Perspectives on the Pandemic: III

A Conversation with Dr. David L Katz
concerning "Total Harm Minimization"
Hamden, CT, April 9, 2020

[00:00:14.20] **JOHN:** So, doctor, just tell us your name and just a little bit about your background.

[00:00:19.06] **KATZ:** I'm Dr. David L Katz. I trained in internal medicine, I worked as a clinician for the better part of 30 years; also, residency-trained in preventative medicine and public health at Yale, where I played various roles over nearly three decades, including founding and directing Yale University's Yale-Griffin Prevention Research Center. So, I'm a board-certified specialist in preventative medicine and public health. I've co-authored multiple editions of the leading textbook on epidemiology and public health, and my career-long interest has been doing everything possible to add years to lives and life to years.

[00:00:58.01] **JOHN:** Very good. so, just recently, and I'm talking about, I think it went on the website yesterday, you released a strategy for getting the country, and I suppose, by extension, the world, back to work, while minimizing risk to the vulnerable. Can you tell us about that?

[00:01:12.19] **KATZ:** My interest from the start in the pandemic has been what I now call "total harm minimization." For someone who is interested in public health, we are always concerned about social determinants. One of the leading predictors of all key health outcomes, all causes of mortality, total chronic disease risk, is social determinants - poverty, access to food, services, critical goods - and it was pretty clear, early on, that the pandemic response could basically dismantle supply chains and provision

of services, and that would fall disproportionately hard on the people who were marginal to begin with.

[00:01:51.00] So, the big picture, right at the start, was this virus can kill people and social upheaval can kill people, not necessarily the same people, although there is considerable overlap. And what we want to do with public policy is gather the data to know who's at risk for all of the fallout, both the direct harms of infection, and the indirect harms of economic collapse, of social upheaval, and we want to minimize the sum of the two, so I call that "total harm minimization." That's the campaign.

[00:02:25.21] Before we were mired in a viral pandemic, the big public health focus of our time is lifestyle practices that translate into variable risk for chronic diseases that are the single greatest burden in the modern world. Most people succumb to premature death from heart disease, cancer, stroke, diabetes. Diabetes was pandemic long before coronavirus was pandemic. Really, the only difference between pandemic chronic disease and pandemic contagion is the timeline.

[00:02:58.22] In fact, these chronic diseases kill millions of people around the world every year, but because it plays out slowly, we tend to be fairly oblivious to it. That's an interesting story in its own right, and it's the paleoanthropologists who best explain it. Our perceptions of time and risk are best expressed in the fight or flight response. This basically was burned into our DNA when we were struggling to survive on a savannah, and when the threats we had to worry about played out in seconds, or minutes. They were threats like tooth, and claw, and fang, and venom, and they had nothing to do with years and decades, which is the timeline for chronic disease. So, we're incredibly oblivious to the massive toll of human misery and premature death from chronic diseases - diabetes, heart disease, cancer, etc.

[00:03:52.02] **JOHN:** I got a good sense of what you would have done if you were head of, say,

WHO or CDC over a long term, in terms of what we need to do with more systemic health problems, but if you were in charge of the public health response globally when this virus was first identified, if you can just bullet point, what were the things that you feel, and some of these you outlined in the *Times* piece and elsewhere, but what are the things you most definitely would have done and what are the things you most definitely would not have done?

[00:04:23.19] **KATZ:** The first thing we needed to do in America when we saw the coronavirus coming from far away was to decide how can we protect people vulnerable to severe infection. We had two options, and I wrote about these: one was horizontal interdiction, keep everybody away from everybody else and the bug; and the other was vertical interdiction, which was establish risk tiers, identify who's at high risk for severe infection, who is not, and let's make sure we keep the high risk away.

[00:04:53.15] [There are] two advantages in doing either of those things. One is, people who are at elevated risk of severe infection, hospitalization, needing a ventilator or dying, avoid all of that, and since we don't have a concentrated population needing intensive medical care all at once, we avoid overwhelming the medical system. I would have convened all of the relevant experts in policy to determine can we do vertical interdiction from the start?

[00:05:25.19] First of all, do we know reliably enough who is at elevated risk or do we still have lots of doubt? And we wonder if what's true in South Korea will be true in the States, because our health is different. If we think we can do an elegant-from-the-start vertical interdiction, just protect those at high risk, if we are confident we can do that well, let's start there, so I would have done that. But, I also would have been prepared to concede that's too elegant. It's a step too far. We're not that organized, we're not that sure of who's at high risk. Let's start out with horizontal interdiction.

[00:05:58.07] While we're doing that, let's gather the data we need in America. Let's do everything

we can to source test kits, both for infection and immunity. Let's get out into the population. By the way, let's pause for a minute before we send the nation's college students home to their far-flung families, and let's test at least random samples of them, because maybe these young generally healthy people are harboring the virus, barely notice it, but their parents can't afford to get it, because their parents, being typical middle-aged Americans are apt to have heart disease, diabetes, hypertension, the very things that place them at heightened risk.

[00:06:35.04] I was very concerned right at the start that we rushed some policy decisions and maybe turned the country into a vast coronavirus mixing bowl, by taking virus circulating on college campuses and in big cities and sending it everywhere. That may have been a huge mistake; water under the bridge now. But, one way or another, we needed to be thoughtful, we needed to think about gathering data. And then, as we were protecting, one way or another, people at high risk of severe infection from exposure, we needed to start gathering data, so we knew who in this country was at lower risk, who could afford to go out to the world, who already is making antibodies, and might be in the vanguard of leading us toward herd immunity. And then, we basically need a plan for a plan.

[00:07:20.16] I think one of the most distressing elements in all of this is that all we seem to be hearing about are extreme positions. So, "flatten the curve indefinitely," which kind of translates to "Hunker in a bunker and hope there's a vaccine before you die of something else." And for older people, who may very well die of something else, if this takes 18 months or two years or three years, before ever again being able to hug their grandchildren, that's really distressing. And I think that distress is a major health concern. If we leave people to shelter in place with anxiety uncertainty, dread and doubt, we are going to propagate an epidemic of mental health decline. There will be depression and anxiety and some people will turn to substances and there will be ill health effects of that, and they will be great.

[00:08:14.20] So, we needed to know right from the start: *we are implementing protections in*

Phase 1 the best we can; we are gathering data; there will be a Phase 2; we will be back to you on, or by, such-and-such a date with major policy announcements as the data allows, so stay tuned; do not worry that you are doing this indefinitely; we will basically map our way, the safest way possible, through this. We needed to hear that. I think the American public deserved to know, right at the start, that if there wasn't a fully-baked plan yet, there was a plan to make a plan, and they didn't get that.

[00:08:53.20] It's been very clear from the earliest days of this pandemic, and even the data out of China tells the same story, that there are massive risk differentials, and they relate to age, they relate a little bit to sex, men are at greater risk of this virus than women, but they relate, especially, to baseline health status. So, people with a significant burden of chronic disease are at much increased risk for severe infection from coronavirus. That suggests that potentially, the protections that we mediate through public policy, the interdictions, the ways we try to keep people and the virus apart, maybe shouldn't be a one-size-fits-all strategy. That maybe there is an optimal balance to strike between preserving critical goods and services, supply chains, critical elements in the workforce, among people who are at relatively low risk for severe infection. It won't be zero, but we're used to that. Life involves risk and we go out every day and we face some risk of something bad happening. So, nobody's going to get a guarantee here that you aren't going to get a severe infection, but we can identify the population where that risk is at a familiar level. The kind of risks we all accept every day, maybe down at the level of the risk of flu being a severe infection that lands you in the hospital.

[00:10:13.12] And that serves two goals. One, it protects those individuals by only exposing people where the risk of coronavirus is in that familiar space, where it's not overwhelming, it's not a cause of fear. And, it protects the medical system, because only very occasionally will a population at relatively low risk to severe infection result in a case that needs hospitalization. The system can handle that. But people

who are at higher risk, and that would be older people, people with chronic disease, we need to shelter them better.

[00:10:46.21] My thinking from the start was: we have limited resources to deploy, limited means of getting food to peoples' homes, limited means of taking up the slack for services that people might require that they used to leave their homes to get, but now they can't; if we try to do everything for everybody, we'll probably do too little to do it well; if, on the other hand, we identify high-risk populations and say, "let's concentrate the deployment of support services there, make sure the people who absolutely need to shelter at home are the ones who get home delivers, and ideally get home deliveries from people who have been tested negative for corona virus, let's do everything we can to keep the highly vulnerable away from this virus," that potentially could allow us to move toward normalcy in waves.

[00:11:37.17] So, the people at lowest risk are in the vanguard. I call them the SERLAWKI's, "Selective Early Returners to Life As We Knew It." They are the tip of the spear. We start to reanimate some semblance of life as we knew it before all this, reactivate the economy, which is really important. People's livelihoods matter, maybe not as much as their lives, but ultimately, there will be a toll in lives if we completely disrupt the economy too, so we have to address that. And then, we do an even better job of protecting people at high risk.

[00:12:09.22] And the one other thing to suggest, is that there's never been a better time, as we are social distancing and sheltering in place, to get healthy. This is the ideal time to improve your diet. This is the ideal time to figure out a way to exercise, whether it is in your house, or near your house, or some combination of outside and inside. And the rationale for that has always been that it would reward you over time. Healthy people have more fun, health is the gift that keeps on giving. But right now, it will reward you with an immediacy that is unusual, because you can change your metabolic health, actually, in hours. We have studies that show vascular responses, hormonal balance, lipid levels, blood pressure - these things actually

can change immediately after a meal - glucose levels, insulin levels, change right after a meal. Inflammatory markers, which are a key indication of immune system balance, the very defense system we are relying on as we confront the coronavirus, these things change over the course of a single day, based on what we do, whether we're active or inactive, if we eat well or badly. So, there's an immediacy to that.

[00:13:23.07] Now, obviously the benefits of taking good care of yourself accrue over time, the more you do, the longer you do it, the greater the benefit, but there's never been a better time to pursue health, both because it is the gift that keeps on giving over time, but also because it confers an immediate best defense against severe coronavirus infection.

[00:13:44.16] **JOHN:** How did we know, right from the start, that this was worth having the sort of response that we've given it? Now, as I'm sure you know, John Ioannidis wrote in STAT, "If we had not known about a new virus out there, and had not checked individuals with PCR tests, the number of total deaths due to influenza like illness would not seem unusual this year. At most, we might casually have noted that flu season seems a bit worse than average." Do you think there's still some truth to that statement?

[00:14:15.18] **KATZ:** I think we're obligated, all of us, however intelligent, however well-educated, however targeted our expertise, to be humble about a situation that really does constitute one of the greatest crises in public health in the history of modern society We really haven't seen anything quite like this since the famous flu pandemic of 1918. And I go back and forth between thinking our response to all of this is exaggerated (we're doing much more harm by shutting society and the economy down than the virus is doing), and then I look at the data coming out of beleaguered New York hospitals, which are overrun. And they are short on beds,

and they are short on ventilators, and that doesn't happen in a typical flu season, and it doesn’t generally happen even in a bad flu season.

[00:15:18.10] When you look at the total numbers here, the total numbers in global context, the total numbers in US context are not all that great, and I say this very cognizant of the fact that the numbers are a disservice to the people behind them. It's one of the great liabilities of being in public health. We're talking about a thing that doesn't really exist. There is no public: there's you, there's me, there's our families, there's everybody else; there are the bonds of humanity and love; there is hope and despair and anxiety and mourning behind every one of these numbers. The numbers are a disservice.

[00:16:02.04] But we have to look at numbers to understand the patterns. And the simple fact is, for instance, that in the United States, about 8,000 people die of miscellaneous causes every day, and nearly 3 million, out of a population of 325 million, die every year, because we are mortal and we die, and most of that is concentrated in people who are older. Some of it, tragically, is not, but 8,000 or so people die every day. And it's absolutely true that with 24-7 news coverage on the coronavirus, we are getting a distortion and an amplification of the magnitude of this one risk; you're not hearing about every car crash that kills somebody, you're not hearing about every heart attack that kills somebody, you're not hearing about every stroke, every new diagnosis of cancer. And you could be given the impression, if the media were to cover any one of these leading causes of mortality or morbidity with the intensity and ferocity that everyone's now covering coronavirus, you might freak out over any of them. You'd say, "Oh my god, another suicide! Another suicide! We have an epidemic of suicide! What's going on? We have an epidemic of heart attacks, what's going on?" We're not doing that. So, there is a distortion here.

[00:17:17.17] **JOHN:** Or an epidemic of flu deaths, right?

[00:17:19.07] **KATZ:** Or an epidemic of flu deaths. And so, so far, the estimate is about 50,000 in the United States alone have died of the flu, which is a number much bigger than the total number of deaths from coronavirus, although, everyone now expects that coronavirus, ultimately, will surpass the flu. But here's the difference, and this is really important, this is why I do go back and forth, and I think we all need to approach this with humility, and learn with each day, and it really does feel like each day in a pandemic is a month or a year. Every week is a decade. This thing hasn't been with us that long, but it's totally upended our lives. It kind of feels like it's been this way forever.

[00:17:59.00] So, the concentration of severe illness in a given place, at a given time, is unusual. It's specific to the pandemic. And one of the critical data points I've had real difficulty finding, and the United States needs badly, is: what is the ratio of people who have the virus, who recover from it, maybe with no symptoms or mild symptoms, the percent of that group that winds up being sick enough to seek medical care? The percent of *that* group winding up sick enough to need hospitalization? The percent of *that* group sick enough to wind up in the ICU? The percent of *that* group that winds up on a ventilator? And, ultimately, the percent of *that* group who dies? What we tend to hear about now, is some level of population testing, so, something about the numbers infected, and something about deaths. A lot of those data in the middle, we haven't been getting.

[00:19:00.03] So, it's really hard, even for experts in epidemiology, to say, "We're exaggerating the risk." What if, for every person who dies, there are say 30 who wind up in the ICU, and what if the 29 who survive to make it out of the ICU need intensive care on a ventilator for 3 or 4 weeks? That's an enormously intense demand on the medical system. And my impression is that the numbers are something like that. So, we can easily get this wrong in either direction. We can be too dismissive and say, "There are many more deaths all the time from heart disease and cancer," and that's true. Diet alone kills many more people in the United States than the absolute

worst-case possibility from coronavirus. But, it doesn't happen all at once, it doesn't happen in just one place, and it doesn't land a lot of people, all at the same time, in an ICU, needing a ventilator for a month.

[00:20:02.13] And one of the predictions at the start of this was the critical thing we had to defend against was: medical system overload. And that appears to be true. So, I think we have to be very respectful of the harms of the pandemic, concentrated in place and time, but I think we also have to be very respectful of the fact that, ultimately, these numbers are small compared to the total population, and that we actually could wind up with more deaths due to social upheaval than to the infection. And that leads us back to total harm minimization: let's look at both; let's think about risk stratification; we want to avoid overwhelming the medical system, we want to keep people who are vulnerable to severe infections and death away from this virus, but we also want to save lives that may be lost because of complete economic collapse and social upheaval.

[00:20:55.14] **JOHN:** To your point of starting to phase people in to, back into the workforce, especially the lower risk people, you've seen Dr. Ioannidis's latest results, that people under 65 have about the same risk of dying in a car accident as they do of dying of COVID-19, and the deaths without underlying conditions are "remarkably uncommon." So have you read his study, his most recent study?

[00:21:22.03] **KATZ:** I have read through it. And it's consistent with data we've been looking at from around the world. But here's one of the problems with the lack of homegrown data: the United States is not a healthy nation. We have much higher rates of obesity than many countries around the world, we have much higher rates of type 2 diabetes, and it may be that the age cut points for varying coronavirus risk are different here than they are in other countries. It's very hard to tell. You know, I

think we all get alarmed. I'm a parent of 5 adult children. I was somewhat reassured, in the early going, that young people seemed to be pretty much impervious to the severe adversities of coronavirus, and then, inevitably, we started hearing about young people being hospitalized, and the occasional young person dying. Now, that's not all we need to know, because bad things happen to people all the time in the world, and all the time in medicine, and sometimes, they're anomalies.

[00:22:28.19] And, you know, sometimes cancer occurs in a young person. We don't know why. It's very rare though. And the same may be true of coronavirus. It's just that if you're a young person and wind up in a hospital with this infection, you are going to make the news. But, what we need to know is for each young person who gets hospitalized or has a severe infection: how many had an asymptomatic infection, or were so nominally symptomatic that they didn't report it to anybody, and we didn't even know about it? All of this leads back to data. We need data, and we need data here.

[00:22:59.03] We really can't assume that the coronavirus experience in South Korea translates directly to the US, or that it's the same as Italy. [In] Italy, rates of smoking among older men are very high, and so, in fact, the mortality rate may be even higher there among older men than it would be here. But, we can't trust that. We need to verify it with data, and the data must come from here. So, I don't know for sure that we can safely say, "Everybody without heart disease or diabetes, under 65, in the United States, can go out into the world and be okay." And I definitely don't think we can say for sure, "Everybody under 65 can go out into the world," because many of them have heart disease and diabetes.

[00:23:42.01] Then we get into the subtle realm of juxtaposing different risk profiles, so age is clearly one of the critical considerations, prior health is another.

[00:23:53.09] **JOHN:** But doctor, if it's true that the under 65 group - and to be fair to Dr.

Ioannidis's study, it seems it's a little bit higher for New York than just normal traffic - like, it's the equivalent of driving 400 miles in a car, as opposed to 8 in Germany - but if it turns out to be, with some confirmation (I'm not sure how we ever feel confirmed in a study) but if we feel confirmed enough that this is about the rate of traffic fatalities, then isn't this just a risk metric that we take at any moment, at any given moment, in life? I mean, you cross the street in New York, you can get hit by the car very easily, but we don't stop that from happening.

[00:24:35.08] **KATZ:** So, from the start, one of the things I was inclined to say is we don't shut society down because there are risks out there, risks of car crashes, the risks of death from the flu, the risks of other infectious disease, all sorts of risks we encounter every day, we don't shut society down. But, on the other hand, we have a certain capacity in our health system. Now, you could argue that we strain the limits of our medical system already, because we have so much chronic disease in the United States. If we were a perfectly healthy nation to begin with, and we had the supply of, you know, medical beds we currently have, but most of them were unused most of the time, because people were healthy, they could presumably absorb the surge need of a pandemic. Hospitals would not be overwhelmed; health workers would not be overwhelmed-

[00:25:29.12] **JOHN:** And you could also argue if there hadn't been a panic generated that they wouldn't be as overwhelmed right now-

[00:25:34.21] **KATZ:** Potentially so. The issue here, though, is that whatever coronavirus is doing, at the population level, it's doing *in addition* to what health was before. It's not as if car crashes have stopped because we have coronavirus, although in fact, they may go down because people are staying at home, so maybe they will, in fact, go down. Maybe other causes of death will temporarily decline - that would be a

good thing. But, for the most part, we have to assume that everything that was wrong with health here before is still wrong. The system was at, or near, capacity much of the time, and this is *in addition*. This is the new thing. And the fact that it's the new thing, that it's the acute thing, that does matter.

[00:26:14.11] **JOHN:** Doctor, speaking of the data, can I ask you, how sure are we- I've seen a number of studies, one from China that no longer appears to be available, and others that have come out since, that, in the first place, tests are not reliable, we're getting a lot of false positives. And second place, some of the tests have been contaminated. Have you looked at that? Have you seen that information?

[00:26:35.04] **KATZ:** I've been working with diverse colleagues from early on in the game and trying to leverage the fact that I was getting lots of correspondence, whether or not I was the right person to be getting it, I was getting it, and I wanted to use it every way I could. And a lot of that related to test kits. And what was obvious is: it was chaos. It was unclear what tests to use, it was unclear how good they were, and by the way, the scramble to determine what are the best kits? How do we most effectively disseminate them to the population at large? How do we find out who's infected now? And equally important, who was infected and is now immune? Because the more we know about that, the greater our ability to gauge the promise of getting to herd immunity, which is, to me, the best prospect for all clear.

[00:27:18.08] And, it's still a conundrum. The good news is, lots of groups are scrambling, and as recently as this morning, I had a correspondence from a private company that is looking to collaborate with state or federal officials that can produce 4 million, highly accurate test kits that were FDA approved, and this is antibody testing, so this could start to tell us how many of us have had this thing and are already immune to it. So, it's a rapidly shifting landscape. We don't really know how many have had this virus. Here's why this is so important: everything you think you

know, everything that makes you lie awake at night and worry about this, is based on your perception of risk, “Oh dear god, am I going to get this thing and die, or is this going to kill somebody I love?”

[00:28:07.03] And, frankly, when all we get is information about hospitalization and death, it makes us all anxious about that. But, if for each one of those stories, we knew a thousand people had the virus and got over it without noticing, or 10,000, whatever that number may be, it would be extremely reassuring. Suddenly, we would be able to compare this risk, the way my colleagues have done, to other more familiar risks, and we'd be able to say, "Okay, there's some chance of severe infection, but, on the other hand, if my health was reasonable before, it looks to be pretty remote." That would be very reassuring.

[00:28:42.13] We deserve to know that. We absolutely need that information for public policy. We need that information to know how to avoid medical system overwhelm, site by site, around the country, but you and I deserve it when we're lying awake at night, worrying about all this.

[00:28:58.04] **JOHN:** Can you explain, as briefly and as succinctly as you can, the concept of herd immunity and you know, a lot of people when they hear this say it necessarily involves culling the herd. Are those two things connected or not?

[00:29:13.15] **KATZ:** The reason to talk about herd immunity when we discuss the pandemic is there's got to be some kind of “All clear.” There's got to be some return to normalcy. Or, we have to concede that life as we knew it is over, and that's a pretty high bar to clear. I don't think we want to go there. So, the idea that this is temporary, we're going to work through it. It's difficult, it's painful, but we want to get back to normal. What are the options? One is a vaccine, everybody rolls up their sleeve, everybody gets vaccinated, we're protected against coronavirus. Why is that a problem? Well, the most optimistic projections take us out 18 months. And

if we're relying solely on a vaccine to protect us, it basically means whatever we're doing in now, sheltering in place, that has to go on for at least a year and a half, and again, that's an optimistic projection. We've been trying to come up with an HIV vaccine for 30 years. No one thinks that coronavirus will be that hard, but until you have an effective vaccine, you don't know for sure how long it's going to take.

[00:30:16.09] **JOHN:** And previous attempts at SARS vaccines have been...?

[00:30:19.12] **KATZ:** Unsuccessful to date. And so, there's reason to be hopeful. there's been early progress. But 18 months is kind of the most hopeful projection. That's a very long time, and that leads us back to that scenario I hate, where some older people will die of something unrelated to coronavirus before ever again being able to hug their grandchildren, because we're social distancing. That's terrible. I think of my 80-year-old parents, that's terrible. I think of an 89-year-old woman who told her story in the *New York Times*, that's terrible. So, herd immunity is something we have to talk about because it is the more proximal alternative to an all-clear. It's the way we can go back to the world.

[00:30:59.18] And the way to get to herd immunity is not to put people at risk, but to risk-stratify the population. Who among us can afford to be exposed to this virus, because it's overwhelmingly probable we'll have an unpleasant infection at worst, an asymptomatic bout of it at best. We'll get over it. We'll make antibodies. Again, we need data to know. How many have done this already? Who are they? And we need to go out in waves so that the people who are most likely to get over this without any adversity do it first, and the rates of transmission drop low, and then the next wave that's at slightly higher risk can get exposed, and if some numbers of us wind up getting sick enough to need the hospital, the hospital bed's available for us.

[00:31:47.02] **JOHN:** And would this involve something like the old-fashioned measles parties, where everyone sort of got together?

[00:31:51.15] **KATZ:** I've had colleagues write to me with what, at first, I thought were slightly callous, and then when I read them carefully, actually seemed very clever and thoughtful, ideas about exposing, for example, medical students who are graduating medical school and who first need to start working full time in hospitals, to coronavirus on purpose, controlling the dose, so they don't get an overwhelming dose. One of the things that's become apparent as we look at frontline healthcare workers who have succumbed, is that the dose of exposure does seem to correlate with the severity of the disease. So, if you're exposed to a relatively smaller number of viral particles, you'll get infection, but basically at a level where your immune system can keep up better. And, you know, one of the easy ways to think of this in terms of analogy is like a military engagement: so, if there's an ambush, you've got your defenses and it's a relatively small group ambushing you, you can defend your perimeter; if it's a massively larger group than yours, they'll overrun your perimeter and you're in big trouble. The virus is much the same. So, absolutely, there've been ideas, in particular, people who need to be exposed to this, people who are in hospitals now, or about to be, exposing them on purpose.

[00:33:05.05] So, gauging their risk, limiting that to people in the lower risk groups, so if you happen to be a medical student who has diabetes, you know, potentially, you would be diverted from that experience, and maybe you would have to spend some time not working in the hospital and doing something else, but you know, the average young healthy person who needs to be able to confront this virus exposing them on purpose.

[00:33:28.18] But, the idea of getting to herd immunity in phases, whether we willfully expose

people, we have, you know, essentially, coronavirus parties, where there's intentional exposure: some person who is infected, basically mingles with some people who aren't, and then everybody quarantines to get over it - or whether it's accidental, because relatively low-risk people go out into the world - either way, or probably both, we monitor immunity. We keep track of who's getting infections that are more severe than expected. We adjust accordingly.

[00:33:59.16] So, you know, if we find out that there are some people at heightened risk because they had a risk factor we didn't know about before, whatever that might be, you know, whether it's some other chronic condition we hadn't thought about. We adjust. But the idea would be to get low levels of transmission in a population that's achieved immunity with minimal adverse effects, and then proceed out in waves. And that's pretty much how the world has gone back to normal after other viral exposures that have rocked the population.

[00:34:30.18] **JOHN:** So, anytime one brings up the concept of herd immunity, people say, “Oh well, what about the school kids who go home to parents and grandparents-”

[00:34:41.03] **KATZ:** Right.

[00:34:42.04] **JOHN:** How do we deal with that situation? Or the teachers that are teaching the college kids-?

[00:34:45.18] **KATZ:** Absolutely. So, one of the things that I was challenged with - again, so at the very early going here, I said, “Horizontal interdiction, keep everybody away from everybody else, means societal collapse. It’s too high a price to pay. We're going to hurt more people than we help.” But one of the valid challenges, I think, was, okay, vertical interdiction means selectively protecting the population - what about this, and what about that, and what about these, and what about those? So,

yeah, what if you've got, in the same household low-risk and high-risk? What do you do? And my answer now, as then, is it's a 1200-page policy manual.

[00:35:20.16] Basically, you need 300 masters-level people under the supervision of a large group of leading experts. It's an intensive whiteboarding experience for several days, and then you get, basically, each of 300 intelligent young people is responsible for 3 or 4 pages and 2 different scenarios: so, you know, an older person caring for their grandchildren, a multi-generational home, a child with diabetes and healthy parents, you know, what do we do in all these situations?

[00:35:49.12] But, at the end of it all, there's still some fairly simple conclusions. So, we might be able to say, "Every household where no one is over 70, and no one has heart disease or diabetes? Out into the world." Now, I don't know that that's right. I want data to inform this. But, if I were in charge, if I ran the zoo, you know, whether we would be there actually, or virtually, it's never been a better time to put Camp David to use. Convene a multidisciplinary group of experts. Start out by talking through all the data we have, make sure we are getting all the data we need, and start to generate these kinds of high-level policy ideas. And then commission - I don't care, it's the Army Corps of Engineers, it's the nation's public health students - but, you know, a large group to work through every permutation, just the kind of questions you're asking now.

[00:36:41.05] So, what if - here's the structure of my house, right? I've got one person who's got this, and one person who's this age, and this person's caring for that person - there are a lot of those variants, but on the other hand, they fall into patterns. And, essentially, at the end of the day, we're talking about a very large decision tree. If this, then this, and there may be a very wide array of them, but fundamentally, there is a large number of households where, based on what we know so far, the risk for everybody there is pretty low, and they could probably safely mingle with all the other households in that same state, and then we could concentrate our

protective resources on those households that need to stay away from this longer, and they come back to the world a bit later.

[00:37:25.12] **LIBBY:** Populations that have been locked down like New Zealand, have they missed the opportunity for herd immunity? Will they ever be able to get it because they have been kept isolated?

[00:37:35.20] **KATZ:** So, if your strategy to avoid exposure to the virus of the population has been highly effective - you're in a part of the world where you're pretty well cut-off from everybody else, a place like New Zealand - if there is no circulating virus, and the levels of transmission fall to near zero, but almost nobody in the country has had it, you are forever at risk of a resurgence in the pandemic, whenever somebody brings it to you from someplace else, until there's a vaccine. So, you remain vulnerable. So, essentially, every population has the choice of intermittently locking down whenever exposure recurs, staying in lockdown until there is a vaccine, however long that may prove to be, or working toward herd immunity by liberalizing exposure, based on risk tiers.

[00:38:34.04] And, again, the goal of total harm minimization would seem to argue for basing exposure on risk. There are these massive differentials. I keep returning to the global data, and where they are most robust, and that's not here yet - South Korea, Iceland, Germany - the overwhelming majority of infections with coronavirus are mild. They don't require a hospital bed, they don't pose a death risk, people get the infection, it's unpleasant to one degree or another, and they get over it, and as best we can tell, they're immune. We need more data to confirm. That's been one of the questions - do people get reinfected? Those anecdotes have been reported, both in the popular press, and in the medical journals, but in every instance, it's not clear if they maybe had a false negative test and then a true positive test. So, they may not have been reinfected; we just may have thought they were free of the virus

when they weren't, and then a subsequent test showed, "oh, they still have it." So, it seems probable, based on our prior experience with related diseases, whether that's flu or other coronaviruses, that immunity will occur, in the majority of people. It may not last forever, but it will last for a while. And so, knowing the level of antibodies in the population is the most reliable way to know everybody can come back to the world and not have to worry if someone steps off a plane, we're back in the frying pan again.

[00:40:01.14] **JOHN:** Doctor, especially in light of the things you've been saying, I can't help but think we're in some kind of danger of confirmation bias where, you know, we start out with the WHO giving us a fatality rate of 3.4%. They've walked that back. Then, you know, Trump and Fauci, and I'm not going to distinguish, they say, "Oh it's 2 milllion, but because of what we've been doing, it's 100,000-200,000," and then the University of Washington, says, "Oh, well, it's 100,000 - now it's 80,000," and then the CDC, this morning - I haven't been able to confirm it - has apparently walked it back yet further, and Cuomo gets on every day, and we are told that, "We're now flattening the curve, and this is happening, and it's all because of our efforts at social distancing."

[00:40:51.02] But if we were to listen to Wittkowski, he claims that, essentially, this is the normal SIR curve of infection - it's epidemiology 101 - susceptible, infectious, resistant - and we may have guaranteed a second wave by slowing down herd immunity; essentially, you're looking at same thing that would happen as spring approaches, and as people have, especially given how haphazardly we locked down, the herd immunity, in fact, did spread, and so that is why we're seeing this curve. But as the New York Times said early on, "We'll never know, right, whether it was the lockdown or was this a natural thing?"

[00:41:35.13] **KATZ:** We actually - yeah, so we're not doomed to never know. I think immunity

testing is the answer, and I think we need to know. I don't know. Again, my fear at the beginning of this - and, it's interesting: So, my op-ed in the *New York Times* appeared, I think, on March 20th, which really does seem like at least several lifetimes ago. But, I wrote it ten days before that, because I submitted it, it took a few days to get reviewed, then it was reviewed, and they kind of liked it, but they had lots of suggestions, so I had to rewrite it from scratch, then that had to be reviewed, and fact checked, and updated, better part of 10 days between my initial ideation on the page, and daylight in the *New York Times*. When I wrote it, we had not yet sent the nation's college students back home. We had not yet shut down everything in places like New York City and Boston, laid off a lot of young people and said, "Maybe you want to go home because you're going to be sheltering in place for a long time, and you might prefer the family home to your small apartment in a big city."

[00:42:30.20] I wound up with three of my five adult children back at home, two from Boston, one from New York, and, you know, I think in many instances, that may have transmitted the virus, but we don't know. If it didn't, then, as inept as we were at the start of all this (inept in getting data, inept in making policy decisions, inept at thinking artfully about risk, and inept about social distancing when we still had the time), if, despite all of that, we actually managed to effectively interdict viral transmission at the population scale, then some of what we're seeing now is courtesy of social distancing and sheltering in place, it just is. And we would have more cases all around the country all at once, if we hadn't taken those precautions.

[00:43:15.00] On the other hand, if we find that everybody's been exposed already, that the people in households all around the country that are not showing up at hospitals that a very high percentage of us have antibodies, that's a different story. Then, what it means is that overwhelmingly, this virus tends to be fairly mild, that the severe cases are just, you know, the tip of the iceberg that's most exposed, most visible and covered in the news. But we don't know. And so, we really need population-level testing of

infection status and immunity. That's really just ramping up now. Why we're so far behind is really frustrating. But that will answer that question. We're not doomed to never know, "Did interdiction make a difference? Are most Americans still naive to this virus, which means yet to be exposed or are there a lot of Americans who were exposed, never needed medical care, and now have antibodies?"

[00:44:15.08] I've been corresponding with many risk modelers, but in particular, a pair, one from Carnegie Mellon and one from University of Pittsburgh, have written now, pretty extensively, on the danger of relying excessively on just flattening the curve. And given where we are now, there's widespread agreement that flattening the curve at the moment until we can transition to the next phase of this makes sense, again, particularly aimed at avoiding medical system overwhelm. But, when you flatten the curve, you basically just push out in time the events that you're deferring. So, you're trying to avoid a spike in severe cases, but you're doing nothing to prevent them, and so you can never stop. So, flattening the curve, the part of that story that isn't routinely told, is, unless there is a Phase 2 to your plan, you're stuck doing that indefinitely until there is a solution from the outside, like the availability of a vaccine. And flattening the curve without any subsequent phase doesn't allow for the development of herd immunity. You're basically keeping much of the population away from the virus and changing the structure of life indefinitely.

[00:45:33.12] So, the risk modelers themselves who are looking at the intrinsic value of flattening the curve, make a pretty compelling case that it is Phase 1 at best. You need a Phase 2.

[00:45:45.06] **JOHN:** There's an article in the *Atlantic* right now [that] my daughter, my 18-year-old daughter, sent me, that is just truly terrifying, and it seems to be in favor of this: it suggests that tracking everyone's movements will be essential to restricting the disease, or others like it, in the future. But how could contact tracing ever work in a city like New York, where one can literally encounter hundreds of thousands

of people a day, both in confined spaces, and in the street, especially given the virus's claimed ability to live on surfaces for three days, etc.? So, if you could just speak to that. Is tracing the way out of this?

[00:46:17.09] **KATZ:** It doesn't seem to me that it is. One of the things we were worried about in the life we knew before corona virus was privacy invasion and being monitored everywhere we go, and you know, just a lifetime ago, we were talking about that being a problem. It's hard to imagine being monitored at a level where we actually could know every exposure everyone is possibly having to this pathogen. It seems daunting to me. It also seems unlikely to be effective, because if we are out there and the virus is circulating, there will be many exposures. We'll maybe know something about which ones occurred, and maybe even with the best tracking, it'll be a fairly blunt instrument, and there are some exposures we won't know about, but I don't see how it's effective for interdiction.

[00:47:02.18] If exposure is occurring, and you are hoping to prevent it, you're back to lockdown; if exposure is occurring, and it's leading to antibody production, that's a good thing, and frankly, you can get there by measuring immunity, and tracking levels of viral transmission that result in a need for medical care, without monitoring everybody's movements. So, it concerns me. And you know, I think it invades areas where we are concerned about privacy and civil liberties and such, and I don't see tremendous advantage in it. There may be selective applications, specific populations, sampling exercises, studies where you are looking at how new pathogens circulate in a population where everybody can be monitored, but they're volunteering, and it's basically a representative sample, the way you would sign up to participate in a randomized controlled trial. That would be fine. But I think we can get all the information we need selectively, without subjecting us all to that level of invasion.

[00:48:06.12] **JOHN:** So, do you worry about the signs we are seeing at home and abroad of

increased repression and authoritarianism, measures that seem to bear little connection to public health and more to the specific political situation on the ground? A country like France, for instance, was experiencing social unrest and demands for major reforms before the pandemic struck, and now France has some of the most restrictive measures in place for leaving the house, which include papers on demand; and [in] Greece, no stranger to recent political upheaval, one must request permission via phone app to leave the house. Do you have concerns that governments will have a hard time relinquishing power that they've now gotten?

[00:48:43.08] **KATZ:** Yeah, I have concerns about the exercise of governmental power here in the US, as well as around the world, and you know, the expression we all know is that "a crisis is a dangerous opportunity." It's an opportunity to rise up and meet the challenge, and basically display the best of humanity. But the danger is that the crisis will get the better of us, and it will be exploited for personal gain. That certainly can occur among people who are leveraging political power. Obviously, you think about the extremes of lockdown. What's the most extreme case of lockdown? It's martial law. It's basically when you say, you know, "I have to take over effectively military control of a civilian population." I don't think any country has declared martial law over its population. But there have been movements in that direction. And, frankly, I think any country where there is overreach by government authorities doing more than they need to do to protect us, and, again, in some cases, not doing the things they should be doing to protect us, there is cause for concern. And we certainly don't want there to be permanent changes in the basic structures of democracy, the protection of civil liberties, as the result of a temporary problem and we all have to be vigilant.

[00:50:08.09] We need to see that any measures that are enacted to protect us from exposure to

this virus at a given place, in a given time, are commensurate with the threat, and go away when the threat wanes. But, there are concerning signs in our own country, as well as around the world, that the response to protecting the public from a contagion may invite excesses in the exercises of governmental authority.

[00:50:37.16] **JOHN:** What will happen to our faith in the medical system if, as it increasingly appears, the data seem to have been, well, I don't want to-

[00:50:48.06] **KATZ:** Go ahead, say what you mean to say.

[00:50:50.11] **JOHN:** Okay, I wasn't giving them the benefit of a doubt, but I'll just say it then, the data have been, when it increasingly appears that, the data have been overblown by governments, and the media around the world, for reasons perhaps other than public health?

[00:51:02.05] **KATZ:** You know, I don't think anyone is going to hold the medical system accountable for the problem. Most of what we would refer to as the healthcare system or the medical system are people taking care of patients. And I think that group and, as we speak, I am going through the fairly lengthy arduous online onboarding process to serve as a physician volunteer at a beleaguered hospital in New York. I've been retired from clinical care for several years, but I know how overworked my colleagues are, I'm looking to join the fray. You know, I look to them as heroes-

[00:51:36.07] **JOHN:** I'm sorry, I guess what I mean is like organizations like WHO and CDC.

[00:51:41.15] **KATZ:** Yes, yes. So, the rank and file in the provision of healthcare services,

they're the heroes of this, and I think everybody will respect that. The problem with an acute public health crisis is, you're really at grave risk of getting it wrong one way or the other in the early going. If it turns out to be a relatively minor threat to the population, and you overblew it, you know you're the boy who cried wolf, and everybody rolls their eyes at you. You'd kind of rather be guilty of that, though, than failing to warn people that something truly horrendous is about to happen, and I think we're going to have to be patient and let history adjudicate here. We don't yet know the final numbers. We don't yet know how many places around the world are going to experience medical system overwhelm. It's certainly happened in northern Italy, and it's happened in New York. Will it happen in other cities around the country? Is the US, you know, still in the relatively early going here. So, I think it's soon to reach judgement.

[00:52:43.18] And I think it will be tempting to look for fault in either direction. We can basically fault the system for not doing enough to protect people, and every family that lost a loved one will be inclined to think about it that way, and we can look around at the wreckage of whatever it is now - 15 million filings for unemployment, never before seen in history - and how that is reverberating through peoples' well-being and mental health and we're seeing a surge in addiction and domestic violence, and that would be a reason to find fault and say, "Hey, you severely overreacted." And you know, I think the best we can do, while still in the midst of this, is try not to rush to judgement, to get the best data possible, and again, make sure that the policy priority is total harm minimization. I do think that is the guiding light through this crisis. There is more than one way for this pandemic contagion to hurt people. It can hurt them directly via infection and it can hurt them indirectly via our responses to the contagion, and both are bad, preventing both is good, and we should be gathering more data every day to get better day by day at navigating between those dual perils.

[00:54:06.08] **JOHN:** It's kind of fun that this coincides with what will turn out to be a 6-10-trillion-dollar bailout of Wall Street….

[00:54:13.14] **KATZ:** You know, I mean, one of the concerns I have about the government's ability to deal with the economic fallout is that I suspect we're just printing money and devaluing the currency. And so, I think we're in the very early stages of realizing how grave the economic and societal toll of our response to the pandemic will be. It may feel good in the short term that, you know, you're unemployed and you can get a check, or you can get money from the government to help your small business survive for a little while, but the government can't just print money. That doesn't really work. We are going to wind up dealing with the consequences of that. And so, you know-

[00:54:54.07] **JOHN:** But this leads me to this. I mean, let's just get to brass tacks. So, this is what you might call a medical-industrial complex, you know, a pharmacological-industrial complex. Many people look around at the ways that big industries like pharmaceuticals, chemicals, and processed foods interact with the agencies that are meant to regulate them, and it seems to them that, there's generally very little concern for the health and well-being of ordinary citizens - I'm thinking the opioid crisis, drugs like Vioxx, chemicals like PFOA, glyphosate. So, given the cavalier, and some would say, profit motive, and corrupt approach of industry and the agencies meant to regulate it working in tandem, the revolving door, many people are asking why they seem to care so much about the most vulnerable among us now, and they wonder if there is, for instance, a big payday fat the end of this for companies developing a COVID vaccine, or, in fact, there is something to do with this bailout that is really maybe what's happening? Because everyone's just amazed that, suddenly, they care about the elderly, and the immune compromised etc.,

whereas as you point out, their food, their water, their air is generally poisoning them all the time.

[00:56:13.16] **KATZ:** So, there's a lot to that question. And, you know, I try not to go too far outside my area of expertise. I'm not an expert in economics, I studied it nominally in college, obviously I care about how it impacts public health, the two are ineluctably linked, and that's why I talked about it at the beginning of all of this, but, you know, the sort of the detailed ramifications of this, through you know, bailouts and how they'll effect Wall Street versus Main Street, I'll defer that to someone else. But, I absolutely share the concern that the overwhelming response to coronavirus begs the question, "Where the hell were we before?"

[00:56:56.01] I'll give you just one obvious example, because there are many. But, we have had the disclosure in really high profile places - *The Chicago Tribune, The New York Times* - that the American food supply is willfully engineered to be addictive. Essentially, teams of PhDs are hired by big food companies, given marching orders to design food people can't stop eating until their arm gets tired from lifting it to their mouths. They get functional MRI machines to achieve that goal; they get a bonus when they get food to the bliss point. And essentially, what that means, is we are watching corporate America subsidize epidemic obesity and diabetes to fatten corporate coffers. This hiding in plain sight, and I have been wondering and asking for years, "Where is the outrange?" And yet, we pay no attention to it.

[00:57:46.04] So, all of a sudden, there is this massive mobilization to protect health because of this acute threat, when there are chronic, relentless, inexorable threats occurring at a massive scale, hiding in plain sight, and is it because the right people profit? Is it because the timelines are extended? Is it some combination of those? We don't get outraged, we don't do anything about it, and we pay the price in lives lost, year after year, after year, and the scourge of poor diet effects children and adults alike. And because it kills hundreds of thousands prematurely in the US every year, but

it kills us by virtue of chronic disease. It doesn't just do what the virus does, which is cause death. For many years, before causing death, it causes chronic morbidity. It takes life from years, and then takes years from life. The virus doesn't do that. And we don't display outrage, and we tolerate it. So, it does beg the question. "Does some of this depend on who profits from what? Is this just about our inability to see grave dangers in slower motion?" And because of the acuity of the pandemic, it has aroused a response that really would be warranted for many things that threaten health all the time, but we tend to turn a blind eye.

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