National Cancer Institute

United States Initiative to Develop Summaries on Latest Cancer Screening Information

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National Institutes of Health

Conflicts of Interest

- I do not have any financial conflicts of interests.
- All opinions expressed are my own and do not represent official statements of the U.S. government.

NCI Communications Resources

Fact sheets/Q & As, news summaries, PDQ statements, NCI Cancer Bulletin

- **Online at http://cancer.gov**
- **By phone at 1-800-4- CANCER (1-800-422-6237)**
- **Social media channels, including Facebook, Twitter, and YouTube**
- **In English and Spanish**

PDQ Editorial Boards

PDQ Editorial Boards evaluate published results of cancer research conducted worldwide and assess strength of the evidence regarding cancer-related interventions

PDQ Editorial Boards do not formulate practice guidelines or make treatment recommendations

PDQ Editorial Boards are not formal advisory boards to NCI and do not formulate policy for Institute

~15% government, 85% non-government

Physician Data Query (PDQ): "Level of Evidence" for Cancer Screening

Definition: certainty of the editorial board's estimate of the health effects of implementing an intervention

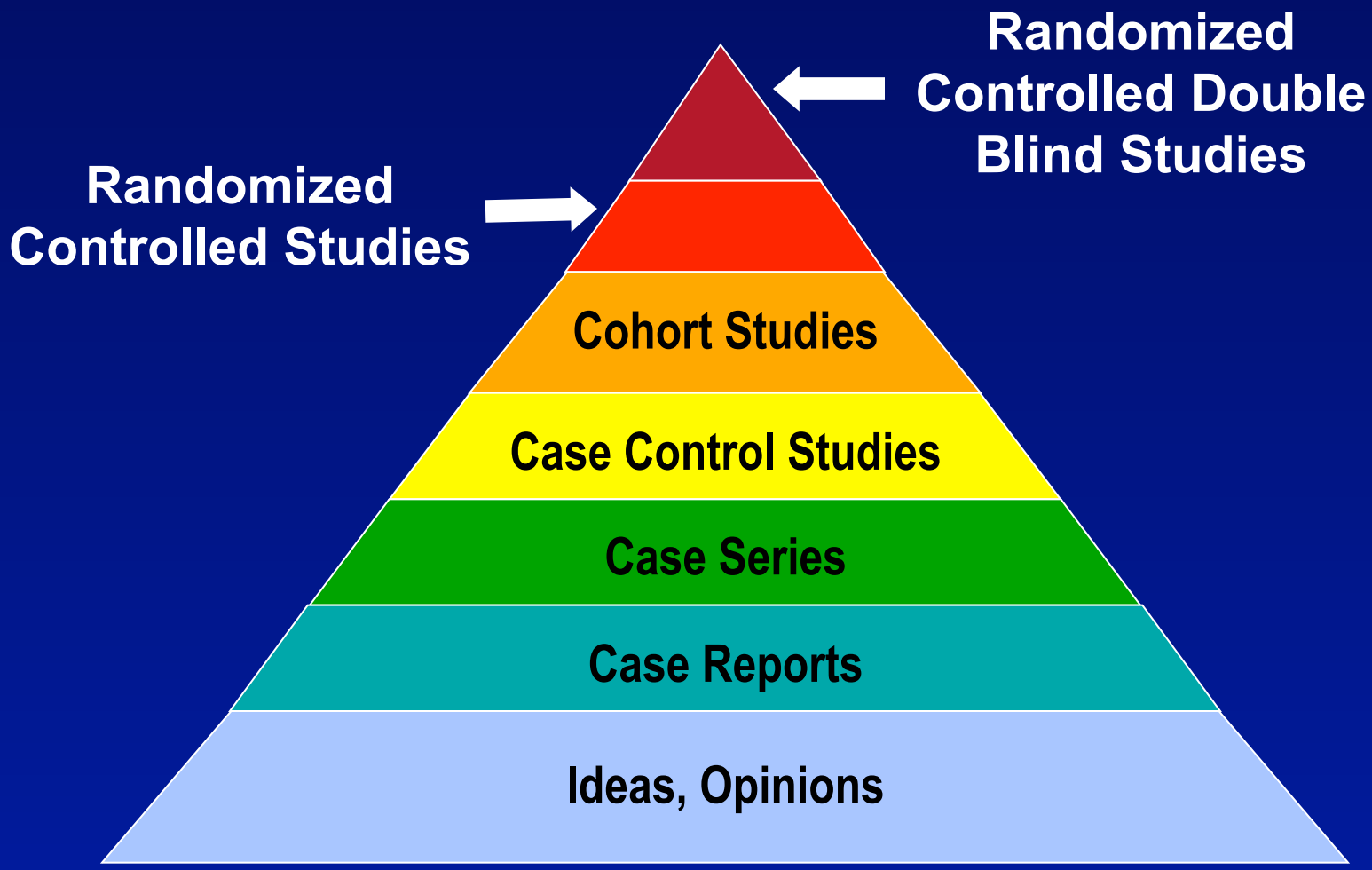
Steps:

I. Description of the evidence (5 Domains)

II. Summary assessment for both benefits and harms

Description of Evidence in PDQ: Five Domains

1. Study design: ranked by design strength
2. Internal validity: "quality" of execution within study design (good, fair, poor)
3. Consistency (coherence) /volume of evidence
   - One vs. multiple studies
   - Small vs. large studies
   - Consistent direction of outcomes
4. Magnitude of effects: prefer absolute vs. relative effects
   - Change from 1% to 0.5%, or from 4/1000 to 2/1000 [Not: 50% decrease]
5. External validity (good, fair, poor)
   - Applicability in usual practice with same effect?


Randomized
Controlled Double
Blind Studies
Randomized
Controlled Studies
Cohort Studies
Case Control Studies
Case Series
Case Reports
Ideas, Opinions

Internal Validity Criteria for Randomized
Internal Validity Criteria for Randomized

- Initial assembly of compatible groups
  - For RCTs: adequate randomization, including concealment
  - For cohort studies: consideration of potential confounders with adjustment in the analysis
- Maintenance of comparable groups (attrition, crossovers, adherence, contamination)
- Important differential loss to follow-up; overall high loss to follow-up
- Measurement differential loss to follow-up; overall high loss to follow-up
- Measurements: equal, reliable, and valid (includes masking of outcome assessment)
- Clear definition of interventions
- Analysis: All important outcomes considered

adjustment for potential confounders for cohort studies, or

Source: R. Harris et. al., Am J Prev Med 2001

Summary Assessment of Evidence

- Level of certainty (solid, fair, inadequate) of direction and
- Level of certainty (solid, fair, inadequate) of direction and magnitude of health effects of widespread implementation

Example: Prostate cancer screening

- Benefit: Evidence is inadequate to determine whether screening for prostate cancer with PSA or digital rectal examination reduces mortality for prostate cancer….
- Harm: Based on solid evidence, screening with PSA or DRE detects some prostate cancers that would not have caused important clinical problems, leading to some degree of over treatment. Based on good evidence, treatments result

Patient and Physician Guide: National Lung Screening Trial (NLST)

What is the purpose of this guide?
To explain the benefits and harms of low-dose computed tomography (CT) screening for lung cancer in people at high risk for the disease. The NLST showed a reduction in deaths from CT screening compared to chest X-ray screening. The Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial recently showed that chest X-ray screening (compared to no screening) did NOT reduce the chance of dying from lung cancer.

Who participated in the NLST?
Current or former cigarette smokers within the past 15 years, 55 to 74 years of age, with at least 30 pack-years of smoking [Pack-years = packs per day x number of years smoking]. Participants must have had no symptoms or signs of lung cancer or other serious medical conditions, and be medically fit for surgery.

Study Findings: Low-dose CT versus Chest X-ray screening

53,454 current and former smokers were randomly assigned to be screened once a year for 3 years with low-dose CT or chest X-ray. Here's what happened after an average of 6.5 years:

	Low-dose CT 26,722 people		Chest X-ray 26,732 people
Benefit: How did CT scans help compared to chest X-ray, an ineffective screening test?			
4 in 1,000 fewer **died from lung cancer**	13 in 1,000	*versus*	17 in 1,000
5 in 1,000 fewer **died from all causes**	70 in 1,000	*versus*	75 in 1,000
Harm: What problems did CT scans cause compared to chest X-ray?			
223 in 1,000 more had at least one **false alarm**	365 in 1,000	*versus*	142 in 1,000
18 in 1,000 more had a **false alarm leading to an invasive procedure**, such as bronchoscopy, biopsy, or surgery	25 in 1,000	*versus*	7 in 1,000
2 in 1,000 more had a **major complication** from invasive procedures	3 in 1,000	*versus*	1 in 1,000

"Take home" messages

Lung cancer screening with CT scans is the only screening test shown to lower the chance of dying from lung cancer. The effect of screening may vary depending on how similar you are to the people who participated in the study. The benefit of screening may be bigger if your lung cancer risk is higher. The harm may be bigger if you have more medical problems (like heart or severe lung disease), which could increase problems from biopsies and surgery.

For perspective, the reduction in deaths from lung cancer with CT screening is larger than the reduction in deaths from the target cancers of other common screening tests, such as mammograms for breast cancer.

There is a tradeoff: CT screening decreases your chance of death but increases your chance of having a false alarm.

If you choose to have CT screening, it is important to have it done at a medical center with special expertise in lung cancer screening and treatment.

Most important thing you can do

DON'T SMOKE. Regardless of your screening decision, avoiding cigarettes is the most powerful way to lower your chance of dying overall or suffering or dying from a variety of diseases, such as lung cancer, emphysema, heart or vascular disease. For example, at age sixty-five, 89 in 1,000 male current smokers will die of lung cancer in the next 10 years versus 4 in 1,000 never smokers. For women, the corresponding figures are 55 in 1,000 versus 5 in 1,000.

For help quitting, call 1-800-QUIT-NOW.

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