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Cost Implications of CT Imaging in Lung Cancer Screening

Prevent Cancer, Tysons Corner
Quantitative Imaging Workshop XIV: Lung Cancer, COPD and Cardiovascular Disease

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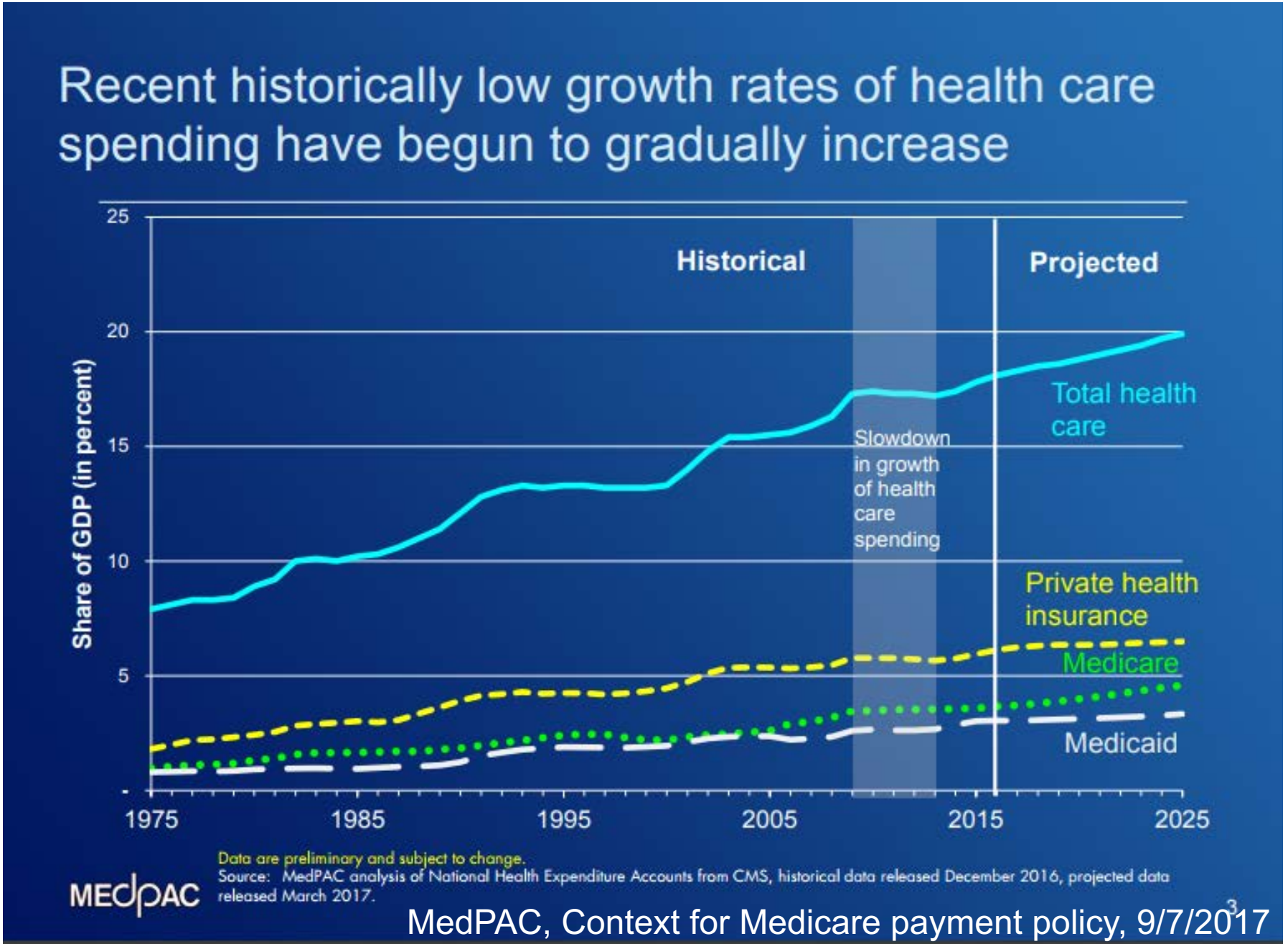
October 2, 2017

Disclosures

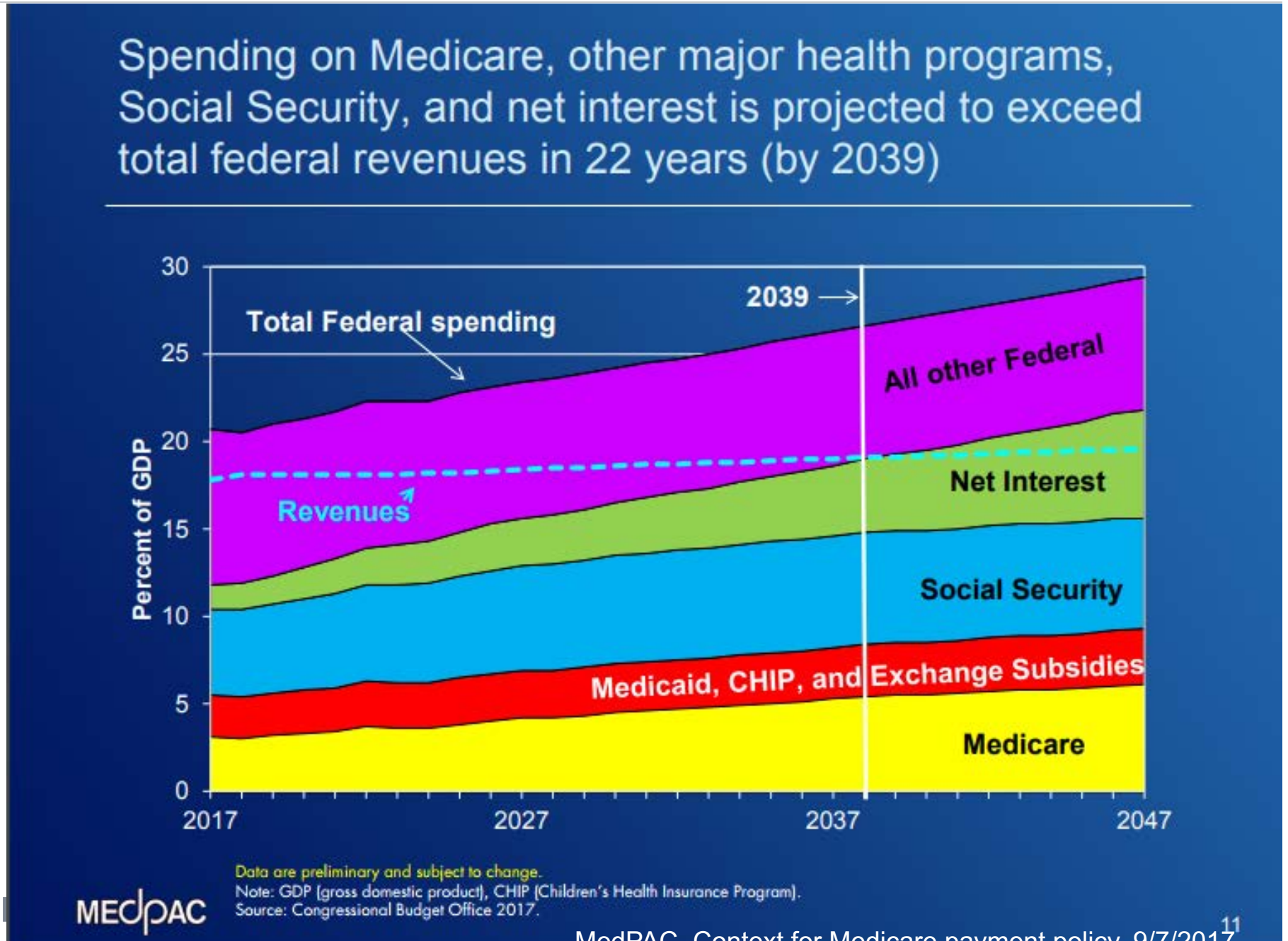
- The American Academy of Actuaries requires its members to disclosure their qualifications in making actuarial communications. I meet the Academy's qualification standards for this work.
- Funding for my work on lung cancer screening has come from Prevent Cancer, Lung Cancer Alliance, National Electrical 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), but I do not speak on behalf of MedPAC.

The Most Important Healthcare Issue of Our Time



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

The Most Important Healthcare Issue of Our Time



Inefficient Healthcare Spending: The Elephant in this Conference
(and all other medical conferences)

Understanding Common Concepts in Risk and Risk Sharing

Defining Risk

Risk can be defined as the consequences of uncertain future outcomes. When two or more parties spell out who bears the potential burden of these consequences, such as financial gains or losses, they are *risk sharing*. Risk-sharing arrangements have many variations and many names, such as:

From a CMR-Milliman eLearning module on Risk Contracting

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:

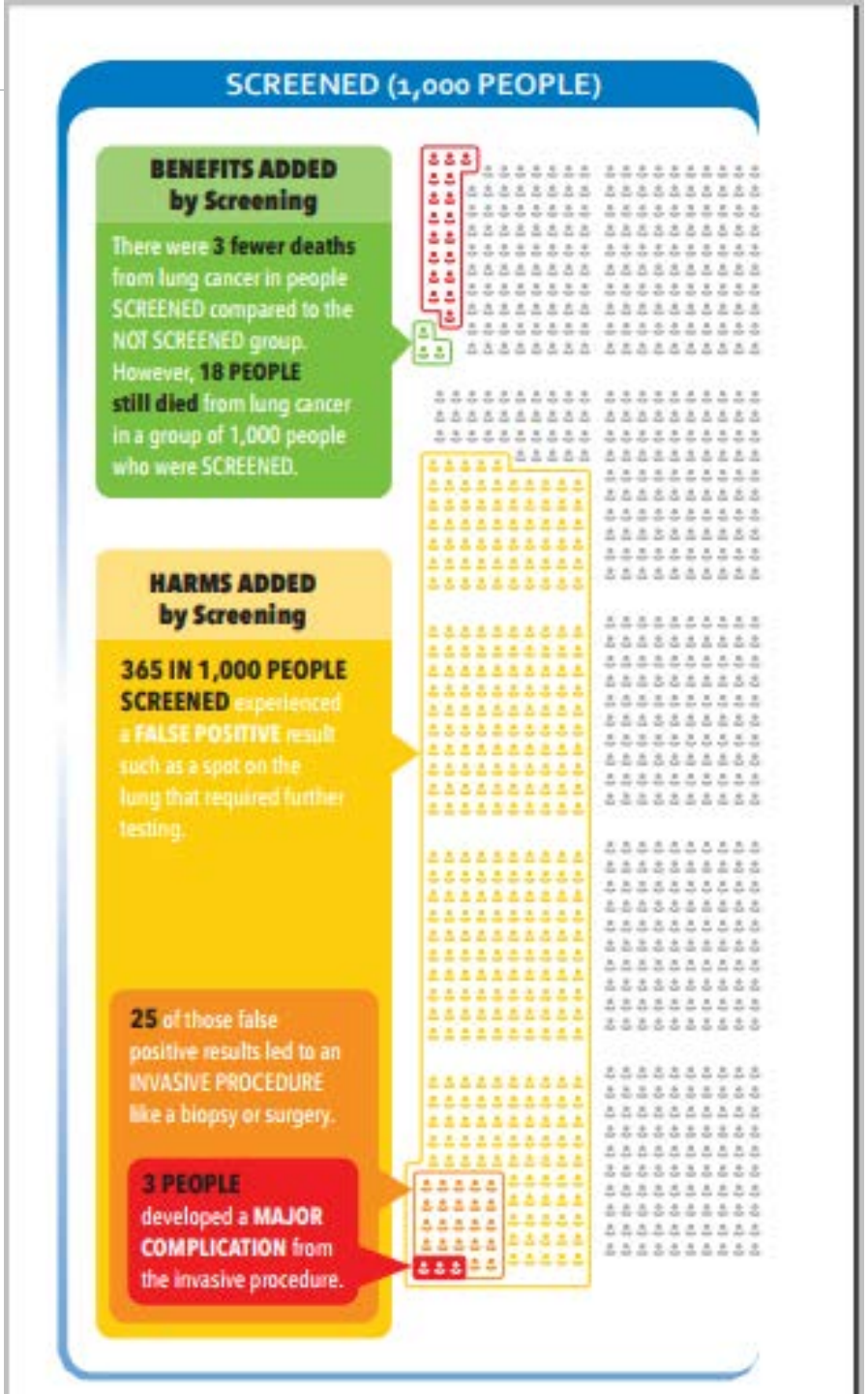
Year 12:

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).

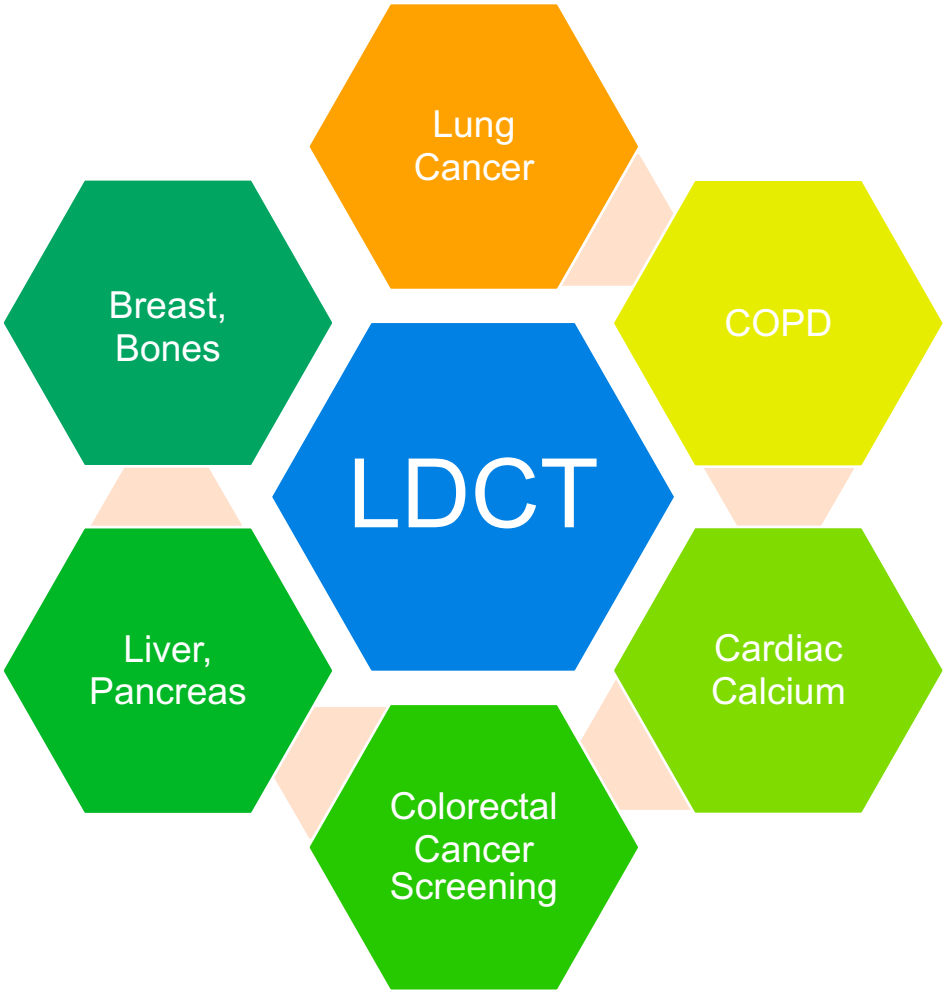
Comment on: Ten Haaf K, Tammemägi MC, Bondy SJ, *et al.* Performance and Cost-Effectiveness of Computed Tomography Lung Cancer Screening Scenarios in a Population-Based Setting: A Microsimulation Modeling Analysis in Ontario, Canada. PLoS Med 2017;14:e1002225.

Submitted Apr 22, 2017. Accepted for publication May 04, 2017.
doi: 10.21037/atm.2017.05.26
View this article at: http://dx.doi.org/dx.doi.org/10.21037/atm.2017.05.26

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?