



Demonstrating Robustness in Health Policy Choices

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Robustness in Health policy choices

This presentation will cover three papers covering two questions:

a) When and how to screen for colorectal cancer (CRC)?

- Stress-testing US colorectal cancer screening guidelines (forthcoming)
- Characteristics of a cost-effective blood test for colorectal cancer (JNCI, 2024)
 - Collaborators: Carolyn Rutter (Fred Hutch), CISNET CRC group. NCI-funded.

b) What is the public health value of environmental sampling surveillance?

- The value of environmental surveillance for pandemic response (Sci Reports, 2024)
 - Collaborators: Henry Willis and others (RAND). RAND/NIH-funded.

Crucial questions in colorectal cancer prevention

- Colorectal cancer (CRC) screening is recommended to everyone 45-75 years old
 - FIT every year or COL ever 10 years.
 - But ~ 1/3 of screening-eligible population is not “up to date” with screening.
- ACP and USPSTF guidelines are at odds re: age to start screening
- Blood tests that can detect cancer are now available.
 - Should guidelines endorse them? Should payers cover them? Should doctors recommend them?
 - CMS is willing to cover a test that is:
 - At least as sensitive to CRC as FIT (74%)
 - But only every three years (like it covers Cologuard, the stool-DNA test)

Are USPSTF and ACP CRC screening guidelines
efficient under challenging assumptions?

what if...

colonoscopy sensitivity is low

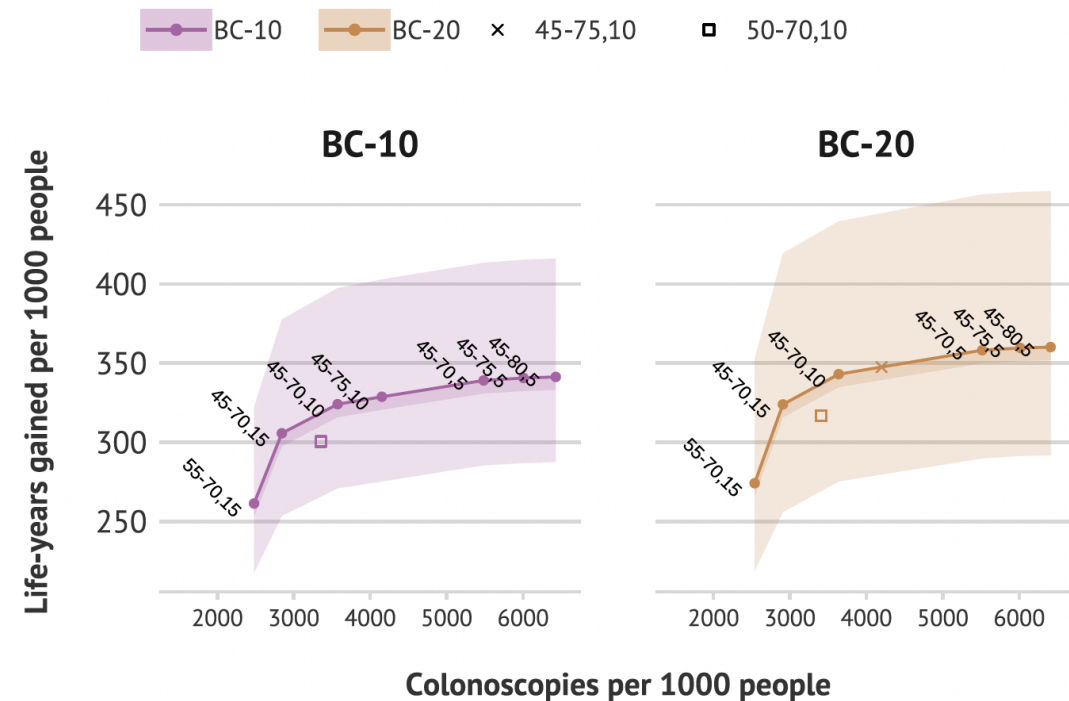
natural history uncertainty is considered

we make different assumptions about adenoma onset

ACP guidelines dominated regardless of model specification

- Simulated a large experimental design combining
 - 500-point sample from 2 model specifications * 4 plausible sensitivity scenarios
- Yes, uncertainty bounds of effectiveness are wide
- But no, ACP guideline are not the frontier regardless of model specification

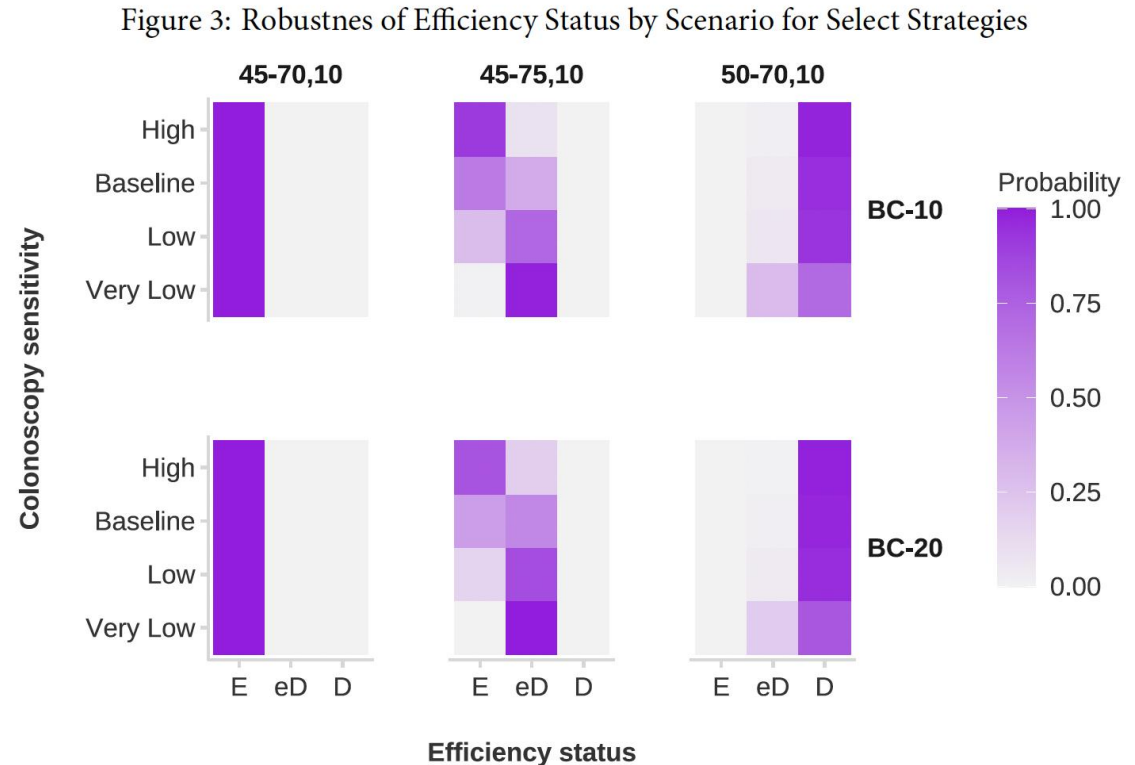
Figure 2: Efficient Screening Strategies across model specifications



Notes: Each point represents one screening strategy, and the line connecting them approximates the efficient frontier. Shaded areas represent a 95% credible interval for the LYG estimates for each strategy. Strategies that are either dominated or even weakly dominated are omitted from this figure. Efficient strategies make the best compromise between saving life years through colonoscopies and requiring a minimal number of colonoscopies. Each panel presents one of this study's four colonoscopy sensitivity scenarios.

Starting screening at 50 was always a losing strategy

- This results **holds for every single parameter set**
 - 500-point sample from 2 model specifications * 4 plausible sensitivity scenarios
- ACP recommendation always dominated or extended-dominated.
- USPSTF recommendations either efficient or extended-dominated.
- Want less-intensive screening?
Stop at age 70 or test every 15 years.



Notes: The horizontal axis represents the efficiency status of each strategy, coded as E (Efficient), eD (extended Dominated) and D (Dominated). Colors represent the probability that each strategy will have a each efficiency status. Each facet represents one colonoscopy screening strategy (columns) for each model specification (rows). The results illustrate that the USPSTF-recommended strategy is sometimes efficient but never dominated, whereas the ACP strategy is almost always dominated and never efficient.

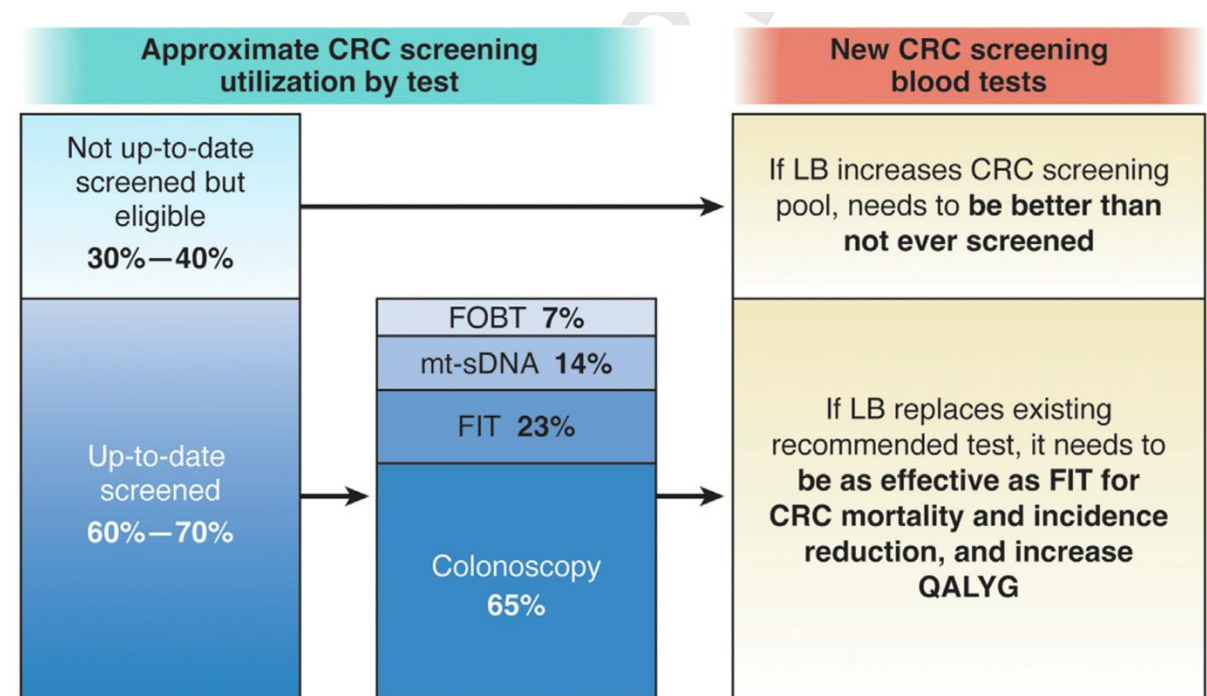
Good news! New blood tests are available for screening!

Bad news: Using them every three years not as effective as alternatives

What is their role on CRC screening?

The American Gastroenterological Association (AGA) reached out to CISNET for input

- Initial questions:
 - Can existing blood tests compete with FIT and colonoscopy?
 - Under what conditions can they be as effective or cost-effective?
- AGA set up an expert panel to provide input
- I led a project to answer the second question, presented to the AGA panel.
 - See Lieberman et al 2024 Clin Gastro and Hepatology

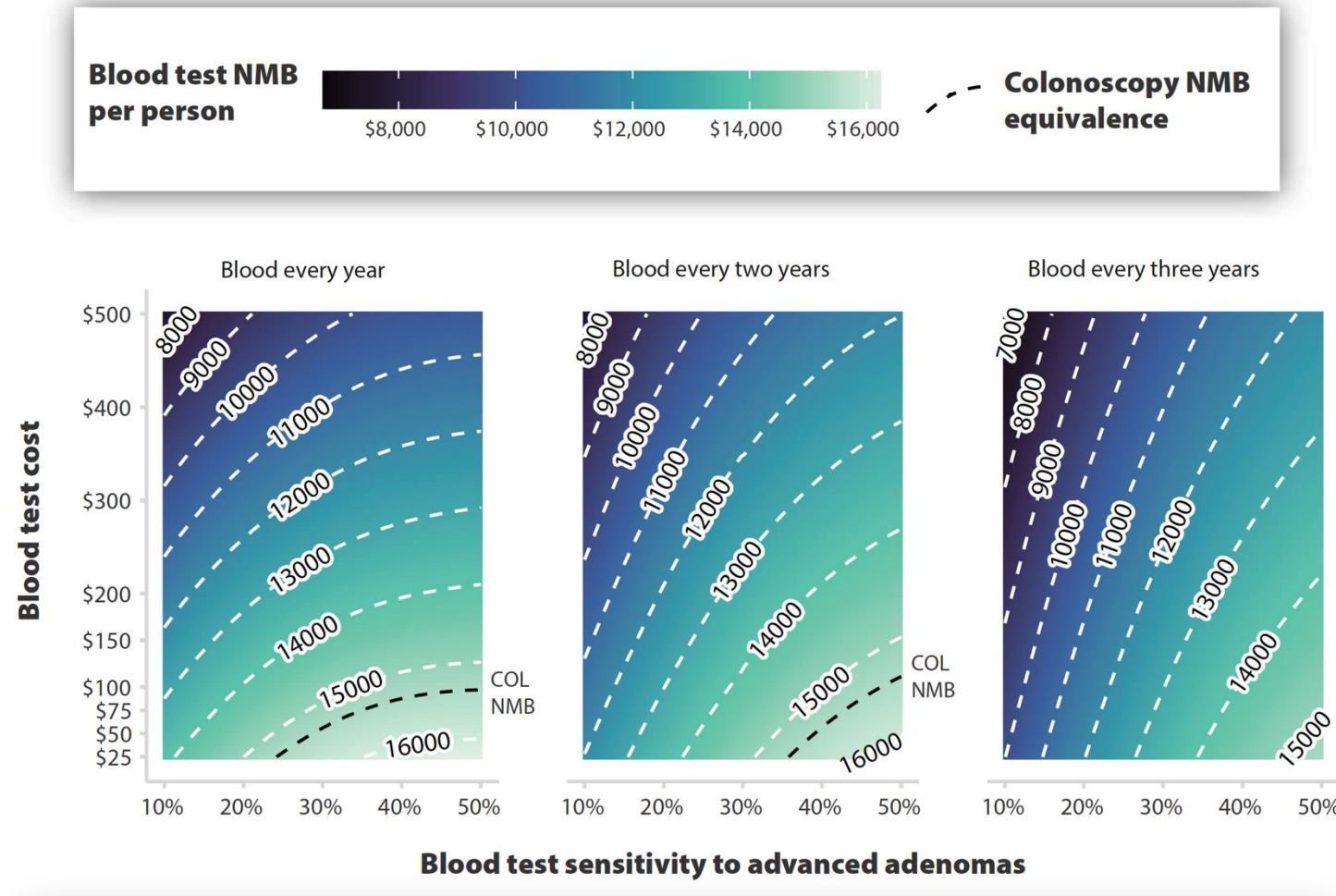


Lieberman et al 2024. Clin Gastro and Hepatology

Q: Under what conditions can blood tests match the net monetary benefit (NMB) of colonoscopy screening?

$$\text{NMB} = \text{Willingness to Pay} * \text{QALYG} - \text{Costs}$$

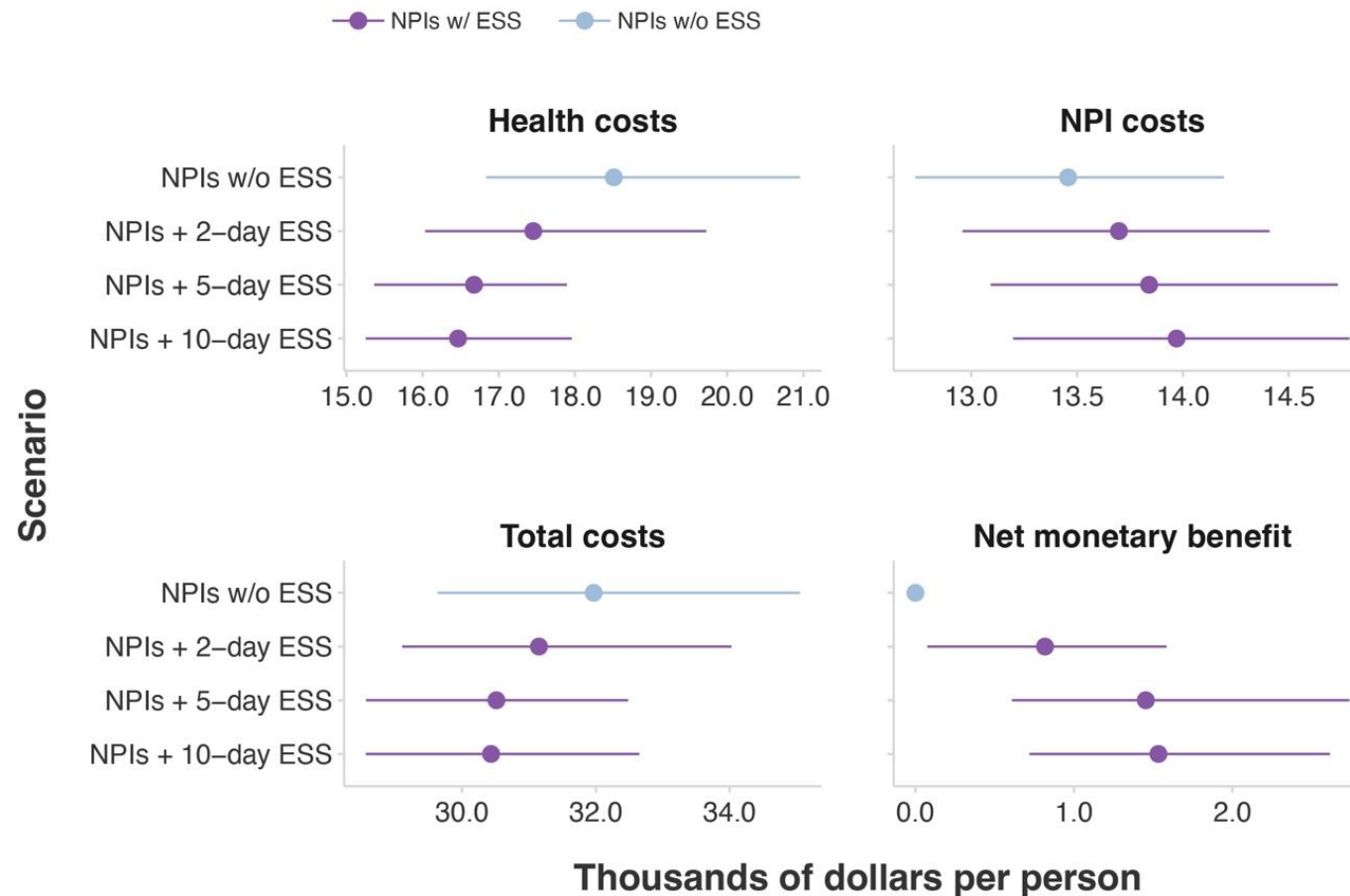
Sensitivity to precursor lesions, lower costs key to effectiveness



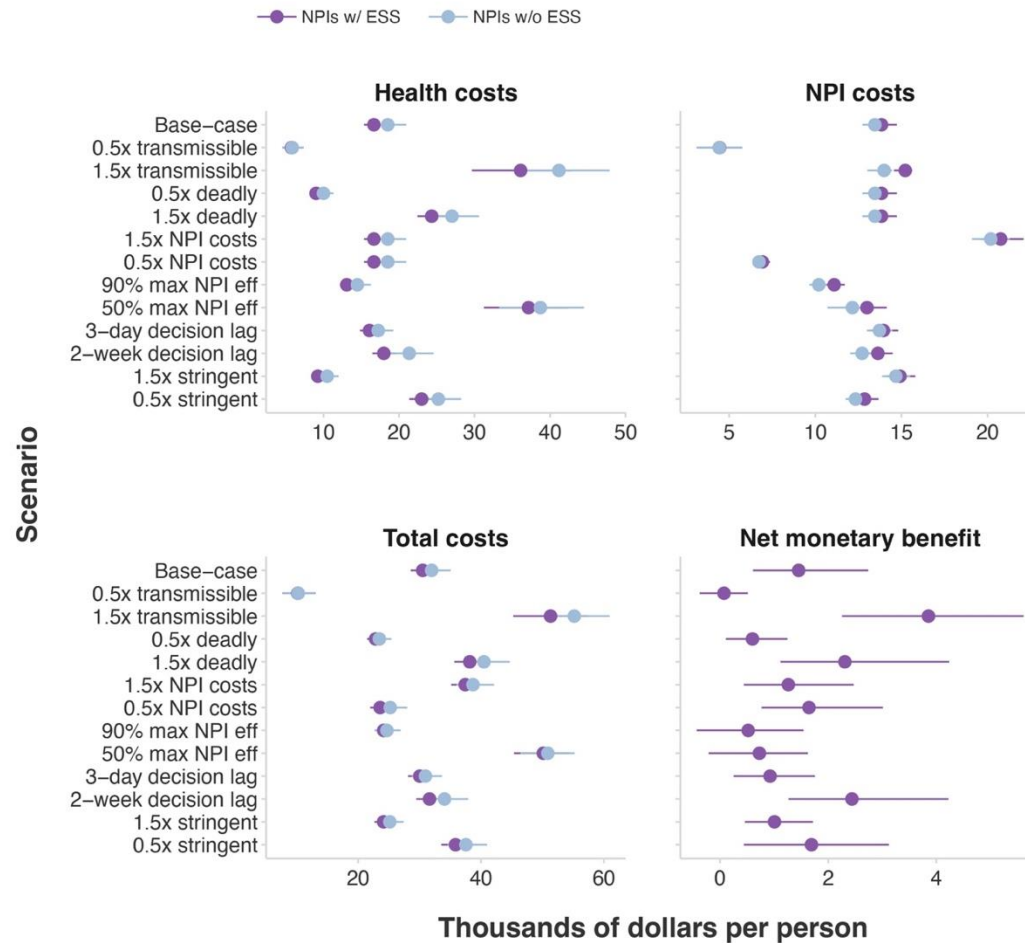
Nascimento de Lima et al 2024 JNCI (see "Scenario Discovery" methods section).

What is the value of environmental sampling surveillance for pandemic response?

ESS could provide ~ \$1,500 of value per person in a new COVID-19-like pandemic



ESS's value is positive under a wide range of conditions



A few reflections on facing deep uncertainty

- DMDU may seem overwhelming
- No extra points for papers that are difficult to follow
- If the answer is clear, make an *a fortiori* argument
 - ACP guidelines dominated in all parameter sets
 - ESS valuable even if a COVID-19 pandemic happened once every century
- If the answer is nuanced, scenario discovery and other methods can be helpful
 - Blood tests only cost-effective if they cost $\sim 1/7$ of what they cost today and have $\sim 4x$ AA sensitivity
- More work on this area will help clarify where DMDU methods are most useful