

Safe, Then Sorry? — The Psychological Biases that Drive Care Cascades



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Logging into the electronic health record (EHR) for her next patient, Dr. G (a colleague of the senior author) noted the red-lettered alert that he was overdue for colorectal cancer screening. Mr. F had dementia, intensifying the hazards and diminishing the potential benefits of invasive screening and any next steps. But as an otherwise healthy and active man in his 70s, he was in some ways a sensible candidate. Mr. F's wife and care partner had seen the same alert in the patient portal. Though she understood that the tradeoffs had shifted since his dementia diagnosis, she wasn't quite ready to let go of screening or ignore the EHR's directive. The three of them decided on a minimally invasive stool test. Two weeks later, the results came back: positive.

In many cases, this story might represent the start of a “care cascade,” a series of downstream visits, tests, and treatments of uncertain value catalyzed by the desire to avoid an unlikely bad outcome. Cascades were first described decades ago,¹ but more recently, we and other researchers have begun to quantify cascades that stem from low-value tests or incidental findings on screening or diagnostic tests — for which downsides are rarely outweighed by benefits.^{2,3} These cases are common, like the small pulmonary nodule on a chest X-ray that prompts further imaging, biopsy, and even surgery in pursuit of an unlikely cancer, each step carrying financial and time costs and crowding out higher-value care. In a national survey of internists, 87% reported that cascades from incidental findings caused patient harms, from treatment burden to physical injury.³ As technologies like blood-based multi-cancer detection tests and increasingly sensitive imaging capture more abnormalities of uncertain significance, cascades will become a larger problem.

To reduce the harms of cascades, clinicians can avoid ordering an initial test in the first place (for tests that are clearly of low value) or mitigate the cascade once it begins. Both the initial test and the downstream events in a cascade

have some similar drivers, such as defensive medicine and supply-induced demand.^{2,4} But compared to avoiding an initial test, stopping a cascade after an abnormal finding can feel far more difficult. In this viewpoint, we focus on the psychology of that thornier second decision stage — pursuing a cascade — because this area has received far less research attention than low-value care, and because cascades can result from a range of initial screening or diagnostic tests regardless of their value. Specifically, we describe how three commonly recognized cognitive biases⁵ drive care cascades, and the ways they can inform potential solutions (Table 1).

UNCERTAINTY INTOLERANCE

When physicians are deciding whether to investigate a questionably significant finding, they are often swayed by discomfort with uncertainty. From their first clinical rotations as medical students, when educators prompt them to confidently assemble limited information into a diagnosis, physicians learn to equate uncertainty with ineptitude.⁶ This socialization, combined with the human tendency to fear the unknown, makes it difficult to not follow an ambiguous result with further testing. Even if a clinician is comfortable with leaving the finding alone, they may find this approach difficult to justify to patients or worry about a malpractice lawsuit. Within a too-short clinic visit, it often seems faster to order another test than to explain the nuances of watchful waiting, even if the resultant cascade ultimately takes more time.⁶

SOCIAL NORM BIAS

Compounding physicians' uncertainty intolerance is a tendency to favor options that seem aligned with social or professional norms. By choosing not to act on a test result, doctors may feel they aren't meeting the standards of their profession or the expectations of patients who may associate doing with caring.⁷ These concerns might be amplified for subspecialists, whose patient populations, by definition, have more “zebra” diagnoses, and who are less focused on holistic care. Social norms also lead physicians to pursue cascades in the absence of clinical need if they perceive that their colleagues or a consulting specialist would do so.³ Moreover, the culture of medicine is biased towards intervention (doing

Table 1 Psychological Drivers of Cascades and Potential Solutions

	Clinician level	Patient-clinician interaction level	Health care system level
Uncertainty intolerance	<i>Driver:</i> Clinicians unsure about ambiguous finding see testing as path to certainty <i>Solution:</i> Emphasize nuance in teaching diagnostic reasoning in medical school. ⁶ Highlight in training and continuing medical education the ways in which the pursuit of certainty and diagnostic closure can cause harm.	<i>Driver:</i> Patients are uncomfortable with uncertainty; clinicians find it easier to follow the cascade than to try explaining nuances in test interpretation <i>Solution:</i> Help clinicians have conversations — increase opportunities for trainees and attendings to practice communicating uncertainty. Provide scripted language accessible at point of care to assist conversations.	<i>Driver:</i> Litigious culture and individual experience with malpractice lawsuits contributes to concern that uncertainty means liability ³ <i>Solution:</i> Expand Communication and Resolution Programs (CRPs) — institutional policies which stress transparency, communication, and proactive cooperation with patients after adverse events would help improve patient safety and lower the frequency of lawsuits; lower fear of legal retribution would decrease the feeling that overly cautious care is necessary.
Social norm bias	<i>Driver:</i> Clinicians view thorough testing as standard practice <i>Solutions:</i> Create forums to discuss practice norms (e.g., at practice meetings) to challenge assumptions and allow physicians to share approaches to common ambiguous situations. Offer accessible, evidence-based guidelines embedded in EHRs to guide clinicians on watchful waiting with close follow-up, etc.	<i>Drivers:</i> Clinicians think patients expect them to pursue abnormal test results, worry that not meeting these expectations will look like incompetence <i>Solutions:</i> Give clinicians opportunities to discuss preferences and the limits/harms of tests with their patients prior to testing so that the choice not to pursue a cascade is normalized and decisions aren't first considered after patient and clinician have seen a concerning result.	<i>Drivers:</i> Fee-for-service payment incentivizes clinicians to order more services and spend less time with patients per visit <i>Solutions:</i> Use alternative payment models that may ease these perverse incentives and allow time for conversations to promote less intensive treatments.
Availability bias	<i>Drivers:</i> Emotional salience of stories of missed diagnoses relative to false alarms make clinicians overweigh some abnormal test findings <i>Solutions:</i> Accompany lab test and imaging results with evidence-based probabilities of clinically significant findings, stratified by patient phenotypes and presented clearly (e.g., “of 100 people with 0 risk factors who test positive, 5 will have the disease”).	<i>Drivers:</i> Stories of serious illness lead patients to worry more about missing rare diseases than about overdiagnosis and overtreatment; clinicians offer testing to assuage concerns <i>Solutions:</i> Provide patient-facing results that give accessible estimates of clinically significant outcomes associated with abnormal test result (e.g., using a visual scale that indicates disease prevalence among those with a positive test).	<i>Drivers:</i> Advertising campaigns, incentive systems stress the importance of thorough screening, reinforcing clinicians' fear of errors of omission <i>Solutions:</i> Raise awareness of overdiagnosis — emphasize stories of the harms of overly vigilant screening in medical education and the media. Create Morbidity & Mortality-style forums to discuss adverse events, form strategies to prevent them.

something), which translates to preferencing errors of commission over errors of omission. In a profession where war metaphors are common, retreating after an initial test can feel like a dereliction of duty.

AVAILABILITY BIAS

The third bias that drives cascades is the availability heuristic, the notion that people overweigh vividly recalled information or experiences when making decisions. In other words, after instances of an ambiguous test result presaging an aggressive illness, clinicians will view that illness as more likely to occur again. While a clinician could also remember the harms precipitated by a cascade, missed diagnoses are often more memorable than false alarms, which may result in diffuse or less dramatic consequences. Several factors contribute to this bias, including national screening and disease awareness campaigns that fill the American consciousness with stories of cancers caught too late and neglect the harms of overdiagnosis. Clinicians may also feel cognitive

dissonance in the idea that health care itself can be harmful, and subconsciously discount such a possibility. Taken together, these impressions can make watchful waiting feel like a greater risk than pursuing a cascade.

CONCLUSION

When Mr. F's stool test result came back, Dr. G felt compelled to order the follow-up diagnostic colonoscopy. But as weeks passed while she sorted out the logistical details of the procedure, frequent check-ins with the couple revealed that his dementia had progressed to the point that further testing was no longer the right choice. The decision to stop here might have made some uneasy. But Dr. G was used to having difficult conversations about uncertainty. As a PCP trained in palliative care, her perception of social norms was informed by this specialty's emphasis on goal-concordant care. She could easily recall examples of the downsides of intervention and remembered that with a test positive predictive value of less than 50%, there was a high chance the result was a false

positive. The three discussed the couple's care priorities, and decided it was better not to follow-up.

As Mr. F's case shows, decisions regarding cascades are difficult, and the right choice is often unclear. But there are ways to deemphasize the influence of implicit biases or to better align that influence with high-value care. In a survey, physicians favored solutions such as adding evidence-based risk estimates (e.g., the test's positive or negative predictive value) to radiology/laboratory result reports and guidance on managing incidental findings.⁴ There is also a need for more research quantifying the clinical significance of incidental findings to inform evidence-based follow-up plans, and systemic changes that give clinicians and patients the time and space to have nuanced testing conversations. With these structures in place, clinicians can approach screening decisions with a more complete picture of their options and frame the choice to forgo testing, when clinically appropriate, not by what is lost, but by what is gained.

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