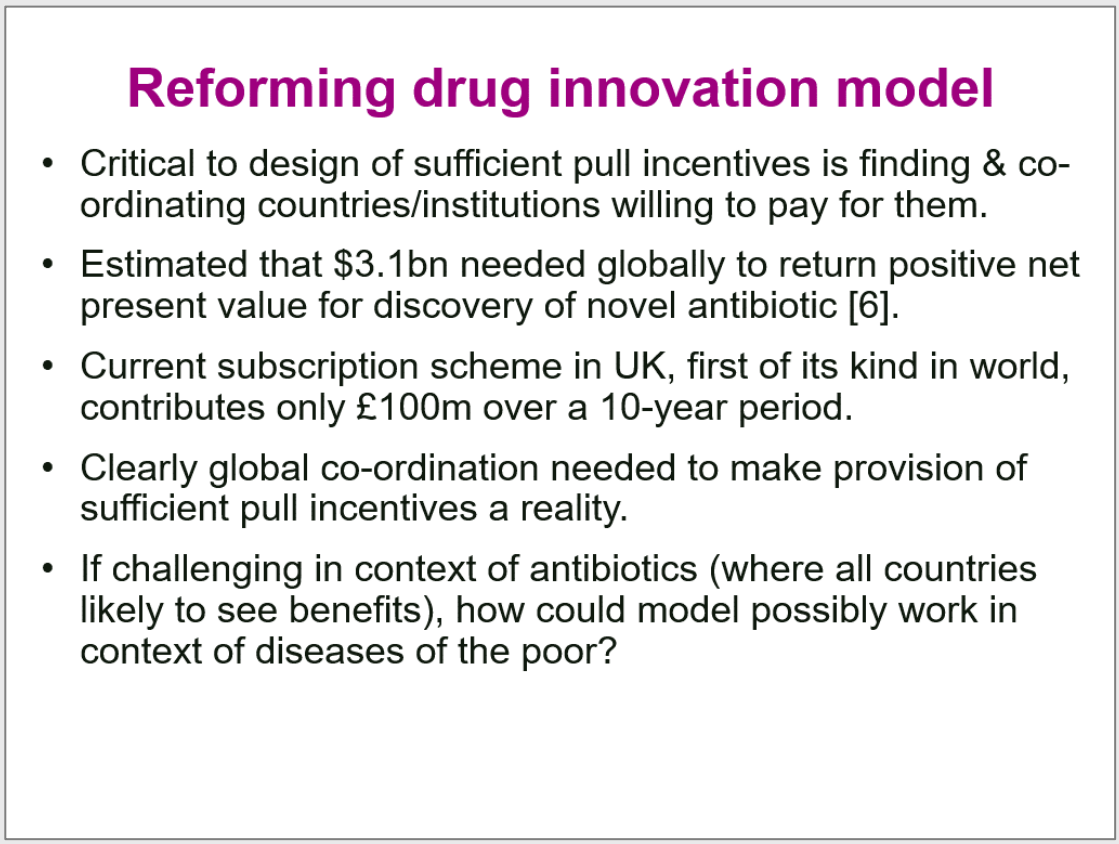
And really there is no other way around this other than somehow delinking the remuneration from drug discovery from prices and volumes. There is really nothing else that can be done to make this add up.



Reforming drug innovation model

In line of this recognition and the case of antibiotics there have been some tentative steps known as subscription-based antibiotics models and probably the most advanced that this has got to has been a pilot that has been running in the UK where the government has been testing a subscription model with respect to two particular antibiotics over a ten year period. And in this scheme the firms that provide these antibiotics are being made lump sum payments each year over this ten-year period where the payment amounts are not based in any way on how many were sold or what they are going

to be charged at but instead they are based on some measure of value to the UK´s National Health System. Now, there is quite a bit of complexity into how this is done but it is ultimately based on some sort of measure of the quality adjusted life years that these new antibiotics are believed to provide versus as if we didn't have these two new antibiotics. So, in other words the additional years of life that people are likely to have across society weighted for the quality of that life depending on the sorts of health conditions that people have. This is something which is in process. And I would say, in passing, that estimating the value of drugs according to something like quality adjusted life years is actually much harder for antibiotics than it is in the case of almost any other kind of medicine. So that is something to bear in mind, for various reasons, primarily due to uncertainties over high resistance to antibiotics (which) is going to evolve over time. Actually, it is very complicated. So if it can be done with antibiotics, certainly it can be done with other diseases.



Reforming drug innovation model

Nevertheless, progress remains slow. One critical thing with designing sufficient pull incentives, whether for antibiotics or for anything else, is finding and coordinating companies and institutions that are willing to pay for these and provide the funding for these rewards.

And to put that in some kind of context, it has been estimated that for a novel antibiotic somewhere between around two and six billion US dollars is needed globally, to return a positive net present value for the discovery of a novel antibiotic.

So, the current subscription scheme in the UK is the first of its kind in the world. So, it is a great step forward but yet, obviously, the numbers are not there. It is just a pilot scheme. The numbers are around a hundred million pounds available over a ten-year period. So, obviously, an awful lot more is needed in terms of global coordination to make provision of sufficient pull incentives a reality.

Now, you might ask: if it is challenging in the context of antibiotics, where all countries are likely to see benefits, including high-income countries, how could such a model possibly work in the context of diseases that mainly affect poor people.

Health Impact Fund

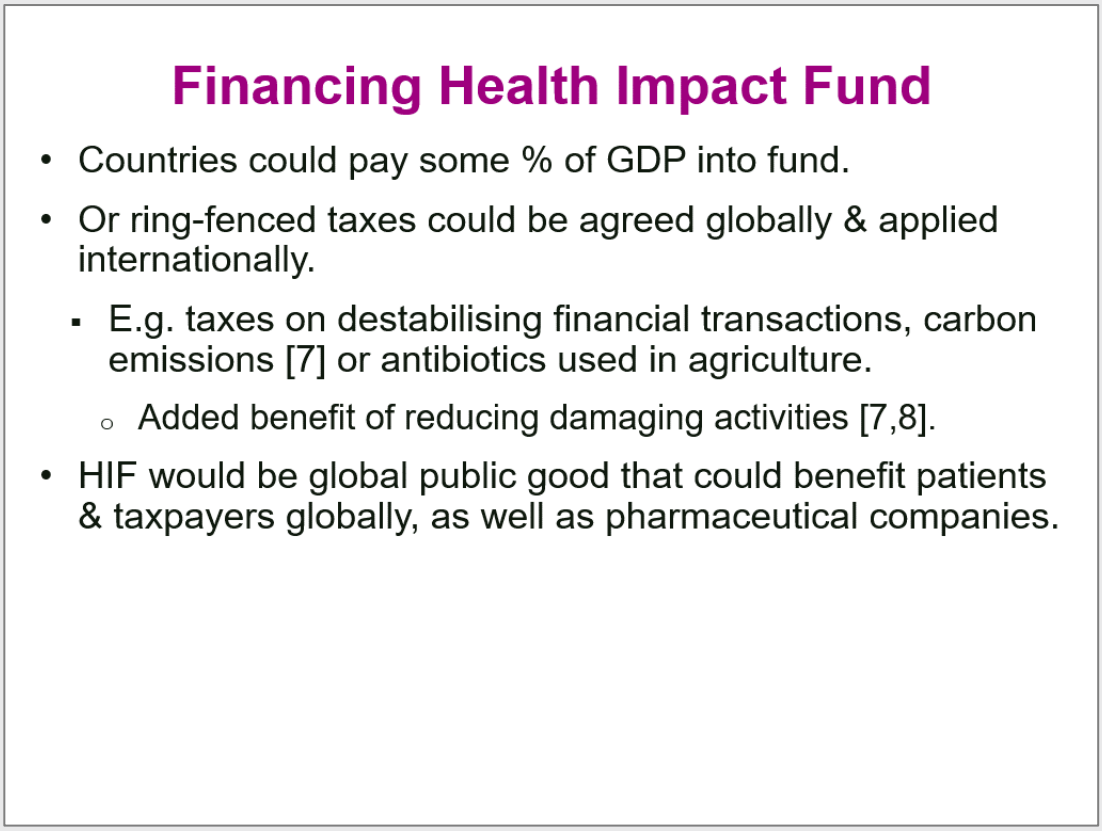
Well, one possibility is the Health Impact Fund (HIF). The idea behind the HIF, which is an idea that has been around for quite some time now, is to create a global government funded agency that offers yearly reward pools from which new drugs can receive a share of those rewards for a fixed period of time, for example, ten years. So, the idea is that firms would register with the HIF and register their new drugs with the HIF. Those firms would be obliged to sell the drug either at or below manufacturing costs. So they would not be allowed to make any profit on actually selling the new drugs that they produced. They would also be obliged to license the new drugs cost free for generic production after this reward period expires, so they don't make any money whatsoever from sales but they get a reward which is entirely based on the global health impact of the new drug. So, what would happen is that the HIF would look at all the new drugs that are registered with it, an analysis would be done for those drugs, estimates would be made for their contribution to global health, via estimates of something like the quality adjusted life years that they would provide, just as in the UK´s antibiotic subscription pilot. And if, for example, one of the drugs was particularly successful out of all the drugs that were registered with the HIF, let´s say it accounted for half of all the quality adjusted life years out of all

the drugs in this pool, well in that case it would receive that year half of all the money that was going to be distributed that year from the fund.

So basically, the more successful the drug is in improving global health the more money it gets but with no damage to the access and no incentive to charge too much, at fact required to sell at cost or less.

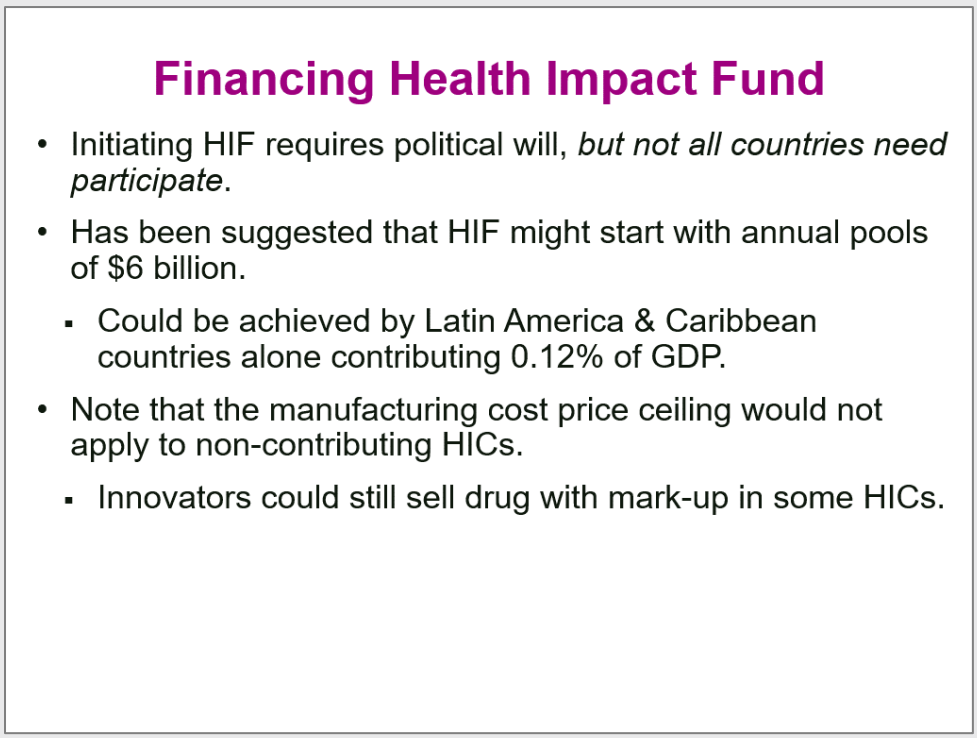
And actually, one other thing to add to that is that this also gives an incentive for something which is missing and even under the traditional model even where a new drug might be innovated, we give no incentive to companies to actually eradicate diseases. Instead, actually, there is this rather perverse incentive, where the ultimate profits that firms are likely to get is to keep selling the drug for as many years as they can as at high a cost as they can get away with.

Here, the very best a drug could do, is would be to completely wipe out a disease - to wipe out a high burden disease - and the ultimate would be to wipe it out in the first year, in fact, and then for each subsequent year the firm would keep getting all the quality adjusted life years added from eradication and that would all be added to their account. So that would be the best and most profitable outcome for them.



Financing Health Impact Fund

So how can we finance the Health Impact Fund? Well, probably the most likely thing is that some countries would pay some percentage of GDP into the Fund. Another possibility – in some ways theoretically more appealing but probably practically much more challenging – would be to arrange some sort of ring-fenced taxes that could be agreed globally and applied internationally. For example, in principle a very nice way of doing it might be to tax things or activities that have socially damaging consequences, so for example destabilizing financial transactions - which is a little bit like the idea of the Tobin tax some years ago - or taxing carbon emissions or taxing indeed antibiotics that are used in agriculture, which are often overused and which are believed to increase resistance to antibiotics. So this would have the added benefit of reducing damaging activities. But of course a lot more global coordination is probably needed there. This is probably more challenging. Either way the HIF would be a global public good which would benefit everyone really. It would benefit patients, taxpayers and it would certainly benefit also pharmaceutical companies because it would provide ways that they can be rewarded for innovation which are not currently profitable.



Financing Health Impact Fund

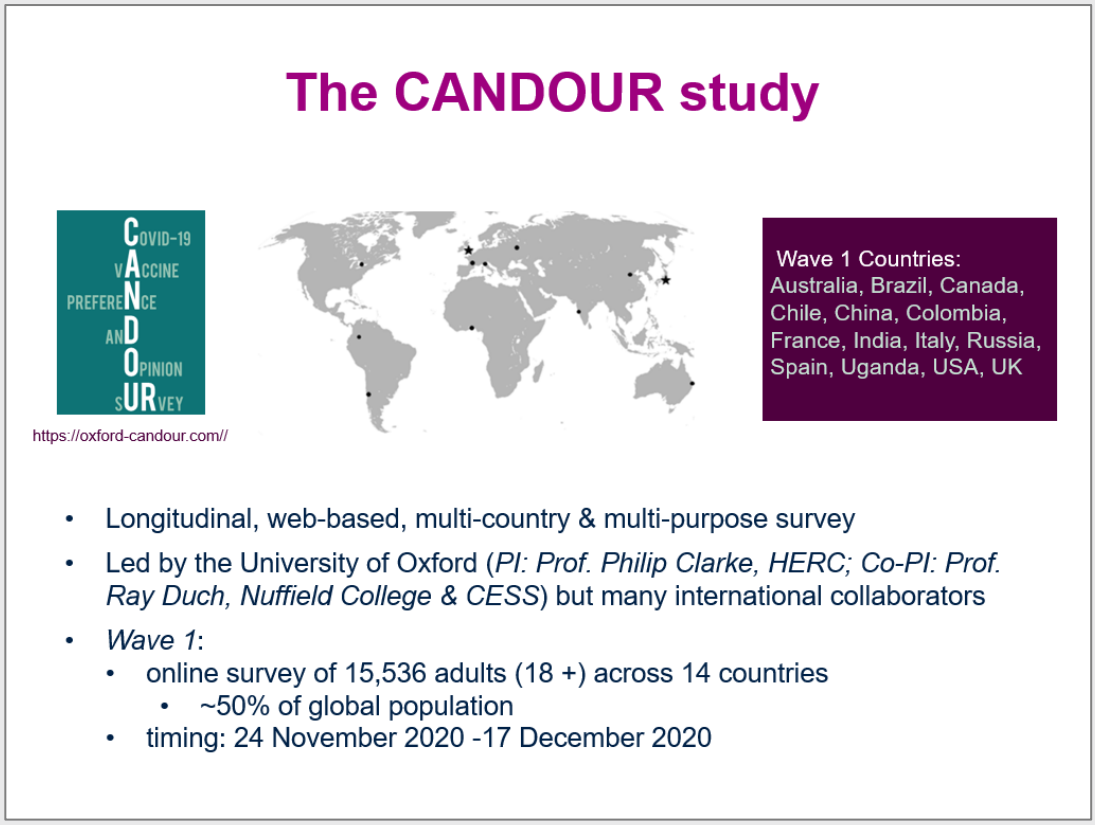
So, initiating the HIF would require some political will but I think it is really important to stress that not all countries would have to participate and certainly not at the start. It is being suggested that the HIF might start with annual pools of around six billion US dollars. I am not for one moment suggesting that this should all be done by Latin America and the Caribbean, certainly not. But it is worth to put that sum in context. If we were to take a little over 0.1% of GDP of all the countries in Latin America and the Caribbean towards the HIF, that alone, without anyone else being involved at all, would be enough to get the HIF off to an excellent start. Six billion dollars is considered an amount where a real impact could be made on some of the most serious diseases that affect people in low- and middle-income countries.

An important thing to note is that, again say that no high-income countries did get involved at the start, the manufacturing cost price ceiling that is applied to new drugs that would be innovated, would not apply to any high-income country that is not contributing to the fund. So in fact, innovators could get the rewards for the impact that it has on global health but they could also continue to sell the drug at a much higher price with a significant markup to any high-income countries that are not yet involved

in getting behind the fund. And this, of course, would give an added incentive for high-income countries to start to support the fund as well and to increase the money that is available.

Financing Health Impact Fund

Of course, with any of these funding decisions whenever we talk about any kind of political will that require spending, the question always comes, I suppose: is there going to be sufficient public support to give policy makers political space and the political capital to make something like the HIF a reality? Now, I cannot answer that question today but I think I can present some evidence, which is at least suggestive that there may be some space to do this. I am going to present evidence from multi-country surveys that I have been involved in and that I have spent a lot of my time on over the last couple of years.



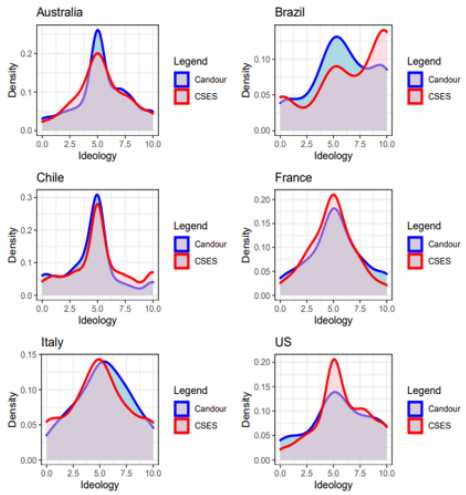
The CANDOUR study

(This is) a study called the CANDOUR study. The CANDOUR study is a multi-country survey study. It is web based and it is longitudinal, but I am only going to present data from the first wave today because the second wave is actually something that we are going to be finalizing and analyzing soon. In the first wave we have fourteen countries, a range of mostly high- and middle-income countries, including several Latin American countries, Brazil, Chile and Colombia. And we are going to go up to twenty countries shortly in the next wave. But in the first wave we had about 15,536 adults across these countries, representing about 50% of the global population. An important and critical thing to bear in mind with these results is that the timing of these surveys was in very late 2020. So this was a time in which the world was still in a very bad state with the COVID-19 pandemic. It was at a state when we knew that effective medicines existed but they had not yet begun to be rolled out in any country. But in some high-income countries it was anticipated that they were going to be rolled out fairly shortly. So, it is important to bear that in mind looking at some of these results I will show you in a moment.

Sampling strategy

- Internet based survey of adults.
- Used quota sampling to ensure sample match population on gender, age, education.
- Subjects recruited from panel & paid $3 to participate.
- Comparisons with Comparative Study of Election System suggest broadly represent political opinion in most countries.

Distribution of self-identified political ideology for the CANDOUR & CSES surveys for selected countries

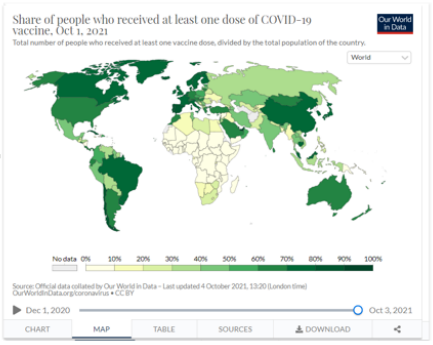


Sampling strategy

Briefly on the methods: it was a survey of all adults; In most countries they used quota sampling to make sure that the samples match the population according to gender, age and education. We also collected a lot of other data and what we find is that the samples appear to be quite representative in other important dimensions as well. So, for example, we asked all of our respondents to what extent they identify with the political left versus the political right. And what we find is that the distribution of those responses is very similar to the comparative study of elections systems distributions. So, this gives us some comfort that really the studies are quite representative in most countries. I think Uganda and India were more skewed towards higher-income, more educated people. But in most of the other countries they are quite representative.

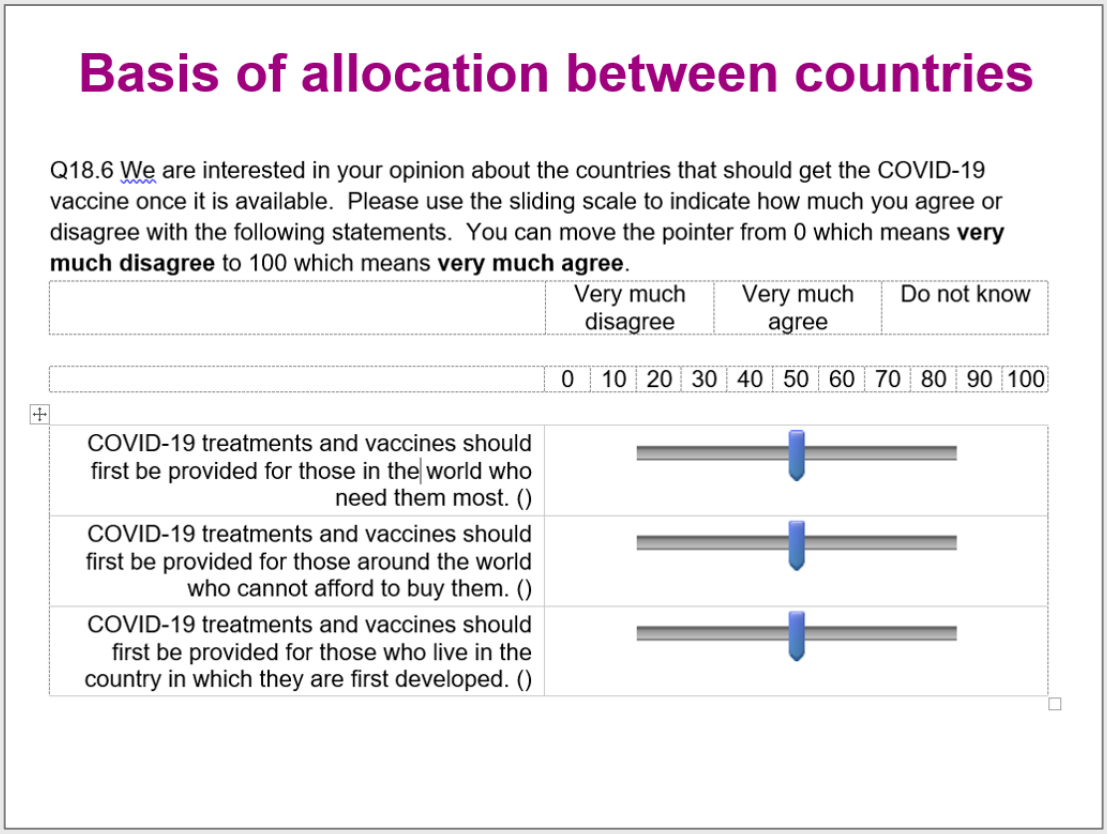
Boosters in HIC or first shots in LIC?

- COVAX has been involved with trying to distribute vaccines equally across countries.
- In reality vaccine access is very unequal across the world.
- Governments have often acted to protect their own supplies to the detriment of others.
- What are the preferences of the public in HICs?



Boosters in HIC or first shots in LIC?

So, vaccines at that time – at that time we were not quite talking about any trade-offs between booster vaccines in high-income countries versus first shots in low-income countries. It was still hypothetical, but we knew that vaccines existed. What we know now, of course, is that vaccine access was, and is still, very unequal. But it was extremely unequal for a long time into the pandemic. High-income countries acted to protect their own supply. And this was certainly to the detriment of others.



Basis of allocation between countries

We wanted to find out what were the preferences of the general public regarding distribution of these vaccines. So, we asked respondents the following question: "We are interested in your opinion about the countries that should get the COVID-19 vaccine once it is available. Please use the sliding scale to indicate how much you agree or disagree with each of the following statements". And we basically offered three different principles for allocating vaccines. The first was a principle that the vaccines should be given first to those in the world who need them most. The second principle (is that) treatments and vaccines should be provided first for those around the world who cannot afford them. And third was much more kind of a vaccine nationalism principle that vaccines should be given first to those who live in the country in which they were first developed.

Strong support for donating vaccines

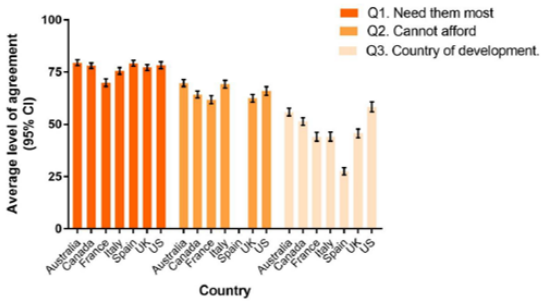
Across 7 high-income countries:

- 48% - 56% supported donating some vaccine.

  >70% of these favoured donating at least 10% of doses

- 15% - 26% not willing to donate
- support fairly broad-based in terms of age, gender, socio-economic status and political ideology.

Figure 1. Public agreement with different allocation principles



Notes: Don't know/prefer not to say excluded. Q1 N=7649; Q2 N=6407; Q3 N=7,285 (Q2 was not asked in the Spainish survey).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Public opinion on global rollout of COVID-19 vaccines

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Strong support for donating vaccines

We asked this across all of our seven high-income countries in the sample. And what we find was in each case, in every country, the principle that had the highest level of agreement was giving the vaccines to those who need them most regardless of where they live, followed by giving it to those who can't afford them, followed in last place by the kind of vaccine nationalism principle. But perhaps, I think, even more interestingly we also asked the question about the extent in which people supported donating vaccines from their own country´s stock pile to lower-income countries. And people had the choice of donating nothing at all or donating 10% of those countries stock pile, less than 10% or more than 10%. And encouragingly what we find was that massively higher proportions of people in all countries supported donating some level of vaccines than those who did not want to donate anything. So, between 48% and 56% across countries wanted to donate something and only 15% to 26% did not want to donate anything and out of those who did want to donate something quite a large majority - over 70% - favored donating at least 10% of doses.

What was probably even more encouraging about these results was that this support was very broad based in terms of all sorts of different sub groups. So, it held broadly across age, gender, socio-economic status and even political ideology.

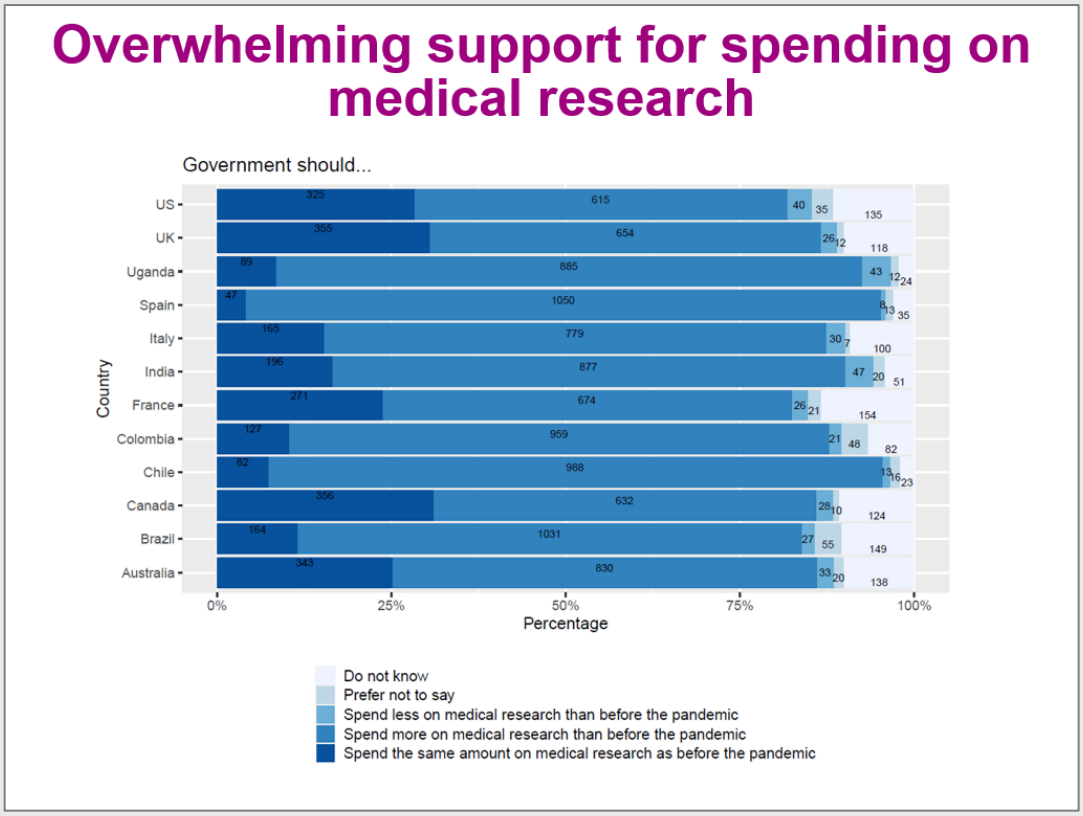
Willingness to donate vaccines: by subgroup

Variable	category	> 10% n (%)	10% n (%)	< 10% n (%)	Any n (%)	Should not donate n (%)	Do not know n (%)	Prefer not to say n (%)
Education Level	Less than primary completed	18 (13)	20 (14)	26 (18)	64 (45)	38 (27)	33 (23)	6 (4)
	Primary completed	95 (15)	105 (17)	74 (12)	274 (44)	128 (21)	171 (28)	43 (7)
	Secondary completed	694 (18)	817 (21)	471 (12)	1982 (50)	801 (20)	1019 (26)	140 (4)
	University completed	786 (23)	786 (23)	408 (12)	1980 (58)	619 (18)	714 (21)	75 (2)
	Not answered	9 (8)	9 (8)	4 (3)	22 (18)	22 (18)	50 (42)	25 (21)
Political ideology	**Left**	**520 (28)**	**505 (27)**	**179 (10)**	**1204 (64)**	**205 (11)**	**433 (23)**	25 (1)
	Central	573 (18)	750 (23)	460 (14)	1783 (55)	627 (19)	752 (23)	86 (3)
	Right	**321 (18)**	**323 (18)**	**262 (15)**	**906 (51)**	**564 (32)**	**259 (15)**	55 (3)
	Missing	188 (14)	159 (12)	82 (6)	429 (33)	212 (16)	543 (42)	123 (9)
Altruism	Meagre	366 (16)	483 (22)	303 (14)	1152 (52)	584 (26)	450 (20)	34 (2)
	Not answered	518 (16)	518 (16)	343 (10)	1379 (42)	600 (18)	1096 (33)	206 (6)
	Generous	718 (27)	736 (27)	337 (12)	1791 (66)	424 (16)	441 (16)	49 (2)
Income	Low	670 (19)	715 (20)	452 (13)	1837 (52)	720 (20)	863 (24)	108 (3)
	High	774 (21)	844 (23)	443 (12)	2061 (57)	743 (21)	746 (21)	69 (2)
	Missing	158 (15)	178 (17)	88 (8)	424 (40)	145 (14)	378 (36)	112 (11)

Source: Roope et al., Applied Health Economics & Health Policy, 2021

Willingness to donate vaccines by subgroup

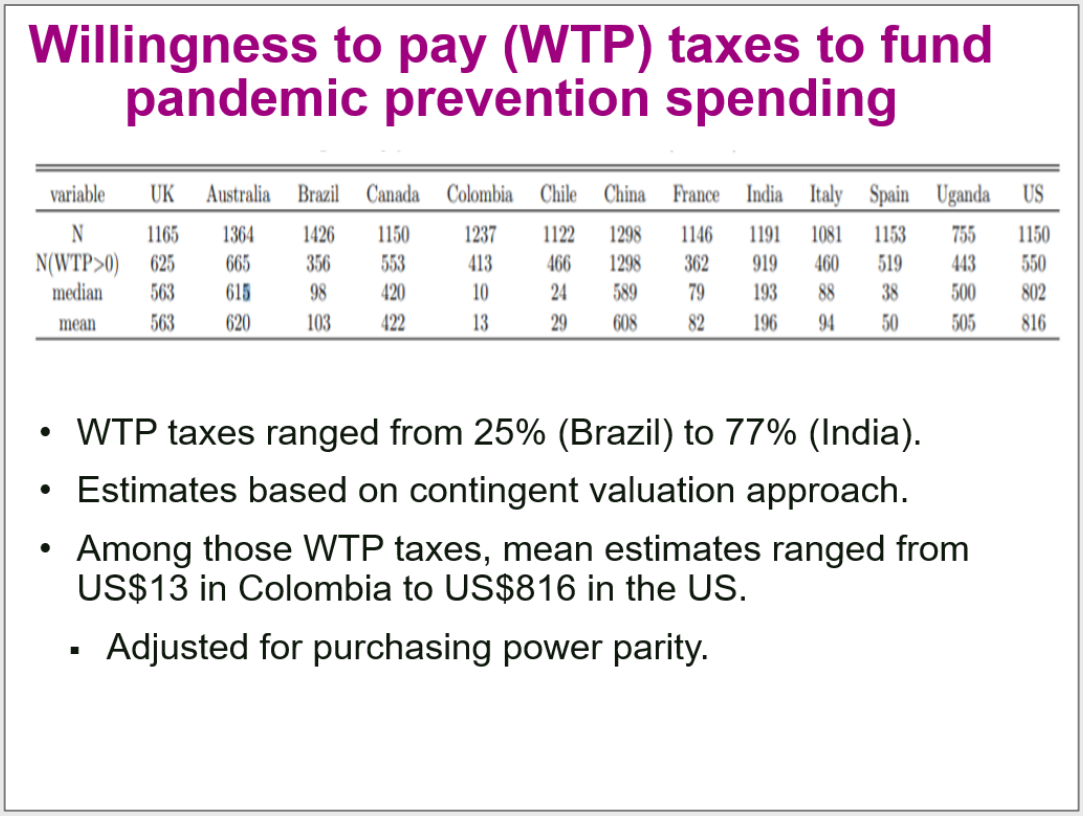
So what we got here when we look at the different sub groups, was in every single sub group, we looked at this column, which is "prepared to donate something" compared to the column which is "not prepared to donate", if you look at political ideology, for example, not surprisingly more people on the left wanted to donate than those on the right. But even on the right many more people, 51% of people said they wanted to donate something versus only 32% who said that they would not.



Overwhelming support for spending on medical research

Similarly, there was overwhelming support for spending on medical research. And again, perhaps not surprising in the midst of a pandemic when the world had come to a halt, but we asked people: in the future, should the government spend less on medical research than they did before the pandemic, should they spend more or should they spend the same amount? And absolutely overwhelming majorities in all countries supported spending at least as much as before the pandemic, with by far the biggest category in all countries being to spend more, and all the rest of the others to spending the same.

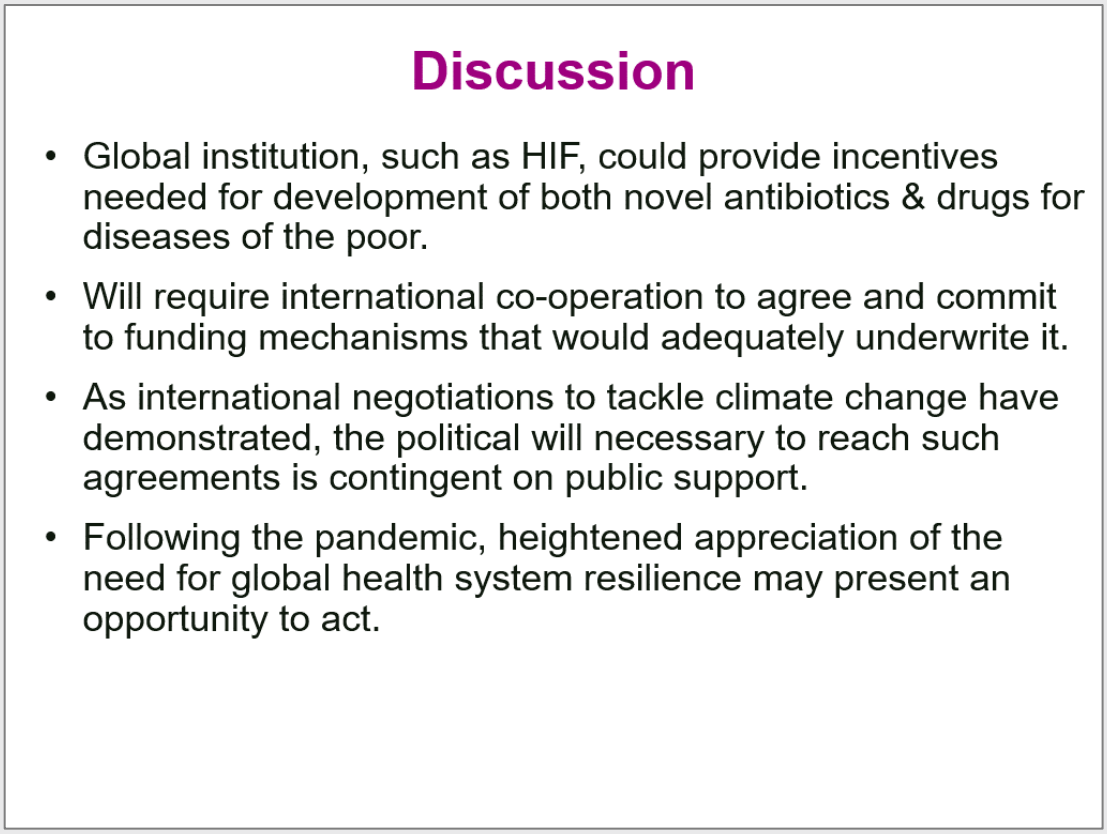
So taken together, none of these are about the HIF, obviously, but I think it suggests that at least at that point of time almost two years ago, there was some sort of public desire to support building increased resilience into global health care systems. So perhaps indicative of some sort of recognition that at least with regard to infectious diseases we are all interconnected. The problems that exist in one place can soon become a problem somewhere else.



Willingness to pay (WTP) taxes to fund pandemic prevention spending

One final example and that is willingness (to pay taxes to fund pandemic prevention). We asked people if they were willing to pay taxes to fund preventative measures to stop the spreading of a future pandemic. In all countries there was at least a reasonable percentage of people who said that they would pay some taxes, which ranged from 25% of the population in Brazil to 77% in India. Although India was probably a bit of a skewed sample.

Of those who said that they were prepared to pay some taxes we then used a method called contingent valuation to try to try to list how much they would be prepared to spend. There was a lot of variation across countries but certainly some of the sums are quite sizeable. So, for example, in the case of the UK sums that people are willing to spend roughly equated to an extra percentage point on their income tax. So (there are) certainly some signs of support. Obviously paying taxes is a flip side of government spending.



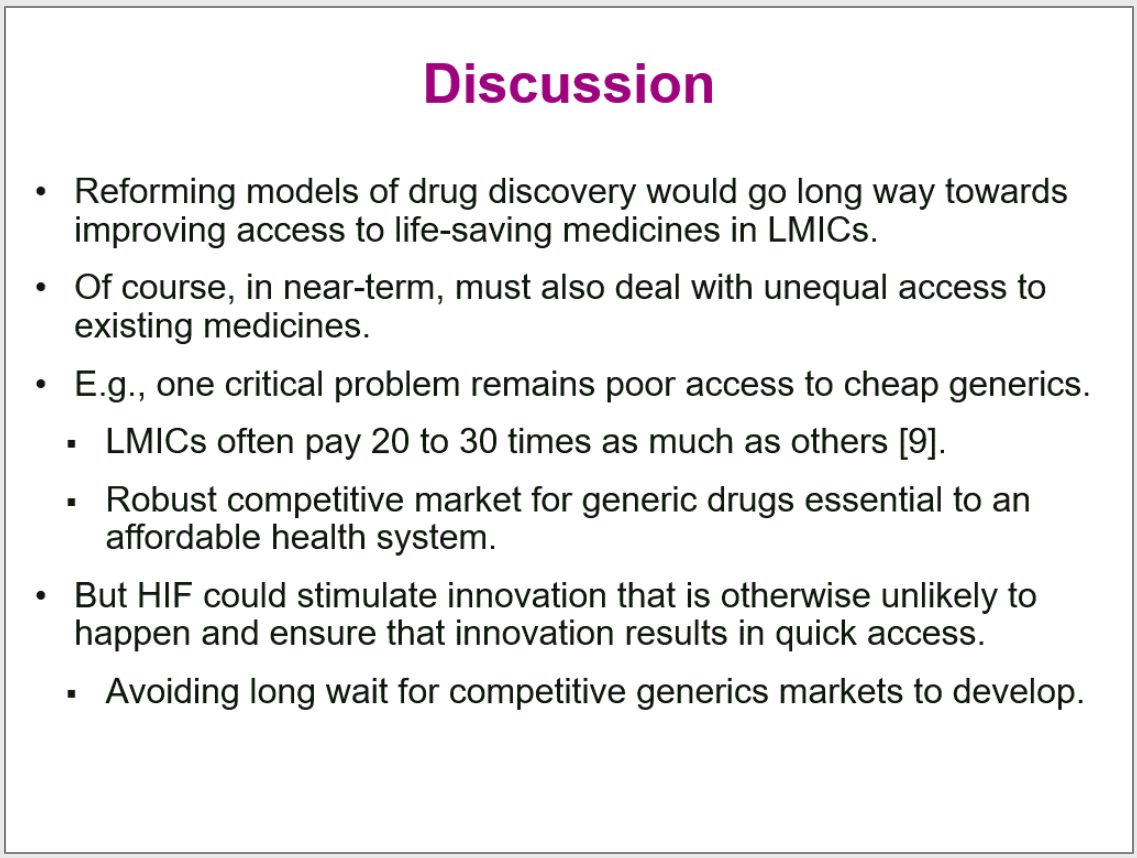
Discussion

I just want to quickly wrap up over these next couple of slides to say what are my main points. Well, a global institution such as the HIF could provide incentives that are so badly needed for the development both of novel antibiotics and for drugs that mainly affect poor people.

It will require international cooperation to agree and commit to funding mechanisms that would adequately underwrite it. And certainly, as climate change and international negotiations to tackle climate change have demonstrated, political will that is very much necessary to make such agreements really does depend on public support.

Following the pandemic, arguably, there is a heightened appreciation of the need for global health system resilience and perhaps this represents an opportunity to act. Of course, the world now also faces a very serious cost of living crises following the war in Ukraine, and so on. So, things may have

changed but we are going to get evidence on this very soon. But at least recently there seems to be quite strong support.



Discussion

Reforming models of drug discovery would go a very long way towards improving access to life-saving medicines in low- and middle-income countries.

Of course, it is also clear that in the near-term, we need to deal with unequal access to existing medicines. For example, one very critical problem is poor access to cheap generic drugs. It is a very sad fact, there is so much variation in what companies pay that lower middle income countries sometimes can pay between twenty and thirty times as much as other countries for certain generic medicines. What is certainly needed in many countries and everywhere what we need is a robust competitive market for generic drugs and this is really essential for affordable health care. However,

the HIF could stimulate innovation that is otherwise just very unlikely to happen or at least unlikely to happen for a very long time and ensure innovation results in quick access to drugs and avoiding the long wait that otherwise we may need for good access to competitive generic markets to develop.

Discussion

- What can be done to help bring about HIF?
- Calls for a pilot fund to act as a demonstration project.
- Competition for pharmaceutical manufacturers to achieve health impact through an existing patented drug.
- Supply an existing patented medicine to region/countries where it is currently under-used.
  - At price at or below anticipated future generic pricing.
- Main barrier appears to be need for funding in ($60m - $200m).

Discussion

Finally, what can be done in this case to help bring about something like a well-functioning HIF? Well, there have been calls for some time for a pilot fund to act as a demonstration project. The idea here is that rather than this being a competition for innovation, instead it would be a competition for pharmaceutical manufacturers to achieve impact through an existent patented drug, so a drug that is still under a patent. There would be a completion to supply an existent patented medicine to some countries or region where it is currently underused. It would have to be supplied at low price, in fact price which is lower than anticipated future generic pricing. But the principle is much the same. There would be a competition and the firms that would get the most rewards from it would be the ones who

improved global health in terms of quality adjusted life years the most relative to the other drugs in the pool. The main barrier even to get the pilot up and running is funding. All that is really required is somewhere in the region of 60 million to 200 million dollars according to the people behind the fund. So I suppose if we want to do something great my suggestion is that a great place to start would be to try and support the health impact fund in its pilot.

And that is really all I have got to say other than acknowledging my funders and collaborators. I have got some references for anyone who is interested and I would be absolutely delighted to take any questions.

Acknowledgements

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Collaborators

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Questions and answers

Ursula Giedion: Thank you very much Laurence. That was a great talk. There are a lot of questions. I will choose some because they are maybe the ones most related to what you have presented in your speech. I will start with one that actually came to my mind too. You showed that the CANDOUR study shows that there is public preference to donate vaccines with parallels to potential public willingness to contribute to an international HIF. Do you have any suggestions how to get decision makers political buy-in within home countries to contribute to these cross-country initiatives? That would be the first part of the question. And I would add on a second part to this and say: what does this tell policy makers about what they can do? When the public says something that is different from what policy makers assume about the willingness to donate and pay, what implications does it have for drug development?

Laurence Roope: These are great questions and very difficult questions as well. I suppose what the results show is - I think donations is an interesting one to discuss because it was something that we asked not only asked about in our survey, but it was something that was such a political issue - that in those high-income countries that secured the drugs early and that did stockpile, that really the public was far ahead of the politicians. The public, medical professionals and really anyone that thought in any way seriously about the pandemic could see that not only was it the right thing ethically to do to distribute more vaccines but it was marginal from a global health point of view because form a marginal point of view the first dose does more good than the second dose relative to having a first does, and so on. But beyond that it is also the fact that the crisis was never going to be over anywhere until it was over everywhere and with the potential of new mutations to come out and so on. So, it is really difficult. I think public pressure is what is missing. I suppose it is one thing seeing the results in a survey and it is another thing (….). You know there are surveys about climate change as well and what people think should be done about them. The pressure comes from policy makers saying something in a media article isn't necessarily the same as when there is real public outcry. You know, I am not suggesting there should be social unrest about this but when people really make their voices heard – ordinary people can write to their members of parliament, write to their representatives and so on. So, I think really it is about galvanizing public support as much as anything perhaps.

Ursula Giedion: Thank you for your answer. I understand that something very similar is happening also with measures to combat climate change. Similar studies have found that the public is actually willing to do much more than a lot of politicians tend to assume.

There is another question (on) economic obstacles to develop these drugs. And it refers to whether maybe resorting more to the public sector for the development might be a solution. It specifically says: To what extent could the investment in developing national pharmaceutical laboratories address at least part of the obstacles you presented?

Laurence Roope: It is a great question and also, again, a tough one to answer, in a way. You know, in theory probably it would be great if we had sort of fully nationalized systems in some ways like this, potentially. But I think what really concerns me about that is that if we think about trying to make a difference in any sort of reasonable time frame is that the big drug companies have developed the

capacity to do these things at a very large scale. If you think about what happened in the pandemic, for example, yes there was really critical research in academia for some of the vaccines. Here in Oxford we had, of course, the Oxford AstraZeneca vaccine. But it was very much in partnership with AstraZeneca that had the capacity to produce very large amounts of drugs in a relatively short time period. I am definitely open to the idea that there is potentially a role for much more public sector provision here, but I would also be very scared to crowed out the private sector. The private sector can do things very efficiently, often more efficiently than the public sector. But the problem is that you have to get (….). The thing is the private sector is very efficient at doing whatever you give it the incentives to do. I suppose my argument is: let´s give the private sector the right incentives, the incentives that lead to outcomes that are socially optimal and then I think they will do a good job with that.

Ursula Giedion: Ok, there is another political question, I think it is an interesting one, asking whether we could somehow push or incentivize the pharmaceutical industry to massively donate drugs to those who need them most?

Laurence Roope: Well, yes!

Ursula Giedion: And improve their reputation through donations eluding to the social responsibility.

Laurence Roope: Well, you see I agree. I think that is what we should incentivize. But I think the HIF is a great way of doing that. So again, the idea in the HIF is that actually they would have to sell the drugs at most at cost. Because the way it would be set up it may actually be to their advantage sell below cost if they think they will sell greater volumes at lower cost and therefore, not because it is greater volumes, because we are delinking the rewards from the volume, but because selling greater volume would lead to a greater improvement in global health. So it could even potentially conceivably be that the ultimate thing for them to do would be to donate some of them, at least in some of the poorer settings because they are going to be paid for the health impact that that leads to.

Ursula Giedion: Great answer! A specific technical question eluded to a pilot in the UK about antibiotics and value-based pricing. One question that emerged is: If you pay by value and you have to massively provide the drug and these drugs provide really good value – I mean beyond what some

novel drugs in the cancer industry are presenting, wouldn't that be extremely costly drugs making them completely unaffordable if you have to provide them massively?

Laurence Roope: Well, no, because again they are not going to get any remuneration from making a profit from the actual sale on the drugs so the only money that they are going to get is what is deemed to be and linked to, for example, the increases in quality adjusted life years versus not having the drug. So yes, if they have an enormous impact on public health then they would get enormous rewards. Well, it depends, of course, on how much money goes into the fund in the first place. If there is not much funding for the fund then there is only a relatively small amount that can go out. But if it is well funded potentially the incentives could be very large. You know, if you are the company that makes the drug that contributes the most in a given year to improve global public health then you are going to get the largest share of the reward. That does not mean that the drugs themselves have to be expensive.

Ursula Giedion: Ok, and there is one last question before we close the session: is there any low-hanging fruit to tackle some of the obstacles in the development and access to these new drugs, something we can do right away without going through a lot?

Laurence Roope: Well, I think firstly to try and somehow get behind this pilot. I mean it is not an awful lot of money that needs to be raised for the HIF´s pilot. I mean really, seriously, it baffles me in a way that it hasn't gone up and running ages ago, for let's say 60 million dollars. So, I really think finding ways to support that I think that would lead to a good outcome. It is not going to lead to the creation of a new medicine but what it is going to do is that it is going to ensure that some important existing medicine, which is currently underpaid and too expensive, it is going to go out at cost or less. So, for me that is the low-hanging fruit.

Ursula Giedion: Ok, so we are going to do some crowd sourcing of funds after the meeting [laughs]. Thank you so much Laurence. That was a great presentation.

CRITERIA

Regional Network on Explicit Priority Setting and Health Benefits Plans