

Serendipitous detection of pancreas cancer
during lung cancer screening
with low-dose computed tomography

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Overdiagnosis in cancer screening

- Solid evidence of overdiagnosis in screening for cancer of the breast, prostate, lung, neuroblastoma...
- Convincing evidence of overdiagnosis in screening for cancer of the kidney, thyroid...

Would there be overdiagnosis if
we screened for pancreas
cancer?

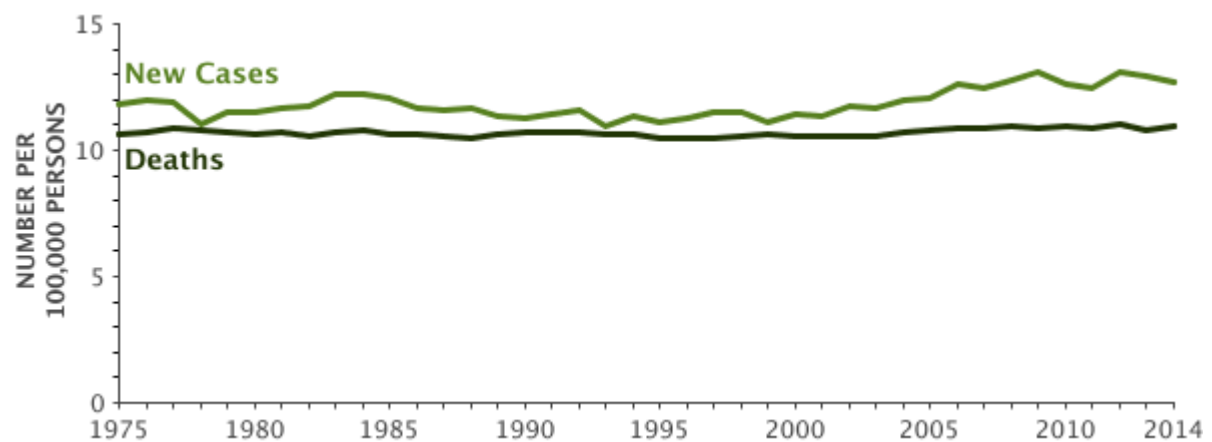
Thinking it through

- Arguments in favor of “probably”
 - Anecdotal reports and case series of detection of asymptomatic pancreas cancer
 - Stony Brook University Hospital web site:
 - “Surprisingly, with the increasing use of CT scans to evaluate symptoms such as cough and kidney stones, approximately 20% of pancreas cancers are being detected “accidentally.””

Thinking it through

- Arguments in favor of “probably not”
 - Pancreas cancer is too lethal
 - Response: That’s what they said about lung cancer

Pancreas cancer incidence and mortality



- <https://seer.cancer.gov/statfacts/html/pancreas.html>

Do I have access to a data set in
which I can explore “screen”
detection of pancreas cancer?

Yes, I do!

The National Lung Screening Trial
(NLST)

NLST

- Randomized controlled trial of lung cancer screening
 - Intervention: low dose computed tomography (CT)
 - Control: chest x-ray
- Over 53,000 participants
- Ages 55-74 at randomization
- 2002-2010
- Each participant was offered 3 annual screens
- Follow-up for no less than 3.5 years (after final screen)

Why NLST?

- Goal was to image the lungs, but the pancreas may have been imaged in addition
- CT is known for its ability to detect asymptomatic conditions, including incidentalomas

Information available on NLST pancreas cancers

- Date of diagnosis
- Death certificate cause of death if deceased
- No information on stage at diagnosis for non-lung cancer cases
- No radiologist reports
- In other words, not a lot of information is available

Questions

- How many pancreas cancers were reported in the CT arm?
 - Was this greater than expected?
- Alive at the end of the study?
 - If not, cause of death
 - Time from diagnosis to death/end of study
 - Long survival time might indicate indolent lesions
- How close to a study screen was pancreas cancer diagnosed?
 - If within a year, what was the proximal screen result?

How many pancreas cancers were diagnosed in the CT arm?
More than expected?

Number of participants:	26,722
Number with known vital status as of 2009:	26,106
Number with confirmed pancreatic cancer diagnosis:	78
Very approximate number of expected pancreas cancer diagnoses*:	36
Very approximate observed to expected ratio:	2

*Average SEER incidence, 2002-2009 – 12.31 per 100,000 - multiplied by 2 to account for smoking;
person-years in CT arm: 144,103

How many pancreas cancers were alive at the end of NLST? Cause of death?

Number of pancreas cancers:	78
Number alive at the end of NLST:	10
Number deceased by the end of NLST:	68 (87%)
Death certificate cause of death - due to pancreas cancer:	61 (89% of decedents)
Other causes of death: Sepsis, malignant neoplasm (site not specified), malignant neoplasm (multiple primaries), nonrheumatic aortic (valve) stenosis, acute kidney failure, falls (n=2)	7

Time from diagnosis to death/end of study

	Median days (Range)
Alive at end of study (n=10)	337 (62-1119)
Deceased at end of study (n=68)	184 (7-1672)
Deceased due to pancreas cancer (n=61)	176 (7-798)
Deceased due to another cause (n=7)	277 (16-1672)

How close to a study screen was pancreas cancer diagnosed?

	First screen (T0)	Second screen (T1)	Third screen (T2)
Within a year after a screen	15	12	12
More than a year after a screen	61	45	32
No screen	2	18	31
Diagnosed prior to screen	0	3	3

If within a year, what was the proximal screen result?

	First screen (T0)	Second screen (T1)	Third screen (T2)
Clinically significant abnormality not suspicious for lung cancer*	2	1	1
Suspicious for lung cancer	5	4	2
Negative or minor abnormality	8	7	9

***All deceased at end of study. Cause of death was pancreas cancer.
Median survival time: 220 days (range: 169 – 618)**

Do these data suggest that there could be overdiagnosis if we screened for pancreas cancer?

I don't know

- Observed to expected ratio of 2 is provocative but...
 - Only 4 were diagnosed following a screen suspicious for something other than lung cancer
 - Another 11 were diagnosed following a screen suspicious for lung cancer
 - No more than 15 were “screen”-detected
 - Only half were diagnosed within a year of a screen
- Are these data at all useful?
 - Don't know if the pancreas was actually imaged
 - No information on stage at diagnosis

Thanks for your attention

Any questions?