Fighting Killer Bugs in Babies

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SPEAKERS

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Maggie Fox 00:00

Hello and welcome to One World, One Health where we chat with people working to solve the biggest problems facing our world. I am Maggie Fox. This podcast is brought to you by the One Health Trust with bite-sized insights into ways to help address challenges, such as infectious diseases, climate change, and pollution. We take a One Health approach that recognizes that we are all in this together and everything on this planet — the animals, plants, and people, and the climate and environment — are all linked.

Antibiotics and antivirals can make the difference between life and death, but they are not working as well as they used to, because the bacteria and viruses they fight evolve fast. They can become resistant to drugs and turn into what we call “superbugs.” These drug-resistant infections kill more than a million people a year, and many are children. One in five of those who die from these infections are children under five. Nearly 7 million newborn children catch these infections globally every year, and more than half a million die from them, and the effects go beyond just life and death. Imagine a toddler kept isolated for days or weeks to protect her and the other children. Imagine the despair of a mother who cannot take care of her baby in the hospital because she has other children or a job or is just too poor to take a cab there.

In this episode, we are chatting with Dr. Heather Finlayson, a pediatric infectious diseases specialist at Stellenbosch University in Cape Town, South Africa. She deals with these types of problems every day, and she has deep experience treating infants and children with infections, especially infections resistant to antibiotics. Heather, thank you so much for joining us.

Heather Finlayson 01:46

Hi, Maggie, it is great to be here today.

Maggie Fox 01:50

Heather, this is heartbreaking, such delicate newborns can sometimes be born infected. How can that happen?

Heather Finlayson 01:59

Well, Maggie, when you are born from your mother, your mother has these bugs on her, and we know that lots of mothers now may be colonized with these resistant bacteria. So, as they are born, those bacteria get passed on to the babies. And more and more often now we are seeing resistant organisms very soon after birth. So usually, (a person would encounter) resistant organisms after they had been in the hospital for at least 48 hours. But now, because resistant organisms are far more common in the community, babies can be born with these.

Maggie Fox 02:37

Can we explain what being colonized means?

Heather Finlayson 02:41

So, it just means that we all have bacteria on our bodies that we carry around us, and there are good and bad bacteria. We have got bacteria in our gut, and (these) bacteria are very important to protect us at times, but they can also sometimes be resistant, so they sit on the mom's skin or in their gut and do not cause any problems, but when the baby is born because the baby is much more susceptible to infections, they actually may cause infections in the baby.

Maggie Fox 03:11

And my understanding is that newborns do not have their population of bacteria, or their microbiome when they are born. So, there is room for the bad bugs to move in and just take over because there is no one else in that space.

Heather Finlayson 03:25

Yes, exactly. So, babies get their bacteria and their microbiome from their mothers after they are born. If you are born very prematurely, or if you are born by cesarean section, then you may not be colonized with those good bacteria from your mom. Then, of course, in the hospital. We all think hospitals are wonderful clean spaces, but there are lots of bacteria that live in the hospital and particularly resistant bacteria that might be lurking in the corners. The longer the baby stays there, the more likely these resistant organisms will become part of their microbiome or ones that colonize their skin.

Maggie Fox 04:04

When a baby gets this ill, (it must be making the baby very ill), the effects on the families may be devastating.

Heather Finlayson 04:11

So, I think babies that land up in hospitals, typically, are born with certain problems, and in our setting, they are often premature babies. So, they were born early. This is all very difficult for parents to accept. And on top of that, they now have these severe infections, they often land in an Intensive Care Unit (ICU), they might need drips or might be on a machine to help them to breathe.

So, I think, just (by) having a premature baby, you are usually living in the hospital for many months before they go home. And these (circumstances) are just things on top of it that make it even more difficult.

Maggie Fox 04:49

Can you explain why the problem is so much worse in low and middle-income countries like South Africa?

Heather Finlayson 04:55

Yes, antimicrobial resistance — we all now know that it is very important worldwide, but we do know that in low and middle-income countries it causes more deaths, and part of that is because of the fewer resources that low and middle-income countries have.

So, we may not have access to diagnostics, we may not have access to some antibiotics, and the staff ratio per patient may be a lot less than you see commonly in high-income countries. Often the wards are full, so babies might be pushed close together, and those circumstances all make it far easier for bugs to spread from one baby to another baby within the same area.

Maggie Fox 05:39

So, when these drugs are so cheap and easy to get in most countries, and that is the thing we know about, the most common antibiotics, they are very very cheap, why are children not getting the treatment they need?

Heather Finlayson 05:51

So, there are two problems. The one is that in some low, and middle-income countries, I think South Africa, we are lucky that many other drugs we do have access to, but in other African countries, or countries in Asia, they may not have access even to the simplest antibiotic. At the other end of the spectrum is that some low-middle-income countries would not have access to some of the newer drugs that are more expensive. So, in South Africa, we often have access to the drugs that we use every single day, but the drugs that are needed to treat resistant organisms we can sometimes struggle to get hold of.

Maggie Fox 06:28

This is part of the problem too, right? People cannot get the more advanced antibiotics, and so there's overuse of the cheap ones.

Heather Finlayson 06:36

Yes, so they carry on using the same antibiotics that are no longer working, but part of the problem is also that we do not, certainly, in some countries identify what is the bacteria that is causing the infection. So, we cannot choose a specific antibiotic that is effective against those bacteria, and that means we will be then using ineffective antibiotics, it seems.

Maggie Fox 07:02

The answer would then be to just try to prevent the infections in the first place. Can vaccination help with that?

Heather Finlayson 07:07

So, vaccination is very important, and it is one of the ways that we can prevent infection. Unfortunately, in very little babies, vaccines are not as effective. So, we know that they are effective in older babies and adults. But little babies, as most people will know, do not get many vaccines when they are born, but they get vaccinated a few weeks later between six and eight weeks. So, vaccines are not that effective in babies or neonates, but the emphasis has now been changed to vaccinating mothers, we call it "cocooning," to protect the little baby, and by vaccinating mothers for infections, we can make sure that they have a good response, and we know that antibodies that prevent these infections are transferred from the mother to the babies after birth, and these can help prevent infections.

Maggie Fox 08:00

Let us talk about the vaccinations that exist and what the infections are. Are there vaccines to protect mothers against many of these antibiotic-resistant bacteria?

Heather Finlayson 08:14

So not just many for resistant bacteria, but vaccines just preventing any kind of infections are important. Some of the vaccines, for example in South Africa, we have started vaccinating our mothers for something like pertussis, which most people will know is called "whooping cough," and this typically occurs in babies at around six weeks of age, before they have gotten their first immunization.

So now, by immunizing the mothers, we hope to prevent these infections in their young babies, and that will mean that we do not need to use antibiotics to treat whooping cough, and by using fewer antibiotics, we cause fewer infections.

Maggie Fox 08:53

Let us get back to how this impacts babies and their families. We know that, in general, when infants are in hospital and very ill, the repercussions go on sometimes for a lifetime. Can you tell us about some of the things that happen to some of your patients?

Heather Finlayson 09:08

Certainly, babies that are born very small, their parents might be too scared even to touch (them) because they look so fragile, and they do struggle to bond. Breastfeeding is very important in creating diverse microbiomes, and part of the problem is that these very, very small babies that may not be breastfed early on or mothers have difficulty producing breast milk worsens the problem of the microbiome and the resistant organisms. We know that breastfeeding is a wonderful way of bonding with your child, and unfortunately, these very little babies and very sick babies often have nasogastric tubes, and they are given the milk via that. So, it is all very important for bonding with children. These resistant infections often happen in children who have been admitted to the hospital for a long time.

So, I think we have spoken a lot about neonates, and I have said, that if you are born at one kilogram, you need to almost double your weight before you are ready to go home. So, you can spend months in hospital, and during that time, you are always going to be at risk of getting these resistant infections.

The other groups that also may have a devastating diagnosis, something like cancer — children with leukemia. They also spend a lot of time in hospitals, and that is another very vulnerable group that may be infected with one of these resistant organisms. So, these infections are then on top of a ready child that has been unwell and is in hospital, and they are often in ICU.

So, for these parents, they have to accept these diagnoses, and as we have said, antibiotics are not always available. Sometimes we need to use antibiotics that are not registered in children. So, we may need to use an off-label (antimicrobial) and we need to explain all these things to parents so that they understand. I think one of the most devastating parts of having a child who has these resistant bacteria is that they often are put onto what we call contact precautions, and these are specific infection control precautions to prevent other children from getting the same resistant bug.

So, anyone who looks after your child may have to wear gloves, a mask, or an apron. This can all be quite scary for mothers and for children who can understand that, but they are often sometimes alone in a room on their own. As I have mentioned before, we have less staff than in high-income countries, so sometimes children are in a room on their own with no one keeping them company. I think part of this is the saddest thing for me, it is that these children do not have the stimulation that they deserve.

So, we have got a little baby in our ward who, like I said, is colonized with this infection. I think the difference also in low-middle income countries is that parents may not be able to stay with their children all the time. They may not be able to come in and out of the hospital often. So, we have a baby who has been in hospital for a few months now, I think she is a little toddler. But unfortunately, she is in a room on her own, and I know we just discussed this morning, it would be so nice to get her out into

the rest of you know, into one of the bigger rooms, but because she is colonized, we cannot move her out.

Maggie Fox 12:27

Tell us how that changed her behavior. I mean, toddlers, their entire lives, are being around other people. How is her behavior different?

Heather Finlayson 12:35

I think she has become very quiet. She sits and looks through the window all the time, waiting for us to walk past or visit on a ward round, and once we are in the room, I think she is craving that attention. So, she will very quickly come to you and try and get you to hold her. We know that toddlers should be scared of strangers, but she quickly tries to get that comfort from us.

Maggie Fox 13:03

Can her family come to hold her and cuddle her?

Heather Finlayson 13:06

Yes. So, unfortunately, her mother does not have the resources to come in and out, but we allow parents to stay in the room with them. So, if their parents are available, such as parents who like to be with their child again, being in a room on their own, just with their child for most of the day, and not necessarily being able to move around between rooms, is also difficult for parents.

Maggie Fox 13:30

When you say, “The mother does not have the resources to come in and out,” what does that mean? Does she live distantly?

Heather Finlayson 13:35

So, she does not live too far away. But you know if you are unemployed, and you are living on social grants, being able to get a taxi and come in and visit regularly is difficult. Often, our parents stay in the hospital for long periods, sleeping in a chair next to the child's bed. But some parents are not able to come in, they may be working, but they do not have enough money to come in regularly

Being a big tertiary hospital, we see children from far distances as well, so their parents may not be able to come in, and sometimes they do need to go home as well for their mental health, just to have time on their own.

Maggie Fox 14:15

Heather, how difficult is it to help patients and their parents understand what is happening to them?

Heather Finlayson 14:23

So, one of the biggest problems, I think certainly for me, is that some parents and children may not be able to understand some of the doctors in the hospital. This is a legacy of South Africa, I may not speak the language that my mother speaks, so usually related to African languages. So, what makes it worse, is that my speaking two or three-year-olds can be quite difficult to explain, so we often need translators. I think it is certainly getting a lot better, but that does make its situation a lot more difficult. But, yes, if you tell the child that they cannot leave the room because they have this infection, it is really difficult and, you know, it is at one stage, they might feel quite well — they have had the infection before, but we know that it is still on their body, and we are trying to prevent other children that would be vulnerable to get these infections.

You know, I have spoken about the different staffing ratios for patients, and fortunately, many of our mothers do stay with our patients to look after them. But one of the things is that mothers that stay in there and there is a baby that does not have a mother, they are already helpful in looking after that baby as well. It is something that sometimes we have to kind of chat with the whole group in that ward. So we might have six beds to say, you know, "We appreciate you trying to help these other children, but it is very important that you all just look after your baby, to make sure that you wash your hands if you do touch anything else because what you may spread is resistant bacteria or other infections to other babies." So, any mother who sees a child crying would want to console it. So sometimes we do have to explain to them.

Maggie Fox 16:14

Heather, thank you so much for joining us.

Heather Finlayson 16:17

Thanks, Maggie, it has been great speaking to you.

Maggie Fox 16:22

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