Table S1. A list of identified themes, categories codes, and illustrative quotes.

Theme	Category	Code	Quote
Current TBI prognostication	Radiologist	Radiologists do not prognosticate	we don't follow the patients long term, so I would say ... We don't meet them and know all the clinical information.
	ER clinician	CT in current prognostication	we just rely on the CT scan, and plus definitely our physical exam, assessment of the patient
		Non-CT in current prognostication	For traumatic, also again, as I said, some other factors, previous kind of patient's health, kind of age and everything, I'm considering that.
		Consultation with neurosurgery	most of the time we're bothering neurosurgeons
			think most of the emerg, I'm talking about maybe our group, that's the problem we have, so that is kind of like, "What are we going to do now?" Then we're calling neurosurgeons.
	Internal medicine physician		We rely on our neurology colleagues a lot for assistance with prognostication. We don't tend to use specific tools, or at least I don't, and I don't see that in my practice with the neurologist that we work with either.
			we rely on consultation from neurology to help us with prognostication.
		ER clinicians' prognosis is holistic based only on short term improvements.	usually it's more holistic. We look for improvements in the short term after the injury and then if they get better quickly, often they end up going home. If they're on the ward for many weeks, often if they're not eating or swallowing, they're needing internal feeding, things like that, that usually goes with a worse prognosis. Then talk to families, "Well, if we haven't seen improvement in three weeks or a month, we can expect that if there is going to be improvement moving forward, likely it will be slow, likely not back to baseline", those types of things
		Prognostication is uncomfortable to some clinicians	I think neurologic prognostication is an uncomfortable topic regardless because it's very high stakes for the people you're talking to and they often have high expectations, which often isn't in line with clinically what we are expecting to see.
		Glasgow Coma Scale is a handy tool for easy communication with colleagues	The Glasgow Coma Scale, I mean, I think it has its benefit when there's a lot of physicians involved, when there's a lot of handover just because it provides a ... it gives people more of numerical things to follow just so that you can make sure when you're handing over between people that it's easy to tell if someone's deteriorating or improving.
		Glasgow Outcome Scale is not used by an internal medicine clinician	I actually don't use the Glasgow Outcome Scale, but I suspect that the things that we use clinically to make some predictions are probably in that scale, I would imagine. But I don't use that scale.
	ER clinician	ER clinicians are looking into short-	we are mostly looking at the short term or the acute side of traumatic brain injury.
			I think in terms of when it's done, I think the emergency physicians have a shorter term perspective.

		term prognosis rather than long-term	just because we see them only acutely, prognosis in three months or six months is not that important for the emergency side of things. Back to your question, any sort of AI algorithm that would be focused on the long term prognosis of TBI patients may not be that useful for emergency side of things. What would be useful for emergency would be, what patients would be more at risk later on,
Preferable time span of prognosis	Patient and their family	Long-term prognosis is important to patients and their families than short-term prognosis	is this patient going to deteriorate in the next hours or in the next day or two? Whereas, the patient wants to know, yes, they want to know that, but they also want to know, "How am I going to be in six months and six years from now?"
			I (patient representative) would think that the long term is certainly very important
			The long term is important because I've been from basically non-functional at all to 100% functional shortly after the surgery.
			Families always have questions about what the patient is going to look like moving forward
			those family concerns are how much their function, the patient's function come back and they are eventually going to get back to normal where they were at before injury happened
	Nurse	Both long- and short-term outcome can affect patient care	Moderator: I have a follow-up question on that. Does thinking about the long-term prognostication impact your care towards patients and families? Are you thinking about the long-term impacts as you are interacting with the patients and families at the moment, or is it more kind of acute outcomes that you're focused on? Nurse: Both. I would say both.
General impression toward AI-based prognostication	ER clinician	Positive attitude toward AI	two, three years from now, we would not be able to function without AI, (omitted) I will make errors, and all those has to be gone through the AI. I think with what you're doing, two years from now would be essential to have, basically, let me just put it that way. Whatever barrier that we think that there is now, I think it will be all resolved in the next couple of years or so, easily. Once we get more advanced AIs, it's going to be even better for everyone. (omitted) I think all of us, we will be very, very dependent on AI in the future
	Internal medicine physician		I think that type of tool would be helpful for anyone that's involved with emergency department or inpatient medicine.
	Neurosurgeon		I think an algorithm could also level the playing field, and so bring everybody up to a level of expertise that the algorithm would be important

	Radiologist		in my opinion, I think an AI tool to help predict long term outcome will be helpful in the overall care of the patient. May not be always applicable in the emerg setting or neurosurgery or radiology, but overall I think it'll be great. I'm in favor of that
	Patient		I think the idea of AI that was brought as a topic around this call is interesting, because I do believe that AI could have helped in diagnosing,
Requests to AI research/developer	ER clinician	AI-based CT head rule for pediatric TBI patients	I can tremendously help, and one is pediatric population, because they have a complete different criteria, which is completely different than CT head guideline.
		Degradation prediction model for decision support on neurosurgical consultation	a little more clear, more obvious type of criteria to just at least decrease the number of patients we need to consult with neurosurgeons
			We just want to give some kind a protocol to all hospitals and all services and that they know that, "Okay, this is what we need to go further and consider neurosurgery intervention," or, "No, just stop it, and we already know what's going to be the prognosis,"
			if there is a system universally that can decide that this patient does not record neurosurgery consultation, these metrics are not met and this patient is not severe, we might be able to actually take some of the consults off of the shoulders of neurosurgeons over the phone.
			I didn't find any good rules or protocols that help us to just make a decision
			What is important for me is that if there's an AI algorithm that can flag some of the patients and tells me that these people, based on the presentation, might be at higher risk of traumatic brain injuries than somebody else, that would be certainly very beneficial.
			when I have the diagnosis of traumatic brain injury, now a patient is going to get admitted, not with neurosurgery, with other services, and those people also need to know, what is the prognosis? What's the outcome in two, three, four, five days from now, so that they can have a better understanding of the situation and when do they, again, need to talk to the neurosurgeon. Do they need to do it or not?
		Risk prediction model for non-TBI people	What would be useful for emergency would be, what patients would be more at risk later on

			What is important for me is that if there's an AI algorithm that can flag some of the patients and tells me that these people, based on the presentation, might be at higher risk of traumatic brain injuries than somebody else, that would be certainly very beneficial.
		Severity scoring system for triage	What I want, just making a type of a scoring system for the TBI involving kind of a CT scan imaging, involved in that scoring, and patient exam and GCS and everything
			what I'm hearing is something that's accessible, easy to use, but also could help with triaging to reduce burden.
	ER clinician and neuroradiologist	Skillful support staff	Plus, we need more people, the experts that they have knowledge and they teach people kind of how to use it.
			I think a major barrier is the lack of resources from our hospitals, within our hospitals, to implement all of these tools that are coming out.
			I mean, a possible solution would be to set up some third party infrastructure that any hospital can access without needing their local tech support to implement
	Neurosurgeon	Ability to predict progression	I think the other important point there is quantifying the probability of progression, of a significant progression. If an algorithm could quantify that, and then I think you could democratize things
		High accuracy	The problem in neurosurgical units is that mid-group, where there are brain contusions or bruises in the brain or diffuse axonal injury type patterns or other patterns, and we're constantly re-scanning these patients because we're concerned about the accuracy of the prediction algorithm. Nobody wants to miss anything
			Any system is going to be able to predict, but it's going to make some mistakes, mistakes, false negative that they call something negative when it's not really negative, or positive, when it's positive and it's not really positive. Those kinds of cut-offs where you determine the accuracy are going to be really important. That's why I think these other systems aren't getting used to the degree that they are, that clinicians like neurosurgeons who have to prognosticate don't have sufficient confidence in the accuracy
			There's a wide variability, if you survey intensive care doctors or neurosurgeons, junior neurosurgeons, senior neurosurgeons, as to the satisfaction with these things and whether they get used or not. The recurrent theme is that they're not accurate enough to put trust in to make decisions about a patient's life.

		Minimum input	We could add a whole bunch of different data into it, but at a certain point it's going to become so obtrusive and so much extra work for emergency doctors, they're not going to use it. What's sort of the ideal and what's sort of the minimum that you think would be doable, that it's not going to interrupt your workflow? Because there's no point in developing an AI algorithm and there's 25 things that somebody has to fill in. Nobody's going to use it
		Final decision should be made by human clinicians	There's a wide variability, if you survey intensive care doctors or neurosurgeons, junior neurosurgeons, senior neurosurgeons, as to the satisfaction with these things and whether they get used or not. The recurrent theme is that they're not accurate enough to put trust in to make decisions about a patient's life.
			if we are going to use GOS as a tool for prognosis, and we need to double check this with (experienced neurosurgeon) as well.
	Nurse	AI tool helping communication with patient or families	I found many of the patient who their loved one is a severe injured have a very unrealistic expectations. It is so hard for us to sometimes do some cares or adjust ... their questions are very unrealistic. I know I even don't know where to begin with and how much they understand. Even though we explain out from our best the knowledge, sometimes they just repeat so many same questions to the other colleagues, and then maybe there's one basic standards the AI can do to answer those questions may be helpful.
	Patient	AI assessment tool for family doctors	if you were to think also of the possibility of providing that (AI software) to family doctors, and then they (family doctors) could kind of look at those symptoms and follow up on how it evolves.
	Physiatrist and PM&R physicians	AI tool for screening follow-up patients	a ton of these patients, they end up landing with a physiatrist for rehabilitation, these TBI patients. I'm wondering if this GOS might be beneficial for them in terms of screening or follow-up or anything else. Maybe for one of these focus groups, if you can get a PM&R physician also as well to come and give us a feedback, I think that would be very valuable.
	Radiologist	CT assessment tool to get inter- and intra-observer reliability	I mean, describing that for any kind of abnormality, it's tough to get a reliable, in my opinion, a reliable inter-observer and intra-observer, between cases that I read myself. It's tough to get inter-observer and intra-observer reliability because there's so much variation, and so to unify that across the board I think will be very helpful for our clinicians.
			AI tool would democratize access to a high level read and give quantitative data to the clinicians. I think that can really help with prognostication. It's tough in a trauma setting for us as radiologists to quantify things, because blood is usually ... When it's even mild, when it's scattered trace hemorrhages, it's tough to gauge the exact volume. I mean, location we can tell, but the overall extent of injury is, there's a subjective component to describing all of that.
		Prognostic tool based on CT scan	some sort of predictor that takes the patterns of injury and correlates with their long term outcome I think will be very helpful.

			Having a tool that can tell us even mild, moderate, severe pattern of injury, although I could do that, but be more specific and more reliable, I think, would help reduce the amount of follow-up.
Benefit of AI	Hospital management	Quick and efficient decision making on resource allocation	a ton of these patients, they end up landing with a physiatrist for rehabilitation, these TBI patients. I'm wondering if this GOS might be beneficial for them in terms of screening or follow-up or anything else. Maybe for one of these focus groups, if you can get a PM&R physician also as well to come and give us a feedback, I think that would be very valuable.
			What can we expect for them to do in terms of function? Can they go home and if not, do I need to get them into some type of institution?
			figuring out do they need a few more days in hospital? Do they need to go to rehab? Do they need to go to a nursing home? Do they need to go to complex continuing? That's the question I ask about every patient, every single day.
			I would say that a more confident prognosis, especially a worse prognosis where you think someone is going to need to be institutionalized, having more tools to support your clinical feeling about that, I think would be helpful because it might just be able to get the ball rolling a little bit faster on getting the patient to where they need to go.
			With prognostic information, it doesn't necessarily change medical management, but it totally shifts the focus in terms of that whole disposition piece to every patient that's admitted.
		Reduced CT scans	We're doing 20 million scans a year or whatever the number is. Does it really change the outcome? (omitted) I think what it does is it gives us greater confidence to do certain management things, but when it boils down to it, could we get away with one CT scan even on neurosurgical services where the patient is really sick and forget the other ones because we have great confidence in our algorithm to predict that this patient is going to be okay without ordering 20 scans in hospital? That's another important outcome and as well with disposition.
	Standardized patient care	Regardless of CT assessor	Even mild, moderate, severe. I mean, describing that for any kind of abnormality, it's tough to get a reliable, in my opinion, a reliable inter-observer and intra-observer, between cases that I read myself. It's tough to get inter-observer and intra-observer reliability because there's so much variation, and so to unify that across the board I think will be very helpful for our clinicians.

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			Regardless of severity	The prognosis is generally pretty obvious at the extremes, the very mild and very severe.
				I think we've kind of heard this from (ER clinician) where she's more confident providing a prognosis on these sort of extremes of scenarios where somebody has improved very rapidly or somebody has not improved at all for a long time. I think the value of all that area in between is sort of a gray area, and it's difficult to have conversations around that because there's so much uncertainty. I think a tool that helps shed some light in that intermediate area would be very useful because not only does it gives physicians almost like a superpower where now we can add information to an area where we couldn't before, but also give you something to hang your hat on when you have these conversations with patients.
				usually it's more holistic. We look for improvements in the short term after the injury and then if they get better quickly, often they end up going home. If they're on the ward for many weeks, often if they're not eating or swallowing, they're needing internal feeding, things like that, that usually goes with a worse prognosis. Then talk to families, "Well, if we haven't seen improvement in three weeks or a month, we can expect that if there is going to be improvement moving forward, likely it will be slow, likely not back to baseline", those types of things
			Regardless of expertise	another (point) was variability in the level of expertise of the family doctor. I think an algorithm could also level the playing field, and so bring everybody up to a level of expertise that the algorithm would be important.
				I think there's tremendous value, and we see this not just in TBI, but across lots of areas of medicine where, I mean, clinicians with decades of experience can be confident enough to make certain calls in these indeterminate cases, but it takes a long time to build that experience, and it's really nice to encapsulate that knowledge in a tool where people could point to it and say, "The output of the tool was this." There's some validation there and some strength in having conversations with patients. I think there's definite value.

			internal medicine, we don't have the long-term data, so being accurate with our prognosis ... I mean, I have no feedback actually the time on whether I was correct or not on the patients that I'm involved in prognosticating and so I think that type of tool would be helpful for anyone that's involved with emergency department or inpatient medicine.
		Regardless of location	Most of the small cities or any kind of rural area, they don't have access (to neurosurgeons), and so that I think is a big one.
CT scans in TBI	Canadian CT Head Rule	What Canadian CT Head Rule is like	the CT head rule was developed to basically identify people who basically had blood in the brain or needed neurosurgical intervention
		Creating heavy burden on neurosurgeons	Right now, the rules are basically, consult on everyone in most hospitals. Getting admitted to medicine, they want clearance, so that creates a tremendous burden on neurosurgeons, whom there are very few of them around and a lot of burden.
		Exclusion criteria of Canadian CT Head Rule	they (pediatric TBI patient) have a complete different criteria, which is completely different than CT head guideline.
	Importance of CT	CT plays a key role in TBI assessment	we just rely on the CT scan, and plus definitely our physical exam, assessment of the patient
			Every trauma gets a scan, so I don't think our clinicians can or want to make any decisions without a CT.
			I would say when CT is not important, it's when the degree of injury, pattern of injury is obvious clinically, but there's no way to do that without a CT,
		Due to lack of assess, MRI is not common for admitted TBI patients	We're not doing many MRIs, probably due to lack of access.
	Too many CT scan	For follow-up	it would help reduce imaging follow-up, I think yes, because we do get a lot of follow-up and I think it's the same scenario
		For clearing uncertainties	The problem in neurosurgical units is that mid-group, where there are brain contusions or bruises in the brain or diffuse axonal injury type patterns or other patterns, and we're constantly re-scanning these patients because we're concerned about the accuracy of the prediction algorithm. Nobody wants to miss anything, and so I think we do a lot of scans on patients that if you look at the retrospective data,
			we can decrease the number coming to emergency department for really no reason to need to be in emergency, with a very mild concussion or very mild injury that obviously doesn't need CT scan.

		Some clinicians realize taking too many CT scans is a problem, but they do	the question is, how can we prevent not doing CT scan for patients who really don't need it? Sometimes it's very, I know, kind of like I said, "Oh, that must be concussion, we don't need it," but still, we do lots of CT scans that is not necessary.
			that would be a really common thing we have. We're doing serial CT scans usually
			at least in my institution, I think in the GTA, CTs are readily accessible and available so it's not a big deal for me to get a CT if I need to. If there's been a change in clinical status, certainly I would order that as a first test to see if something's changed, if there's been a rebleed or whatever. But I think in more rural and remote areas, getting repeated CT scans might be a bigger issue.
	Subjective CT assessment	CT measurement can be subjective	It's tough in a trauma setting for us as radiologists to quantify things, because blood is usually ... When it's even mild, when it's scattered trace hemorrhages, it's tough to gauge the exact volume. I mean, location we can tell, but the overall extent of injury is, there's a subjective component to describing all of that.