

## How the pandemic will shape the near future

*Virtual conversation: Chris Anderson with Bill Gates*

*29<sup>th</sup> June 2020*

00:03

**Chris Anderson:** Welcome, Bill Gates.

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**Bill Gates:** Thank you.

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**CA:** Alright. It's great to have you here, Bill. You know, we had a TED conversation about three months ago about this pandemic, and back then, I think fewer than -- I think that was the end of March -- back then, fewer than 1,000 people in the US had died and fewer than 20,000 worldwide. I mean, the numbers now are, like, 128,000 dead in the US and more than half a million worldwide, in three months. In three months. What is your diagnosis of what is possible for the rest of this year? You look at a lot of models. What do you think best- and worst-case scenarios might be?

00:46

**BG:** Well, the range of scenarios, sadly, is quite large, including that, as we get into the fall, we could have death rates that rival the worst of what we had in the April time period. If you get a lot of young people infected, eventually, they will infect old people again, and so you'll get into the nursing homes, the homeless shelters, the places where we've had a lot of our deaths. The innovation track, which probably we'll touch on -- diagnostics, therapeutics, vaccines -- there's good progress there, but nothing that would fundamentally alter the fact that this fall in the United States could be quite bad, and that's worse than I would have expected a month ago, the degree to which we're back at high mobility, not wearing masks, and now the virus actually has gotten into a lot of cities that it hadn't been in before in a significant way, so it's going to be a challenge.

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There's no case where we get much below the current death rate, which is about 500 deaths a day, but there's a significant risk we'd go back up to the even 2,000 a day that we had before, because we don't have the distancing, the behavior change, to the degree that we had in April and May. And we know this virus is

somewhat seasonal, so that the force of infection, both through temperature, humidity, more time indoors, will be worse as we get into the fall.

02:31

**CA:** So there are scenarios where in the US, like, if you extrapolate those numbers forward, we end up with, what, more than a quarter of a million deaths, perchance, even this year if we're not careful, and worldwide, I guess the death toll could, by the end of the year, be well into the millions, with an "s." Is there evidence that the hotter temperatures of the summer actually have been helping us?

02:56

**BG:** They're not absolutely sure, but certainly, the IHME model definitely wanted to use the season, including temperature and humidity, to try and explain why May wasn't worse than it was. And so as we came out and the mobility numbers got higher, the models expected more infections and deaths to come out of that, and the model kept wanting to say, "But I need to use this seasonality to match why May wasn't worse, why June wasn't worse than it was."

03:37

And we see in the Southern Hemisphere, you know, Brazil, which is the opposite season, now all of South America is having a huge epidemic. South Africa is having a very fast-growing epidemic. Fortunately, Australia and New Zealand, the last countries in the Southern Hemisphere, are at really tiny case counts, and so although they have to keep knocking it down, they're talking about, "Oh, we have 10 cases, that's a big deal, let's go get rid of that." So they're one of these amazing countries that got the numbers so low that test, quarantine and trace is working to get them, keep them at very near zero.

04:26

**CA:** Aided perhaps a bit by being easier to isolate and by less density, less population density. But nonetheless, smart policies down there.

04:35

**BG:** Yeah, everything is so exponential that a little bit of good work goes a long way. It's not a linear game. You know, contact tracing, if you have the number of cases we have in the US, it's super important to do, but it won't get you back down to zero. It'll help you be down, but it's too overwhelming.

04:56

**CA:** OK, so in May and June in the US, the numbers were slightly better than some of the models predicted, and it's hypothesized that that might be partly because of the warmer weather. Now we're seeing, really, would you describe it as really quite alarming upticks in case rates in the US?

05:15

**BG:** That's right, it's -- In, say, the New York area, the cases continue to go down somewhat, but in other parts of the country, primarily the South right now, you have increases that are offsetting that, and you have testing-positive rates in young people that are actually higher than what we saw even in some of the tougher areas. And so, clearly, younger people have come out of mobility more than older people have increased their mobility, so the age structure is right now very young, but because of multigenerational households, people work in nursing care homes, unfortunately, that will work its way back, both the time lag and the transmission, back up into the elderly, will start to push the death rate back up, which, it is down -- way down from 2,000 to around 500 right now.

06:19

**CA:** And is that partly because there's a three-week lag between case numbers and fatality numbers? And also, perhaps, partly because there have been some effective interventions, and we're actually seeing the possibility that the overall fatality rate is actually falling a bit now that we've gained some extra knowledge?

06:38

**BG:** Yeah, certainly your fatality rate is always lower when you're not overloaded. And so Italy, when they were overloaded, Spain, even New York at the start, certainly China, there you weren't even able to provide the basics, the oxygen and things. A study that our foundation funded in the UK found the only thing other than remdesivir that is a proven therapeutic, which is the dexamethasone, that for serious patients, is about a 20 percent death reduction, and there's still quite a pipeline of those things.

07:23

You know, hydroxychloroquine never established positive data, so that's pretty much done. There's still a few trials ongoing, but the list of things being tried, including, eventually, the monoclonal antibodies, we will have some additional tools for the fall. And so when you talk about death rates, the good news is, some innovation we already have, and we'll have more, even in the fall. We

should start to have monoclonal antibodies, which is the single therapeutic that I'm most excited about.

08:01

**CA:** I'll actually ask you to tell me a bit more about that in one sec, but just putting the pieces together on death rates: so in a well-functioning health system, so take the US when places aren't overcrowded, what do you think the current fatality numbers are, approximately, going forward, like as a percentage of total cases? Are we below one percent, perhaps?

08:23

**BG:** If you found every case, yes, you're well below one percent. People argue, you know, 0.4, 0.5. By the time you bring in the never symptomatics, it probably is below 0.5, and that's good news. This disease could have been a five-percent disease. The transmission dynamics of this disease are more difficult than even the experts predicted. The amount of presymptomatic and never symptomatic spread and the fact that it's not coughing, where you would kind of notice, "Hey, I'm coughing" -- most respiratory diseases make you cough. This one, in its early stages, it's not coughing, it's singing, laughing, talking, actually, still, particularly for the super-spreaders, people with very high viral loads, causes that spread, and that's pretty novel, and so even the experts have to say, "Wow, this caught us by surprise." The amount of asymptomatic spread and the fact that there's not a coughing element is not a major piece like the flu or TB.

09:37

**CA:** Yeah, that is devilish cunning by the virus. I mean, how much is that nonsymptomatic transmission as a percentage of total transmission? I've heard numbers it could be as much as half of all transmissions are basically presymptomatic.

09:53

**BG:** Yeah, if you count presymptomatics, then most of the studies show that's like at 40 percent, and we also have never symptomatics. The amount of virus you get in your upper respiratory area is somewhat disconnected. Some people will have a lot here and very little in their lungs, and what you get in your lungs causes the really bad symptoms -- and other organs, but mostly the lungs -- and so that's when you seek treatment. And so the worst case in terms of spreading is somebody who's got a lot in the upper respiratory tract but almost none in their lungs, so they're not care-seeking.

10:33

**CA:** Right. And so if you add in the never symptomatic to the presymptomatic, do you get above 50 percent of the transmission is actually from nonsymptomatic people?

10:44

**BG:** Yeah, transmission is harder to measure. You know, we see certain hotspots and things, but that's a huge question with the vaccine: Will it, besides avoiding you getting sick, which is what the trial will test, will it also stop you from being a transmitter?

11:04

**CA:** So that vaccine, it's such an important question, let's come on to that. But before we go there, any other surprises in the last couple months that we've learned about this virus that really impact how we should respond to it?

11:18

**BG:** We're still not able to characterize who the super-spreaders are in terms of what that profile is, and we may never. That may just be quite random. If you could identify them, they're responsible for the majority of transmission, a few people who have very high viral loads. But sadly, we haven't figured that out. This mode of transmission, if you're in a room and nobody talks, there's way less transmission. That's partly why, although planes can transmit, it's less than you would expect just in terms of time proximity measures, because unlike, say, a choir or a restaurant, you're not exhaling in loud talking quite as much as in other indoor environments.

12:09

**CA:** Hmm. What do you think about the ethics of someone who would go on a plane and refuse to wear a mask?

12:15

**BG:** If they own the plane, that would be fine. If there's other people on the plane, that would be endangering those other people.

12:24

**CA:** Early on in the pandemic, the WHO did not advise that people wear masks. They were worried about taking them away from frontline medical providers. In retrospect, was that a terrible mistake that they made?

12:41

**BG:** Yes. All the experts feel bad that the value of masks -- which ties back somewhat to the asymptomatics; if people were very symptomatic, like an Ebola, then you know it and you isolate, and so you don't have a need for a masklike thing. The value of masks, the fact that the medical masks was a different supply chain than the normal masks, the fact you could scale up the normal masks so well, the fact that it would stop that presymptomatic, never symptomatic transmission, it's a mistake. But it's not a conspiracy. It's something that, we now know more. And even now, our error bars on the benefit of masks are higher than we'd like to admit, but it's a significant benefit.

13:40

**CA:** Alright, I'm going to come in with some questions from the community. Let's pull them up there. Jim Pitofsky, "Do you think reopening efforts in the US have been premature, and if so, how far should the US go to responsibly confront this pandemic?"

14:01

**BG:** Well, the question of how you make trade-offs between the benefits, say, of going to school versus the risk of people getting sick because they go to school, those are very tough questions that I don't think any single person can say, "I will tell you how to make all these trade-offs." The understanding of where you have transmission, and the fact that young people do get infected and are part of the multigenerational transmission chain, we should get that out. If you just look at the health aspect, we have opened up too liberally.

14:46

Now, opening up in terms of mental health and seeking normal health things like vaccines or other care, there are benefits. I think some of our opening up has created more risk than benefit. Opening the bars up as quickly as they did, you know, is that critical for mental health? Maybe not. So I don't think we've been as tasteful about opening up as I'm sure, as we study it, that we'll realize some things we shouldn't have opened up as fast. But then you have something like school, where even sitting here today, the exact plan, say, for inner-city schools for the fall, I wouldn't have a black-and-white view on the relative trade-offs involved there.

15:47

There are huge benefits to letting those kids go to school, and how do you weigh the risk? If you're in a city without many cases, I would say probably the benefit

is there. Now that means that you could get surprised. The cases could show up, and then you'd have to change that, which is not easy. But I think around the US, there will be places where that won't be a good trade-off.

16:19

So almost any dimension of inequity, this disease has made worse: job type, internet connection, ability of your school to do online learning. White-collar workers, people are embarrassed to admit it, some of them are more productive and enjoying the flexibility that the at-home thing has created, and that feels terrible when you know lots of people are suffering in many ways, including their kids not going to school.

16:56

**CA:** Indeed. Let's have the next question. [Nathalie Munyampenda] "For us in Rwanda, early policy interventions have made the difference. At this point, what policy interventions do you suggest for the US now?" Bill, I dream of the day where you are appointed the coronavirus czar with authority to actually speak to the public. What would you do?

17:17

**BG:** Well, the innovation tools are where I and the foundation probably has the most expertise. Clearly, some of the policies on opening up have been too generous, but I think everybody could engage in that. We need leadership in terms of admitting that we've still got a huge problem here and not turning that into almost a political thing of, "Oh, isn't it brilliant what we did?" No, it's not brilliant, but there's many people, including the experts -- there's a lot they didn't understand, and everybody wishes a week earlier whatever action they took, they'd taken that a week earlier. The innovation tools, that's where the foundation's work on antibodies, vaccines, we have deep expertise, and it's outside of the private sector, and so we have kind of a neutral ability to work with all the governments and the companies to pick.

18:33

Particularly when you're doing break-even products, which one should get the resources? There's no market signal for that. Experts have to say, "OK, this antibody deserves the manufacturing. This vaccine deserves the manufacturing," because we have very limited manufacturing for both of those things, and it'll be cross-company, which never happens in the normal case, where one company invents it and then you're using the manufacturing plants of many companies to get maximum scale of the best choice. So I would be

coordinating those things, but we need a leader who keeps us up to date, is realistic and shows us the right behavior, as well as driving the innovation track.

19:23

**CA:** I mean, you have to yourself be a master diplomat in how you talk about this stuff. So I appreciate, almost, the discomfort here. But I mean, you talk regularly with Anthony Fauci, who is a wise voice on this by most people's opinion. But to what extent is he just hamstrung? He's not allowed to play the full role that he could play in this circumstance.

19:46

**BG:** Dr. Fauci has emerged where he was allowed to have some airtime, and even though he was stating things that are realistic, his prestige has stuck. He can speak out in that way. Typically, the CDC would be the primary voice here. It's not absolutely necessary, but in previous health crises, you let the experts inside the CDC be that voice. They're trained to do these things, and so it is a bit unusual here how much we've had to rely on Fauci as opposed to the CDC. It should be Fauci, who's a brilliant researcher, so experienced, particularly in vaccines. In some ways, he has become, taking the broad advice that's the epidemiology advice and explaining it in the right way, where he'll admit, "OK, we may have a rebound here, and this is why we need to behave that way." But it's fantastic that his voice has been allowed to come through.

20:57

**CA:** Sometimes. Let's have the next question. Nina Gregory, "How are you and your foundation addressing the ethical questions about which countries get the vaccine first, assuming you find one?" And maybe, Bill, use this as a moment to just talk about where the quest for the vaccine is and what are just some of the key things we should all be thinking about as we track the news on this.

21:25

**BG:** There's three vaccines that are, if they work, are the earliest: the Moderna, which unfortunately, won't scale very easily, so if that works, it'll be mostly a US-targeted thing; then you have the AstraZeneca, which comes from Oxford; and the Johnson and Johnson. Those are the three early ones. And we have animal data that looks potentially good but not definitive, particularly will it work in the elderly, and we'll have human data over the next several months.



22:03

Those three will be gated by the safety and efficacy trial. That is, we'll be able to manufacture those, although not as much as we want. We'll be able to manufacture those before the end of the year. Whether the Phase 3 will succeed and whether it'll complete before the end of the year, I wouldn't be that optimistic about. Phase 3 is where you need to really look at all the safety profile and efficacy, but those will get started. And then there's four or five vaccines that use different approaches that are maybe three or four months behind that: Novavax, Sanofi, Merck. And so we're funding factory capacity for a lot of these -- some complex negotiations are taking place right now on this -- to get factories that will be dedicated to the poorer countries, what's called low- and middle-income. And the very scalable constructs that include AstraZeneca and Johnson and Johnson, we'll focus on those, the ones that are inexpensive and you can build a single factory to make 600 million doses.

23:18

So a number of the vaccine constructs are potential. I don't see anything before the end of the year. That's really the best case, and it's down to a few constructs now, which, typically, you have high failure rates.

23:39

**CA:** Bill, is it the case that if you and your foundation weren't in the picture here that market dynamics would likely lead to a situation where, as soon as a promising vaccine candidate emerged, the richer countries would basically snap up, gobble up all available initial supply -- it just takes a while to manufacture these, and there would be nothing for the poorer countries -- but that what, effectively, you're doing by giving manufacturing guarantees and capability to some of these candidates, you're making it possible that at least some of the early vaccine units will go to poorer countries? Is that correct?

24:20

**BG:** Well, it's not just us, but yes, we're in the central role there, along with a group we created called CEPI, Coalition for Epidemic Preparedness, and the European leaders agree with this. Now we have the expertise to look at each of the constructs and say, "OK, where is there a factory in the world that has capacity that can build that? Which one should we put the early money into? What should the milestones be where we'll shift the money over to a different one?" Because the kind of private sector people who really understand that stuff, some of them work for us, and we're a trusted party on these things, we get to coordinate a lot of it, particularly that manufacturing piece.

25:08

Usually, you'd expect the US to think of this as a global problem and be involved. So far, no activity on that front has taken place. I am talking to people in the Congress and the Administration about when the next relief bill comes along that maybe one percent of that could go for the tools to help the entire world. And so it's possible, but it's unfortunate, and the vacuum here, the world is not that used to, and a lot of people are stepping in, including our foundation, to try and have a strategy, including for the poorer countries, who will suffer a high percentage of the deaths and negative effects, including their health systems being overwhelmed. Most of the deaths will be in developing countries, despite the huge deaths we've seen in Europe and the US.

26:10

**CA:** I mean, I wish I could be a fly on the wall and hearing you and Melinda talk about this, because of all of the ethical ... "crimes," let's say, executed by leaders who should know better, I mean, it's one thing to not model mask-wearing, but to not play a role in helping the world when faced with a common enemy, respond as one humanity, and instead ... you know, catalyze a really unseemly scramble between nations to fight for vaccines, for example. That just seems -- surely, history is going to judge that harshly. That is just sickening. Isn't it? Am I missing something?

27:00

**BG:** Well, it's not quite as black-and-white as that. The US has put more money out to fund the basic research on these vaccines than any country by far, and that research is not restricted. There's not, like, some royalty that says, "Hey, if you take our money, you have to pay the US a royalty." They do, to the degree they fund research, it's for everybody. To the degree they fund factories, it's just for the US. The thing that makes this tough is that in every other global health problem, the US totally leads smallpox eradication, the US is totally the leader on polio eradication, with key partners -- CDC, WHO, Rotary, UNICEF, our foundation. So the world -- and on HIV, under President Bush's leadership, but it was very bipartisan, this thing called PEPFAR was unbelievable. That has saved tens of millions of lives.

28:02

And so it's that the world always expected the US to at least be at the head of the table, financially, strategy, OK, how do you get these factories for the world, even if it's just to avoid the infection coming back to the US or to have the global

economy working, which is good for US jobs to have demand outside the US. And so the world is kind of -- you know, there's all this uncertainty about which thing will work, and there's this, "OK, who's in charge here?"

28:34

And so the worst thing, the withdrawal from WHO, that is a difficulty that hopefully will get remedied at some point, because we need that coordination through WHO.

28:52

**CA:** Let's take another question. Ali Kashani, "Are there any particularly successful models of handling the pandemic that you have seen around the world?"

29:07

**BG:** Well, it's fascinating that, besides early action, there are definitely things where you take people who have tested positive and you monitor their pulse ox, which is the oxygen saturation level in their blood, which is a very cheap detector, and then you know to get them to the hospitals fairly early. Weirdly, patients don't know things are about to get severe. It's an interesting physiological reason that I won't get into. And so Germany has quite a low case fatality rate that they've done through that type of monitoring. And then, of course, once you get into facilities, we've learned that the ventilator, actually, although extremely well-meaning, was actually overused and used in the wrong mode in those early days. So the health -- the doctors are way smarter about treatment today. Most of that, I would say, is global. Using this pulse ox as an early indicator, that'll probably catch on broadly, but Germany was a pioneer there. And now, of course, dexamethasone -- fortunately, it's cheap, it's oral, we can ramp up manufacture. That'll go global as well.

30:28

**CA:** Bill, I want to ask you something about what it's been like for you personally through this whole process. Because, weirdly, even though your passion and good intent on this topic seems completely bloody obvious to anyone who has spent a moment with you, there are these crazy conspiracy theories out there about you. I just checked in with a company called Signal that monitors social media spaces. They say that, to date, I think on Facebook alone, more than four million posts have taken place that associate you with some kind of conspiracy theory around the virus. I read that there was a poll that more than 40 percent of Republicans believe that the vaccine that you would roll out would somehow

plant a microchip in people to track their location. I mean, I can't even believe that poll number. And then some people are taking this seriously enough, and some of them have even been recirculated on "Fox News" and so forth, some people are taking this seriously enough to make really quite horrible threats and so forth. You seem to do a good job sort of shrugging this off, but really, like, who else has ever been in this position? How are you managing this? What on earth world are we in that this kind of misinformation can be out there? What can we do to help correct it?

32:03

**BG:** I'm not sure. And it's a new thing that there's conspiracy theories. I mean, Microsoft had its share of controversy, but at least that related to the real world, you know? Did Windows crash more than it should? We definitely had antitrust problems. But at least I knew what that was. When this emerged, I have to say, my instinct was to joke about it. People have said that's really inappropriate, because this is a very serious thing. It is going to make people less willing to take a vaccine. And, of course, once we have that vaccine, it'll be like masks, where getting lots of people, particularly when it's a transmission-blocking vaccine, there's this huge community benefit to widespread adoption of that vaccine. So I am caught a little bit, unsure of what to say or do, because the conspiracy piece is a new thing for me, and what do you say that doesn't give credence to the thing? The fact that a "Fox News" commentator, Laura Ingraham, was saying this stuff about me microchipping people, that survey isn't that surprising because that's what they heard on the TV. It's wild. And people are clearly seeking simpler explanations than going and studying virology.

33:46

**CA:** I mean, TED is nonpolitical, but we believe in the truth. I would say this: Laura Ingraham, you owe Bill Gates an apology and a retraction. You do. And anyone who's watching this who thinks for a minute that this man is involved in some kind of conspiracy, you want your head examined. You are crazy. Enough of us know Bill over many years and have seen the passion and engagement in this to know that you are crazy. So get over it, and let's look at the actual problem of solving this pandemic. Honestly. If anyone in the chat here has a suggestion, a positive suggestion for how you can, how do you get rid of conspiracies, because they feed on each other. Now, "Oh, well I would say that, because I'm part of the conspiracy," or whatever. Like, how do we get back to a world where information can be trusted? We have to do better on it. Are there any other questions out there from the community? Aria Bendix from New York

City: "What are your personal recommendations for those who want to reduce their risk of infection amid an uptick in cases?"

35:03

**BG:** Well, it's great if you have a job that you can stay at your house and do it through digital meetings, and even some of your social activities, you know, I do video calls with lots of friends. I have friends in Europe that, who knows when I'll see them, but we schedule regular calls to talk. If you stay fairly isolated, you don't run much risk, and it's when you're getting together with lots of other people, either through work or socialization, that drives that risk, and particularly in these communities where you have increased cases, even though it's not going to be mandated, hopefully, the mobility numbers will show people responding and minimizing those kind of out-of-the-house contacts.

36:08

**CA:** Bill, I wonder if I could just ask you just a little bit about philanthropy. Obviously, your foundation has played a huge role in this, but philanthropy more generally. You know, you've started this Giving Pledge movement, recruited all these billionaires who have pledged to give away half their net worth before or after their death. But it's really hard to do. It's really hard to give away that much money. You yourself, I think, since The Giving Pledge was started -- what? 10 years ago or something, I'm not sure when -- but your own net worth, I think, has doubled since that period despite being the world's leading philanthropist. Is it just fundamentally hard to give away money effectively to make the world better? Or should the world's donors, and especially the world's really rich donors, start to almost commit to a schedule, like, "Here's a percentage of my net worth each year that, as I get older, maybe that goes up. If I'm to take this seriously, I have to give away -- somehow, I've got to find a way of doing that effectively." Is that an unfair and crazy question?

37:22

**BG:** Well, it'd be great to up the rate, and our goal, both as the Gates Foundation or through The Giving Pledge, is to help people find causes they connect to. People give through passion. Yes, numbers are important, but there's so many causes out there. The way you're going to pick is you see somebody who's sick, you see somebody who's not getting social services. You see something that helps reduce racism. And you're very passionate, and so you give to that. And, of course, some philanthropic gifts won't work out. We do need to up the ambition level of philanthropists. Now, collaborative philanthropy that you're helping to facilitate through Audacious, there's four or five other groups that are

getting philanthropists together, that is fantastic, because then they learn from each other, they get confidence from each other, they feel like, "Hey, I put in x, and the four other people put money in, so I'm getting more impact," and hopefully, it can be made fun for them even when they find out, OK, that particular gift didn't work out that well, but let's keep going. So philanthropy, yes, I would like to see the rate go up, and people who do get going, it is fun, it's fulfilling, you pick which of the family members are partnered in doing it. In my case, Melinda and I love doing this stuff together, learning together. Some families, it will even involve the kids in the activities. Sometimes the kids are pushing.

39:04

When you have lots of money, you still think of a million dollars as a lot of money, but if you have billions, you should be giving hundreds of millions. So it's kind of charming that, in terms of your personal expenditure, you stay at the level you were at before. That's societally quite appropriate. But on your giving, you need to scale up or else it will be your will, and you won't get to shape it and enjoy it quite that same way. And so without -- we don't want to mandate it, but yes, both you and I want to inspire philanthropists to see that passion, to see those opportunities significantly faster than in the past, because whether it's race or disease, or all the other social ills, the innovation of what philanthropy can go to and do quickly that, if it works, government can come in behind it and scale it up, God knows we need solutions, we need that kind of hope and progress that expectations are high that will solve very tough problems.

40:17

**CA:** I mean, most philanthropists, even the best of them, find it hard to give away more than about a percent of their net worth every year, and yet the world's richest often have access to great investment opportunities. Many of them are gaining wealth at seven to 10 percent plus per year. Isn't it the case that to have a real chance of giving away half your fortune, at some point you have to plan to give away five, six, seven, eight, 10 percent of your net worth annually? And that is, isn't that the logic of what should be happening?

40:50

**BG:** Yeah, there are people like Chuck Feeney, who set a good example and gave away all of his money. Even Melinda and I are talking about, should we up the rate that we give at? As you say, we've been very lucky on the investment side through a variety of things. Tech fortunes in general have done well, even this year, which is one of those great contrasts in what's going on in the world. And

I do think there's an expectation that we should speed up, and there's a reason to speed up, and government is going to miss a lot of needs. Yes, there's tons of government money out there, but helping it be spent well, helping find places it's not stepping up, and if people are willing to give to the developing world, they don't have governments that can print checks for 15 percent of GDP, and so the suffering there broadly, just the economic stuff alone, put aside the pandemic, is tragic. It's about a five-year setback in terms of these countries moving forward, and in a few cases, it's tough enough that the very stability of the country is in question.

42:15

**CA:** Well, Bill, I'm in awe of what you and Melinda have done. You walk this narrow path of trying to juggle so many different things, and the amount of time that you dedicate to the betterment of the world at large, and definitely the amount of money and the amount of passion you put into it -- I mean, it's pretty awesome, and I'm really grateful to you for spending this time with us now. Thank you so much, and honestly, the rest of this year, your skills and resources are going to be needed more than ever, so good luck.

42:54

**BG:** Well, thanks. It's fun work and I'm optimistic, so thanks, Chris.