

Medical Simulation in Pediatrics – Creating a Safe to Practice, Improve and Reflect - Pediatric Grand Rounds-20260911_073006-Meeting Recording

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Kamat, Deepak M 0:07

Good morning and welcome to Pediatric Grand Rounds. The CME code is in the chat box and it's working. I tried it this morning. It's my great pleasure to introduce this morning's Grand Round speaker, Dr. Jian Kim, who is a medical director of Pediatric Critical Care Division.

Also the medical director of pediatric simulation division at Children's Hospital of Michigan. She completed her pediatric residency and pediatric critical care fellowship at Children's Hospital of Michigan. And that's where I met her. Actually, she was my resident for three years and she's board certified.

in both general pediatrics and pediatric critical care medicine. In 2021, Dr. Kim co-founded the hospital's medical simulation program, where she continues to serve as the co-director, building an interdisciplinary simulation curriculum for residents, fellows, and nurses

throughout the hospital. Her work in simulation-based education has been recognized nationally, where her trainees who have done research under her mentorship presented at American Academia, Pediatrics and Society of Critical Care Medicine conferences. Dr. Kim, thank you for accepting.

our invitation. We are looking forward to your presentation. Thank you.



Kim, Ji-yeon 1:31

Good morning, everyone. Thank you so much for inviting me to chat with you about one of my passion projects. My name is Jeon Kim and I'm the pediatric critical care physician at Children's Hospital of Michigan and also a recovering ex-associate program director for the PICU Fellowship Program. Through simulation, I'm still fulfilling my love for medical education.

And I'm excited to share why I believe medical simulation should be an integral part

of any healthcare system.

Over the next 30 to 45 minutes, we'll discuss first why simulation matters specifically in pediatrics, the literature behind pediatrics' unique need for simulation-based training, and how simulation is designed through SimZone, which is a framework for matching fidelity,

Facilitation and debriefing to the learner.

and how it drives clinical improvement at both individual and system level through simulation-driven QI projects in the medical education and clinical setting, and how debriefing turns simulation experience into learning and making a lasting impact.

We'll review the common debriefing strategies, including pearls, advocacy, inquiry, plus delta, and team and system-focused approaches.

So let's ground everyone in a shared definition before diving in. So according to Dr. David Gabba, who is the, like the godfather of simulation, he says simulation is a technique, not a technology, to replace or amplify real experiences with guided experiences, evoking or replicating substantial aspects of the real world in a fully interactive manner.

Simulation is broader than high fidelity mannequins practicing codes on the floor, which is what we're most familiar with. It includes virtual patients, standardized patients, and insight to simulation, all of which we'll touch on today.

So let me try to convince you in the next couple of slides as to why simulation matters in pediatrics.

So one of the core problems is that our future pediatricians' exposure to high acuity, low frequency events are becoming more limited. The high acuity pediatric resuscitation is rare. It is far less frequent than adult codes, even at busy pediatric tertiary care centers.

At our hospital, if there is a code blue, the PICU team is dispatched and we take over the resuscitation. And I think because of this efficient algorithm, many of our trainees report of never leading a resuscitation before graduation. The resuscitation training programs such as PALS or NRP have been a benchmark for CPR training.

and is mandatory to recertify every two to three years, but simple participation does not guarantee competency, especially in a stressful, high acuity setting.

Number 3, work hour limit is also decreasing the bedside exposure. And lastly, many of the residents do not achieve procedural competency prior to graduation and are expected to perform independently. This is a foundational rationale from my end as to why simulation isn't optional in pediatric setting.

It is filling the real exposure gap.

To address the problems mentioned before, simulation is a great vehicle. The traditional apprenticeship model depends on frequent varied exposure, which is decreasing. The see one, do one, teach one assumes volume pediatrics that doesn't have.

Research shows that graduates only perform average of three of each procedures required by ACGME before graduation.

And skills also tend to decay quickly without reinforcement, especially resuscitation skills decline. And once again, as I mentioned, simple participation of PALs and NRP does not guarantee competency.

And simulation offers deliberate, repeatable practice without patient risk directly. Simulation encounters skills decay as well as low real-world volume.

Here's an example of a longitudinal study of a 48-month mock code program at a tertiary care center that showed 50% of pediatric cardiopulmonary arrest survival rate achieved, which was above national average.

A strong correlation coefficient between survival gains and frequency of mock code, and most importantly, this improvement was sustained for three years.

Here's another QI project created to address cardiac arrest outside of the ICU. This QI study created an improved multi-discipline team performance between nurses, physicians, and advanced practice providers. They used a moderate fidelity mannequin. The results showed a dramatic increase from 0% during the pre-training period

to 64% in post-training of survival to hospital discharge after a cardiac arrest. These projects also demonstrate a drop in median time of the first epinephrine dose from 8.5 minutes to 2 minutes. And most importantly, they were able to achieve 80% ROSC.

I also want to flag a recent ACGME change worth watching. The new pediatric residency requirements cut mandated procedures from 11 down to 5, with everything else shifting to an individualized career-tailored curriculum. So the required inpatient time, NICU, PICU/ED also decreases well.

The goal of this change is more flexibility for the program directors, letting training focus on the procedures that actually match the resident's community and career path.

But I do want to note that this flexibility raises a real equity concern. The pediatric

workforce is unevenly distributed in the United States. So in many rural and underserved areas, our general pediatrician is the only provider around and often the sole frontline acute care provider.

That role demands a broad procedural competency and experience. And if training standards now vary more by program, some residents may graduate less prepared for exactly the communities that need them most, which deepening the existing disparities in our pediatric care.

So the question is, how do individual programs like Children's Hospital Michigan in Detroit and University of Texas San Antonio make sure our mutual pediatric residents still get exposure to the procedure and pathology in their future practice that will demand? That's where the simulation must fill the gap.

building competency-based training pathways that don't depend on which procedure or pathology a given program happened to prioritize.

So my first take home point is pediatric has a volume problem, simulation is built to solve, and growing evidence base now links simulation training directly to better patient outcomes.

So now let's talk about how an effective simulation is designed, starting with the learning theory behind it.

To design an effective simulation, it is important to know about the different types of learning processes. One of the theories is proposed by an organization psychologist named Chris Argyris. First type of learning is called a single loop learning, where the learners modify actions according to the differences between expected and reached outcome.

The goal is to get better at a known task, like comparing your behavior against a standardized benchmark and closing that gap. An example is how to place an ultrasound-guided IV or how to provide an effective back mass ventilation.

As this figure shows, a learner has actions or approaches which leads to a result. And with the single loop learning, this learner tries to master an existing approach with some edits.

Now, the type of simulation that makes a lasting impact is one that provides a double loop learning opportunity for the patients. It is a learning process that highlights how the very way we go about defining and solving the problems can be the source of problem in its own right. So it digs into what is the root cause.

This type of learning involves challenging our underlying beliefs and assumptions. It focuses on the trainees to think about their actions and the framework of our

operating assumptions.

So compared to the figure before, in a double loop learning figure, acknowledges that there are assumptions, values, and norms that lead to specific actions and approaches. So in an ideal simulation, the learner would lead a session with questioning their own current framework and develop better approaches to clinical situation.

So an example would be in a multi-discipline team brief, the cardiologists and the CVICU surgeons uncover disparities that are rooted in professional and experiential differences in how they read patient's condition.

So now that we've discussed the different types of learning theory, let's talk about different types of simulation. And one of the best way to categorize simulation is through Dr. Christerson's simulation zones, aka sim zones. All of these types of sim zones can be used to develop a more of like a longitudinal learning system from zone zero.

to Zone 3 and then Zone 4.

So let's walk through zone 0 to 2 as a single continuum of increasing complexity. So for zone 0 simulation, the goal is that the participant learn and practice how to perform a task according to a standard practice. An example would be a CPR feedback device

that monitors the quality of the resuscitation by informing the rescuer compression rate and depth and full chest recoil.

Zone one adds an instructor teaching a standard skill. So an example would be a new graduate nurse orientation where there is learning a new skill or a resident to recognize signs and symptoms of sepsis in pediatric patients. So this may involve multiple scenario experiences

or a single simulation and debrief. And the instructors explain what to do and when and how to do it and use the pause principle to guide learning.

Zone 2 adds more of a realistic noise and uninterrupted action, but the goal is still executing a known protocol correctly, such as a septic shock protocol.

Debriefing at this stage is typically a plus delta, which I'll talk about in the debriefing section of the lecture. It is a quick mastery focused feedback. And the learning goal is to really contextualize the clinical skill. So an example would be how to utilize the septic shock

protocol to 1st identify, then manage, and then treat the pediatric patients in septic shock. So this type of mod code has a greater complexity on what to do and when

and how to do a task and involves significant noise. And noise is...

like a competing stimuli, someone interrupting or someone saying that the supply isn't available and such, as well as human interactions such as a parent coming in and asking for an update as the team is resuscitating the patient.

Most importantly, zone 2 scenario involves an uninterrupted action. So what that means is the participants are engaged in a realistic fashion, then exposed to simulation until a pre-planned stimuli or an action or a reaction and a response have played out to the instructor's satisfaction.

So this is probably the most common simulation design that we are probably used to.

Zone 3 is qualitatively different from zone zero to two, not just harder. It exists to produce a double loop learning. And keep in mind that double loop learning is deeper. It questions the assumptions behind the approach itself, why the action is taking place.

which is exactly what a good team debrief after a complex scenario can surface. So this type of simulation is used for purpose of team and system development. So the participants are native, intact teams, and there's no clinical role-playing. So there's no resident playing a role of a nurse or a nurse playing a role of a fellow or resident.

And the learning goal is understanding the team's behavior and its cause and to create a positive change. There is significant noise with equipment difficulties or failures. There's human factors, including like family members, utilizing actors, and competing clinical indication. So for example, if the blood pressure is dropping, suddenly the patient is hypoxic as well. So there's like multiple competing clinical action that needs to happen. And once again, simulation should be run uninterrupted. The simulation session must elicit

authentic behaviors as a raw material for the subsequent debriefing after the simulation ends. I also like to once again mention that there should be no role-playing. These are actual people who are working together, facing a full fidelity, uninterrupted crisis.

The point of this Sim Zone 3 simulation isn't a correct save, like, hey, we finally got Ross back. We did what we're supposed to do. Instead, it's more generating an authentic team behavior that a skill facilitator can then use in a debrief to surface assumptions driving the team's dynamic.

So once again, these are the type of simulation we can utilize in pediatric education.

In this figure, we have zone zero, the auto feedback, zone one, foundational

instruction, zone 2, acute situation instruction, and zone 3, team and system development.

The learner in zone 0 to 1 is individualized learners versus zone 2 is more of a partial team and zone 3 is a full native team. The goals including learning, the goal includes learning procedural skills, developing proficiency for zone 0 to 2, versus Zone 3 is more building a shared understanding, including why and creating an innovative solutions, creating innovative solutions. So the clinical noise and signal becomes louder as we go up in the zones, with Zone 3 having clinical signal that are complex and embedded and in a clinical context and the noise becomes more and more authentic distractions.

And as a debriefer, zone one is more of a pause and correct, and zone 2 onwards being more uninterrupted actions with post-event debriefing. Zone one and two involves the debriefer or the instructor providing mastery feedback. and teaching versus zone 3 is where the facilitator guides positive reflection and then development.

An example of a zone 0 is an auto feedback skills practice, virtual reality skills practice. And zone one is more procedural skills workshops and clinical orientation. And zone 3 is mock codes and acute simulation training. And zone 3 ends up becoming crisis team

teaching, development, cross-specialty system development, and human factors development. So the way we would use this, that I use this in my education curriculum is that for zone one, this would be more during like intern orientation. or a first year fellowship orientation. And then when it comes to monthly mock codes or monthly simulations that I do, it would be more of a zone 2. When it comes to ensuring that our nurses, our faculty, our trainees, our are refreshing their skills in CPR. We utilize Zone Zero, a model, like a feedback model, and we'll just like bring it across to different folks and then have them practice their CPR.

So the take home point for my last section is that good simulation design is an accidental. Zone 0 to 2 build single loop mastery of a known skill. And zone 3 creates a double loop team insight that debriefing turns into a lasting challenge.

Okay, so simulation isn't only for an individual skill building. It also operates at a system level that could be a great QI initiative, as well as a great opportunity for people to do projects and submit them for presentations.

All right, so how do we use simulation to improve care we're providing for the

patients? One category is QI simulation using any of the zones zero to three. The simulation session provides an opportunity to explore diagnostic or clinical reasoning at an individual or team level.

The outcome could feed directly into a measurable QI project for our trainees.

Now, the second category is diagnostic or it's also known as translational simulation.

This is done by zone 3. This type of is more of a complex situation focusing on learning about the system. It provides an opportunity to co-brief with the frontline staff. The outcome could refine the system.

Both of these type of simulation have a shared goal. It converts rehearsal into a safer, better care. And both are testable, repeatable, and comes with a low risk, especially for the patients. Both type of simulations depend on strong debriefing as well.

So one of the ways I merged my love for simulation and my role as a medical director is utilizing diagnostic or translational simulation. So I love doing in situ simulation or AKA mock codes, which is a simulation run in a real clinical unit. We're using the same team.

same equipment and same workflow, not at the simulation center. It also, it captures system complexity that is, that just like a sim center cannot. This includes like real handoff, real location, and also real interruptions.

And most importantly, insight to simulation creates a safe sandbox where problems can surface during these rehearsals instead of in a real patient encounter.

And simulation can be used to identify and fix system, fix system level problems. So many of the performance failures are often not due to like individual lack of skill or knowledge. And A diagnostic sim or translational sims allows to see the system.

in action. So an examples of system level breakdowns include like communication barriers, maybe a poor layout or an equipment access. For example, the Zoll is way down the hallway or maybe the code card is just not available.

were at a certain unit, or there's like a role confusion under stress, or just the process does not function as expected under pressure.

So this is a sample of a repeatable pathway QI team can flow through a project. So we can start, number one, with a real problem. So target an area with a known safety issue or performance variability.

For example, like there is delayed stroke alerts or complex NICU transfers or postpartum hemorrhage. We actually have a high risk fetal department where these high risk moms are coming into a children's hospital. And if she has a situation where there's a code event, like how can we make sure that we can triage

this mom appropriately instead of coming to Children's Hospital ER? How do we effectively in a timely fashion transfer them over to Hatzenbiler, which is the birthing center at a different building. So anywhere where the data shows a concerning trend. And #2, run insight to simulation. So simulate the event in a real care environment with the real team.

So for example, the project that I was talking about, what we're planning on doing is we're able to create a protocol and one of the days we're going, our plan is to make it into just a regular clinic day and have an actor come in and have some type of acute respiratory response, and then we'll call a rapid code and then see how that plays out. So see how, observe how the system responses, not just how like the individual perform. This once again, this is not to test out individual knowledge, but more like the system itself. And #3,

Identify latent safety threats. So use trained observers to spot system level issue. Is there a poor unit layout? Is there a task redundancy? Or maybe there's an unspoken confusion and miscommunication. Are the call numbers available so that someone who's covering can easily

spot the escalation protocol. Number 4, co-debrief with the frontline staff. So skip down the top-down analysis, but instead invite every role in the room to discuss what worked, what didn't, and what needs to change from their own perspective.

And then redefine the system, adjust workflows, policies, or the actual physical environment. Then redo the simulation to test whether the new design actually works. And then lastly, measure and repeat. So track performance indicators. So the response time, communication clarity,

time to medication, and then repeat simulation to reinforce the change.

So these numbers represent a very tangible QI project result showing changes in outcome measures. So for example, there's a decrease from three to one per year serious events, safety events per year after simulation-based LST programs. Another study showed a decrease in 74%

and central line associated bloodstream infection rates following simulation-based training for the nursing staff, and 27 to 13 minute door-to-needle time for stroke care before versus after simulation process improvement.

So section 3 for a take-home message is simulation isn't only just a learning tool. It is a diagnostic instrument for a system itself, turning rehearsals into identified risk, tested fixes, and measurable improvement.

So the last part of my talk, in my opinion, is the most important part. Everything in

section one, two, and three depends on what happens in debrief after the simulation ends.

So without debriefing, simulation is just a rehearsal. And studies show at least 25% performance improvement associated with facilitated debriefing. And this is why a facilitator skill matters as much as a scenario design.

So for me, after being part of many very scary mock codes as a resident and a PICU fellow, I am always very purposeful in creating a safe learning environment, especially based on theory of psychological safety.

Dr. Amy Edmondson's theory of psychological safety originated from studying relationship between error making and teamwork in hospitals. So the initial hypothesis was that the more effective teams made fewer mistakes. However, during debriefing, the teams, what they noticed is the teams who reported better teamwork seem to experience more errors. And the explanation for this pattern was that a better team might be more willing to report their mistakes and able to conduct follow-up research to explore that hypothesis.

When I run simulation and debrief, I set a clear objective and ground rules, especially during the pre-brief section. This includes reviewing the basic assumptions with the participants. I say, all right, we believe that everyone participating in activities at the simulation

is intelligent, capable, and cares about doing their best and wants to improve. I also asked the participants to keep what happened and what was discussed in the session confidential. Not only is this to have like an element of surprise, so I asked the residents not to talk about the type of case with the following group.

But most importantly, out of respect for our peers, not to discuss what happened in the case, including like questions that was asked, maybe a mistake that happened, or just like notable actions by their peers.

So why is psychological safety important, especially when it comes to, as like faculty or as a debriefer, trying to provide a lasting impact in our trainees? It leads to, number one, team members feeling more engaged and motivated.

It allows the participants to feel that their contributions matter and what they're able to speak up without fear or retribution. It also leads to a better decision making.

People feel more comfortable voicing their opinions and concerns, which leads to a more diverse range of perspectives. And lastly,

It fosters a culture of continuous learning and improvement as a team members feel comfortable sharing their mistakes and learning from them.

A foundation for a good debriefing requires a shared mental model between the debriefer and the participant of what happened before really diving into analyzing why. So it is important to skip, instead of like skipping straight into the analysis, before the facts can cause more like confusion and more defensiveness by the people who are part of the simulation. And it is more important to use like more open-ended questions like, like I've noticed such and such happen. Can you tell me more about it? Or tell me what you were thinking when you did this action. Or more of like a strategic, uncomfortable silence. And attention to more like non-verbal cues. So looking at what the body, what the participants, like their body language is showing, especially during simulation and also maybe during debriefing as well.

The facilitator's job is to draw reflection and not deliver a lecture.

So, as a facilitator, there are multiple approaches to debriefing, but most importantly, you should align with the learner's needs and goals of the simulation.

So the first one is Plus Delta. It is the simplest tool in the toolkit of debriefing. It's an easier skill to master for new facilitators as well. And it is often used in single loop learning from zone zero to two. It is organized around what went well, what can be improved, and questioning, and following by a directive feedback to guide that change or that development. It is useful when the time is short, and maybe if a group is large, there is a lower facilitator burden. Plus Delta also builds a happy

bit of more like a reflective practice, like what can I do better next time?

The second type of debriefing framework, this is more like complex debriefing, is called debriefing with good judgment. It is more complex, but this is what we should all work to achieve as a facilitator. And truth be told, even as a faculty, with trainees that were taken under. So this practice was developed at the Center of Medical Simulation, which is the Boston program that provides a fantastic simulation course, which I'll talk about at the end. And debriefing with good judgment. combines rigorous and honest feedback with genuine curiosity about the learner's frame.

The core technique is advocacy inquiry. So state your observation and your concern, which is the advocacy part, and genuinely ask about the reasoning behind the action, which is the inquiry part. An example would be, hey, I noticed that you paused before calling for help. I'm just curious about what's going on through your mind at that moment.

And it just like makes that technique concrete. Lastly, there's no such thing as a non-judgmental debriefing, okay? Judgment is inevitable as a debriefer, but the goal is just being transparent about it.

So let's refer back to the double loop learning process that was discussed in the designing simulation section. So people make sense of external stimuli through our own internal cognitive frames and our own internal images of external reality.

These frames are called frames of reference or mental models. And these frames are invisible, but inferible. It's like, for example, like how I grew up or what my beliefs are and what my experiences are. They're in the mind of trainees and instructors.

Frame and turn shape the actions people take.

And clinical frames and social interpersonal frames can play a crucial role in medical decision making.

In simulation scenarios, actions including speech is observable for the facilitator, like what they say or how they said it, or what wasn't said. And most results, the vital signs, the order, chaos are also observable. But what is not observable per person debriefing the scenario is the frames of the individual participants.

And ultimately, a trained facilitator should identify and highlight the frame in order to make a lasting educational impact.

So a goal of a debriefing in a medical simulation is facilitating a more of a reflective practice. So the participants and the facilitator should learn to scrutinize taking for granted assumptions and mental routines through debriefing and through debriefing participating

Pins are able to self-correct and improve their professional skills by editing or altering their frame.

And once again, the goal of debriefing for the facilitator is to challenge the participants to create new frames. And this idea of debriefing with good judgment is actually what I use quite a lot in the ICU when I talk to my residents or my fellows about different new skills that they're learning, including

how to talk to parents about clinical status of their child or how to break bad news or, and such. So just, it's a different type of teaching method that I always try to utilize. So let's talk about a sample scenario.

a sample scenario and how it plays into how we can utilize debriefing with good judgment. So in a scenario, a facilitator observes that a PICU fellow manages an unresponsive patient in a setting where the actual bag mask is not readily available. The patient becomes hypoxic.

and has an acute hypoxic cardiac arrest. So, the frame that the debriefer needs to understand is that the PICU fellow only resuscitates or is known to believe that using a device which they're most familiar with. And what is observable by everybody else is the action by the debriefer is that trainee searches relentlessly for the bag mask ventilation instead of also intervening when the patient becomes hypoxic. And the result that was seen by the debriefer patient desaturates, there's changes in the cardiac rhythm, and there's also confusions for the nurses and the code team.

The action makes perfect sense, the frame, when the instructor understands that the trainee held a belief or a frame that basic life support cannot be achieved without a bag mask and mouth to mouth was just out of the question. And passive oxygen was something that they have yet to learn. So during the debriefing part, It is the instructor's job in debriefing to help trainee bring these frames to surface and analyze the impact on action and craft new frames and actions.

PEARLS is another framework that is often used in debriefing. It stands for Promoting Excellence and Reflective Learning and Simulation.

So what this is, is after a simulation session is completed, the first part is the introduction part. So setting the scene by orientation to the debriefing. So for example, what I like to do is after the simulation is done, I say, okay, the simulation is completed, and then I do the quick pre-briefing and say, okay, we're going to debrief the scenario. Sometimes I ask the participants to say, hey, give me a one-liner as to what the scenario was so everyone could be on the same page.

The second part to this is the reaction part. So just clearing the air and then setting the stage for discussion. That uncomfortable feeling or the feeling that the trainees have, just let it out and then let's just talk about it. So this includes learners sharing their initial feelings.

And often I, after a mock code, I would, I get, oh, how did that go? Let's just talk about what you guys are thinking right now. And oftentimes our trainees would be like, oh, that was scary, or I didn't like that, or I don't think I did a good job. So just talking about the emotional response to simulation and just get it out of the. get it out into the open.

And then the next part is really the understanding by the debriefer and analyzing and applying. So this includes the description part, which is exploring, like exploring the

trainee's perspective on a scenario event, and then discussing and teaching. So helping move the trainees to new perspective, new frames, and understanding their own reaction and creating new skills. And then generalizing and applying lessons learned to real clinical settings.

Lastly, the summary includes distilling the lesson learned for future use. And what was the major take away that was talked about during the sim session as a person who created the simulation as well as the take away points that was elicited during the debriefing?

The last take home of this section is that no single framework is correct. Effective do reefers deliberately match the method of pearls or advocacy inquiry or plus delta or team focus or system focus to their learners, their time and their goal.

So given that, as you can tell, I'm a lover of debriefing, this is a summary of my talk. So the major 4 takeaways from this lecture is that pediatrics is a rare high acuity event that makes simulation necessary, not optional.

And the evidence now links to real patient outcomes. Secondly, good simulation design is deliberate, not accidental, and matching the sim zones and whether you want to do a single loop skill mastery or a double loop insight to your learning goal. And simulation improves care is at 2 level, not just individual clinical reasoning, but at a system.

level and debriefing is where the actual learning is made. So choose different framework deliberately.

And medical simulation isn't a niche interest. It's A fast-growing subfield. The publication grew more than sevenfold after 2011. And I really hope this talk has inspired folks out there to start simulation-based projects. And especially if I was able to pique interest in any of our residents or fellows, I think I've achieve my goal for this lecture. So often the questions that I guess, the questions that I get asked is, where can I start? And resources for scenarios, there's actual like amazing scenarios that are fully completed with even questionnaires and MedEd portal. There's also resources through Lairdal simulation, scenario cloud.

And even like participating in boot camps out there. For example, I send our senior fellows to Picky Fellow boot camp where when I help facilitate this, the boot camp, we're given scenarios that I also like to use and review as well.

There's now dedicated research infrastructure. The Inspire Network is amazing. It's a bunch of pediatricians who are geeking out on simulation, and it's International

Network for Simulation-based Pediatric Innovation. Also, there's IPSS, International Pediatric Simulation Society. That's very wonderful.

and a great resource too. And if you guys are interested in how do I make, how do I like augment my career in medicine utilizing simulation, I've taken the Center for Medical Simulation course at Boston. And the specific course is Healthcare Simulation Essential Design and Debriefing was an excellent course.

And also I know that Stanford does like an online debriefing course as well, which is excellent. I also tell my fellows that there is medical simulation fellowship programs available. It is a one to two year fellowship programs out there if that is an interest for folks as well.

All right, so thank you for your attention and I'm happy to answer anybody's questions or concerns.



Kamat, Deepak M 45:43

Dr. Kim, thank you very much for that wonderful presentation on simulation in pediatrics. Let's see if anybody has any questions or comments. They can put their questions or comments in the chat or they can unmute themselves and ask the question directly to Dr. Kim.

This is a simple basic question. Do we really need this high fidelity mannequins to run a simulation program? I guess it depends on what you are going to teach, but in general.



Kim, Ji-yeon 46:21

Mhm.

No, I, one of the challenges when it comes to like building a simulation program, or like actually one of the challenges to offer simulation is monitor a resource, right? And these high fidelity simulations are quite expensive and often requires people who are really advocating for the simulation to have that numbers to prove to hospital administration that this is like worth investing in. So no, it really depends on like different sim zones and what you're trying to achieve. Like for example, You could, for example, it really, like an example would be in our ER, our faculty has opted to use like moderate fidelity mannequins. For our PICU, we have one high fidelity mannequin that we could intubate. And that's only because we need like difficult airway and have our fellows like practice. bronchoscopy and intubation, and that's why we use high fidelity simulation. But it

really depends on what the scenario is, and even like a moderate or low fidelity simulator is important. I think it really depends on how well you create the scenario and the participants and the debriefing.

And what I also like to pre-brief for our residents or fellows is that actually even with a high fidelity mannequin, I tell them, hey guys, you know, this is a simulation mannequin. Things like capillary refill or patient responding to you is not going to be realistic. And setting that tone that

It is not going to be like a realistic scenario, but however, let's really play into this.

Let's really dive into this and really pretend that this is like a real patient. And that really, it's like setting that tone in the beginning also helps with the buy-in from the participants as well.



Kamat, Deepak M 48:36

There is a comment by Dr. Lipsitt that so every single area of pediatricist could benefit from simulation, not just ICU.



Kim, Ji-yeon 48:46

Absolutely. Yeah, that is totally true. I think I just have a lens of an ICU physician, but for example, one of, we're doing a simulation day for our PGY2 residents. And one of the cases that we emphasize is let's do a simulation at our outpatient clinic. So Let's, we're doing a case about a respiratory distress on a patient after getting a vaccine. So what is the process for a pediatric resident to stabilize a patient in an outpatient setting, and then who do they call? How do they transfer the patient? And that's more like a system process, system education for residents as well. So I absolutely agree. It's just not the ICU. And I apologize, yeah, it's coming from like my ICU lens, but we try to make sure that we also address our pediatric residents, the hospitalists and the ER as well.



Kamat, Deepak M 49:59

Any other questions, comments for Doctor Kim?



Garcia-Canet, Cesar E 50:05

Yes, I have a question. Hi there. My name is is Cesar Garcia and I'm one of the PICU docs here as well as one of the pediatric palliative care docs.

And I have been working since the end, since the spring with the PICU fellows regarding a communications SIM lab where we go through case

 **Kim, Ji-yeon** 50:37
Mhm, mhm.

 **Garcia-Canet, Cesar E** 50:42
on, for example, how to deliver bad news, how to lead a family meeting, how to have difficult conversations with parents and children, and so on and so forth. So, it's kind of in the beginning stages.

 **Kim, Ji-yeon** 50:44
Mhm.

 **Garcia-Canet, Cesar E** 51:00
And any advice from your end on tips or tricks that either you've seen or you've used specifically for specifically for communication?

 **Kim, Ji-yeon** 51:17
That's excellent. There is.
So delivering bad news is one of the cases that we do for the PICU Senior Boot Camp, which is offered by, which is organized actually by our Johns Hopkins folks. And they have like,
They have Midwest one and West Coast one. And I've participated, I wasn't part of building that scenario, but I have participated in that. And what I've noticed and during, while I was facilitating the debriefing is
Having more of like a one-on-one really helped. So for example, we had an actor, an actor as a parent, and then we had a debriefer, and then we had a single fellow debrief or providing like that communication piece and practicing that communication piece.
And that really intimate setting allowed the fellow to really experience what the actor was responding and how to navigate communication piece and really open up to how they felt and figuring what the frame was during the debriefing. So that unfortunately, it does take a lot of effort to, and a lot of time,

to individualize having that individual session, but I did notice that the individual, the intimate piece was very helpful specifically for delivering bad news.



Garcia-Canet, Cesar E 52:59

Great.



Kamat, Deepak M 53:00

Thank you, Doctor Kim. Any other questions, comments?

I don't see any. Thank you, Dr. Kim, for that wonderful presentation. Thank you all for attending this morning's round round. We'll see you next Friday at 7.30 in the morning. Thank you all and have a wonderful weekend. Thanks again. Thank you.



Kim, Ji-yeon 53:22

Thank you.

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