The Diagnostic Pathway of Symptom-Detected Cancers

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Disclaimer

I have no conflicts to disclose.

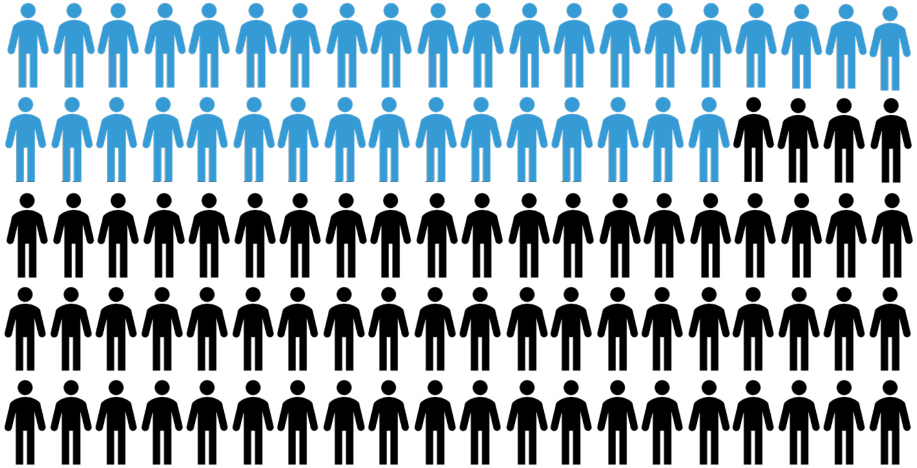
The work and ideas presented are my own and do not reflect official positions, policies, or endorsement of the National Cancer Institute or any other federal agency.

Most Cancers Are Not Screen Detected

1,898,160 estimated new cancer cases in 2021

Of these, **1/3** are potentially screen detectable*

*Including female breast, colorectal, lung, and cervical

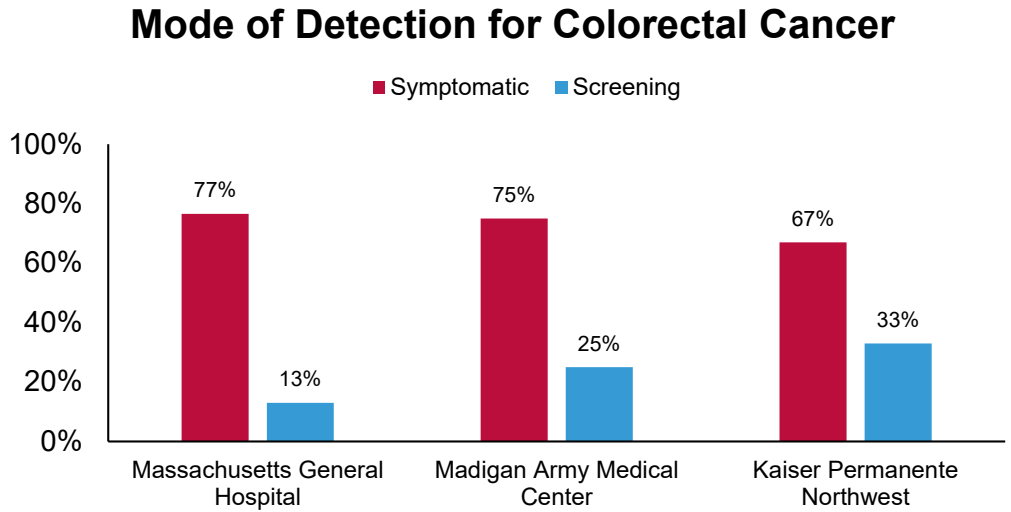


Leaving **2/3** of cancers to be detected via other pathways

Sarma et al., *Cancer Prev Res*, 2020; Siegel et al., *CA Cancer J Clin*, 2021

Most Cancers Are Detected After Symptomatic Presentation: *US Evidence*

- Empirical evidence, largely coming from single healthcare settings in the US, supports this conclusion



Leijssen et al., *Surg Endosc*, 2020; Hatch et al., *J Gastrointest Surg*, 2016; Moiel & Thompson, *Perm J*, 2011

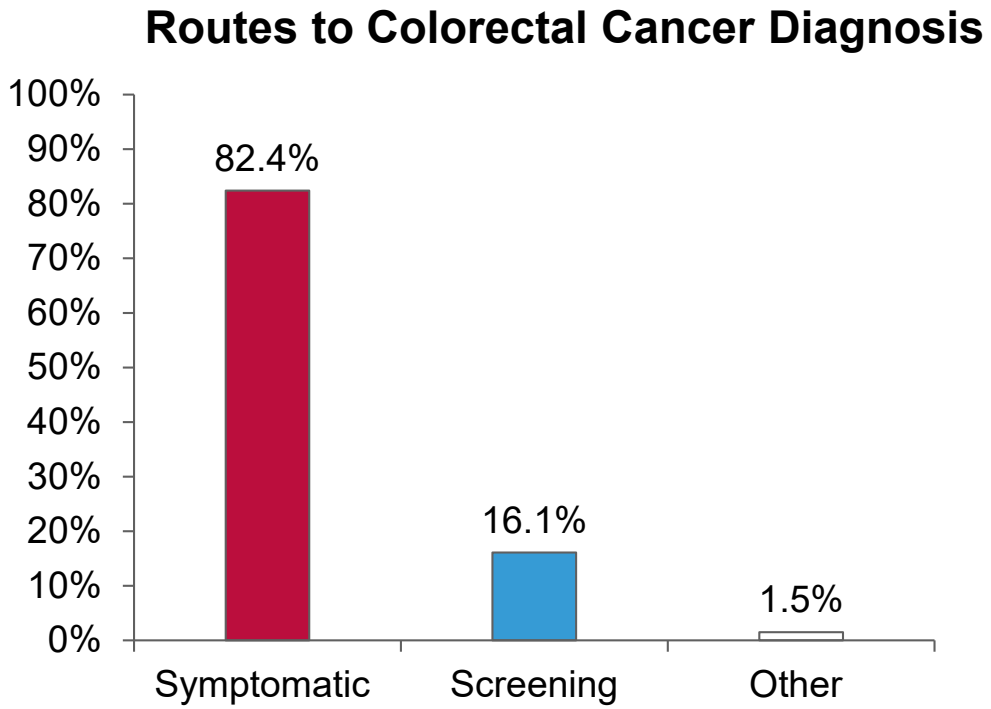
Most Cancers Are Detected After Symptomatic Presentation: *International Evidence*

ICBP
International Cancer Benchmarking Partnership

- Explores factors that may influence differences in cancer survival across 8 countries
- Phase 1: described routes to cancer diagnosis for breast, colorectal, lung, and ovarian cancers

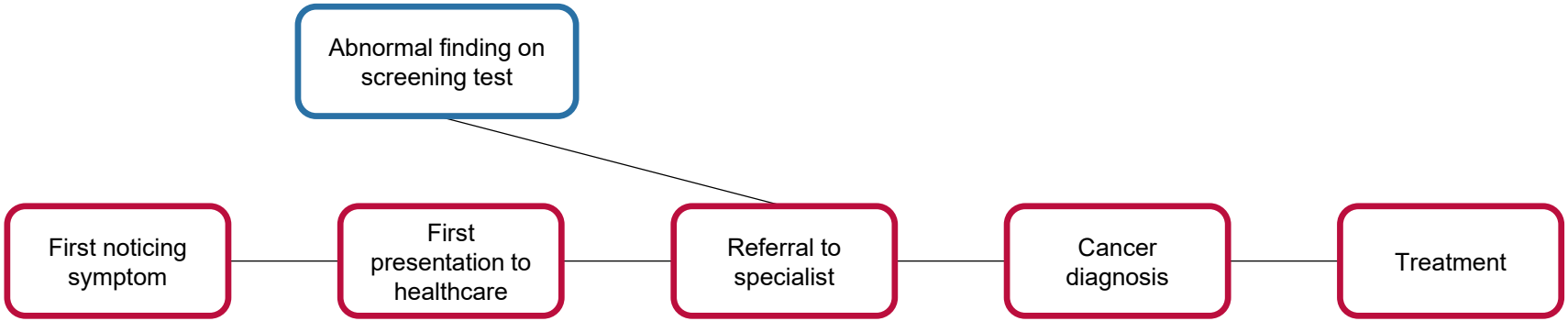
https://www.cancerresearchuk.org/health-professional/data-and-statistics/international-cancer-benchmarking-partnership-icbp; Weller et al., *BMJ Open*, 2016

Most Cancers Are Detected After Symptomatic Presentation: *International Evidence (ICBP)*



Weller et al., *BMJ Open*, 2018

Defining Early Diagnosis of Symptomatic Cancers



Focuses on identifying cancers at the earliest possible stage in patients with potential signs and symptoms of cancer and subsequently diagnosing and treating cancer <u>without delay</u>

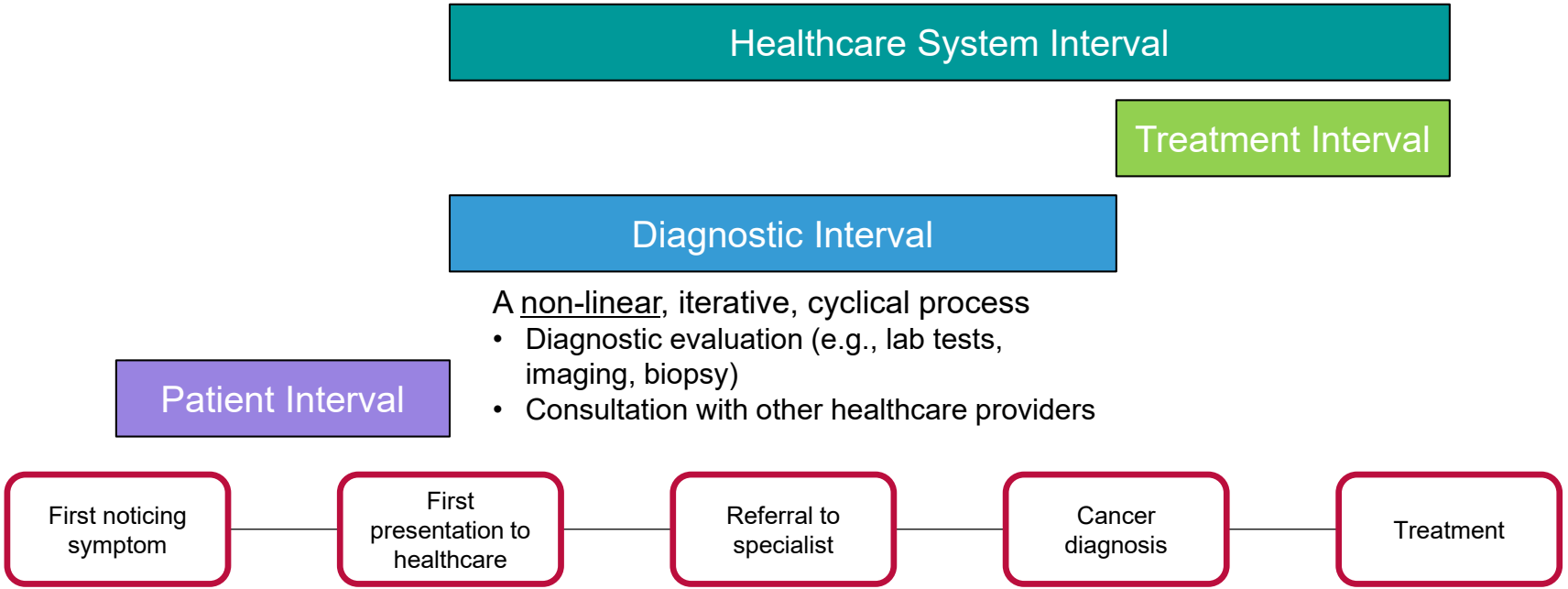
World Health Organization, *Guide to Cancer Early Diagnosis*, 2017
Walter et al., *J Health Serv Res Policy*, 2012; Weller et al., *Br J Cancer,* 2012

Benefits of Early Diagnosis of Symptomatic Cancers

- Reduced time to diagnosis in symptomatic cancers associated with better *clinical outcomes* (earlier stage diagnosis, improved survival)[1]
- Better *patient-reported outcomes* and care satisfaction[2]
- Lower *treatment cost*[3]
- Improved *care quality* (e.g., reducing diagnostic errors[4])

[1]Koo et al., *Lancet Oncol*, 2020; Neal et al., *Br J Cancer*, 2015; [2]Pham et al., *Cancer Epidemiol*, 2019; Salika et al., *Frontline Gastroenterol*, 2018; [3]Gildea et al., *Clinicoecon Outcomes Res*, 2017; Smith & Hillner, *N Engl J Med*, 2011; [4]Newman-Toker et al., *Diagnosis*, 2019; Singh et al., *BMJ Qual Saf*, 2017

Pathway to Detecting and Diagnosing Symptomatic Cancers



Menon et al., BMJ Open, 2019; National Academies of Sciences, Engineering, and Medicine, *Improving Diagnosis in Health Care,* 2015; Nekhlyudov & Latosinsky, *J Natl Cancer Inst Monogr*, 2010; Walter et al., *J Health Serv Res Policy*, 2012; Weller et al., *Br J Cancer,* 2012

Challenges in the Patient Interval

Appraisal of signs and symptoms as due to cancer[1]

- Influenced by many factors (e.g., knowledge of cancer symptoms[2], comorbidities[3])

Barriers to healthcare access[4]

- E.g., direct and indirect costs

[1]Scott et al., *Br J Health Psychol*, 2013; Whitaker et al., *Br J Cancer*, 2015; [2]Quaife et al., *Br J Cancer*, 2014; Rendle et al., *Am J Prev Med*, 2019; [3]Renzi et al., *Nat Rev Clin Oncol*, 2019; Salika et al., *J Public Health*, 2018; [4]Koo et al., *JCO Glob Oncol*, 2021

Challenges in the Diagnostic Interval

Symptoms are common, but most patients do not have cancer

- Positive predictive value of postmenopausal bleeding for endometrial cancer is **9%**[1]

Initial cancer suspicion influenced by education, knowledge, patient

Balance risks of missed diagnosis vs potentially unneeded evaluations

Koo et al., *Neoplasia*, 2018; Koo et al., *JCO Glob Oncol*, 2021; Nekhlyudov & Latosinsky, *J Natl Cancer Inst Monogr*, 2010; Sarma et al., *Cancer Prev Res*, 2020

[1]Clarke et al., *JAMA Intern Med*, 2018

Challenges in the Diagnostic Interval

Lack of tools for diagnostic evaluation, competent and appropriate specialists

Lack of effective communication and coordination among healthcare providers, and with patients

- E.g., timely referrals, follow-up of positive test results

Koo et al., *JCO Glob Oncol*, 2021; Mullen et al., *Br J Cancer*, 2021; Nekhlyudov & Latosinsky, *J Natl Cancer Inst Monogr*, 2010; Sarma et al., *Cancer Prev Res*, 2020

Conclusion and Suggestions for Future Research Directions

- **Most cancers** are likely **detected** after **symptomatic presentation**
  - Potential to achieve earlier-stage diagnoses and better outcomes for these cancers

- Need for data to describe pre-diagnostic care and diagnostic pathways in US healthcare systems
  - *Who* is being diagnosed with cancer? *When*, *where*, *how*, and *by whom*?
  - *Nature* and *frequency* of *presenting symptoms* that can be used for risk prediction?

- Use to guide intervention development in early diagnosis

Koo et al., *JCO Glob Oncol*, 2021; Sarma et al., *Cancer Prev Res*, 2020

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