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Cost-effectiveness

Prevent Cancer
2018 Dialogue for Action

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Disclosures

- The American Academy of Actuaries requires its members to disclosure their qualifications in making actuarial communications. I meet the Academy's qualification standards for this work.
- Funding for my work on lung cancer screening has come from Prevent Cancer, Lung Cancer Alliance, National Electrical Manufacturers Association, Legacy Foundation, and others (to a lesser extent).
- My employer (Milliman, Inc.) consults to organization in almost all healthcare sectors, with a concentration on the insurance industry.
- I am a Commission on the Medicare Payment Advisory Commission (MedPAC).

LDCT Screening is Cost Effective (Chest 2018)

Screening for Lung Cancer

CHEST Guideline and Expert Panel Report

Peter J. Mazzone, MD, MPH, FCCP; Gerard A. Silvestri, MD, FCCP; Sheena Patel, MPH; Jeffrey P. Kanne, MD, FCCP; Linda S. Kinsinger, MD; Renda Soylemez Wiener, MD, MPH; and

How can an intervention be cost-effective if it not effective?

Cost-effectiveness: PICO 8: What is the cost-effectiveness of LDCT screening of individuals at elevated risk of lung cancer, compared with either no screening or screening with another modality?

By most currently used standards in the United States, LDCT screening is considered cost-effective. Results from a systematic review that included data from 13 studies found that cost-effectiveness estimates for LDCT screening range from $18,452 to $66,480 per life year gained and $27,756 to $243,077 per quality-adjusted life-year gained.[71] A study published after the systematic review used microsimulation modeling to estimate the cost-effectiveness of lung cancer screening

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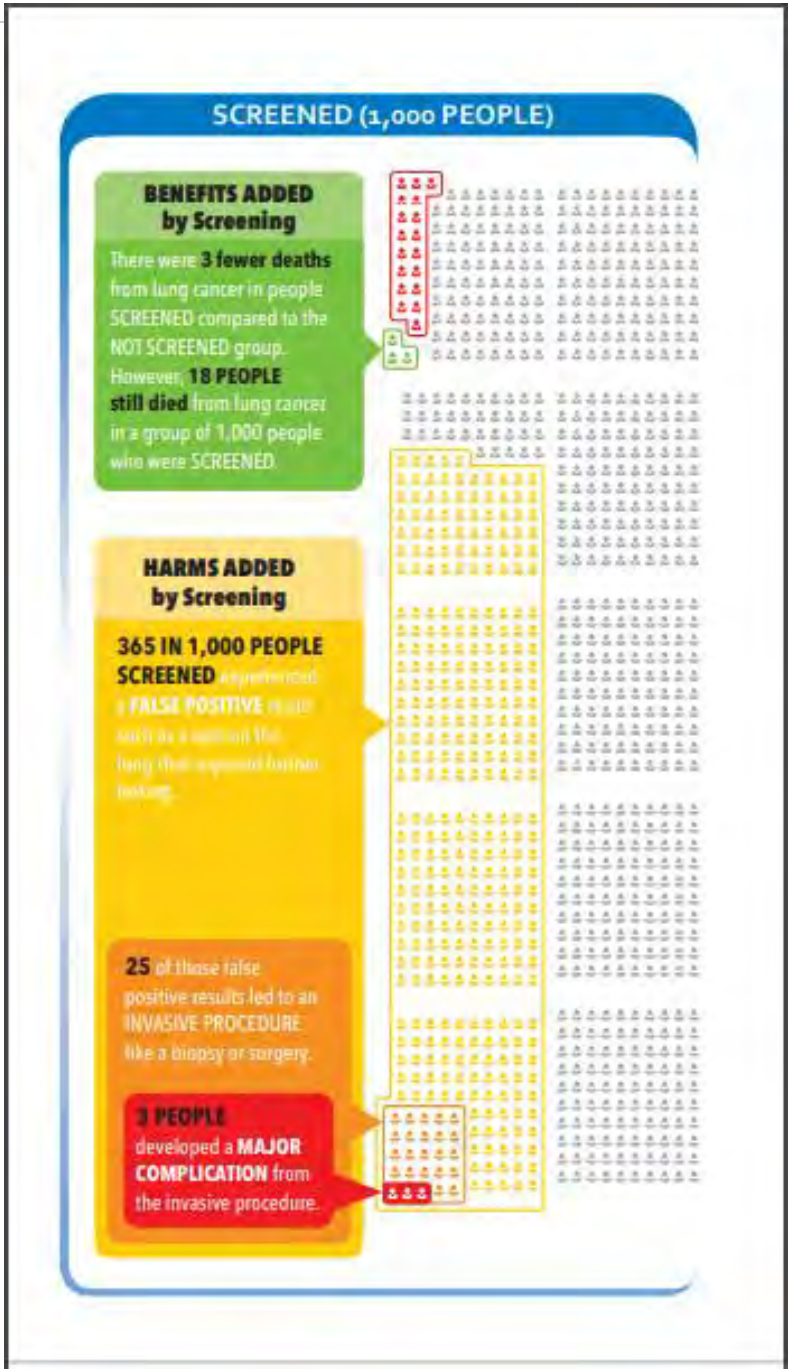
The Most-Used Patient Decision-Aid is Dead Wrong



https://www.thoracic.org/patients/patient-resources/resources/decision-aid-lcs.pdf

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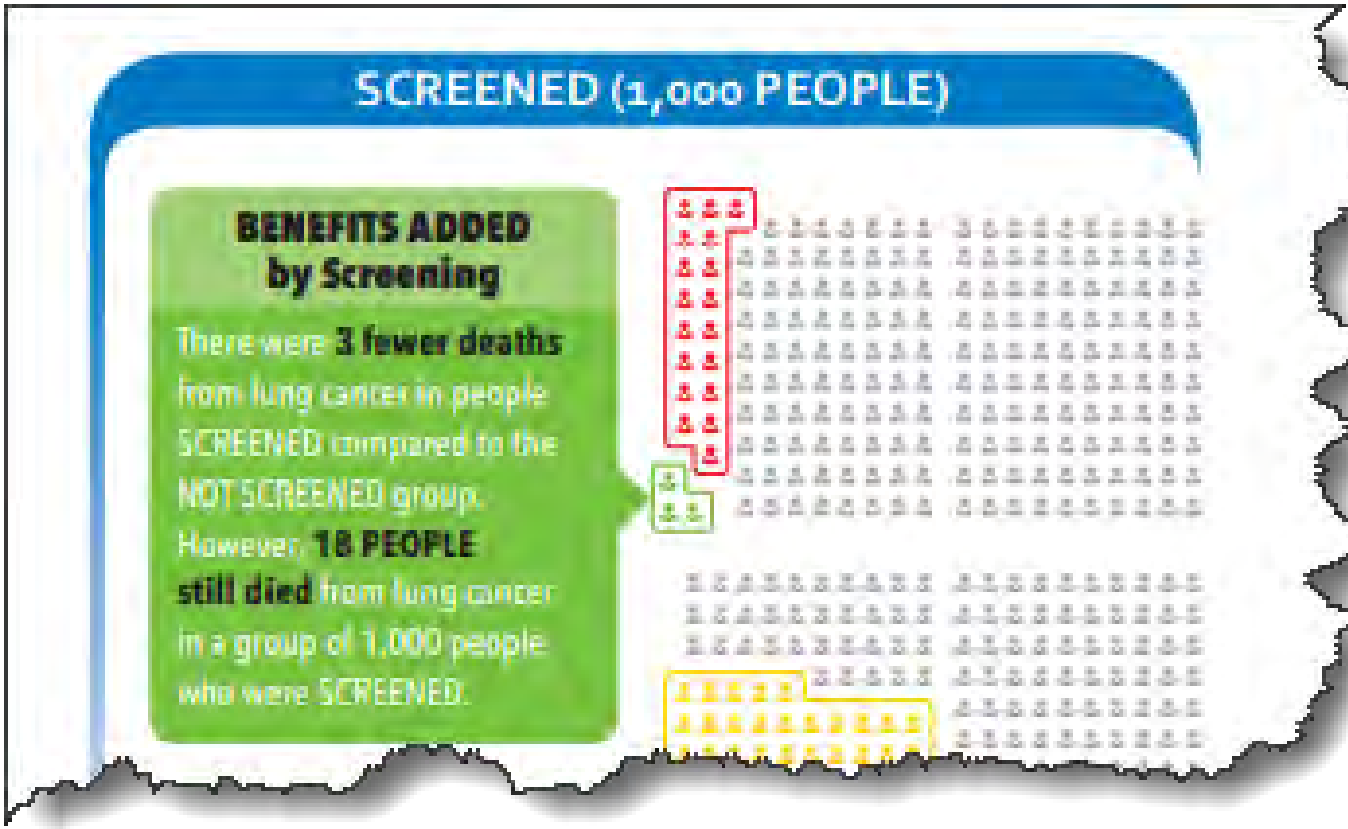
The Most-Used Patient Decision-Aid is Dead Wrong (1)

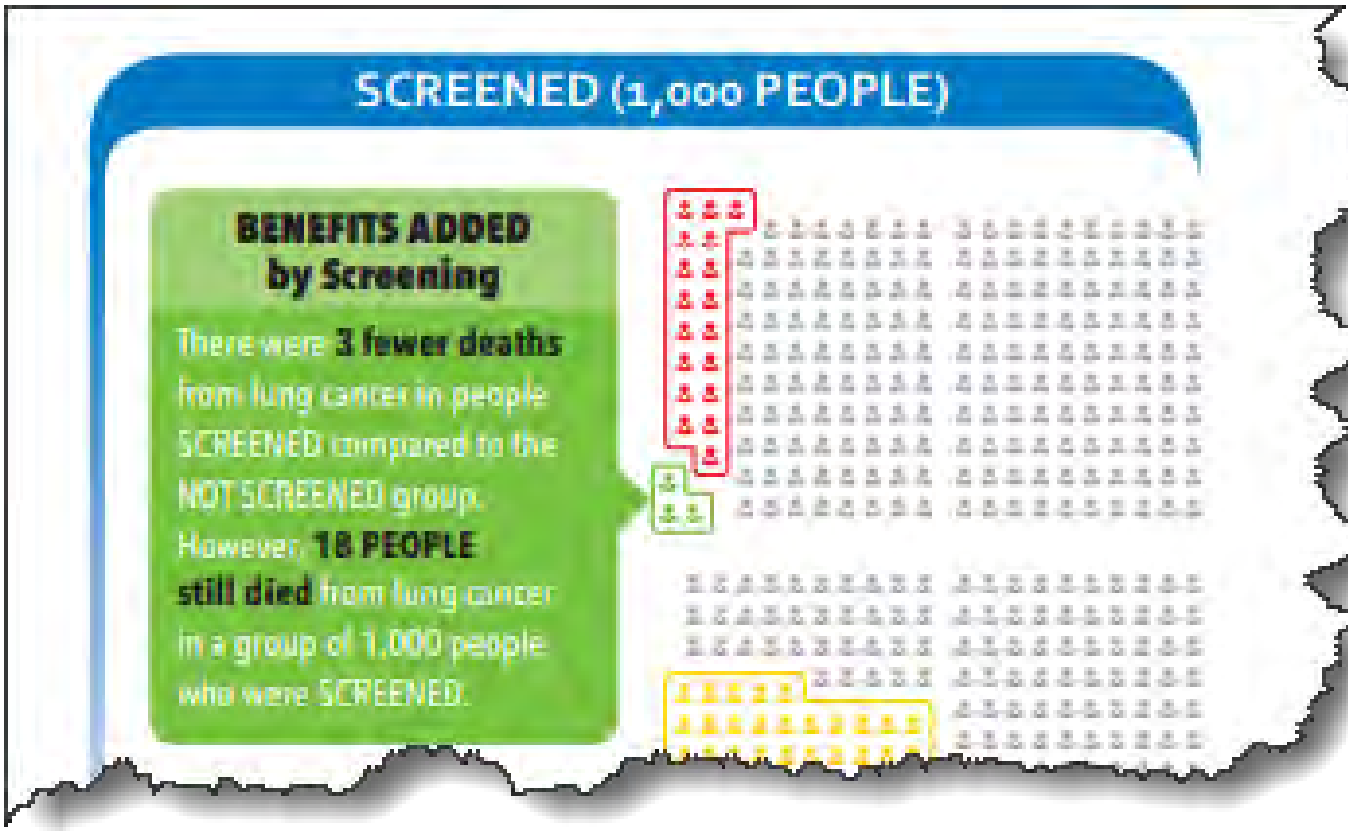
- The Aid says 21 out of 1,000 heavy smokers will die of lung cancer w/o screening
- But the fact is >200 heavy smokers will die of lung cancer w/o screening



WHO, http://monographs.iarc.fr/ENG/Monographs/vol83/mono83.pdf , p 174

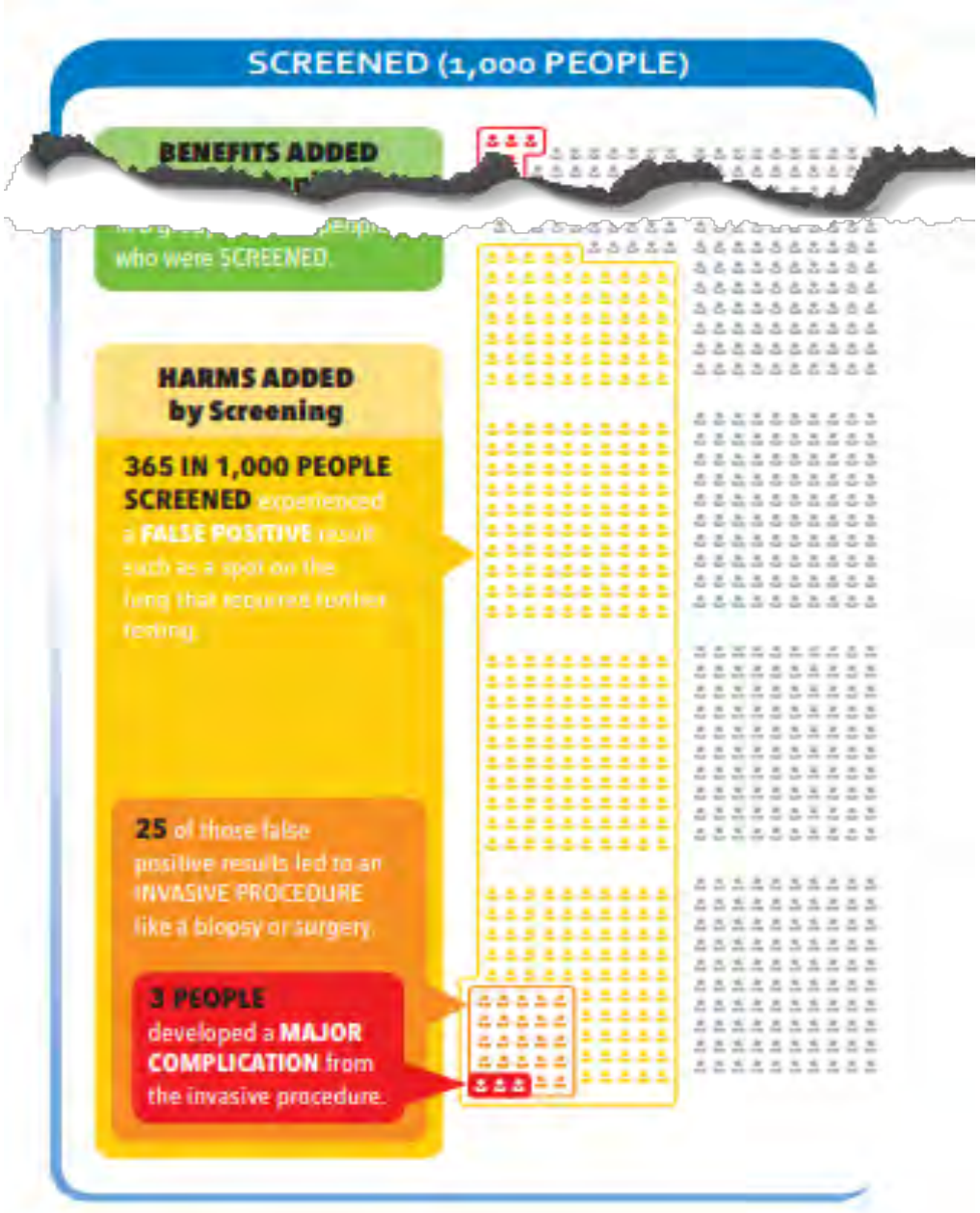
The Most-Used Patient Decision-Aid is Dead Wrong (2)

- The Aid says only 3 out of 21 fewer deaths (14% reduction) with screening
- But the fact is ~80% of deaths can be avoided with screening
  - More like 160 out of 200 deaths avoided
- Many modeling studies, eg, ten Haff, Performance and Cost-Effectiveness of Computed Tomography Lung Cancer Screening Scenarios, PLOS Medicine, 2017. I-ELCAP results.



The Most-Used Patient Decision-Aid is Dead Wrong (3)

- The Aid says only 354 out of 1000 people will be harmed
- But this is totally misleading.
  - They are counting findings of non-cancerous nodules as harms



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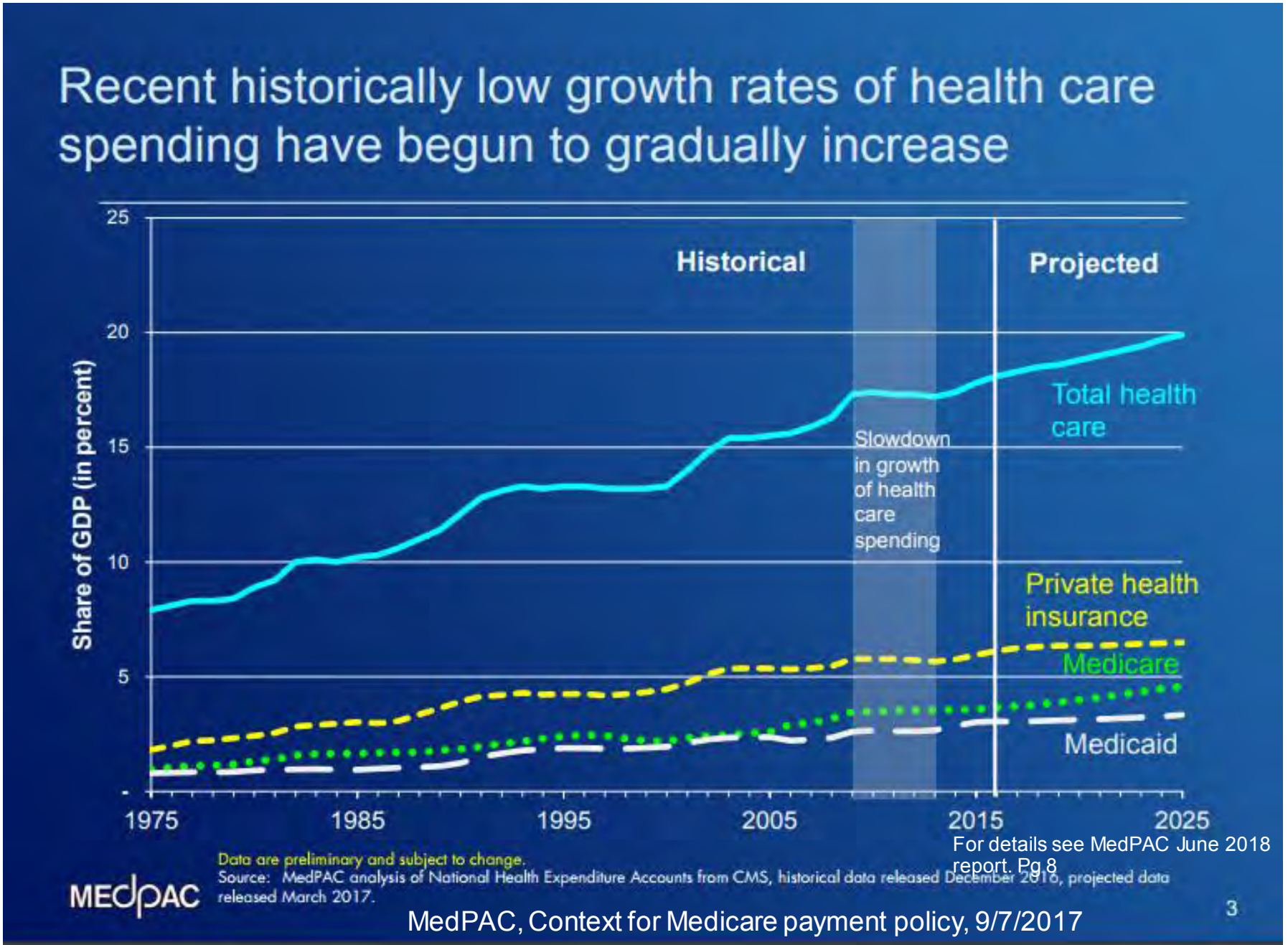
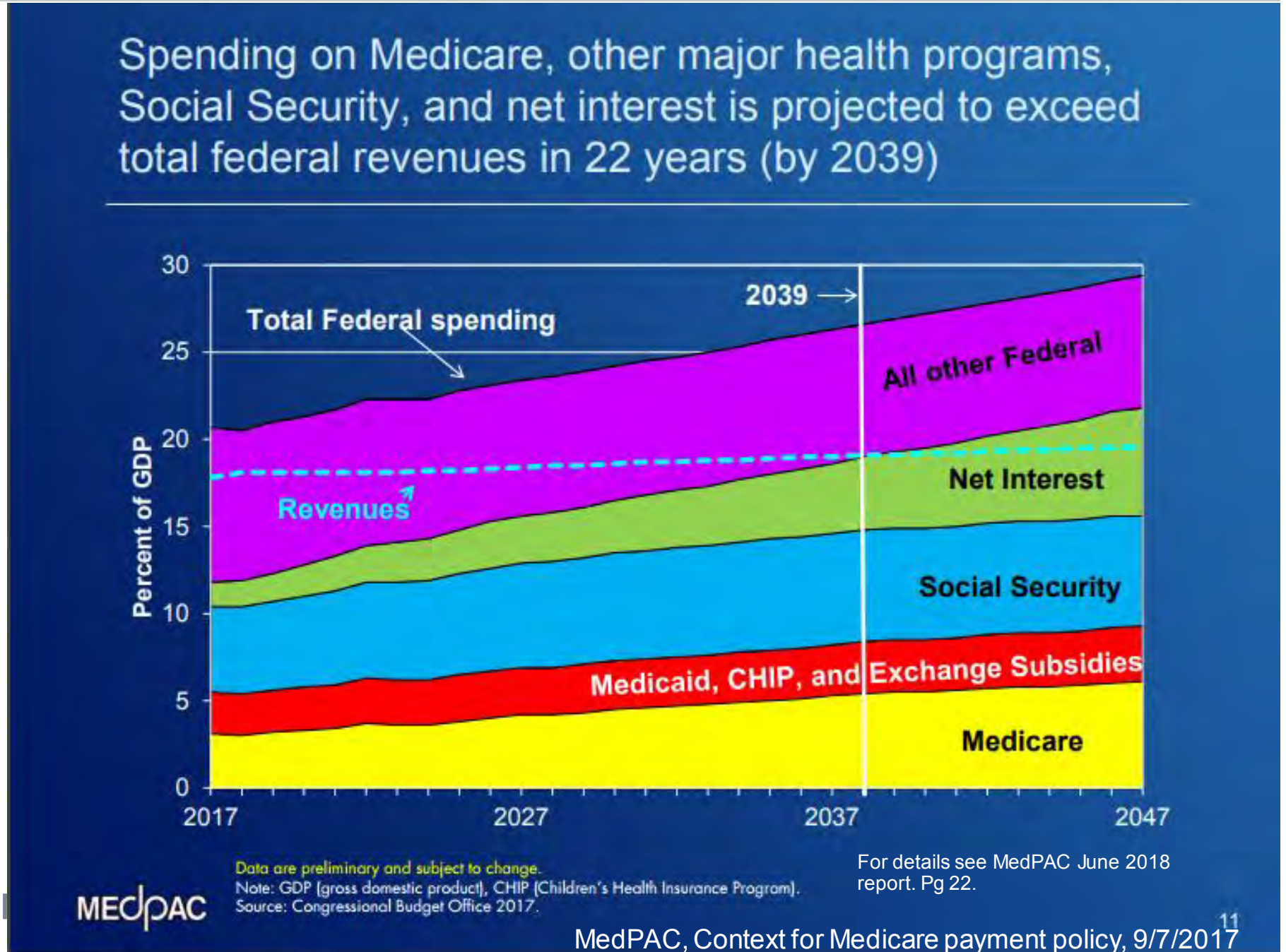
The Most Important Healthcare Issue of Our Time



For details see MedPAC June 2018 report. Pg 8

MedPAC, Context for Medicare payment policy, 9/7/2017

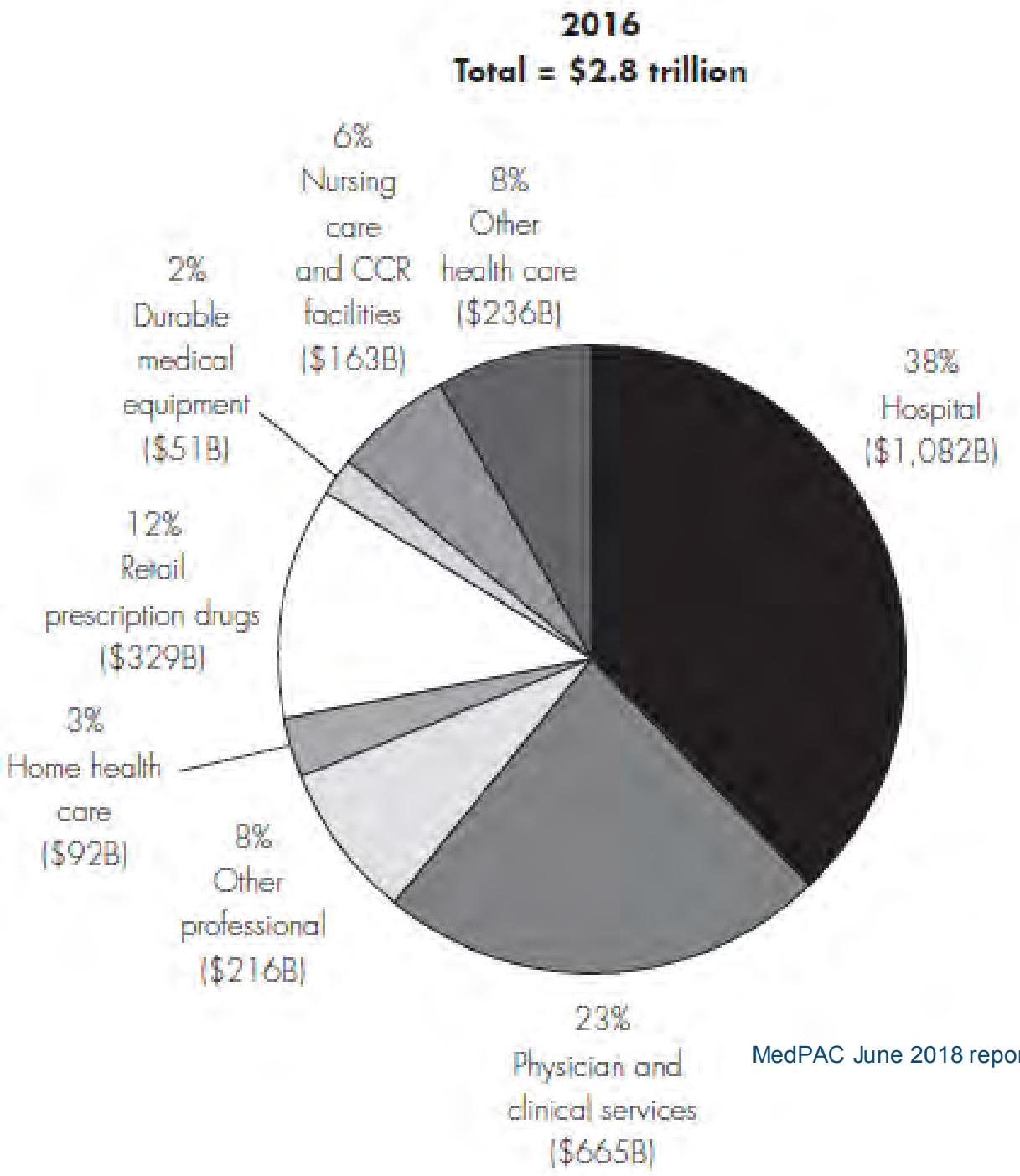
The Most Important Healthcare Issue of Our Time



For details see MedPAC June 2018 report. Pg 22.

MedPAC, Context for Medicare payment policy, 9/7/2017

Hospital and Physician take Largest Share

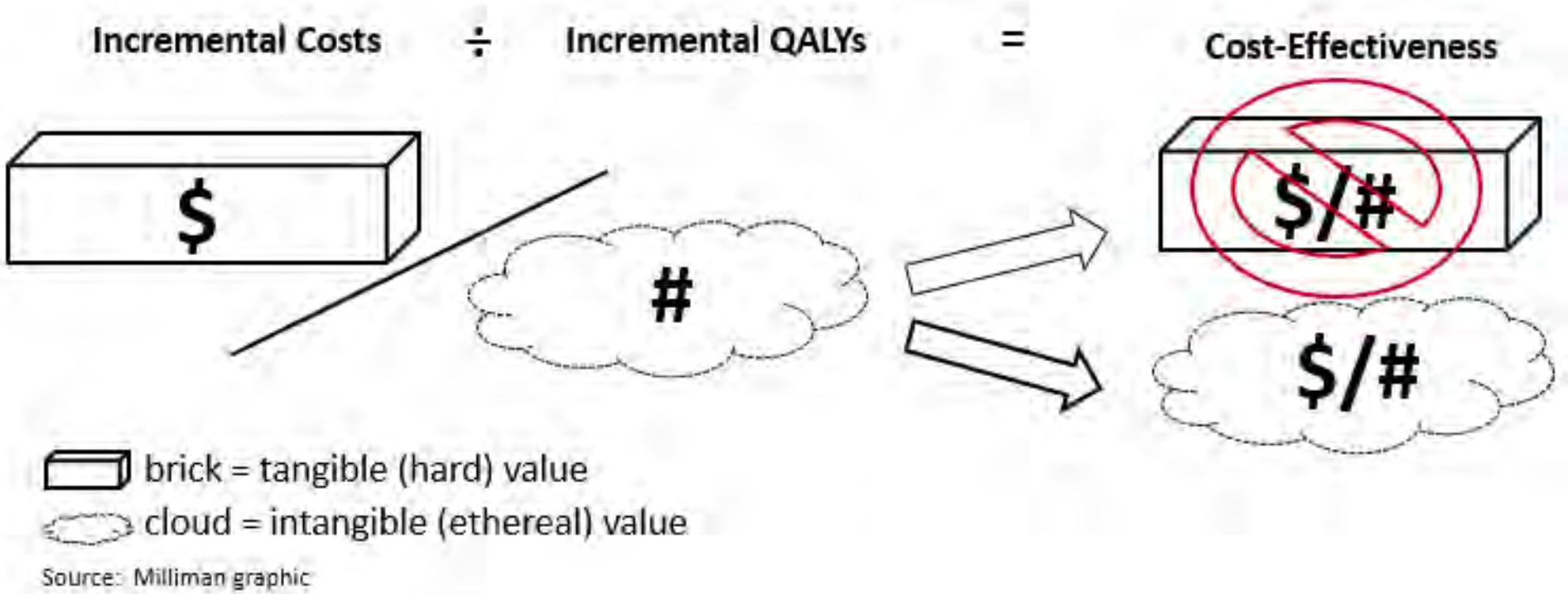


MedPAC June 2018 report. Pg 10

Cost-Effectiveness Analysis…To the Rescue?

- Cost-effectiveness analysis (CEA) strives to compare the "cost-benefit" of different interventions-with the goal of helping organizations decide which services to fund
- Most CEA use Quality Adjusted Life Years (QALYs), which is a scalar
  - QALY=1 means a year spent in perfect health
  - QALY=0 means a year spent dead
- Examples of the crude use of QALYs
  - A person who loses the use of their dominant hand
    - This person would have a lower QALY for the next year, perhaps a QALY of .8
    - Saving this person's life would count less than saving the life of someone with a QALY of 1.0
  - The US has MR/DD programs.
    - Some people who are severely mentally handicapped may have close to 0 QALY
    - Should we stop spending money on these programs?

QALYs are crude and ephemeral



Source: Milliman graphic

Fortunately, for Lung Cancer Screening, Studies that Use NLST or I-ELCAP Data All Show Favorable Cost-Benefit Results

Table 2 Comparison of key assumptions for several recent cost-effectiveness studies of lung cancer screening

Component	Black *et al*. (22) (NLST)	Valenti *et al*. (1)	Pyenson *et al*. (23)
Demographic	Medicare	Commercial	Medicare
Age (years)	55–74	50–64	50–74
Stage shift for base case	NLST	I-ELCAP	I-ELCAP
Pack-years	>30	>30	>30
Discount rates for life-years/cost/inflation	3%/3%/0%	0%/0%/0%	0%/0%/0%
Time horizon	Lifetime	Spending to age 65	Lifetime
Cost per LDCT*	$285	$180	$178
Basis for price of LDCT	2009 Medicare	Medicare diagnostic fee [2011] adjusted downward for screening	Medicare fee [2014]
Utilization for screening follow-up	NLST data	I-ELCAP data	I-ELCAP data
Price of care	Repricing NLST data	Actual commercial data	Actual Medicare data
Indirect cost	Time and travel	none	none
Base year	2009	[illegible]	[illegible]

Fortunately, for Lung Cancer Screening, Studies that Use NLST or I-ELCAP Data All Show Favorable Cost-Benefit Results

1. Huge mortality differences between early and late stage LC
2. A cure for the large majority of early stage cancers
3. Low cost screening with very low potential harms
4. A concentrated risk group
5. Readily available technology

Potential transformational system of care

Favorable cost/benefit implies favorable benefit

Why do the finance / economics people get it right – and the patient decision aid people get it wrong?

Cost-benefit: Each person goes through many years of screening…one year at a time. $ applied to each step.

Year 1: Screen, findings➔ follow-up, treatment, survival

Year 2: Screen, findings➔ follow-up, treatment, survival

Year 3: Screen, findings➔ follow-up, treatment, survival

Year 4: Screen, findings➔ follow-up, treatment, survival

Year 5: Screen, findings➔ follow-up, treatment, survival

Year 6: Screen, findings➔ follow-up, treatment, survival

Year 7: Screen, findings➔ follow-up, treatment, survival

Year 8: Screen, findings➔ follow-up, treatment, survival

Year 9: Screen, findings➔ follow-up, treatment, survival

Year 10: Screen, findings➔ follow-up, treatment, survival

Year 11: Screen, findings➔ follow-up, treatment, survival

Year 12: Screen, findings➔ follow-up, treatment, survival

Etc.

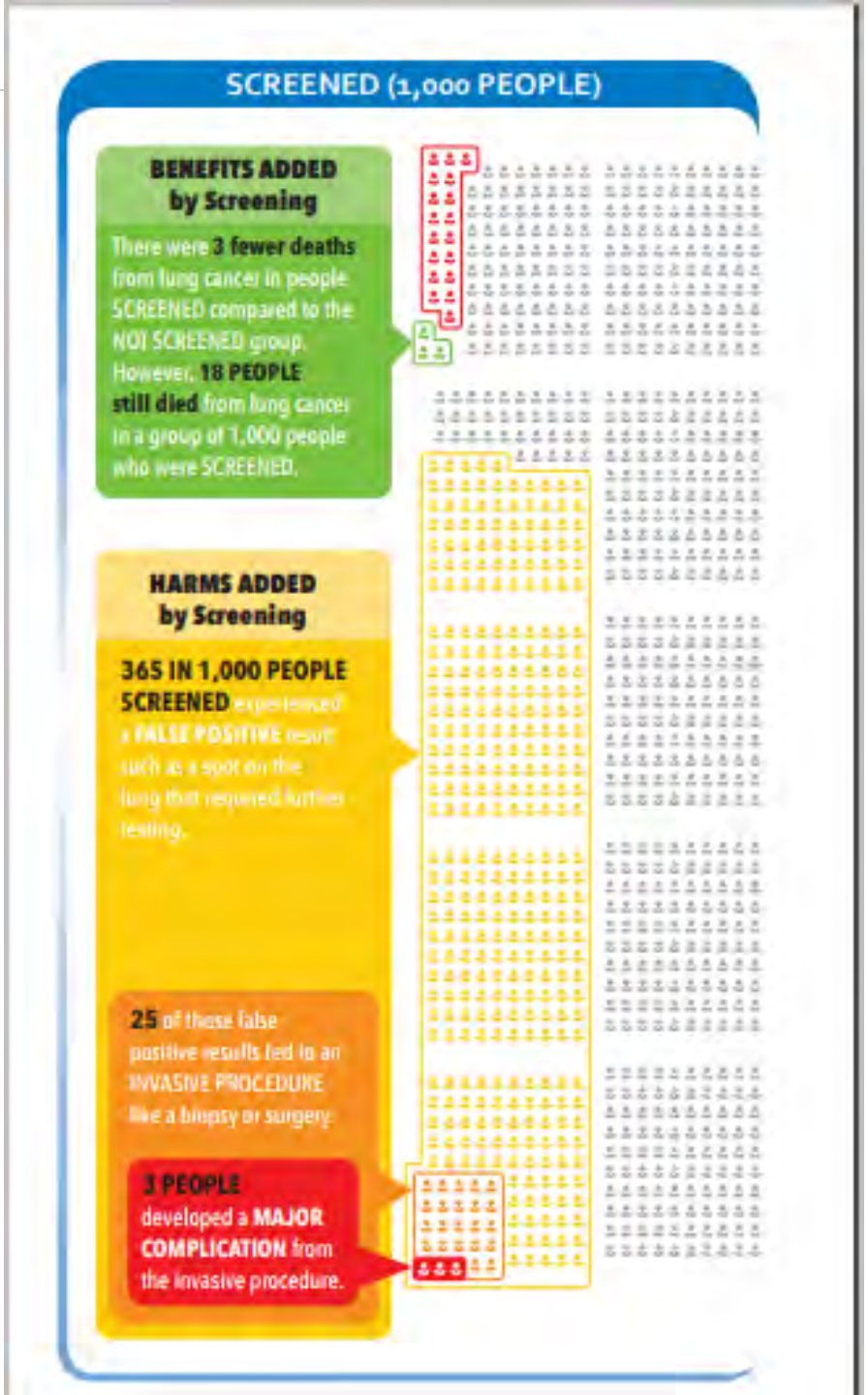
Naïve application of NLST

Year 1: Screen, findings➔ follow-up, treatment, survival
Year 2: Screen, findings➔ follow-up, treatment, survival
Year 3: Screen, findings➔ follow-up, treatment, survival
Year 4: findings➔ follow-up, treatment, survival
Year 5:
Year 6:
Year 7:
Year 8:
Year 9:
Year 10:
Year 11:
Year 12:
Etc.

Why do the patient decision-aids get it wrong?

- "They" say 80% of people who would die of LC will die with screening
- Recent cost-benefit studies all imply MUCH higher efficacy.
  - ten Haaf found >80% reduction for Ontario
  - Pyenson found >80%
  - Henschke's observational data was ~80% reduction in LC deaths.
-

https://www.thoracic.org/patients/patient-resources/resources/decision-aid-lcs.pdf



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Editorial

Population health's unanimity on lung cancer screening: far ahead of medical advice

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Provenance: This is a Guest Editorial commissioned by Section Editor Jianrong Zhang, MD (Department of Thoracic Surgery, First Affiliated Hospital of Guangzhou Medical University, Guangzhou Institute of Respiratory Disease, Guangzhou, China).

Comment on: Ten Haaf K, Tammemägi MC, Bondy SJ, *et al.* Performance and Cost-Effectiveness of Computed Tomography Lung Cancer Screening Scenarios in a Population-Based Setting: A Microsimulation Modeling Analysis in Ontario, Canada. PLoS Med 2017;14:e1002225.

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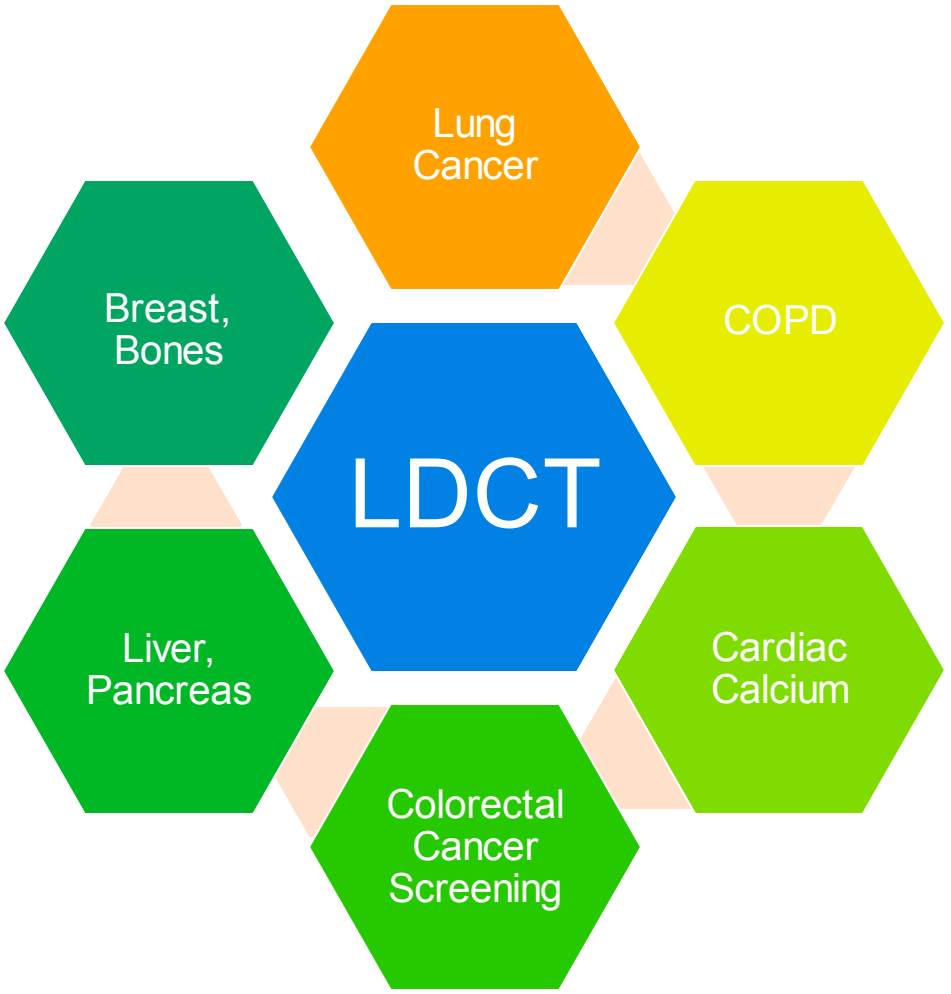
Opportunities
1. to improve care?
2. to multiply inefficiency?

My Conjecture

- Integrated screening is not now a scientific issue but a business/system issue
- While multiplying inefficiency worked for healthcare in the past, emphasizing quality and outcomes is the only way integrated screening will see widespread adoption



Population Health Myths

- 80/20 rule➔focus on the most expensive
  - Can you predict who will be expensive?
  - Even if you can predict who will be expensive, can you do anything about it?
  - Can you change the course of patients who are already expensive?
  - Bring more inefficient care to the unfortunate patient
- Keep people healthy
  - Behavioral change
  - Psycho-socio-economic drivers
  - A version of blame the patient?
  - Compliance

Is better coordination the solution?

Bruegel, Wedding Dance

Other Ways to Cut Spending?

- Cut fees. People in the US pays more for most services than in other countries.
- Make patients pay more
- Eliminate waste, fraud

Durer, Four Horsemen of the Apocalypse