

Healthcare Information & Decision Equation: **Information → Decision → Action → Outcome**
 Is it true → Is it useful → Is it usable?

Screening is the process of identifying a disease, condition or risk factor in asymptomatic patients regardless of setting (practical definition).

- It is useful to think of screening as a type of therapeutic intervention, but screening embodies elements of both diagnosis and treatment.
- Screening may appear to be a good thing, when, in fact, harms might outweigh benefits.
- In addition to usual considerations for interventions, clinically meaningful screening requires that early detection and treatment improve outcomes more than later (symptomatic) diagnosis and treatment.

Screening categories are—

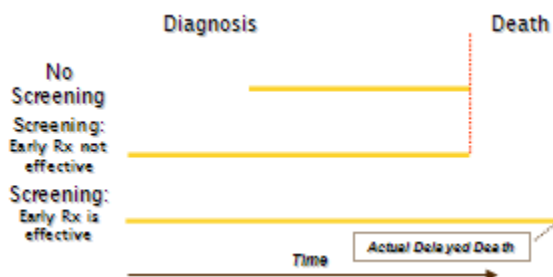
- **Primary Prevention:** Prevention of disease by eliminating causes OR interrupting disease processes before they become established or symptomatic.
- **Secondary Prevention:** Limiting the harms (symptoms, functioning, mortality) done by established disease processes.

Special bias issues in screening—

- **Lead Time Bias** occurs when early detection makes it look like there is longer survival time, but the date death occurs is no different.
- **Length Bias** is a “disease-spectrum” bias and occurs when screening “appears” to improve survival due to missing the most deadly tumors and finding tumors that people are more likely to live with or live a long time with. Screening is more likely to find slower growing tumors that may not be harmful, or as harmful (aka “overdiagnosis bias”).
- **Volunteers** participating in screening have been shown to have better outcomes than those who don’t (i.e., those who are persuaded to participate), possibly due to the healthy user effect.

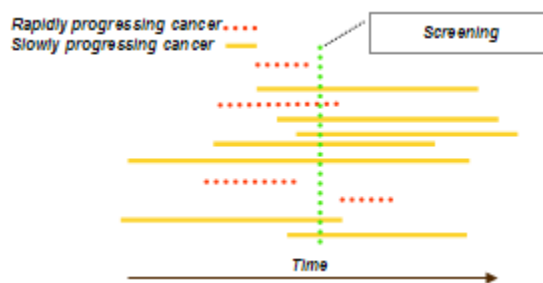
Lead Time Bias

Early diagnosis always increases “survival” (death from time of diagnosis):
 survival appears longer from time cancer is found.



Length Bias (Disease-Spectrum Bias or Overdiagnosis Bias)

Disease progressing rapidly is likely to be missed by screening.



Considerations & Critical Appraisal Issues

- Requires valid studies of diagnostic tests and interventions demonstrating improved outcomes with early interventions compared with intervening after symptoms develop.
- Assess potential for lead-time bias, length bias and volunteer bias.