Mistakes, errors, and foul-ups – practice-based evidence for evidence-based practice.

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Mark Turner:

Yeah. Hi everyone. Welcome to this talk. It's great to be here. So the subject of my talk this afternoon is human error in the veterinary profession. There's a little bit of evidence now that we have acquired regarding this subject. So I'll be presenting some of that. I'll also be mentioning some of the literature that we have from human medicine regarding mistakes in practice, partly because it's a, it's an interesting topic in its own right, partly because there's an awful lot of very good quality evidence from human medicine, and of course, it's a comparative profession. The other reason for talking a little bit about the evidence from human medicine is that it has informed and it is informing our approach to research on human error in our, in our profession.

I also just wanted to talk a little bit about the historical narrative, if you like, of the research in the human medical profession and I'd like to start off with this study performed in 1984. So this was quite a large study in the state of New York. And researchers were concerned about human error in medicine and the, and the possible impact of that. And so they performed this study whereby they looked at hospital records from around 50 randomly selected hospitals in the state of New York. It came up with a statistic that 3.7% of all hospital admissions were experiencing some form of adverse event. And in a small proportion of that percentage, the event actually led directly to the death of that patient during their hospital stay.

So in 13,450 cases, their adverse event directly caused their death. There's one other important study from around the same time, in human medicine. This was a study led by Atul Gawande, whom you may have heard of recently in the media. His group looked at adverse events in the states of Colorado and Utah and came up with a similar statistic for the overall adverse event rate. He said furthermore in his, in his study that around two-thirds of the events were surgical in nature. And I'll be coming back to that a little bit later on.

So I just wanted to help us conceptualise, if you like the number of deaths in human medicine that we believe are being caused by adverse events or avoidable harm. So a few years later, a report for the then president Bill Clinton said that if you extrapolate the statistics from that first study that we looked at for the whole of the United States that lethal event rate would be around 98,000. So you could fill the New Camp football stadium in Barcelona. If you were to take out a few seats for FIFA cronies, perhaps you could fill that stadium with the annual death rate from avoidable harm in the United States. But getting back to our profession, you know, how much evidence do we have that we are causing any harm?

Are we anywhere near as unsafe as the human medical profession is? We've got this study, it's a small study published in 2004. And the researchers sent out a questionnaire to recent graduates from five British veterinary schools. And they asked 'Have you made a mistake in your first in your first 18 months of veterinary practice?' And 78% of the respondents said that they had and that on this slide are a few of the mistakes that they were making. So the failure to perform an appropriate diagnostic test, accidents during non-neutering surgical procedures, and so on. So some evidence there that, that we are causing harm through avoidable human error.

Another source of research was this study published in 2013. So the researchers invited 22 veterinary equine anaesthetist to a behind closed doors discussion of errors in their specialty. And they concluded that there was an agreement that human error does also happen in equine anaesthesia. So a very specialised field of veterinary medicine. But interestingly, nobody speaks about them.

Do we have more evidence of avoidable harm occurring in our profession? We need to be a little bit careful about this study and how we interpret the results. But this is the confidential inquiry into perioperative deaths in dogs and cats published in 2008, and the statistics there are on the screen for the overall risk of anaesthetic death in dogs and cats. The author said that an equivalent statistic in human anaesthesia is significantly lower, 0.02 to 0.005%. And they went on to wonder that because a significant number of the perioperative deaths in dogs and cats were occurring within the first three hours after the anaesthetic or sedative might just closer monitoring if those patients help drag down that statistic from the last slide. So we had to be careful as I say about interpreting this particular study, but there might be some avoidable harm going on evidenced by those, those statistics. Do we have more evidence? Well, this is a larger study published large last year in 2015 by a group at Nottingham University. And there was a sort of two-pronged study. They looked at five years claims to the profession's largest indemnity insurer. They also held focus groups. So they invited practicing vets and nurses to discuss mistakes in practice. The statistics from their investigation of indemnity insurance claims, they're on the screen, 50% or about 50% of the claims to the insurer were for surgical events. So, so some more evidence there of avoidable harm.

I'd just like to mention another couple of papers, however, from human medicine, just to take it back to human medicine, because I think it's important that we perhaps review some of the underpinnings of the patient safety movement. So the approach that's now being taken to the subject of human error in human medicine. There are two, these are both really good papers actually and the first one by Robert Helmrich, a psychologist, was advocating that human medicine takes more of the aviation industry's approach to accidents. The second paper is by James Reason a bit of a personal idol of mine. Another eminent psychologist. He talks about human error the types of human error that occur and the ways, ways to manage them.

He said to his medical audience, 'Look, I know you are very clever, very clever guys. You are highly, highly trained, and highly skilled, but when it comes to accidents, I might have something to teach you.' There are really two approaches to the subject of human error in industry. There's the personal approach where people are labeled careless or reckless, and a conclusion to the error or the mistake, if you like, is to just name and blame them and possibly retrain them. He argued that that was the dominant tradition in human medicine at the time. So around the year 2000.

He said, however, there is another approach, and echoing the paper written by Robert Helmrich, he said that the aviation industry and the nuclear power generating industry take a different approach. They view their system as one that is involved in technically challenging outcomes. Whilst people are very much integral to those industries errors are inevitable and people will make mistakes, and it's just human nature. He said that the silver lining to the cloud and indeed what aviation and, and nuclear power have learned is that by investigating these accidents forensically and not just simply naming individuals and blaming them, we can learn something very valuable about our system. So they're taking an evidence-based approach. And he argued that medicine was just the same. It's just yes, another complex industry really it's concerned with technically challenging outcomes. People, of course, are a very important part of the system, so human errors are inevitable and mistakes will be made. However, he said that if we investigate these accidents in all their complexity, just like we do in aviation or, or the nuclear power generating industry, we can potentially learn some very valuable lessons about the system and about the way people work.

This is his rather elegant Swiss cheese model of accident causation. I apologise for the slide. So, those yellow squares are meant to be slices of Swiss cheese. So he says that this is a demonstration

of the etiology of accidents in any complex industry. So that's aviation, for example, but also human medicine. And of course, it also applies to veterinary medicine. So one of those slices of Swiss cheese is the active failure of the person who's made a mistake. And the whole represents the error that they've made. Accidents, however, only ever occur through a combination of different factors. The other slices of Swiss cheese symbolised problems elsewhere in the system. So you may have budgetary constraints that lead to staff shortages. It might lead to a high workload for individual workers. So vets or nurses having to work hard to keep up with the pace of their caseload. Other latent factors as he called them might be communication issues within the practice or the hospital. So antiquated ways of communicating, perhaps. Other problems might be with individual pieces of equipment or problems with supplies. Other problems might be a problem with the culture of, of that hospital or, or that practice. A problem with its safety culture.

And essentially he said that as a psychologist, we are all going to make mistakes sooner or later. There are three broad categories of human error which were all liable to make. Here are cognitive slips and lapses cognitive rule and knowledge-based mistakes that we're all liable to make, and we're all also liable to perform violations or workarounds, which we don't have time to go into today. But another important area. So he was making the case that really if we are ever going to improve the safety and the quality of our care, we need to move past this situation where we just focus and highlight individual error. As he explained in his articles there are types of cognitive mistakes that we're all liable to make because we're human.

But is there evidence that this system-based approach is, is even a feature of medicine? Well, this is a large study from human medicine. It was published in 2012, and the authors performed a large literature review of documented cases of medical error. They reviewed around 80 separate papers, and they came up with a list of active failures and latent failures that they had identified in this literature review. It ended up being something called the Yorkshire Contributory Factors Framework, which is now used in the NHS to investigate cases of avoidable harm.

So it's a, a bit like a tool in, in civil aviation to investigate mistakes that happened. So there very crudely is a summary of their literature review. They found evidence of yes, active failures, doctors were, were making those cognitive mistakes that James Reason has alluded to. They're also an important factor. However, in those documented cases of medical error are quite a few latent failures. So conforming to James Reason's Swiss cheese model, they found problems with supervision and leadership in some examples they found problems with the management of staff and staffing levels. These are documented cases where they found that these latent failures were, were contributory factors. We've got some more there down there at the Boston Safety Culture. Again, that was an important conclusion of the Mid Staff's inquiry.

But what about our profession? Are we developing an evidence base of latent factors contributing to cases of human error? Do we conform to Reasons Swiss cheese model of accident causation? So this again, was another conclusion from the study published last year by the group at Nottingham University that we talked a little bit about earlier on. So, their investigation of indemnity insurance claims and also the results of their work with focus groups of vets and nurses. They came up with a list of contributory factors to veterinary error. They found evidence of active failures at work. So yes, vets and nurses are making cognitive errors that conform to James Reasons' model. They also found evidence of latent failures at work in some cases as well.

Again, problems with communication, that, that word that seems to keep cropping up issues around leadership equipment problems productivity means individual staff workload contributing, contributing to errors and organisational failure also they found some evidence to support that, that could legitimately be called a, a latent failure, in some cases. More evidence of latent failures in veterinary medicine. This was a nice study published in 2012 that looked at two typical UK veterinary practices, and the researchers physically followed vets and nurses around in these two practices for a total of six weeks. And they recorded, they documented 40, 40 errors in that time. They said that

none of those had con contributed directly to a case of patient harm, but the human patient safety movement would teach us that these free lessons or, or so-called near misses are just as important for those individual practices in terms of learning from, from the mistakes that were made.

So in their observations, they found latent systems latent system factors at work. So again, it would appear that we also conform to the Reasons Swiss cheese model. We've got some examples there on the slide. Lack of communication again, but also time pressures and staff staffing levels also contributed to those 40 errors that they discovered.

Does the system approach work would be the next logical question if we're following James Reasons, arguments we have this study, which you may have, may have heard about. It was called the Safe Surgery Saves Lives Campaign. So this was a WHO or World Health Organization effort to improve the surgical safety record of human medicine. This, this group was also led by Atul Gawande. They came up with a checklist, which was designed to confirm the completion of some essential steps to, to safe surgery. And they also hoped that through using this checklist theater team staff would just start communicating more.

This is the checklist. It's very, it's very simple. There's one section to be completed before the induction of anaesthesia one to be completed just before the first skin incision, and there at the end one portion to be completed just before the patient leaves the theater. One of the tick boxes in the last section asks that a nurse completes an instrument, swab, and needle count. So these are all very simple steps as I say, that you might have heard about. Interestingly if we referenced the previous work done by the group at Nottingham University in which they found examples of retained surgical items and retained swabs hopefully this type of checklist would help negate that the risk of that happening.

Did it work? Well, there's an awful lot of research to suggest that checklists do work. And this is just one study of eight hospitals. They audited their surgical activity before and after starting the checklist. They found that complication rates fell overall by 36%, but the death rate fell by even more by nearly 50% just through the use of a checklist. So this is just one example of, potentially, the effects or the benefits of using a systems approach to our, to our approach to human error. So just going back to our football stadium, if, for sake of argument, we say that of those 98,000 people's lives half of them died because of a surgical event. The checklist potentially if used nationwide in the United States, could save around 25% of the seats in that stadium.

What about evidence of the benefit of checklist used in veterinary practice? Well, of course, these are very early days. We don't have an awful lot of evidence. One letter, however, here, for example, written by James Gasson, he was working at the time at the Animal Health Trust. His conclusions were, were that their use of the checklist had helped develop situational awareness, which is an important aspect of work in high-risk industries. It's a fascinating area of psychology in its own right, and he also mentions that it's helping them talk about concerns that they might have from moment to moment in the theater. So evidence of the benefits of a checklist. Here we've just got a, a few articles that I just struck me in the last couple of years. We've had a few editorials now talking about the benefits of patient safety and the benefits, benefits of checklists in practice.

The last one by Matt McMillan references the confidential inquiry into perioperative deaths that we talked about a little bit early on. He said, although those statistics had come down in the last 20 or 30 years he felt that those, they were, were high, high than they should be. He felt though that just by using patient safety principles not necessarily waiting for the next generation of anaesthetic drugs to come along, but just using some basic patient safety principles might help drug drag those statistics down much further, more to where the human perioperative death rate is. Just wanted to mention Bradley Weiner's work on clinical audit because it it's part of the final paper. I'd just like to mention this final paper uses clinical audit and patient safety principles in a rather elegant way. So this last paper is, is from the veterinary profession. This was a group at the University of Georgia in

the States. They wanted to audit that anaesthetic activity. They wanted to see just how many incidents were occurring week to week in their small animal hospital.

We've got two periods there. The first period was pre any intervention, just to mention that anaesthesia there is performed by a veterinary student supervised by a nurse, but also a qualified veterinary anesthetist. And they defined their incidents that they wanted to log as any deviation from usual care that caused injury or posed a risk of harm to a patient. And these are quite interesting statistics in themselves. I haven't put every last statistic on there from their first auditing period. But at the top, they're 20 incidents of an APL valve being left closed when a patient was attached. Further down 16 of oesophageal intubation. Well, we might expect that in a teaching hospital. But also some problems around giving the wrong dose of a drug, giving a drug by an incorrect route. As a result of those incidents that they logged in period one, they decided to come up with four very simple changes to their system.

Prior to any drug, the individual would, would call out allowed what they were about to give and to whom and by what route. They started using a, a bandage over intra-arterial catheters which was a, a colour they didn't use anywhere else in the hospital, which was an aid memoir, I believe. And then they started using a very simple checklist of two items on their anaesthetic record. One to ask somebody to confirm that intubation had been performed correctly and one to simply for somebody to simply go into the theatre and check that it was all ready to receive the patient. So did the systems approach achieve benefits for the quality of care in that hospital? The results are, are there, so 3.6% was the pre-intervention incident rate, and this came down to 1.4% after the intervention in the second auditing period. So and in the conclusions, they state that it would appear that practical changes to the practice of anaesthesia a system-based approach improves or, or reduces the number of staff-caused anaesthetic incidents. So we're starting to get some evidence now trickling down through of a systems approach benefits benefiting the quality of our work in terms of our robustness to human error.

I just wanted to finish with this slide. I don't know how, how I'm doing for time, but this is a great book, 'Beyond the Checklist'. It's about the use of aviation-based safety theory again in human medicine. But I also wanted to mention it because of the title. I think it's important that we don't get too hung up on, on checklists, although they do have a massive role to play. There are other elements that we need to consider when we're talking about patient safety probably in the veterinary profession as well as the human profession, as one final quote there which alludes to that. Of course, we don't have any evidence that, that we need, that we need to take this major cultural and behavioural shift. But one could argue that we do just to mention that one of the asp, one of the other aspects of patient safety is safety culture. And that's something that I'm researching at the RVC. We're looking for any vet or nurse in small animal practice in the UK. If they'd like to complete our survey, we'd very much like that. And it's there if you search for RVC patient safety thanks to my two supervisors. And I'd just like to leave you with a picture of Barcelona Football Stadium on Match Day.