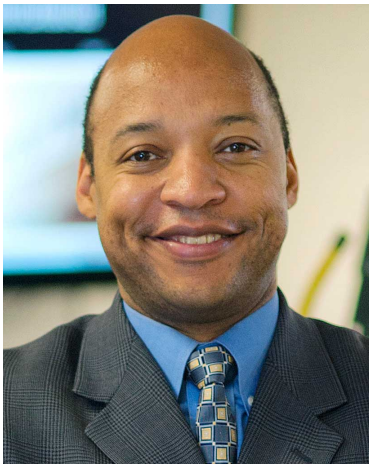
COVID Information Commons (CIC) Research Lightning Talk

Transcript of a Presentation by Erick Jones (University of Texas at Arlington), September 16, 2020



Title: EAGER: AI-Enabled Optimization of the COVID-19 Therapeutics Supply Chain to Support Community Public Health

Erick Jones CIC Database Profile

NSF Award #: 2028612

YouTube Recording with Slides

September 2020 CIC Webinar Information

Transcript Editor: Macy Moujabber

Katie Naum:

Without any further ado, I will kick things off and let Erick Jones of University of Texas get things started.

Erick Jones:

Thank you, Katie, and thank you Florence for having me. Please when I share full screen, I won't be able to see anything so let me know if everything's fine when I- so I can start.

Katie Naum:

Will do. Looks good.

Erick Jones:

Slide 1:

Okay thank you. Let me start my timer. Well, good morning everyone. I want to first thank Florence and Katie for putting on this very important research initiative. I also want to thank the National Science Foundation specifically Georgia-Ann Klutke and Fay Cobb Payton for funding this research project and funding it out of two different groups. One for the operations engineering and the other out of smart and connected health. As you'll see, my research is connecting to the health area. This research project:

Artificial Intelligence Enabled Optimization of the COVID Therapeutic Supply Chain to Support Community Public Health is actually a project that's in partnership with the Houston Health Department in which we're working with them as we address COVID-19 and also get access to important data sets.

Slide 2:

So, our project is really about looking at how we're actually- at risk communities are going to be impacted through COVID-19, but specifically when therapeutics become available, how the supply chain will actually help facilitate getting those important therapies into these communities. As you've heard on the news recently, the biggest challenge we have is the global supply chain has been disrupted. Without global access to ports, with states actually hoarding resources, it's going to be very difficult for the supply chain to operate as usual and this specifically impacts us if you look at healthcare supply chain. Things such- as we saw that masks, gloves, and even hand sanitizer became a big challenge at the first part of the pandemic and so we can just imagine as we get these important therapies how different policies are going to drive these supply chains. And so, our research has two main components. One is how do we actually optimize the supply chain when it's ever changing, especially that you know when we say providers- the health supply chain where are providers? Is it hospitals? Is it community cares? Is it Meals on Wheels? How are we actually going to model this so that we actually can get therapies to everyone not just the at-risk communities? And also, those at-risk communities in the Latino community and the African-American community, we see that those communities are really being impacted from a health standpoint at a much faster rate than other communities. So, as we look at this document you can see that you know we've used Houston as our test bed, the fourth largest city in the United States, and you can see that we broke it into communities and neighborhoods.

Slide 3:

Our project has three main thrust areas. One is the automatic data capture and artificial intelligence. I call this physics-based modeling because as we capture data from our smartphones, from our barcodes, this data is very hard to be frank model because you have to bring it into a Flat file to different servers and it's very hard to capture the data let alone use it to quantify. We've come up with some artificial deep learning models that allow that data to be quantified. But the things that we look at is when these therapeutics become available, we have to make sure that one they're not stolen, number two the right person takes the medicinals. And so, when we look at the supply chain for health care providers, it's not as simple as getting it to the right patient it's making sure the right patient gets it and actually takes the actual therapies as I've been so informed by the health department. So, one, the automatic data capture and artificial intelligence supports those activities.

Slide 4:

Secondly, you know, we look at Thrust 2 which is- I call it the main thrust but again I'm finding out in healthcare nothing's ever as it appears. But we look at- we have to protect electronic health records as we get information from these different communities. These are protected data points and so how we

use something like a blockchain or AI to actually protect that data as we bring it into these important models. And we're also looking at a specific type of supply chain model. Most industrial engineers or optimization people would think about a Mixed-Integer Program, but we have to have a customer service component to it that allows for it to actually be- to get to the right place, the right time, at the right customer level. We hope that a hundred percent of the therapeutics can get out to everyone, but the reality is there may be some shortcomings and how we use that model to actually determine how that happens.

Slide 5:

Finally, we look at what are the health cost benefits. Most supply chains are optimized off profit or minimizing cost. Our supply chain is going to be optimized off of you know saving lives and minimizing the spread of the disease throughout the communities. And so, as we get into the modeling and we get into the behavioral cost it's always important that we we're having to- I call it 'flip the script' as I say to my students and we're going to have to really model off saving human lives and the societal impact of doing that is a lot more difficult than one would think.

Slide 6:

So again, I know I have brief time so I mean- I will tell you that we are also- have an opportunity to capture specific information from these populations. It's not specifically part of our current grant, but we have other grant funding happening but also as we think about social distancing and how these populations, we call healthy behaviors, how we can model that to actually make sure that those behaviors are founded and that the medicinals are going to be successful as stated. So again, I- my time has ended. Thank you for making time for us thank you, Florence. Thank you, Katie. I think I stayed on time.

Slide 7:

If you want to reach out and know more about our project we'd be more and excited to address it. Right now, the modeling is specifically in the Houston area. There are other cities that are inquiring so hopefully if you have any questions or thoughts please reach out to me. So, thank you Katie and I'm going to hand the mic back over to you.