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## Associate Professor Sharon Newnam

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### Description: Applying systems thinking to understanding MSDs with Associate Professor Sharon Newnam

**MADONNA KING:** Welcome back. Our next speaker is Associate Professor Sharon Newnam, Director of the Systems Safety Team at the Monash University Accident Research Centre. Sharon has published widely in the area of workplace safety from a systems thinking perspective. She’s a prolific author and has published work in a variety of academic and media outlets. She’s an associate editor of the leading safety journal, Safety Science. Sharon was invited by the Transportation Research Board to be an international member of the Truck and Bus Safety and is Chair of the Subcommittee in Safety Management. Sharon, welcome.

**SHARON NEWNAM:** Thanks very much for having me here today. Okay, I’m really excited to present the findings of this project. I’ll jump straight into the slides. So the Patient-handling injuries Review of Systems project was funded by WorkSafe in 2018. The goal of the project was to develop a tool to help guide manual handling coordinators, conduct systems thinking review and revision of risk controls following the report of a patient handling injury.

So the tool itself was developed in collaboration with Monash University Accident Research Centre, where I’m from, the Centre for Human Factors and Sociotechnical Systems at the University of the Sunshine Coast, WorkSafe Victoria and, in particular, the Victorian public health service played a critical role in the co-design of this tool.

Now the goal of PHIRES is to provide health services in Victoria and broader now, too, with a standardised process for reviewing and revising risk controls following the report of an injury to staff in a hospital setting, and we’re extending that to aged care now. The purpose of the PHIRES is to improve compliance with regulation 28(1)(c), optimise risk controls used to prevent future patient-handling injuries, optimise allocation of resources to control risks associated with patient handling across Victorian health services, and the last one is to improve collaboration across all levels of the system.

The unique aspect of this tool is that it’s underpinned by a systems thinking accident analysis method, Rasmussen’s risk management framework and the Accimap technique. And it’s also based on WorkSafe Victoria’s guidance material on the review and revision of risk controls. So you can see here on the right-hand side, we drive five principles from Rasmussen’s risk management framework to improve work systems, to reduce the risk of injury to staff. And these principles underpin the development of the tool itself.

So the first one is there is a need to focus on factors at the higher level of the system rather than just focusing on the behaviour of staff or changes to equipment. There is need to improve interaction between all components of the system. There is also a need to improve the flow of communication up and down levels of the system. There is a need to make the system more resilient to people performing tasks in their own way and becoming more efficient over time. And, finally, the last one, work systems need to have good processes in place for monitoring the implementation of risk controls.

So there are five steps – six steps in the development of the PHIRES investigation, and I’ll go through those steps briefly. So when a report is made by an injured staff member the first step is to actually summarise the incident. That involves summarising the outcomes of the injury to staff, the current risk controls and any response prior to review. Step 2 involves relevant stakeholder consultation across all levels of the system. Step 3 involves identifying the factors contributing to the incident, why the risk controls were ineffective and whether better practice risk controls were available. Step 4 is where the Accimap technique comes into it and it creates that visual representation of all the factors contributing to the incident under review that were identified in step 3. Step 5 is about involving the review and revision of risk controls internal to the health service. Where step 6 is about looking at recommendations for external stakeholders to improve risk controls to prevent patient-handling injuries. So external stakeholders, particularly referring to regulators and relevant government bodies.

So when we turn to the implementation of the PHIRES here in Victoria, this actually involved first of all training in the actual systems thinking and use of the tool. So this involved a 2-hour webinar on systems thinking and the model and method used to develop the tool itself. There was a 4-hour workshop on systems thinking. We really focused on communication style within the workshop, too. That was important in regards to step 2, identifying relevant stakeholders and how to communicate effectively to essentially piece together all those pieces of the puzzle that need to be captured to create a systems-thinking review and revision of the risk controls.

There was follow-up coaching and consultation following the completion of the first report. So we gave feedback on all of the steps within the PHIRES tool. And there was technical support throughout implementation of the PHIRES, particularly in the development of the Accimaps as well, which we used an online program called Loserchart for this.

So the participants within the implementation trial of the PHIRES were asked to complete a minimum of five reports using the PHIRES and that was undertaken from July to December in 2019. So 16 occupational health and safety officers from 10 health services in Victoria were trained in the PHIRES, so they received the training in the webinar and the workshop. And the majority of these were metropolitan based. There was some attrition over time because of the length of the project. This was due to individuals changing job roles.

I’m just going to provide some information regarding the findings of the PHIRES. So this actually presents the risk management framework as I presented earlier, so you can see the five levels of the system here going from equipment and surrounding environments, the lower level here, to government regulators and external influences at the higher levels. Essentially what this figure is representing is all of the factors that were aggregated across those health services participating in the implementation of the PHIRES over that time period. So we were able to aggregate all of those factors, which was step 3 of the PHIRES tool. So this presents essentially the summation of all the factors contributing to patient-handling injuries as identified in the PHIRES review as implemented here in Victoria.

So essentially this data shows that the complex system of factors contributing to patient-handling injuries, and this is really evidenced by the percentage of factors identified at each of the levels of the system, as you’ll see, 11 per cent of factors were identified at equipment and surrounding environments and up to there was 9 per cent of the factors were identified at government regulators and external influences level.

There was evidence from the findings here that the PHIRES guided coordinators in a system is thinking review of incidents. This is really evidenced by the identification of contributing factors at operations management level, which is 24 per cent, the governance and administration level at 17 per cent and 9 per cent at government regulators and external influences.

So why this finding is so unique is the traditional investigation tools tend to prompt investigation of contributing factors at the lower levels of the system – the equipment and surrounding environments, frontline staff and some at the operations management level. Yet there’s very, very little guidance out there in terms of identifying factors at these higher levels of the system. So this is how we came to the conclusion that provided a systems thinking approach and evidence of that to an investigation of incidents.

So this next slide is incredibly complex and messy, and I don’t expect anyone to be able to read all of the different boxes. But essentially why I present this particular graph is to show how complex the system is. As I just mentioned before, traditional investigations typically focus at these two lower levels of the system, which essentially means that actions generated from these reviews, then again also focus on these levels of the system, which result in training to staff or changes to equipment. This shows how complex it is and why we need to under the factors contributing to patient-handling injuries at these higher levels of the system.

So you can see the number of the factors that are represented within the boxes that have been identified through the reviews. But you’ll also see the relationship between factors. As I mentioned previously in regards to the principles underlying the PHIRES tool, is that the flow of information and the relationship between factors in the system is incredibly important in being able to identify actions that are going to create systemic change. And this illustrates why we need to identify actions capable of creating systemic change and as represented through the arrows within the system.

So this figure provides an aggregate Accimap from one of the health services that undertook 13 reviews using the PHIRES tool, so it’s an aggregate here. So it’s essentially what I want to present is – or the message I want to get across is how complex the system of factors contributing to patient-handling injuries and the multiple interacting factors within and across different levels of the system.

Now in step 5 and step 6 of the tool kit it’s about generating actions. And these actions are based on review of the Accimap itself. So, again, we looked at aggregating those actions across these five levels of the system again. So this figure presents the summation of the key themes emerging from the actions generated in the PHIRES review.

So as you’ll see here, the highest proportions of actions identified the review and revision of controls at the operations management level. This was through strategies such as safety culture, review of rostered hours and staff breaks. There was always a large number of actions generated at the governance and administration level, as you see by 27 per cent here, and included strategies like creating a safety culture and introducing a KPI for staff safety.

So the majority of these actions also targeted stakeholders internal to the health services such as managers, directors, nurse unit managers. So the actions weren’t only focused on occupational health and safety officers or the department of occupational health and safety within the health service. And that is exactly what we wanted to do in terms of presenting a systems thinking approach within this – is to extend or share the responsibility of safety across the system.

So, again, the actions generated suggests that the PHIRES help facilitate a shift away from frontline worker and towards higher managerial levels when developing risk controls. It was also great to see that a smaller percentage of actions involved the review and revision of equipment and those just focused on the frontline level. So that was more evidence that it helped provide that systems thinking approach.

In this project we also undertook an evaluation of the PHIRES in terms of understanding the user experience. So effectiveness in the implementation of PHIRES was evaluated and we found that coordinator strongly agreed there was value in using the PHIRES, they support using the PHIRES in their future work, they believe that it could be easily integrated within their existing work practices and that the feedback could be used to improve PHIRES in the future, which is exactly what we aimed to do and have done since analysing the results from this implementation trial.

We also got some qualitative feedback collected at the completion of the PHIRES. And as you’ll see from these comments here, the participants overall believed that the PHIRES provided a more comprehensive approach to investigating patient-handling injuries.

So, in conclusion, we found from the implementation of the PHIRES that it helped coordinators to think in systems. And this was really evidenced by identification of contributing factors at the operations management level and above and actions targeting systemic change in health care, and that was illustrated through the aggregation of actions, the key themes in those actions. There was also positive support for the effectiveness of the PHIRES, and this was identified through the evaluation itself.

The coordinators believed it was a highly valuable tool for investigating patient-handling injuries. They said that with the first review, it took them about one half to 2 hours to complete the review because it’s prompting investigation of factors at those higher levels of the system, so factors that you wouldn’t have previously considered using a more traditional approach to investigation. So it did take an additional amount of time to complete the investigations. However, they found that after they became more expert by the end of the implementation trial that they were completing the reviews in less than 1 hour. So it was definitely an experience thing that contributed to the longer length of time to start with. But then – and the other bit of feedback in terms of timing was the development of the Accimap itself, which brings me on to the next steps and where this has gone to from here.

So from the evaluation and the feedback from the PHIRES this stage essentially said there was extremely positive insight from the data and it’s also being used, this data, to inform activities within WorkSafe, such as inspector training and guidance material. So at the beginning and the middle of last year WorkSafe has announced to extend funding to support the development of a software tool to support implementation of the PHIRES. It’s not PHIRES anymore – we’re now referred to this app-based version as STIR – Systems Thinking In Review. So it’s going beyond patient-handling injuries and looking to investigate all workplace injuries within health care and aged care.

So there’s also going to be within this tool the capability that it will automatically generate that Accimap which, coming back to the feedback, that was one factor that contributed to the time taken to complete the review because the development of the Accimap in the Loserchart program is quite time intensive. Very informative and educational and best understanding all of the factors and relationship between factors but, at the same time, very time intensive.

We know occupational health and safety officer within health care don’t have the luxury of a lot of time to be taken to software tools like this. So this STIR app is going to be fantastic it being able to minimise that time. There’s going to be online coaching and coaching through videos that are integrated within the tool as well. And we hope that that component of this app will help broader dissemination of the act. So it’s not only going to be able to be used from occupational health and safety practitioners that have a background in undertaking investigations; but it will be easy enough to understand how to undertake each step for line managers and supervisors, nurse unit managers, for example.

As part of this project with WorkSafe Victoria we’re also going to be evaluating the financial, social and cultural benefits of application or use of the STIR app as well. So very, very happy to answer any questions about the STIR app, the PHIRES implementation and, in particular, the next steps. It’s a really exciting project.

**MADONNA KING:** It sure is. And thank you so much, Sharon. And so on point to our theme of looking at that bigger picture through systems thinking. Several questions have come in, and I’ll go to the first one from Shannon. She says, in using this approach, once you’ve identified the many factors, how does the hierarchy of control fit with this model?

**SHARON NEWNAM:** We don’t integrate the hierarchy of control within the framework itself. The actual steps of the tool. But it is – we do ask that the occupational health and safety officers or those in charge of the investigation consider that in the development of their action plans. So, for example, within the STIR video, which is the coaching video to be integrated within the app, there’s reference to hierarchy of controls when developing the action plan itself. We’re very happy to be able to share those videos, and WorkSafe Victoria is currently putting them on their website. To tell you the truth, I don’t think the last step has been uploaded yet on to the WorkSafe Victoria site, but I do know that steps 1 to 4 have. And that provides some guidance in terms of using hierarchy of controls in the development of the action plan.

**MADONNA KING:** Thank you for that resource as well. From Annette, is there consideration of extending the use of PHIRES tool kit in the home care sector where work is performed in the home environment and within consumer-directed care model?

**SHARON NEWNAM:** Absolutely. And what we’ve come out with at the end of this project is essentially an understanding that the six steps of the PHIRES tool are applicable to any setting. It’s important being able to develop a classification scheme, and what I mean by classification is step 3 where you’re identifying the contributing factors, that step is underpinned by an evidence base. So understanding the context regardless if its patient handling, workplace violence, we’re even developing a tool now for undertaking systems thinking investigations in work-related driving crashes as well. So long as that classification scheme accurately represents the context it can be used in any setting.

**MADONNA KING:** Thank you. A great question next from Kerry: where contributing factors were outside the organisation’s control, have you any examples where information from PHIRES was shared? Government regulators, external influences and whether any change resulted or perhaps be tabled for review?

**SHARON NEWNAM:** As part of the implementation of the PHIRES itself we weren’t able to track/monitor those actions that came out of the implementation trial itself. So that’s one of the main considerations in the development of the STIR app and the evaluation side – to monitor that over time.

What we did find from the results that were generated from the PHIRES investigation, WorkSafe Victoria used that information to, the their guidance material to develop new guidance material and to incorporate that within inspector training as well. So we did see the uptake from more of local level. But in terms of the health services itself, follow-up, which was around three months after the implementation, they said that the actions were still being actioned at that point in time there was discussions. So there was definitely progress being made, from that local level we needed a longer amount of time, which was the purpose of the STIR implementation.

**MADONNA KING:** Thank you. Similar questions from both Zoe and Louise about whether the tool kit will be available for other employers or other industries?

**SHARON NEWNAM:** Yes, absolutely. There’s essentially no copyright on this. WorkSafe Victoria has put the PHIRES tool on their website now, and the videos are accompanying that to provide that training in use of the PHIRES. There is this more comprehensive training model for occupational health and safety officers, but we needed to be able to provide training that was more feasible and practical as well. So it’s on the WorkSafe Victoria website now and you’re able to access feedback on the videos and how effective the training is, you’re most welcome as well.

**MADONNA KING:** Thank you. From Alison, do you have any suggestions of how you could make the approach part of ongoing core business of an organisation?

**SHARON NEWNAM:** I would love that. That’s essentially the goal that we have for this entire project. I think embedding that systems thinking within workplace culture is the first step. So we need to have these discussions with the regulators and relevant government bodies to ensure that the understanding of systems thinking is first and foremost in people’s thoughts. Because as I was saying, the traditional approach to investigation focuses on these lower levels of the system. Most – a lot of employers are looking for that silver bullet solution to prevent injury in the workplace, and that systems thinking goes against that. It’s not an easy process. We need to understand, map out all the factors and a relationship between factors across the system to be able to create more of that systemic change.

So I think how we actually go about doing that is doing systems thinking training in the first instance. And that’s what we’ve been rolling out across New South Wales and more broadly here in Victoria – doing regular workshops on systems thinking and applying that using this tool.

**MADONNA KING:** Thank you. As you know, our symposium theme is Safety by Design – Building Workplace Capability. Those words, Safety by Design, what do they mean to you?

**SHARON NEWNAM:** I think to me, Safety by Design, what resonates with me in that is the translation of research into practice. And what is so unique about this tool is that it is underpinned by systems thinking model and method, Rasmussen’s risk management framework and the Accimap technique. And it’s underpinned by those five principles. And I think that really resonates and provides an effective foundation to be able to best understand incidents in an investigation process.

**MADONNA KING:** Sharon, such an informative presentation and answering so many of the questions, thank you.

**SHARON NEWNAM:** Thank you.

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