

00:00:01:07 - 00:00:32:05

Clare

Hello and welcome, I'm Clare and you're listening to Microbe Talk, the podcast by the Microbiology Society. In the first episode of 2024 I'm joined by Rick Mumford, Deputy Chief Scientific Advisor & Deputy Director of Science Evidence & Research at the UK Food Standards Agency. He's here to chat about his recent publication in Journal of Medical Microbiology which reported on the Food Standards Agency's AMR programme review. In this episode we'll discuss research, surveillance and the future of AMR in food.

00:00:32:07 - 00:00:45:01

Clare

So my first question is, as always, are you able to introduce yourself?

00:00:45:03 - 00:00:50:23

Rick Mumford

Yes, so my name is Rick Mumford and I'm deputy chief scientific adviser at the Food Standards Agency.

00:00:51:00 - 00:01:20:05

Clare

Fabulous. So the reason why we've got you on the podcast today is for your article, which was published in Journal of Medical Microbiology. So it's food borne antimicrobial resistance research and surveillance in the UK. Priorities identified through the Food Standards Agency's AML program revealed that Article two summarizes the outputs from an event reviewing the FSA's AML program and identifying new challenges in food related AML.

00:01:20:07 - 00:01:27:18

Clare

Could you explain the background of that then? What led to it and what the event was sort of trying to achieve in more detail?

00:01:27:21 - 00:02:13:14

Rick Mumford

The Food Standards Agency, the FSA, has been involved in antimicrobial resistance research and surveillance for getting on for 20 years now since it was formed in 2000. And what we're really keen on understanding is what role does food play in the possible spread of AMR? As we all know,

AMR is a massive challenge. The O'Neil report from 2016 highlighted the threat that it posed to us and actually lots of people around the world, but in particular the UK government has been doing a huge amount to try and mitigate those risks and it creates this 20 year vision and then it's been operating on a 25 year national action plan which started in 2019 and

00:02:13:14 - 00:02:37:03

Rick Mumford

actually finishes next year. So part of what the FSA does within the the National Action Plan, the NAB, is that it looks after the sort of food workstream, if you like. So we're doing the work to try and understand how that fits together with the other work that's done in, say, health or animal health or within the environment.

00:02:37:05 - 00:03:00:07

Rick Mumford

Because the NAP is is very much a cross-government program. It works across all departments and it also tries to take a really one health approach. So it looks at all the elements of of of how human health, animal health and environmental health, including food sort of work together and how we can create a joined up solution to mitigate those risks.

00:03:00:07 - 00:03:00:21

Rick Mumford

Remember.

00:03:01:00 - 00:03:27:01

Clare

And just to reiterate for everybody who's listening. So the one health program is it's this kind of concept of working collaboratively within multiple different sort of disciplines as well as internationally. Is that kind of correct? And then also accessing sort of from various areas related to public health, not just kind of from medicine, etc.? Is that is that the right way to describe it?

00:03:27:03 - 00:03:53:20

Rick Mumford

Yeah, I think that's a pretty good description. I mean, certainly the international aspects are important. You know, AMR doesn't respect boundaries. So, you know, we import a significant portion of our food. Is that a source of AMR coming into the country? You know, people travel. So we do have to look at the international aspects, but also if you think about the sort of different sectors and how they interact, you know, we use antibiotics in humans that can drive resistance.

00:03:53:22 - 00:04:20:16

Rick Mumford

We use antibiotics in livestock production that can drive AMR as well. And then of course, then you have the bits in between. So, you know, if animals are generating AMR, then that's getting into the environment through through so their faces or whatever or it's coming through from the food itself, from pathogens, foodborne pathogens that might be on that food that are carrying the anti bacterial resistance genes, then they can move through.

00:04:20:18 - 00:04:27:23

Rick Mumford

And of course, we're also caring more, more about antifungals as well. So it's not just antibacterial. So AMR is quite a broad church.

00:04:27:24 - 00:04:42:07

Clare

Yeah, definitely. You also kind of talked about this national action plan that maybe people are saying that perhaps aren't as familiar with it. Yeah. What's a kind of a brief introduction to the National Action Plan?

00:04:42:09 - 00:05:20:03

Rick Mumford

So it was a five year plan and it was across a wide range of government departments. And it's also a four nation approach. So, you know, Northern Ireland, Scotland, Wales and England all involved and all having their deliverables within it. And it had a number of different strands. So the theme, the area that the FSA was involved in was around agri food and environment and we were then contributing various pieces of work to that to try and sort of understand how that the agri food system worked in terms of the possible spread of AMR.

00:05:20:05 - 00:05:57:17

Rick Mumford

So for example, we would be running surveys on the incidence of anti-microbial resistance and and pathogens carrying that on on things like meat that we would sample from retail. But of course then that joins up with other agencies like the Veterinary Medicines Directorate, the VMT that were doing work on looking at AMR within livestock and production systems. So then joining up and can we see trends within livestock and can we then see the sort of following on trends in meat and other food products?

00:05:57:19 - 00:06:25:06

Clare

So we were saying, you know, surveillance is essentially the beginning and the kind of cornerstone and delivering on the National Action Plan of targets and working across cross-disciplinary. That's a kind of key part of that sort of review article that's published. And with us, I suppose what are the challenges of kind of surveillance of antimicrobial resistance? And what were your sort of key findings, you know, based upon the sort of program event that you took part in?

00:06:25:08 - 00:06:50:03

Rick Mumford

Yeah. So the program itself was designed it was a two day event. We had about 70 experts came in from from different departments and different academic disciplines. And also then the people who've worked with us in the past to deliver our program of research. As we said, we've we've had an extensive program and we spent about £1.5 million on on AMR surveillance and research over the last three years.

00:06:50:05 - 00:07:15:14

Rick Mumford

Wow. So we we had that opportunity to both look at what we've done and then review it going forward and see where the gaps in our knowledge still existed. And that included surveillance, but also research because we've funded some research projects as well. Yeah. And I think one of the one of the key things is that we've been doing surveys for some time.

00:07:15:16 - 00:07:44:15

Rick Mumford

Initially these were done as part of the EU harmonized program. So this was a sort of EU wide program, but we're continuing that work now. And one of the things we found is that over time, a lot of the AMR and or the anti anti microbial resistance genes have sort of dropped in food. So we've seen some significant drops in levels since we staff started some of those work that were back in 2014.

00:07:44:17 - 00:08:09:12

Rick Mumford

But what we are seeing as well is that that so understanding that the risk is reasonably low, that the incident is reasonably low, we aren't seeing a significant level of resistance to things like Colistin,

which is some of the sort of antibiotics of last resort, some of these really, really vital antibiotics that are really essential to protecting human health.

00:08:09:14 - 00:08:39:09

Rick Mumford

We're seeing levels of resistance genes there being quite low. And actually sometimes, again, it links to your point earlier about international or because some of this stuff is on on imported food. The one thing we do have to state though, is as well as the course, what we are looking at is raw product. So we're looking at raw meat, things that are intended for cooking and of course that will very much if things are quickly, properly cooked, then they will obviously reduce that risk of transmitting them through to humans.

00:08:39:13 - 00:08:46:21

Clare

So you talked a little bit about some of the challenges. Is that kind of all encompassing? Are there any more sort of challenges with the surveillance of AMR in the UK?

00:08:46:22 - 00:09:18:03

Rick Mumford

Yeah, I mean, I think one of the one of the one of the big challenges around many areas of both AMR but also foodborne disease and pathogens, of course, and food borne diseases. Can we make better use of the new technologies and what I mean new technologies? The obvious one is whole genome sequencing. You know, we're still able to do so much more now and very readily look at the genomes and identify and characterize and identify pathogens so much better.

00:09:18:05 - 00:09:41:08

Rick Mumford

So we have this new power that that's available to us at much lower cost than ever used to be. But the challenge we still have is how do we share that data better? And obviously sometimes you sort of get into a space where the sensitivities around data might be commercial sensitivities about data. You know, if you're talking about human health, you have patients sensitive data.

00:09:41:10 - 00:10:01:23

Rick Mumford

So you have to consider very carefully about how you join up. And of course, one of the things if you do join up the data in that one health space, you can make much better use of it in terms of control

plans. So you might identify outbreaks of things or identify things in humans and then be able to maybe track them back to where they came from.

00:10:02:02 - 00:10:29:22

Rick Mumford

So the ultimate source and then through that then implement better control plans and mitigate genes. And one of the things we we have been doing is through a shared outcomes fund, Treasury funded a program called Path Safe, which is Pathogen surveillance in agriculture, food and environment, which is led by the FSA, but has over 50 different partners from across government and academia and industry.

00:10:29:24 - 00:10:39:05

Rick Mumford

We've been building things like data systems that exactly designed to join up and use and better utilize the power of whole genome sequence data.

00:10:39:07 - 00:10:48:14

Clare

What were the outcomes of being able to join all of this data together? Was there any like key findings that you were really surprised by, or is it more kind of on a granular level?

00:10:48:18 - 00:11:10:19

Rick Mumford

So the pesticide program is still still still going at the moment, It's still working on developing that program. So what we're hoping is to start generating a lot of the data now was thought to be publishing that very soon. And then from that we'll be able to start feeding into sort of new mitigations and new a new action plans.

00:11:10:21 - 00:11:33:10

Rick Mumford

And one of the things that we're hoping is, of course, is that some of the stuff that we've been doing in the past, even the current program, which finishes in March next year, is it can then feed into the new National Action Plan, the UK National Action Plan, which is due to start and the FSA alongside other government departments, has been very active in developing that new plan.

00:11:33:12 - 00:11:38:11

Rick Mumford

And again, things like surveillance will be a major pillar within that new new program.

00:11:38:13 - 00:11:53:02

Clare

Obviously, surveillance is the sort of basis of this this program. How are you foreseeing perhaps integration of AI and things like that in these types of surveillance programs is something that you're considering? What's your sort of thoughts on that?

00:11:53:04 - 00:12:20:01

Rick Mumford

Yeah, I mean, artificial intelligence, obviously gives us a massive opportunity to to automate. And actually some of the the data system we talked about the passive data system, which is there for comparing and aligning sequences uses a lot of by informatics and of course with things like bioinformatics and data analytics is a it's a massive area where AI has the potential to be very widely used.

00:12:20:03 - 00:12:26:22

Rick Mumford

So again, I think that's probably one of the sort of key areas going forward for, for our work where air could have an impact.

00:12:27:03 - 00:12:49:17

Clare

Okay. So taking it back slightly to the National Action Plan, you mentioned obviously that there is a new plan sort of in the works at the moment. In your article, you mentioned that the FSA successfully delivered on these National Action Plan targets. Could you sort of give me a background on what they are and how those targets were achieved?

00:12:49:23 - 00:13:12:09

Rick Mumford

Yes. So we had had a range of targets. I mean, one of the key ones was to gather this understanding of where ammo was in the food supply chain and what the incidence was and whether that was going up or going down. And through through a particular surveillance program. And so we carried on these surveys we've done I looked across a number of different commodities.

00:13:12:09 - 00:13:35:18

Rick Mumford

So we've done red meat, we've done poultry meat. We've got new surveys that have just started looking at salmon, for example. So fish is a new area. And again, that was something that was reinforced by the review that we did. It's talked about in the paper as well. We would hope in the future, in the future to then also look at things like fresh produce as well.

00:13:35:18 - 00:14:06:18

Rick Mumford

So we're trying to sort of fill the gaps in all in our knowledge. The other thing that we did as well, as well as the surveillance is we also looked at aspects of research as well and things like in production systems. Is there evidence that for example, biofilms and forming in production facilities might be harboring asthma? So so also trying to understand some of the basic knowledge about AMR operates because surveillance is fine.

00:14:06:18 - 00:14:45:23

Rick Mumford

It tells you what's what you have and where it is and maybe what the level of that is. But I suppose the big question that we still need to answer and some of the research we've done has helped, but there's more to be found out is about how. So if you find AMR, if you find antimicrobial resistance genes on fresh meat, what is the actual risk and how might that transmit into a possible infection or how much that that that might transmit across into pathogens that then might cause human infection.

00:14:46:00 - 00:14:55:15

Rick Mumford

So it's so we've understanding a lot more about the where, but we still need to understand a lot more about the how.

00:14:55:17 - 00:15:03:18

Clare

And I suppose like you mentioned with the kind of rural products they're likely to be cooked, etc., whereas I suppose it's a different kind of beast with the fresh products.

00:15:03:20 - 00:15:23:16

Rick Mumford



Yes, exactly. That that is one of the challenges. And and again, a lot of the things that came up in the review were thinking about products where maybe things aren't cooked or aren't thoroughly cooked. So again, that those might present more of a risk because the reason, as you say, fresh or raw.

00:15:23:18 - 00:15:40:21

Clare

And how much does your supposed choices on surveillance reflect like like trends? I suppose with consumption, there's a bit of a movement at the moment away from milk, for example. How much do you alter what you're looking at depending on kind of consumption?

00:15:40:23 - 00:16:07:21

Rick Mumford

Yeah, we do a So some of the things we have done is look at consumer consumption data. So we get that to try and understand the trends because again, it's it's if you think about risk, it's having a hazard. So AMR is the hazard, but then you need to consider the total risk will be about the exposure. So if we're eating large amounts of something or an increasing amount of the product, then that's more exposure to us as a population.

00:16:07:21 - 00:16:33:08

Rick Mumford

Hence the risk goes up or the other way. If the exposure goes down, if we're eating or consuming less of the product. So yes, we do look at that. That's all part of the consideration and again, we would always have a list of ideas of things where maybe we want to consider more in the in the future and build those into future plans of of what we might target.

00:16:33:10 - 00:16:59:05

Clare

Hmm. Okay. Amazing. So interesting. And I had a question about my tracking back a little bit. You mentioned about there's the EU Harmonize program and how that's still carrying on. How has Brexit, for example, how has it impacted your kind of ability to collaborate internationally within sort of Europe, or is it provided perhaps advantages to collaborating elsewhere?

00:16:59:07 - 00:17:35:17

Rick Mumford

I think in terms of the direct impact on what we've done, that that's what we've said. We've just been able to sort of continue with the work we've carried on the same sort of design in the same sort of contact, mainly because of that continuity of data. Yeah, So it was those surveys had been

going on for some years and I think it's a really important thing for us to content, which is why we have done even even though we're now outside of the EU, we hope that in many cases the scientific collaboration internationally has is continued.

00:17:35:19 - 00:17:59:17

Rick Mumford

So we're still able to talk to scientists on a chance to science basis, even though maybe some of the the political channels have maybe ended and some of those have stopped as Great Britain left the EU. But actually that sort of ability to continue talking through through science has been very important for us.

00:17:59:19 - 00:18:14:14

Clare

All That's kind of useful. Continue talking through science like that. And has it affected anything with kind of the change to import and exports? That's quite, I'm assuming, going to be quite difficult with our use of antibiotics and farming, for example?

00:18:14:20 - 00:18:23:19

Rick Mumford

Yeah, absolutely. So I think increasingly things like asthma and antibiotic use in livestock is being considered when thinking about trade.

00:18:23:21 - 00:18:24:16

Clare

Yeah.

00:18:24:18 - 00:18:54:07

Rick Mumford

Because again, it's if it's seen as a driver, I mean from a UK perspective, I mean obviously we've just published the Government's just published the latest results of, of antibiotic sales in livestock with something called the VARs report. And again it's, it's a very positive picture. It's showing that yet again we've seen a decline in overall usage of antibiotics in animals that affect human consumption.

00:18:54:09 - 00:19:06:07

Rick Mumford

And that's a very promising trend. And I think overall the total use of antibiotics has dropped by a significant amount since the data started being reported in 2015.

00:19:06:09 - 00:19:21:01

Clare

Yeah, I mean, and antibiotics are still sort of used in animal feed, if I'm correct. What I suppose steps being taken to reduce this. And do you think you'd be able to completely eradicate this in future?

00:19:21:03 - 00:19:49:15

Rick Mumford

So I think overall in livestock usage, you've got to be very clear that there are times when animals get sick and there is a need to use antibiotics and it's a welfare issue. Yeah. So if you didn't treat them, they would be suffering. So it is really important. But I think what has been shown and a lot of this has been not just the government but also working with industry and then there's industry voluntary groups such as Reba that has had a major influence as well.

00:19:49:17 - 00:20:15:13

Rick Mumford

They have been able to take it out. So the the sort of routine usage of antibiotics has dropped massively and just and has been taken out. So all of a sudden, the sort of very bad practices of old have stopped now. And the say the figures from the latest false report just show in so many areas how limited antibiotic usage is.

00:20:15:15 - 00:20:28:17

Clare

Hmm. And just for those who are missing, it might not be sort of familiar. You mentioned the kind of old ways of antibiotic usage. Could you kind of explain how they used to be used in livestock?

00:20:28:19 - 00:20:56:01

Rick Mumford

Well, it was in some cases they were used as as as growth promoters and they were sort of given routinely to animals, which is obviously a very bad practice because using very large amounts and not for specific disease or illness prevention. So I think the stopping of that as a practice was this had a major benefit on mitigating the risks.

00:20:56:03 - 00:21:10:01

Rick Mumford

But again, to say that a lot of this has been driven by industry, so they've been very proactive in taking the steps because as I say, I think all of us realize just how important AMR is as a challenge.

00:21:10:03 - 00:21:22:14

Clare

Yeah, yeah, definitely. And so I suppose, Yeah. My final question is always what's what's next? How are you going to go about implementing the findings from from this program?

00:21:22:18 - 00:21:46:03

Rick Mumford

So the, the review that was characterized in the paper as it's already been useful in going into our AMR research and evidence program and trying to look at future priorities. So we're trying to think about the projects that we're going to commission in the future and some of those key ideas have been some of the targets that came out out of the review.

00:21:46:03 - 00:22:09:01

Rick Mumford

So that's already been very influential in terms of setting our priority. And then through that, also the commitments that we're making that will be published early next year for the new National Action Plan. So that's really key. But also a lot of this is not just about what the FSA is going to do directly, but also how we work with others to deliver some of this stuff.

00:22:09:03 - 00:22:36:02

Rick Mumford

And, you know, some of the more basic research questions are sort of best handled by someone, you know, funded through UK and maybe the BBC is a research council in this in that space. And again, we're talking to the UK about ways that we can work together and and develop ideas. And of course there's other initiatives going on in that space.

00:22:36:02 - 00:23:01:01

Rick Mumford

So under the UK right Tackling Infections program, there's a call out at the moment to develop new AMR research hubs. So these would be transdisciplinary bringing together people from all sorts of

disciplines and policy, etc. to try and look at how we can further understand the problems and generate solutions. For AMR.

00:23:01:03 - 00:23:11:06

Clare

That's exciting. So then there's a sort of new national action plan sort of in the works, as you mentioned. How do you foresee the FSA engaging with that?

00:23:11:06 - 00:23:42:12

Rick Mumford

So we've been working with other government departments to create that new plan. A lot of what we're going to be doing is more of the same in terms of things. That's the balance of carrying on the commitment we've made to to understand that surveillance and how it then is used, incredibly useful evidence for working with others. So those who are monitoring antibiotic use in an AMR in livestock, then can we see the signatures of that that coming through?

00:23:42:12 - 00:24:16:09

Rick Mumford

Will that impact in the food supply chain? But we're also carrying on other work that we've we've started in the previous natural action plan. But moving forward is things like consumers. We do a lot of work at the FSA on understanding consumer views and insights into matters related to food. And one of the things we have been doing is, is asking people who in food businesses, but also just general consumers, what they understand about the risks associated with AMR and food.

00:24:16:11 - 00:24:36:04

Rick Mumford

So we will carry on monitoring that and to see if we're getting through with the messaging, because some of this is about surveillance, some of this is about research, but also just the general public understand the threats and the risks associated with AMR and are they playing their part and can we do more to educate them?

00:24:36:06 - 00:24:55:04

Clare

Yeah, Yeah, definitely. And and then finally, the UK's aim is to contain and control AMR by 2040 in this sort of longer 20 era action plan. Are we on track? What do you think about this in the future? Do you think we could get there?

00:24:55:06 - 00:25:25:00

Rick Mumford

I think the UK has made significant strides in that ambition. There's still a lot to be done, but it has made major strides. And as I say, just to focus on the the bit that I'm most familiar with, which is around the agri food system. Yeah, as I say, we looked at the reduction in antibiotic usage or certainly sales of antibiotics for livestock production and that has been a very, very significant decline and that's a very positive thing.

00:25:25:02 - 00:25:49:19

Rick Mumford

I think if we then look at the data, the Food Standards Agency's generating in terms of levels of AMR and AMR genes that we're finding on food that's been declining, it's plateauing, but it has been declining. So again, we have got a good sense that certainly in the food system we don't think there's a huge risk at the moment, but we will keep on monitoring.

00:25:49:19 - 00:25:55:14

Rick Mumford

Well, we can't be complacent and we have to keep working to to try and reduce that risk even further.

00:25:55:16 - 00:26:09:08

Clare

Mm. Fantastic. That's amazing. Thank you so much for taking the time to have a chat with me. Has been so interesting. Is there anything that you'd like the audience to engage with to keep up with your research? Yeah.

00:26:09:08 - 00:26:37:12

Rick Mumford

So actually one way, if you want to keep up to date with what the FSA is doing in the science and evidence space and updates on research reports, for example, because we publish them all, we do have a science newsletter that we publish on a quarterly basis. So if you go to the FSA website and look under about us, you'll find the science and evidence pages and then you can sign up there and that's been incredibly popular.

00:26:37:14 - 00:26:49:11

Rick Mumford

A lot of people we have about 2000 subscribers to that now, so we're very happy for more people to subscribe and follow what we're doing across not just AMR but a whole range of different areas of science.

00:26:49:14 - 00:27:12:22

Clare

Amazing. Yes. Thank you so much. That was brilliant.

You can find Rick's paper and details of how to sign up to the FSA newsletter in the description. If you've been inspired by this episode and want to find out more about what you can do to tackle asthma, follow the link in the description to visit our Knocking Out AMR Project page on our website.

00:27:12:24 - 00:27:18:19

Clare

You've been listening to Microbe talk. If you liked this episode, please leave a like or a comment wherever you're listening.