2 year old split: Part of the question is I feel like some of their justification isn't quite that it's worse in those less than two, it's just that radiation exposure is generally worse for you the younger you are. We don't think twice about it if someone has less than 25 years ahead of them, but the longer you have to live the longer you have to develop radiation induced malignancy. There's no discontinuity at 2 years old; the relationship is basically linear.

Kids under 2 are less verbal and less able to describe their symptoms, so certain independent variables are more difficult to report. Likewise for the "does this kid seem to be acting normally" questions, they'd be different for preverbal kids. It'd be interesting not to do the split, just to do something different, and doing for all ages is pretty reasonable.

GCS 14-15: I would still go with what they did in the study here. GCS is a funny score; anything less than a 14 means you're pretty out of it. No emergency doctor is \*not\* going to do a CT scan on someone with a low GCS score; it wouldn't be practical to consider people in that region. If GCS is put into the model as an independent variable it could overwhelm the other components of the model- the model would quickly learn that any score below 11 or 12 is practically guaranteed to be a TBI. Based on levels of disorientation (name/place/time), motor response, and reflex. To get a 13 you'd need to be confused about where you are and also unable to follow simple commands, ex. "Lift your right hand".

Pharmacologically paralyzed: Usually in intubated patients (breathing tube in trachea) who are generally severely injured- in order to intubate someone we give them an anesthetic but also a sedative that blocks their muscles' ability to contract. This can last from 15 minutes to an hour; during that period it is very difficult to get a neuro exam because a lot of that is based on how they move. Highly correlated with low GCS score; also paralyzed/sedated/intubated tend to go together. It's very rare that we intubate a child- they generally don't get into as much trouble as adults.

Scalp hematoma- I could imagine it could be made more reliable with a system that would make people look very closely at the scalp, but it's overall difficult to detect. Dizziness is inherently a very fuzzy symptom; in general it will have poor reliability.

Which variables tend to be important?

Injury mechanism: moderately important. How you were injured is, on a physics level, one of the most important questions (how much force was applied to your head?) but the injury mechanism is an inaccurate representation of this. Often times there are multiple levels of removal between the doctor who inputs the value and the person who actually saw it; third- or fourth-hand.

Amnesia: Fairly important. Forgetting things means you likely had a fair bit of force to your head.

LOC: Moderately important. Loss of consciousness in the first place is a bit more important than its duration.

Seizure probably quite important- natural progression is to last for a minute or so and stop, so you could have high GCS after.

Acting normally: Something to that. Question of whether a kid is acting like themselves likely does matter.

Headache: Less important. Kids have headaches for a lot of reasons, and intensity is really subjective.

Vomiting: Somewhat important. Can be an indicator of intracranial pressure, but also kids vomit for all sorts of reasons. Subcategories don't matter.

Dizzy somewhat matters.

GCS will matter a lot.

Altered mental state- quite important, one of the main signs.

Basular skull fracture- very important. "Raccoon eyes" or blood pooling around your eyes from a nearby skull fracture, is a highly important sign of TBI

Anterior fontanelle bulging: Babies' skulls aren't quite solidified for a while, and the anterior fontanelle is the last soft spot- if it bulges that's a sign of cranial pressure. Depending on how reliable the measure is, it could be a very good indicator.

Scalp hematoma: Pretty decent indicator of trauma; frontal hematomas are more benign than elsewhere since your forehead is a strong part of your skull.

Above clavicle injury: Probably not important.

Neurological deficit other than mental status: Important- being unable to, say, move a limb is indicative of nerve damage.

OSI (other substantial injuries): Medium importance.

Clinical suspicion of intoxication: Probably won't predict TBI much, can sort of explain mental status

Age: Would be interesting to see if it predicts; maybe build a model both ways.

Gender/Ethnicity/Race: Doubtful it's significant for predicting injury but could be interesting to see any biases the model has.

Where was individual sent: Not particularly useful if you want a classifier that tells you what to do with the patient.

Most outcomes are pretty objective, the only "soft" one could be hospital stay length since it depends on how cautious the doctor is.

Correlation plot: I think if they're so strongly correlated that you could get the same predictive value, you could just pick one. Problem is which to pick- probably the thing everyone will look at; such as GCS scores. Injuries above the clavicle would be less important most likely.

Missing data issue: Seems like there's some statistical way you could work around it? Like, maybe impute 0 for them. Valid concern though.

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