EU CanScreen
European Joint Action on Cancer Screening

Data harmonization and interoperability

The EUCanScreen Approach

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Outline

- Cancer screening at a turning point
- EUCanScreen WP5 – what, why and how?
- Future prospects

Towards personalized screening

Personalized cancer screening requires a multi-layered framework, including data on



Traditional demographics

Genetic risk markers

Clinical / Screening history

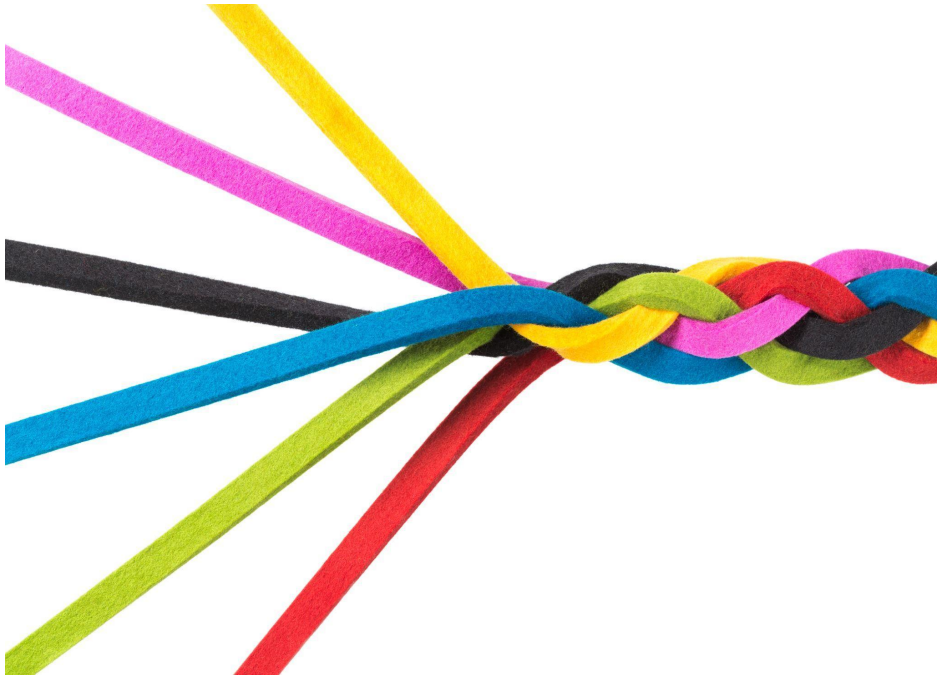
Lifestyle factors

Comprehensive information is vital for tailoring screening protocols and improving effectiveness and cost-effectiveness

Towards personalized screening

Multinational studies strengthen the evidence base:

- Outcomes are rare even with large datasets
  - 1-2 cancers per 1 000 screened in colorectal cancer screening
- Detailed stratification reduces subgroup size and statistical power



✔ **Changes in legislation make cross-border secondary data sharing difficult**

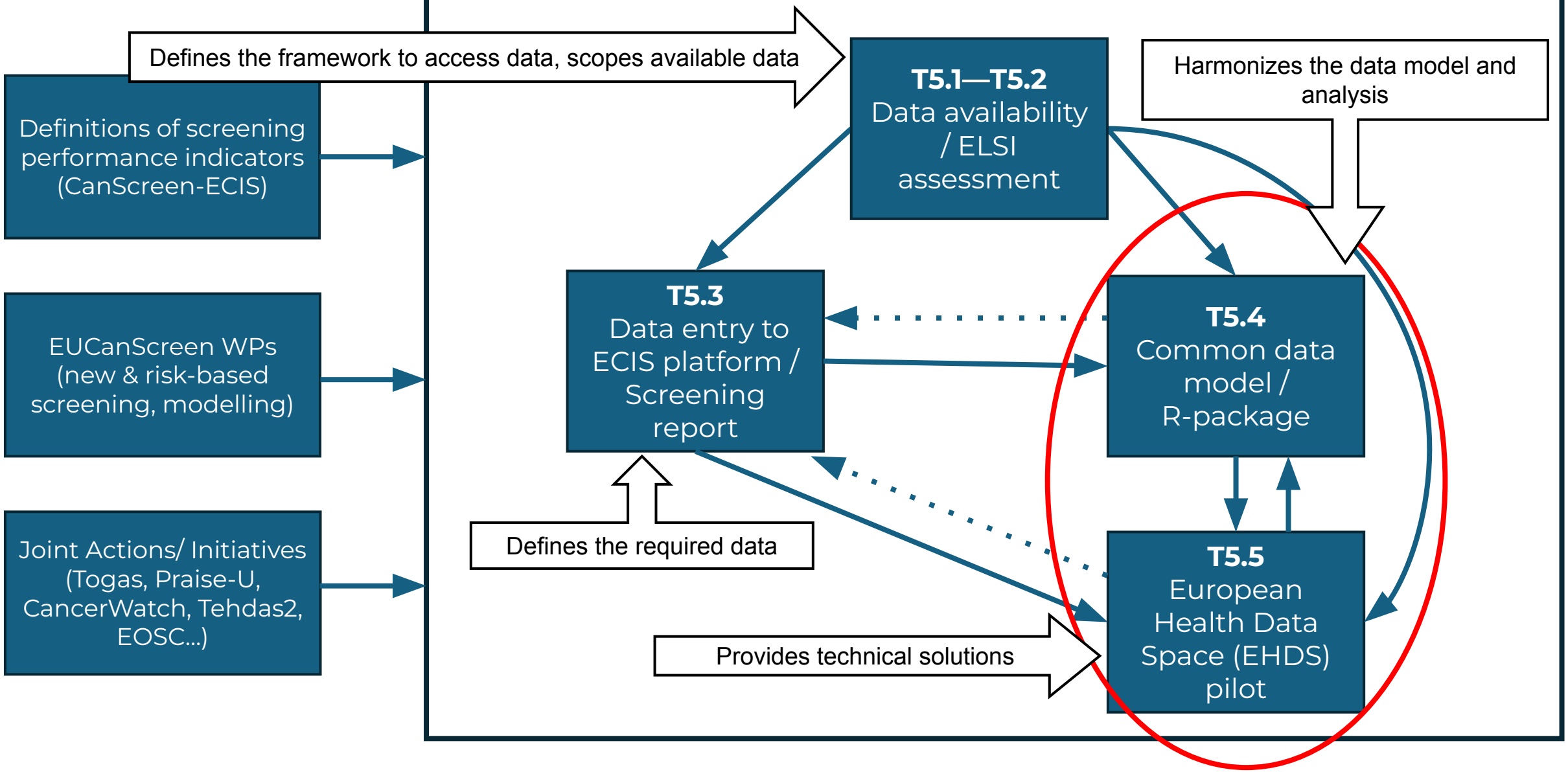
EUCanScreen WP5

Aims to:

- Improve and develop data sharing and standardization across Europe
- Improve monitoring and comparison of screening programs
- Enable and promote cross-border screening research

- **T5.1**: Ethical, legal, and social implications of data sharing (Dypede, Greece)
- **T5.2**: Assessment of data availability (CPO, Italy)
- **T5.3**: Extended pilot of data entry to the ECIS platform (CPO, Italy)
- **T5.4**: Software and standardised data model for screening (CSF, Finland)
- **T5.5**: Piloting for European Health Data Space (EHDS) (IACS, Spain)

WP5


Defines the framework to access data, scopes available data
Definitions of screening performance indicators (CanScreen-ECIS)
EUCanScreen WPs (new & risk-based screening, modelling)
Joint Actions/ Initiatives (Togas, Praise-U, CancerWatch, Tehdas2, EOSC...)
T5.1—T5.2 Data availability / ELSI assessment
Harmonizes the data model and analysis
T5.3 Data entry to ECIS platform / Screening report
T5.4 Common data model / R-package
Defines the required data
T5.5 European Health Data Space (EHDS) pilot
Provides technical solutions

Individual-level analysis

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T5.4—T5.5

Common data model (CDM) for cancer screening
- Flexible enough to accommodate data from various settings

Upload converted data

ASPIRE* web interface
- Standard environment for analysis
- Runs in a local docker container
- Data stays at the host institute's premises

EHDS compliance

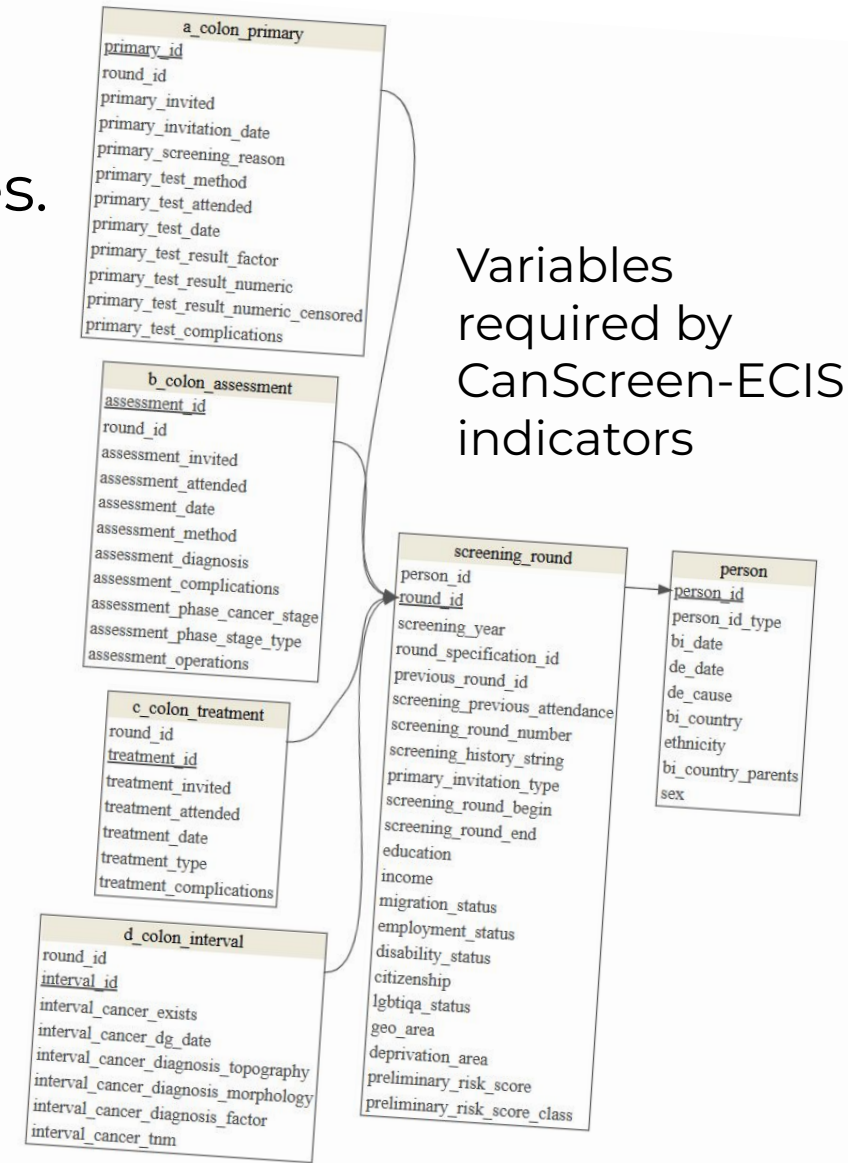
R-package *eucs*
- Pre-configured analysis encapsulated in the container

Download aggregated outputs

*ASPIRE = Analytic Software Pipeline Interface for Reproducible Execution: https://github.com/cienciadedatosysalud/aspire

Data models

- Three CDMs: breast, cervix, colon
- CDM based on the idea of five screening phases.
  - Primary
  - Triage
  - Assessment
  - Treatment
  - Interval
- Phases are linked together to form a screening round that is linked to person data
- Phases can be omitted or unlinked



Variables required by CanScreen-ECIS indicators

Template for monitoring

The CDM and standardized analysis offer a template for monitoring

- Set standards for indicator calculation
- Better cross-country comparability
- Clear workflow for producing indicators
- Possibility to develop and extend

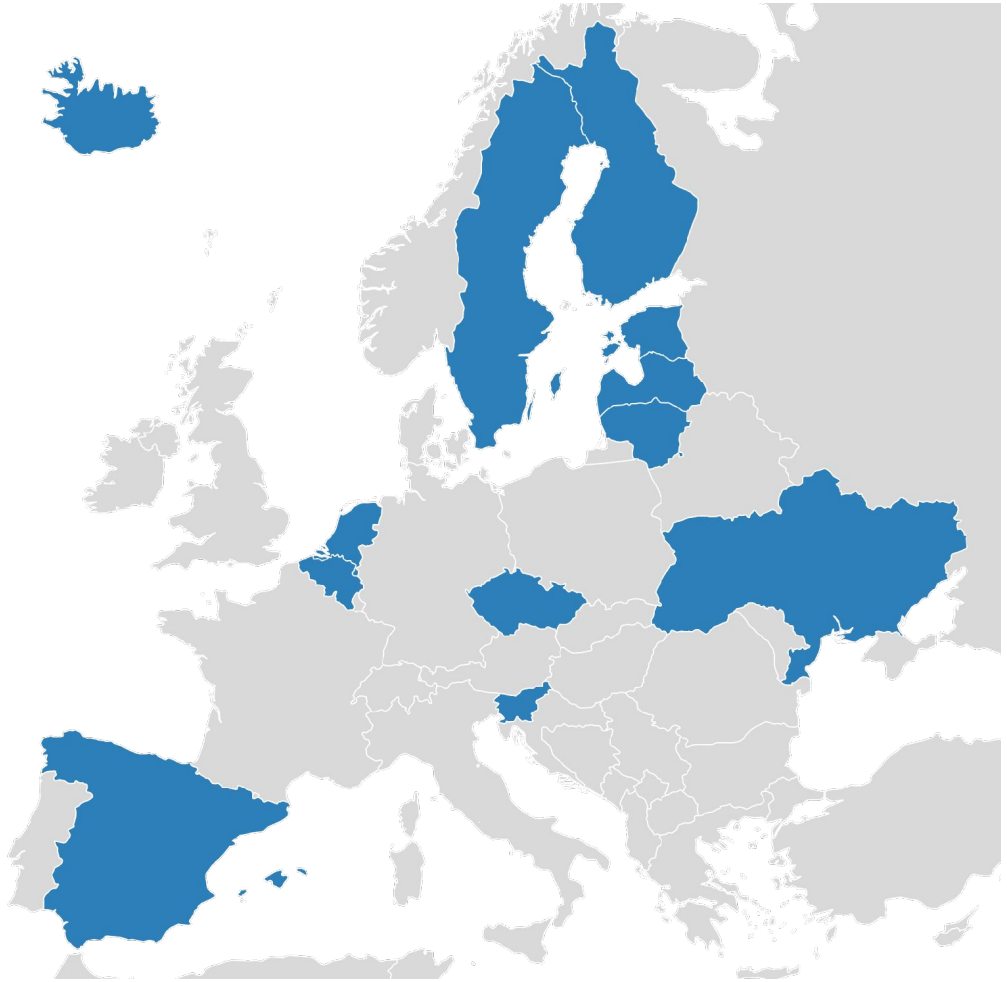
Template for monitoring

- Example: Screening attender characteristics relevant for targeting personalized screening, using the EUCanScreen CDM variables
- Indicators stratified by
  - Screening history (participation, positivity)
  - Sociodemographic factors (SES, education, immigration status)
  - Risk status (based on, e.g., risk score)
- Screening history could also be derived from the data, if sufficient follow-up exists

sex	age group	education	previous attendance	previous positivity	total (N)	test positive (N)	test positive (%)
1	50—54	2	1	1	100	30	23
1	50—54	2	1	0	900	90	9
1	50—54	2	0	NA	500	75	13
…	…	…	…	…	…	…	…

Now: piloting the pipeline

- EUCanScreen WP5 partners from 15 institutions and 12 countries test the analysis pipeline with real screening data
    - Breast, cervical, colorectal, prostate, and gastric cancer screening
- Feedback is expected by the end of this year
    - Deliverable due on May 2028



Future: template for research

- The greatest benefits from CDM + pipeline go beyond the indicators
- Any data model can be added to ASPIRE with the Common Data Model Builder (CDMB)
- Common data model + standard analysis scripts
  - Template for practically any federated analysis research project
  - Reduces barriers for complex model use and scale models better
- EUCanScreen to OMOP – events in cancer screening process can be tagged to OMOP episodes
  - Preliminary analysis performed

✔ **Work to be completed beyond current EUCanScreen period**

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Thank you

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