Interview conducted on April 4 2019.   
Interviewer (Emma den Brok) in plain text,   
**Interviewee in bold**

E: It's recording, great. Okay, so just describing my research. I am studying the effect of uncertainty on strategies for placing Ebola Treatment Centres. So there is already a fair amount of work on resource allocation and placement strategies during epidemics. But most of it assumes that you have complete and perfect information, or they consider their strategies in several scenarios, but that - to me - doesn't seem like a very realistic representation of an actual response. So I would like to find out how uncertainties influence the performance of those allocation strategies. And as a case study I am using the Ebola epidemic. So these uncertainties could be the number of people in a certain area that require help, the rate at which the disease is spreading, how much people are travelling, or the effectiveness of the Ebola treatment Centres. And I'm also studying the interaction between being active in a response and how these uncertainties might be reduced, so the assumption is that once you put a treatment centre in a certain area, things will become less uncertain, since you're there and you're getting information. So I will be building a model to study this, and it will consist of an epidemiological compartmental model, modelling the disease, and a component that handles decision-making and the effect of the decisions on the compartmental model. So that would be placing a treating a treatment unit somewhere.

**I: What bit... the connection was a bit, it didn't work just now. You said you were building a model?**

Yeah.

**And?**

And the model will consist of two parts, one will be a compartmental model that models the spread of the epidemic, and other component will be modelling how decisions are made. And the effect of the decisions on the compartmental model.

**Okay, yeah.**

Sorry, you froze for a bit, but you heard the last part?

**Yeah, the internet connection seems to be a bit… Up and down. We'll manage.**

Okay. And obviously, because I don't have a background in epidemiology or response, I'm doing these interviews to learn more and make sure all the assumptions I'm making are valid

**Okay. Yes.**

Okay, so your research is on IT design to be used in emergencies and crisis response right?

**Yes**

And in December 2014, January 2015 you went to Liberia with the [a response mission]?

**Yes, that is correct**

Can you tell me more about that?

**Yeah, basically the whole idea of going there was an idea formed on the assumption that we see very few studies of actual organizing, and I wanted to study how do they organise a response, what type of information sharing takes place, and how do they, from an information point of view, basically, manage and handle uncertainties and the dynamic and so on. And my interest is basically technologies, I look at technologies used, so when I arrived, I was met with a bit of suspicion. Since they introduced me, the head of the mission, she introduced me as the guy who's going to evaluate them. So I was met by scepticism and suspicion. But then I said, no, I am not here to evaluate you, I am here to learn. And then I started to focus on analysing, what type of technologies are they're using, I was doing lots of observation and so on. But what was very evident, that there was lots and lots of frustration in the group. Since they had been promised to go on one type of response, when they arrived the situation had changed, so the work they were doing was not in line with what they had been promised, in a sense. And then, over time, I was there only two weeks, or eleven days, something like that. Then, additional changes happened. And that was what basically characterised the entire [response mission], a set of changes, rapid changes, that they didn't foresee, and that created lots and lots of frustration within the group. So the project management, they had a project manager in [country of origin], they had a head of mission, in Liberia, and they also had a small unit in the Southern part of Liberia, where they had a temporary ETU set up.**

Right. And you were with that last group?

**Yeah, I was with the last group but also with the group in Monrovia, so I flew down to Greenville during these days. So regarding the fact where they placed ETUs, I would say - why [mission] built a ETU in Greenville, was basically due to the fact that they wanted to do something. So when this chance arrived, everyone said: let's do it. And the underline was, so we have done something. We are now in Liberia, we didn't get the job of running a ETU, which was the initial plan. What do we do now?**

Right. And so when that decision was made to build that treatment centre in Greenville, they heard there was an opportunity to do work there. Do you know where that information came from?

**It was communicated from the district. Because they had a very "home-made" ETU, connected to the local health station, in Greenville. But the medical conditions and the health situation at that very, very temporary ETU, was not acceptable. And they responded to this need of doing something, to improve the capacity.**

So, when you say it came from the district, it’s from the local government, or the hospital already there?

**The hospital that is already there. But when we talk about the hospital, it's not a hospital, it's like a health station. A community health station. Don't think about a hospital, because it's not.**

Just to check, the response mission was from the [organisation], that's a governmental organisation, right?

**Yes, it is.**

And so, their initial presence was requested by the WHO?

**Yes.**

But then, as you said, when they arrived, they found out that the work they were supposed to do was not actually necessary anymore?

**No. So there were two very big ETU run by the government. They were called MOD. There were two ETUs placed on a space near the old ministry of defence. And the ministry of defence was a building that was burnt out basically. So, the first ETU was run and set up by Cuban nurses and doctors, and the idea was to set up a second, identical one, next to it that should be run by [the organisation]. But the need for the capacity, the response mission was, too much done too late. Or maybe too little, too late. But when they arrived the capacity wasn't needed. So, then they started to work with the Cubans instead and improve the quality of the health care. So, the idea was to run a big ETU but they never got the chance. So instead they went to Greenville to work with local organisations, in Greenville. Because in Greenville, a German organisation had got the contract to build a permanent, more large-scale ETU, but they also ran into some sort of problems, so that ETU was not in place when it was needed. So instead the temporary ETU provided by [the organisation] was used for a couple of weeks.**

Right, and what I'm also curious about - originally the request came from the WHO, but while the organization was in Liberia, how much contact was there in terms of the international response, were they advised by the WHO, saying your presence is needed here, or the UN mission, or was it more based on local information.

**The reason why we had a [country] mission was due to the fact that we had at the time, [a famous person]. But he was working on global health issues. And he was working as an advisor to the government in Liberia. And we also had several doctors from the [country] health system working with Doctors Without Borders, so in August all of them came home with the stories from Liberia. And that put the pressure on the Swedish government organisations to do something, and to contribute. So I wouldn't say it was a rational decision, it was a decision made out of prestige, and urgency, rather than facts.**

And when they were in Liberia on the ground, was the mission being steered by the Swedish themselves, and not so much in terms of the international response, would that be correct to say?

**Yes. And in the sense that, for me it looks like a system where the country, the host, is telling the organisations: we have these needs. And then the different organisations who are guests in the county say: we can help you with this, we can help you with that. It's some sort of a strange market, with a demand and a supply side, but the supply side didn't always meet the market needs. So, for example, the amount of large scale ETUs were fairly substantial at one point in time, but at that point they needed small teams instead, working in the local communities. So, it was a sort of non-harmonized mobilisation of resources.**

I get the picture. So, as I understand it, when they were on the ground the team received information from the national government, local government, health clinics in whatever form they were present. Can you give me an indication of how you would classify that information? Would it be more "we need these resources here now", or was it on a more abstract level in terms of "we think the disease is spreading in that direction"

**I would say it was more like what was actually happening, the Swedish team got information that there is a need in Greenville, they got the name of the person who communicated that information. And then the Swedish team sent down their own personnel to interact with that person and to gain as much information as possible, in order to be able to make that decision: should we go there and try to do something, or not? It was a conversation between very few persons. It was not an analytically made decision. It was based on "we have something we can offer, we would like to offer, please allow us to help you with something".**

So, when it is being communicated that there is a need for an ETU, there is not much information about how many people would be attending it, how many patients.

**No, they had an idea that it was a situation that was escalating. But once again, when the ETU was in place, the number of patients were much much lower compared to the plan. So even with the rapid response, they were too late, and it didn't meet demand. It was difficult to forecast, basically.**

Yes, exactly. So that's one of the things I'm very interested in, is when you make these types of decisions, how sure are you?

*Connection fails at this point - we re-establish it*

Yes, I am recording again. We were talking about the expectation of patients when setting up an ETU. So that's one of the core things I'm interested in - how you sure you are about these things when you make a decision and how that's influenced. In your experience, to what extent was there an indication that the team wanted certain information that just wasn't available? Apart from the fact that there's always uncertainty you're going to be dealing with a rapidly changing situation

**They got information from the local health station about how many patients they had, they also were aware of the situation in the rural area, and so on. The health station had excel sheets with patients and some sort of contact tracing, and I think the numbers came from them. But the quality of that data can be debatable, I think. So I'm not sure -  the whole Ebola response, it was framed like “we need to improve the health care capacity in Liberia.” Maybe what would have happened, if they had framed it as "we need knowledge", so we can provide it to people in order to prevent Ebola from spreading. Now it seems like lots and lots of resources were assigned to treat people, rather than preventing people from getting Ebola. So, for me, they were looking for data in order to set up ETUs and so on, but maybe they should instead have done more education activities, for example. But that's not your topic.**

No, but for me it's still very good to get all these insights, because obviously I wasn't there, I have no experience in this, so info is helpful to me.

Okay, so now I would like to ask you about some of the assumptions that I'm making and you can just give some of your ideas and thoughts on them. So, within the model, there will be a few variables that I will make to be uncertain, so they can vary. The ones I'd be using right now would be the number of people in a district in need of medical aid, so that we talked about. And you indicated that has changed over the response and there was uncertainty in that. So, would you agree that that is something that would be uncertain?

**The number of people that have been affected by Ebola? Or what was it? Can you repeat it?**

The number of people in a district in need of medical aid. And then medical aid would specifically be for Ebola.

**Okay. Yes, the number of people in need of healthcare. And I would also say, the number of people... for me it was more about how they expected things to happen, how they made some sort of subjective assumptions on what they think will happen next.**

Right.

**I don't know how to quantify that.** **But some sort of a... expected urgency, so also some sort of factor.**

Yeah, so maybe I can just list the next ones, because I think they're all related. So, for example the next one would be the transmission rate of the disease within a district. So that would also influence how it would evolve. How much and where to people travel, so that would be between districts. And the actual effect of a response, for example, of a treatment unit on transmission rates and mortality rates. So, for example the idea here is that once a response in an area, you can also teach people about safe burial practices. So those are the factors that I'm considering at the moment.

**But I would also say there are some sort of more infrastructural factors, such as what is the road network capacity to a certain area. What possibilities do we have to do medical evacuation of a medical personnel and so on. Because that was also almost a decision shutting down the ETU in Greenville, because if you need to do a medical evacuation of your personnel, and someone believes that they have been affected by Ebola, there will be no helicopter pilot that will take on board that patient. Instead you have to drive that person back to Monrovia, for example. And, during parts of the year, driving to Monrovia will basically kill a person that is isolated. So, some sort of road, or transport capacity, I think, is also a factor here.**

Okay, yes, good to know. I'm not sure if that's a factor I can represent in my model, but I think it's a very important thing to also consider when-

**Have it as a background aspect**

Yeah, and also in context, saying "I am considering these things, but this is also important".

**Because I mean, for example, if you are building an ETU, perhaps you need some sort of special equipment, how do you deliver that.**

Exactly. And also, as I'm also looking at the interaction between making a decision and how that affects uncertainty, would you say that some of them, or all of them, or none of these uncertainties would be affected by becoming active in a region. So that would be the same ones: the number of people in need of help, transmission rates, travel, and the impact of the response.

**Those are important aspects for sure.**

Would you say you gain more certainty about those factors once become active in an area?

**I mean for example, the aspect of how many people are travelling in this area, is a very mobile area, is that an aspect... or is it the number of people in need. Obviously, the number of people in need is a much bigger aspect. Mortality rate... if people are dying quickly, then, in a very cynical way, they have limited possibility to infect other people. But I'm not sure if those discussions are made. You have to treat people, even if they are about to die pretty soon. Difficult questions, I don't have- It’s very difficult for me to give you any directions here.**

That's fine. I think I've, looking at the questions I have, I think I've asked most of them an also have some really good answers. Is there anything you still want to say or add that you feel we haven't covered and you think might be relevant?

**Let's see here. Maybe it's out of scope for your model, but I would say how quickly you can, I mean, if you are going to make these decisions, I would also like to know a bit more about the organisation using this model. For example, are they able to do rapid changes in their organising of the response? Or are they more static or slow? Then obviously I would do different decisions. Are they very agile and flexible then other opportunities would be presented. Is it a large scale ETU, is it a small scale we're talking about, so scale and capacity in terms of how fast they are. I think that are aspects that should be included in some way. Not in the model perhaps, but in the background.**

Yes, I think also maybe when you're evaluating the outcomes, you talk about, this would be realistic for this type of organisation, but not - yeah, great.

**I mean, what would happen, what if someone says - If we're talking about building really big ETUs, for hundreds of people, or are we talking about building an ETU for 5 people. And maybe we can deploy that 5 person ETU a thousand times.**

Exactly. And also, that will be much faster to build than the big one.

**Exactly.**

I definitely want to take into account capacity and also, you can make a decision to do something but then there will be a delay, before the ETU is actually operational, and I want to reflect that element in my model.

**And in this type of country, such as Liberia, if you're going to import these types of resources, via the harbour or the airfield or so on, that will be a very slow operation, since it's a bit corrupt in these countries. So, the customs service is slower and so on. But that's more organisational aspects, maybe not part of your model.  Not part of this model, but another model.**

Okay, I think I have everything, so I will stop the recording.