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2018 NCSBN APRN Roundtable - The Role of the RN and APRN in Diagnosis Video Transcript

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Event

2018 NCSBN APRN Roundtable

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Presenter

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- [Mark] Good morning, everybody. It's a real pleasure to be here. I usually talk to doctors, but I'm really honored to be speaking with you today, and I hope this is the first of many speaking engagements with nursing staff, we have a lot in common. I'm here on behalf of our Society to Improve Diagnosis in Medicine.

We're focused on getting rid of diagnostic errors. Our vision is someday we'll have a world where nobody is harmed from these diagnostic errors. We think diagnosis should be accurate, timely, and above all, safe. So, raise your hand if you know who this is. I saw one almost, almost.

One back there? Okay, maybe one or two people in the room. Well, this is, if we're all lucky, the most influential person in the history of nursing education since Florence Nightingale. This is Thomas Duncan, the first person to have Ebola infection in the United States.

He presented to a hospital in Texas with symptoms of fever and headache, GI symptoms. The nurse who interviewed him got a history that had recently traveled to an endemic region in Africa, put that in her note, but when he was seen by the physician, the physician didn't get that travel history, didn't talk to the nurse, didn't read her note, sent him home with a diagnosis of sinusitis.

He returned two weeks later, died of his Ebola infection, and in the meantime, exposed 24 people to the infection. This was a diagnostic error that happened because the nurse was not an effective part of the diagnostic team, and that's what we're trying to change. So here's what I'd like to accomplish, I'd like to talk over with you how likely it is that there will be a diagnostic error, why do these happen, and to understand that, we'll have to back up a little bit and talk about how we come up with a diagnosis, how do doctors and nurses think, and what can we do about all this?

And most importantly, what is the role of nurses, RNs, and APRNs in improving the diagnostic process? So let me tell you about a different case of diagnostic error so you'll have the sense of what we're talking about here. This was a famous case in New York City, it was all over the newspapers, and not because it

was a diagnostic error, it was because of Sully, you remember Sully, the pilot, he landed that plane on the Hudson River?

Well, Rory Staunton was a 12-year-old boy who idolized Sully, heard that story, thought that was the greatest thing since sliced bread, he wanted to grow up and be a pilot. He had written Sully a letter, Sully wrote him back. For his 12th birthday he got a helicopter tour of New York City, but that was not to be. Rory at school one day scraped his arm diving for a ball, and didn't think much more about it.

Three nights later he woke up feverish, vomited, felt sick, the next morning couldn't go to school. His mother succeeded in getting him an appointment at the pediatrician's office, the pediatrician got this story of the fever and the vomiting. You can see the vital signs there, a heart rate of 140, pretty high even for an adolescent. And his skin is described as mottled, so we don't have a picture of Rory's skin, I think, you know, 20 years from now we'll have all sorts of pictures in our medical records.

So this is just a stock picture of mottled skin, you know, livedo reticularis, and it's a sign that something serious is going on with your circulatory system. At any rate, with his history of vomiting and fever, the pediatrician thought he had viral gastroenteritis, perfectly reasonable diagnosis. But she recognized that he didn't look good and called up the local emergency room, "I'm sending over Rory, he's got gastroenteritis."

So here he is in the ER, same story, same vital signs. There is nothing in the medical record about what his skin looked like, his abdomen was benign as it was in the pediatrician's office. And they said, "Yeah, sure, gastroenteritis, that's fine." They gave him some saline, some medication for nausea and sent him home.

After he left, and who knows if it would have made any difference, the results of his CBC came back, and he's got a very mild elevation of his white cell count, but kind of a striking number of bands, 53% bands is, like, whoa, crazy, very high, and would really point you more towards a bacterial thing than a viral thing. He's at home on Friday, worse, can't get off the couch.

The parents said they have never seen anybody's skin look like this, it's red and blue and white and splotchy. They tried to get back in touch with the pediatrician, did not succeed, somebody told them, "Just take some Tylenol." Saturday they couldn't stand it anymore, they took him back to the emergency room where he was immediately admitted to the ICU, and died the next day of streptococcal sepsis from that scrape he got on his arm, which is probably what he had all along.

So a very sad story of diagnostic error, but the features of what happened in this story play out over and over again. Everything we know about diagnostic error, kind of a blessing for us, was summarized in this wonderful report that came out in 2015 from the National Academy of Medicine on *Improving Diagnosis in Health Care*.

So this was a major report that was meant to supplement *To Err Is Human* from 1999, and focused exactly on diagnostic error and what we know about this. The problem is, the National Academy has no enforcement arm, all it does is make reports. And if we ever want to improve diagnosis, it means we have to change what we do in our practice, we have to change what doctors do and nurses do and health organizations do, what patients do.

And that's why I'm here, what each of us can do and needs to do to improve the diagnostic practice, we each can do something. The National Academy gave us a new definition of diagnostic error, failure to establish an accurate and timely explanation of the patient's problem and communicating it.

The communication phrase was very controversial, you know, people were saying, "Well, that's not part of the process." But I'm so glad it's in there, because if you look at the surveys of our health care organizations, this is where we all kind of fail, we all think we're great communicators, and then you get those surveys back and, you know, we're really not. So, very important. And I've highlighted a few things there, so what does "accurate" mean?

Used to be enough to say you had lung cancer, now you need to know the genome type. What does "timely" mean? We have almost no concept in medicine of how long it should take to diagnose something. So how long should it take to diagnose sepsis or cancer or any disease, there're really no guidelines out there on that at all.

And "patient" is highlighted in red, there are three or four other definitions of diagnostic error. I have one, Gordon Schiff has one, but this is the only one that's got the patient highlighted in there a couple of times. This is all about the patient, getting it right for patients. So, a quick little survey, take off your professional hat and think of yourself as a person, a family member.

Does one of these three things apply to you or your family? Can you recall when you were given a diagnosis that was just flat-out wrong, or a diagnosis that should have been made much earlier? Or is there somebody in your family with a medical condition that remains undiagnosed, they're still symptomatic? Anybody meet one of those three criteria?

Yeah, yeah, it's over half the room. And that's the problem, these diagnostic errors are just so common. A survey done by the National Patient Safety Foundation published last year reported that one in five Americans has experience with a medical error, and the most common reason was a diagnostic error. But we think the incidence is actually much higher than that.

Certainly, it's the number one cause for a malpractice claim in this country. This is data from CRICO, the insurance arm of the Harvard teaching hospitals, but they also collect cases from all around the country. So they did a five-year lookback, looking at thousands of cases, the number one reason for a malpractice claim, diagnostic error, and the most dollars spent on it. This is some of the research data that we have about diagnostic error and its incidence, it's been studied a lot in the visual specialties, so, radiology, pathology, dermatology.

In actual practice, 2% to 5% is the error rate. In internal medicine and pediatrics, you know, frontline care, probably 10% to 15%. So 1 in 10 diagnoses we think is wrong. And we really have almost no data on the medical specialties, they probably do much better than we do in internal medicine but we don't know. Opinion, there is a famous guy from Chicago named Arthur L.

Stein. Arthur is a cognitive scientist, and he wanted to study how doctors think, so he gave them scenarios, dozens of them, and had them read through and explain how they were coming up with the diagnosis. So after doing this for 20 years, it was his entire professional career, Arthur concluded that we

are wrong 10% to 15% of the time.

And when we first saw that number we said, "That just can't be, that doesn't comport with my experience practicing medicine." But the more you stay in this field and the more articles you read and the more stories you hear, I'm now pretty convinced that Arthur had it correct. I think the most reliable data comes from studies using standardized patients. So these are like the secret shoppers, they go out into practices in the community with classic symptoms and presentations of COPD or rheumatoid arthritis, and the doctors get it right 87% of the time, they got it wrong 13% of the time.

Case studies, there are hundreds of these. Whatever is your favorite disease you can find a case study that has looked back to see how we do, and they're all scary bad, the diagnosis is delayed 10%, 20%, 30%, 50% of the time in every single one of these studies. The gold standard is autopsies which we don't do anymore in the United States, but they are still done routinely in some areas and in some countries, and the incidence of major, unexpected findings has really not changed very much over the decades despite all our sophisticated stuff, major discrepancies 10%, 20%, 30% of the time.

In ambulatory care, of a colleague of ours, Hardeep Singh, did a study a couple of years ago with just using chart reviews, concluded that 1 in 20 people attending a primary care clinic will have a diagnostic error every year, every year, 1 in 20 chance. This is what it adds up to, in the U.S., we believe there may be 40,000 to 80,000 deaths a year from diagnostic error, which would put it squarely in the top 10 causes of death.

And if you do the math and divide by the number of hospitals, it means that every one of our hospitals about 10 deaths a year from diagnostic error, and patients harmed every day in our hospitals and clinics. This was the conclusion from the National Academy, it used to be called the Institute of Medicine, it's likely that most of us will experience at least one diagnostic error in our lifetime, and sometimes with devastating consequences.

So, they are very common, but let me just point out that what I've been showing you are all research studies, and estimates, and opinions. I don't really know what my own rate of diagnostic error is, I don't know any of your rates in your hospitals, there isn't a single health care organization in the country that's measuring the incidence of diagnostic error right now, it's hard to do and nobody's tackled that.

Where do they happen? This is, again, data from CRICO. The biggest chunk of the pie, ambulatory care, which makes sense because that's where most medical care is delivered. But plenty of diagnostic errors on the inpatient wards, and of course, in the ER. Anybody working in emergency room? Yes, so you know what we're talking about, here is the petri dish for diagnostic errors, it's the worst possible environment to diagnose somebody, there's pressure of time there, you don't know the patient, there's uncertainty, distractions, not a great place for diagnosis.

And we've also learned that it's not just the rare conditions, that's what I thought it would be when I first got into this. And for sure if you've got Ebola infection, people are going to have a hard time diagnosing that, but by far the most common causes of diagnostic error, the most diseases most commonly represented are common ones, it's cancer, it's cardiovascular disease, it's infections, anemia, asthma.

Okay, why do these happen? What is the cause of diagnostic error? And to understand that, we have to

understand the system and how people proceed through it. This is kind of the big picture that I use when I'm looking at this, I have a...this is my definition in the middle of a diagnostic error, it's one that was wrong, missed, should have been made much earlier.

And by and large, most of them result from some breakdown in the diagnostic process, and Gordy has a wonderful study on that, that shows that we don't do a great job with any one of those steps, we're not perfect with getting the history, missings in the physical exam, we have trouble putting things together. A few of them result from what I call "no fault" conditions, and these are patients where things are just so nonspecific that nobody can figure out what's going on, or the patient doesn't follow up with having their test done, whatever.

And it's easy to ignore these, but these are actually the future of medicine, this is how we're going to get better. Someday we're going to have tests that allow us to pick things up at an earlier stage where it's still too nonspecific to diagnose it from the symptoms. At any rate, here's your diagnostic error, and what happens? Well, 99.999% of the time nothing, you're fine, and thank goodness, you know, you got better anyway, or the treatment I gave you worked for whatever you had even though I didn't know what you had.

But there's some tiny fraction that results in harm, and if you multiply that by the tens of millions of diagnoses being made every day in our country, that's where those very high numbers of patients who are harmed by diagnostic error comes from. And, diagnosis is just so hard, it just really is, I think it's the most complicated, cognitive task that humans face, because there is so much variability at every step and every part of the process, it involves our patients and our diagnosticians, and our health care systems that are getting more complex by the day.

There's just complexity and uncertainty everywhere in the diagnostic process. And how many diseases are there, for goodness' sakes? If you look at the ICD system, there's over 12,000. The National Library of Medicine has their own way of counting, they say there's over 8,000 diseases. And it's fun, you can go to the National Library site and see the new diseases that are added every year.

How good am I going to be at diagnosing a disease that just got added last year, that I've never seen before, I may never have heard of it? So, if there is a diagnostic error, how do we understand what happened? This is the approach I use, and if you're involved in root cause analyses, you can use this. So here's Rory Staunton going along his clinical course, here's the diagnostic error, it's perfectly appropriate to say, "Mark, why didn't you think of sepsis when you saw him in clinic?"

And it gets at the cognitive causes of diagnostic error. And these are the ones that are most interesting to me because this is what's under my control, as a clinician I should be able to, you know, do a good job with diagnosis. But the Institute of Medicine would actually say, "You know, don't bother with the sharp end, if you can fix something in the blunt end, you've really done the world a favor because you fixed something that going forward hopefully will prevent a recurrence of that same kind of problem."

And we're talking about all the system factors that contribute to performance, so it's communication, and coordination, and training, and policies, and procedures, on and on and on. We looked at 100 cases of diagnostic error and trying to understand how many had cognitive problems and how many had system-related problems. And this is what we found, the biggest chunk of the pie were cases where there were

both factors easily identified.

Or if you ask how often is there a cognitive problem? It's the sum of the blue and the yellow. So, like, two thirds of the time there's a cognitive issue. How often is there system problem? It's the sum of blue and red. So three quarters of the time there is a system problem. And every once in a while there is one of those no-fault things going on.

And if you've been practicing for any length of time, all the things on this list will be familiar to you. So in terms of the system problems that contribute to diagnostic error, there's just so many ways that our systems can break down. We all know about problems with communication, for example, lab tests that just, like, fall between the cracks, you've seen every single one of these things.

The phenomenon that was new to me was this one at the bottom, this business of normalization of deviance, I didn't know what that was. But it was going on just as I was learning about this at my own hospital, I worked at a kind of a small VA hospital, and on nights and weekends we had no radiologist to read the films. So if you came into my ER with shortness of breath, your X-ray was read by a moonlighting, endocrinology fellow.

And if you had a knife in your chest, he would have seen it but every year we had two or three diagnostic errors where the radiologist would come in on Monday and say, "Hey, you missed this pneumothorax," or whatever it was. We knew that we didn't have a radiologist, we were told we couldn't afford to have a radiologist, and we just got used to it, that was just the way it was.

And that's how we all practice, we all run into things every week that annoy us, that we say, "Oh, that shouldn't be that way." And there's just a thousand of them, and we just, we know we just don't have time to bring them to attention. So, big issue. Let's go back to the cognitive things because they're a little harder to understand.

So why are there cognitive errors? It turns out that it's really not in the cases we looked at a problem with knowledge. So, medical school works, nursing school works, the problem, the huge chunk of the pie is in putting it all together, if you have all the facts, coming up with the correct diagnosis. And it gets to this question, how do doctors think and nurses?

The question that Arthur L. Stein studied his entire life. And, Arthur didn't answer the question but he simplified it a little bit because... You know, he's saying to himself, diagnosis is so important, doctors and nurses, they want to get it right.

And he was sure that when we're doing this diagnosis business we're really careful, and when we hear a story we're going to think about all the possible conditions it could be, make a careful differential diagnosis. And you know what, that is not what Arthur saw, he did not see that. This is what he saw. So let's say we're in clinic, and here comes a patient who, at springtime, he was cleaning out his yard last weekend between snowstorms, and now a week later he's got this really itchy, wicked rash on his legs, where they were exposed when he was wearing his shorts, and it's vesicular, and it's in linear streaks, so what does this patient have?

Help me out here. Everybody okay with poison ivy? Yeah, and probably no dermatologists in the crowd,

but we can all make this diagnosis. And how do we do that? Well, we just recognize it, and that's what diagnosis is all about, and that's the chief lesson of Arthur L. Stein's 20 years of studying this, it's the business of recognition.

So this is the current paradigm for how doctors and nurses think, and it's the exact same paradigm for how we all solve every problem in life. When we're faced with a new problem, there is a little part of your brain, the recognition center, that lights up, and if you recognize what's going on, you, within milliseconds, know the answer, you know the diagnosis.

And this is the top pathway, it's called system one by cognitive scientists. And it's wonderful, it's effortless, it's fast, it's how experts think, and it's almost always correct. And we've learned to trust it because it gets us through our everyday lives so well.

If we don't recognize what's going on, you have to stop and think, and that's system two, that's when you have to deliberately, rationally consider what might be going on, and we can all do that but we don't like to do that, it's effortful. So, quick test, what's that thing in the upper-left? Telephone, right? We recognize it. Even though none of us had a phone that was quite that ugly or maybe, you know, not that color, but it's got the features of a phone.

We know that's a telephone, we recognize it. Upper-right? Can opener. Lower-right? We have to stop and think, that's a can opener, too. Lower-left? -

[Male] [Inaudible].

- I don't know, I don't even know what that is. I think it's a modem. Anyway, this is system one and system two, we recognize things or we don't. So Arthur L. Stein would tell us, the way we made that diagnosis of poison ivy was something called the availability heuristic, which is a fancy way for saying we recognize it, it was available to us. And why is this a good thing? It's fast.

It's effortless. It approximates the base rate of disease in our population, which is why it's so often correct. In other words, the vast majority of people who have those linear, vesicular, itchy eruptions on exposed part of their skins have contact with poison ivy. But, and there's a but for every single one of these little, automatic, subconscious things there are major drawbacks, we did not stop to make a differential diagnosis, we didn't do that.

Our experience may be limited, maybe we hadn't seen some of the other things that were on that list. And just because we think it's right doesn't mean that it is right. And this was a tough concept for me. But this is a wonderful book, I would recommend that you read, or there's a TED Talk that you can look at by Kathryn Schulz, it's called on "Being Wrong."

And Kathryn asks this question, what does it feel like to be wrong about something? And the first time you hear that question, you know, you say, "I don't want to be wrong, my colleagues will think less of me, my patients won't trust me. It's uncomfortable. It's embarrassing." And Kathryn says, "Nope, what it feels like to be wrong is exactly what it feels like to be right, because until somebody proves to you that you're wrong you think you're right."

That's how our brains work, it's kind of crazy. So if we don't get feedback we think we're right, we think we made the right diagnosis, and that's where we are in medicine today, we make all these diagnoses, our patients go on their business. And if there was a major diagnostic error, what do you think the odds are they would come back and tell you? Zero. They will find some other practitioner or some other health care system.

What do you think's more common? R as the first letter of a word or the third? First, third? - [Audience] Third.

- Okay, the answer is third, it's three or four times more common, and there are some examples here. The first time I saw this, I said, "First," because it was easier for me to think of words that start with R. Roll over red rover was my typing exercise. This is an example of a heuristic, and how it can be wrong. If you look in Wikipedia, there are now 150 of these heuristic biases that you can read about, it's quite amazing, and new ones are being added by the week.

And it's not only cognitive biases, we're subject to what they call affective bias. So if a patient comes into our ER who's alcoholic, that we've seen 40 times before and is obnoxious and spits in our face, how good are we going to be at diagnosing that patient? Not maybe as good as the next patient who we know and like.

So, the point that I'm making is that a lot of what we do in diagnosis is based on intuition, the subconscious things. And is that okay? Is that a good thing or a bad thing? And I think it's really one of the critical questions facing us. So here's one for you. So we've all done a lot of multiple choice tests, think back to the last one that you did, what advice did you get?

Trust your intuition, or when you're done with the test go back and check the answers you weren't sure about? Trust your intuition? Go back? Fifty-fifty. Okay, so we thought this was a pretty good analogy to the problem in diagnosis, so we did a study with the people who give the boards in internal medicine, so these are third-year residents, they're as smart as they're ever going to be, and if they pass this test...

Yeah, really. If they pass this test, they'll be board-certified, and we looked at every single question about diagnosis by every single person taking the test, so we had 80,000 data points. And this is what we found, it's all done on the computer, so you can see who does what. Sometimes if they went back they changed a wrong answer to another wrong answer, it didn't help them, it didn't hurt them, but they were twice as likely to change a wrong answer to a right answer as vice versa.

In other words, going back helped them, they got more questions right, they got a better score on the test when they went back and thought about the questions they weren't sure about. And silly me I had not done my homework, but this exact same type of study has been done a half a dozen times over the last century and some of these are nurse exams, some physicians exam, they're all high-stakes exams.

And everybody found exactly the same thing, it's so unusual to replicate things in science. But here it is, we all found that you're twice as likely to change a wrong answer to a right answer. So what's the lesson? Well, intuition is swell, it gets us through our life, it got us through most of that test. But you have a little inkling that something's off, I think it's time well spent to go back and think about what might be a better answer.

So how do we think? Well, by and large we use our intuition and it's nice but it's not perfect, there's many things that detract from it. And I would propose to you that diagnosis is too important a process to rely on intuition. So now you know how doctors and nurses and all of us think, and we can go back and see what happened to Rory Staunton.

So let's think about the system things down on the bottom there, well, it would have been great if that lab results were back. I was disappointed in the plan for follow-up, I think if the family had a better instruction set on how to get back into the medical care system, there might have been a better outcome. And, the place where this occurred to their credit did a really nice root cause analysis, and they said, "Nobody's leaving or ER now until all their test results are back."

And I think that's fantastic, so they addressed something in that blunt system end that's going to make the world safer. But, they didn't say, "Hey, I wonder if this is happening in our ER every day." No, they do it as a one-off event that will never happen again. So that was disappointing as well. How about the cognitive things?

Well, knowledge was okay, everybody knows about sepsis. Data collection could have been better with regard to that CBC. The big problem was in putting it all together, I think they had enough information to suspect the diagnosis of sepsis. But two things befell them that are common, and we see over and over again in cases of diagnostic error, they were in the wrong context, they thought it was a GI case.

And if you're throwing up, you have a GI problem, and if you're in a GI context, gastroenteritis is a great diagnosis. But it wasn't a GI thing, it was a systemic infection thing. And premature closure, it's kind of fancy words for you just stop thinking. You know, the minute you've solved the puzzle, you're happy, and gastroenteritis explained almost all the pieces of the puzzle except that livedo reticularis.

So yeah, a fever, vomiting, great, we don't have to make a differential diagnosis. There was no differential diagnosis in the pediatrician's chart or in the hospital record. And Hardeep Singh, our colleague that I talked about already and the cases he studied, 80% of the time in cases of diagnostic error there's no differential diagnosis in the medical record.

"Yeah, what's a mountain goat doing up here in the cloud bank?" So I collect these horrible jokes about disasters, but if you studied disasters, aviation disasters, any kind of disasters, these context errors are the most common thing that you'll find. So, the pilot thinks they're at 10,000 feet, but they're at 1,000 feet, about to crash into the mountain.

They think there's no ice on the wings, but there is. They think they have enough gas to get back to the airport, but they don't. They think it's a GI case, but it isn't. So these context errors are very common. What's that symbol in the middle? Okay, it's a B. No, it's a 13.

Well, it's the exact same symbol, but the context is different. One of the pioneers in our field, Pat Croskerry, has a paper called Context Is Everything, and he writes about diagnostic error. And if you're not in the right context you do not have a chance of making the correct diagnosis, so it's a real challenge to make sure we're in the right context, although we are very good at that, we are really good at it.

Have you ever had the experience, you come out of the movie and you're looking for your car, and you walk up to a car and you're trying to get in but it's not your car? That's a context error. Okay, what's premature closure? Anybody have a dog? Any dog people? Yeah, lots of dog people. I am guessing you did not go look at five litters, just guessing.

We don't do that, you know, we go look at one litter and we fall in love with a puppy, and we're done, that's how we are as humans. Herbert Simon got a Nobel Prize for this concept in the field of economics, he called it satisficing. It's a great word, satisficing. And that's what we do as humans. It's the opposite of optimizing.

So instead of going to look at five litters, instead of making the differential diagnosis, we are happy with the first answer that comes to mind that makes sense, we satisfice instead of optimize. And that's just how we are, we are humans, and that's how doctors and nurses are in the diagnostic process. We are humans and we satisfice, and we are subject to context errors.

Okay, but don't feel bad about this because this is just everywhere. You can look at the literature in any field you like, and these context errors play out in exactly the same ways, the same things, context problems, premature closure, all those 150 other cognitive and affective biases are seen in every single one of these, and it's because we are all human.

And if you just keep track of your own everyday life, you will see in the next month dozens of context and premature closure events if you care to keep a diary. So that's the story, that's why we have so many diagnostic errors. - [Audience] [Crosstalk].

- Yeah, you know, our systems are a mess, we're human, we have all these human failings. And what are we going to do about this? Well, this is what we're doing in our society, we've convened something called The Coalition to Improve Diagnosis, and we've now enlisted 36 major professional societies to help us address this. And it's fantastic because our society is tiny, we only have 200 members to tell you the truth, but through the coalition we can reach 100,000 medical professionals.

And if any of you are in positions to influence whether your organization would like to join us, please do that, we would really welcome your participation. And to us nursing is the next frontier for where diagnosis can improve. What can we do as individual practitioners? Well, I made a big deal out of pointing out all these cognitive errors and pointing out all our problems, but it turns out the solutions are pretty simple, and free or relatively free.

So if the problems are the things on the left, it turns out that any of the things on the right we think would be pretty good solutions. So just practice reflectively, you know, take a diagnostic time-out, "How did I come up with that diagnosis? Am I in the right context? Is there something else I should be thinking about?"

Try to be comprehensive. So, you know, creating that differential diagnosis we all learn how to do that. If we just did that in every case, how different life would be? The universal antidote is to ask, what else could this be? Stop and think, that's really what it boils down to. This is a little poster we have up in the room where we discuss cases in my hospital, you know, so after we're done discussing a case it just takes a second or two to glance at this, and maybe it'll bring to mind some other context from what

you're originally thinking.

Checklists, I'm a big fan of checklists. A colleague of ours, John Ely, put together a really nice set for primary care, it's the top 99 symptoms that people could come in with and you just...he carries it around in his lab coat pocket, he flips it open. So if somebody came in with a complaint of chills, that was Rory Staunton's chief complaint, here's what you'd see, well, there's sepsis right in the first column.

You can use John Ely's checklists for free, you can download them from our website, and they can live on your smartphone, you just go click, click, and then you've got John Ely's checklists. And there are some really elegant tools now available on the internet to help with differential diagnosis. I don't have a commercial interest in any of these, but I think they are all great.

Let me show you how they work, so this is one called Isabel, and what you do is you put in the key findings. So on the left here's Rory Staunton with his fever and his mottled skin and his vomiting, and within a second it gives you some things to think about over on the right. And what's the number three thing on the list there?

Group A, streptococcal infection, which is exactly what he died from. This hospital did not have Isabel available, and who knows if that would have made a difference? This is a study of Isabel, was done in a teaching hospital in the pediatric ICU, and left to their own devices the residents got the diagnosis right 89.4% of the time, and with Isabel it went up to 92.5%.

And you can look at that and say, "That's not much of a difference." I don't know if that's statistically significant. But if you're a parent, or if you're a patient safety person, or if you're the doctor or the nurse taking care of those kids, you will look at that and say, "Before Isabel, there's 10 kids at risk for harm from diagnostic error, and with Isabel, it's down to 7 or 8."

And I will take that any day, this is exactly where we are in medicine today, if you ask me, we get it right 90% of the time. How are we going to get to 92%? How are we going to get to 95%? We have to do something a little different like using Isabel, like take a diagnostic timeout, like use a checklist, etc. How about getting a second opinion?

Fantastic, great advice, we know it works. If a second radiologist or pathologist looks at a study, the diagnosis changes 2% to 5% of the time, and internal medicine it's much higher, 10% to 20% of the time the diagnosis will change from a second opinion. If you are faced with a serious condition that you've just been diagnosed with, get a second opinion.

So this is the advice we give to physicians and APRNs, what can I do? Be thoughtful, be reflective, learn why these errors happen, and now you know. Always construct a differential diagnosis, not just on the tricky cases, do it on the ones where you're really sure what's going on, because you're just as susceptible to a diagnostic error there as in cases that are complicated, perhaps even more so.

Get second opinions, take advantage of that. Use these decision support things like Isabel. Make the patient your partner, that's so powerful, if the patient knows that he's part of the process and a patient knows that they have to get back to you if things don't pan out or if their symptoms aren't resolving, that's an incredibly important safety net that could catch a lot of these diagnostic errors.

Okay, so what you've just learned about diagnostic error is exactly what I tell physicians, and everything that we say to physicians applies to APRNs equally well, you are in the exact same situation we're in. RNs are a little different, but we're focused on that group as well because we think involving RNs more effectively and the diagnostic process could have a huge impact, as that would have in that Ebola case that we started out with.

So we would like to see RNs much more effective in contributing to the diagnosis and monitoring whether communication was good, whether what's panning out and how the patient looks, you know, jibes with what the diagnosis that was assigned to that patient, monitoring for diagnostic error, looking for things that don't fit, and helping the patient navigate these incredibly complicated systems we have that they must access in the diagnostic process.

So, there are so many things that nurses could do to help us in diagnosis. Let me just wrap up by reminding you of the Tenerife disaster, this was the largest airline disaster in the history of the world, 583 people were killed on 2 different airlines. One of the jets was taking off on a runway that they thought was clear, it was a foggy day, but it wasn't, there was another jet at the end of that runway that they crashed into.

The copilot raised the alarm, he said, "I don't think we ever got the clearance to take off." But the pilot just ignored that and the copilot didn't press the point. That was what was found on the voice recorder after every single one of the people on those two planes died. And it led to the concept in aviation of crew resource management team training, which has proven to be so effective in aviation, and space flight, and many other industries.

And it's starting to play out in health care, how many people have done team steps training in your health care organization? Yeah, it works, but it hasn't been applied to diagnosis. So far diagnosis is not a team sport, it's an individual sport, and we need to make it more of a team activity. In fact, this was the number one recommendation from that National Academy report, facilitate more effective teamwork in a diagnostic process.

And what that means to me is making the patient a partner to co-produce the diagnosis, and making the nurse a full and very important member of the diagnostic team. The nurse observations and opinions have to be considered and incorporated. In the most recent issue of our journal called *Diagnosis*, there were three articles that made this point, and I would recommend them all to you.

The most relevant one for nursing was the one in the middle by Kelly Gleason that defined this new concept that we're announcing, where we want to see nurses more engaged and more effective. I wrote an article on the new diagnostic team that also emphasized the role of nursing, and Julie Considine that you'll hear from in just a few minutes also had a wonderful editorial on both of those.

And Susan Carr in our newsletter had a similarly terrific article called *The Evolution of Diagnostic Teamwork*. So I would recommend all of these. This is a quote from Paul McCartney, "I love to hear a choir. I love the humanity to see the faces of real people devoting themselves to a piece of music. I like the teamwork. It makes me feel optimistic about the human race when I see them cooperating like that."

Wouldn't that be great to see in medicine? This is the mandate we got from the National Academy, we need to do something about this diagnostic error problem, so improving the diagnostic process is not only possible, it's a moral, a professional, a public health imperative. And we welcome working with you to make this real. Thank you. -

[Maureen] ...take some questions, Mark?

- We have time?

- Yeah, we have time.

- Good.

- We are good for time, so we could take some questions. I do want to just plant a thought, because Mark was kind of taking you toward how do we roll the registered nurse population in with our plans to improve diagnosis? We did a quick review of the state's Practice Acts and rules to look at the language of diagnosis for nurses, and what we found was there were somewhere around seven states that actually had a total prohibition against a nurse contributing to medical diagnosis.

So those are ones we're going to want to go back and revisit. But also, I would tell you we had maybe around 27% of the states that we looked at had nursing diagnosis language. We're kind of proposing that we look at that. Do we need nursing diagnosis or do nurses need to be part of this expanded diagnostic team?

So keep that in your thoughts. But if you have any questions, you've got time here, you can ask Mark some questions. Thank you so much.

- [Inaudible]. - [Female] Thank you. Thank you, Dr. Graber, I really appreciate this message. I had a couple of thoughts when you were talking, one is that I work in a small system that uses the Cerner electronic health record which does not articulate with Epic, which most of our surrounding, bigger systems use, and that lack of interoperability is a big barrier for us, we're still relying on facts records from specialists, and you get them sometimes and sometimes you don't get them before you see a patient.

Another thing that I thought about was, how can we form a more robust team for, like, M&M rounds or peer review? I think we really need to be doing that in our institutions, having regular reviews of regular cases. The physicians have that, but the advanced practice and PAs aren't invited to those.

One last thought, I did my doctoral capstone on the RN care coordinator, so this would be a care manager in the primary care clinic who's kind of provides the care between the care, and I think it's critical with how people are admitted and discharged with high-skill, high-need situations. People are being cared for in the home with...they used to be in the hospital for two or three days, now we've got...and the primary care providers are overwhelmed and can't provide that care, we need an RN to be managing that care in the community.

- Amen. Well, thank you for raising those points, it's unlikely that I'll remember all three of them. But,

about the medical record, you're absolutely right, it's right in the middle of everything we do in medicine today. And I guess I may be the only person in the world who actually liked their electronic medical records system, I worked in the VA, and the outpatient and the inpatient was all coordinated and you could actually get records from afar.

But I know that there is great dissatisfaction, and Gordy has actually written eloquently about all the problems that our medical records create. And, you know, kind of wish you could come back in 50 years when that's fixed, so right now you're absolutely right, it's a big communication barrier, it inhibits communication as much as it facilitates it, and we really need to envision a better system, that was the big debate about the Texas Ebola case.

Was this a reflection of how bad the EMR is, or does it reflect more on our culture, that the nurse wasn't a part of the team? So, maybe a little bit of both. And you're absolutely right, I mean, the nurse coordinator is the perfect person to be monitoring whether the diagnosis that was assigned looks like it's playing out in real life. And the middle point?

Remind me.

- [Inaudible].

- M&M rounds. Oh, thank you, absolutely. So, you know, I've given you advice on what doctors and nurses to do. We have advice for health care organizations, and the number one thing is to find and learn from diagnostic errors. So for that to happen we need patients, doctors and nurses to report these and then perfect, discuss them in an M&M conference with doctors and nurses and patients present, it's an excellent way to learn, so, absolutely, I completely endorse that, I would love to see that happen more regularly.

Please. - [Caroline] I'm Caroline. I have a [inaudible] down there, and one of the things that I've started using are the buccal swabs to help with alpha genomics, so I get a lot of patients that come in with psych medicine that I take care of, and they're like, "These medicines aren't working," and usually, they come in with a basketful of 20 medicines.

So when I run the enzymes, you know, I'm like, "Okay, this is why these medicines aren't working and this is why the statins aren't working." But the printout is about 30 pages long, and I'm just a generalist, and I'm like, "I'm not..." You know, I don't have the capacity, the staff to... And so the doctors are like, "You know, send me the stuff. Send me the stuff." But I guess the systems just aren't in place to share that, and I'm a one-person show, so I think that pharmacogenomics has a great potential to reduce medication error, cost, you know, make it more precise for the patient.

But not having it portable or exchangeable is a big barrier to what I do in my practice.

- Yeah, absolutely. And I'm a nephrologist, my average patient was on 23 medications, so I know exactly what you're talking about, it's so complicated. Actually, Gordy has written about that as well, we should have Gordy up here instead of me about all the problems with medications, and how often diagnostic error is really a reflection of a medication side effect that was misinterpreted as something else.

So you're absolutely right, it's very important to have all the medicines, are they really appropriate for the conditions that they were prescribed for? And are they all the right ones? Are any of the side effects playing out in terms of what we're seeing as new complaints? Very complicated, maybe that's a good place for, you know, artificial intelligence to help us out, we'll get a little push notification, "Hey, did you realize the patient's on two beta blockers?"

Or something like that. - [Female 2] Thank you. I was wondering, in this era of healthcare policies and reimbursement policies, incentivizing volume of patients and disincentivizing, retesting, or reflective practice, and some of those things, what kind of efforts are your organizations making to help change the policies that provide a culture of safety and accurate diagnosis?

- Would you mind running for congress, please, in your state? You know, absolutely, if you talk to doctors and nurses they say the number one thing, what's the biggest problem? Well, I don't have enough time. What's incentivized today is turnover, you know, so we're all, the patient visit is down to 10 or 15 minutes in many organizations, and it's not enough time, you need time to get to know the patient and to hear their story and to try and understand what's going on.

And you're absolutely right, it's the fault of our payment system that incentivizes productivity over quality. So if we had a payment system that rewarded diagnostic quality and punished diagnostic errors, we'd have a totally different situation.

[Inaudible] has a policy committee, and we are actively working to get legislation that addresses exactly that, although, as you can imagine, changing the payments, payment reform is going to be a huge challenge. - [Stacy] Hello, I'm Stacy with North Dakota Board of Nursing. And we are one of the states that in our Practices Act it does state that the nurse cannot medically diagnose or treat, and we have actually...because we're a rural state and we have an access of health care concern, we've had a lot of instances where nurses are forced to medically diagnose, treat, and they're the only person seeing the patient, and they're found to be outside of their scope of practice, and they're not educated in that in their educational programs.

So I think on the flipside we always have to look at those unintentional consequences that can occur by taking things like that out of Practices Act, so that just caught my attention, Maureen, when you said that. And also, it's just the nature of innovative ideas, we always have to look at the flipside, and one of the things that North Dakota and this is a little bit more along with the rules, but because we're a rural community we have a really difficult time with the specialized nurse practitioners, and we worked really hard to get nurse practitioners all over to do diagnosing and to be in all sorts of settings, and now we're seeing that change to our nurse practitioners are being replaced with physician assistants, because they're so specialized they no longer belong in a lot areas where we need them in rural North Dakota.

So, and we worked for years to get nurse practitioners, and most of ours are family because it...and we only have two programs in the state, and they actually worked in the emergency setting, and now they've all been replaced with physician assistants. So I think we need to keep that in mind as the flip side of how we can maybe assist with these barriers. Thanks.

- Thank you for that. Well, let me just say it's easy for me to say nurses should be more involved, but

very quickly we're going to get into these scope of practice issues and reimbursement issues that there're going to be some major fights. And let me just say we're ready to stand by you and whatever organizations are willing to take up that battle. -

[Carol] I'm glad that... I'm Carol Hartigan, I'm from the American Association of Critical-Care Nurses, and I just love the description of nurses working with physicians and supplementing the information that they have so that they can work together on the correct diagnosis. And it reminds me of the early days in the '70s of critical care nursing and learning together and supplementing the information to come to the correct diagnosis.

We need more nurses to be able to do that because the nurses today don't even know what the diagnosis is of the patients that they have because they have too many, and they're coming in, and they're going out. And, you know, the unavoidable or the avoidable patient deaths should be the rationale to have enough nurses to be able to do that so that they do know who their patients are and what the diagnosis is, and to give the correct information so that they can come to the correct diagnosis.

- Thank you for that. Thank you, everybody.

- Thanks so much.