**A Fireside Chat with Dr. William A. Haseltine: Covid-19**

**The Swedish-American Chamber of Commerce**
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**Barbro Ehnbom (BE):** I have the privilege to welcome you all on behalf of the Board of the Swedish-American Chamber and on behalf of the Swedish American Life Science Summit.

It is my delight tonight to be able to welcome such a fantastic guest, one of the world's foremost scientists, particularly on viruses. We are lucky that Dr. Haseltine lives here in New York City as he is here tonight to tell us a little bit more about the coronavirus. We will also have a chance to ask a few questions Thank you so much for being here

**William Haseltine (WH):** Thank you for the generous introduction. You are lucky to have Barbro as a representative of Sweden. I have worked with Barbro and the Swedish American Life Science Summit from the beginning. It has been a wonderful experience. Not only do you get to go to Stockholm at the best time of the year, which is mid August, but you are there with a wonderful group of scientists from all over the world enjoying the summer crayfish and a cruise through the archipelago.

**AIDS**

First, a bit about my background. I am a scientist working on applications of molecular biology for medicine. Early in my career I decided viruses would be a way to understand what was happening with human biology. My entry into virology was through studying mouse and chicken cancer causing retroviruses. I had the intuition that this family of viruses would cause human disease. Then HTLV followed by HIV were discovered. I was one of the only people in the world actually working on human retroviruses at the time. I was in the right place at the right time.

Let me remind you a little bit of what it was like in the early days of the AIDS epidemic. It reminds me of what is happening now with Covid-19. All of a sudden there was a new disease that was, people were dying. In this city, our artists were dying, our theater actors were dying, our designers were dying. Really the flower of creativity in New York was devastated. People would lose one, two, or three friends a week. It was a horrible time, and nobody knew what it was. Then it was discovered the disease was caused by a human retrovirus. Still, most people preferred to ignore or minimize the danger as did Reagan, our president at the time. He did not want to say a word about it, even though his friends from Hollywood were dying. In 1985, well after the virus had been isolated, *Discover Magazine* published a story in which they said not to worry. It is only going to affect homosexuals and drug users. It is not a heterosexual problem. Then a book was published attacking me and Bob Redfield. Today Bob is the director of the CDC. Bob and I were personally attacked in a two

hundred fifty-page book called the *Myth of Heterosexual AIDS*. People did not want to believe what it was. It was hard to get the money to do the research. What has happened since? Forty million people have died of AIDS. About two million people every year are infected and about a million and a half people die each year, even now. The good news is we have a way to control HIV and AIDS. The first way is information, safe sex, a clean blood supply. We have diagnostic tests. All over the world, people know what AIDS is and they know how to protect themselves from it. We now have drugs to prevent infection of those exposed and to save the lives of those infected. We now have a new equation: U=U., undetectable means untransmissable.

What are the lessons for today? Well, today we have a new epidemic Covid-19. It is a new coronavirus, a member of a family of viruses discovered in the 1950s. One third of all the colds you and I get are coronaviruses. Everybody in this room has had coronaviruses, everybody. Three of ten of your colds are due to coronaviruses. Coronaviruses generally do not cause too much trouble. They cause a cold. And we know how colds are transmitted. So, if you want to know how this Covid-19 is transmitted, think about what you know about cold viruses.

**Polio**

Now there is another example that goes back in history a little bit that most of you know about: polio. Most of you have not had direct experience with polio because the vaccine has been really effective. When I was a kid, we knew about polio because every summer we could not go swimming. We had to be in groups of three, not four. We could not go to the movies. What we did not know about polio is that it was also a cold virus. Only one out of a hundred people who contracted the virus were paralyzed. Does that sound familiar? Does that sound like this Covid-19? It does! What we are going through right now is familiar to those of us sixty five and older because this is exactly what happened during the polio epidemics. It is nothing new for us. It is new for most of you.

**Covid-19**

Can we control the epidemic? If you do not know who is infected, you cannot control it. That is a major lesson. So, if you do not have a test and if a test is not widely available, you cannot control the infection. What country in the world today has the tests they need? China, South Korea, Taiwan, Singapore. What country is not testing? The US! Why the hell not? Why are we so behind in testing? You talk to anybody in public health and they will tell you if you are going to control an infectious disease and you are fortunate enough to have a test for it, you test and you do contact tracing. If somebody has a symptom, you test them. If they are positive, you test everybody they have been in contact with, and if need be you test everybody they have been in contact with, and you isolate them or you treat them. We do not do that even today, after the virus has been around for three months. What is wrong with the United States? I do not know what is happening in Europe.

The promise is in two days we will have the test. Will we? NO way. It is a huge public health failure.

Our political leaders are denying that this is a serious problem. Think back to what was happening with HIV. People denied it was a problem until it was unavoidable. What finally did it for HIV/AIDS in the United States was a very famous movie star got infected. It was not just that he was infected. He went to France to get treated and came back almost dead, both from the infection and the treatment. People began to ask, “Why does a famous American have to go to France to be poisoned? Why can't we do something here?”

**Preparedness: BioShield**

Now there is another aspect that really bothers me about this epidemic, and that is that we should have been prepared but were not. Predictive protection against a tourist attack with anthrax is the model we should have followed for coronavirus threats.

Envelopes filled with powdered anthrax were sent to politicians and journalists. Some got infected and died. The attack came on the heels of 9/11. Our government swung into action. We decided that we needed to protect ourselves from terrorists that could use bioweapons against us. Enabling legislation was passed lickety split. What was that legislation? It was called BioShield followed up by something called BARDA, legislation that allows rapid development, stockpiling and deployment of anti-bioweapons vaccines, drugs, and diagnostic tests.

That legislation is meant to protect us from manmade bioweapons. What about those diseases that nature itself produces? In the recent past we have experienced epidemics and some pandemics. AIDS, swine flu, Ebola, Zika, and many more. We are not protected against the worst terrorist of all, nature. Think of nature as the ultimate artificial intelligence machine. Evolution produces billions of random changes in viruses every day in an attempt to find chinks in our armor. It is not surprising nature succeeds. There’s a whole world out there in nature that is after us. That we are not prepared is evident from the Covid-19 pandemic.

**Lack of Preparedness for Covid-19**

Could we have anticipated this event? Nature gave us two warnings. Yes. Our situation is like living on a volcano and hearing terrible rumblings. We had SARS, we had MERS, and we knew you could get lethal viruses. So, what happened with SARS and MERS? After the first and second lethal coronavirus attack, scientists around the world took the lead and began developing drugs both to treat and to prevent infections. And guess what? They came up with many drug candidates. The drugs showed they worked in the test tube. They showed they worked against the virus, and some even worked against animals infected by SARS and MERS. Those drug candidates are still around.

I will give you a graphic example. My daughter is a sculptor. She works on biological themes. She competed in Singapore for a big sculpture in the middle of their Biopolis and she won. She asked the Biopolis scientists what they were most proud of and they said it was their creation of a SARS protease inhibitor. We can stop the SARS virus. She made a sculpture based on their work. It is a walk-in sculpture. When you walk through the active part of the SARS protease, you become a drug that stops the SARS epidemic, and by the way, you are walking on a pavement built in the form of the drug they discovered that stops the SARS and MERS proteases. (See Image below)

Why can't we take that drug today? Because it was not economically feasible for big pharma companies to spend the money to take the drug through the human trials necessary for FDA approval. The financial incentive was not sufficiently attractive. There is no regular market. There is no predictable market. No government was willing to step in to stockpile the drugs. That is why we do not have it.

**Anti-Viral Drugs**

You can go to the literature and find twenty compounds that, if you manufactured today, would prevent you from getting infected if you were exposed and would cure you if you got infected. There is one drug approved in China and the NIH is testing another that may work. That is really good news. My prediction is that within a matter of months we are going to have prophylactic drugs and we are going to have curative drugs available. It is going to happen. Most of the work is already done. It is now just a question of turning the crank. Following BioShield rules, a company need only show the drug works in animal models of human disease and one safety trial. It can then either be sold or stockpiled.

**Future Dangers**

Let us take a broader perspective. What does nature hold in store for us? There will be another lethal coronavirus epidemic. When? Five years, ten years from now. There have been three in twenty years. Why should there not be another? Let's be prepared. Let us stockpile the drugs. Most antiviral drugs work on the inside of the virus. Unlike the outer shell of the virus, the inner working changes very little from strain to strain. Combinations of two or more antiviral drugs also defeat virus resistance. We need a set of anti-coronavirus drugs that act on different viral proteins to use in combination, just like we do for HIV.

What else is out there that is going to get us? A terrible new strain of influenza, that is for certain. The last time a brand new flu came around, it killed between 50 and 90 million people. That was 1918-1920. The next one could kill a billion people or more. How did the 1918 flu kill? It triggered an immune reaction called cytokine storm. Well in the morning, dead by evening.

Are we protected? No, we do not have the prophylactic or curative drugs for flu. Why? Because it is a hard virus to work with? Not at all. I look at that virus and see at least ten different ways you can make prophylactic and curative drugs for the flu.

Let's learn our lesson and bring new anti-flu drugs to FDA approval and stockpile them for what we know is to come.

What else is on the horizon? As we are sitting here, 500,000 Indians are going to die of tuberculosis and one third of those are going to die of antibiotic resistant, multi-drug resistant tuberculosis. You talk about something you can catch on a plane just by breathing. You do not want to be on a plane anywhere near somebody with antibiotic resistant tuberculosis. That is much more dangerous than the flu or anything else that you are likely to encounter. Over half a million Indians a year have it. Are we prepared for it? We are not. Nor are we prepared for a wave of antibiotic resistant bacteria that exist and are spreading around the world and in our hospitals. There is a big dearth of research in antibiotics. Such research is perfectly suited for national governments to create markets that do not naturally exist.

Covid-19 is yet another lesson from the natural world, one we have ignored in the past and ignore in the future at our peril. If you live in an earthquake zone, you build earthquake proof houses. If you live near a volcano, you pay close attention to the local seismometer and clear out when it goes off. Yes, we are on the alert today. But will we forget again tomorrow? It is up to us to work to convince those in government meant to protect us now and in the future.

I am happy to answer some questions.

**Questioner 1:** The World Health Organization has declared COVID-19 a pandemic. How will that impact our everyday lives? Should we participate in social distancing or should we continue with life as normal?

**WH:** You should not continue with life as normal. You should avoid big crowds. Do not go to political rallies. Do not go to sports events. Do not go to the opera. Stay away from all big crowds. If you take public transportation, wear gloves. Wash your hands, take it seriously. If you are going to be in a public space for a long time, a taxi or an airplane, wipe down your seating area.

**Questioner 2:** You did not mention malaria. Malaria is another big problem too.

**WH:** Yes, exactly. Malaria is on my list too. Drug resistant malaria is a growing problem.

**Questioner 3:** Will a vaccine against Covid-19 protect against the next coronavirus infection?

**WH:** Probably not. Coronaviruses are what I call hit-and-run. They must change their coat every year to avoid our natural immunity. Like the flu, a vaccine against last year's coronavirus most likely will be weakly effective at best

**Questioner 4:** Do you think drugs effective against one type of flu or coronavirus would be effective against all strains**.**

**WH:** Very likely. Combinations of drugs that prevent and cure one strain of influenza and one strain of coronavirus are very likely to be highly effective against all strains. Viruses vary the outer shell much more readily than they do the key enzymes they need to reproduce.

**Questioner 5:** How many people die a year from influenza infection.

**WH:** In the US between 20 and 60 thousand people die per year from influenza. On average about 400,000 people die each year from the flu.

**Questioner 5:** What would be the advice from an expert like yourself to chiropractors? Mine is worried sick.

**WH:** Anybody who is in a service industry should be worried right now because we do not know how many people are infected. That is a huge problem. The United States is a service economy, not a manufacturing economy. So, we are going to get hit hard.

**Questioner 6:** Will the infection disappear in the summer with the heat and spare the tropics?

**WH:** I would not count on that. Singapore lies just above the equator. It is moist and warm all year round. Singapore has a problem with Covid19 and had a problem with SARS.

**Questioner 7:** What do you expect from Trump's task force?

**WH:** Not much. So far the administration's response to Covid-19 has been pathetic and dangerous. Denial, deferral and prevarication coupled to inaction. We have every right to be ashamed of our leaders. Not so our professional public health officials who have been muzzled. I hope for better. Our local officials are doing what they can, but they need federal help and guidance.

**BE:** Thanks Bill for an excellent discussion.

*SARS Inhibited (2006) stands in the center of the science city Biopolis in Singapore. The bronze sculpture by Mara Haseltine depicts the three dimensional polypeptide backbone of the active site of the SARS protease. The paving stones represent the drug candidate that inhibits the SARS protease and stops virus replication. Unfortunately this and other similar drugs were not fully explored, nor did they move to the clinical testing. Given the similarities between the SARS coronavirus and this latest strain, developing these early drugs might have given us a ready prophylactic and therapeutic solution to the latest outbreak.* [www.calamara.com/](http://www.calamara.com/)