

Harried doctors can make diagnostic errors

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Credit: Karolina Grabowska from Pexels

When a person goes to the doctor, there's usually one thing they want: a diagnosis. Once a diagnosis is made, a path toward wellness can begin.

In some cases, diagnoses are fairly obvious. But in others, they aren't.

Consider the following: A 50-year-old man with a history of [high blood pressure](#) goes to the emergency room with sudden [chest pain](#) and difficulty breathing.

Concerned that these are symptoms of a heart attack, the ER physician orders an electrocardiogram and blood tests. The tests are negative, but sometimes heart attacks don't show up on these tests. Since every minute counts, he prescribes a blood thinner to save the patient's life.

Unfortunately, the [diagnosis](#) and decision was wrong. The patient was not having a heart attack. He had a tear in his aorta (known as an aortic dissection) – a less obvious but equally dangerous condition.

It's not a far-fetched scenario.

"Three's Company" star [John Ritter](#) died from an aortic tear that doctors initially [diagnosed](#) and [treated as a heart attack](#).

With over three decades of combined experience caring for patients in hospital settings, we have faced our share of [diagnostic dilemmas](#). Determined to improve our practice and those of other physicians, we are studying ways to prevent diagnostic errors as part of a project funded by the federal government's [Agency for Healthcare Research and Quality](#). Below, we describe some of the challenges – and possible solutions – to improving diagnosis.

The flawed thought processes that result in errors

When physicians learn to make diagnoses in medical school, they are trained to initiate a mental calculus, analyzing symptoms and considering the possible conditions and illnesses that may cause them. For instance, chest pain could indicate a problem with the cardiovascular or respiratory system. Keeping in mind these systems, students then ask

what conditions may cause these problems, focusing first on the most life-threatening ones such as [heart attack](#), pulmonary embolism, collapsed lung or aortic tears.

Once tests rule these out, less dangerous diagnoses such as heartburn or muscle injury are considered. This process of sifting through possibilities to explain a patient's symptoms is called generating a "differential diagnosis."

Although the ER physician in our example could have stopped to generate a differential diagnosis, this is easier said than done. With time and experience, mental shortcuts overshadow this time-consuming process and mistakes may result.

One such shortcut is "[anchoring bias](#)." This is the tendency to rely upon the first piece of information obtained – or the initial diagnosis considered – regardless of subsequent information that might suggest other possibilities.

Anchoring is compounded by availability bias, another mental shortcut in which we overestimate the likelihood of events based on memory or experiences.

Thus, an ER doctor who frequently sees patients with heart attacks [might anchor on this diagnosis](#) when evaluating a middle-aged man with cardiac risk factors presenting with chest pain. We doctors also tend to stop exploring something once we've reached a tentative conclusion, a bias called premature closure. So, even if a diagnosis doesn't fit perfectly, we tend not to change our minds to explore other possibilities.

How can we minimize diagnostic errors?

[Daniel Kahneman](#), who won a Nobel Prize in 2002 for his work on

human judgment and decision-making, argues that people have two systems that drive everyday thinking: fast and slow.

The fast thinking, known as System 1, is automatic, effortless and fueled by emotion. The slow system of thinking, or System 2, is deliberative, effortful and logical. Medical students are trained to use both systems: by toggling back and forth, physicians can thus harness their training, experience and intuition to craft a [logic-driven diagnosis](#).

So why don't physicians just do this routinely?

In some cases, System 1 thinking is all that is necessary. For example, a physician who sees a young child with fever and the typical rash of chicken pox can easily make this diagnosis without slowing down or thinking about alternatives.

However, some physicians don't use System 2 thinking when they need to because their work load makes it hard. Really hard.

In an [ongoing study](#), we have recorded first-hand how time pressures make it hard for doctors to stop and think. In addition to the incessant pace of work and physical distractions, there is substantial variation in how information is collected, presented and synthesized to inform diagnosis.

It is thus abundantly clear that physicians often do not have the time to do this type of toggling back and forth [during patient care](#). Rather, they are often multitasking when making diagnoses, work that almost always leads to System 1 thinking.

Can technology help?

Technology seems like a promising solution to diagnostic errors. After

all, computers do not suffer from cognitive traps like humans do.

Software tools that provide a list of potential diagnoses for symptoms and group collaboration platforms that allow physicians to engage with others to discuss cases [appear promising](#) in preventing [diagnostic errors](#).

IBM's Watson is also helping doctors make [the right diagnosis](#). There is even an XPrize to create technology that can diagnose 13 health conditions while [fitting in the palm of a hand](#). It may not be too long before a computer [will make better diagnoses than physicians](#).

But technology won't solve the organizational and workflow problems physicians face today. Based on 200 hours of observing clinical teams and asking them what could be done to improve diagnosis as part of an ongoing research project, two remedies appear necessary: time and space.

Crafted timeouts from "busy work" with dedicated "thinking time" is a key need. Within this period, a diagnostic checklist may be [useful](#). Although they vary in scope and content, these checklists encourage physicians to engage System 2 thinking and improve data synthesis and decision-making. One such tool is the [Take 2, Think Do](#) framework, which asks physicians to take two minutes to reflect on the diagnosis, decide if they need to reexamine facts or assumptions and then act accordingly.

Second, physicians need a quiet place to think, somewhere free from distraction. Working with colleagues in architecture, we are examining how best to create such environments. This is no small challenge. Hospitals have limited physical footprints, and medical culture makes it hard for doctors to duck into quiet spaces to think. But redesigning workflow and space could have an important impact on diagnosis. How do we know? The physicians we followed said so. In the words of one:

"if we had a place where the pager could be silent for a few minutes, where I could review my [patient] list and think through labs, recommendations and plans, I know I could be a better diagnostician."

This approach may prove particularly valuable in high-stress, more chaotic environments such as the ER or intensive care unit.

A future with [fewer diagnostic errors](#) – and the negative consequences of them – appears possible. Stopping to think about our thoughts and employing the power of modern technology is a combination that may lead us to the correct diagnosis more frequently. These changes will help [physicians](#) deliver better care and save lives – a future we can all look forward to.

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