Testing vs. Overtesting: Understanding the Risks, Benefits, and Questions Worth Asking

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A test can clarify a frightening symptom, identify a treatable disease before it causes harm, guide an operation, or show that treatment is working. The same test, used without a focused question or in a person unlikely to have the condition, can produce a different journey: an ambiguous result, another scan, a biopsy, a new label, expense, and weeks of uncertainty—without improving health.

That is the central tension in medical testing. “More” is not automatically safer, and “less” is not automatically wiser. The useful question is whether a particular test, for a particular person, at a particular time, is likely to improve a decision.

This guide explains how to think about screening, diagnostic tests, incidental findings, radiation, contrast, and follow-up. It also examines a widely reported 2025 CT study carefully. Its estimate of about 103,000 future cancers was a model of lifetime risk from one year of U.S. CT use—not a count of cancers observed after scanning, and not a finding that every one of those cancers came from an unnecessary examination. [1]

Do not delay urgent care to avoid a test. Trouble breathing, severe chest pain or pressure, sudden weakness or a sudden change in vision, uncontrolled bleeding, loss of consciousness, a severe allergic reaction, or thoughts of suicide can be emergencies. Call 911 in the United States or the local emergency number. A needed test may prevent disability or save a life. [2]

This publication supports conversations with health professionals; it does not diagnose symptoms or determine whether an individual test is appropriate.

Evidence Summary

• A good test answers a defined question and can change care. Its value depends on the symptoms or risk being investigated, the probability of disease before testing, the accuracy and burden of the test, and what will happen after each possible result.

• False positives, incidental findings, overdiagnosis, false negatives, and diagnostic cascades are different. A false positive is an abnormal result when the target condition is absent. Overdiagnosis is detection of a real condition that would never have harmed the person. An incidental finding is discovered while looking for something else. Any of these can start a cascade; a false negative can delay needed care. [3] [4] [5]

• Screening is not the same as diagnosing symptoms. Screening looks for disease in people without relevant symptoms. Targeted screening can improve outcomes in a defined population; evidence for that program does not support indiscriminate testing, and advice against broad screening should never be used to dismiss concerning symptoms. [3]

• Whole-body scanning of people without symptoms is not equivalent to proven screening. FDA reports no scientific evidence that whole-body CT screening of asymptomatic people provides more benefit than harm. ACR likewise finds insufficient evidence to recommend total-body MRI for people without symptoms, risk factors, or a relevant family history. MRI avoids ionizing radiation, but it can still uncover uncertain findings and launch cascades. [6] [7]

• CT is valuable and uses ionizing radiation. For a clinically justified scan, immediate diagnostic benefit commonly outweighs a small future cancer risk. Optimization means using the protocol and dose needed to answer the question—not pursuing the lowest dose at the cost of an unreadable or misleading examination. [8] [9]

• The 2025 CT headline describes a population model, not observed cases. Investigators estimated that 93 million CT examinations performed in 2023 could lead to about 103,000 future cancers over patients' remaining lifetimes (90% uncertainty limits, 96,400–109,500). The estimate combines measured examination data with assumptions about organ dose and low-dose radiation risk. [1]

• Children face higher modeled risk per scan; adults dominate the national burden. Children are more radiosensitive and have more years for a radiation-related cancer to develop. Yet adults received 96.7% of examinations in the 2025 model and accounted for about 91% of projected cancers. [1] [10]

• Contrast deserves a specific discussion, not blanket fear. Modern intravenous iodinated contrast has a lower kidney risk for most people than older terminology implied; uncertainty is greatest with acute kidney injury or severe chronic kidney disease. The risk of nephrogenic systemic fibrosis from group II gadolinium agents is very low even in advanced kidney disease. Agent, kidney function, prior reactions, urgency, and expected benefit all matter. [11] [12]

1. Start with the decision, not the machine

Testing is a means to a decision. Before a blood draw, scan, scope, genetic panel, or home test, it helps to complete one sentence:

"We are doing this test to find out whether , because the result would change ."

The second blank is essential. A test may be technically capable of detecting an abnormality yet clinically unhelpful if neither a positive nor negative result changes treatment, follow-up, or prognosis. Conversely, a rapid test can be extremely valuable when minutes matter, even if it has disadvantages that would be unacceptable in a casual screening package.

Four purposes often get mixed together:

1. Screening looks for a condition in someone without relevant symptoms.

2. Diagnosis investigates a symptom, examination finding, or abnormal prior result.

3. Surveillance watches a known condition or a person with a defined high-risk history.

4. Monitoring assesses treatment effects, medication safety, or disease control.

An annual laboratory value that is unsupported in a healthy, low-risk person may be appropriate every few months for someone taking a medicine that can affect the liver or kidneys. A chest CT marketed to any healthy adult is not the same intervention as low-dose lung CT offered to a person who meets evidence-based smoking-history criteria. A scan repeated because the prior images are unavailable is a different problem from one repeated because the disease has changed.

The aim is not a "perfect" number of tests. It is a testing plan proportionate to the clinical question, followed by reliable interpretation and follow-up.

2. Five terms that should not be used interchangeably

False positive

A false positive is an abnormal result in a person who does not have the condition the test targets. The initial result can still lead to repeat blood work, imaging, biopsy, referral, cost, and anxiety before the condition is ruled out. Screening tests are often designed to be sensitive so they miss fewer important cases; that can come at the price of more false alarms.

False negative

A false negative is a reassuring result even though the target condition is present. No test rules out every possible disease, and its performance may differ by timing, specimen quality, disease stage, anatomy, or patient group. A normal result should update the assessment, not erase persistent, worsening, or newly dangerous symptoms.

Incidental finding

An incidental finding is discovered while a test is being done for another reason: perhaps a small kidney lesion on a scan ordered for abdominal pain or a thyroid nodule on chest imaging. Some are important and actionable. Many are benign, age-related, or uncertain. The American College of Radiology has consensus pathways for selected imaging findings because following everything aggressively can create overtesting, while ignoring everything can miss meaningful disease. [4]

Overdiagnosis

Overdiagnosis is not a mistaken result. The detected abnormality is real, but it would never have caused symptoms or death during that person's lifetime. Because medicine often cannot know the future behavior of an individual lesion with certainty, detection can lead to treatment "just in case." Treatment of an overdiagnosed condition is overtreatment, which can cause harm without providing benefit. Cancer screening illustrates why simply finding more early cancers does not prove that a program saves lives; mortality, serious illness, and quality of life matter. [3]

Diagnostic cascade

A diagnostic cascade is the chain that follows an initial finding: another image, then a specialist visit, then a procedure, then surveillance. A cascade can uncover a dangerous disease and be worthwhile. It can also produce physical complications, anxiety, time away from work, and financial burden for little benefit.

A 2019 national survey documented physicians' experiences with cascades after incidental findings and their reports of patient and clinician harms. It shows that cascades are a real feature of care; because it is a physician survey, its percentages are not the probability that any individual patient will be harmed and do not show that every cascade was avoidable. [5]

These categories can overlap. A broad scan may reveal a real incidental lesion; uncertainty may trigger a cascade; and labeling a harmless lesion may eventually constitute overdiagnosis. That sequence is not a false positive.

3. Why the chance of disease before testing matters

A test's sensitivity and specificity do not tell the entire story. Interpretation also depends on pretest probability: how likely the condition was before the result, based on symptoms, age, examination, exposures, family history, and prior findings.

When a condition is uncommon in the tested group, even a fairly accurate test can produce more false positives than true positives. Here is deliberately hypothetical arithmetic—not the performance of any named medical test:

- Test 10,000 people in a group where 1% have the condition: 100 people with it and 9,900 without it.
- Assume 90% sensitivity and 95% specificity.
- Among the 100 people with the condition, 90 test positive and 10 test negative.
- Among 9,900 people without it, 495 test positive and 9,405 test negative.

• There are 585 positive results, but only 90 are true positives: about 15.4%.

Now use the same hypothetical test in a group where 10% have the condition. Among 10,000 people, it would produce 900 true positives and 450 false positives. About 66.7% of positive results would be true positives.

Nothing about the imaginary test changed. What changed was whom it was used in. This base-rate effect explains why targeting matters and why a commercial slogan such as “95% accurate” is not enough. Useful questions include: Accurate by which measure? In what population? Compared with what reference standard? How often is the target disease present in people like me? What confirms a positive result?

Pretest probability also guards against undertesting. A concerning symptom pattern can make further evaluation appropriate even after one normal test, while a very low-risk situation may make immediate testing less useful than observation with a clear reassessment plan.

4. Screening can help—when the program, population, and outcome match

Effective screening is more than early detection. It requires a recognizable disease phase, a test that performs adequately in the intended population, and evidence that acting earlier improves outcomes enough to outweigh harms. Detecting more abnormalities or improving five-year survival after diagnosis can be misleading because lead-time and overdiagnosis can inflate those measures without reducing deaths. [3]

Low-dose CT lung screening is a concrete example of targeted benefit. The USPSTF recommendation retrieved for this guide calls for annual low-dose CT in adults ages 50 through 80 who have at least a 20 pack-year smoking history and currently smoke or quit within the past 15 years. It calls for stopping after 15 years since quitting or when health substantially limits life expectancy or the ability or willingness to have curative lung surgery. Shared decision-making and smoking-cessation support are part of the program. [13]

The recommendation rests on trials showing reduced lung-cancer mortality in selected high-risk populations, while acknowledging false positives, incidental findings, radiation, overdiagnosis, and downstream procedures. [14] This is evidence for a defined low-dose screening program—not annual standard-dose chest CT for everyone, and not a substitute for diagnostic evaluation of coughing blood, unexplained shortness of breath, or another symptom.

At the other extreme, FDA states that it knows of no scientific evidence that whole-body CT screening of people without symptoms provides more benefit than harm. It can expose large areas to radiation and find abnormalities that lead to invasive follow-up. [6] Total-body MRI avoids ionizing radiation but has not earned a blanket recommendation: ACR finds insufficient evidence for screening people without symptoms, risk factors, or a relevant family history. [7]

“Broad” is not the same as “thorough,” and “targeted” is not the same as “incomplete.” A focused test can be more informative because the question, population, interpretation, and next step are defined.

5. CT: a powerful tool with a real tradeoff

CT uses rotating x-rays and computer reconstruction to produce detailed cross-sectional images. It is fast, widely available, and especially valuable for trauma, internal bleeding, suspected stroke-related conditions, blood clots, kidney stones, infection, cancer diagnosis and staging, and image-guided procedures. [8]

The x-rays pass through the body during the examination. A standard CT does not make a person radioactive, and radiation does not remain in the body afterward. That differs from some nuclear-medicine examinations, which administer a radioactive tracer. The relevant CT concern is the energy deposited during exposure and the small possibility of later biological effects—not stored radiation continuing to emit from the patient. [15]

There is also no prescribed fixed lifetime cap on the number of CT scans. The International Atomic Energy Agency explains that the decision depends on whether each examination is justified; a count alone ignores body region, protocol, dose, age at exposure, and clinical need. Ten limited low-dose studies are not biologically identical to ten higher-dose multiphase studies. A rigid cap could deny lifesaving imaging; an unlimited “just in case” approach could create avoidable exposure. The appropriate principle is to justify each examination, avoid duplication, and optimize every needed scan. [16]

Optimization does not mean making the dose as low as technologically possible regardless of image quality. A scan that cannot answer the question may create more harm through missed disease or repeat imaging. The goal is the lowest radiation dose that still produces diagnostic information for that patient and purpose. Age, body size, anatomy, and clinical indication should shape the protocol. [10]

MRI and ultrasound can sometimes answer the same question without ionizing radiation, but they are not interchangeable:

• MRI often provides excellent soft-tissue contrast. It can cause claustrophobia and requires careful review of implants, devices, and metal hazards. Some examinations need gadolinium contrast; others do not. [17]

• Ultrasound uses sound waves and has no ionizing radiation. Air or gas can block the view, bone cannot be penetrated, and deeper structures may be harder to see in larger patients. [18]

• CT is often faster and may be the better tool for bone, lung, major trauma, bleeding, or time-sensitive anatomy. Some CT questions need iodinated contrast; some do not. [8]

The safest choice is the test that can reliably answer the question with the least total burden—not automatically the test with no radiation, no contrast, or the shortest appointment.

6. What the 2025 CT study actually estimated

In 2025, Smith-Bindman and colleagues published a national modeling study in JAMA Internal Medicine. They estimated 93 million CT examinations in about 61.5 million U.S. patients during 2023. After excluding scans estimated to have occurred during the last year of life, about 84.2 million examinations entered the cancer-risk projection. [1]

The investigators used examination-level information from more than 120,000 scans in the UCSF International CT Dose Registry to reconstruct doses to organs. They scaled age, sex, and examination categories to national use and entered organ dose, age, and sex into the National Cancer Institute’s RadRAT software. That tool draws largely on BEIR VII risk models, which rely heavily on Japanese atomic-bomb survivor data and other exposed populations.

The principal result was 102,700 projected future cancers, reasonably rounded to 103,000, from the CT examinations performed in the single year 2023. The reported 90% uncertainty limits were 96,400 to 109,500. Separate one-at-a-time sensitivity analyses produced a broader range of 79,900 to 126,600, with changing organ-dose assumptions by 20% producing the widest reported variation. [1]

Three time concepts must stay separate:

1. Exposure year: the CT examinations occurred in 2023.

2. Outcome horizon: the projected cancers would occur across the exposed patients’ remaining lifetimes, after latency—not during 2023.

3. Ongoing-use scenario: the paper said that if annual utilization and dose remained unchanged for future decades, while total U.S. cancer incidence stayed around 1.95 million per year, CT-associated cancers from many prior exposure-year cohorts could eventually account for about 5% of annual diagnoses.

Thus, “5% annually” is a hypothetical steady-continuation burden, not an observation that CT already causes 5% of cancers diagnosed each year. Likewise, 103,000 is not a count found in medical records.

Body region and multiple phases

Across all ages, abdomen/pelvis CT accounted for about 39,100 projected cancers, approximately 38% of the modeled total. The paper’s abstract separately reported 37,500 projected cancers from adult abdomen/pelvis CT, equal to about 37% of the all-age total and about 40% of the adult total. The 37% figure therefore describes the adult abdomen/pelvis contribution to the total; it should not be relabeled as the all-age abdomen/pelvis value. [1]

The reconstruction accounted for multiphase scanning in 28.5% of examinations. A phase is a separate acquisition timed before or after contrast administration; additional acquisitions expose the patient to additional x-rays. Multiphase protocols can be necessary—for example, to characterize blood flow or a lesion at different contrast timings—but every phase should answer a question.

Contrast does not itself create the CT radiation. The x-ray acquisitions do. A contrast-enhanced scan may use one phase; a multiphase examination may repeat acquisitions at several timings. It is therefore accurate to ask whether every phase is needed, but inaccurate to say “contrast causes the radiation” or that all contrast CT is multiphase. The study did not calculate what share of projected cancers was caused by multiphase protocols and did not show that multiphase imaging caused most abdomen/pelvis projections. [1] [10]

7. How much confidence should the number carry?

The projection deserves neither dismissal nor false precision. Ionizing radiation is a known carcinogen, the study used actual examination and dose data, and small individual risks can matter when tens of millions of scans are performed. The authors accounted for 26 CT categories, organ doses, multiphase imaging, latency, and several specified uncertainties. NIH summarized the individual incremental risk as small while endorsing reduction of unnecessary scanning and dose optimization. [9]

But the model cannot observe which future cancer was caused by which scan. Baseline cancer is common, and direct lifetime adult CT evidence would require enormous cohorts followed for decades. At diagnostic dose levels, risk is extrapolated using a linear-no-threshold approach: risk is assumed to rise in proportion to dose, without a zero-risk threshold. This is useful for radiation protection, but the exact magnitude at low doses is scientifically uncertain.

Other assumptions include transferring risks from mid-20th-century Japanese survivors to a contemporary U.S. population, combining excess relative and absolute risk models, estimating national examination volume, and assuming registry doses represent U.S. practice. People who undergo CT may have shorter life expectancy because of illness, leaving less time for a radiation-related cancer; the investigators addressed this partly by excluding estimated last-year-of-life examinations. Independent experts agreed on the importance of justified, optimized imaging but differed in how much confidence to place in the numerical total. [19]

A later letter argued that 2018–2020 dose data may overstate current dose as deep-learning reconstruction and photon-counting technology spread; the letter also acknowledged limits in real-world validation and adoption. This is a plausible direction of bias, not proof that the model is invalid. [20]

A published correction concerned only the reversed sex-symbol/color mapping in the Figure 1 legend. It did not change the 102,700 estimate, uncertainty limits, denominator, body-region results, or 5% scenario. [21]

How the MSK, UC, and ACR perspectives fit together

Memorial Sloan Kettering's 2023 patient explainer predates the 2025 model and is not a rebuttal to it. MSK describes a generic CT dose range of about 1–10 mSv and says that, for an average person, a CT may carry a potential theoretical risk of less than about 0.05% (less than 1 in 2,000). That approximate counseling figure is not a universal per-scan risk or safety ceiling: dose and modeled risk vary by examination, protocol, body region, patient size, age, and sex. Its durable message is justification and optimization—clinical benefit should outweigh risk, and dose should be reduced without compromising the image. [22]

The University of California's 2025 article reports the same Smith-Bindman study from the authors' institution; it is useful institutional context, not an independent replication. Its 103,000 and 5% figures therefore inherit the model's assumptions and timeframes. The article also says children accounted for 4.2% of scans, but the primary paper assigns 4.2% to patients and 3.3% to examinations; the primary table governs here. Likewise, its infant “10 times” summary should not be converted into a universal patient risk without the study's age, sex, and examination-specific denominators. [23] [1]

ACR supplies a professional-society critique: the national estimate is model-based rather than an observed adult lifetime outcome, and necessary imaging should not be forgone. Its categorical statement that no published studies directly link CT to cancer must still be read alongside pediatric and young-person cohorts reporting dose-response associations. These sources have different roles—not three independent estimates. Together they support a balanced conclusion: the exact low-dose risk is uncertain, population models should not be personalized mechanically, and every scan should be justified and optimized. [24] [25]

Other contemporary coverage also had narrower roles: the JAMA Medical News in Brief item summarized the national model, while an earlier NBC report discussed dose variation and emerging Medicare quality reporting. The JAMA item's available text was access-limited, and the NBC article predates the modeling paper; neither substitutes for the primary study or official guidance. [26] [27]

Most importantly, the study did not conclude that all 103,000 projected cancers were preventable, unnecessary, or caused by inappropriate scans. Many examinations were likely essential. The number is a modeled burden under existing use and dose patterns; the preventable fraction would require separate evidence about indication, alternatives, protocol, and achievable dose reduction.

8. Children and adults: individual risk versus population burden

Children are more sensitive to radiation because tissues are developing and because they have more remaining years in which a radiation-related cancer could appear. Equipment settings designed for an adult can expose a smaller child to more radiation than needed, so pediatric protocols should adjust for size and limit the scanned region and phases. [10]

Large observational studies of children and young people have reported dose-response associations between CT exposure and later brain tumors or hematologic malignancies. NCI’s discussion of a U.K. cohort describes roughly tripled relative risks around cumulative 50–60 mGy to the relevant organs, while emphasizing that the absolute risks were small. More recent multinational evidence likewise reports a small absolute excess after scans in young people. Observational studies must contend with reconstructed dose, underlying illness, and the reason the scan was ordered; they strengthen concern but cannot attribute an individual cancer with certainty. [25] [8]

The 2025 model estimated about 9,700 future cancers from 3.1 million pediatric examinations and 93,000 from 89.9 million adult examinations. Children had greater modeled risk per examination, but adults accounted for about 91% of projected cases because they received almost 97% of scans. [1]

Both perspectives matter:

• For a child facing one examination, pediatric tailoring and the higher per-scan sensitivity deserve special attention.

• For a health system trying to reduce total burden, adult use cannot be ignored because its volume is so large.

Neither perspective supports refusing a needed scan. A promptly diagnosed brain bleed, appendicitis, serious injury, or cancer can pose a much larger and more immediate risk than the small future radiation risk.

9. Contrast: separate the agent from the radiation

Contrast agents improve visibility of blood vessels, organs, inflammation, and tumors. Whether contrast is needed depends on the question. A prior contrast reaction, kidney disease, pregnancy possibility, thyroid issues in selected circumstances, and current medicines may affect planning; patients should provide accurate history rather than independently canceling or changing medicines.

For intravenous iodinated CT contrast, the ACR–National Kidney Foundation consensus separates two terms. Contrast-associated acute kidney injury means kidney injury occurring around the time of contrast from any cause. Contrast-induced acute kidney injury means contrast caused it. Treating every associated case as caused by contrast exaggerated historical risk. For most people, attributable risk from modern intravenous iodinated contrast appears lower than once believed; uncertainty and concern are greatest with acute kidney injury or eGFR below 30 mL/min/1.73 m^2. Severe chronic kidney disease is a relative—not automatic—contraindication, and a necessary examination for a life-threatening diagnosis should not be withheld solely because of kidney function. [11]

For gadolinium-based MRI contrast, allergic-like reactions and other adverse effects can occur. Nephrogenic systemic fibrosis is the kidney-related complication that drove major restrictions, but agents differ. The ACR–NKF consensus concludes that NSF risk from group II agents is very low even in advanced kidney disease and that delaying a needed enhanced MRI may be more harmful. [17] [12]

The ACR contrast manual is a living operational reference. [28] Universal instructions about hydration, holding medication, or arranging dialysis do not belong in a general guide; these decisions depend on the agent, route, kidney status, urgency, and local protocol.

10. Blood tests and the “just check everything” problem

Laboratory testing does not involve ionizing radiation, but broad screening panels can still lead to follow-up that may not benefit a healthy, low-risk person. Results need to be interpreted in the context of the clinical question, symptoms, risk profile, medicines, and prior results rather than as a stand-alone diagnosis.

Choosing Wisely Canada advises against annual screening blood tests unless directly indicated by the patient’s risk profile. This supports a stewardship principle, not a U.S. rule and not a reason to skip evidence-based preventive services. [29] Blood pressure checks, lipid or diabetes screening, prenatal testing, medication-safety labs, and monitoring a known condition each have their own populations and intervals.

Ask what each ordered laboratory test is meant to detect and what action would follow. Broad direct-to-consumer panels deserve the same questions as imaging: Has this use been shown to improve outcomes? What confirms an abnormality? Who interprets and follows it? Could the panel miss the condition actually causing symptoms?

11. Questions worth asking before a nonemergency test

These questions are not a script for refusing care. They help make the plan explicit.

Clarify the purpose

- What exact question are we trying to answer?
- Is this screening, diagnosis, surveillance, or treatment monitoring?
- Based on my history, examination, and symptoms, how likely is the condition before testing?
- How would a positive, negative, or uncertain result change care?

Compare paths

• What are the benefits and harms of doing the test now?

• Could watchful waiting be safe? If so, when will we reassess, and what should trigger earlier testing?

• Would another test—or no immediate test—answer the question adequately? What might each option miss?

• Is a prior image or result available so we can avoid an unnecessary repeat?

For imaging

• Does this test use ionizing radiation?

• Could ultrasound or MRI answer the same question equally reliably and quickly?

• Will the protocol be tailored to my age, size, and clinical question?

• If CT is planned, does it need more than one phase? What does each phase add?

• Is contrast needed? Which agent? Do kidney disease, a prior reaction, pregnancy possibility, medicines, or implants affect the plan?

• For a child or repeated surveillance, is a pediatric or reduced-dose protocol available?

Plan for results

• What false positives, false negatives, incidental findings, and overdiagnosis are possible?

• If an incidental finding appears, is there an evidence-based follow-up pathway?

• What procedures, costs, and time commitments might follow an abnormal result?

• When and how will I receive the result?

• Who is responsible for reviewing it and arranging follow-up?

Good care can include a decision not to test immediately—but that decision should have reasoning, a timeframe, and a safety net.

12. When avoiding overtesting becomes undertesting

Concern about unnecessary care can become harmful if it causes a person to minimize a new symptom, distrust every recommendation, or substitute a consumer screening package for clinical assessment.

If a symptom persists, worsens, recurs, or concerns you, ask a clinician what reassessment is appropriate even if an earlier test was normal. The earlier test may not have addressed the new question. Follow explicit return precautions and scheduled follow-up.

Call emergency services for possible emergencies, including trouble breathing, severe chest pain or pressure, sudden weakness or vision change, uncontrolled bleeding, loss of consciousness, severe allergic reaction, or suicidal thoughts. Do not pause to calculate a scan's lifetime risk during a time-critical emergency. [2]

Testing can also be too narrow. People with fragmented records, limited access, atypical symptoms, or prior dismissal may face delayed diagnosis. Stewardship should improve the fit and quality of testing, not create a barrier to evaluation. "Do not test without a reason" has a companion principle: do not ignore a reason to test.

Frequently Asked Questions

Is every abnormal result a diagnosis?

No. A screening result may indicate that diagnostic follow-up is needed; a laboratory value may need confirmation; and an imaging finding may be incidental or uncertain. Ask what the result means in context, what could have influenced it, and what establishes the diagnosis.

Does a normal test mean nothing is wrong?

No. It may substantially lower the probability of the condition it was designed to detect, but it does not rule out every condition or every stage. Ask what the test was capable of excluding and what to do if symptoms persist or worsen.

Is an incidental finding the same as overdiagnosis?

No. “Incidental” describes how something was found. It may be dangerous, harmless, or uncertain. “Overdiagnosis” means a real condition was detected that would never have caused harm during the person’s lifetime. An incidental finding can eventually lead to overdiagnosis, but the terms are not synonyms. [3] [4]

Is there a safe lifetime number of CT scans?

There is no prescribed fixed lifetime cap. Risk depends on age, body region, protocol, dose, and number of exposures, while benefit depends on the clinical problem. Keep prior images accessible, question avoidable duplicates, and ask about optimization—but do not refuse a necessary scan because a count reached an arbitrary number. [16]

Does CT radiation stay in my body?

No. The x-rays are present during image acquisition and do not remain afterward; a standard CT does not make you radioactive. That is different from nuclear medicine using an administered radioactive tracer. Contrast material is also separate from the x-ray exposure. [15]

Should I ask for the absolute lowest CT dose?

Ask for an appropriately optimized dose. Too much radiation is avoidable harm, but too little to produce a diagnostic image can miss disease or force a repeat examination. The right protocol uses the lowest dose that reliably answers the question for your size, age, and anatomy. [10]

Is contrast itself the source of CT radiation?

No. The CT x-ray acquisition produces the ionizing radiation. Contrast can make anatomy more visible. Multiple acquisitions at different contrast timings—multiphase scanning—raise dose because the x-rays are used repeatedly, not because contrast emits radiation.

Is MRI always safer than CT?

MRI has no ionizing radiation, which can be an important advantage. It has implant and metal-safety constraints, may be less suitable for some clinical questions, and can uncover incidental findings. The better test is the one that answers the question reliably with the least overall harm. [17] [7]

Should kidney disease always prevent contrast?

No. Kidney function, acute kidney injury, the type of agent, urgency, and alternatives matter. Modern guidance does not treat severe kidney disease as an automatic ban on every iodinated or gadolinium agent. A tailored risk–benefit discussion is appropriate, especially with acute kidney injury or advanced chronic kidney disease. [11] [12]

Are all 103,000 modeled CT-related cancers preventable?

The study did not establish that. It estimated lifetime population risk from one year of CT use under specified assumptions. It did not classify every scan as necessary or unnecessary, and many scans provide major benefit. Some burden might be reduced through better justification, avoiding duplicates, fewer unnecessary phases, and dose optimization, but the preventable fraction was not measured. [1]

What does the study's "5% annually" mean?

It is a hypothetical future steady-continuation comparison. If CT use and dose continued at the 2023 level for decades and overall cancer incidence stayed similar, lifetime effects from many annual exposure cohorts could eventually contribute cases equal to about 5% of annual diagnoses. It does not mean 5% of cancers diagnosed in 2023 were observed to come from CT. [1]

What if I am still unsure?

Ask the ordering clinician to state the question, alternatives, expected benefit, and follow-up plan in plain language. For an elective high-stakes decision, a second opinion may help. For an emergency or rapidly worsening symptoms, do not delay time-sensitive care while seeking perfect certainty.

The bottom line

Good testing is not maximal testing. It is purposeful testing: the right question, the right person, the right tool, the right time, and a plan for every plausible result.

The harms of overtesting are real—false alarms, incidental findings, overdiagnosis, cascades, procedures, radiation, adverse reactions, cost, and anxiety. The harms of undertesting are equally real—missed or delayed diagnosis, preventable complications, disability, and death. Sound decisions hold both sides at once.

For CT, the responsible message is neither alarm nor dismissal. The 2025 national estimate is a modeled warning about population exposure, not a ledger of observed cancers and not proof that all projected cases are avoidable. Clinically justified CT is often lifesaving. Each examination should still be justified, prior studies used when available, phases limited to those that add information, and dose tailored to produce a diagnostic image.

The most powerful patient question is not "Can I get every test?" or "Can I avoid every test?" It is: "What decision will this test help us make, and is this the best way to make it?"

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