Research Gap Typologies: Classifying What We Don't Know

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Disclosures

Although I am a member of the U.S. Preventive Services Task Force (USPSTF), materials provided in this presentation reflect my individual views only and do not represent the views or recommendations of the USPSTF. The overall presentation should not be attributed to the USPSTF.

Context

- Will always have evidence gaps!!! (Not just “I” statements)
- Joint presentation at the North American Primary Care Research Group
- US Preventive Service Task Force (USPSTF) and Canadian Task Force on Preventive Health Care (CTFPHC) members led the workshop
- Occurred in 2017, 2018, and 2019

Common Reasons for Research Gaps

- Insufficient or imprecise information
- Biased information
- Inconsistency or unknown consistency of information
- Not the right information

Source: Robinson KA, et al.(2011). Frameworks for determining research gaps during systematic reviews. Methods Future Research Needs Report No. 2. AHRQ Publication No. 11-EHC043-EF. Rockville, MD: Agency for Healthcare Research and Quality.

PICOS Typology (Robinson)

Characterizing research gaps, using the PICOS framework to characterize research gaps around interventions:

- Population (P): information about a population is not adequately represented in the evidence base (e.g. gender, race, age)
- Intervention (I): information regarding the specific intervention is inadequately included in the evidence base (e.g. duration, intensity)
- Comparison (C): lack of information regarding the comparison intervention or standard intervention
- Outcomes (O): information lacking regarding key outcomes of interest (mortality, morbidity rather than just process measures)
- Setting (S): information regarding the relevant settings for research gaps is lacking (primary vs specialty care)

Dissemination and Implementation Taxonomy (Krist)

Implementation gaps

- What is the right service interval
- Can you vary the service intensity
- What are the essential elements of the service
- Can the service be modified

Dissemination gaps

- Will the service work in a range of settings
- How can we make sure those in need get the service
- How do we reduce disparities in service delivery
- Is service delivery sustainable
- What are the unintended consequences of service delivery

Population gaps

- Will the service work on a range of populations
- Does the service need to be modified for different populations

Inadequacy Taxonomy (Ebell)

The evidence gap is caused by inadequate:

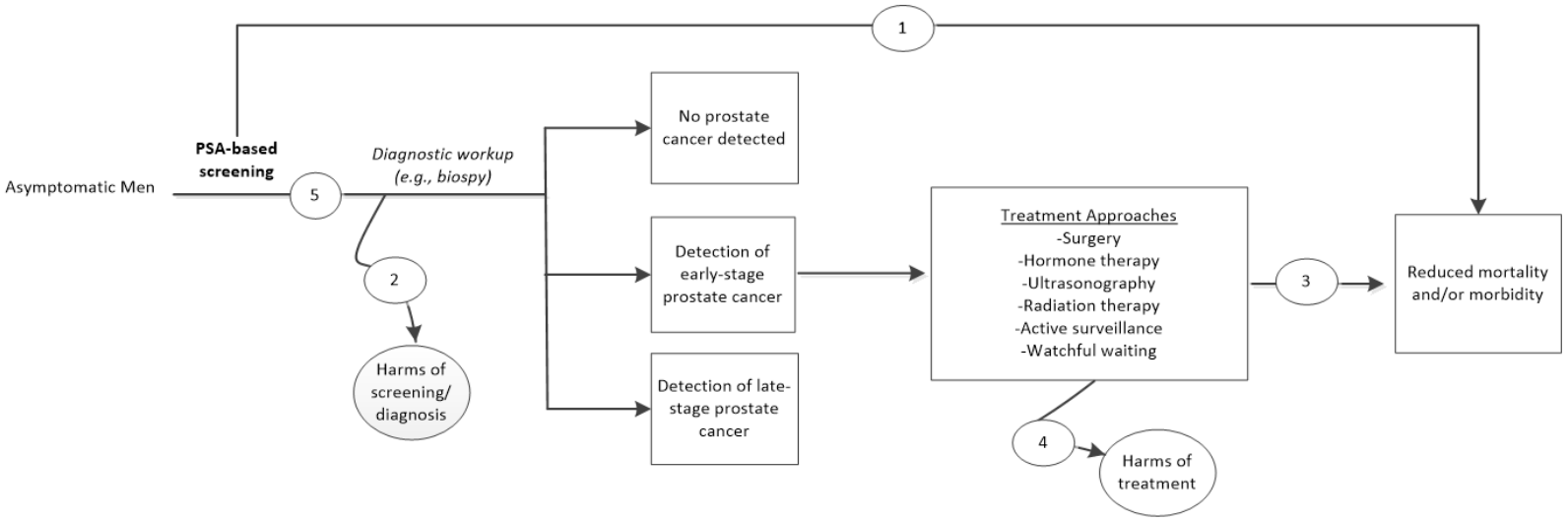
- Number or size of studies (no studies or poor quality)
- Duration of studies (inadequate for outcome)
- Methods, with risk of (un)intentional bias (ecologic studies)
- Intervention or technology (only studies of older technology, different dose, older drugs) or inadequate description of intervention
- Research in a range of populations (race, age)
- Research in relevant settings (primary care)
- Selection of outcomes (intermediate, not patient-oriented)
- Modeling studies (none, poor quality, biased)

What happened at the workshop?

- Biggest interest in Dissemination and Implementation gaps
- Some discussion about practice-based research networks (PBRNS) joining together to conduct large scale longitudinal studies to close evidence gaps (colorectal cancer screening in younger adults)
  - Interest was there but there was really no great funding opportunities for PBRNS
- Some discussion about testing typology
  - Was of academic interest but wasn't directly useful for attendees
  - *This is the group to address this!*

USPSTF Approach to Identifying Gaps

- Driven by evidence
- Framed by Key Questions and Contextual Questions
- Could benefit from common language referring to gaps
- Could benefit from system to define what is/isn't included



Research Plan Can Help to Prospectively and Systematically Identify Gaps

	Included	Excluded
Population	KQs 1, 2, 5: Asymptomatic men* KQs 3, 4: Men with screen-detected or early-stage prostate cancer (defined as stage I or II)	KQs 1, 2, 5: Symptomatic men KQs 3, 4: Men with later-stage prostate cancer†; men with refractory, hormone refractory, or recurrent prostate cancer
Setting	Primary care or specialty care settings in countries categorized as "Very High" on the Human Development Index (as defined by the United Nations Development Programme)	Countries not categorized as "Very High" on the Human Development Index
Interventions	KQs 1, 2: PSA-based screening (single-threshold PSA test, age-specific thresholds, velocity, doubling time, variable screening intervals) KQs 3, 4: • Surgery (radical prostatectomy, including different surgical techniques, such as nerve sparing, robotics) • Cryosurgery • Hormone therapy (androgen deprivation therapy via luteinizing hormone-releasing hormone agonists, antiandrogen therapy, and/or orchiectomy) • Ultrasonography (high-intensity focused ultrasonography) • Radiation therapy (external-beam radiation therapy, proton beam therapy, brachytherapy, combination therapies) • Ablative therapy • Watchful waiting • Active surveillance KQ 5: Risk prediction models to predict clinically important prostate cancer	KQs 1, 2: Non-PSA-based methods of screening for prostate cancer, performed alone (e.g., digital rectal examination) KQs 3, 4: Chemotherapy (typically used for the treatment of later-stage cancer) KQ 5: Risk prediction models for any prostate cancer
Comparisons	KQs 1, 2: Usual care; no screening KQs 3, 4: No treatment KQ 5: PSA-based screening only, usual care	
Outcomes	KQ 1: Prostate cancer mortality; all-cause mortality; prostate cancer-specific morbidity (i.e., bone pain from metastases, urinary obstruction); incidence of advanced stage cancer KQ 2: False-positive results; physical harms of screening or biopsy; psychological harms; overdiagnosis KQs 3, 4: Mortality (overall and disease-specific); quality of life (overall and disease-specific); functioning (overall and disease-specific); bowel, urinary, and sexual dysfunction; psychological effects (e.g., mental status, depression, and cognitive dysfunction); endocrinological effects (e.g., bone health, hot flashes, and gynecomastia); surgical complications KQ 5: Test performance (area under the curve, sensitivity, specificity); detection of clinically significant or high-grade prostate cancer; positive predictive value of biopsy	
Duration	KQ 1: Long-term prostate cancer mortality, long-term all-cause mortality KQs 3, 4: 30 days for perioperative complications; >12 months for other harms	
Study designs	KQ 1: Randomized, controlled trials; systematic reviews (of included study designs); meta analyses KQs 2–5: Randomized, controlled trials; cohort studies; uncontrolled observational studies of harms‡	Other study designs
Study quality	Good- and fair-quality studies	Poor-quality studies
Language	English	Non-English
Timeframe	KQs 1–4: January 1, 2011 to present§ KQ 5: January 2006 to present	KQs 1–4: Published before January 1, 2011 KQ 5: Published before January 2006

Some Gaps and What Is Needed Can Be Very Specific (AAA screening)

Research Needs and Gaps

Addressing several key research gaps could help inform the benefit of screening for AAA in US-based populations:[1]

- Although evidence shows that women who smoke or have a family history are at increased risk for AAA compared with nonsmoking women without a family history, evidence is insufficient that screening this population confers a net benefit. Ideally, appropriately powered RCTs among women with risk factors could answer these critical gaps in the evidence on screening for AAA. In the absence of new trial data, high-quality, well-calibrated modeling studies based on reliable data on the harms and benefits of screening in women who smoke or in men and women with a family history of AAA may be informative.

Some Gaps Are Obvious
(Prostate cancer screening)

Research Needs and Gaps

There are many areas in need of research to improve screening for and treatment of prostate cancer, including

- Comparing different screening strategies, including different screening intervals, to fully understand the effects on benefits and harms
- Developing, validating, and providing longer-term follow-up of screening and diagnostic techniques, including risk stratification tools, use of baseline PSA level as a risk factor, and use of non–PSA-based adjunctive tests that can distinguish nonprogressive and slowly progressive cancer from cancer that is likely to become symptomatic and affect quality or length of life, to reduce overdiagnosis and overtreatment
- Screening for and treatment of prostate cancer in African American men, including understanding the potential benefits and harms of different starting ages and screening intervals and the use of active surveillance; given the large disparities in prostate cancer mortality in African American men, this should be a national priority

…but how to close the gap is not clear.

Some Gaps Are About Certain Groups (STI Counseling)

Research Needs and Gaps —

Most studies identified by the USPSTF enrolled heterosexual girls, women, and men at increased risk for STI acquisition. More research on counseling interventions to prevent STIs is needed in sexually active boys; pregnant persons; gay, lesbian, bisexual, nonbinary, and transgender persons; and older adults at increased risk; as well as in adolescents who are not yet sexually active. Research on interventions that engage couples or sex partners of primary care patients is also needed. More national-level data on prevalence of STIs in certain risk groups are also needed, including lesbian, bisexual, nonbinary, and transgender persons. Additional research is needed on understanding the role of social determinants of health in contributing to increased STI rates.

…but who do we highlight versus not.

Some Gaps Are About Future Directions
(Healthful diet and exercise)

Research Needs and Gaps

The USPSTF found very limited evidence on the effect of behavioral interventions to reduce sedentary behaviors. Given the link between sedentary behaviors and cardiovascular risk, this is an important area for future research. Continued research on individually tailored, computer-based interventions that can be delivered via the internet, social media, and text messaging is needed. Novel research methods should be applied to understand longer-term health effects of behavioral interventions and to improve understanding of the association between changes in behaviors, changes in intermediate risk factors, and improvements in health outcomes.

…but when do we call it out versus not.

Thank you!

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