Title: Policy brief formulating recommendations based on the research and innovation strand of the 'Prevention and early detection – Implementation Research' annual cluster meeting (Year 1)

Work program: Horizon Europe (HORIZON)
Grant No: 101104777
Start date: 01/06/2023
Duration: 42 months
Project website: https://www.oncodir.eu/

Deliverable Report	
Deliverable No. for the project	D2.4
Deliverable Name	**Policy brief formulating recommendations based on the research and innovation strand of the 'Prevention and early detection' annual cluster meeting (Year 1)**
Version (No.1; Date) (DD/MM/YYYY)	1; 30/10/24
Responsible partner [No]	MoHGR
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Due date of deliverable (DD/MM/YYYY)	31/10/2024
Actual deliverable date (DD/MM/YYYY)	31/10/2024
Justification if delayed	N/A

Dissemination Level of this Report (please indicate):		
PU	Public – fully open	**X**
SEN	Sensitive – limited under the conditions of the Grant Agreement	

Funded by the European Union

The six projects (CPW, PIECES, PREVENT, CO-CAPTAIN, 4PCAN, ONCODIR) that form the Prevention & Early Detection cluster are funded by the European Union's Horizon Europe – Research and Innovation funding programme (2021 – 2027). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union nor of the individual projects that constitute the cluster. Neither the European Union nor the granting authority can be held responsible for them.


co-CAPTAIN

CPW
CANCER PREVENTION at WORK

ONCODIR

PREVENT

pieces

4PCAN

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Revision Control

Version	Author	Date	Status
0.1	Rebecca Papp	3/10/2024	First draft
0.2	All	24/10/2024	Contributions from all partners
0.3	Manthos Bimpas	30/10/2024	Final version
1.0	Dora Spyropoulou	31/10/2024	Final review and submission

List of Abbreviations

Abbreviation	Definition
EC	European Commission
WP	Work Package
CO-CAPTAIN	Cancer prevention among individuals with mental ill-health: co-adapting and implementing patient navigation for primary prevention
CPW	Cancer Prevention at Work: Occupational health surveillance in the implementation of prevention of infection-related cancer
ONCODIR	Evidence-based Participatory Decision Making for Cancer Prevention through implementation research
4P-CAN	Personalized CANcer Primary Prevention research through Citizen Participation and digitally enabled social innovation
PIECES	Towards large-scale adaptation and tailored implementation evidence-based primary cancer prevention programmes in Europe
PREVENT	Improving and upscaling primary prevention of cancer by addressing childhood obesity through implementation research-the PREVENT approach

CONTENTS

1.INTRODUCTION

The goal of this deliverable is to present a set of initial policy recommendations under the collaborative efforts from the 6 projects within the "Prevention and early detection" cluster of the Mission Cancer initiative, based on the Research and Innovation strand. This policy brief is intended to amplify the overall impact on the Mission Cancer's aspirational objective of enhancing the lives of over 3 million individuals by 2030.

Firstly, the main challenges each project faced in community, national and EU-level are presented, alongside with identified opportunities. Following by the outcome of our workshop in Research & Innovation during our 1st annual meeting in Vienna. Table 3 introduces the policy recommendations each project formulate based on their findings so far and finally a list of our first common policy recommendations as a cluster are presented.

2. RESEARCH FINDINGS AND POLICY RECOMMENDATIONS

2.1 RESEARCH FINDINGS

In this initial policy brief, formulating recommendations based on the Research and Innovation Strand of the 'Prevention and Early Detection' Annual Cluster Meeting (Year 1), the projects addressed challenges at the community, national, and EU levels, along with the opportunities identified during their research phase.

Community-level challenges focus on local or regional barriers, such as insufficient resources, low awareness, or lack of local support, which hinder the implementation of interventions and research. On the national level, projects identified difficulties in scaling interventions, largely due to variations in healthcare systems, misalignment of policies, or funding limitations. At the EU level, pan-European challenges emerge, including policy fragmentation, regulatory hurdles, and the need for greater standardization across member states. Additionally, the projects highlighted existing opportunities and action points at local, national, and EU levels that could be adapted or scaled to support broader cancer prevention efforts.

The research findings from the six clustering projects are presented below in three tables. Table 1 details the findings of each individual project. Table 2 summarizes the common findings identified and agreed upon during the "Research & Innovation" working group workshop, led by PREVENT, at the Cluster Annual Meeting held in Vienna on 23rd September 2024. Table 3 outlines each project's policy recommendations, including their potential impact and advantages.

Table 1. Project-Specific Research Findings

	Community-Level Challenges	National-Level Challenges	EU-Level Challenges	Identified Opportunities
CO-CAPTAIN	1. Limited access to mental health and cancer prevention services: In rural or resource-limited communities, access to quality preventive services is uneven. 2. Lack of awareness of the importance of prevention, early detection and promotion of mental health. 3. Stigmatisation of people with mental health problems: Persistent prejudice prevents people from seeking or receiving appropriate medical help, which complicates cancer prevention and treatment. 4. Lack of integration of services: Fragmentation of local mental and physical health services, hindering a comprehensive approach to cancer prevention.	1. Insufficient public policies for equitable access: Health policies that do not guarantee adequate coverage for prevention, especially in vulnerable groups. 2. Limited resources for mental health programmes: Inadequate funding in many countries, resulting in few psychological support programmes for cancer patients. 3. Geographic disparities in health service provision: Significant differences in the quality and availability of services between urban and rural areas.	1. Lack of harmonisation of health policies: Lack of a common framework unifying prevention and treatment strategies across EU countries. 2. Difficulty of transnational coordination: There is limited coordination between European countries to address common challenges in mental health and cancer prevention. 3. Gaps in funding for public health projects: Lack of efficient funding allocation mechanisms to support long-term preventive initiatives.	1. Building community support networks: Strengthen the role of local health networks and NGOs to provide integrated cancer prevention and psychological support programmes. 2. Implementing digital solutions: Developing digital platforms to facilitate access to mental health and cancer prevention services, especially in remote areas. 3. Strengthening collaboration between EU countries: Leveraging programmes such as Horizon Europe to facilitate collaborative research and innovative practices in public health. 4. Training of health professionals: Expand training programmes for physicians and psychologists in interdisciplinary approaches combining cancer prevention and mental health.

CPW	1. Low awareness of infection-related cancers and primary prevention, particularly regarding H. pylori's role. 2. Barriers to accessing cancer screening and preventive services, including hesitancy toward HPV vaccination. 3. Fear, shame, and stigma around sexually transmitted infections (HPV, HCV), hindering individuals from seeking prevention and treatment. 4. Caregiving strain and fear of infection transmission within the household, adding emotional and logistical burdens on families.	1. Low attention to and investment to infection-related cancers, particularly stomach and liver cancer. 2. Lack of stakeholder involvement in infection-related cancer prevention, especially for H. pylori. 3. Weak representation of occupational medicine in healthcare and cancer prevention efforts. 4. Limited engagement of employers and occupational health services in national cancer prevention. 5. Sociocultural attitudes and norms complicating health and vaccination efforts.	1. Lack of occupational-based policies for cancer prevention. 2. Scarce implementation of screening for infection-related cancers, especially in Eastern Europe. 3. Lack of attention to H. pylori as a carcinogen, with limited screening programs. 4. Scaling interventions to the supranational level is difficult due to healthcare system variations and policy misalignments within the EU. 5. Scientific guidelines may need updates, such as for H. pylori testing and HPV vaccination in adults. 6. Scarce literature regarding occupational-based cancer screening for the targeted infections (H.pylori, HCV, HPV).	1. Expanded role of the occupational physician in promoting cancer prevention, with potential company-supported cancer screenings integrated into annual health services. 2. Collection of workers' occupational history, clinical, and lifestyle information for comprehensive health risk profiling. 3. Contribution to the European Beating Cancer Plan to reach HPV vaccination rates of 90% for girls and increase vaccination of boys by 2030. 4. Find new evidence on infectious-related cancer epidemiology in high-risk countries, enabling updates to data and guidelines. 5. Multicomponent interventions involving healthcare professionals and public authorities for comprehensive cancer prevention. 6. Increase participation in cancer screening and vaccination campaigns beyond HPV, HCV, and H. pylori.

ONCODIR	1. **Accessibility:** Free of charge or low-cost community prevention programs are inaccessible to citizens due to narrow eligibility criteria and/or complex registration processes. 2. **Limited awareness**: Communication campaign do not properly address targeted populations' information needs while not being tailored to their health literacy levels. 3. **Lack of dedicated education programs**: established programs are short in duration and raise very specific topics. There should be health education programs not only in schools but also across all establishments and population groups of interest, i.e., day care centres, facilities for the disabled, prisons, pregnant women, the elderly, etc. 4. **Cultural challenges:** Language barriers, dietary influences, marginalization. 5. **Social challenges:** Lack of social support while heavily relying on family for health-related decisions. 6. **Hesitancy**: Fear of cancer, stigmatization and lack of community outreach programs	1. **Healthcare professionals' competencies:** The required competencies for addressing properly the cultural and health-literacy related barriers impeding CRC primary prevention are scarce among them. Dedicated trainings are required. 2. **Limited face-to-face interactions with patients**: Professionals having limited time due to their heavy workload affects individuals' negatively as they value personalized interventions, especially when preventive care is considered. 3. **Occupational health:** The available programs are limited despite employees recognizing them as positively affecting them towards preventive and positive health behaviors. 4. **Tailored approaches required**: Despite citizens being in favour of genetic testing and personalized care	1. **Lack of a common standard for prevention**: 2. EU countries address cancer differently. Many of them have established national cancer plans incorporating initiatives of different policy fields through different perspectives-not all of them address preventive care. Iniciatives should be taken to ameliorate the fragmented legislative setting. 3. **Private sector involvement**: Regulations are required to encourage and facilitate public-private-partnerships. 4. **EU Code Against Cancer Update**: There is a need for the update of the code in a way that encompasses more novel approached (i.e., digital health) while impedes the grave variations of the awareness and engagement campaigns through setting specific standards. 5. **Financial barriers**: More resources should be provided to communities of member states for preventive care. 6. **Environmental & Occupational Health**: Incentives for investing in environmental and occupational health is important to be provided to the member states.	1. **Society engagement**: Engagement and collaboration between different public and private entities in a "whole-of-society" approach to properly address prevention barriers. 2. **Policymaker Involvement:** Preventive services should be offered by all administrative levels an mainly where people reside and reside. 3. **Clinical studies support**: Encourage the conduction of clinical studies to produce evidence-based needs assements while the effectiveness of different measures is studied as well. 4. **Infrastructure support**: Infrusture for physical activity is required for individuals to leverage and be supported in adopting positive health behaviors. 5. **Cross-country collaboration**: Foster opportunities for collaboration especially for the development and validation of genetic tests. 6. **Education and awareness programs**: Campaigns tailored to the populations' respective health information needs that enable them to

	increase hesitancy towards prevention. 7. **Adaptability issues**: Adopting and maintainingg preventive behaviors requires significant resoures that are scarce in contemporary lifestyles (e.g., sufficient income, substancial time, being stress free, etc.). 8. **Distrust in the healthcare system**: There is limited trust to healthcare professionals mainly due to issues of patient-provider communication and lack of patient-centered care. 9. **Fear of cancer**: Adoption of avoidant behaviors. 10. **Low engagement of community leaders**: Collaborations and synergies are limited as a "whole-of-society approach" hasn't been adopted so far. 11. **Technical barriers**: Poor digital health literacy competencies, limited resources at community level.	healthcare professionals appear hesitant towards such approaches. 5. **Lack of prioritisation by national policymakers**: Policy makers appear more concerned with budgeting and resources issues thus being less supportive of preventive care.	7. **Additional support for the development of novel technologies**: It's important to support the development and validation of genetic tests to provide individual care to citizens.	surpass cultural and language barriers while promote equity.

4P-CAN	1. Desire for continuity beyond a temporary project. 2. Lack of engagement from local healthcare professionals. 3. Low trust in the healthcare system and widespread disappointment. 4. Cultural barriers and resistance to change. 5. Limited local infrastructure and resources.	1. Barriers in local and regional implementation of European projects, often due to fragmentation and lack of coordination. 6. Excessive politicization of healthcare issues, including cancer, hindering effective action. 7. Poor integration between national initiatives and projects, leading to fragmented efforts and inconsistent outcomes. 8. Ineffective traditional (top-down) implementation of primary cancer prevention programs, compounded by limited long-term policy support.	1. Insufficient funding and resources, especially in Eastern Europe. 2. Difficulty aligning national priorities with EU health strategies in Eastern Europe. 3. Limited cross-border collaboration and data sharing	1. Identification of local influencers beyond the “usual suspects.” 2. Deep understanding of local networks influencing cancer prevention and risk awareness. 3. Direct engagement with citizens for co-creation of tailored cancer prevention strategies. 4. Enhanced outreach to underserved populations through locally adapted interventions.

PIECES	1. **Limited resources**: There are insufficient financial and human resources at the local level to support the widespread implementation of prevention programs. 2. **Low awareness and stakeholder engagement**: Many local communities have low awareness of the importance of primary cancer prevention programs. Additionally, socioeconomic and cultural factors, such as low health literacy, complicate engagement with preventive measures. 3. **Lack of implementation expertise**: Many communities lack the local expertise to access, adapt and implement evidence-based cancer prevention programs effectively. 4. Despite a significant amount of research being conducted, **many interventions at the community level are not based on strong evidence** or lack the practical adaptation needed for real-world settings. This gap in implementation science knowledge at the grassroots level limits the ability to tailor programs to specific community needs and	1. **Funding limitations**: National health budgets often prioritize immediate healthcare needs over preventive care, making it difficult to allocate sufficient resources for long-term cancer prevention strategies. 2. **Inconsistent training and knowledge gaps**: Nationally, many implementers lack the necessary training and knowledge of implementation science, making it difficult to effectively roll out cancer prevention programs.	1. **Policy fragmentation**: At the EU level, inconsistencies in healthcare policies and cancer prevention guidelines hinder effective cross-border collaboration. Regulatory barriers and lack of uniform policies create challenges for scaling initiatives. 2. **Need for greater coordination**: More consistent collaboration across EU member states is needed to optimize the dissemination and implementation of best practices in cancer prevention. Furthermore, the lack of expertise in implementation science at the EU level hinders the effectiveness of scaling programs. 3. **Lack of standardization**: Varied definitions and understandings of "healthy lifestyle" and cancer prevention across EU countries complicate the harmonization of health campaigns and interventions. 4. Many evidence-based primary cancer prevention programs fail to publish the necessary materials and resources required for others to reproduce and scale interventions. 5. **Long-term infrastructure and support** for the PCP-IT toolkit is	1. **Repository of Primary Cancer Prevention (PCP) programs**: PIECES has established a comprehensive, evidence-based repository that supports local adaptation and implementation of cancer prevention programs. This offers a significant opportunity to improve the uptake and success of primary prevention across various settings in EU. 2. **Expanding the repository**: Other projects working on cancer prevention programs, provided they produce evidence-based outputs, could be added to the PIECES repository. This would allow for a broader selection of programs that can be adapted and utilized by implementers across Europe and beyond, increasing the repository's utility and impact. 3. **Toolkit adaptation:** The PIECES PCP Implementation Toolkit (PCP-IT) provides a structured process for selecting and adapting cancer prevention programs to different local contexts, enhancing their relevance and impact. 4. **Cross-border collaboration**: There is a growing opportunity

	contexts, often resulting in poor outcomes.		challenging due to the need for continuous updates, development, and EU-level funding mechanisms. Reliance on temporary funding makes it difficult to ensure sustainable infrastructure. PPP could be explored, but require substantial negotiation and coordination efforts across multiple stakeholders. 6. **Capacity building:** Establishing a permanent platform for training and upskilling implementation science practitioners across EU member states is essential but resource intensive. Without consistent funding and institutional support, it will be difficult to maintain the capacity-building programs needed to train healthcare workers to effectively use and adapt the toolkit. 7. **Data sharing/ethics requirements for non-medical research:** Complex ethical and regulatory standards impede effective data sharing and collaboration in non-medical research based in healthcare environments.	for EU-wide collaboration in cancer prevention, with PIECES acting as a model for implementing and scaling prevention strategies through cross-border cooperation.

PREVENT	1. **Sustaining and maintaining premises and infrastructure:** making structural changes and building the infrastructure needed for the schools (e.g. cafeterias, canteens, playground) and the change of obesogenic environment (e.g. lanes, parks, spaces for physical activity). 2. **Different attitudes towards ideal body weight and body image:** that causes lack of understanding from students and their families about the necessity to make healthier menus in schools. 3. **Unhealthy foods** are considered by parents as an act of love towards their children. 4. **Disadvantaged neighbourhoods with high vulnerability and conflict** have different perceptions about obesity. 5. **Students with different cultural backgrounds and different dietary habits** do not easily accept proposed changes for healthier food choices. 6. **Aggressive food marketing** and especially extensive promotion and marketing of ultra- processed food. 7. **Negative influences by the media.**	1. **Limited financial resources** for hiring and training personnel, purchasing materials and tools needed, continuing educational activities for teachers, parents and other targeted populations. 2. **Lack of coordination and cooperation** between relevant stakeholders for the successful implementation and evaluation of the intervention/policy. 3. **Unsuccessful dissemination efforts** in reaching all nutrition-related professionals. 4. **Lack of an organizational system to monitor** the implementation of the intervention/policy. 5. **Lack of actions** to raise awareness among parents and professionals.	1. **Limited financial resources** for hiring personnel, training personnel, and for long term infrastructure buildings. 2. **Lack of transnational collaboration and coordination.** 3. **Insufficient data sharing** between EU countries. 4. **No adequate research** available for providing **evidence on the effectiveness** of interventions/policies.	1. **Community-based interventions:** Community-based interventions that promote healthy lifestyles (such as urban gardens, family exercise programs, and fresh food markets) have proven effective. Involving schools, local governments, and families in these initiatives can be key to generating a positive impact. 2. **Early education in nutrition and health:** Introducing nutrition education programs in schools at an early age can form healthy habits that last throughout life. These programs should be inclusive, accessible and culturally adapted to the diversity of communities. 3. **Public policies and regulations:** Implement public policies that restrict the marketing of unhealthy foods aimed at children or limit their “intake” in spaces such as schools and/or subsidize fresh and healthy foods. Increase taxes on sugary drinks and/or ultra-processed foods.

Table 2. Common Findings and Agreed Insights from the Research & Innovation Working Group

Community-Level Challenges	National-Level Challenges	EU-Level Challenges	Identified Opportunities
• **Financial barriers:** Limited funding for preventive measures and promoting healthy lifestyle changes, followed by challenges in financing follow-up care and screening after medical interventions or treatments, as well as maintaining and further developing healthcare infrastructure. • **Low awareness of primary prevention:** General lack of awareness about the importance of primary prevention, with unclear and inaccessible messaging. • **Lack of targeted education programs**: "One size fits all" approaches do not work. There is uncertainty about at which level to start when educating the public. • **Cultural and social challenges:** Low health literacy and disengagement from healthy behaviours due to social and cultural factors, including social ties and networks. • **Preventive measures hesitancy**: Reluctance to adopt	• **Primary healthcare providers' high workload**: Primary healthcare providers, including general practitioners, are managing a heavy workload. Additional stakeholders are needed to support tasks related to preventive healthcare and patient education. • **Limited acceptancy of introducing new specialists in the healthcare sector**: Other health professionals and specialists face resistance when attempting to take over certain healthcare tasks. • **Occupational medicine involvement**: Employers and occupational health services are not sufficiently involved in national cancer prevention efforts. • **Lack of Healthcare provider education** in implementing preventive measures. • **Insufficient infrastructure**, including medical deserts, a shortage of specialists, outdated equipment, limited technological resources, and inadequate facilities for promoting a healthy lifestyle, such as physical activity and providing healthy school meals, hinders the implementation of preventive measures and advancements.	• **Implementation of evidence-based recommendations**: More needs to be done to implement evidence-based guidelines, especially in food-related health policies. • **Private sector influence**: Regulations are needed to ensure that the private sector promotes evidence-based healthy food choices, rather than profit-driven options. • **Inconsistent health campaigns**: Health engagement campaigns vary greatly across the EU, with insufficient collaboration on shared goals. • **Economic barriers**: Lack of economic incentives that encourage individuals and businesses to adopt and support preventive health measures. • **Unified EU-level policy adoption**: There is a need for the development of unified, evidence-based minimum recommendations at the EU level, enabling consistent adaptation and	• **Involvement of community leaders**: Engage and collaborate with community leaders, including healthcare providers, mayors, school principals, and sports clubs, to actively promote cancer prevention education and raise awareness to raise awareness and educate the public about preventive healthcare. • **Policymaker engagement**: Engage a broad range of national policymakers, including Ministries of Education, Health, and Finance, to support and advance the implementation of cancer prevention initiatives. • **Evidence-based advocacy**: Use robust, evidence-based data to advocate for policy changes at the EU level. • **Infrastructure support**: Encourage the development of infrastructure and financial incentives to support telemedicine, healthcare applications, and other essential services, such as modernizing healthcare facilities, improving internet

preventive actions like vaccines and screening tests. • **Adaptability and acceptability issues:** Challenges in tailoring health information to meet the specific needs of diverse stakeholders and ensuring that it is both relevant and accepted by communities, considering varying cultural and social contexts. • **Distrust in the healthcare system**: Scepticism toward the healthcare system, leading to lower engagement in prevention. • **Fear of professional consequences:** Concerns about negative work-related outcomes when disclosing private health challenges. • **Difficulty in engaging community leaders:** Difficulty in collaborating with relevant stakeholders (e.g., community leaders) to spread health messages through informal channels. • **Technical barriers**: Limited internet access for healthcare applications, hindering the implementation of digital tools.	• **Integrating new systems**: The healthcare system is slow to adopt systemic, integrated interventions such as telemedicine. • **Tailored approaches needed**, particularly in cancer prevention. • **Lack of prioritisation by national policymakers**: Prevention initiatives may receive less attention from national policymakers, who may be focused on short-term outcomes and immediate visibility in the social media. • **Challenges in implementing a national cancer prevention plan**: In many EU countries, the absence of a dedicated national cancer prevention plan, combined with a lack of sufficient investment and funding, hinders the development and implementation of comprehensive cancer prevention strategies, limiting the effectiveness of long-term preventive measures. • **Industry resistance**: Certain industries resist national health campaigns and preventive measures, particularly when policies affect their interests.	implementation into national regulations across all member states. • **Inconsistency in the definitions (and understandings) of "Healthy Lifestyle" across EU countries** create inconsistencies in policy implementation. • **Limited employer involvement in educational programs at the EU level**: Across the EU, employers are not sufficiently engaged in offering or supporting educational programs that promote employee health and wellness. • **Lack of support for implementing new technologies at the EU level**: There is a need for greater financial and structural support across the EU to build a robust system for implementing telemedicine and healthcare apps.	connectivity in underserved areas, and upgrading outdated medical equipment across all EU member states. • **Cross-country collaboration**: Create opportunities for EU countries to collaborate on defining and promoting healthy lifestyles, ensuring consistency in health promotion campaigns. • **Education and awareness programs**: Promote national and EU-wide educational programs for employees and citizens to improve health literacy and engagement with preventive measures. • **Enhancing message understanding and acceptance**: Develop clear, culturally sensitive communication strategies to improve public understanding and acceptance of cancer prevention messages, ensuring they resonate with diverse audiences and drive effective behavioural change.

2.2 POLICY RECOMMENDATIONS

In Table 3, each project suggests a few policy recommendations based on the input they have received in the first year.

Table 3: Policy Recommendations from Each Project

	Policy Recommendations
CO-CAPTAIN	• Policies for integration of mental health and cancer prevention services: Promote the creation of integrated community health centres where mental health services and cancer prevention programmes are offered jointly. • This would reduce fragmentation of services and facilitate a comprehensive approach for patients. • Community education and awareness programmes: implement national education and awareness campaigns on the importance of early cancer detection and mental wellbeing, especially targeting vulnerable groups (youth, women, rural areas). • Low awareness is a key barrier to prevention, and these campaigns can help increase participation in preventive programmes. • Adequate funding for mental health and cancer prevention programmes: Increase public funding for mental health and cancer prevention programmes, prioritising attention to disadvantaged and rural communities. • Many countries do not allocate sufficient resources to these programmes, contributing to lack of access and health inequalities. • Expand the use of digital technologies and telemedicine: develop and promote telemedicine and digital health platforms to provide remote mental health consultations and cancer prevention services. • Digital technologies can facilitate access to health services in geographically isolated or resource-limited areas. • Creating psychosocial support networks for cancer patients: Establish nationwide patient navigation programmes, where trained professionals help patients coordinate their treatment and receive emotional support. • Patient navigation is key to reducing anxiety and improving health outcomes for people with cancer, especially in vulnerable populations. • Advocate for the creation of a unified cancer prevention and mental health policy across the EU, ensuring equity in access to these services regardless of country or region. • Different approaches and quality levels between EU countries lead to disparities in access and treatment, which could be addressed by a common strategy. • Encourage public-private partnerships in health: Encourage collaboration between governments, the private sector and NGOs to fund and develop technological and social innovations in cancer prevention and mental health. • Multisectoral collaboration can facilitate research, development and implementation of new public health solutions.

	• Gender mainstreaming in health policy: create specific policies that address gender disparities in access to cancer prevention and mental health services, especially for women in vulnerable settings. • Women face greater barriers to accessing these services in many countries, contributing to higher rates of premature mortality and health inequalities. • Increase investment in research that explores the interactions between mental health and cancer, as well as longitudinal studies that assess the impact of preventive interventions. A better understanding of these interactions can improve the personalisation of treatments and public health policies. • Policies for equitable access to palliative care and post-treatment support: establish clear guidelines to ensure that cancer patients at all stages of the disease have access to palliative care and post-treatment psychosocial support. • Palliative care is essential to improve patients' quality of life, and post-treatment support helps prevent mental health problems such as depression or isolation.
CPW	• To strengthen cancer prevention in the European Union, incorporate comprehensive cancer screening into mandatory occupational health surveillance, including screening for oncogenic infections like Helicobacter pylori (H. pylori), Hepatitis C Virus (HCV), and Human Papillomavirus (HPV). Implement regulations that mandate consistent health monitoring to facilitate early detection and enable preventive measures such as screenings, vaccinations, and treatments. • Foster safe work environments to reduce infection risks, address overall employee health, and provide opportunities for education about cancer prevention. Establish databases compiling occupational history, lifestyle factors, and clinical information to support personalized preventive medicine. • Ensure that privacy protections are in place to maintain worker confidentiality. Implement robust data security measures to balance effective health monitoring with individual rights.
ONCODIR	• Streamline the registration processes and broaden eligibility criteria for community-based prevention programs. • Establish outreach programs and mobile clinics to reach semi-urban and rural areas. • Develop tailored interventions-campaigns adequate to the health literacy levels of the targeted populations that properly address their health information needs. • Design and implement sustainable health education programs in different sectors covering multiple health issues. • Offer health information in multiple languages while culturally adjusted; special provisions are required when dietary guidelines are communicated. • Engage with community leaders from marginalized and vulnerable communities to create health programs that are truly inclusive. • Create support groups, peer networks and offer counseling by community health workers to shift away from the family influences.

	• Offer occupational preventive care programs that are flexible enough to accommodate different lifestyles as well as financial incentives for both employees' and employers' participation. • Incorporate effective health communication training in healthcare professionals' education. • Set up patient advisory councils across communities. • Offer counseling services for cancer-related anxiety and promote positive messaging on early detection and treatment. • Engage community leaders and help to broker partnerships between providers, businesses and other healthcare organizations. • Have more digital resources available at community level while encourage cultivating the digital health literacy competencies of individuals. • Educate businesses of all sizes about cancer prevention and create wellness programs. • Develop physical activity infrastructure and make it available at low or no cost. • Encourage the adoption of telemedicine by means of pilot projects, financial incentives and training. • Encourage the development and piloting of genetic tests. • Advocate for prevention initiatives, highlight long-term cost benefits, and provide economic incentives like tax credits and subsidies.
4P-CAN	• Prioritization of local and regional implementation actions using implementation research tools such as living labs • Promotion of social science tools for in-depth understanding of local environment (personal and social network analysis, NetMap, personalised communication model)
PIECES	• Encourage open access to program results, methodologies, materials and resources: National and EU-level bodies should encourage or mandate the publication of both positive and negative findings from implementation projects. This will help prevent duplication of ineffective strategies and enhance the knowledge base available for successful cancer prevention interventions. Moreover, evidence-based primary cancer prevention programs should include a full publication of materials and resources. These should be made openly accessible to allow other institutions, regions, and countries to reproduce and adapt these interventions. This will increase the scalability and broader use of effective programs. • Establish and maintain National and EU-level repositories for cancer prevention programs: In addition to the PIECES repository, policymakers should create or integrate national and EU-level repositories of evidence-based cancer prevention programs. The PCP Implementation Toolkit (PCP-IT) repository developed by PIECES could act as a reference or even be integrated as the primary tool for this purpose. This would enable cross-border sharing of successful interventions and support collaborative efforts to fight cancer across Europe. Such repositories should include comprehensive details on how to implement and adapt programs for different contexts, making them useful for stakeholders at all levels.

- Strengthen implementation science capacity: To improve the success of cancer prevention programs, local healthcare providers and policymakers need enhanced training in implementation science. National governments should invest in capacity-building programs that equip healthcare professionals and community leaders with the skills needed to adapt and implement evidence-based interventions . This will address the gap in local expertise and ensure more successful program adaptation at the community level.
- Allocate specific resources for program scalability and adaptation (before implementation): Policymakers should ensure that funding streams are aligned with the long-term goals of scaling successful prevention programs. This would involve allocating resources specifically for the adaptation, training and ongoing support of evidence-based programs at both the national and local levels.
- Developing a permanent, EU-wide platform for the training and upskilling of healthcare implementers is crucial for the successful use and adaptation of the PCP-IT toolkit. This capacity-building initiative should be supported with consistent funding and institutional backing. Additionally, a collaborative effort across member states is needed to standardize training programs and ensure that healthcare professionals are adequately prepared to implement cancer prevention programs using the toolkit.
- Fund and support cross-border collaboration: Encourage greater coordination between EU member states in cancer prevention efforts. Cross-border collaboration should be prioritized to ensure the effective sharing of best practices and the joint development of new interventions, helping address policy fragmentation and ensuring consistent preventive measures across the EU.
- EU should work toward harmonizing ethical and regulatory standards across member states. Establishing a unified framework that simplifies the ethical approval process while ensuring compliance with GDPR and other privacy regulations would facilitate more efficient data sharing. This could include the creation of standardized ethical guidelines and protocols tailored for non-medical research, which would enable smoother cross-border collaboration and foster innovation in cancer prevention programs.

PREVENT

Protected timeframes: Ban in all EU countries the broadcasting of advertisements for ultra-processed products during children's prime time viewing. Promote the consumption of fresh and seasonal products on television channels and social networks.

Engage community leaders and help create more and better spaces for physical activity that will be accessable to all and without cost.

Promote the use of digital tools for tailored interventions and implementation research.

Promote the collaboration between public and private sector in health and primary prevention.

Invest in educating stakeholders, health proffessionals, community about early cancer detection and the benefits of a balnced nutrition and physical activity in day to day life.

Develop a one-stop cancer information centre on prevention.

2.3 POTENTIAL IMPACT AND ADVANTAGES OF THE RECOMMENDED POLICIES

This section outlines the potential impact and key advantages of the recommended policies, focusing on how these policies can contribute to cancer prevention efforts, improve public health outcomes, and support sustainable healthcare practices.

CO-CAPTAIN:

- Cancer Prevention: Policies will promote early detection of cancer, thereby improving survival rates through awareness and education.
- Improving Mental Health: Integrating mental health care with cancer prevention will increase the quality of life and well-being of patients.
- Equity in Access to Care: Policies will reduce disparities in access to health services, ensuring quality care for all communities.
- Health System Strengthening: Implementation of patient navigation systems will improve the efficiency and quality of care in the health system.
- Cross-Sector Collaboration: Fostering collaboration across sectors will allow for a more integrated and effective approach in the fight against cancer and mental health.
- Awareness and Education: Awareness campaigns will increase knowledge about cancer and mental health motivating the population to seek medical care.
- Sustainability of Health Care: Prioritising prevention will help reduce the burden on health systems, promoting their long-term sustainability.
- Innovation in Healthcare: Investments in research and new technologies will enable more effective and personalised cancer treatments.

CPW:

Putting workers into the center of cancer prevention programs by involving them in mandatory occupational health surveillance might facilitate early detection and intervention for infection-related cancer. Public health outcomes might include reduced cancer incidence, improved HPV vaccination coverage, and safer work environments, potentially lowering healthcare costs and supporting sustainable healthcare practices. Such policy could also decrease the number of average sick days. The project will raise awareness of important risk factors for cancer and improve general health education of working population.

ONCODIR:

To make prevention programs more effective and sustainable it's imperative that we make them more accessible at local -community level through simplifying the registration process and expanding the eligibility criteria. It's also essential to reach remote and underserved populations through outreach programs and mobile clinics. Targeted communication campaigns need to be

designed to address specific health literacy levels, using various channels like social media, community radio, and local newspapers, while comprehensive health education programs should be developed for schools, day care and senior citizens' centres, facilities for the disabled, and prisons, covering a wide range of health topics, sustained over time to reinforce learning. Additionally, providing multilingual resources and culturally sensitive dietary guidelines will ensure inclusivity and better health outcomes for diverse populations.

Adopting a "whole-of-society" approach by actively involving community leaders in health initiatives is crucial. Engaging community leaders from marginalized groups is key to promoting inclusive health programs. Establish community support groups & peer networks, and train community health workers to offer guidance and assistance, reducing the reliance on family for health-related decisions. Flexible prevention programs that accommodate diverse lifestyles, coupled with financial incentives, can encourage participation. Facilitating partnerships between community organizations, local businesses, and healthcare providers can enhance collaboration. Providing digital literacy training programs and ensuring the availability of digital resources at community centres will improve community members' competencies in using health technologies. To improve patient-centred care, healthcare providers should be trained in effective communication and empathy whilst patient advisory councils should be established to involve patients in decision-making and build trust in healthcare services. Moreover, offering psychological support and counselling services for cancer-related anxiety, along with positive messaging on early detection and treatment options, can help reduce avoidant behaviours.

Promoting the adoption of telemedicine and other integrated healthcare systems through pilot programs, funding incentives, and training is essential. Advocacy for the inclusion of prevention initiatives in national health agendas, highlighting their long-term cost benefits, is necessary. Developing and funding comprehensive national cancer prevention plans with clear objectives and measurable outcomes, establishing accountability mechanisms, and engaging with industries to align health campaigns with their interests will support public health initiatives. Strengthening the implementation of evidence-based guidelines in food-related health policies, fostering collaboration among EU member states to harmonize health campaigns, and standardizing definitions of a healthy lifestyle across EU countries through educational campaigns are critical steps forward.

4P-CAN:

Recommendation 1: Prioritization of local and regional implementation actions using implementation research tools such as living labs

Potential Impact: Prioritizing local and regional implementation actions through **living labs** can significantly enhance the effectiveness of cancer primary prevention efforts by fostering **context-specific solutions**. Living labs encourage real-world experimentation, where local communities (local stakeholders and citizens overall) actively participate in the co-creation of interventions.

This ensures that cancer primary prevention initiatives are not only scientifically sound but also aligned with the needs, behaviors and preferences of local populations. This approach allows for adaptive implementation, where solutions can be continuously refined based on feedback from the community, leading to **higher adoption rates** and long-term sustainability. Moreover, this approach is particularly crucial for rural areas and vulnerable populations such as the elderly and the Roma community, who are often hard to reach through traditional campaigns, including those promoting the European Code Against Cancer.

Advantages: One of the key advantages of utilizing living labs is the **engagement of diverse stakeholders**, using the pentahelix model: academia, public sector, civil society and business sector, highlighting in addition the key role of the orchestrator. By working collaboratively, these groups can better address specific challenges such as access to cancer primary prevention, cultural specificities, and local health system capacities. Furthermore, living labs create opportunities to **test and scale innovations** efficiently within a localized setting before broader implementation, reducing risks and enhancing the **transferability of successful interventions** to other regions. This method can support **more equitable health and care delivery** and improve **cancer primary prevention outcomes**, particularly in under-resourced areas.

Recommendation 2: Promotion of social science tools for in-depth understanding of the local environment (personal and social network analysis, NetMap, personalized communication model)

Potential Impact: The promotion of **social science tools** like personal and social network analysis, NetMap, and personalized communication models will enable a **deeper understanding of the social dynamics** within local communities (local stakeholders and citizens). These tools allow us to map out **key influencers** and networks that can play a crucial role in spreading health information and fostering behavior change. By leveraging these insights, cancer primary prevention campaigns can be **better tailored** to the specific cultural, social, and relational contexts of different communities, leading to more effective outreach and engagement (personalised communication model).

Advantages: A major advantage of these tools is their ability to **uncover hidden barriers and opportunities** within local environments, offering a more nuanced view of how individuals and institutions interact. This can be crucial for improving **communication strategies**, especially in regions where traditional approaches may have failed. Using personalized communication models ensures that messaging is more relevant and relatable, enhancing trust in healthcare initiatives. Additionally, this approach can support the **building of strong local coalitions of willing** that are critical for long-term sustainability, ensuring that cancer primary prevention efforts are deeply rooted in the community and supported by its most influential members.

PIECES:

The recommended policies for cancer prevention are expected to have significant positive impacts on public health, particularly in improving the scalability and effectiveness of preventive interventions. These policies provide a strategic framework that addresses current gaps in knowledge, resources, and collaboration across local, national, and EU levels. The following outlines the key advantages and potential impact of each recommendation:

1. By mandating the publication of both positive and negative results, along with the methodologies, materials, and resources used in cancer prevention programs, policymakers will enable greater transparency and accessibility. This approach will:
    - **Improve knowledge sharing**: Open access will allow stakeholders across regions to learn from successful interventions and avoid ineffective strategies, creating a more efficient and evidence-based approach to cancer prevention.
    - **Enhance scalability**: Making resources widely available will enable other institutions to adapt and reproduce evidence-based programs, increasing their reach and impact.
    - **Optimize use of research**: Policymakers and healthcare providers will benefit from a rich database of cancer prevention initiatives that can be adapted to local contexts, ensuring that valuable research translates into practical, effective actions.
2. The creation of centralized repositories for cancer prevention programs, with PIECES' PCP Implementation Toolkit (PCP-IT) serving as a reference or even as the primary tool, will:
    - **Promote cross-border collaboration**: These repositories will enable countries to share best practices and successful interventions, fostering collaboration across borders to combat cancer at an EU-wide level.
    - **Support evidence-based implementation**: Having a central repository will ensure that programs are based on strong evidence, enabling healthcare providers and policymakers to implement interventions that have been proven effective.
    - **Facilitate adaptation**: By providing detailed guidelines on how to adapt and implement programs in different contexts, these repositories will empower local implementers to customize interventions to meet the unique needs of their communities.
3. Investing in capacity-building initiatives that focus on implementation science will ensure that healthcare providers and policymakers can:
    - **Improve program effectiveness**: Local healthcare professionals will have the necessary skills to adapt evidence-based interventions for their communities, leading to better health outcomes.
    - **Address local challenges**: By equipping local stakeholders with training in implementation science, they will be better positioned to overcome local barriers, such as cultural or socioeconomic challenges, ensuring more successful program adaptation.

- **Sustain long-term impact**: Strengthened knowledge will contribute to the sustainability of cancer prevention programs, ensuring that they are effectively maintained and expanded over time.

4. Ensuring that specific funding is directed towards the scalability and adaptation of successful cancer prevention programs will:
   - **Ensure long-term program success**: Programs will be more likely to succeed when they receive financial support not only for implementation but also for the necessary adaptation and ongoing evaluation.
   - **Enhance program reach**: Dedicated resources will allow programs to be scaled more effectively across different regions, ensuring a broader population benefits from proven cancer prevention strategies.
   - **Create sustainable healthcare solutions**: With sufficient funding, programs can be continuously improved and adapted to address emerging health trends, ensuring that cancer prevention efforts remain relevant and effective in the long run.
5. Prioritizing cross-border collaboration will:
   - **Reduce policy fragmentation**: Harmonizing cancer prevention efforts across EU member states will lead to more consistent policies, improving the overall effectiveness of preventive measures.
   - **Accelerate innovation**: By fostering collaboration among countries, new and innovative cancer prevention strategies can be jointly developed and shared, ensuring that best practices spread rapidly across the EU.
   - **Strengthen the EU's position in cancer prevention**: A unified approach to cancer prevention will reinforce the EU's leadership role in public health, setting a strong example for global cancer prevention efforts.

PREVENT:

By proposing primary targeted, multi-actor and context-aware interventions along with respective engagement policies for weight control management during childhood and adolescence (closely related with diet and physical inactivity), reduces the incidence of cancer in adulthood. Focusing on early education and awareness in community level and in health professionals, increases user acceptability of the delivered primary interventions, issuing improved counselling and guidelines, and engaging upscaling of the proposed interventions. The recommendation on a cancer information centre will contribute to open science repositories, develop collaborations with other EU initiatives as well as exchange knowledge and expertise with similar research initiatives.

2.4 COMMONLY RECOMMENDED POLICIES

This section presents the commonly identified policy recommendations agreed upon by the various projects. These policies reflect shared priorities and strategies aimed at addressing cancer prevention at the community, national, and EU levels. The recommendations are designed to be scalable and adaptable, fostering collaboration across sectors to promote effective and sustainable cancer prevention measures.

1) Community education and awareness programmes: implement national education and awareness campaigns on the importance of early cancer detection especially targeting vulnerable groups (youth, women, rural areas). Design and implement sustainable health education programs in different sectors covering multiple health issues.
2) Fund and support cross-border collaboration**:** Encourage greater coordination between EU member states in cancer prevention efforts. Cross-border collaboration should be prioritized to ensure the effective sharing of best practices and the joint development of new interventions, helping address policy fragmentation and ensuring consistent preventive measures across the EU.
3) Encourage the development of infrastructure and financial incentives to support telemedicine, healthcare applications, and other essential services, such as modernizing healthcare facilities, improving internet connectivity in underserved areas, and upgrading outdated medical equipment across all EU member states.
4) Fund and support cross-border collaboration: Create opportunities for EU countries to collaborate on defining and promoting healthy lifestyles, ensuring consistency in health promotion campaigns.
5) Establish and maintain National and EU-level repositories for cancer prevention programs: This would enable cross-border sharing of successful interventions and support collaborative efforts to fight cancer across Europe. Such repositories should include comprehensive details on how to implement and adapt programs for different contexts, making them useful for stakeholders at all levels.
6) Harmonizing ethical and regulatory standards across EU member states. Establishing a unified framework that simplifies the ethical approval process while ensuring compliance with GDPR and other privacy regulations would facilitate more efficient data sharing. This could include the creation of standardized ethical guidelines and protocols tailored for non-medical research, which would enable smoother cross-border collaboration and foster innovation in cancer prevention programs.

7) Encourage public-private partnerships in health: Encourage collaboration between governments, the private sector and NGOs to fund and develop technological and social innovations in cancer prevention and mental health. Multisectoral collaboration can facilitate research, development and implementation of new public health solutions.

3 CONCLUSION

In conclusion, this first policy brief tried to formulate recommendations based on the opportunities identified during the first research phase of each project. Our collaborative efforts aim to contribute on the fight against cancer with measures that are easy to adapt, upscale and promote cross-sector collaboration in national and European level, facilitating research and innovation in future cancer prevention programs.

As the projects continue growing, recommendations would be formulated in even more specialized level addressing cancer prevention always in an evidence-based manner.

Funded by the European Union

The six projects (CPW, PIECES, PREVENT, CO-CAPTAIN, 4PCAN, ONCODIR) that form the Prevention & Early Detection cluster are funded by the European Union's Horizon Europe – Research and Innovation funding programme (2021 – 2027). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union nor of the individual projects that constitute the cluster. Neither the European Union nor the granting authority can be held responsible for them.