Calling for an Evidence-Based Approach to COVID-19 – An interview with Dr. Vinay Prasad

In episode 33 of the OFID podcast, OFID Editor in Chief Paul Sax, MD, speaks with Vinay Prasad, MD, MPH, author and associate professor of medicine at the University of California, San Francisco, about being an evidence-based medicine proponent, the handling of COVID-19 in the U.S., and voicing his thoughts on social media.

Hello, this is Paul Sax [MD]. I’m editor in chief of Open Form Infectious Diseases (OFID). And, this is the OFID podcast and that’s O-F-I-D, and not “Oh-fid.”

So, one of the proposed benefits of social media is that it broadens our exposure to the way other people think, and hence could make us more open-minded. Whether this actually happens is debatable, but it certainly happened to me when I began following the Twitter feed of our guest on today’s podcast – Dr. Vinay Prasad [MD, MPH].

He’s a practicing hematologist oncologist and an associate professor of medicine at the University of California, San Francisco (UCSF) and the author of two fascinating books: Ending Medical Reversal and Malignant: How Bad Policy and Bad Evidence Harm People with Cancer. Both books and his Twitter feed detail how doctors will often advocate for treatments long before they’re proven to be effective, only later to recommend the opposite once careful studies have been done.

Dr. Prasad has not been quiet either when it comes to our current pandemic. And hence, I thought it would be very interesting to have him on to give us his impressions of our policies and treatments today. A bit of an outsider, a hematologist oncologist. So first Vinay, can you start by telling us a bit about yourself: how you came to be a doctor, how you chose your specialty, and how you ended up as a champion of evidence-based medicine?

Well Dr. Sax, thank you so much for having me, and it’s a real pleasure to get a chance to talk to you. And, thanks for those kind words. Very rarely does one leave a positive impression on someone on social media.

So, I’m from the Midwest, just outside of Chicago. And, I did my college not too far from home in Michigan State University. When I was a college student, I wasn’t sure what I was going to do with my life. I had thought about a number of different things. I had a roommate who was really gung-ho about going into medicine, and he was a kind of infectious personality. He let his enthusiasm carry in every direction. And, he probably touched me a little bit because it got me thinking about medicine as well as a career.

I didn’t know a lot about it. There are no doctors in my family. I ended up taking the MCAT [Medical College Admission Test]. And I probably didn’t know what I was signing up for, but sign up I did. I started at University of Chicago Medical School. Along the way, I got bitten by the evidence-based medicine bug, probably as a third-year student. We have a number of faculty members there who are superb evidence-based clinicians, practitioners in medicine. And, when I was a resident at Northwestern [University] in internal medicine, that was when I started to write a couple of papers and get into it. I didn’t really understand that one could have a career doing evidence-based medicine or health policies – what my life has become – but, you start working at it, you publish a few papers, people start to know you for doing this kind of work, and it kind of snowballs.
I went to fellowship at the National Cancer Institute. By the time I finished fellowship, I had a sense that I would give this a shot. I didn't know how long I'd last in the university setting, maybe I still don't know. I'm only six years out. And I moved to Oregon, I was on faculty for five years there, and now recently at UCSF. I would say that I practice hem-onc [hematology oncology], I'm still kind of interested in general medicine topics. We still do some research in that space. And, my work is probably health policy and evidence-based medicine.

So, now we have to shift to COVID-19 [Coronavirus Disease 2019]. And, we'll start with something that should be right up your alley as a hematologist oncologist. So as you know, the disease, especially in its severe forms, is associated with abnormal thrombosis and bleeding. So, give me your observation of how we're approaching this problem, and how you think we should be approaching this problem.

Yeah, that's a great question. I've looked at, oh my God, how many studies now, maybe 20, 30 studies that have tried to ask the question if the propensity to clot or the propensity to bleed is different among COVID patients who are hospitalized or in the intensive care unit, than other patients who usually would be hospitalized in the intensive care unit. It's a very difficult thing to do those kinds of studies.

Maybe there's a net signal there that people believe that there's more of a prothrombotic risk. But, if you really put a gun to my head and said am I 100 percent sure it's not the same as people who are equally sick of a different illness, I don't know if I would say that. But in my mind at some point, and this point was really early – I think it was when the experience was in Europe and in China – we had a couple of studies, I think one from the Netherlands, one from China that said there may be more clotting going on here than one would expect.

And the moment somebody tossed that hypothesis out there, the question was already there, which was, “Do these patients benefit from escalated doses of anticoagulation, full dose anticoagulation instead of the typical prophylactic doses, or something in between?” That question was right there and smack dab in the middle of March. And, the only way to answer that question is a randomized controlled trial. That was the only way back in March, it's still the only way today. We still don't have the results of such a study. We thankfully have a number of brave investigators who are doing those studies, and a lot of places are accruing.

But along the way, we had a lot of top centers just pull the trigger on different anticoagulation strategies, from full dose anticoagulation, to something in between, to prophylactic dose. They've tried different things off protocol, non-randomized. These results have been published in a number of journals. They're very hard to interpret. I'm still waiting to know, should I, as the doctor seeing a COVID patient who's getting hospitalized or transferring one to the [critical care] unit, escalate DVT [deep vein thrombosis] and PE [pulmonary embolism] prophylaxis beyond what we would typically do? I don't know the answer to that question and it's November. I wish I had known it a few months ago.

Obviously, a randomized trial gives us the best evidence, but there's an activation energy, and a time commitment, and human subjects review and all kinds of hurdles. How do you get the funding for it? What do you do in the meantime?

It's almost a philosophical question about how we should practice and incorporate randomized trials into medicine. I would say, we do have a model for how it could have been done, which is RECOVERY [Randomized Evaluation of COVID-19 Therapy trial]. The investigators from Oxford, it didn't take them a
whole lot of money, but were able to run an extremely large, multi-arm, randomized, pragmatic study. Fifteen percent accrual among hospitalized patients in the UK [United Kingdom]. They're running it on a shoestring budget.

It's answering really important questions from convalescent plasma, which is coming, hydroxychloroquine, which has come, and dexamethasone. It has so much power that they can actually have pre-specified subgroups and look for interaction coefficients. So we know this is maybe working if you're on the ventilator and on oxygen, but maybe not if you're not on the ventilator and not on oxygen. I think any future pandemic preparedness plan needs a randomized trial agenda built right into it. That will be not just the drugs we give, but also prone positioning, ventilatory strategies, early intubation, anticoagulation – the questions that we didn't get satisfactorily answered.

Well, let's cover another one. And, I want to share an anecdote with you. Back in the spring when we had our first surge of cases of hospitalized patients, and I hope our last one, although things aren't looking so good right now, we embedded ID doctors into the general medical teams. I was assigned to two medical teams that had a 100 percent census of COVID-19 patients with other medical problems, of course.

Wow.

And on one of the two teams, all of the patients when they got admitted were started right away on hydroxychloroquine. And on the other team, which rounded just across the hall, essentially none of them received it. This was all done without any input from their ID consultant, which was me. So, how would you explain this? And, what would you have done in my situation?

So, these two teams are the Republican team and the Democrat team?

No, I think it's really interesting. I'm reading between the lines, but it sounds like there is somebody who feels strongly on one team. And, somebody on the other team who doesn't feel strongly the other way. That is so often the case in clinical medicine, from the choice of antibiotic for pneumonia, that there's often a red pill and a blue pill, and different doctors have different preferences. But the moment you suggest that the way we settle this question is through randomization, people have some aversion to that.

I think I was critical a little bit when I saw something trickle out of a Harvard hospital that showed the go-to protocol.

It goes back to the age-old question which is, under what circumstances should you try medicines that don't have proven efficacy? Different people can disagree, but there are some general principles in medicine that we've long subscribed to which is that the healthier somebody is, the higher evidence thresholds we typically have before giving something a shot versus the sicker they are; the more the natural history is certain versus more it's uncertain; and the more something is rare, we're more likely to give something a shot than if it's very common.

With SARS-CoV-2 [severe acute respiratory syndrome coronavirus 2], even though it's quite fearsome, the majority of people, even hospitalized people, are still going to recover. The majority of people are going to do okay. The pre-test probability any novel drug works in a novel virus situation is probably on the lower side of drug development.
Yes, very low.

Very low. Not Alzheimer’s low, but low nonetheless, the pre-test probability that a drug works. These things should be factored in, and then the rarity of the situation. We wish it were rare, but unfortunately it was quite common. It met all the preconditions, I think, for randomization really early on.

Obviously it turned out not to work.

Yeah.

I would like to go back to that medical team and explore with them how they feel in retrospect. I do know that there is a hospital in our city that put it on their protocol, but I want to say that we did not. This was something that they elected to do, because as you said, there was a very persuasive, charismatic resident who basically made the argument, “We don’t know who’s going to get sicker with this disease. And so, we’re just going to give them the best chance they’ve got.”

Yeah.

I want to switch now to a study you mentioned already, and this is the NHS [United Kingdom National Health Service] RECOVERY trial. They released a press release on dexamethasone and essentially it showed in this large randomized clinical trial, “We are about to release the data that the intervention of dexamethasone given to hospitalized patients with COVID-19 improved survival.” And, they showed very impressive data. The response from a lot of people initially was that they couldn’t trust the data because they hadn’t seen it yet, even though the study had to be stopped because there was such a benefit for certain populations.

Now, what did you think when these data were released? How should we have approached it? Dexamethasone of course is widely available, and there were some parts of the world that were already using corticosteroids in treatment of COVID-19. And then, we have a randomized clinical trial and this press release.

Right.

What would you do if you were the doctors managing cases at that time?

I came out guns blazing. And I said, "It ought to be given right away." I took people to task who said, "We ought to wait for the full publication," because they would kill people while we waited for that publication, which was going to confirm the press release. There was not going to be any red flags in that publication, and there weren’t, that weren’t in the press release. And, how did I know that? I guess I’m somebody who has thought a fair bit about medicine-by-press-release. And, I hate it, actually. In my line of work oncology, we live by medicine-by-press-release. There’s a press release every week that tells me to do something different. And, I know that often the trials have some serious limitations or pitfalls that I should know before I leap on that situation.

So, what are the differences here? One difference, oncology medicine-by-press-release is typically for-profit companies bringing extremely costly drugs to market based on endpoints that don’t necessarily capture how well people live, or how long they live. In the RECOVERY trial, we have Oxford investigators,
they're impartial, they're testing a drug that's pennies a day, that's really low cost, widely available. So, it
doesn't have that same financial conflict.

The second difference is when it comes to proprietary clinical trials in oncology and the press releases –
you've never read the protocol, you've never seen the statistical plan. And even when it's published, you
may never see those things. They can often be redacted or not forthcoming. With RECOVERY, even
though they had only issued press release results, they had posted in advance the full statistical analysis
plan and the full protocol of the study, which is actually much shorter than most study protocols.

So, the way I thought about RECOVERY was a paper and a supplement – that's a passport, it tells you
who somebody is. But a statistical analysis plan and the press release, that's a driver's license and social
security card. It's a double-ID way of finding out someone's the real deal. Some of the people who
commented that were reluctant to embrace the press release, I think they were well-intentioned. They
thought that you want more information. But, I think they missed some of the differences here, that this
is a pandemic, it's raging, the cost of the medication is cheap.

The other thing that they were missing is that we have already demonstrated an appetite to try things
based on next to nothing, such as hydroxychloroquine. So, why would we not have an appetite to try
things based on an 11,000-person randomized trial that purportedly has an all-cause mortality benefit? I
think that the calculus was fundamentally different than the typical medicine-by-press-release.

I thought it was also fascinating that some of the same people who are saying, "I don't trust it until I
see the actual paper," would be recommending tocilizumab.

Right.

That's a whole different topic.

Right. They're recommending tocilizumab and full dose anticoagulation, but they want to see this
publication. Sure, okay.

Okay. So, we're now going to talk about a really tough problem.

Okay.

And, that's the people who survive COVID-19, and then have long-term adverse effects of some sort,
whether it's palpitations or it's fatigue, or brain fog, or shortness of breath. They're really suffering.
And right now, we don't really know what to do for them. This is the so-called “Long COVID” sufferers.
Any thoughts how we should approach this tricky clinical condition? And, you think about it from both
the medical side and also the nonmedical side, like the press.

When all is said and done, this is the multi-billion dollar question. One thing I want to say always upfront
is that anybody who comes to see a doctor who feels any symptom, that's a real symptom and that
really needs to be taken seriously. And the doctor has to do everything possible to address and
ameliorate that symptom.

But, just because the symptom is real doesn't mean it's really attributable to COVID. There's a couple of
sets of related questions. One is, we are going to see a lot of people who come in with Long COVID, the
genie is already out of the bottle. There's been rampant media coverage and that media coverage is getting people to think about these side effects, even if they weren't thinking about them too much before.

It will get a lot of people to present with these constellations of symptoms of Long COVID. Some of them will have had documented SARS-CoV-2 prior, and some of them, I'm reading, don't have a current documented SARS-CoV-2 positive test or antibody. Nonetheless, they could have been infected, that's theoretically true, and these could all be false negatives.

But, it's going to get a lot of people who feel like they have this syndrome. And, I think the first question is, how much of this syndrome is really due to having had COVID? That is a very thorny, epidemiologic problem that requires comparators. I saw a study that says, "Among people hospitalized with COVID, what percent have long-term sequelae?" You need to compare it to, among people hospitalized with the flu a year ago or two years ago, what percent had long-term sequelae? What is the excess of sequelae from this respiratory infection than other respiratory infections?

The next piece of the puzzle is, irrespective of why someone feels this way, if people are going to have forgetfulness, memory fog, nausea, a host of symptoms, we might want to try medications from all different classes – perhaps memory medications to mood medications, to all sorts of medications may be attempted. I'm a proponent that those medicines should be tested in a randomized fashion to see, are they really helping these people? I worry that we're going to create a cottage industry of uncontrolled anecdotal medications being prescribed to these people who are truly suffering, but may not be suffering from the sequelae of having had COVID. They may be suffering from something else. And, we may never know if some of our treatments are making them better or just adding medications and cost.

And then, the last part of your question is the media. The media has jumped on this, and they've jumped on it hard. They've written many, many stories about Long COVID. To some degree, the more stories they write about Long COVID, it's a self-fulfilling prophecy, there will be a lot more Long COVID as a result of those stories. But, it doesn't help us get at the cause, and it doesn't help us get at how to make these people feel better.

The hardest thing to tread on is the difference in the socio-demographics, the socioeconomics of the people who are being affected by COVID and dying of COVID, and the people who are presenting with Long COVID. Do they comprise the same racial minorities or the same socioeconomic class? That's an open question, I think, that needs to be teased out. So, Long COVID, yes, people are suffering, yes, they deserve sympathy. But we need a whole lot of science to separate myth from fact.

A treatment center, an evaluation center for Long COVID would be ideal. The problem, of course, is that right now, there is no accepted way to either evaluate or treat it. So what we're doing is essentially a lot of listening and saying, "Look, we'll keep you apprised and if there's something that becomes available that's helpful treatment..." But, it's very tough situation.

Yeah.

I'm going to ask you about the most exciting news we've heard in some time. I'm not sure when this podcast is going to post, but earlier this week, we heard that the first of the late-stage vaccine studies, the Pfizer vaccine study actually demonstrated more than 90 percent efficacy in reducing
symptomatic COVID-19. And, we haven't seen much of the data yet. But, how do you think these first vaccines, because I assume there will be others that are effective, should be deployed? And, how much safety data do you think we need before going ahead?

Specifically, there have been people who say, "We need to wait longer for more safety data before we actually deploy this." And, I know that you took issue with that.

Yes, I take issue with that. So, I would say a couple of things. We're not in peace time, we're in war time. It's a very different situation than peace time. What should the standards be to deploy a new pneumococcal vaccine? That's a kind of question that we can mull over. We can have a leisurely conversation.

But right now, every day we either experience the runaway spread of SARS-CoV-2 and the downward sequella of it. Or that some of the interventions we're using to stop SARS-CoV-2, leading to massive harms and massive downstream casualties that we may not fully appreciate. Lock downs do not come at no price, they come at great price, often to the poorest people. We hear situations about, globally, tens of millions on the brink of starvation. I think these have to be taken into account, when one thinks about the threshold to deploy a vaccine approval.

We have guidance from FDA [the U.S. Food and Drug Administration]. They said, "If you come in with a 50 percent efficacy and a lower-bound 95 percent confidence interval, I think above 30 percent, we're going to grant your approval." We've got an interim analysis with a point estimate of 90 percent. And, I think I've seen some calculations that the lower bound of that confidence interval, we'll see what it comes in finally, but right now it's around 60 percent. I bet the final efficacy of this is not going to be 90 percent, it's going to be lower. But, let's say it's 70 percent, that's still terrific. It's not going to go through a traditional vaccine approval. It's going to get an emergency use authorization for an infectious disease in the middle of a pandemic setting, an EUA. The FDA had previously suggested that they would give that, when there was a median follow-up of two months of everybody in this 40,000-person randomized study. Which means that 20,000 people, 10,000 in each arm, they're going to have two months of follow-up.

And then, there was a movement, a petition to say, "We don't want a median of two months follow-up, we want a minimum of two months follow-up." So for the extra 20,000, instead of having one month follow-up or 1.4 months follow-up, we're going to wait until they're all past two months. I had a lot of difficulty with this proposal because I saw from the calendar, it would clearly push the EUA out beyond the election. That was clear. But, the additional safety information you get from taking 10,000 people who have 1.78 months follow-up, and pushing that to 2.1 months follow-up, I'm not necessarily convinced that's a lot of additional safety information. On the margin, it's very, very small. And, it has to be weighed against the cost, which is now a two-week delay in approving this vaccine and giving it out.

Now some people say, "Well, you can't give it out anyway, they haven't manufactured it." Well, my understanding is they have a lot of it ready and it can be deployed very, very quickly.

Yeah.

The trade-off here is not safety versus speed, it's an incremental increase in safety, which is quite marginal, versus a three-week delay at a time where the virus is running rampant across this country. And, I find it hard to believe that's a worthwhile trade-off. We're never going to get perfect safety until
we deploy it, actually to a few hundred thousand people, then we'll get a sense of rare AEs [adverse events] and things like that. And it ties into Long COVID actually, because there will be some people who have symptoms after the vaccine that may not be attributable to the vaccine. And the standard we use to say, "This is due to the vaccine, or this is due to prior COVID," that sort of epidemiological standard is the same. It shouldn't be different.

There's some fascinating parallels with Lyme disease.

Don't say that. I think you're right.

I can't help it, because there was a Lyme disease vaccine approved. And, it was actually eventually pulled because it started to get into the controversies that are associated with Lyme disease to begin with, which is that there's people who test negative and have Lyme symptoms, and people who test positive and have persistent symptoms. And then, there were people who got the vaccine and said, "I have those same symptoms."

It's obviously a sensitive issue for people and, I've been surprised by the massive social media presence in this space, but it is an important lesson and it really has a lot of parallels. I think you're spot on.

I do want to now talk about some medical publishing issues. And, the one that I want to focus on first you took me to task on — not me directly, but people like me. Because, some public health officials, epidemiologists, policy wonks and ID types, and I'm in the last group, have written position papers or editorials promoting bold moves to contain the epidemic, along with sometimes very strong critiques of national policies. And, I'd say the most prominent recent example was The New England Journal of Medicine editorial, "Dying in a Leadership Vacuum," which I thought was actually very well-written. But, wasn't to your taste. Give me your view.

I guess it's multifaceted. That particular paper was interesting, because it was an editorial that was written and it was sub-tweeting Donald J. Trump. It was all about Donald J. Trump and his failure to lead us properly through this pandemic. And, I don't dispute that claim. In fact, I'm quite sympathetic to that view. I think that's probably right. But, it didn't say Donald J. Trump, it tiptoed around it. And I was like, "If you're going to call this guy is the problem, then you better call this guy, just say his name, say his name. If you're going to point the finger at this guy, just say his name, I want you to do that." That was one of my critiques of the paper.

I also think it speaks to something that's a harder challenge, which is how do we in the publishing world in medicine and science, how much of a barrier do we have between us and open political advocacy? There have always been journals that are incredibly intertwined with political advocacy. I think of The Lancet. The Lancet has written papers on what we should do in Kashmir, what we should do in Sub-Saharan Africa, what we should do with the crisis in Yemen. It has written a number of papers about foreign policy. They had a famous series of articles on the war in Iraq, and the death toll from the war in Iraq and Afghanistan from the George W. Bush administration.

The New England Journal of Medicine has historically been quite reticent, very reluctant to engage in political matters, particularly on the eve of an election. And at that time, of course, the pundits all believed it was going to be a landslide for Mr. Biden. And so, I wondered if like the delta on getting people to think more about public health was off-set by the delta of losing the respect of people who are politically not aligned with the way I'm politically aligned. I'm a progressive.
And so, the risk-benefit calculation of their publication is, are we going to persuade more people to join public health, or are we going to potentially alienate a lot of people in these red states? And so, I know, I was critical of it on my podcast. I still don't have a great answer for this entire space. Because it's changed a lot, you and I will both admit. Ten years ago, we could be doctors and we were so apolitical, right. We were so outside of political processes, but now politics has blundered so colossally in the space of medicine and public health, we feel drawn to it.

But there is still a recognition, it's hard to admit when you're on Twitter, that 50 percent of the doctors in this country are Republicans. They have historically held Republican policies, and I don't think we want to lose them. We don't want to make them feel like they can't participate in these discussions. We don't want to push them away. We want to bring them into our discussion. And so, I worry that sometimes when you thread this needle of political advocacy and speaking about public health, you cannot really tell people to join your cause and push people away. And, that's my concern.

One question is, will it actually improve the situation at all? And, perhaps by at least calling out the problems, you rally the troops who feel like you want something different, but I see your point. I really do. I don't think it convinced anybody. I would agree with you on that one.

It made us feel good. And, I'll give you another analogy that I think is a very difficult problem right now, which is the mask and the mask mandate. For better or worse where we are, right as we're talking in November after the election in 2020, there's a lot of us who believe that this is a very simple and easy thing we can do to show our patriotism, to try to decrease the spread of this virus. And, there's a bunch of us who don't want to wear one. And, I'm not sure we're going to win by having mandates or policing.

I'm not sure the best way to win, but I think you want to have people who are psychologists, behavioral scientists and really sort of tacticians of persuasion at the table. A lot of people toss out seatbelt analogies to me that we had a mandate, seatbelts went up. They didn't go up in three days. They went up on the order of three years or 20 years. And, we don't have 20 years. 20 years from now, you can wear a mask, nobody cares. You need them to do it in 20 minutes. And, that's a very difficult problem.

I actually often think that if we had said at the outset, “Mask wearing in public places, indoors is required because that's where the evidence is strongest.”

Yes, that's right.

There's really not much evidence that wearing masks outside prevents spread of the virus or protects you. But when you're outside, it's in public, and so it's supposed to be a signal that you're a mask wearer.

Right.

Anyway, last controversial topic. I can't leave this discussion, because I'm married to a pediatrician, without asking you about schools.

Ah, yeah.
Schools closed in March, and that has had major consequences and many places still have closed schools. What are we to do, both as doctors and also as public health officials, and also as teachers and parents – how do we manage this really difficult problem?

Yeah. This is a big issue. And, in June I didn't have a strong opinion, but then I started reading a lot about this space and my opinion has coalesced and it has become strong.

When the pandemic was blowing at us in early March, I think it was entirely reasonable to suspend schools at that point, because we did not know where we would be. New York City ended up being devastated by SARS-CoV-2 then, and you all in Boston to some degree as well. But, that could have been every city in America. We just didn't know. In that setting of uncertainty, as [Nassim Nicholas] Taleb says, "A fat tail probability distribution of what the worst events could be," I think it's entirely reasonable to suspend schools.

By June, July, August, I think we were getting information that children, when exposed to the same household conditions of somebody with it, they're less likely to acquire the virus. There's some contact tracing studies. Well first of all, they're very poorly represented in contact tracing studies to begin with, which tells you something. There are contact tracing studies to suggest they may be less likely to spread. And then, we started to get the European experience in August where schools could be safely reopened without devastating consequences to the staff. And there's a number of really well-done studies showing that teachers may be slightly at increased risk of acquiring the virus, but not tremendously at increased risk. And so, it looks like it's pretty safe for teachers. It's certainly safe for the children. We now know the IFR [infection fatality rate] in kids is...

It's very low.

It's very low. Yeah. And then, I started delving into the economics and educational literature, which I was frankly not that familiar with. I learned through a number of publications that school is the only tattered rope ladder of opportunity left in this country for poor kids, for minority kids. There's nothing else. We have stripped all the other ladders of opportunity in this country. We left one tattered ladder. And right now in November, there are places in this country that are hard hit, and maybe we'll give them a pass. And, there are some teachers who are, because they're older or have comorbidities, they're reluctant to go in-person. I'm willing to give them a pass too.

But, there are places where low test positivity with a young, healthy teacher workforce, and we still don't have in-person schools. And the more I study the problem, I come to the conclusion that it is a misalignment between incentives that the teachers, and unfortunately the unions that represent them, have the incentive to keep things closed, at least on the short-term. And, they have done a lot to keep it closed. I actually think that's against their long-term interest, it will hurt public schools in the long-term. It's a very thorny political problem.

The moment DJT [Donald J. Trump] said, "We ought to open schools," was the moment that 50 percent of people had a vehement opposition to schools. It would have been better off if he had not put himself in the debate. But, just like a broken watch is right twice a day, he was right. That it is something that is the foremost thing, if we could only do one thing in a society and everything else must be closed, it should be schools.

You don't agree with having the bars and restaurants open and schools closed?
Yeah. Or large sporting events, or strip clubs as is true in some places. The schools are closed, but the strip clubs are open. Or the schools are closed, but the afterschool basketball practice is open, because the teachers get a little bonus pay or the coach gets bonus pay for the basketball class. Our priorities are misaligned here.

And actually, with the news of the vaccine and with the news of Joe Biden, my optimism that we can re-open schools has sunk. Because now, I think many people will face the calculus that the vaccine should be deployed in teachers before they go back. And, that we should wait for Biden to come and finance the air filtration systems of schools before we go back. And, I think that's where a lot of people are emotionally, and it's going to be a hard battle. But places like in the Bay Area, crack a window, put a mask on and get to school. And to be honest, I don't do anything more in my county clinic than those precautions. It can run. We have very low test positivity here.

Okay. I'm going to end on a lighter note. One of the times that I've laughed out loud at one of your Twitter posts was the time that you described being invited to give a presentation where the person said that they wanted your PowerPoint file, a signed permission to record form, a biography, five multiple choice questions and a conflict of interest form completed and sent to the person a month in advance to the talk. And, you said, "If you're going to invite me to do that, just don't invite me."

Just reading that you had that response made me laugh out loud at the bravery of writing that.

Dr. Prasad, I want to thank you for spending time talking to us about COVID-19 and other things in evidence-based medicine. And just a reminder, I've been talking to Dr. Vinay Prasad, associate professor of medicine at the University of California in San Francisco. Thanks a lot Vinay.

Dr. Sax, thanks so much.