**Human factors and maternity systems presentation by Paul Bowie**

**Accessible transcript**

**Visual**

**The screen appears. It is a full screen video of Paul Bowie. He has brown hair and glasses, and is wearing a green shirt and headphones.**

Audio

Thank you very much everybody and welcome to the session.

**Visual**

**The next slide appears. The title across the middle of the screen is in purple and reads ‘Introduction to Human Factors Paul Bowie’. Across the top of the screen is a purple band, in which is written ‘NHS Education Scotland’. Underneath the purple is a turquoise band. In the bottom left corner is written ‘University of Glasgow Institute of Health and Wellbeing. Top the left of that is the university crest. In the bottom right corner is written ‘Safety, Skills and Improvement Research Collaborative’. To the left of that is its logo, a blue circle within which are three interlocked white rings. A video box of Paul is in the right top corner of the screen. This video remains throughout the presentation. The next slide appears. In the turquoise band is the title ‘Webinar Purpose’. Below is a list of bullet points of the webinar topics.**

Audio

I've got three hours or so, I wanted to be as interactive as possible, wanted to be as practically useful for you as possible as well. I know you've got a session coming up this afternoon on learning reviews and so when Leona informed me about it this week I've kind of tweaked things to try and support that piece of work as much as possible. And so as well as giving you a high level overview of what human factors is and why it's important from a quality and safety perspective, I'll also gear you towards understanding a systemic framework, a basic systemic framework, and also fundamental systems thinking principles, both of which will play into supporting the idea of learning reviews which we'll pick up about later on this afternoon as I said. And so one of the things that we have to counter straight away in health care around the introduction of Human Factors is the way that it's been introduced over the last two decades in most modern health care systems worldwide. It's been introduced in such a way which I'll explain and break down in detail later on, but it's been introduced in such a way that we now have to counter so many different myths and misunderstandings about what the discipline is. So much so that I estimate that I spend maybe 20 percent of my time countering these misunderstandings so it takes a lot of time and energy and resource to actually do that, and we're the only industry where this has ever happened. But again I'll unpack that a bit and they can discuss that later on. One of the other issues, many of you are going by your titles, I mean a lot of directors of midwifery care which is excellent, but also people from the quality and safety world, which is where I came from. It's fair to say that in health care generally we're probably 25 years behind the curve in terms of our understanding of fundamental safety science principles and approaches compared with other high-risk industries, and that's a significant problem for us to overcome. There's a multitude of reasons why that's the case and again I'll try and unpack that as much as possible. I did say that I will try and align one aspect of human factors which is around enhancing system safety so that it supports the learning review session you're going to do later on. But given that there's so many here with senior leadership positions, you'll all be very familiar with policy and practices around quality and safety in your own country. It would be good at the end, or even during it, you know, to encourage questions in the chat or put your hands up to compare what I've got to say with what's happening in terms of current practice and current policy and the way that's designed from a safety and a human factors perspective. Okay, so one of the things I'm going to do, and I haven't got up here, is a purpose. I'm going to challenge you quite a lot during this session, maybe so much so that you might be frustrated and irritated by some of the things that I'm potentially going to say, I will say, there will be no potential about it, but it's deliberate in the sense that I want to provoke a conversation, but I think I'm on steady ground because what I've got to say is evidence-based, it's based on an existing science and so there may be a mismatch between what it is I'm saying and what it is we currently understand about what it is we're trying to do and achieve from a safety perspective and a learning perspective in health care. So I'm just pre-warning you that what I call stubborn myths or hard truths continuously exist and reinvent themselves in health care.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Defining Human Factors/Ergonomics (HFE)’. Below is a definition of ergonomics, and below that are two bullet points which Paul refers to. To the right of the screen is a circle consisting of three differently coloured bands – green at the top, yellow to the right and blue to the left. Each band had text written inside. Around the top of the circle is text reading ‘Systems: How people and the things they do affect others’. In the middle of the circle is a side-on drawing of a head in blue. Above the head is written ‘Psychology’, below the head is written ‘Physiology’.**

Audio

Here we have the official definition of human factors in economics, so it's a very kind of bureaucratic academic boring definition in the first bullet point now. What's interesting about that definition and this is maybe the first learning point for some of you or maybe many of you, is that economics and human factors is the same science discipline. There's no difference between them. The difference has evolved over decades and it's a historical issue and a geographical issue, so generally speaking in North American countries we tend to use the term human factors, in European countries it's particularly but mainly in the rest of the world, we tend to use ergonomics. What's happened is that both parts of the world if you like, recognise the others' disciplines and so we tend to use each term interchangeably now, so if you look at most professional societies they're known as the Human Factors and Economic Society in the States or the Institute of Economics and Human Factors in the UK and you have a similar set up in New Zealand as well as in Australia. So that's the first learning point. The second, and one of the reasons for asking about your thoughts in terms of what comes to mind when you hear human factors in economics, is that we were looking for a few terms there that didn't necessarily come up, one of which is interactions, and the other is optimisation of design as such. The word design, interactions and design, which are absolutely critical to the application of the science, to any type of work problem or issue. And so as we can see there it's understanding of interactions amongst humans and other elements of a system. That's another critical point to pick up. Notice that humans and other elements of a system, not humans and the system. So this is a point that's often missed in health care. I often speak to clinicians who say the problem is the system, it's the system that's the problem, you know if only for the system then we could work better, things would be better if it was for the system. And that belies a significant misunderstanding of what a system is. So the first thing to know about a system from a human factors perspective is that humans are at the centre of it, they cannot be disassociated from it, they are absolutely fulcrum to the operation of any type of care system. So people, whether it be patients, families or staff are central to the system, and they interact with all other elements of the system. So that can be the task that you do or we ask patients to do, communicating with each other, interacting with technologies, interacting with a physical environment, the influence of culture and shift work and so on and so forth, the influence of external policy, all of these are different system elements which touch people in some way. We interact with them and they influence what we do every single day. And so that is our definition of a system, that whole idea of people being central to it and interacting with all these other different layers within the system. And how these interactions go, how these interactions are designed, will give rise to whether human wellbeing is what we want it to be and system performance is what we want it to be. So to break that down slightly, so human wellbeing can be issues around our own health and safety, it can be patient safety, it can be patient experience, it can be staff enjoyment of work, it can be comfort, whereas system performance can be broken down into issues such as, (I'm getting a bit of feedback there sorry) issues such as system safety, productivity, efficiency, effectiveness. And what human factors is trying to do, as a discipline, when we are applying our principles and methods to a particular problem, is that we're trying to jointly optimise both the wellbeing of people and the performance of the system, because we believe you can't get one without the other. So, if staff are not being looked after properly then it's likely that patient safety will be compromised in some way eventually. If we design a safety intervention which adds work, adds frustration, adds irritation to what staff have to do, then it won't be embedded in normal practice and therefore system performance will suffer and human wellbeing will suffer also as well. So it's trying to optimise both, balance both at the same time, and that's something we'll tease out again over the coming minutes as such. So, much easier definitions and somebody nailed it, I don't know who it was, but somebody nailed it in the feedback, is a bit, Human Factors is quite simply about designing for people, to make things easier and safer. Now that's easier said than done, but we've got an entire science basis there that helps us to do that, but that can be quite difficult to implement within complex systems, just like anything we try to do in a complex system can be difficult, and so Human Factors as a science suffers from the same issues, that, patient safety, quality improvement, other initiatives will also suffer from as well.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Distinguishing Features of Human Factors’. Underneath to the left is a list of three points, which Paul talks through. To the right of the screen, at the top are three drawings. The first is a depiction of a workplace chain of command, with a figure in blue on the top and three orange figures below. This is titled ‘Work System’. An arrow pointing right leads to the second drawing, a doctor in a white coat watching a patient enter an MRI machine. This is titled ‘Process’. A third arrow pointing right leads to a drawing a person jogging through countryside. The figure is wearing a red top and blue shorts. This it titled ‘Outcomes’. Below these drawings are three explanatory sections. On the left is the black circle outline. Inside the circle are five interconnected yellow boxes, titled ‘External Environment’. A right arrow leads from the black circle to a box with a black border, titled ‘Process’. An arrow leads from the bottom of this box back to the circle. Another right arrow leads to a box with a black border, within which are two more boxes with black borders. An interconnecting arrow goes between these two boxes. An arrow leads from the bottom of the main box back to the circle. This is the SEIPS framework, and appears in later slides.**

Audio

So there are lots of disciplines, there's lots of people who work in health care who have a distinct interest in improving human work in its broadest sense, so people who work in organisational development, people who work in human resources, frontline care staff themselves, people who design and develop and implement policies, they've all got a significant interest in trying to improve human work. human factors can be defined as the evaluation and improvement of human work but what is it that's different about human factors and all these other disciplines, like health and safety or risk management, which are interlinked in a significant way, HR as well, organisational development, what is it that's different, what makes human factors different from these other approaches? And then we have three characteristics here, three distinguishing features. It always takes a systems approach, and that's hopefully one of the takeaway points for you today is, you're going to understand what we mean by a systems approach, and you can also enact that in your learning review later on. I appreciate that the word system and the words systems approach you've probably heard of but I would hazard a guess that you don't necessarily, and as most people don't necessarily understand it from the human factors perspective, what it is we mean by a systems approach. The second distinguishing feature is it's always design driven, so a big part of what we learn as human factors specialists is about the human sciences and how we can design for people, how we can understand their characteristics, their limitations, their preferences, their capabilities and their human needs. This is extremely important if we're going to design the working environment. But I would hazard that it's something that we don't really do well at all in health care. I can give you 1 or 2 examples where it has worked, but I don't think it's a routine activity, and as I stated earlier, it always focuses on these two outcomes or trying to jointly optimise what we call the twin aims of system performance and human wellbeing. Now this model you can see in the right-hand side of the screen is known as the Safety Engineering Initiative for Patient Safety, Safety Engineering Initiative for Patient Safety otherwise known as the SEIPS model, and I'm going to introduce you to that later on, you're going to do a bit of group work on it. We've got a worksheet designed around it, just a two-pager which again is a practical tool for you to take away to problem solve on any issue within health and social care. And so again it can be used as part of our learning review but it can be used to look at everyday irritations and things that really frustrate you, and to try and get a better understanding of what these issues are from a systemic perspective, so it takes us away from just focusing on people in the immediate environment in which you work. So that's another issue. So I said distinguishing features of human factors, this is what gives it its professional characteristics if you like in its own right. In the UK that's, it gets a chartership, these distinguishing features would not result in a chartership if they were not distinct from what other professions do.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Human Factors Science…’. Underneath there are four grey boxes, each with text inside. The left box is titled ‘Draws on important principles derived from other disciplines’. Below is a list of bullet points which Paul talks through. A blue arrow connects to the middle box. This is titled ‘Human-centred design of:’, below is a list of bullet points Paul refers to. A blue arrow connects to two more boxes, one above the other. The top box is titled ‘Organisation Performance’, the lower box is titled ‘Human Wellbeing’. In each is list of bullet points which Paul refers to.**

Audio

So I mentioned about how human factors specialists draw upon various sciences, so it's a bit of a mongrel science itself, because what we do is we take important principles that are derived in other sciences and apply them to design of work and design of technology, again that's a distinguishing feature. So we're going to study human factors, one of the first things you learn about is human anatomy, you'll learn about biomechanics, physiology, psychology and anthropometrics. So anthropometrics is a big issue just now, I'm doing a lot of work in response to COVID-19 as I'm sure we all are. So a couple of anthropometric issues have come up and are still coming up, which is to do for example, with the design of PPE. So the design of most PPE has been designed with males and not females in mind and so therefore we have poor fit, ill-fitting PPE, because we have we don't have any anthropometric data around how PPE should be designed for different users of it. So for people who are larger, smaller, who are male or female and so on and so forth. So anthropometrics is a scientific study and measurement of individual humans, so how big our noses are, how big our ears are, how big our index fingers are, how long our arms are, how long our legs are, and all these things are really important if you think about it, and understanding across different users within populations. If we're going to design various medical devices and technologies, in hospital beds and wheelchairs and so on and so forth, and so you can probably think of examples as well as a mismatch between some of our patients in terms of body size and so on and so forth, and some of our staff, and what it is we're asking them to do or what it is we're asking them to wear or what it is we're asking them to use in terms of tools and technology, because there hasn't been any consideration of the anthropometrics and the design processes around these. And this is important because it impacts on how the work is done, and when it impacts on how the work is done then there is the chance that things can go wrong and safety can be compromised and so on and so forth. So the two biggies here are about taking a systems approach and applying the principles of human-centred design and so there are many different principles that are already well established internationally. Again we're not very well [indistinct] on them in health care and so they're often overlooked just because we don't know about them necessarily, but in other high risk industries work is designed around the types of tasks you do, the work systems you inhabit, the technologies you use, the buildings that you use, work is purposely designed to support your performance. We cannot say that in health care, which is another significant reason why we have so many safety issues. And then all of that's put into the mixer and we're trying to optimise system or organisational performance and human wellbeing as I said earlier on, so that's human factor science in a kind of nutshell, hopefully to some extent.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Wide ranging discipline – Focus Is on improving all aspects of Human Work etc’. Below this are 12 differently coloured ovals, in each of which is an aspect of work. Paul refers to these aspects.**

Audio

So it's a very, very wide-ranging discipline. So as I said earlier, one way to define it is it's the evaluation and improvement of every aspect of human work. So essentially anything within an organisation that causes a problem, an issue, a frustration, an irritation, you can say probably quite rightly is a human factors issue. And so we don't have a great deal of evidence for health care in terms of the application of human factors science, where the evidence tends to be is that we've done quite a lot of research in it rather than everyday practice, which is what we want to get to, and so what we'll see is the use of human factors specialists and human factors principles, and the design and implementation, evaluation of new information technology, and supporting ageing clinical workforce, the design and usability of reporting systems, looking at the design of medical technologies, reducing work-related musculoskeletal disorders with you know, amongst midwives, nurses, surgeons, you know people in health care who tend to do quite physical work or adopt awkward postures, you know we'd know that sore shoulders, sore backs, chronic conditions such as this lead to people retiring earlier, lead to you know lots of enforced sick leave and so on and so forth, and sometimes claims from staff, and so you can see the whole breadth here of where human factors potentially fits in because all of these different issues are essentially related to design. Now what can we do to better design work so that we minimise risks for staff and patients with musculoskeletal disorders, with failures with information technology, with poorly designed medical technology being used? So many of our staff been fatigued and suffering from work related stress, and a significant proportion also suffering from or exhibiting signs of burnout. All of these are related to poor system design essentially, however we define poor system design. So how can we better design work as I said a few times there, to minimise risks associated with these different areas, and that's what human factors brings to the table. Not on its own as a profession, I must stress that, it doesn't bring it here on its own, it's a multi-disciplinary effort, we need to work with frontline clinical teams, we need to work with policymakers, we need to work with those who work in risk and safety and so on and so forth. So this is the added value that we can bring.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Examples of Underlying Human Factors Principles’. Below this on the left is a fundamental principle of the discipline. To the right of the screen are six differently coloured boxes, in each is written a principle.**

Audio

So one thing at the outset, and this is quite handy to know for your session this afternoon, and it's something that some people struggle with, but we take an entirely no blame approach within the human factors profession, so if you unintentionally make a mistake at your work we automatically see that, not as you've been an idiot or been careless or whatever it may be, because you could have been careless, it's unlikely you're an idiot because most people in health care tend to be extremely well trained, experienced and qualified, and therefore you've been employed specifically because of that, so to us, if things are going wrong, that points to systemic design issues, rather than people being, as I said, particularly stupid or idiotic or forgetful. If you're forgetful in your work that is also a systemic issue, because work should be designed to accommodate the fact that people naturally will forget to do things, especially when they're under pressure, get huge demand in their workloads and so on and so forth. So we fundamentally reject the notion that humans are primarily at fault when making errors in the use of a complex social technical system, a complex social technical system is our fancy term for something like health care which we see as arguably the most complex workplace that has ever existed in the, and you're in the 21st century. I don't think there's any other workplace that can compare with the sheer complexity of what happens in health and social care.

**Visual**

**The next screen appears. In the turquoise band is written the title ‘Ultimately Human Factors is asking…’. Below this is a picture of a computer screen. On the pictured screen is the title ‘HFE Principles’ with a list of points underneath which Paul talks through. The computer screen has the words ‘Loughborough University’ and its crest in its top right corner.**

Audio

So that's something to bear in mind in terms of position on what we call error or things going wrong. My colleague Sue Hignett from Loughborough University in England has neatly summarised it. So what is human factors ultimately asking? So can this person, and that could be a patient, a family member, a team member, an individual worker, with this particular training or information depending on the context, do these tasks, using this equipment or the service, to these standards which can be equated with performance, under these specific working conditions? How often do we apply that type of thinking to the design of any aspect of our work. So I'm looking, and I come from a quality improvement background, and a patient safety background, I'm looking at our quality improvement patient safety colleagues, we don't necessarily see it through this lens, I think we are often focused on our work process, we're often focused on trying to build in high reliability in terms of what it is we're doing, we do not look necessarily through the lens of people and people doing the job. But this is fundamental, before we go on to the improvement aspect of it, and this is where I think that human factors as a science can add value to what's already been done from a patient safety and quality improvement perspective, we can close this gap potentially.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Other High Risk Industries’. Below this on the left is bullet point list of other industries. On the right, in red, is written ‘Aviation versus Healthcare Comparison’ with a list of bullet points underneath which Paul talks through. Below that is the three-coloured circle from a previous screen, with the blue head in profile in the centre.**

Audio

Feel free to put your hand up, pop a question in the chat, interactive, you know, give me some abuse, say you want to challenge me on something, I don't mind honestly, I'm up for it you know, I'm from Glasgow, we don't mind these things. Because I've only just started, there'll be other bits and pieces where I really will challenge you. So I think I've said that human factors is extremely well established in other safety critical industries other than health care, and so anywhere in the world in modern work systems you will see human factors embedded seamlessly in these different industrial sectors, so much so that if you speak to anybody or know anybody who works in these industries it's highly unlikely they've heard of human factors, because it's integrated seamlessly within what they do. It's not to say that it's perfect but they've already considered the application, the implementation, of core human factors principles and the design of the work tasks that they do, and how they manage and understand risk, and how they design the immediate workspaces and how they design their technologies and so on and so forth, that's been considered. We tend to ignore that largely in health care and boy does it bite us on the backside because of that. And to give you an idea of how far we are behind, many of you've heard of an organisation known as Eurocontrol. So Eurocontrol are the air traffic control body who control the skies over the whole of Europe. They employ around seven and a half thousand in a workforce and they have 40 professional human factors and organisational psychologists supporting performance and wellbeing within that safety critical organisation. If you look at the National Health Service in the UK we have somewhere upwards of 1.3 million employees and as far as we know we have less than 10 qualified human factors professionals, employed specifically because they're human factors specialists, working in the service. So that's how far we've got to go. We also have a reasonably large patient safety advisory workforce but unlike our colleagues here who work in safety, in nuclear or military or aviation, all these guys are professionalised, they're qualified in safety, they're members of appropriate safety societies and professional bodies, they have to do a CPD around safety, and most of them are indemnified in the same way that a clinician has to do a CPD, has to be qualified and has to be indemnified as such, because their safety science advice can bring an entire industry down. So they have a safety science professionalisation if you like and that's something in the UK for example, we're only beginning to discuss this year, because we don't have it.

**Visual**

**The next screen appears. Underneath the turquoise band is written the title ‘Human Factors and Ergonomics in Healthcare: Myths and Misunderstandings’. To the right of the title is a picture of a page showing an article about human factors. The top left of the publication has written the words ‘Open Access’, above this is its logo consisting of a black circle within which is a white open padlock.**

Audio

One of the things that we spoke about, for those of you who've got some familiarity with human factors and economics and health care and this, I'll go through this very quickly because it may not make much sense to you if you don't, but I did mention at the beginning that we've got a bit of a problem with the understanding of this discipline in health care and this paper was published a few years ago and we were delighted it was published because it really backed up a lot of the issues that we were seeing on the front line we were working with, with clinicians and managers and others. And so they spoke about the myths and misunderstandings that continuously pervade health care and here's just some of them.

**Visual**

**The next screen appears .In the turquoise band is written the title ‘Human Factors Myths and Misunderstandings’. Below this are written five facts, each followed by a fiction, which Paul refers to. On the right of the screen are two red boxes, outlined to look like rubber stamps. The top stamp has the word ‘Fact’ written inside and the stamp below has the word ‘Fiction’ written inside. In between the two stamps is the word ‘Or’ and beside the bottom stamp is a question mark.**

Audio

And so regardless of whether you know about this debate, and it's all very abstract and academic to you, forget about that, because these facts and fictions that you can see on the screen here will still be important anyway. And so human factors as a science is about designing systems that are resilient to unanticipated events. So we recognise that error is going to happen the vast majority of time, you know, so we need, people need to be comfortable with that. What we're trying to do is not eliminate error, because it's impossible 99 percent of the time. What you're trying to do is say well error's going to happen, so how can we dampen the impact of it across the care system so we don't harm people? So that's the way we've got to think, we're going to change our mindset in that regard. But the fiction is that that we can eliminate human error, a lot of people think that can be done. The other one is that human factors addresses problems by modifying the design of the system. We focus on the system, of which people are part of, so that's the factual approach. What we're continuously fighting against is that people think human factors is a kind of psychological discipline, it's about behaviours and that we're trying to address those behaviours by focusing on individuals and teaching them to, you know, get their finger out and better behave themselves and pay attention. And it's not, it's the opposite of that. So psychologists and educationalists are interested in the behaviours of people. Human factor specialists are interested in design of work systems, and if they're poorly designed, how we can better design them so we can support the performance of people. By supporting the performance of people through the work system, then you might get the behaviours you're looking for. So it's kind of a roundabout way of looking at that problem. The other big issue is that we do get clinicians who've been on a half-day course or sometimes a three-day course and suddenly they're director of human factors, we just have to live with that. But a human factor specialist is equivalent to a pharmacist, a midwife, or a nurse, it's six, seven years of qualifications, usually undergraduate, postgraduate, CPD as I said earlier on and so on and so forth. We don't work just be individuals, work as, probably got the point here, we can work across the entire organisation as such.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Human Factors Myths and Misunderstandings in Healthcare’. Below this on the left of the screen are three red bands, each followed by a quote from the Open Access publication shown earlier. On the right of the screen are written eight bullet points. Each shows the words ‘Human Factors’ followed by a not-equal symbol and a misconception. Paul refers to these.**

Audio

It's often conflated, so for those of you who are familiar with clinical skills, simulation, quality improvement, team training, non-technical skill training, so human factors is often conflated with these approaches. All of these issues are extremely important to human factors, but something like non-technical skills training is about one ten thousandth of what human factors is about. But only in health care do we see these things being equated with human factors and substituted for them and it's just not the case at all so I don't want to go into too much detail because it's not necessarily part of the chat.

**Visual**

**The next slide appears. In the middle of the screen in large purple text is written the title ‘Controversial “Hard Truths”’. At the top is written the words ‘Why we Need Human Factors (HF) Training in Healthcare’. Below this are the words ‘Brace Yourself’ followed by two exclamation points.**

Audio

I did mention about challenges, some hard truths, so just brace yourself here.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Hard Truths’. One by one, eight points appear in different colours. Paul talks through these.**

Audio

Now I've got evidence for this, so it's not just my opinion okay, but here it goes. So for the anybody who from now on or has in the past read anything in the academic literature or in policy, in health care, about human factors, then I'd put my mortgage on 90 percent of the time, that what you're reading is misguided, misunderstood and mistranslated. And I do this for a living so I see all the time and I keep examples of it. Now the way to check this, and it's the same with health care, education and training curricula, the way to check this is if a qualified human factors specialist has not been involved then it's likely that these mistranslations have occurred. And that goes down to this issue, and I feel sorry for them, for our health care educators, our clinicians, our leaders, who become impressed with what human factors has got to offer, become involved in it, take a great interest in it, have a passion for it, but because they don't have that fundamental understanding of what it's about, then we end up with these mistranslations in both the training curricula and the national policies as such. And that's self-evident you know, I've done a lot of documentary analysis of these policies and documents and curricula and we, as that paper I showed you earlier before, it points out beautifully where these mistranslations occur. The problem is though, if you're an educator standing in front of an audience of one thousand at a health care conference, and you perpetuate these myths, nobody, it sounds convincing, nobody in the audience is going to challenge you because what you've got to say sounds fantastic, but this is how these misunderstandings and myths are seeded and we can't get rid of them, and so it's just a continuous cycle. I'll speak about some of them later on. We take our systems, we talk about taking a systems approach, I mentioned that term earlier on, it's a term that's often used arbitrarily, unilaterally, in health care but most people don't necessarily understand what it actually means. So if we talk about root cause analysis for example, and taking a systems approach, the two of them are incompatible, but we often see them used in the same sentence. For those of you who work in quality improvement like myself, a lot of what we do in terms of applying quality improvement concepts and methods has been adapted from less complex industries, from manufacturing industries, and we are trying to apply these approaches in the most complex work system that's ever existed. Is it any wonder we don't have a great deal of evidence for how good bad or indifferent quality improvement is. I think we've backed the wrong horse to some extent by adapting some of the QI approaches and trying to apply them to very complex problems. They will have a role absolutely, so especially in very standardised environments, maybe in clinical laboratories, but if you're an acute medical receiving ward or a very busy maternity ward, highly complex situations, it's probably going to be the case that QI approaches there, certain QI approaches, are going to have limited impact. We have this obsession with nursing error, midwifery error, medical error, human error, as I'll explain later on, it's completely educationally backward and self-defeating, self-harming to us. But we're focused on error. Error is not the unit of analysis. Incident's harm is the unit of analysis. Error happens all the time. I don't think you have never events in in New Zealand, we have them in England, not in Scotland, we have them in England and North America. Never events are serious patient safety incidents which are judged should not happen. However nobody's told the people in charge of developing never events lists that the safety science evidence quite clearly shows that if you work in a complex social technical system, then things going wrong, serious things going wrong, is technically normal, and so therefore you can never have zero harm and you can never have never events. It's something, it's ambition, it's fantastic if you want to have that ambition, but you're deluding yourself and you're deluding the public and you're deluding patients and you're deluding families. We need to be open and transparent and honest, that serious safety incidents can be reduced, yes we can do things to try and minimise risk there, but from a safety science point of view they're technically normal in complex systems. That's a principle that's not understood at all in most of health care. In NHS England, we go even further and say that they shouldn't happen because we've strong systemic barriers. The good thing is that's been countered in the last few weeks through publications which demonstrate that a checklist, the WHO surgical checklist, is not a strong systemic barrier, it's so people-dependent. Strong systemic barriers is a term that comes from the nuclear industry, from aviation, where they do have strong systemic barriers. We do not have any equivalence to that in health care as I said, because it's so people-dependent. The last one's a bit facetious but it's still true, because of the lack of design in procurement, and human factors thinking in the procurement of tools and technologies in health care. We still buy technology every year that kills patients because it's cheaper, and we don't know anything about usability evaluation, we don't know anything about human factors principles in the design of these technologies. But there you go, I did say it was challenging, I did say there's some hard truths and so there's an evidence base to back up what I said there, so I'm quite happy to take any questions or any clarifications here as well.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Why we need training in Human Factors at ALL levels in Healthcare’. Below is written ‘Case Studies’. A the bottom of the screen is written ‘MISMATCH between Policy, Evidence & Practice’. ‘Policy’ is written in red text, ‘Evidence’ is written in blue text and ‘Practice’ is written in green text.**

Audio

-The World Health Organization Global Action Plan talks zero harm, I find that challenging because just for the reasons that you've said, zero harm is kind of like, that's the ideal but it's not realistic when you've got humans doing things. What were your thoughts about it?

**Visual**

**Paul flicks through two slides to the one relevant to the question. The next slide appears. In the turquoise band is written the title ‘3. WHO Patient Safety Curriculum Guide’. Underneath the turquoise band on the left is the WHO logo. Beside this, to its right, is the text ‘World Health Organization Patient Safety’. In the bottom left of the screen is a blue box, within this is white text reading ‘Patient Safety Curriculum Multi-professional Edition’. To the right of the screen is a list of points taken from the guide.**

Audio

 -I mean, so I'm in total agreement, so the WHO, we've given lots of feedback to them on that particular issue, and they've just, it's one of these things where they've said, you know, it's a bit like astronomy and astrology you know, in the sense that if you're a journalist, some journalists want to give equal time to debate on astronomy and astrology, whereas as we know the evidence base is with astronomy and not with astrology. And it's the same here, so the WHO was sitting on the fence by saying yeah we realise that there's vested interest in both camps, but we think this is a great ambition. But that's what I said, you know it is, but that's all it is, it's an ambition because it's not just a virtual, it's an absolute impossibility to have zero harm in these circumstances, so therefore you're deluding yourself and you're deluding the world. -Well we're deluding the public, aren't we, we're deluding the people because they expect that we should be aiming at zero harm which is impossible. -Yeah so but they turn that round by saying morally, we shouldn't be saying that, morally we should be aiming for zero harm. I would say that that's immoral but that's another story. So I think it's turning into a bit of an academic debate just now. So the WHO are always extremely influential, and I've jumped straight to this slide Leona, because I was pointing out some of the mismatches in terms of policies from adverse events, and how we review incidents.

**Visual**

**Paul flicks back to another slide. In the turquoise band is written the title ‘1`. Review of Incident Investigation Approaches’. Under this is a list of bullet points. Another slide appears, this is titled ‘2. Policies on Learning from Adverse Events’. Below is a list of bullet points. Paul refers to both lists in his talk.**

Audio

So I've been involved in cases around this, I won't go into the detail, but it was just to point out that our lack of knowledge, and it's nobody's fault, our lack of knowledge in the people who are doing the incident investigations and who are learning from adverse events and developing policies, they are mistranslating and misinterpreting key concepts here, but most people don't know because, you don't know what you don't know, and so that therefore that's the issue that we're trying to highlight.

**Visual**

**The next slide appears. This is a return to the WHO Safety Curriculum Guide.**

Audio

And the WHO are in the exact same camp, so the WHO don't employ any safety scientists or human factors specialists, but they still will write edicts on patient safety and what to do about it, and also on human factors, and what it is and what we can do about it and how we can implement it without any expert advice in these matters. And so the WHO Patient Safety Curriculum is a perfect example of that, it's very good in some parts, but it's a complete misunderstanding of what human factors is, it's a complete misunderstanding of what we mean by systems thinking, and it's a complete misunderstanding of fundamental safety science principles. So these myths and misunderstandings I bored you with earlier on are being perpetuated within this curriculum guide, and so we've pointed this out in academic publications, but as I say nobody reads them anyway, so you know you really have to try and bring them as much to the attention of the leadership as possible. We've done that with a never event, zero harm debate, they are listening but I don't think they're taking action based on it but they are aware of the debate, and they are aware of our concerns around this particular safety curriculum. So what I'm doing here guys is just pointing out more examples of where there's a mismatch between what we are doing from a quality and safety point of view, not just in New Zealand but worldwide, and where the mismatches are between what the science says we should be doing and what other high-risk industries are actually doing. Okay.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘4. Teaching about “Medical Error”. Below the title, the screen is covered in different coloured ovals, each with text reading a different quote from different scholars. Paul refers to these. To the right of the screen is a pink circle. Written inside is the question ‘Surely it’s now time to put ‘medical error’ to bed?’.**

Audio

And a perfect example of this is it's just a continuation of error and medical error, and so I'm trying to write a paper on this just now, there's a dozen or so examples of, and this isn't me, this has been known about for 30 odd years, I've just picked out some quotes from famous scholars who have studied this area. What I'm trying to do is bring together what all the counter arguments are against, how nonsensical it is to focus on error, when as I said, as a unit of analysis, when it's just, it's not the error, it's the harm event of the patient safety incident which is what we're really interested in, as well as everyday normal work. We'll come to that later on. So I think it's inaccurate and misleading, error is ubiquitous, it happens all the time, I've stumbled over words countless times since this presentation started but hopefully I'm still getting there, so hopefully it's not having a consequence. So making mistakes is absolutely necessary for learning, that's a fundamental principle as well, so making mistakes is ubiquitous as I said, it happens all the time. What we're interested in is not the mistake, per se, it's the consequence where it does have a consequence, and quite often what we see in health care can never actually be pinpointed on an individual, so when you look at lots of hairy safety incidents that happen, and you try and get to the bottom of it, there's so many different sectors, care sectors involved, so many different teams, departments and individuals involved that you can't pin it on a single individual. You know what the outcome is, which is usually a poor outcome for the patient, but you cannot pinpoint a single individual, but we still call it an error, and we still focus on an error, and then by doing that we're insinuating, whether we mean it or not, a blame culture. And that's why I get so het up about the whole error situation. But I know Carl Horsley and Leona and other colleagues in New Zealand have essentially eschewed this approach, which is fantastic, and they're embracing much more modern safety science thinking around this as well.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Safety Engineering Initiative for Patient Safety’. Below is the SEIPS framework diagram. There are three drawings. The first is a depiction of a workplace chain of command, with a figure in blue on the top and three orange figures below. This is titled ‘Work System’. An arrow pointing right leads to the second drawing, a doctor in a white coat watching a patient enter an MRI machine. This is titled ‘Process’. A third arrow pointing right leads to a drawing a person jogging through countryside. The figure is wearing a red top and blue shorts. This is titled ‘Outcomes’. Below these drawings are three explanatory sections. On the left is the outline of a circle in black. In the circle are five interconnected yellow boxes, titled ‘External Environment’. A right arrow leads from the circle to a box with a black border, titled ‘Process’. An arrow leads from the bottom of the box back to the circle. Another right arrow leads to a box with a black border, within which are two more boxes with black borders. An interconnecting arrow goes between these two boxes. An arrow leads from the bottom of the main box back to the circle.**

Audio

So I'm going to introduce you to this model called the SEIPS model. So forget everything, well please don't forget everything I've said as much as possible, but what I'm trying to say, I'm trying to give you some context here. If you go away with one thing today, it's going away with an understanding of what we mean by a system in health care from a human factors point of view, and also that we have, there's many system frameworks I should add, but I've picked up on this one. So Leona asked me to do something at the beginning which I completely forgot about. So I moonlight a day or two a month with the Healthcare Safety Investigation Branch in England, so I've been doing a bit of work with them for a while now and particularly with the maternity incident investigators, and trying to professionalise the whole idea of incident investigation science as such, and so they're getting weekly tutorials, we're building a learning pathway for them, but core to their incident investigation process is the use of this SEIPS model. So we call this entry-level human factors and this approach can be used to facilitate an incident investigation. It's not the be all and end all of it, there's lots of going on around the incident investigation other than this, but this is the systemic framework that can be used. So what we have here is a work system in that bounded left hand oval if you like, and so within that work system, and that can be any care work system, so it could be a midwifery lead unit, it could be an emergency department, it could be a general practice, it could be a community pharmacy, it could be a social work department, that is the basic system elements that would make up any type of work system. So you have an external environment, let's start at the top. External environment goes all the way up to the politicians, goes all the way up to your own Commission, people who determine the policy, the health care regulators, the health care accreditors, those who are external to the working environment but importantly, those who influence how work is done or is not done. That's one thing to bear in mind. We have the organisation as a whole, so how the work is organised, so that encompasses issues such as the prevailing safety culture, shift work, leadership, teamwork and how we communicate. All these issues tend to be derived and implemented at the organisational level but filter their way throughout the organisation and influence how things are done. We have the physical environment, so we all work in a physical environment, so it might be in a GP practice, it might be in an office, it might be in an absolutely chaotic acute medical receiving ward, or it might be in an extremely busy high demand emergency department. There will be a physical environment. The design of that physical environment, whether it's too hot, whether the lighting's good, whether it's too big, too small and so on and so forth, in terms of its physical characteristics will influence how the work is done, which impacts on both your own wellbeing and safety, and if you combine it with the shift work patterns, with a culture in department, with the policies that you're going to have to follow from external, you can see how wanted and unwanted outcomes can arise out of the interactions of these different elements. And that's me only looking at some of the different work system elements. We've got the tools and technology that people use within the physical environment and within the organisations with which they work. We've already spoken about how poorly designed these technologies can be, that doesn't help us. We've got the tasks that people do, some of them are easy, some of them can be simplified and standardised, many of them are highly complex, many of them require you to apply your professional knowledge, to adapt to a specific context, in a specific situation when you're performing these tasks. Think about it in those terms, think about all these different interactions, think about the people you're working with, the people you're treating, you're two staff members down, you've got a whole load of patients to see, many of them are critically ill. You've only got 10 minutes in a clinic or a GP surgery to see them but you've got another 20 sitting outside. So how do you resolve all the different safety issues that they're bringing to you, but still be efficient and see the other 20 who are waiting to see you. All very complex issues. So that's the way we understand the work system here, the care process is in the middle and those 20 aims that I mentioned in the very beginning and the outcomes at the end here. So this is the SEIPS model explained, about understanding these interactions in this bubble on the left hand side, amongst these different system elements, that give rise to safe care or unsafe care, that give rise to good wellbeing for staff or poor wellbeing for staff, so it's a very holistic high-level overview of a system model and a system framework. I'm happy to take any questions on that if anybody's got anything to add.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Worksheet – Care System Interactions and Outcomes’. This slide is a close up of the SEIPS diagram. The yellow boxes from the black circle from the previous slide are interlinked and show the interactions among them that lead to outcomes. Paul talks through these. On the right of the screen is a grey box titled ‘Outcomes’. There is a large black arrow pointing both ways between the yellow boxes and the grey box.**

Audio

What we've done, and this is for you to use and take away and maybe use later, I'm going to get you to do it in an exercise, probably after coffee, but what we have here is a worksheet based on that model, so you can think of any problem you have, any issue, whether it's a design issue, an improvement issue, or whether it's a problem you have, work as a team. What is it that's ongoing here, in terms of the people issues, the tasks, the technology, the external influences, how they're organising work, and the social and physical environment in which we're working, and how this has given rise to the outcomes we want or the outcomes you don't want on the right hand side. So it's a problem solving sheet, if you like, to let you jot down and take a systems approach to understanding the nature of a problem, or take a systems approach to actually design an improvement that hopefully will give you the outcomes you're looking for on the right hand side of this sheet. So on the reverse side of this sheet we have some more guidance.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Worksheet – Care System Interactions and Outcomes’. This shows the reverse of the worksheet. Below the title are five white boxes. Each box corresponds with a yellow box from previous slides, with text inside explaining more detail. On the right are two grey boxes, with text expanding on the outcomes from previous slides. Paul talks through these.**

Audio

So what do we mean by person factors? There are some examples for you to reflect on, so we broke it down into the care team, patients staff and so on. What do we mean by tools and technology issues? What do we mean by task factors? What do we mean by external influences? These just act as prompts for you to consider when you're completing the sheet on the other side there. So that's the SEIPS framework, the SEIPS model and the SEIPS framework. We are pushing it very hard, it's probably, the SEIPS model is probably the most published human factors intervention in health care. I reckon I've found 350 plus academic papers that have used the SEIPS framework, but what irritates me about that, well it doesn't irritate me, it just frustrates me, about it, is that it's research people like me, it's researchers and patient safety researchers and human factor specialists that are using it. It should be getting used by front line teams, by individuals, because it's straightforward enough to pick up, and it would add significant value to our understanding of how we're actually working. And at the same time as using it you're doing two things, you're applying human factors thinking and you're using a systems approach. Something, so if you think about trying to understand a problem currently with your colleagues. You might go in a room and have a team meeting and you're trying to think through an issue. More often than not you're brainstorming, and that's great, brainstorming's fantastic, that's great, but it's only going to get you so far. You might not think about the organisational issues, you might not think about technology, you might not think about the bloody policy that the government expects you to implement necessarily. What this framework is saying, well let's brainstorm but here's some more guidance to help you brainstorm what the issue may be, and by doing that, not all of these issues might be important, but at least you're considering them and rolling them out and you endeavour to take a systems approach to understanding the nature of the problem. So you're going to go to a wee bit of group work just now before coffee, but I'm happy to take any questions on this, any clarifications around this particular approach before we do that. Anybody want to ask a question, anybody struggling with it, do just speak up if you like. -Hi Paul, I have a question. I'm Keren, looking at this worksheet remind me the Ishikawa diagram very much because they're the same, roughly the same branches.

**Visual**

**The slide returns to the previous page, the SEIPS diagram. The title is ‘Worksheet – Care System Interactions and Outcomes’.**

Audio

I use Ishikawa very often and can you see, so what is the plus using this tool compare the Ishikawa for example, that identify roughly the same things? Is it just a different way to represent the reality or do something more? -There's something more. So it's a great point and it's a question I've been asked a good few times and it's something we do point out in the guidance to this. So the Ishikawa, and this is a very subtle difference and it's something you might think, oh this sounds like two bald men fighting over a comb when you're comparing this approach with the Ishikawa approach or the fish bone diagram approach for those who may know it by that name. So you're absolutely right and some of the system elements such as organisation of work and physical environment are our own Ishikawa diagram, but if you remember the Ishikawa diagram, it's like a fish bone and it's pointing towards a root cause, it's pointing towards a single outcome, and it's saying all these issues that you've identified give rise to that outcome. This diagram's not saying that. This diagram is saying two separate things. The Ishikawa diagram does not ask you to look at interactions. This is about trying to understand the interactions, yes you do the first part where you're identifying the different system elements of importance, but what you're trying to understand thereafter is how do these different system elements, so how does the technology, and your tiredness, and working in a cramped physical environment doing an extremely complex task, how do these interactions come about that give rise to the poor outcomes in the right hand side here. The Ishikawa diagram doesn't force you down that road. It takes a much more, how would I call it, logical approach, so it's based on what we call linear cause and effect thinking. So it's assuming a linearity, it's assuming that these things end up as a root cause problem, whereas this is not, this is about taking a holistic perspective on it. Now you may be convinced or unconvinced by that because there are subtle differences here. The other issue here is, on the right hand side we've got these 20 aims. The Ishikawa diagram doesn't have that. So it's focusing on not just a patient safety issue or a root cause of patient safety issue, it's focusing on a whole ream of different system performance issues, productivity efficiency effectiveness, as well as wellbeing issues for both staff and patients, so it's broader and more holistic and it's focusing on interactions. I don't know whether I convinced you with that or not, it'd be good to know. -Yeah I can see the benefit of the outcomes in a different box and also the human wellbeing expected is not very often highlighted, that then, and it is also true, it depends how people will utilise the Ishikawa in order to find a connection in this worksheet, the connection interaction already there. -So you're absolutely right, it depends on how people use a particular tool, but something like five whys, the Ishikawa diagram, have been criticised by safety scientists when they're used for highly complex problems, because they can lead you down a blind alley, which is why this more holistic approach is giving you the opportunity to be much more broad in your thinking, your understanding, and so this is moving away from what we call linear cause and effect thinking which is what Ishikawa is based on. So what we mean by linear cause and effect thinking is that a + b = c and that's great when you're trying to diagnose a problem with a car engine or you're trying to diagnose a problem the production line, because you can understand that all right, that's not working because that's not working therefore it's going to cause that problem. And health care doesn't work like that. Health care is so complex, there's so many issues ongoing at the same time that people have to adapt the performance, you can't trace anything to a root cause or a bunch of root causes. You can if you want, but it's going to be unhelpful which is why you have to take a much more holistic overview, which is why the learning reviews you're doing this afternoon are imploring you not necessarily just to look at an event that's happened, but to look how work normally goes. How does the work normally go well, because it goes well most of the time. Sometimes it doesn't go well, why is that? So I'll give you an example. If you are a midwife in a ward and you're handing out medications and you give the wrong medication to a patient and you do a root cause analysis of it. Well the root cause analysis might find favourably that you were two staff down, you were extremely busy, you were distracted and so on and so forth. You can get the picture, we can make up all these different system elements that contributed to why you gave that medication, why that medication incident occurred and why you were at the centre of it, and I think most people agree that's fair enough and I'd agree that's fair enough. The problem is, however, that if we look at you doing that any other day, then the same problems are there. You still get distracted, you're still extremely busy, there's high demand of patients, you've got a lot of complex patients on, you might be three staff members down, but 9 times out of 10, or 99 times 100, or probably even higher than that, you don't make a medication error. So that's the difficulty, that understanding more or less proves that linear cause and effect thinking in a complex system is going to have very limited traction. And so it's about trying to understand both those situations. So the work normally goes well even under these sub-optimal conditions because we're great at adapting, but sometimes we make a mistake during that. So what is it we can do to better support performance so that things are going right even more of the time, if that makes sense, so they can get it up to 999 times out of 1,000 instead of 99 out of 100. So it's a different way of thinking about it. That's something that I know that Carl Horsley and others in New Zealand are extremely interested in and it plays into resilience engineering and the whole idea of Safety I and Safety II. We'll touch on elements of that later on So I don't know if that's convinced anybody. This is fairly new thinking, fairly new concepts being applied in health care. It can take a lot to get your head around, but I think what we'll do, if there's no further questions just now or any comebacks or not, or any clarifications that are required, then we've got one or two, depending on the time, one or two small group exercises that we can do, when we apply this particular framework to a problem but we'll do that after coffee.

**Visual**

**The next slide appears. Written in purple in the middle of the screen is the title ‘HF Design Thinking’. In the bottom left corner is written ‘University of Glasgow Institute of Health and Wellbeing’ with the university crest. In the bottom right corner is written ‘Safety, Skills and Improvement’ with its logo.**

Audio

I spoke about that human factors as both a systems-based science and it's also a design-based science, so these are two key things to think about, systems and design is what human factors is all about, as we've probably said.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Importance of Human-Centred Design’. To the left of the screen below is a page from a publication titled ‘Why design starts with people’. At the top right of the page is written ‘The Health Foundation’ with its logo of a pink circle to the left. At the bottom of the page is a red box titled ‘Design for patient safety’. In the middle of the screen is a brown rectangle divided into nine sections. Each contains white text and an arrow pointing in alternate directions. Paul talks through these. To the right of the screen are words separated by hyphens, which Paul refers to.**

Audio

So there's various different terms, there's inclusive design, there's universal design, there's human-centred design, there's user-centred design, they are all slightly different but there's significant crossover, it's all very academic, we don't want to get bothered with that, but the problem is, and that's what we've just been speaking about, there is no systematic feedback between users, purchasers, designers and manufacturers of equipment, therefore opportunity to reduce risk through better design are being lost. We don't have these formal procedures in place and where these types of projects are undertaken, that type of approach is not followed whatsoever. So we have lots of knowledge about design, we have lots of international standards about design, we have lots of guidelines about design that are largely either ignored or unknown about in health care, in the same way they wouldn't be ignored in other high-risk industries, so I just want to make that that basic point. And that's what a human factors specialist can bring to the party, is knowledge of these design principles and design thinking and design conventions as such.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Design for Patient Safety Improving Birthing Pool Design’. On the right of the screen is a picture of a white birthing pool. Above the pool is a tap. On the left of the screen is a list of bullet points that Paul talks through.**

Audio

So very quick example, I thought well have I got a midwifery example that's relevant, so here we have it. So I apologise if this example is about 30 years out of date, and we can have a laugh about the fact that it is out of date, but the issue here is about the principle of design and showing you how we go about our work is probably the best way to describe it. So we have a birthing pool design here and it was gaining in popularity back in the day, so they resembled large barrels, they had not been specifically designed for users. So mothers and babies are not the only users, midwives are users, people who maintain these birthing pools are users, people who clean them are users, and so the very design of that had impacts for people who were cleaning them, people who were trying to maintain them, but most importantly for midwives and for mothers. So midwives were not able to monitor and examine mothers as well as they would like to without putting strain on their back and it was very difficult as I can tell you from personal experience, when my wife gave birth in something very similar to this, it's very difficult to get, even with the help of two midwives, to get your wife in and out of such pool. I don't know how much of this resonates, as I said it might be quite an old example. So the needs of the people need to be identified, so these are the different users here, the mother, the midwife and the baby, the maintenance, cleaning, infection control staff – forgot about them – so we need to identify all the different needs of the different users of that piece of equipment, what the impacts are, what the risks are, so we need to see how it's been used as well. So there were interviews and videos done, lots of interviews with different users, we got their views and experiences, their ideas, their design suggestions, we looked at what was already out there in terms of the design world, what existing standards and conventions exist for these types of, not necessarily that specific piece of equipment but similar pieces of equipment. So what we do is, we build a mock-up or a prototype before approaching a manufacturer to do that and we test it out, and so to cut a long story short, here is the redesigned birthing pool.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Design for Patient Safety Improving Birthing Pool Design’. On the left is written a list of bullet points that Paul talks through. On the right is a picture of a blue birthing pool. It has steps up to it with a hand rail, there is an integral seat in the pool, and a shower attachment beside the steps. The pool is in a room which has a window with curtains, and is beside a radiator.**

Audio

And it's got all sorts of different attributes and elements and characteristics to it which are there to enhance performance and reduce risks for the various different users of this particular system of birthing pool design. So it's been, in the UK it's known to have, back in the day, have revolutionised the design of birthing pools, and so we now have an internationally designed ergonomic birthing pool as such. Very quickly, did that make sense? It'd be good to hear some thoughts, even if it's out of date as an example, I don't know what current birthing pool designs look like, but from a few decades ago, that was a problem that was identified in midwifery care, from an ergonomic perspective because of the impacts it was having, in terms of ingress and egress of mothers, musculoskeletal diseases with midwives, problems accessing how to maintain and actually clean it, and so by taking an ergonomic approach to understanding design and involving the users at every single stage, getting their input, we come up with something that would seem to be satisfactory to all concerned.

**Visual**

**The next slide appears. In the middle of the screen underneath the turquoise band is written the title ‘Systems Thinking Principles to inform Learning Reviews’. Glasgow University is written in the bottom left corner and ‘Safety Skills and Improvement’ is back in the bottom right corner.**

Audio

So I want to leave some time or as much time as possible for some chat around the next section and this is to lead you into your learning from reviews session later on, and Leona kindly gave me some of the guidance forms that which I'm impressed with, but I think what could add value to it is embedding in the users of that guidance and people participating in learning reviews, is the idea of understanding basic systems thinking principles, and also having a systems framework to think about now. We've already introduced a systems framework via the SEIPS model, so this is the system's thinking principles. So I'm going to speak about I think about 10 of them, I think it is, and then at the end of it I want you to think through, or even interject at any point, please do that, is to think through how well these systems thinking principles are understood in New Zealand midwifery care, in your area and how well they're practiced if at all, so think about it in those terms.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Webinar Purpose/Reflective Prompt’. Below this on the left of the screen is a list of bullet points which Paul refers to. On the right of the screen is a circle comprising of 10 differently coloured boxes making up the circumference. Each box has written inside a principle which Paul will talk through in detail.**

Audio

So the purpose here is to introduce fundamental systems thinking principles and it's to explore to what extent this type of thinking currently informs the patient safety work that you're generally involved in, and then the learning from events that you're specifically involved in, our learning reviews as the term is.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Foundational Principle’. Below this on the left of the screen in a grey box is text stating ‘Avoid blaming individuals, focus learning at the system level’. On the right of the screen is a signpost with four coloured signs on it, each facing in a different direction. Each sign has text inside it.**

Audio

So some of it may seem common sense and you've heard them before, but it's to let you know that they do form part of systems thinking when taken as a whole. So the first one is what I call a foundational principle, and it's to avoid blaming individuals. Now that can happen on a number of levels because people blame themselves, often wrongly blame themselves, they implicate themselves because they feel guilty and because they were the last one, excuse the pun here, holding the baby or holding an instrument or holding, talking to the patient, and so they blame themselves. There's also a deep human need, even deep psychological tendency, to want to blame others, which we need to change, you need to be aware of that. And we also use language inadvertently that either directly or indirectly blames individuals. So today I finished a report whereby I reviewed, and I can post this link too, you can read some of them, they're in the public domain, some of our health boards post adverse events learning summaries, they're one page learning summaries, that summarise the learning and improvement that's taking place from a more substantial incident investigation report that they've done. And the idea here is to post it to a community or practice so that other health boards can look at it and learn from it. Now it isn't working as well as we would like to think, based on the report that myself and a few others have done, but we've given them lots of things to think about and how to improve it, and one of them is that even though it's in the spirit of sharing learning, a lot of the language that's used in these reports is actually blaming people and we don't even know that we're doing it. So to say that we need to avoid blaming people, it's quite a simplistic thing to say, I know it's very difficult to implement, but it's to think about it in those different levels, so people blame themselves, other people blame other people, we write reports that sets out not to blame anybody, but we inadvertently blame people in some of the language that we use and so on and so forth, so it's to think about it probably a bit more deeply than we're currently doing. There's a probably an apocryphal story that I've heard about a chief executive in an organisation, health care organisation, who on one hand had some insight and on another hand just shot himself down in flames when he said, when confronted by quite a serious patient safety incident that had taken place, he said right I know we're in a no blame organisation but who is it we're not blaming. So that type of approach and attitude and behaviour probably still prevails, as well as the much more explicit stuff that we're trying to get people to move away from. So that's something to think about, a foundational principle about understanding what we mean by blaming people.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 1’. Below this on the left of the screen in a grey box is text stating ‘Recognise that system safety is everyone’s responsibility’. To the right is a depiction of a wall sign. It has three bands, red at the top, white in the middle and black on the bottom, and has the same text written inside it.**

Audio

Anybody want to come in at any time as I said, please do. Here's one, principle number one, which is certainly not well recognised, so if you think about system safety or patient safety or a patient safety incident, whatever, either you're talking about the discipline and the practice of patient safety or system safety, I go broader than that, we tend to use system safety, or a specific patient safety incident, what needs to be understood, and your colleagues in Australia, Paul Salmon's team in Queensland are very hot on this, is that safety is a shared responsibility across the entire system. So often we put the onus on frontline care teams to sort out the safety problems because they were directly involved in it, so therefore they should report it, resolve it, and learn from it and improve from it. But the issue here is that every system actor has a shared responsibility, so whoever the clinical director is, whoever's head of the department, whoever is the chief exec, whoever the medical director is, whoever is head of the regional health board they're part of, whoever develops the patient safety policy at government level, whoever the politician is that's elected as the health secretary, everybody in systems thinking, everybody has a shared responsibility. And so therefore what we're not doing, and we're not good at doing, is passing up the chain some of the issues which are important from a safety point of view. If it's about procurement of technology which is a significant contributory factor here, if it's a significant learning issue, then we need to not let manufacturers know that. Our chief executives need to be in touch with our regional health authorities or our national health authorities to pass on this information as part of what you found, because everybody has that shared responsibility. Now I'm making up some examples there, but quite often we don't, we bound that responsibility with front line care teams, the chief executive, the medical director, the clinical director, ticks a box to say yeah, that safety incident happened, they're learning from it, that our team's learning from it. It's almost as if they absolve themselves of responsibility and accountability for their part of the system that contributes or otherwise to that particular incident. So they have a role to play, everybody has a role to play to some extent, maybe not all the time, but at least you should be considered and ruled out. So the whole idea of shared responsibility is a systems thinking principle.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 2’. Below this on the left of the screen in a grey box is text stating ‘Safety incidents are caused by multiple, interacting, contributory factors across the care system’. To the right is a circle comprising of bands of different colours. Each colour corresponds to a different factor which Paul refers to.**

Audio

I should say that the principles as I go through them are not in any particular order, which I should, I should attempt to put them in some sort of logical order but I've just randomly put them down. So the second principle, and I think most of us know this and the SEIPS framework certainly addresses that, is that safety incidents are caused by multiple interacting contributory factors from across the care system. So if you think about that SEIPS framework, and if you think about something that's gone wrong recently, then you can apply that framework and think through the different system elements which may have contributed, may have interactively contributed to whatever it is that's gone wrong. So this again is a specific principle that needs to be well understood but it's not always well understood because we quite often focus on individuals and we focus on their actions and behaviours at the time, and we become kind of semi-obsessed by that. We don't look beyond the immediate people who were involved in a particular incident as such, and I think that's probably reasonably well established, not everywhere but reasonably well established a lot of places.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 3’. Below this on the left of the screen in a grey box is text stating ‘Understand that safety is an emergent property of complex care systems’. On the right is a black outline of a square which is divided into quarters. In top left is written ‘Complex’, in the top right is written ‘Complicated’. In the bottom left is written ‘Chaotic’ and in the bottom right is written ‘Simple’. Paul refers to these.**

Audio

So this one is getting to the academic side of things, and again it can be a difficult one for people to get their head around, and that safety is an emergent property of a complex care system. So health care is largely highly complex. The bit that people don't understand is that in complex systems, your systems are not safe. You can never say with certainty, at any moment in any time, that we work in a safe system. My midwifery care system is the best system because it's the safest system. You just can't - you can say that if you want, but it's just that you've got no evidence to back it up, because lack of safety incidents isn't evidence of the safety of your system. So safety comes about because of the interactions previously described, and non-safety comes about because of those interactions between those safety systems, sorry, these system elements previously described, and so those wanted or unwanted outcomes in the right-hand side of the SEIPS model are what emerges out of these interactions. So the assumption is that you don't have a safe system, it's in a state of neither safety or guaranteed safety, it's just there, we can't think about it in those terms. The outcomes we get in the right hand side are emergent and so safety may be guaranteed in that particular instance or there may be a safety issue, because of the same types of interactions that are taking place. This plays into the whole Safety I Safety II thing which I'm not going to touch on today but I know that my colleagues in New Zealand are very hot on, but it's just to get this point across about what we call emergents. So not only that, but staff wellbeing is an emergent property, patient experience is an emergent property, system safety, patient safety are also emergent properties.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 4’. Below this on the left of the screen in a grey box is text stating ‘Consider ‘human error’ as a symptom of a system problem, not its cause’. To the right is a picture of a book cover titled ‘The Field Guide to Understanding ‘Human Error, Sidney Dekker’. On the cover is a picture of a cloud of smoke rising up into the sky.**

Audio

I banged on earlier about human error and its synonyms - medical error, clinical error, nursing error, midwifery error, pharmacy error and so on and so forth, widely are used and abused in health care both in just in normal everyday language but also in our publications, we still use this term, and we use it to be synonymous, wrongly to be synonymous, with safety incidents and with harm events when it's not, it's a distinct entity from them. So we don't even understand what this means at a fundamental level, and so ultimately if you're arriving at the conclusion that an incident was caused by human error then it is wrong. What it's doing is saying to you that this is a symptom of a system problem, it's not the cause of the problem, it's never the cause of the problem, it's telling you you've got a design problem in your system somewhere.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 5’. Below this on the left of the screen in a grey box is text stating ’Recognise that there is no ’root cause’ of a safety incident in highly complex care situations’. To the right is a block of text that Paul reads through.**

Audio

So in complex systems the idea of a root cause is anti-systemic, it doesn't make sense, there can't be a root cause in a highly dynamic and chaotic complex system. And so if you read that quote there, so we tend to be looking for the root cause of something but in complexity there's no root cause, there's no root cause of a hurricane, there's no root cause of a tsunami, sorry to bring that up given your current circumstance, but there's no real root cause of what's happening just now. Nature is a complex beast, so there's no root cause of trust, there's no root cause of leadership, these are all a series of things that happen together, so in the same way that a lot of contributory factors interact in a very given way within a given context in a given situation, at a specific moment in time, either gives rise to safe or unsafe care. The exact same is happening in New Zealand with your earthquake and your potential tsunamis which are occurring. We know geologically and because of your location a lot of different things are playing out at the same time and giving rise to these outcomes. So we can potentially explain them but we can't fully understand them necessarily, because we can't predict them in that sense, exact same from a patient safety point of view.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 6’. Below this on the left of the screen in a grey box is text stating ‘Recommendations for improvement should focus on systemic change and redesign, rather than individual performance’. To the right are two circles overlapping an oval in the middle. The green left circle has written inside ‘Problem framing’. The yellow right circle has written inside ‘Solution oriented’. The middle oval has written inside ‘Systems thinking + Design thinking’.**

Audio

A real difficulty we have is that when we do learning from reviews, we focus on individual performance because we're looking at, we become fixated with the actions and behaviours at the person level, when what we should be trying to do is to provide design solutions, design improvement, that supports the performance of the people doing the job, and I'm pleased to see that's what your learning reviews, that's your direction of travel for them, is what can we do across the work system that we're all based in to better support performance in this particular area? Without thinking about things that have gone wrong necessarily, or who did what or who said what, who should have done what, these things are not necessarily important. It's about how you can better understand the design of the current system to support the performance of everybody.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 7’. Below this on the left of the screen in a grey box is text stating ‘Adopt a recognised systems approach to investigations, learning and improvement’. To the right is the SEIPS framework diagram from earlier slides.**

Audio

Earlier we spoke about principle number seven and I'm pleased to see that you thought it was reasonable, that you now have this framework and you can now adopt this framework and use it, so another principle is you use a systemic framework or approach to learning and to improvement and to problem solving in general, so we've given you one there, an entry-level human factors models such as SEIPS.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 8’. Below this on the left of the screen in a grey box is text stating ‘It is critical to explore and reconcile ‘work-as-imagined’ and ‘work-as-done’. To the right is a large grey circle, written inside is ‘Work-as-done’. On top of the grey circle, half in and half out, is a red circle, with the words ‘Work-as-imagined’ written above it in red.**

Audio

I think Leona's mentioned this term earlier on so, really important and it's part of your learning review as well, that you explore and try and reconcile work as imagined and work as done. So for the uninitiated, work as imagined is what people who are removed from the front line of care think should be done or think about the way work was done, even because they used to maybe do it. They don't do it anymore, but they used to do it so they've got this mental model about how they imagine the work should be done and so we often see this embedded in guidelines, in policies, in protocols, in work procedures, in checklists, somebody designs it because they've got an imagined way of how the work is actually done, oh sorry, so it's imagined but it's not reflective of how the work is actually done. To understand how the work is actually done, you need to engage the people who do the job, the experts in how it's done, the front line care teams know how it's done, and so you may have a gold standard idea, a guideline, it's often impossible to have gold standard care in the way we envisage because of lack of resources, lack of funding, not enough staff, technology doesn't work, all the things I spoke about, but that's the way that we imagine it should be done and then some people can't get that out of their heads, but the reality is somewhat different. So what we're trying to do here is reconcile both those worlds so that you can better design a protocol or a procedure or a checklist so it better reflects the way the job's actually done. But the only way you can understand that is by involving the users and the experts in every single stage.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 9’. Below this on the left of the screen in a grey box is text stating ‘Seek multiple perspectives when attempting to understand and improve system safety’. To the right is a depiction in black of six figures seated in a circle.**

Audio

And that's a big part of it, so regardless of what we do in terms of safety and improvement currently, our problem we all have is that I think we do not seek multiple perspectives as often as we should. So a classic example of that is maybe a medic, senior medic who's got an idea for a protocol or a procedure and who might involve the medical team junior doctors and get their perspective on how we manage this particular group of patients, but there's also other people who help to manage those groups of patients. There's a pharmacist who might come in twice a day, that are nurses who, and potentially midwives, who potentially manage this aspect of patient care and who are now expected to use this protocol or checklist or whatever but have never been consulted on it, and more importantly they have perspectives on how the care is done that the medics don't necessarily know about, so they're missing out in a number of ways there. The nurses also have ideas about how things can be done differently which have not been tapped into. They also have knowledge about risks and hazards that nobody else knows about because they see the system from a different perspective. And so this is something that we don't do well at all, even though we like to think we do, is that the porter, the admin staff, the check-in staff, may see that group of patients, may have valuable insights about things that you don't know about, that the clinicians don't know about, do we tap into those perspectives? Really we don't think broadly enough about who can help us and who has asked, who touches the system that we're working in.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 10’. Below this on the left of the screen in a grey box is text stating ‘Consider Local Rationality when learning from previous safety incidents’. To the right is a drawing of two people, facing in opposite directions, each looking through long rectangular boxes. Above them in red is written ‘Understanding Local Rationality’.**

Audio

A really important aspect of this, and I'm delighted to see it's fundamental to your learning review, is the idea of local rationality. So when you're looking back, not just at safety incidents, when you're looking back at anything whether, it's gone wrong or not, you're trying to understand why people made decisions and actions at the time. People are qualified, educated, experienced, generally speaking, but quite often we look back and go, for the name of god, who would have done this in that way and why, and we're all guilty of it. We're all guilty of it, but the person who made that decision at the time did it because of the conditions they faced at the time. They're just as experienced as you, they're just as qualified as you, they made that decision because it made sense to them. Do you know why they made that decision? Because it made sense to them, because they wouldn't have done it otherwise if they knew what the consequences would have been. So that's why it's so important to understand why they did what they did, without judging them because that's the bit you need to learn about. The learning isn't that they did x, y and z. You know in hindsight that you wouldn't have done x, y and z now, what you're trying to learn about is why did they do x, y and z, what was happening in the system that forced them to make that decision. So that's the concept of local rationality which I think is extremely important to understand this, you know, it's absolutely fulcrum to it.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 11’. Below this on the left of the screen in a grey box is text stating ‘Explore performance variability (trade-offs and adaptions etc)’. To the right is a diagram. Through the middle is an brown arrow pointing right. Below the arrow is an outline of a box with ‘Thoroughness’ written inside. A red arrow goes up across the middle arrow to a red outline of a box with ‘Efficiency’ written inside. This is repeated to the right along the brown arrow.**

Audio

And so a bit like exploring work as imagined versus work is done earlier, another principle is exploring trade-offs or efficiency thoroughness trade-offs. So you need to understand that as well because that's important, because that impacts on our own performance. So I said earlier, and it's probably a rubbish example to give to a bunch of midwifery leaders, but if you're a general practitioner, you've got to see thirty patients in that session, in that clinic, you've got ten minutes for each patient, patients come in with seven or eight different problems, you can only do so many of them and to safety net the rest of them, so you're trading off thoroughness for efficiency, because you have to keep that patient as safe as you possibly can, not as safe as you would like to be, but as safe as you possibly can, because you've got sitting on your shoulder a big efficiency bird chipping away at your head because you've got another 29 patients to see. So you need to trade off the fact, you need to safety net this patient and get them out the door and get somebody else in, because you need to keep the system going. So if you think about that principle, and how we do this probably every minute of the day, maybe not to that extent, but you're always trading off how thorough you can be against efficiency. That needs to be understood and explored as part of looking back in a review.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Principle No. 12’. Below this on the left of the screen in a grey box is text stating ‘Recognise the need to learn from everyday work as well as past safety incidents’. To the right is a grey circle with the words ‘Work-as-done’ inside. Around the grey circle are 9 smaller, coloured circles, each with a separate title.**

Audio

And the great thing is your learning from review does this as well, the need to learn from everyday work as well as past safety incidents. How does it normally go well? That's just as important to understand, if not more important to understand, than the things we've been talking about, is why it's went wrong, so you need to marry up both those worlds. So this is things we're not very good at in health care, it's a new concept, why does it normally go well, and learn from that as well as the past incidents.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Others?’. Below this is a grey box. Inside is a list of bullet points that Paul refers to.**

Audio

There are a lot of approaches which I won't go into because I want leave time to chat just now, but avoiding reductionist thinking and approaches, so that whole thing about a + b = c or what's the root cause here and so on and so forth, we want to try and get away from that world. That world's okay if you're work in, if you make tins of Heinz beans in a factory, when you make cars in a factory, that type of approach is probably better suited there, it's not necessarily better suited in complex health care.

**Visual**

**The next slide appears. In the turquoise band is written the title ‘Reflective Prompt’. Below this in a grey box are written three bullet points which Paul talks through. To the right of the grey box is a blue line drawing of a head and body. Radiating from the head are blue arrows, pointing outwards in a semicircle from left to right.**

Audio

Okay, so that's the systems thinking principles. A reflective prompt here is to explore to what extent this type of thinking is in your patient safety policy and your work generally and more specifically and you're learning from events, work that you do or may not be heavily involved in, I'm not too sure.

**Visual**

**The next slide appears. In the turquoise band is written the words ‘Thank You Very Much!’. Below this are two speech bubbles. The top one is blue and has written inside the letter ‘Q’ and the bottom one is yellow and has written inside it the letter ‘A’.**

Audio

So that was a quick, very quick overview, quite a high level overview of systems thinking principles. There are many more systems thinking principles incidentally, I only chose some to try and align with the learning from review working on patient safety in general.