Towards the 3rd (and subsequent) report on the implementation of the Council recommendation on cancer screening in Europe: the need to build up on the pan-European efforts to improve the quality of cancer screening

A proposal aligned to the Flagship Initiative on Improving Cancer Early Detection included in Europe's Beating Cancer Plan

Background

Cancer is the second leading cause of mortality in European Union (EU) countries after cardiovascular diseases, more than 1,3 million people died of cancer in 2016 across all EU Member States, accounting for 26% of all deaths that year.[1] However, 40% of cancers are preventable if we implement what we already know.

In 2003, the Council of the European Union had issued recommendations setting out principles of best practice in the early detection of cancer. The recommendations called on all EU countries to take common action to implement national, population-based screening programmes for breast, cervical and colorectal cancer.

The European Code Against Cancer (ECAC), an initiative of the European Commission (EC) to inform people about actions they can take for themselves or their families to reduce their risk of cancer has proposed 12 ways to reduce cancer risk in Europe.[2] Among the recommendations listed in the 4th edition of the ECAC, one of the successful and cost-effective interventions is organized population-based screening for breast, cervical and colorectal cancers, for which evidence-based, feasible, and efficient screening strategies exist.[2] The effectiveness and appropriate balances of health benefits and harms of these screening strategies to reduce mortality at the population level for these three tumour sites are well established through randomized controlled trials and observational studies;[3-5] and comprehensive guidelines covering all aspects of breast, cervical and colorectal cancer screening have been developed by experts and published by the EC.[2]

A first report prepared by International Agency for Research on Cancer (IARC) in collaboration with the Centre for Epidemiology and Prevention in Oncology in Piemonte (CPO), and the Finnish Cancer Registry analysing the state of implementation followed in 2008 and showed that incidence and mortality rates for breast, cervical and colorectal cancer vary widely across the EU, reflecting considerable inequalities in the cancer burden between, but

also within Member States.[6] Moreover, less than half of the current volume of screening tests (41%) was performed in population-based programmes by providing the organizational framework for implementing comprehensive quality assurance as required by the Council Recommendation.[6,7] The first report has provided justification for a number of initiatives at the European level and in the EU Member States to expand and improve implementation of population-based programmes for breast, cervical and colorectal cancer screening, such as conclusions of the Council, resolutions of the European Parliament and national laws and regulations.[7-9]

In 2014, the second report on the implementation of the Council recommendations on cancer screening was proposed to update and expand the scope of the first report in order to cover both the status and organization of the screening programmes and also to calculate selected indicators of programme quality included in the European quality assurance guidelines for breast, cervical and colorectal cancer screening.[10-12] The second report was published in 2017, and it has been supported by the EC and prepared by the IARC, with the collaboration of the CPO, the Finnish Cancer Registry and representatives of the Member States.[8] The data requested was for the most recent year in which complete data was available, generally 2013. It presented the state of play of screening of breast, cervical and colorectal cancer in the 28 EU countries. A great added value of the second report compared to the earlier one was that key performance indicators could be estimated based on the data collected and compiled from most of the population-based programmes. The availability of aggregated data analysed using common standardized algorithms / formulas allowed us to compute the performance indicators for cancer screening by age groups and by initial or subsequent rounds of screening. In spite of the variability of the results, due to the differences in the underlying incidence of the disease and the screening protocols, the report allowed the comparison of the national programmes by these indicators and eventually paved the way to define common benchmarks for cancer screening programmes in the EU.[8]

According to the second report on the status of implementation and performance of cancer screening programmes, population-based breast cancer screening programmes are ongoing, piloted or planned in 25 EU Member States for nearly 95% of women in the chosen age group of 50-69 years. Cervical cancer screening programmes are ongoing, piloted or planned in 22 Member States for approximately 72% of the women in the 30 to 59-year age

group. The rapid progress in recent years for colorectal cancer screening has been truly remarkable, with 23 Member States already implementing or planning to introduce population-based screening programmes for a population of 110 million men and women (72% of the total target population) in the 50-74-year age group. The second report brings into focus the fact that significant efforts need to be made by the Member States to improve the organization of their programmes to increase the coverage further as well as to improve the performance.[8]

The first report had a strong influence on the EU Member States to improve their cancer screening programmes. The second report showed that EU Member States had adopted significant measures to deliver cancer screening services to their respective populations as per the European Council recommendation. The second report has not only highlighted the status of the screening programmes and the volume of screening ongoing in the EU Member States but also has identified a set of essential indicators that need to be continuously monitored to ensure quality improvement. This would probably prove useful in gradually extending the programme coverage, improving the data quality, and offering a basis for networking and enhancing screening effectiveness in the EU.[8]

Among the Key Recommendations from the 2nd report,[8,13] a few may be highlighted to justify and emphasize the importance of this proposal:

- Screening monitoring should be continuous and the updating of the status report on cancer screening in EU should be periodic at regular intervals. The report will be a valuable resource for programme managers, clinicians, policymakers, researchers and patient groups.
- Efforts need to be made to ensure consistency and enhanced quality of the data collected for the screening reports. The inconsistencies existing for some indicators for breast, colorectal and cervical cancer screening should be investigated, and steps should be taken at the country and EU levels to reduce unjustified differences.
- Information systems should capture data from mixed screening programmes as well where part is opportunistic and part is organised.
- Updating of the 2003 EU Council recommendations should be considered. New screening tests and protocols have been validated, recommended in the European

guidelines and introduced in the EU Member States. Introduction of HPV vaccination will substantially change risk profiles of cervical cancer requiring adapted screening.

Europe's Beating Cancer Plan is expected to put forward a new EU-supported Cancer Screening Scheme to help Member States ensure that 90% of the EU population who qualify for breast, cervical and colorectal cancer screenings are offered screening by 2025. To guide further EU action on cancer screening with the most recent evidence, the Commission is already committed to prepare a 3rd report on the implementation of the Council recommendation on cancer screening. Our proposal will support the Commission to achieve the objectives under the Flagship Initiative for improving cancer screening in Europe

How will the third and subsequent reports benefit the ongoing screening programmes in EU?

Measuring the performance is essential to identify and reduce the social inequalities in cancer screening:

The population coverage even in the population-based cancer screening programmes is low in several Member States, indicating a low rate of acceptance by the population, and possibly also inadequate adherence by the policymakers and medical professionals to the quality requirements. There are wide variations in the EU in the resources available to the governments for healthcare services; some Member States may still lack the resources for establishing these financially and logistically demanding programmes. Lack of resources and inadequate attention to quality affect the socially disadvantaged population the most, thus broadening the inequality gap. The next reports should have a special focus on the inequality perspective. The screening programmes in the EU member states need to address cancer inequalities such as lower cancer screening utilization and higher rates of advanced cancer diagnosis in different socio-economically disadvantaged groups. It would be possible to plan and implement various strategies targeted to identify the disadvantaged populations and ensure their high participation to the entire cancer screening continuum. The added value of

the third and subsequent reports rest in the possibility to examine these dimensions of inequity or of in general inadequate quality inequalities from a comparative perspective and draw attention to potential interventions taking place across member states. The European statistical system includes a number of measures that can be potentially used to measure inequalities, for instance several aggregated indicators and data on the region/municipality, and also individual-level data on marital status, country of origin or mother tongue, employment status, education level and household income level. Unfortunately, the current monitoring of cancer screening programmes in the Member States do not systematically utilize these measures of inequality. The European Health Information Survey (EHIS, https://ec.europa.eu/eurostat/web/microdata/european-health-interview-survey) includes information on a number of such factors, even though it does not yet collect information on the screening programmes or any use of the screening tests (in the programmes or outside).

Sustained focus on quality is essential to ensure benefits of screening with minimized harms:

In many countries, appropriate monitoring of screening activities was not yet in place at the time of drafting the second report. The monitoring databases are necessary not only for the accountability of cancer screening but also for evaluating the screening outcomes and avoiding potential harms. The second report harmonized the definitions for some of the key performance indicators, such as participation rate, coverage, detection rates and positive predictive values, etc. In the context of the EU2020 EU-TOPIA project, data collection has been extended to collect additional information about the potential harms of screening activity. Persisting differences in the interpretation of the definitions of the indicators and incomplete data can explain some inconsistencies, which can still be observed in the outcomes.

The third and subsequent reports will be able to highlight the extent to which the individual programmes have adopted these indicators to improve the quality of the services. Deficiencies in the quality of cancer screening have been documented not only in the less organized programmes but also in some of the well-established population based programmes.[14] From the second report,[15,16] it was evident that the variability of some key performance indicators of Breast and Colorectal cancer screenings, was only partially explained by the target population characteristics and/or by different screening protocols.

The next reports will focus on new screening paradigms: The evaluation and implementation of emerging techniques and approaches on cancer screening will be considered in the new report (e.g. sigmoidoscopy, or total colonoscopy, for colorectal cancer; HPV tests for cervical screening followed by various triaging technologies, modified cervical cancer screening policies for women vaccinated against HPV, the expanded target age for breast cancer; among others), and implementation of risk-adjusted screening.[3-5,17] The European guidelines for the quality assurance of the breast, cervical and colorectal cancer screening published with the scientific and technical inputs from IARC and Joint Research Council of the European Commission (JRC) provide the evidence-base to adopt new interventions and strategies to make the programmes more efficient.[18,19] Also interventions to tackle the social inequalities need to be addressed. The state of implementation of these new paradigms in the real programme setting will be reported for the first time.

<u>The evaluation of quality and reach of the existing screening programmes will allow the countries to make an informed choice regarding the introduction of screening for new cancer sites</u>:

There is evidence that screening of the high-risk populations for lung cancer with low-dose computed tomography (LDCT) scan may reduce lung cancer specific mortality[20,21]. The existence of well organised screening registries linked to cancer registries facilitate extension towards screening and early detection of other cancers and complete the evidence-based on effects evaluated through randomised trials on including new screening programmes. The third screening report will provide the Member States to understand the quality and reach of the existing programmes and thus facilitate an informed decision making on whether the health system is capable of handling a new programme.

<u>Creating a long-term network for coordinated continuous efforts in between EU reports</u>

So far, monitoring and evaluation of the implementation of cancer screening programmes in the EU Member States is being done in an episodic, project-based fashion. The first report being published in 2008 and the second report in 2017, there is an almost 10-years of gap that is too long to ensure continuity of efforts. In between the reports, many activities concerning the dissemination, advocacy, capacity building, monitoring and evaluation have

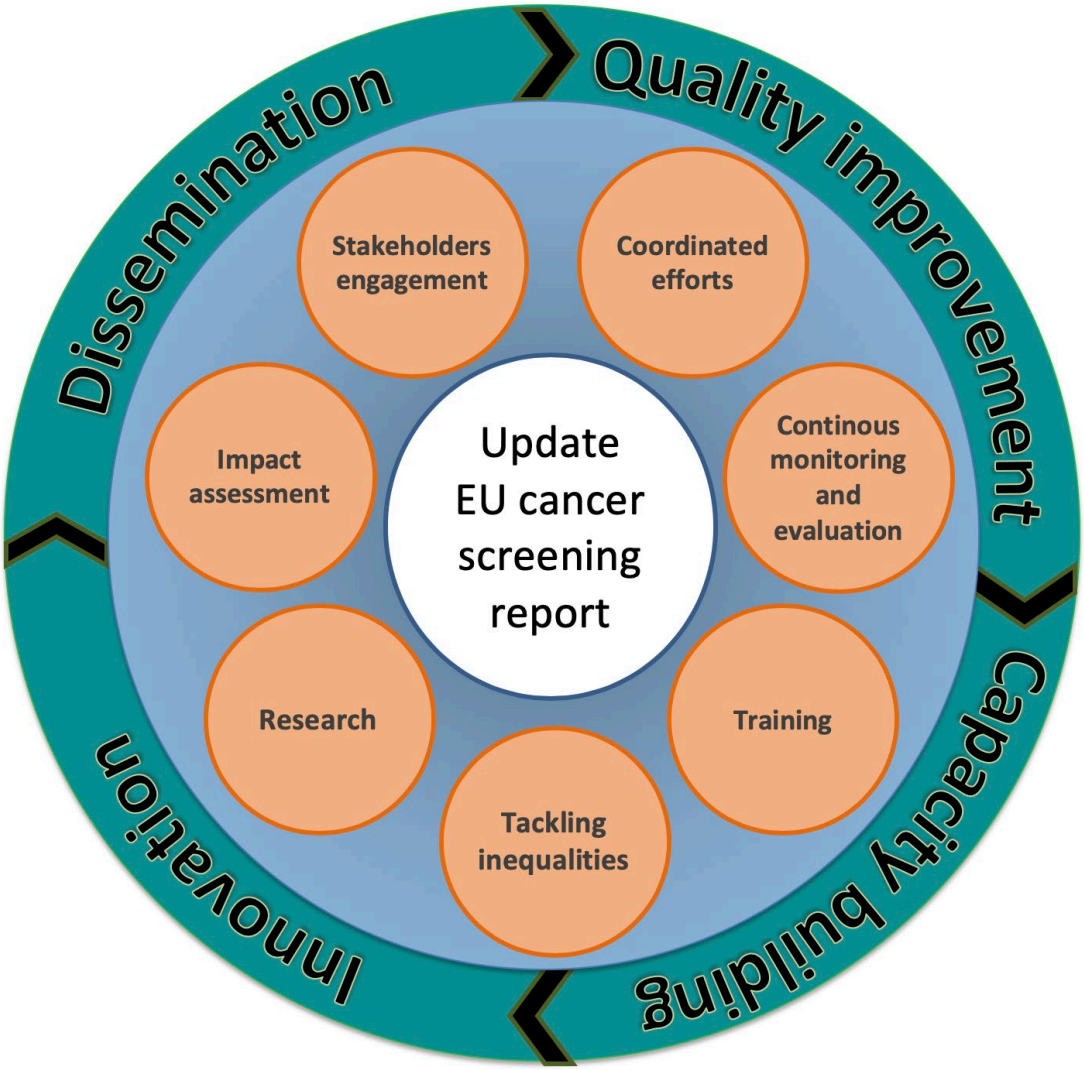
been performed by many stakeholders that were involved in the reports, but not in a coordinated and integrated manner. Additionally, the efforts to assemble a team of programme managers and data providers around the reports is lost until the next report is planned, and then a new round of engaging stakeholders and assembling the teams is needed, consuming time and resources. Moreover, sharing of knowledge and update of information regarding the evidence of new techniques for screening or management of screen-positive subjects is important to prepare stakeholders and programme managers, who can plan pilot implementation as soon as evidence is sufficiently mature.

Understanding that the EU reports on the status of Cancer Screening in the European Union cannot be a limited exercise but a process of establishing a sustainable mechanism that is continuously available to member states, which would ensure that the report is not just an objective itself but an instrument for quality improvement for member states. In our proposal, it is not the periodic publishing of the reports which is essential for monitoring and evaluation of the cancer screening programmes, but most importantly what is done between reports. All activities and efforts should be performed in a coordinated fashion, allowing for the synergy of the stakeholders and for the project to achieve its full potential.

We hereby propose a continuous cycle for quality improvement of cancer screening programmes will entail the following steps, that will be fulfilled by the proposed work packages (WPs):

1. Engaging stakeholders and identifying priorities for the report on the cancer screening programmes in the EU Member States;
2. Implement a platform for continuous data collection;
3. Produce the report on the status of implementation and performance of cancer screening in the EU Member States and their performance;
4. Dissemination of the results among stakeholders, advocacy and capacity building;
5. Identification of and investigation on criticalities;
6. Proposing, planning and implementing quality improvement;
7. Proposing, planning and implementing interventions to tackle social inequalities on cancer screening programmes, if possible using randomised service-based approaches;

8. Proposing, planning and implementing innovations;
9. Assessing the impact of screening implementation;
10. A new cycle of monitoring and evaluation.



Objectives:

The main objective of the proposal is to produce a framework to support the EU Member States implement comprehensive quality assurance and continuous quality improvement of the population-based cancer screening programmes.

Project coordination and governance

European Commission would be expected to coordinate the project and the same Institutions that prepared the first and second report will be involved in the preparation of the third and subsequent reports (IARC, Lyon, France; CPO, Turin, Italy; and the Cancer Society of Finland (CSF), Mass Screening Registry, Helsinki, Finland) along with Joint Research Center of the European Commission (JRC) and other institutions that have contributed significantly to improving quality of cancer screening in the EU and development of evidence-based guidelines for quality assurance of cancer screening (e.g. Erasmus MC, Sciensano, ECL, CHAIN, among others) will actively participate in the project. All cited Institutions will either lead or collaborate in the different proposed WPs; other external collaborators, based on expertise, might be invited to collaborate in a specific WP to strength and expand the network.

WP1 – The EU report on the status of implementation and performance of cancer screening programmes in the EU Member States

Leadership: IARC; Co-leader: CPO; Collaborators: JRC, CSF, CHAIN, CvKO, Sciensano

The main objective of WP1 is to produce the third and subsequent reports on the status of implementation and performance of breast, cervical and colorectal cancers in the EU Member States and their performance. The process of producing a report of appropriate quality is complex and will entail at least the following steps:

1. To define a systematic, scientific methodology, taking into account the need for comparison between the Member States and between the first, second and subsequent reports regarding key standards of quality and best practices in EU Guidelines;
2. To extend the framework of data collection methodology allowing insertion of information from screening programmes with mixed levels of organisation.
3. To fine tune the instruments and methods for collecting data used to produce the second report and also collect data that would allow measuring the inequity (e.g., key covariates of inequity: geographical, socio-economic category, education, etc.) within

the screening programmes, to document management of screen detected cases and to estimate the frequency of side-effects of screening, assessment and treatment;

4. To collect data and other content of the report from all EU Member States with special stress on collecting the core performance data identified in the second report;
5. To process the collected data and other content of the report to estimate the appropriate performance indicators for each cancer site;
6. To interpret the analysed data in a meaningful way that will provide the Member States specific guidance on improving the quality of cancer screening.

The objective of this project might be to establish a network/group/body creating in the appropriate context a permanent structure to continuously monitor and collect data from cancer screening programmes. The network/group/body would be responsible for publishing implementation reports on cancer screening periodically in the EU. Starting with opublication of the next implementation report on cancer screening by 2023. EU reports would be prepared every 5 years, establishing a framework for regular data collection and monitoring might also allow to plan ad hoc surveys, focused on specific needs.

Methodology:

A secretariat will be established to coordinate all activities related to the systematic planning of the third and subsequent screening implementation reports, finalizing (updating/coordinating across all projects collecting (parts of) cancer screening data) the data collection instruments, collecting and processing data and other information, and drafting, reviewing and finalizing the report. Special priority will be given to the integration of key standards and best practices recommended in the EU Guidelines for quality assurance of cervical and colorectal cancer screening and the European guidelines on breast cancer screening and diagnosis (https://healthcare-quality.jrc.ec.europa.eu/european-breast-cancer-guidelines) as well as in the European Quality Assurance Scheme for breast cancer services (https://healthcare-quality.jrc.ec.europa.eu/breast-quality-assurance-scheme), such as coverage and detection rates. Priority will also be given to the collection and presentation of data and other information which will underscore the need for measuring and minimizing

the inequity within the programmes. The quality, completeness, plausibility and validity of the collected data will be checked internally and by external reviewers.

The editorial board of the report will be a selected group of experts well versed in the implementation of population-based cancer screening programmes in Europe. Many of the members of the editorial board have drafted and revised the first and second reports allowing for continuity of the monitoring and evaluation of the implementation status.

Focus on screening programmes

Implementation data for the third and subsequent reports will be collected on cancer screening performed in the framework of publicly mandated programmes; in such cases the eligible population, the screening test and the screening interval, as a minimum, are defined by laws, statutes, regulations or official recommendations, and the costs of participating in screening are covered by public sources (government or publicly mandated health insurance), apart from a possible co-payment. When possible screening activities outside the programme could be collected.

However, as in the past reports, sometimes it may not be possible to differentiate the population-based programme data from the opportunistic programme data, where the programmes co-exist. In the context of the H2020 EU-TOPIA project data collection protocols have been developed, including specific data collection templates, to support data collection (where available) about opportunistic activity in those jurisdictions where (mainly for cervical cancer screening) organised programs are targeting individuals who are not covered (i.e. have not performed the test within the recommended interval). Building upon this experience, additional data collection templates could be developed, when preparing the data collection for the third and subsequent reports, to get data from opportunistic programmes, although this might prove challenging, as data for that activity are often lacking or incomplete. However, certain countries have complete registration of organised and opportunistic. The data collection on spontaneous cancer screening activities, will be assessed (and possibly integrated) taking into account the data of European Health Interview Survey (EUROSTAT-EHIS) and consequently can provide a more comprehensive National Health Interview Surveys on attendance and complete picture than intervals in countries where only the organised activities can be monitored. spontaneous and organized screening settings.

Selection of the data providers

Due to the need for inclusion of aggregated data used to generate key programme parameters and indicators, special knowledge and skills are required for accurate data compilation, calculation and interpretation. The data providers must have access to the respective information in the Member States. Hence the data providers would be identified through the official screening registries and the Ministries of Health. The screening programme coordinators and/or senior scientists directly involved in programme monitoring and evaluation in their respective countries would also be invited to participate in the project and provide data. All data providers will be requested to ensure that they have the mandate of the responsible authorities in their country to provide the requested information on the cancer screening programmes. To streamline communication and coordination, the number of data providers per country should be kept to a minimum. In some cases, one data provider per type of screening programme (breast, cervical and colorectal) in the country as well as a coordinating expert, might participate.

Data collection tools and web-based data collection

Based on the experience of the collaborating centres of the second report, web-based data collection instruments were developed and were hosted on a website (http://canscreen5.iarc.fr/) created by IARC (with support from CPO). The website is developed within the framework of "Cancer Screening in 5 Continents (CanScreen5)" project of IARC that aims to collect information on the characteristics and performance of cancer screening programmes across the globe in a harmonized manner and disseminate the information for improved programme management and informed policy-making. The website contains a set of standardized data collection questionnaires and data tables (one each for breast, cervical and colorectal cancer screening programmes). The questionnaires and the data tables are accompanied by a set of instructions and all the documents are in English. The questionnaires and data tables were designed to collect information about implementation status and performance in each of the countries and also, when applicable, at a regional level. Similarly, the EU-TOPIA project created a more detailed data monitoring tool that included, besides the indicators from the second report, the collection of data on harms of screening activities and clinical data on cancer cases. The project also developed a web-based platform

(https://www.eutopia.cpo.it/) to display the indicators. In summary, the second EU screening report collected more detailed quantitative information about screening performance indicators (indicators were generally stratified by screening history, for example), and the EU-TOPIA monitoring tool included additional indicators (referring to treatment and side effects) and some additional detail about patterns of participation.

We will work collectively to develop a data collection tool for the EU screening reports that would support gathering data on more indicators maintaining a level of detail already achieved for previous data collection efforts as a basis for the third report but, at the same time, also collect the core information available on the canscreen5 platform. Thus, available monitoring and online analysis tools can be integrated and harmonized to avoid duplications of data collection efforts, but also allowing for displaying the core and the detailed data in different platforms. Therefore, a dedicated web-platform would be developed with the ability to be tailored for the EU report needs regarding data collection and display. The website will also be an integral part of the dissemination of the EU third and subsequent reports. Nevertheless, this data should be share with the European Cancer Information System, CanScreen5 and EU-TOPIA platforms to feed and update their databases.

Data management and analysis

The questionnaires and the data tables will be carefully checked for inconsistencies and incompleteness by the editorial board. The data providers will be contacted to collect the missing data or to correct the apparent inconsistencies. For the interim report, analysable tables from the completed questionnaires (qualitative data) and analysed data tables (quantitative data) will be generated. These data will again be checked by the editorial board to derive the qualitative information related to the national programmes and correctly estimate the programme coverage, data completeness and performance indicators. The final analysis will be done after having solved inconsistencies and receiving feedback from the participating countries and from the experts.

Workshops will be held with the data providers at the beginning of the project, after the preliminary analysis of the data and after drafting the report to ensure that the data collection

is harmonized and the data providers are in agreement with the analysis and interpretation of the data.

All the selected data providers may access to consolidated data bases for data analysing, further investigations and publications according to the rules established by the network/group/committee.

Deliverables for WP1:

#	Title	Description	Confidentiality level
1	Interim technical, financial and evaluation report	Description of work conducted, the outcome achieved and expenditure in the first year of the project period, including initial results of the call for data.	Public
2	Draft results	Presentation of the draft final results	EC
3	Progress report	Written summary of the third and subsequent reports on cancer screening in EU delivered	Public
4	Final technical, financial and evaluation report	Description of work conducted, outcome achieved and expenditure in the entire project period.	Public
5	Scientific publication	Scientific publication of project results published	Public
6	Evaluation report	Indicator-based analysis of the activities performed, and the results achieved in the project	Public

WP2 – Supporting quality improvement of cancer screening programmes

Leadership: CPO; Co-leader: CSF; Collaborators: JRC, IARC, ECL, CHAIN, CvKO

There have been considerable developments in the implementation of population-based screening programmes for cancer within the EU Member States since the EU council

recommendation in 2003. Still many of the Member States lack systematic, comprehensive policy-making protocols and structures for an organized cancer screening programme and appropriate legislative frameworks[8,19]. Also, the analysis of key performance indicators of screening activity based on the data collected for the second EU screening report[15,16], showed a wide cross-country variability, which could not be explained by differences in the background cancer risk, in the population structure, or in the screening protocols. These findings highlight the need to explore the role of quality of screening and of the process of care in screen-positive subjects in determining the observed variability and to device, apply and evaluate corrective actions.

Monitoring represents a key step in the quality cycle (Plan-Do-Check-Act, according to Deming)[22], as it allows to identify areas where there are opportunities to improve and to assess the impact of interventions. The efficacy of monitoring in producing change is however much diminished if planned and practised alone. This project represents the first attempt on a European scale to fully include monitoring in the quality cycle. The WP activity will be focused on:

- Support to the definition of relevant performance and outcome indicators as well as of the data collection requirements for standardized reporting (collaboration with WP1)
- the identification of and investigation on criticalities
- proposing and supporting the implementation of quality improvement efforts, including support to
    - the implementation and maintenance of well-organized information systems, integrated with population based cancer registries
    - Clinical and diagnostic quality assurance and quality management initiatives
    - the evaluation of the impact of the program components, methods, policies and organizational models (collaboration with WP3)

In-depth comparative analysis of the results of key quality indicators along the entire process of care will be carried out, in order to understand reasons for differences across the EU Member States (MSs) and to evaluate barriers to cancer screening related to the participants (e.g. participation in screening, further assessment and treatment), to the health

providers (e.g. knowledge of and compliance with recommended protocols), to governance (e.g. policy, protocol, health system capacity, information system).

Moreover, one key area to improve is reducing disparities in the access to screening or in the quality of screening between and within Member States, focusing on specific vulnerable groups. Including this perspective when monitoring screening performance will be an important step forward to inform where efforts should be focused to contrast inequalities.

Comparing key quality indicators results with European standards and benchmarks, across countries, as well as across regions within each country, can provide evidence and knowledge about best practice as well as poor performance. As part of the process of developing the European quality assurance scheme for breast cancer services, JRC envisages an exercise on checking the feasibility in real settings to test the implementation of the requirements, indicators and tools. This exercise will include some EU screening programmes and could serve as a test for collecting additional information comparing to the previous report, as well as an information source identifying potential areas of improvement and corrective actions.

Also, in the scope of the European Commission Initiative on Breast Cancer, the European guidelines on breast cancer screening and diagnosis (https://healthcare-quality.jrc.ec.europa.eu/european-breast-cancer-guidelines) as well as the European Quality Assurance Scheme for breast cancer services (https://healthcare-quality.jrc.ec.europa.eu/breast-quality-assurance-scheme), have been developed, and contain evidence-based recommendations, quality requirements and indicators to measure the performance and quality of care at breast cancer services, including breast cancer screening programmes. These should be considered when developing a methodology for ensuring comparability of the performance indicators and defining the data items to be collected for their computation.

Audit initiatives on screening performance can yield information about strengths and weaknesses of the program, can enable prioritization of quality assurance initiatives and can provide the necessary feed-back to plan training and capacity building programs[23].

Two structured webinars for each of the 27 Member States having contributed data will be organised, the first when initial monitoring data will become available for identifying potential areas of improvement and corrective actions, the second after subsequent monitoring for evaluating the effect of the measures taken. The seminars will be attended by members of all disciplines involved in screening on the State side and by European experts on the project side.

The framework of learning screening programs[24-26], adopting a randomized design to assess the effectiveness of changes within ongoing established programs might also facilitate such continuous quality improvement efforts. Organized screening programs represent indeed an ideal platform[27] to implement comparative effectiveness research aimed not only to compare benefits and harms of different screening protocols, but also of alternative methods to improve quality of care.

Training and retraining of health professionals working in the screening programmes seems a milestone for achieving adequate levels of quality and quality improvement. The analysis of quality indicators will provide inputs for identifying candidate areas for training activities, to be implemented in co-ordination with clinicians and screening managers. Planning of capacity building efforts as well as of communication interventions, including ad hoc interventions based on the analysis of country specific training needs, will be conducted in collaboration with WPs 5 and 6.

The project will utilise the current fast development of technology for effective on-distance meetings and organise such meetings frequently, each to tackle specific criticalities emerged from the data and the corresponding quality improvement initiatives.

Deliverables for WP2:

#	Title	Description	Confidentiality level
1	Interim report	Description of work conducted, the outcome achieved and expenditure in the first year of the project period, including parts in the first questionnaire and preliminary results of the comparative analysis of screening programs performance.	Public
2	Draft results	Presentation of the draft results of the comparative analysis of key quality indicators, including identified training and intervention research priorities	EC
3	Summary report	Report summarizing the main results of quality indicators of EU screening programs performance and indicating priorities for quality assurance interventions and feedback to MSs	Public

4	Final project report	Description of work conducted, outcome achieved and expenditure in the entire project period	Public
5	Scientific publication	Scientific publication of project results published	Public

WP3 – Proposing innovations and tackling social inequalities

Leadership: Sciensano and CHAIN; Collaborators: JRC, IARC, ECL, CPO, CSF, CvKO, Erasmus MC

Improving participation rate and decreasing inequalities

Europe inhabited by only one-ninth of the world's population carries one quarter of the global burden of cancer (mortality and disability)[28,29]. Despite this high burden the mean participation rate in cancer screening in Europe is only 50%[8]. In addition to the sub-optimal participation rate, the benefits of early cancer detection technology have not been reaped to the same extend by all social groups. Similar to other technological innovations, utilization of cancer screening depends on differences within the context of diffusion (organization) and end-users[30,31]. When new technologies in health are introduced, end-users in higher socioeconomic groups are at a double social advantage. Due to larger accumulation of cultural and health capital they are a) faster adopters of innovations and b) more proactive users of strategies to offset potential health problems. Not surprisingly, empirical evidence from different countries finds that individuals from higher social groups are more likely to participate in screenings for cervical, breast and colorectal cancer[32,33]. There are little European healthcare policymakers can do to improve socio-economic position of individuals. However, they can design the context of diffusion of screening technologies. Here, European health policymakers are faced with the choice to provide prevention services that reproduce the 'natural social' gradient of utilization or to design institutional conditions to minimize or at best to avoid it.

In order to minimize human suffering and decrease intensive healthcare provision it is vital to set up cancer screening services able to reach out to all segments of our society. Social

inequalities in cancer outcomes have significant financial consequences for individuals and their families, and major economic consequences for countries. These costs account for 15% of social welfare system costs and 20% of the overall cost of health systems in Europe[34]. Investment in an equitable cancer screening program which would increase screening uptake among hard to reach population may be significant in reducing cancer burden and related costs. For several decades, cancer screening services in many European countries have been operating under different programs and institutional settings[35]. Indeed, across European countries, participation rates in cancer screening vary from 7% to 80% and higher socioeconomic groups are from 20% to 700% more likely to participate in cancer screening[36]. These large organizational variations offer a unique opportunity to identify enablers and barriers to overall participation and particularly to participation of lower socio-economic groups in cancer screening.

The first step towards building more equitable cancer screening programs concerns identification of the social groups which are less likely to attend cancer screening programs within European Union countries. Therefore, the first objective of this WP will be to support cancer screening program coordinators to identify context-relevant social markers to measure the magnitude of social inequalities in cancer screening. Workshops will be organized with national representatives to discuss which data to collect and how, which indicators should be adopted and how this information should be used for communication and engagement with policy makers and stakeholders. Our objective will be to establish at least one meaningful indicator of health inequality in each EU country, to strengthen the equity perspective in cancer screening monitoring by introducing social stratifiers and to support countries to incorporate in their information system tools to assess trends in health inequality and their relation with distribution of cancer risk factors and social determinants. Such data will be a valuable source of information to help identify health inequality indicators of cancer screening for EU health monitoring, since these data will provide information on health inequalities both within and between EU member states.

European Union countries have accumulated different level of experience with interventions promoting access to cancer screening and/or decrease social inequalities. Yet this experience has not been sufficiently garnered to enhancement our knowledge on what works, for whom and where. This WP will map past and ongoing interventions aimed to

increase participation and/or decrease social inequalities. The first EU repository of cancer screening interventions will be built documenting the design of interventions, barriers to implementation and impact analysis on overall participation and social inequalities. In-depth comparative assessment of cancer screening interventions will ultimately provide the much-needed evidence-based policy recommendation towards an EU roadmap to equitable cancer screening. This WP will work closely with EU countries in the design and evaluation of new interventions to increase participation and decrease social inequalities. In addition, throughout the intervention data collection process, we will also provide countries with structured opportunities to exchange knowledge and good practice and to strengthen their capacities in cancer screening interventions. To facilitate exchange of experiences, we will cluster countries with similar approaches based on the principle "do something, do more, do better" in order to better adapt intervention options to their national policy milieu and to overcome difficulties that could arise. An inclusive, multi-disciplinary and multi-stakeholder voice is needed for finding social advances and innovations in cancer screening, as one key area is reducing inequality[17]. The European guidelines on breast cancer screening and diagnosis contain recommendations about how to invite socially disadvantaged women for breast cancer screening, how to invite women with intellectual disabilities, and how to invite non-native language speaking women. These can be considered in the process of developing tools to decrease inequalities in screening.

Innovations in cancer screening programmes

Developed in previous Joint Actions, the iPAAC project is looking for social innovations and tools for implementation in three EU council recommended screening programmes[17]. In this WP we will provide some preliminary thoughts on how innovation could enhance performance of cancer screening programmes. These could include (but not only limited to): 1. Risk-based (risk stratification) screening; 2. New management of screening positives; 3. Health service trials; 4. New cancer screening techniques and sites; 5. Research on artificial intelligence and big data. Additionally, more behavioural research on misconception about screening harm is needed in order to design innovative evidence-based interventions, to effectively overcome anti-screening campaigns and to combine population and targeted interventions to tailor screening messages and communication to specific subgroups[17].

There is room for improvement in many parts of the screening process. Among the innovations proposed by iPAAC it was the "E-vite", an electronic platform for invitation, re-scheduling invitations, SMS reminders, as providing responses and information on further assessment are vital[17].

There are opportunities to implement social innovations regarding screening services, health system and inequality. Screening programmes are currently facing, such as cost effectiveness and low participation because of cultural barriers, economic status, gender issues (masculinity), logistical issues, misconception about screening, inequalities in implementation status between countries and regions. Innovations could be more cost effective for some programmes, for example the use of local leaders to improve screening participation in socially vulnerable groups in screening, use of smart phone to improve invitation strategy in other programmes, self-sampling for HPV test, among others[17]. For the self-sampling for HPV test, Sciensano has important expertise regarding the offering of self-sampling devices, enabling women to take a specimen suitable for HPV testing in the framework of cervical cancer screening. This new strategy has been shown effective in reaching women not responding to conventional invitation letters, and helps in reducing inequity and in addition provides opportunities for safe sample collection during the COVID-19 pandemic. COVID-19 has boosted promotion of self-sampling as the main method as self-collection in certain countries (SE, NL). Carefully planned pilot studies are needed to identify procedures that are cost-effective and accepted locally. It is appropriate to define new indicators regarding the introduction of self-sampling in EU cervical screening programmes (proportion of self-sampling among all cervical cancer screening collections, impact of self-sampling strategies on overall coverage, quality of screening test on self- vs clinician collected tests).

Risk-based models offer a tailored approach to suit each individual's risk. Individuals are offered screening strategies based on their risk of developing cancer over the next five- or ten-year period, or on the suitability of mammography as a screening modality[17]. Sciensano is a steering group member of the H2020-funded RISCC (Risk-based Screening for Cervical Cancer) Network, where new screening policies are investigated, based on results of prior screening, history of treatment of precancer and HPV vaccination status. Implementing risk-based screening has repercussions on the definition and assessment of future screening

performance indicators. Sciensano also follows the state of the art regarding new cervical screening methods and assists WHO in developing new cervical cancer prevention guidelines in the framework of the elimination of cervical cancer initiative.

Recent advances in artificial intelligence and analytics related to big data on medical field (epidemiological, personal and medical history, imaging, biomarkers) showed promising alternatives to facilitate the risk-based strategy or to overcome challenges in medical imaging in cancer such as false-positive and false-negative test results. One influential technology is computer-aided detection, which uses deep learning algorithms to automatically identify tumors or suspicious lesions in images. Importantly it can deliver more consistent analyses than visual assessments alone, reducing the rate of false negatives. Two recent publications have shown AI systems outperforming radiologists in first reading of breast cancer screening, presenting the potential for a significant improvement in radiologists' performance when aided by AI application as a diagnostic support tool[37,38]. How to incorporate artificial intelligence into mammography screening, and finding out how digital solutions can improve the quality of screening programmes, is a new area of interest for innovation in the field.

Finally, research on economic evaluation of these innovative screening interventions is needed to show the return on the investment to policy makers in tangible and intangible benefits (for example, taking the sample at home implies saving time to work or leisure, other than saving direct cost of the health system)[17].

Deliverables for WP3:

#	Title	Description	Confidentiality level
1	Interim report	Description of work conducted, the outcome achieved and expenditure in the first year of the project period, including preliminary results of the comparative analysis of social inequalities in cancer screening participation.	Public
2	Draft results	Presentation of the draft results of the comparative analysis social inequalities in cancer screening,	EC

		including identified training and intervention research priorities	
3	Summary report	Report summarizing the main results of inequality indicators of EU screening programs and indicating priorities interventions to increase participation and reduce inequalities	Public
4	Final project report	Description of work conducted, outcome achieved and expenditure in the entire project period	Public
5	Scientific publication	Scientific publication of project results published	Public

WP4 – Impact assessment

Leadership: Erasmus MC; Co-leader: IARC; Collaborators: JRC, CSF, CvKO, Sciensano

The overall objective of this work package is to evaluate the different screening programmes, quantify the impact of and to help determine which actions have to be taken to possibly implement a more optimal, but feasible programme. In order to accomplish this, we have developed innovative dedicated population models of the natural history of the three cancers for the evaluation of screening, tailored to the characteristics of the 4 different European regions where screening is implemented. The models will be used to estimate the long-term health outcomes of the existing cancer screening activities. The amount of screening activities (i.e., the applied screening test, screening ages, screening frequencies, and attendance) are incorporated into the models. The lead partner (Erasmus MC) will be responsible for model development and incorporating the key indicators of screening from the individual countries, as collected in the other WPs. The participants will assist in collecting country-specific data, and incorporating quality indicators.

The Department of Public Health of the Erasmus MC (Rotterdam, the Netherlands) developed and extensively validated so-called MISCAN microsimulation models for the evaluation of breast, cervical and colorectal cancer screening. These models have, among other things, previously been applied to inform e.g., the Dutch national cancer screening programmes as well as the US Preventive Services Task Force recommendations for breast and colorectal cancer screening, and have been used in the EU-TOPIA project, and will again

be used for EU-TOPIA EAST. These models of the natural history of breast, cervical, and colorectal cancer are seen as the best way to extrapolate findings on the short-term quality indicators from screening programmes to their expected long-term health outcomes. In a second phase, and in collaboration with the data scientists of the individual countries, we can determine the most optimal screening programme, by quantifying the benefits and harms and barriers of existing screening activities and several options to improve. We may propose changes in the screening ages and applied screening tests. In addition, we will make proposals to adjust the key screening indicators, such as test sensitivity and referral criteria after a positive test result. We will use existing European cancer screening guidelines, expert opinion and guidance from WP 3-7 to discuss with decision makers/ stakeholders a list of country-specific strategies of interest. These strategies might include more intense screening or less intense screening, changes in screening ages, screening test, and possibly even discontinuation of (part of) screening. For each cancer type the chosen strategies will reflect recent important debates and new developments. Through a web-based tool local representative from all European countries may adjust the model to their specific situation. In all cases, capacity constraints and economical resources for screening, follow-up and treatment will be considered.

In the first task of this work package, we will develop realistic MISCAN models of the clinical background situation for, breast, cervical and colorectal cancer. For colorectal cancer we will develop two models, for men and for women. For the clinical background situation, we will use data on the population distribution and life-expectancy to determine inputs of births and deaths in the model. In addition, we will use data on incidence, stage distribution and survival not affected by screening (i.e. from the pre-screening era) to determine the onset of disease, the probability to be diagnosed in each stage and the probability to die of cancer in each stage.

The 2nd task is Evaluation of existing cancer screening programmes by determining for each country how much feasible improvements in key indicators can improve the outcomes of these screening programmes, by quantifying the impact of changes in:

- clinical indicators (e.g. changes in stage distribution in the absence of screening, due to awareness)
- test indicators (e.g. changes in the sensitivity/specificity of the screening test)

- programme indicators (e.g. lowering the starting age) on the benefits, harms, and equity.

Task 3 is assessing the benefits, harms and cost-effectiveness of the implemented programme by using the short-term indicators to predict long-term outcomes and evaluate existing inequalities, like:

- Breast cancer: mortality reduction (number of breast cancer deaths averted), number of life-years gained, number of quality-adjusted life-years (QALYs) gained, number of overdiagnosed women, number of false positive test results, costs and cost-effectiveness
- Cervical cancer: mortality reduction (number of cervical cancer deaths averted), number of life-years gained, number of quality-adjusted life-years (QALYs) gained, incidence reduction (number of cervical cancer cases averted), number of overdiagnosed women, number of false positive test results, costs and cost-effectiveness
- Colorectal cancer: mortality reduction (number of colorectal cancer deaths averted), number of life-years gained, number of quality-adjusted life-years (QALYs) gained, incidence reduction (number of colorectal cancer cases averted), number of overdiagnosed (and overtreated) people, complications from colonoscopy, number of false positive test results, costs and cost-effectiveness

The critical risk for this task is availability of (high-quality) data in the exemplary countries. We will mitigate this risk, by using data from local studies, neighbouring countries or expert opinion when national or regional data are unavailable. In addition, we will perform sensitivity analyses to assess the robustness of our outcomes for these assumptions.

In the long-term, impact of cancer screening among EU member states measured by reduction on incidence and mortality after implementation of quality improvement can be monitoring by the European Cancer Information System (https://ecis.jrc.ec.europa.eu/), which contains data for all cancers, including breast cancer, cervical cancer and colorectal cancer.

WP5 – Capacity building

Leadership: CSF; Collaborators: JRC, CPO, CvKO

Capacity building will be a cornerstone of the development and maintenance of the network: in the short term to enhance knowledge of researchers and public health officers on concepts pertaining to evaluation and quality assurance of screening programmes; in the longer term to stimulate countries to implement quality assured, systematic screening; and provide and report validated data describing their cancer screening programs and use those data for programme evaluation, quality improvement and population-based implementation science research. For example, European guidelines on breast cancer screening and diagnosis contain recommendations about training of staff working in breast cancer screening programmes - for mammography readers and communication training. Specific requirements for the staff working in breast cancer screening programmes are included in the QA scheme and a training template for radiologists and radiographers is available. Trainings for auditors and auditees (on how the compliance with the requirements and indicators is assessed) are also developed/available.

Moreover, the European Partnership for Action Against Cancer (EPAAC) has piloted in 2012 a two-week intensive training on principles, organization, evaluation, planning and management of cancer screening programmes.[39] The target groups for this curriculum were cancer screening programme managers, planners, evaluators and key professional experts in quality management of the screening programmes. The course aimed to improve the implementation of cancer screening and related quality assurance guidelines as recommended by the European Union, by introducing a comprehensive curriculum to interested staff of national or regional cancer screening management and evaluation units. There were several modules in the pilot course, related, e.g., to burden of disease, principles of screening and its organization and evaluation, required legal frameworks, current European recommendations and guidelines, and the potential new screening programmes. Thereafter, training needs have been recognized also for further aspects, such as screening governance as a whole[7]. In the scope of the CanScreen5 project, IARC has developed an e-learning platform dedicated to capacity building of screening program managers and different levels of health providers in program quality improvement and also in using the CanScreen5 data to improve program quality. The piloted course and e-learning platform will form the foundation

of capacity building efforts in this work package. The proposed training scheme follows a blended approach, combining a unified course with several modules on key areas, with e-Learning and webinars and a 2½-5-day face-to-face sessions (depending upon the targeted modules). E-Learning is ensured through a dedicated platform, for participants to review relevant concepts prior to attending the face-to-face session. There will also be specific practicals and assignments, related to the programmes and tasks of the participants and the results of the EUSR and other European collaborative projects and activities on cancer screening. The face-to-face session focuses on reflection upon and application of those concepts through practical and group work activities, thus stimulating interaction, mentoring, twinning opportunities and sharing of experience between participants and Faculty members. The purpose in this networking will be to find solutions to the crucial challenges of insufficient coverage as well as implementation of systematic quality assurance in screening; e.g., re-considerations of screening methods and policies, questions in affordability and lack of resources, and improving the organisational models. The focus will also be on inadequacies in the register-based information. There will be a specific focus throughout on settings with only limited resources for cancer screening. Group-based learning activities include developing a program improvement plan based on estimated performance indicators, debates focusing on benefits and harms of screening, planning implementation science research projects using real programme data. EU-TOPIA and other projects have highlighted the value of bringing together the experiences and fostering cooperation amongst screening programmes, which have demonstrated a clear appetite for such activities. All those initiatives could be combined and tailored for capacity building in the scope of the current proposal.

To ensure that the curriculum fulfils the needs of stakeholders, quality assurance visits will be arranged to a few regional or national programmes already while planning the next data collection round and the first course. These programmes will be chosen based on recognized quality improvement and capacity building needs apparent in the previous EUSR report. The quality assurance visits will inspect the requirements in the visited programmes to achieve appropriate quality assurance and quality improvement drawn from the whole set of recommendations and descriptions from the relevant European guidelines. These quality assurance visits are direct capacity building exercises in themselves, but they are also beneficial in optimising the contents of the curriculum. Similar visits will be continued during

the next rounds of the training schemes. The quality assurance visits will be continued on a regular basis throughout the activity.

A proposal for a continuous capacity building programme will be designed based on the experience and tailored for the challenges EU Member States are facing on quality improvement and implementation of their cancer screening programmes.

Deliverables for WP5:

#	Title	Description	Confidentiality level
1	Interim report	Description of work conducted, the outcome achieved and expenditure in the first year of the project period, including preliminary results of the quality assurance visits, and the main contents of the first curriculum.	Public
2	Report of the results of the quality-assurance visits	Final presentation of the results of the quality assurance visits in year 1, with conclusions and priorities for the corrective activity	EC
3	Summary report of the first course	Report summarizing the main results of the first course	Public
4	Summary results of the all training modules and materials incl. the second-year activity	Description of work conducted, and the training materials produced in the entire project period	Public
5	Scientific publication	Scientific publication of project results published	Public

WP6 – Dissemination of the findings from the EU report on the status of implementation and performance of cancer screening programmes in the EU Member States and continuous communication about quality improvement of cancer screening in Europe

Leadership: ECL; Co-leader: Erasmus MC; Collaborators: CPO, CHAIN, CvKO, Sciensano

The dissemination of the results will be implemented by work package co-leads the Association of European Cancer Leagues (ECL) and its member societies, and Erasmus MC; the project collaborators; and the secretariat of the project overall. The results of the screening reports are fundamental to the overall the project as they represent the active monitoring of cancer screening programmes towards achieving continuous quality improvement.

The primary aim of this work package will be to disseminate the findings of the EU Report to a broad of audience of stakeholders and the general public, scientists and professionals. As a measure of success for this activity, this work package will aim to improve the understanding of fundamental concepts of quality improvement for cancer screening amongst policy-makers, and increase awareness of the definition of quality assured, organised screening amongst stakeholders (e.g. civil society) and the general public (and target populations for screening).

Additionally, this work package should communicate routinely on the progress and outcomes from other work packages. Most importantly, this work package should connect with WP2 on quality improvement to communicate on the activities and outputs from this work package towards increasing knowledge in key target audiences about the importance of quality improvement.

Ultimately, the general objective of the dissemination work package is to encourage the use of the findings in practice to improve the quality of cancer screening programmes. Results will be addressed to specific target audiences according to their respective interests and decision-making responsibilities.

<u>Target audiences</u>

The target audiences of the dissemination will include:

- **Research and professional communities**
    - Coordinators of the national and regional screening programmes,
    - Data providers to the EU Reports,
    - Professionals with a stated interest in or obligation towards cancer screening,
    - Established regional and international networks on cancer screening and for cancer registries, notably – the International Cancer Screening Network (ICSN), European Cancer Registries Network (ECRN), etc.,
    - Principal investigators and coordinators of EU co-financed projects focused on or addressing cancer screening;
- **Policymakers at regional, national and European scale**
    - For example, officials in Ministries of Health, public health agencies, research institutes,
    - At the EU level, relevant DGs of the European Commission, European Parliament, attachés or member states and associated countries;
- **Civil society organisations who communicate to the general public**
    - Special emphasis on local and national advocacy groups and associations.

Methods and means

The work package will ensure dissemination by the following methods and means:

- **'Project' website**
    - The findings of the EU report will be made permanently available online, ideally hosted by the secretariat of the project overall. The website will contain data visualization and tools to facilitate the analysis and application of the results. Effective and efficient use of existing platforms, such as CanScreen5, should be explored;

- **Publications based on the activities and findings**
    - Final Reports on the Implementation of the Council Recommendation on Cancer Screening in the European Union. The work package will provide

technical support to the EC for the process of publishing and printing the implementation reports,

- Scientific publications based on the project activities and results achieved in the project – fully available in Open Access,
- Policy briefs developed for regional, national and international policymakers to implement relevant findings,
- Factsheets and lay version of report communicating essential findings and results,
- Report on the introduction of HPV-based screening in EU-member states and monitoring of quality indicators on use of validated HPV tests (in collaboration with Sciensano).

- **Dissemination events (virtual & physical)**
  - Series of workshops at the national level with data providers and policymakers to present and discuss results, examining reasons for failures in quality and the discussion of option for corrective actions,
  - Webinars to inform civil society about key results and their implications,
  - Reporting of activities and results at scientific meetings, congresses and conferences in EU Member States,
  - Presentation of project activities and results at European-level roundtables and policy dialogues,
  - Press conference to commemorate the publication of the report. Press releases drafted and translated into EU languages for national dissemination.

Continuous communication activities

Whilst the work package is oriented towards the dissemination and uptake of results from the EU reports, routine communication activities will be required continuously. These actions will focus on several key areas:

- Facilitating communication amongst the “project” collaborators via an internal communication platform that allows individuals to reach out, discuss and share materials with fellow collaborators;

- Open communication portal (for example via a section on the website) for organisations and professionals external to the project collaborators, which will allow the external stakeholders to contact and engage in dialogue with collaborators.
    - This will be especially to critical for EU co-financed projects focused on cancer screening, which become active over time. Such projects will be encouraged to interact with the project collaborators at every stage of the project development. The outputs from the projects can be shared and disseminated to the project collaborators via the communication channel.
- Regular collaboration with WP2 to organise events communicating about the importance of quality improvement for organised screening programmes to key stakeholders;
- General digital communication about the project, its goals, and progress to date made during commemorative days and events e.g. World Cancer Day (4th February, Pink October, etc.). This can be achieved by agreeing standard messages for project collaborators to communicate using existing channels rather than creating new accounts on channels specifically for the project.

Dissemination audience and expected impact

Target audience	Dissemination channels	Dissemination tools	Expected impact	Indicative timing
Cancer screening coordinators and professionals	• 'Project' website • Internal communication platform/channel • Workshops to present findings at national level • Periodic workshop on quality improvement (**WP2**)	• Scientific publications • Final EU Screening Reports • Quality improvement workshop report and conclusions / recommendations	• Adoption of key findings / recommendations • Increased networking and interaction amongst peers in Europe • Improvement in quality in long term	• Online platform identified at M 1-3 – operational by M6 • Operational in basic from M3 • Available & updated continuously • Workshops take place <6-12 months after publication • Periodic workshops on quality improvement at least once every two years
Research community	• Presentation at scientific meetings, congresses and conferences • Open communication platform (via 'project' website)	• Scientific publications • Posters and standardised presentation materials for congresses, etc.	• Knowledge sharing and exchange with other recognised and established networks • Acknowledgement of findings and results by EU projects on cancer screening	• Publications timed to coincide with publication of report, thereafter base don further analysis of data performed • Conferences e.g. ICSN biennial meeting; ESMO Conference, IPVC, Eurogin, European Breast Cancer Congress, ASCO, etc.
National Policymakers	• Workshops to present findings at national level • Periodic workshop on quality improvement (**WP2**)	• Policy briefs • Quality improvement workshop report and conclusions / recommendations	• Adoption of key findings / recommendations relevant to European level	• Workshops take place <6-12 months after publication • Periodic workshops on quality improvement at least once every two years

European Policymakers	• Policy dialogue and participation at relevant roundtable discussions	• Policy briefs	• Adoption of key findings / recommendations relevant to European level	• Policy dialogue on release of Implementation Report
Civil society	• 'Project' website • Webinars	• Factsheets & lay version of report • Quality improvement workshop report and conclusions / recommendations	• Raise awareness and demonstrate support of civil society to advocate for quality improvement in cancer screening	• Webinars <1-3 months after publication - follow up events annually • Periodic workshops on quality improvement at least once every two years
Media	• Press conference • Digital communication	• Press Releases (translated in national languages)	• Promotion of key results in media • Increased discussion of key definitions of cancer screening	• On release of EU Cancer Screening Implementation Report • During key commemorative periods, and events
Public	• Digital communication	• Standardised messages and updates in respective languages	• Increased awareness of project existence and general objectives	• During key commemorative periods, and events

Deliverables for WP6:

#	Title	Description	Confidentiality level	Delivery (month)
1	Internal communication platform	Platform for exchange amongst project partners and collaborators. Platform allows partners to be in virtual contact and share information and materials.	EC	M3
2	'Project' Website	Public facing website to communicate the data of the reports and outputs related to the continuous monitoring and networking that occurs between reports.	Public	M6
3	Communication guidelines for project partners	Guidance, including model documents and templates, for partners to use to communicate about the 'project' overall.	EC	M9
4	EU Screening Report Dissemination toolkit	Materials to disseminate the report and key data collected by the reports to various audiences e.g. factsheets, policy briefs, etc.	Public	At time of report launch
5	Evaluation report of dissemination activities	Process and outcome evaluation of the dissemination activities promoting the report from the initial launch for a period of up to one year.	Public	<12M after report launch

Pre-meeting to plan for the proposal

In October 2019, the ECL sponsored two days meeting among cancer screening experts to discuss efforts towards the next implementation report on cancer screening in Europe. The group assessed the state of play towards developing a sustainable roadmap platform for monitoring cancer screening in the EU and consider a common proposal for the development of future implementation reports of the Council Recommendation on cancer screening (2003).

The first day of the programme was devoted to the lessons learned from the 2nd implementation report on cancer screening in the EU (hereafter, EUSR), focusing on improving the comparability of data collected from the screening programmes. The example of cancer screening programmes in Belgium, which are organised at the regional level, was presented as a case study of how the EUSR may underestimate key performance indicators, such as invitation coverage. Presentations were made from representatives of Sciensano (the Belgian federal institute for public health), the national cancer registry, and from screening programme coordinators representing the three regional screening programmes.

The second day focused on how existing initiatives at the European and international levels can align to produce a common proposal for the development of the next implementation report on cancer screening in the EU and build a sustainable platform with a long-term perspective. To inform this debate, presentations from the EU-TOPIA project, the Cancer Screening in 5 continents initiative (CanScreen5), and the iPAAC joint action were discussed, alongside an overview of current actions from the European Commission Initiative on Breast Cancer (ECIBC), which aims to improve the approach to screening and breast cancer care to ensure that essential levels of quality of care are equally accessible across Europe. Also discussed were new concepts to add to future reports. An overview of organisational requirements to address socio-economic inequalities was presented by CHAIN (Centre for Global Health Inequalities Research), who explained their approach to conceptualising and addressing this important issue. The issue of risk-stratification in screening was also discussed with a focus on the specific example of cervical cancer screening, acknowledging the growing complexities in this programme and that this must be anticipated as a serious topic for presentation in future reports.

Additionally, a roundtable was organised to update health attachés of EU Member States on the progress and innovations in cancer screening since the publication of the Council

Recommendation in 2003. The positive impact of the Council recommendation was highlighted, suggesting that an update of the technical annex, considering the innovations of recent years, would further consolidate the added value of the recommendation.

At the conclusion of the programme, participants agreed to collaborate on a common proposal to develop a sustainable approach for the regular update of the cancer screening implementation reports and to promote the concept of updating the technical annexes of the Council Recommendation. Additionally, the participants agreed on the need to update the European Guidelines for quality assurance in cervical cancer screening and to contribute to Europe's answer to the WHO call for elimination. Regarding the EU report on cancer screening, the following key messages arose as a result of the presentation and discussions from both days of the meeting:

- The cycle of supporting the cancer screening in the EU implementation reports in an episodic, project-based fashion should be replaced by a long-term sustainable solution. This solution should provide a platform to continuously monitor and collect data from screening programmes, ensuring the development of targeted (on monitoring results) quality improvement activities and the maintenance of key contact points (i.e. the data providers for EUSR) during the periods between the publication of the reports. The platform can be overseen by a steering committee to help identify the necessary indicators, etc;
- As this platform will be continually active before, during, and following the publication of future reports, it is best placed to make the link to other ongoing initiatives, projects and key stakeholders e.g. EU-TOPIA, ECIBC, iPAAC, CHAIN, CanScreen5, etc, facilitating data sharing (or one overall database?) between initiatives with common objectives;
- Future reports should adapt the data collection to take account of new topics not previously addressed well enough, such as inequality and the presence of risk-adaptation in screening management. Considering the impact on HPV vaccination implementation, performance data could also be collected on HPV vaccination to enrich the data on cervical cancer screening programmes;

- Data collection should be more sensitive to the regional and local dimension of the screening programme management. Reporting on cancer incidence by region would be helpful as would incorporate exclusion criteria into the data collection template to ensure accurate reporting of the population denominator. A dedicated annex with profiles of the screening programmes operational in each country would provide greater opportunities to learn from the experiences of the programmes.

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