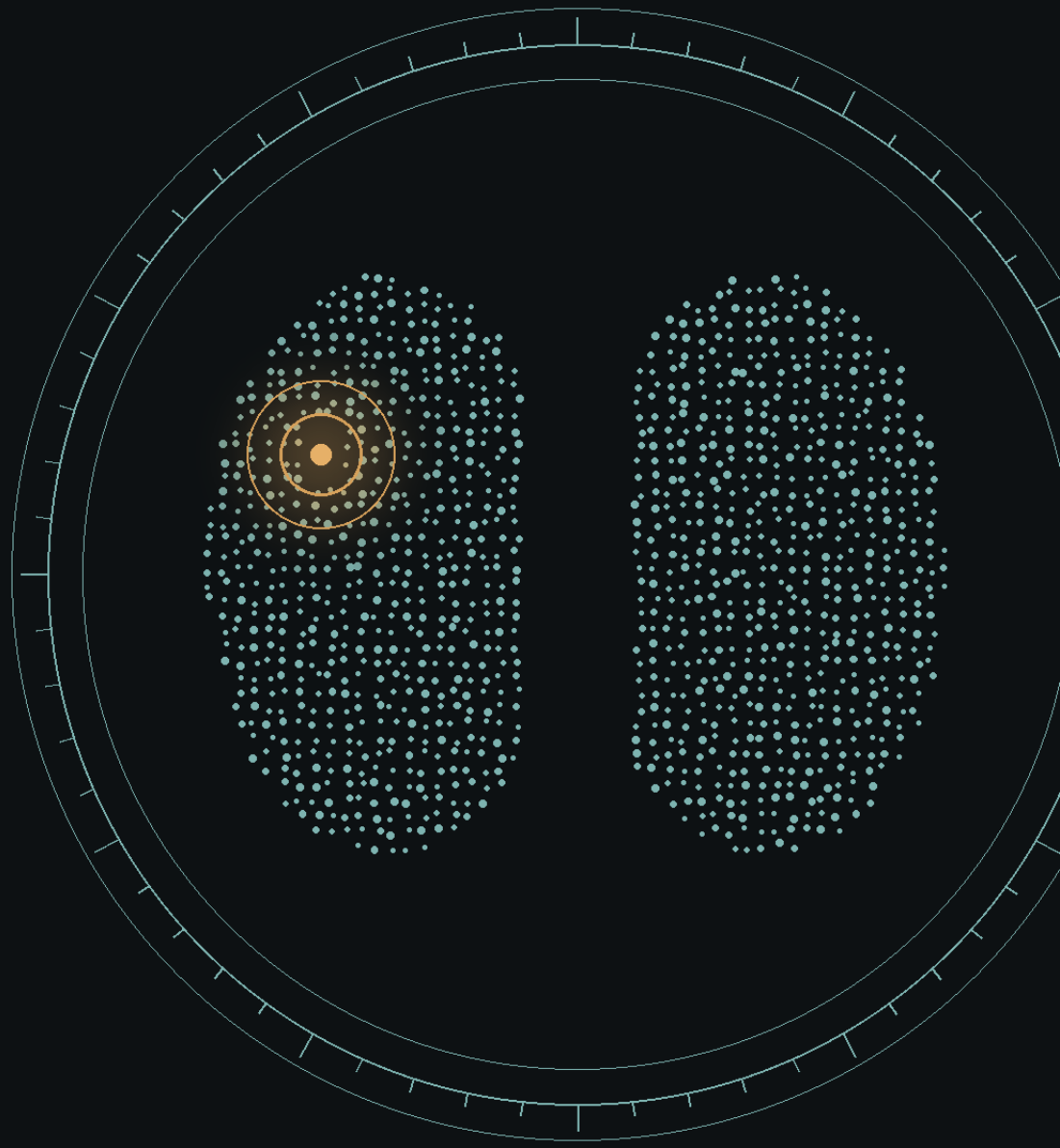
INCIDENTAL PULMONARY NODULES IN 2026

ONE DOT.
FOUR DECISIONS.

Watch, work up, biopsy — or operate?

What changed — and what did not.

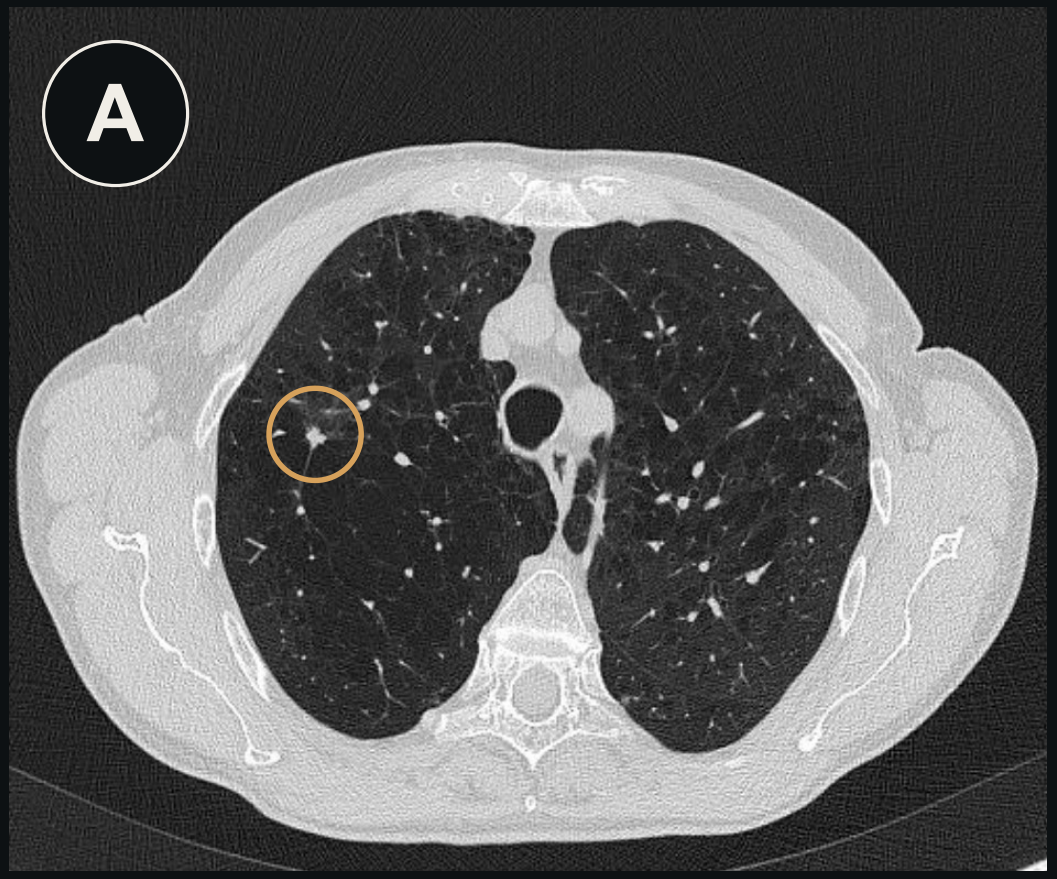


Dr. MHD Ayman Al Baik

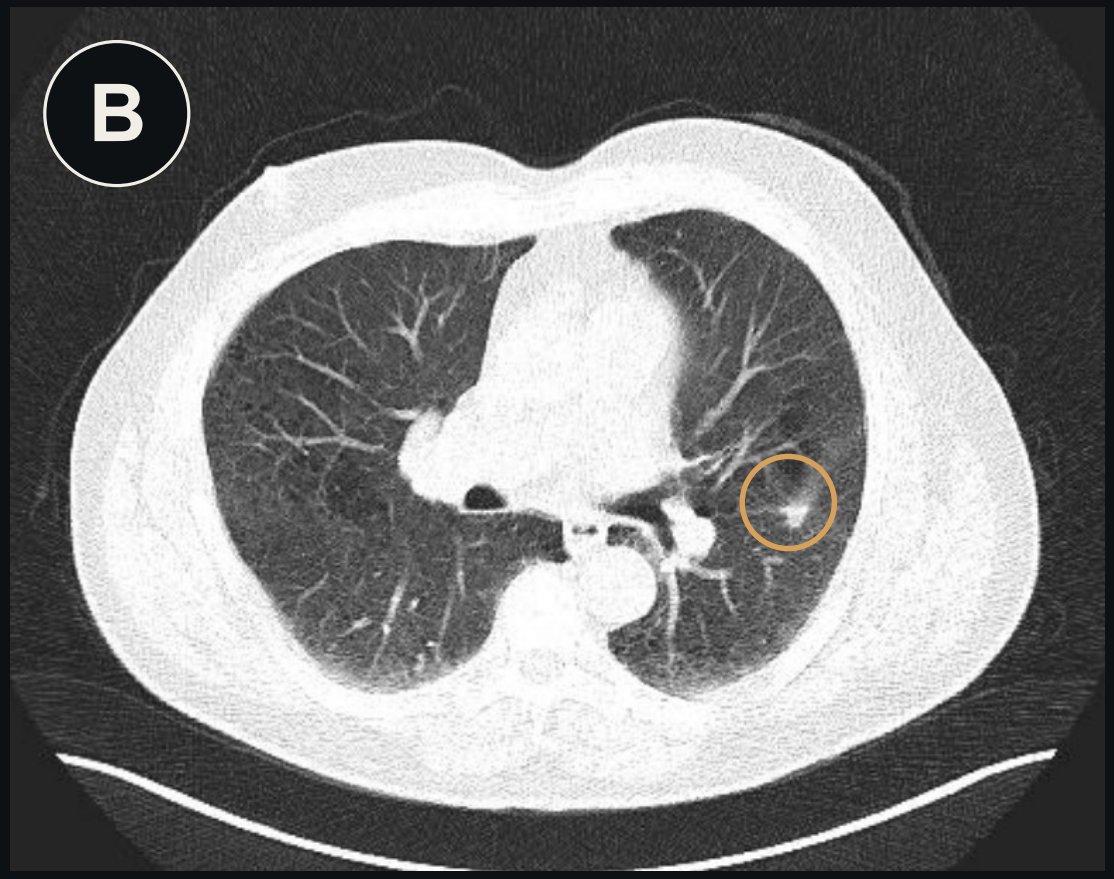
Specialist in Internal Medicine & Pulmonology

Oberarzt • Bergmannsheil Buer, Gelsenkirchen, Germany

Two patients. Same clinic. Both PET-hot. Both operated without biopsy.



SUV 5.5



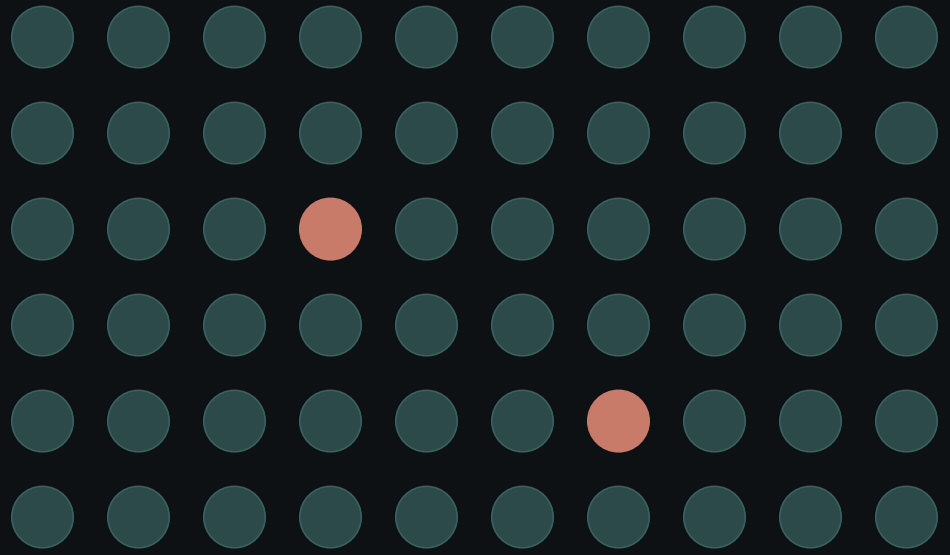
SUV 5.2

One had cancer. Which one?

DURING THE NEXT 20 MINUTES • IN THE USA ALONE

≈60

people will hear:
"We found something on your lung."

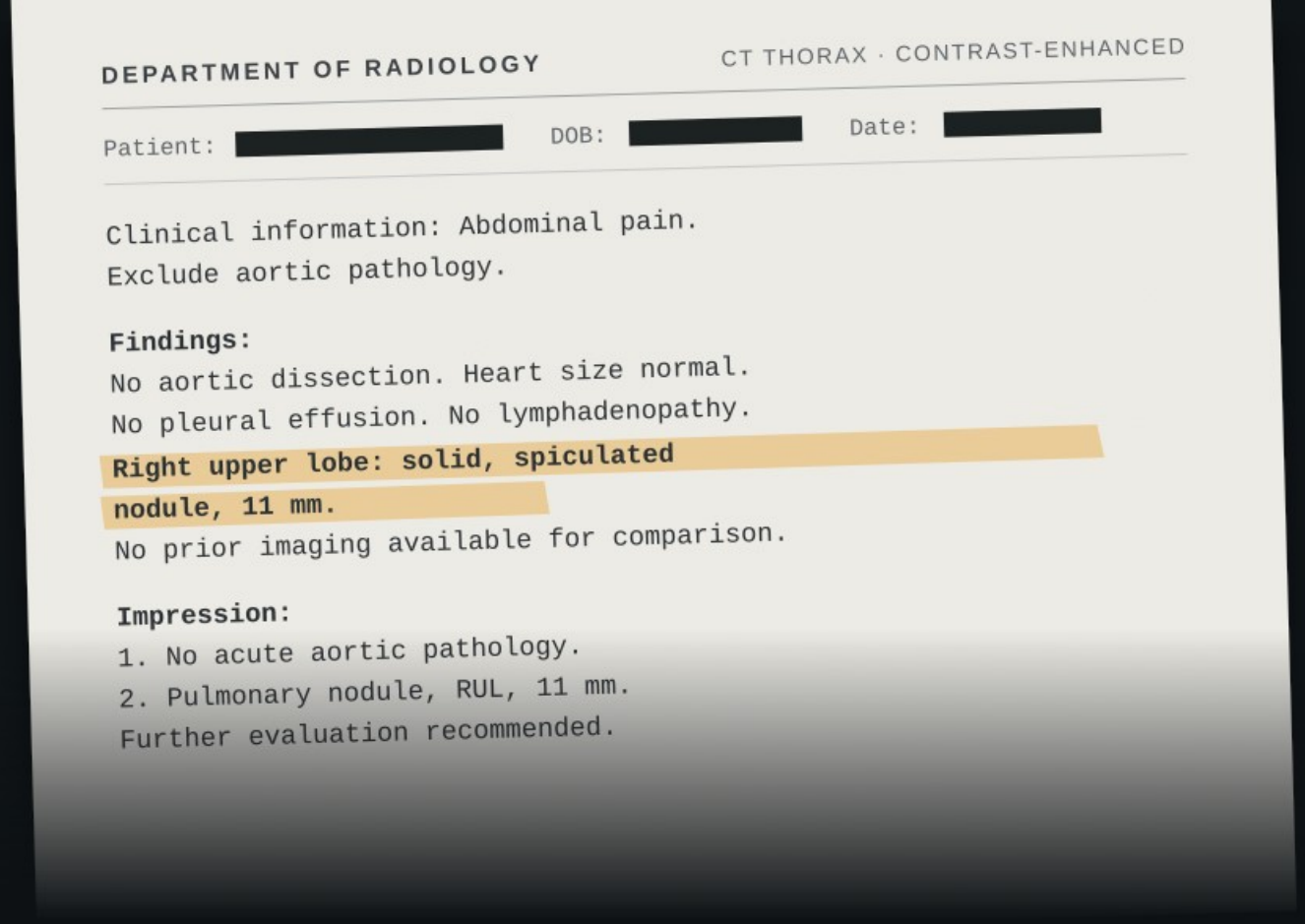


≈2 will have cancer

≈58 will not

The challenge: find the 2 — without harming the 58.

USA only. Gould MK, et al. AJRCCM 2015: ~1.57 million adults/year with a pulmonary nodule (≈3 per minute); ~4% diagnosed with lung cancer.



“We found something on your lung.”

11 mm. Nothing more. Yet everything changes.

Illustrative report • Gould MK, et al. AJRCCM 2015: ~1.57 million Americans/year have a nodule identified.

MORE CT. MORE NODULES. MORE DECISIONS.

9,955 → 20,476

+106%

CT volume

38 → 50%

reports mentioning a nodule

9 → 17%

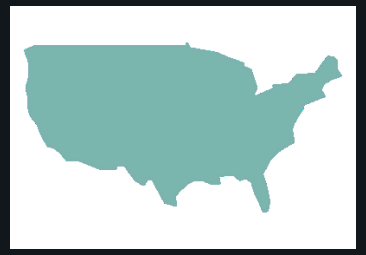
new significant nodules ≥5 mm

More CT means more nodules — and more decisions.

Hendrix W, et al. Eur Radiol. 2023;33:8279–8288 (single academic centre, the Netherlands).

LDCT SCREENING IS EXPANDING.

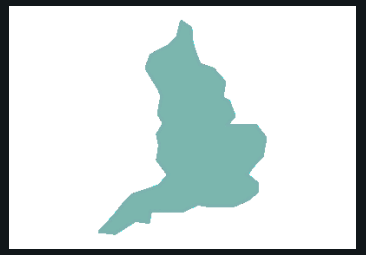
Not everywhere in the same form — but the direction is clear.



USA

2013 →

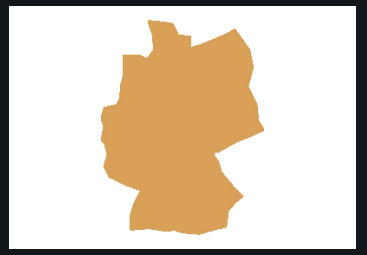
national recommendation



ENGLAND

2023 → 2030

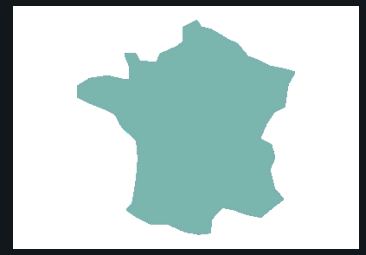
national rollout



GERMANY

APR 2026

statutory care



FRANCE

2025 →

20,000-person pilot

76% VS **30%**

stage I–II at diagnosis
England • lung checks vs before roll-out

Screening nodule → Lung-RADS • Incidental nodule → Fleischner / BTS

ACR Lung-RADS v2022 • USPSTF 2013/2021 • NHS England (Roy Castle briefing, Feb 2025) • G-BA Germany 2026 • France INCa IMPULSION pilot, Sept 2025.

MOST ARE NOT CANCER.
BUT THE ONES THAT ARE MATTER.

LUNG CANCER AMONG INCIDENTAL NODULES

6%
Denmark

4%
USA • 1.57 million patients

5-YEAR SURVIVAL

92%
stage IA1

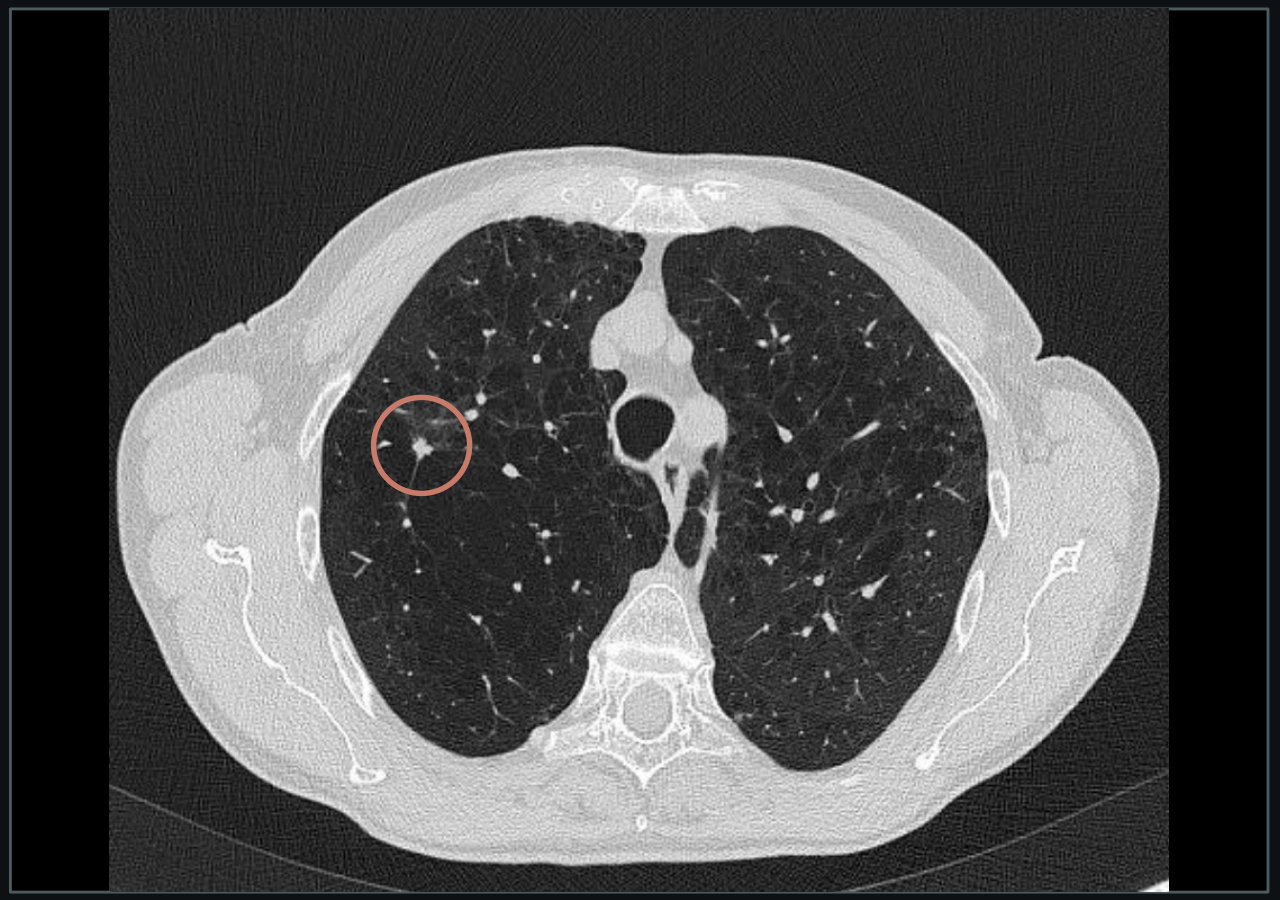
<10%
stage IV

The challenge is not finding nodules. **It is finding the right minority — in time.**

Over-investigate → harm the many. Under-investigate → lose the few when they were curable.

Vindum HH, et al. Clin Lung Cancer. 2023;24:673–681 • Gould MK, et al. AJRCCM. 2015;192:1208–1214 • Goldstraw P, et al. J Thorac Oncol. 2016;11:39–51 (IASLC 8th ed.).

HOW DO WE FIND THE RIGHT 6%?



78 years

40 PY smoker

11 mm solid

WOMAN • RUL • SPICULATED • EMPHYSEMA

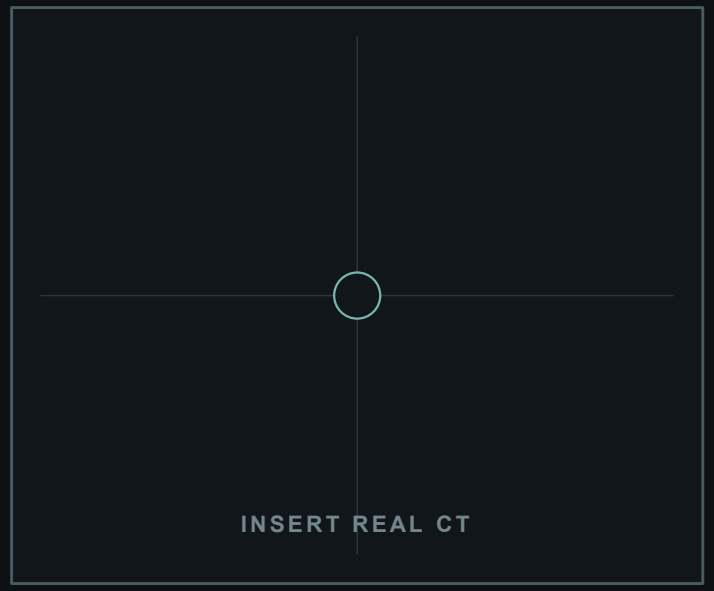
PATIENT A

Cancer — or not? Keep your answer.

We will follow exactly this patient through the talk.

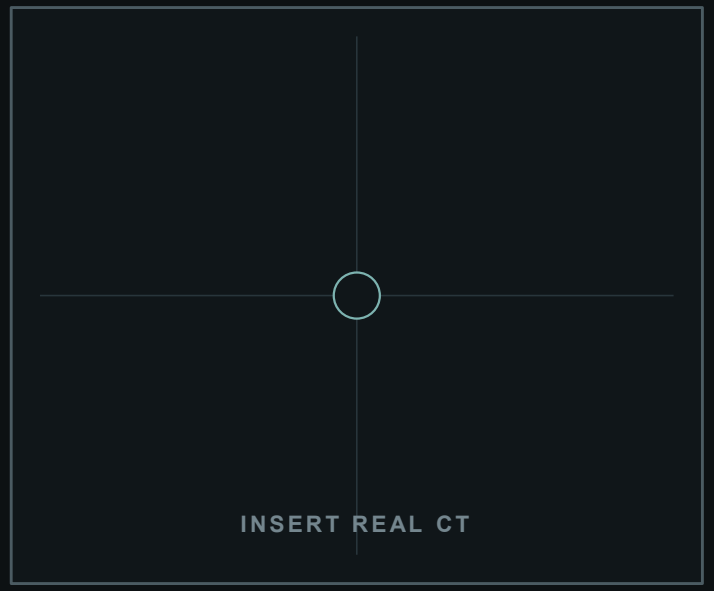
FIRST, NAME THE PHENOTYPE.

Three phenotypes. Three different diseases. *Crude cancer rates in screening — not size-matched.*



SOLID

7% malignant



PART-SOLID

63% malignant



PURE GROUND-GLASS

18% malignant

Make sure you are scoring the right lesion.

Henschke CI, et al. AJR Am J Roentgenol. 2002;178:1053–1057 (ELCAP baseline screening) • MacMahon H, et al. Radiology. 2017;284:228–243.

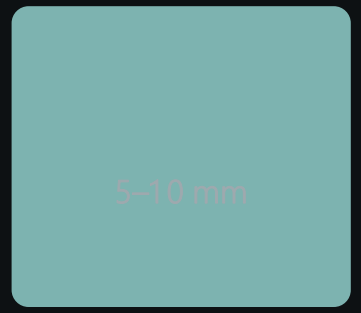
SIZE FINDS THE ZONE. GROWTH CHANGES THE STORY.

SIZE

0.4%

<5 mm

= no nodule at all



15.2%

≥10 mm

go to work-up

IN 5–10 MM NODULES, GROWTH DECIDES

0.8%

VDT ≥600 days

4.0%

400–600 days

9.9%

≤400 days

×12 vs slow

Growth converts "watch" into "act."

Lung-cancer probability, NELSON screening cohort (heavy smokers) • VDT assessed in intermediate nodules only

The cheapest test in nodule medicine is the old CT.

Horeweg N, et al. Lancet Oncol. 2014;15:1332–1341 (NELSON).

SUBSOLID NODULES PLAY A DIFFERENT GAME.



5 YEARS STABLE
≠
BIOLOGICALLY DONE

GREW AFTER YEARS OF STABILITY

2%
≥6 mm • after 5 y

5%
pooled • after ≥2 y

13%
10-y follow-up • after 5 y

Late growth was usually slow and rarely changed outcome.

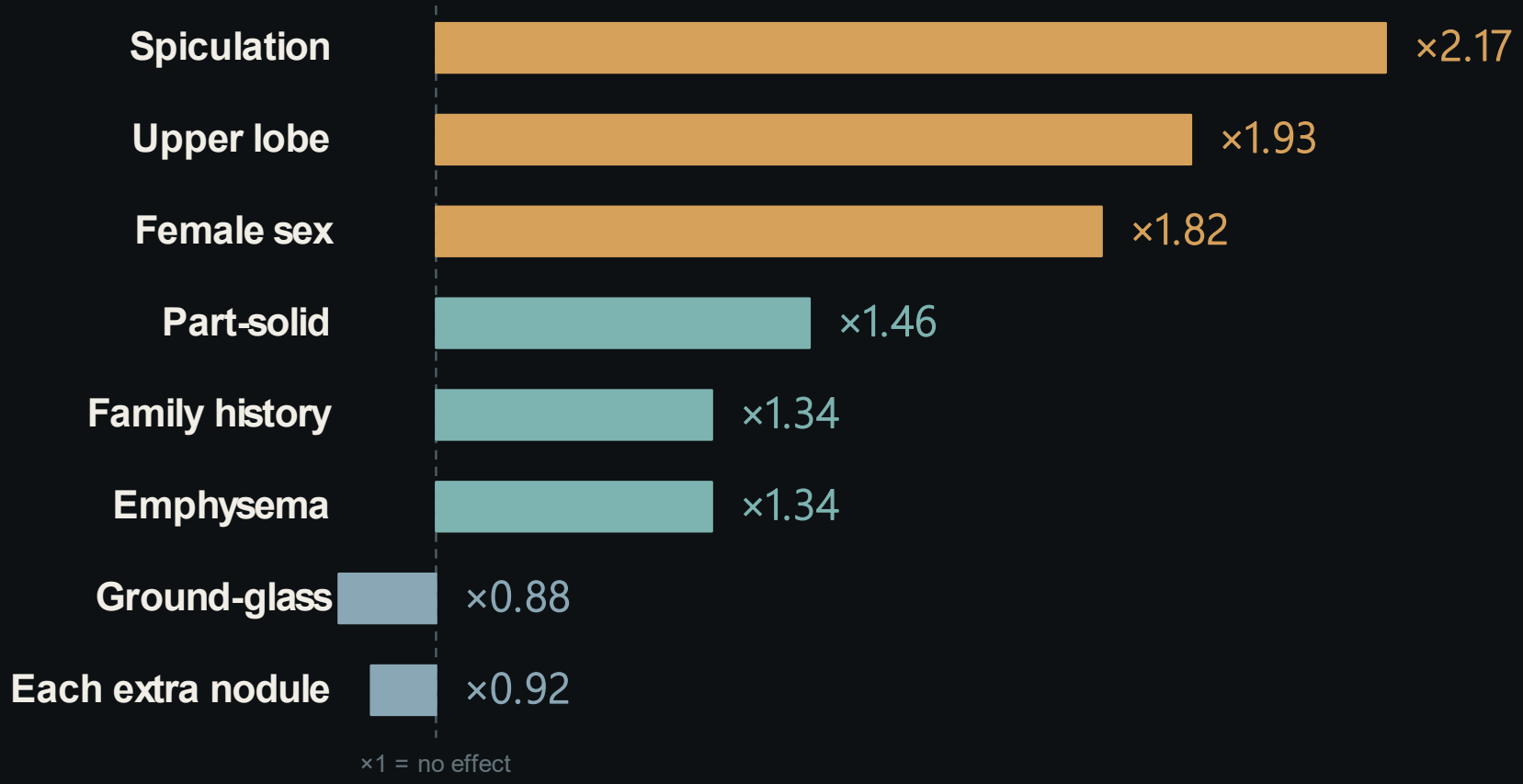
Part-solid → more attention. Pure GGO → more patience.

Don't discharge too early — and don't panic either.

Lee JH, et al. Radiology. 2020 (doi:10.1148/radiol.2020191921) • Systematic review & meta-analysis of SSN growth, 2023 (PMC9935651) • Lee HW, et al. J Thorac Oncol. 2019.

RISK IS MORE THAN SIZE.

Size dominates. But in the Brock model, these features multiply the odds of cancer:



McWilliams A, et al. N Engl J Med. 2013;369:910–919 (Brock/PanCan full model, odds ratios from published coefficients). Age and size enter as continuous variables.

EVERY MODEL HAS A BIRTHPLACE.

MAYO 1997

Incidental nodules

chest radiographs • Mayo Clinic, USA

23%

of nodules were cancer
~1 in 4

Age • smoking • prior cancer • size • spiculation • upper lobe

BROCK 2013

Screening nodules

low-dose CT • Canadian smokers

1.5%

of nodules were cancer
102 of 7,008

Age • sex • family history • emphysema • size • type • count • spiculation • upper lobe

Same nodule, different worlds. Neither was built on our patients.

Swensen SJ, et al. Arch Intern Med. 1997;157:849–855 • McWilliams A, et al. N Engl J Med. 2013;369:910–919 (PanCan derivation cohort). Both are pre-PET models.

SAME NODULE. 41% OR 56%.

41%

if she were a man: 27%

56%

Same patient. Different birthplace. Different number.

“Forty-one percent” always needs a second sentence: according to which model — built on whom?

Calculated with published coefficients: woman, 78 y, 40 PY, solitary solid 11-mm spiculated upper-lobe nodule, emphysema, no family history. Brock full model; Mayo (Swensen 1997).

A MODEL MATTERS ONLY IF IT CHANGES WHAT YOU DO.

≥8 mm OR ≥300 mm³ → **10%**

BTS ACTION THRESHOLD

<10% CT surveillance

≥10% PET-CT → refine risk

A threshold is not a diagnosis. It is a decision point.

ACCP: clinical judgement or Mayo — <5% / 5–65% / >65% • different numbers, same logic

Callister MEJ, et al. Thorax. 2015;70 Suppl 2:ii1–ii54 (BTS) • Gould MK, et al. Chest. 2013 (ACCP) • MacMahon H, et al. 2017 (Fleischner).

PET CHANGES PROBABILITY. IT DOES NOT GIVE THE DIAGNOSIS.

SAME NODULE • HERDER PROBABILITY BY FDG UPTAKE

ABSENT	FAINT	MODERATE	INTENSE
7%	41%	88%	89%

< 10%	10–70%	> 70%
SURVEILLANCE	INDIVIDUALIZE	SURGICAL PATHWAY*

*if fit and properly staged

FDG uptake graded against the mediastinum

One scan can move the same patient from 7% to 89%.

Herder GJ, et al. Chest. 2005;128:2490–2496 • BTS 2015. Calculated for this case with the published Herder coefficients.

TWO RULEBOOKS: SIZE, TYPE → ACTION.

FLEISCHNER 2017

Incidental CT • adults ≥ 35 • solid, single nodule

< 6 mm	No routine follow-up (high risk: optional CT at 12 mo)
6–8 mm	CT at 6–12 months, then (consider) 18–24 months
> 8 mm	CT at 3 months, PET-CT or tissue sampling

Not for: screening • known cancer • immunosuppressed.
Low / high-risk patient changes the small-nodule rules.

LUNG-RADS v2022

Screening LDCT only • solid nodule • category → action

1 – 2	< 6 mm or benign	12-mo LDCT • <1%
3	6 – <8 mm	6-mo LDCT • 1–2%
4A	8 – <15 mm	3-mo LDCT ± PET • 5–15%
4B / 4X	≥15 mm, growing, or spiculated	PET / tissue • >15%

Germany 2026: modified Lung-RADS + volume doubling time, CAD software, second reader at a lung centre.

Rulebooks give an action by size and type. Calculators give a percentage for this patient.

MacMahon H, et al. Radiology 2017;284:228–243 • ACR Lung-RADS v2022 (solid nodules shown; subsolid have separate rules) • Hessisches Ärzteblatt 04/2026.

MANY TOOLS. THREE QUESTIONS.

1 Where was the nodule found?

SCREENING CT

LUNG-RADS

category 1–4X → fixed action

INCIDENTAL CT

FLEISCHNER / BTS

size + type + low / high-risk patient

RULEBOOK

2 ≥ 8 mm? How likely is cancer?

BTS USES

B ROCK

born in screening (Canada)

ACCP USES

MAYO

or clinical judgement • born in incidental

CALCULATOR • % FOR THIS PATIENT

3 PET done? Update the number.

AFTER PET

HERDER

Mayo + PET uptake
(absent / faint / moderate / intense)

BTS after PET:
<10% watch • 10–70% biopsy • >70% treat

CALCULATOR, UPDATED

LOW →

MIDDLE →

HIGH →

Different tools. Different birthplaces. The same logic: watch, work up, treat.

MacMahon H, et al. Radiology 2017 (Fleischner) • ACR Lung-RADS v2022 • Callister MEJ, et al. Thorax 2015 (BTS) • Gould MK, et al. Chest 2013 (ACCP) • Swensen 1997 • McWilliams 2013 • Herder 2005.

THE NEIGHBOURS ALREADY TESTED IT.

ANKARA 2024 • AUC IN THE ORIGINAL STUDY → IN A TURKISH SURGICAL COHORT (n = 351)

BROCK	MAYO	HERDER
0.96 → 0.70	0.79 → 0.72	0.92 → 0.79

17%

average Brock risk of the BENIGN nodules
above the 10% line — most benign nodules would still be sent to PET

The logic travels. The numbers must be checked.

No Syrian validation exists. Surgical cohort, 64% malignant — a signal, not proof.

Nomenoğlu H, et al. Updates Surg. 2024;76:2903–2915.

SAME PET. DIFFERENT MEANING.

COLD PET

89%

sensitivity — stays high everywhere

Reassuring

except < 8 mm, ground-glass, carcinoid

HOT PET

77% → 61%

specificity — falls where infection is common

21 of 25 tuberculomas were hot

a hot PET does not separate TB from cancer

Here, a hot PET is a reason to sample — not a ticket to the OR.

Deppen S A, et al. JAMA 2014 (meta-analysis: sensitivity 89%; specificity 77% non-endemic vs 61% endemic) • Zheng Z, et al. 2011 (tuberculomas).

NO PET? YOU STILL HAVE CT, TIME AND TISSUE.

CT

Read it properly

Benign calcification or fat
→ **stop**

Enhances ≤ 15 HU
→ **cancer unlikely**

TIME

Repeat CT in ~3 months

Shrinks or disappears
→ **likely infection**

Grows
→ **act**

TISSUE

Stage first, then sample

CT chest + abdomen, brain
EBUS if nodes are big
CT-guided needle
or bronchoscopy

No PET also means no PET staging — stage before you operate.

Swensen SJ, et al. Radiology 2000 (≤15 HU: sensitivity 98%, specificity 58%) • BTS 2015 • ACCP/CHEST 2013.

TWO ROADS TO THE SAME NODULE.

First randomised trial • 234 patients • nodules 10–30 mm

THROUGH THE AIRWAY

navigation bronchoscopy

CORRECT DIAGNOSIS

79%

NEEDED A CHEST TUBE OR ADMISSION

1 in 120

≈

THROUGH THE CHEST WALL

CT-guided needle biopsy

CORRECT DIAGNOSIS

74%

NEEDED A CHEST TUBE OR ADMISSION

1 in 9

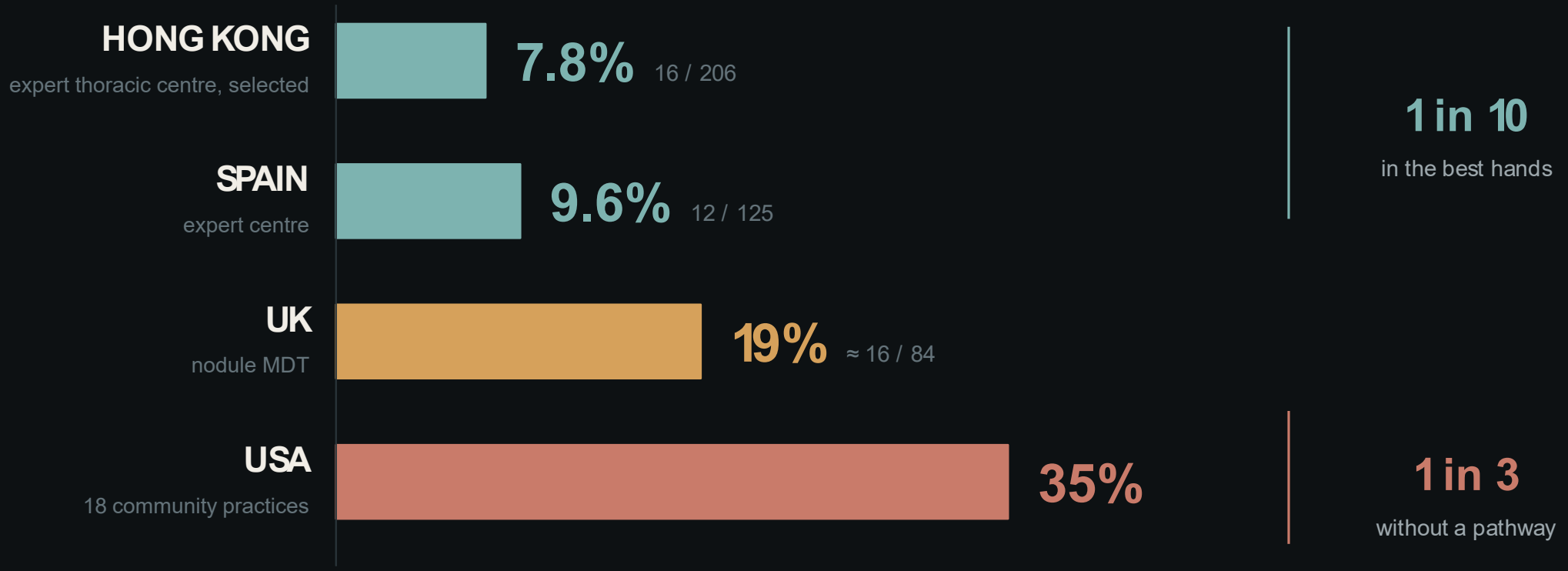
Same accuracy. Very different price.

Pneumothorax 3% vs 28%. VERITAS changes HOW we take tissue — not WHETHER we need it.

Lentz RJ, et al. N Engl J Med. 2025;392:2100–2112. 7 US expert centres • EM navigation + digital tomosynthesis (not robotic) • chest tube/admission 0.8% vs 11.5%.

NO TISSUE, STRAIGHT TO THE OR: HOW OFTEN IS IT BENIGN?

Benign at final pathology — patients resected without a preoperative diagnosis



Surgery without tissue is a legitimate choice — when probability is high and the pathway is good.

Sihoe ADL, Eur J Cardiothorac Surg 2013 • Obeso Carillo GA, Korean J Thorac Cardiovasc Surg 2014 • Marathe O, Eur Respir J 2021 (abstract) • Tanner NT, Chest 2015 (industry-funded).

OPERATE FIRST — OR TISSUE FIRST?

OPERATE FIRST IS REASONABLE

WHEN ALL ARE TRUE

- High probability of cancer (> 65–70%)
- Fit for lobectomy
- Staged: no nodes, no metastases
- Biopsy unsafe or would not change the plan
- Patient informed and agrees

TAKE TISSUE FIRST

WHEN ANY IS TRUE

- TB or infection is plausible
- Intermediate probability
- Enlarged nodes → stage first (EBUS)
- Several nodules
- Not fit for surgery → tissue before SBRT

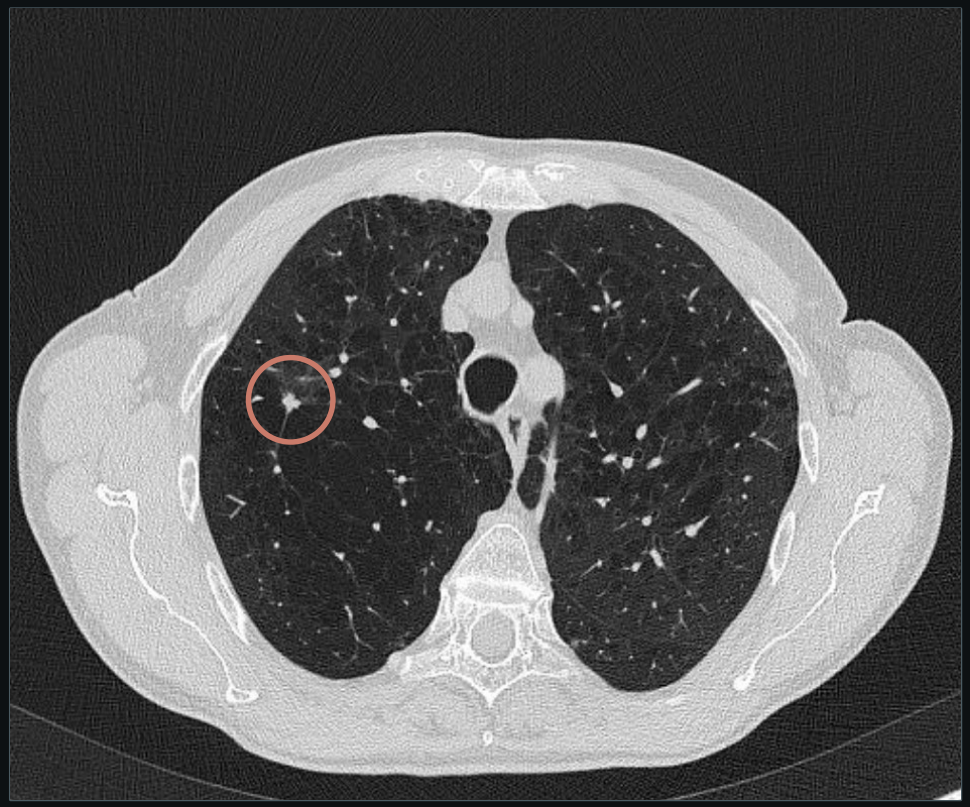
24% → 12%

Benign resections halved after a nodule & interventional-pulmonology pathway — granuloma-endemic region (Vanderbilt).

No tissue? Wedge + frozen section before lobectomy — and frozen section can mistake a granuloma for cancer.

BTS 2015 (>70%) • ACCP 2013 (>65%; suspected TB/fungal → nonsurgical biopsy) • Brown LB, J Bronchology Interv Pulmonol 2019 • Meteroğlu F, case report 2014.

BACK TO THE PATIENT. A SEQUENCE OF DECISIONS.



1 **CLASSIFY**

Solid • 11 mm • spiculated • upper lobe

2 **QUANTIFY**

Brock 41% → above 10% → PET

3 **ESCALATE**

SUV 5.5 → Herder 88%

4 **FIND THE OLD CT**

5 mm (May 2025) → twice the size → Lung-RADS 4B / 4X

5 **DECIDE**

All conditions met → VATS segmentectomy, no biopsy

In Germany, all were true. In Syria, ask first: could it be TB?

Real case, Bergmannsheil Buer (anonymised). Calculations: Brock full model, Mayo, Herder — published coefficients.

WHAT IT WAS.

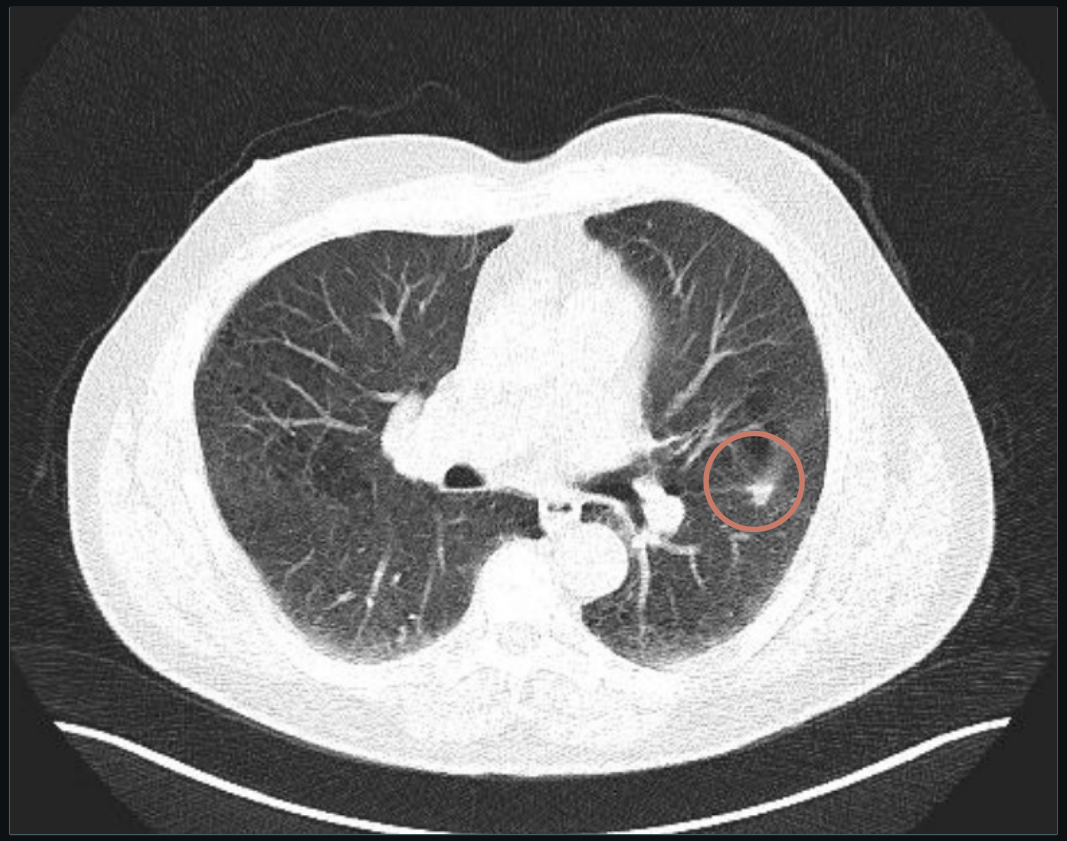
LARGE-CELL NEUROENDOCRINE CARCINOMA

Clinical stage IA2 • completely resected (R0) • VATS segmentectomy

Found at the moment it was still curable.

cT1b N0 M0, UICC 9th edition (2024). Pathology: R0; PD-L1 TPS 20%.

PATIENT B. ANOTHER HOT NODULE.



62 years

24 PY smoker

13 mm solid

MAN • LEFT LOWER LOBE (S6) • ILL-DEFINED • EMPHYSEMA

NO PRIOR CT

BROCK	MAYO	HERDER
8%	12%	58%

PET: nodule SUVmax 5.2 • axillary node SUVmax 7.0

LUNG-RADS: 4A → repeat LDCT in 3 months

All three tools: wait or sample. Decision: straight to surgery.

Real case, Bergmannsheil Buer (anonymised). Assumed: solid, solitary, no family history, moderate FDG uptake. Brock full model, Mayo, Herder — published coefficients.

WHAT IT WAS.

NO CANCER

Giant-cell, abscess-forming, organizing inflammation • 16 lymph nodes negative

SUV 5.5 → CANCER

A • woman, 78 • LCNEC

SUV 5.2 → INFLAMMATION

B • man, 62 • benign resection

Same clinic. Same PET. Opposite answers.

At the start, ___ of you chose A.

Pathology: chronic and florid giant-cell, focally abscess-forming, organizing inflammation; no malignancy; lymph nodes 0/16.

FOUR LINES TO REMEMBER.

01	FIND THE OLD CT.	Growth changes the story more than size.
02	TURN "SUSPICIOUS" INTO A NUMBER.	Then ask where that number was born.
03	HERE, A HOT PET MEANS SAMPLE.	No PET? CT, time and tissue.
04	OPERATE FIRST ONLY WHEN ALL ARE TRUE.	Otherwise — tissue first.

2026 changed the route to tissue — not the logic.

AI and blood biomarkers: promising, not yet practice-changing in 2026.

THE BIOPSY DOOR GOT SAFER — NOT WIDER.

Bring the logic home. Let the numbers earn their place here.

SELECTED REFERENCES

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2. Vindum HH, et al. Clin Lung Cancer. 2023;24:673–681.
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RECENT EVIDENCE

11. Nomenoğlu H, et al. Updates Surg. 2024;76:2903–2915.
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21. Zheng Z, et al. South Med J. 2011 • ACR Lung-RADS v2022

Talk ends on slide 30.