EU CanScreen
European Joint Action on Cancer Screening

Implementing innovations to improve cancer screening quality and access: lessons across Europe

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Background: Why this brief?

- There are organized cancer screening programmes across EU countries but issues with quality – **including access, efficiency, and timeliness** – persist.
- The 2022 EU Council screening guidelines recommend **three key innovations**:



Self-sampling to improve **access**



Risk-stratification of the target population, to improve **efficiency**



Artificial intelligence (AI)-aided radiological image reading, to improve **timeliness**

- Countries need practical information to **implement these innovations**.
- In this policy brief, we asked:
  - Why are these 'innovations' innovative – i.e., **how do they add value to the screening pathway**?
  - What do **lessons from real-world experiences** tell us about how these innovations can be implemented within cancer screening programmes?

What does the evidence say: Self-sampling as a way of improving access

Why it is innovative:

- Self-sampling brings cancer screening **from the clinic to the person's home**

What to consider in implementation:

- **An opt-out approach –** sending **test kits directly** with invitations and reminders make screening easier and increase participation, particularly among people who **experience more barriers**
- Giving **clear information and guidance** on how to do the test and what happens next, reduces unnecessary waste from unused or improperly used kits
- Providing **personalized support** helps people complete their test and get the follow-up care they need.

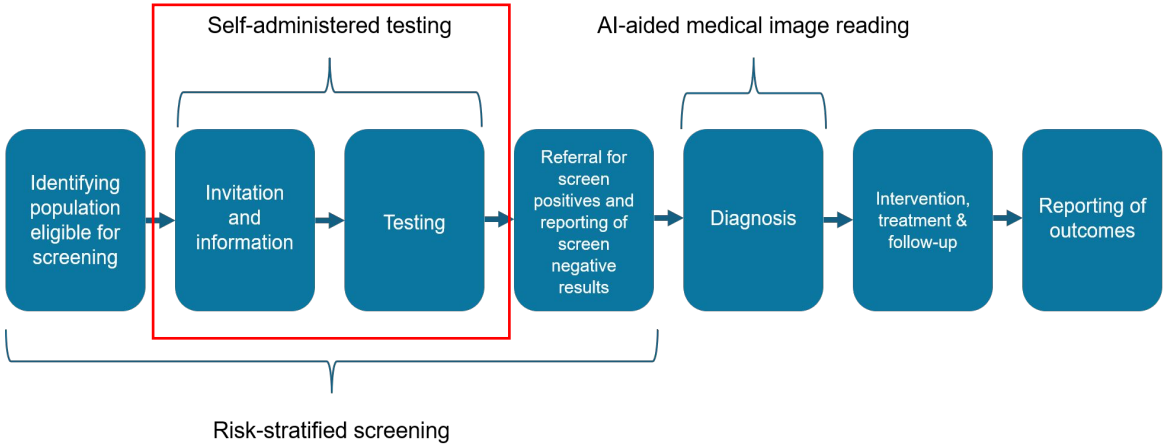


Figure 1. Steps in the cancer screening pathway affected by implementation of self-sampling

Increasing colorectal cancer screening uptake in Ireland through an opt-out approach

- **National uptake is suboptimal:** only 46% of screening invitees completed FIT in 2022–23, below both national and EU targets
- **Making FIT easier to access through an opt-out approach works:**
  - Enclosing a FIT kit in the reminder letter to **non-responders increased uptake from 48% to 54%**
  - Direct mailing gave participants **26–30% higher odds of completing screening** than requiring them to request a kit (standard care)
  - Opt-out approach **enabled meeting Ireland's 50% national target**, but fell short of the 65% EU-recommended target
- **Further testing is needed:** mailing FIT kits with the initial invitation (rather than reminder) may increase participation further
- **Continuous improvement is key:** screening programmes should monitor uptake, understand non-participation, and test and adapt approaches to their local context





Comparing opt-out and opt-in strategies for cervical cancer screening in the Netherlands

- **The Netherlands has been an early adopter of innovation:** since 2017, HPV has been the primary screening test, with HPV self-sampling available nationwide as an alternative to clinician-collected samples.
- **Self-sampling can reach underserved groups:** although initial uptake was low (7%), self-sampling was disproportionately used by never-screened and other underserved women, suggesting potential to reduce screening inequalities.
- **Moving from opt-in to opt-out :** from 2021, HPV self-sampling kits have been automatically mailed to newly eligible women and to non-responders, rather than requiring women to request a kit – though impacts remain to be evaluated
- **The Dutch experience shows how programmes can evolve:** screening pathways can be adapted in response to emerging evidence and changing circumstances



What does the evidence say: Risk-stratification to improve screening efficiency

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Why it is innovative:

- Risk-stratification **prioritizes those most likely to benefit from screening**, reducing harms and costs

What to consider in implementation:

- Choosing risk tools that fit the **local setting, available data**, and **how risk is defined** matters
- **Testing risk tools** in the intended setting/target population helps ensure they are accurate and fair
- Health professionals need **training** to assess risk and explain results clearly to participants
- **Primary care** is well-placed to assess/explain cancer risk, and **electronic health records** can source the information needed to calculate risk.

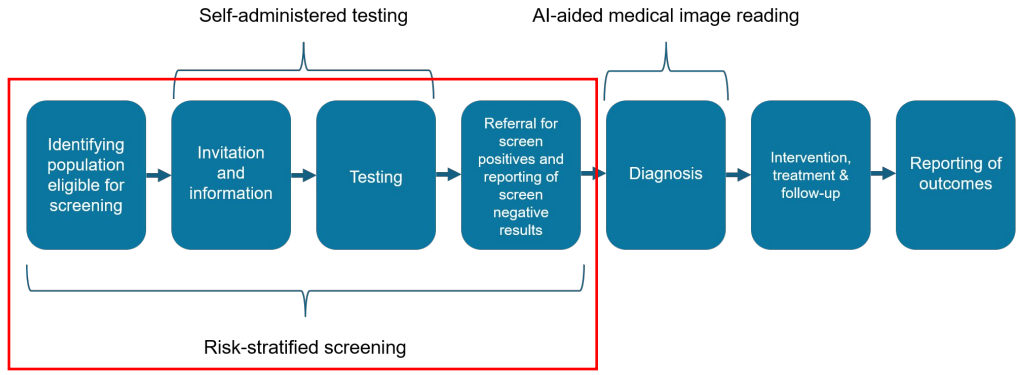
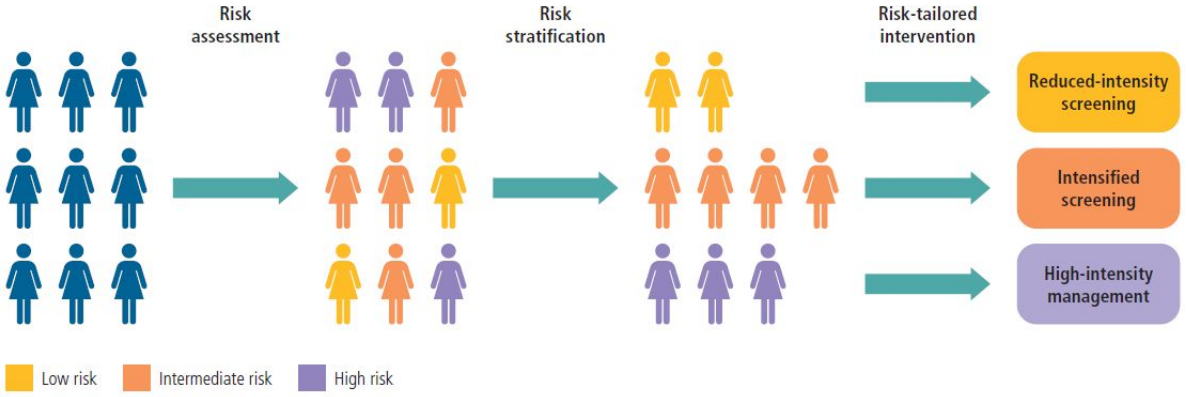


Figure 2. Steps in the cancer screening pathway affected by implementation of risk-stratification



Source: Adapted from Pashayan et al., 2020.

Figure 3. How risk stratification works

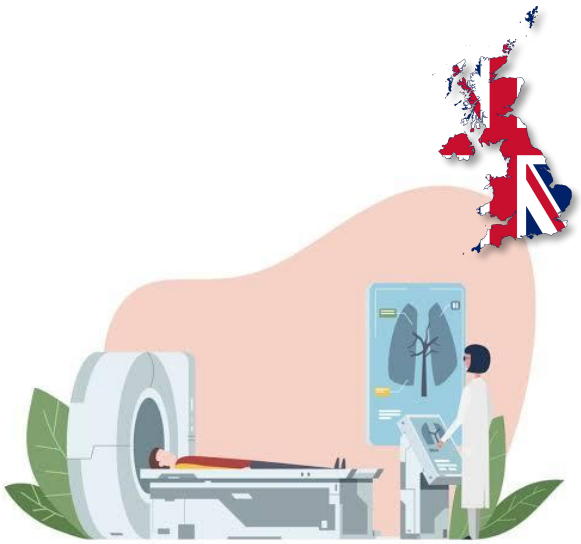
Improving benefits and reducing harms through risk-stratified prostate cancer screening in Ireland

- Ireland has a high incidence of prostate cancer alongside widespread opportunistic PSA testing, suggesting a **high rate of overdiagnosis** and highlighting the need to better **align screening with individual risk**
- **The ongoing risk stratification pilot aims to reduce unnecessary procedures:** PSA results are used to define the timing of re-screening and whether further investigation, including MRI and biopsy, is needed
- **Early results are promising:** by March 2026, **36% of participants avoided biopsy**, suggesting that risk-based screening may reduce unnecessary investigations
- **Uptake was low:** only **15% of the recruitment target** was reached
- Further work is needed to **increase participation, refine risk algorithms for the Irish population, and assess cost-effectiveness**



Implementing risk-stratified lung cancer screening in most deprived communities in the United Kingdom

- **Community-based screening can reduce barriers:** “lung health checks” brought risk assessment, LDCT and smoking cessation support into community settings, including mobile screening units in areas of high deprivation
- **Screening can engage underserved populations:** community pilots showed strong participation among people living in socioeconomic disadvantage, demonstrating that these groups are interested in and willing to take part in screening
- **The approach successfully reduced screening inequalities:** by March 2025, England’s Targeted Lung Health Check programme had diagnosed 7,000+ lung cancers, 75% at stages I–II, with people in the most deprived areas more likely to be diagnosed at an earlier stage
- **Evidence supported national scale-up:** the programme is being expanded into a national lung cancer screening programme, with full coverage expected by 2029.



What does the evidence say: AI-aided image reading to improve timeliness

Why it is innovative:

- Using AI as a **second reader** of radiological imaging (instead of two human readers) can **alleviate health workforce constraints** and resolve bottlenecks

What to consider in implementation:

- **Radiologists need training** in AI tools to support safe use and avoid overreliance on AI outputs
- **Clinicians need communication tools** to help them explain AI findings clearly and openly to participants
- Using **representative real-world data** to test AI tools reduces bias
- Ensuring **transparency** in the design of AI tools will increase trust among health professionals and screening participants.

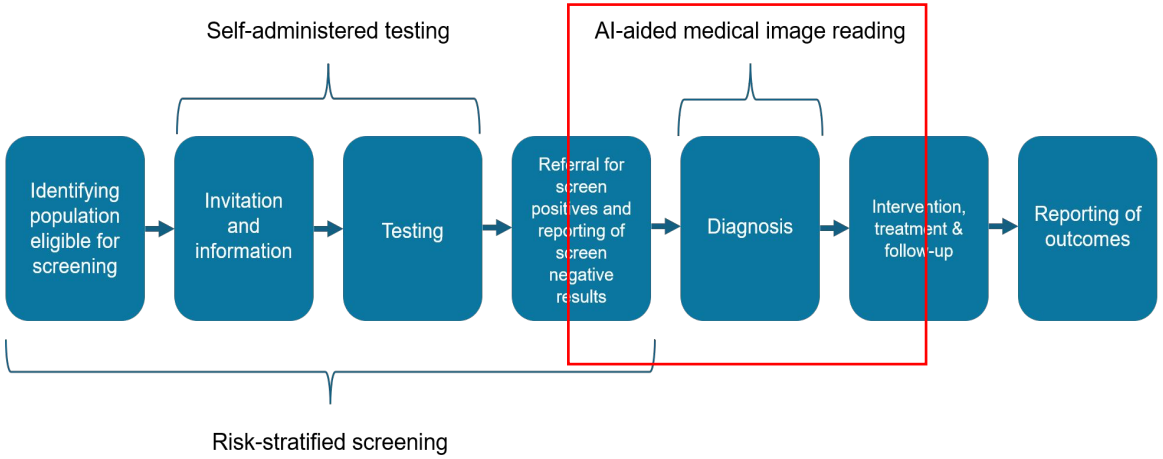


Figure 4. Steps in the cancer screening pathway affected by implementation of AI-aided radiological image reading

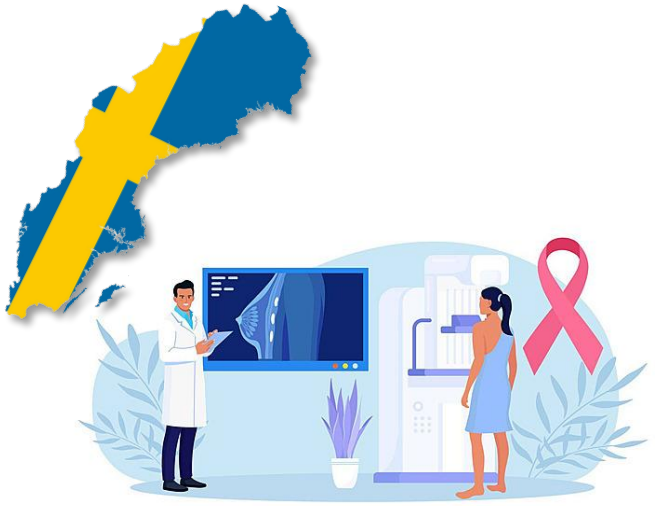
Resourcing a high-quality imaging dataset for AI algorithm testing in Sweden

- Sweden developed a **high-quality breast imaging dataset** by linking population screening, cancer registry and mammography imaging data
- The dataset contains **over 1.1 million mammography examinations**, supporting assessment of sensitivity, specificity, false positives/negatives and cancer detection of AI algorithms
- The Swedish dataset **demonstrates that real-world implementation of AI tools is possible**, as it has already been used to calibrate an AI tool for routine mammography interpretation in Swedish hospitals
- **International standards** for developing robust, representative datasets will be important to validate and safely implement AI-aided radiological image reading in cancer screening



AI-aided mammography workflow in a Swedish hospital

- In 2023, a Swedish hospital became the **first worldwide to use AI as a second reader** for screening mammography in routine practice
- **Radiologist + AI** performed at least as well as the standard two-radiologist approach, with a **4% increase in screen-detected cancers**
- Radiologists received training on interpreting AI scores and markings, alongside **on-the-job support during the trial**, helping staff become familiar with the technology, thus facilitating adoption
- **Risk assessment of ethical and legal considerations** was conducted before introducing AI into routine practice
- The new workflow has allowed radiologists to **spend more time on individual patient care -** double reading with one radiologist and AI could be a **viable alternative in settings where radiologist capacity is limited**.



What are the policy implications: Cross-cutting considerations

Implementation of innovations in could usefully consider:

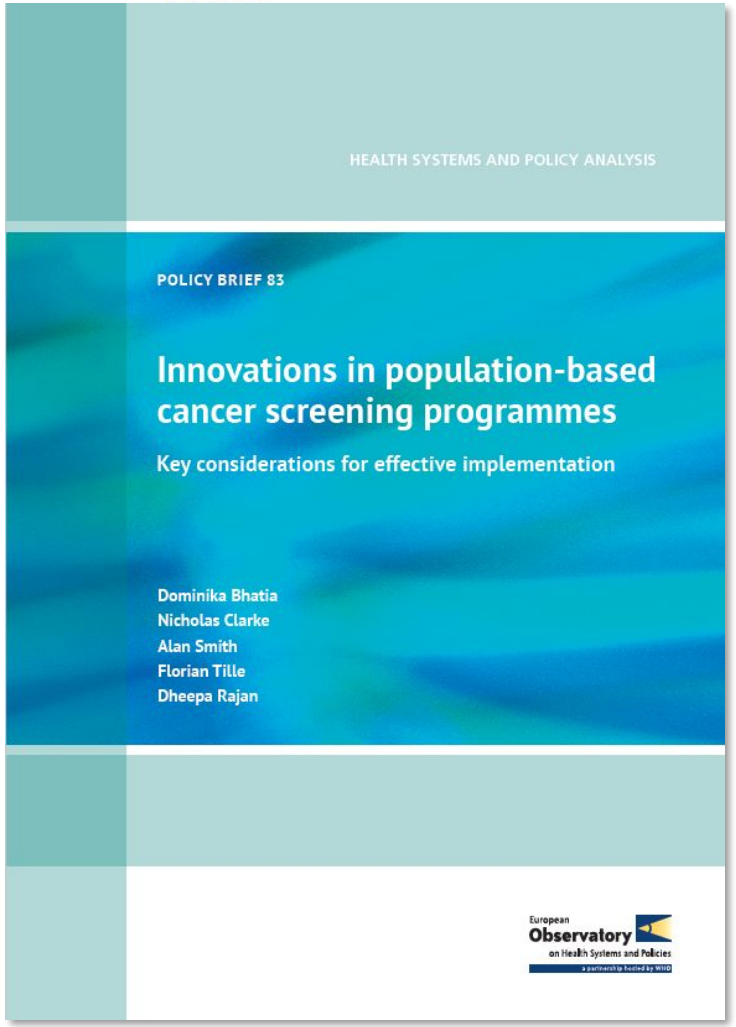
- **Putting people at the centre**
  - Communicating clearly with the public builds understanding, trust, and acceptance of innovations
  - Tailoring screening to people's needs and bringing services into the community helps improve equitable access and sustain participation
  - Working with health professionals to reassure them that innovation supports rather than replaces their roles and providing training opportunities enables delivery.

- **Building systems and evidence for innovation**
  - Creating strong systems that provide reliable, representative data reduces the danger of inaccurate or biased risk estimation and AI tools
  - Setting clear standards for implementation of innovations, protecting privacy and insisting on informed consent ensure data and tools are used responsibly
  - Real-world evaluation and learning from other countries' experiences helps assess feasibility, strengthen implementation, and ensure cost-effectiveness.

Read the brief

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Thank you

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