



ProY&O
Protecting You & Others
Community infection prevention behaviour change program

Report

Development of the ProY&O program framework



**Co-funded by
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Report # 1: Development of the ProY&O program framework, July 2024

TITLE

Report on Development of the ProY&O program framework

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TITLE OF THE PROJECT

Protecting You And Others: Community Infection prevention behaviour change program (ProY&O)

Programme Erasmus+ Action Type KA220-HED: 2023-1-PL01-KA220-HED-000155248

Project Start Date: 1 December 2023

Reporting Period: 1 December 2023 – 31 July 2024



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1. PROJECT DETAILS

Applicant organisation:	Uniwersytet Medyczny w Lublinie
Applicant organisation OID:	E10137356
Project code:	2023-1-PL01-KA220-HED-000155248
Project title:	Protecting You And Others: Community Infection prevention behaviour change program (ProY&O)
Action type:	KA220-HED – Cooperation partnership in higher education
Project Start Date:	01/12/2023
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Language of the report:	English

2. PROJECT SUMMARY

The COVID-19 pandemic has made people learn some basic preventive behaviors that were generally applied in an incorrect manner or systematically violated, putting others' lives at risk. Washing hands, hygiene practices preventing respiratory infections, covering sneezes are all involved in the prevention of infection transmission.

Moreover, misinformation spread on social media has played a crucial role in creating misunderstanding, whereas health institutions encountered several barriers in spreading scientifically founded advice. Furthermore, limited access to health education has increased disparities across the world. People with low literacy have had difficulties accessing, understanding, critically appraising, and applying in daily life information delivered by health organizations.

Infection prevention and control remain a milestone in maintaining the health status both at individual and community levels and in the whole society. However, most of the available literature regarding educational strategies has been directed towards improving health professional behaviors and controlling infections spread in healthcare settings. Moreover, most of the programs/studies target specific disease such as immunocompromisation, or specific transmission modalities, neglecting some fields including the prevention of respiratory infections.

Protecting You and Others (PRO Y&O): Community infection prevention behaviour change program is a European project, which was born in this social and health context. For this reason, PRO Y&O aims at promoting a widespread culture to prevent the transmission of respiratory infections, in addition to educational interventions, in a way capable to meet the cultural needs of the countries, facilitating the inclusion of disadvantaged populations, as well as ensuring the measurement of the effectiveness of such educational strategies. Moreover, the project is intended to develop and pilot a process embodying the principles of digital alphabetization and health literacy around behaviors aimed at preventing the spread of respiratory infections.

The main outcomes to achieve in the five planned Work Packages are:

- A report with the evidence-based interventions that are effective in promoting community selfcare behaviors related to the prevention of the spread of respiratory infections in disadvantaged populations;
- The validation of a tool measuring the adherence to the infection prevention behaviors in different contexts and in specific target populations;
- A multi-dimensional program capable of promoting changes in individual behaviors to prevent respiratory infection spreading in daily living settings, especially in disadvantaged populations;
- The development of a strategy to overcome barriers to health promotion, by establishing a wide inclusive approach towards citizens with different degrees of literacy, auditory, visual deficits,

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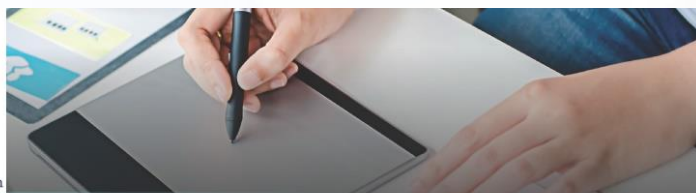
cognitive impairments, and age-related issues in learning, taking into consideration cultural, religious, ethnic values and habits;

- A toolkit for carers and stakeholders of vulnerable populations on how to use program of education in daily work with them; and
- The dissemination of the program and the tools among stakeholders to ensure the long-term sustainability of the project.

The following report summarizes all the outcomes achieved with the second Work Packages activities and in particular:

1. The findings of a review on effective public health strategies and interventions to help disadvantaged people to adopt appropriate behaviors in order to prevent respiratory infections and their spread within the community;
2. The findings of a review on effective behavioral change theories and techniques to help vulnerable people to adopt appropriate behaviors to prevent respiratory infections; and
3. The findings of a qualitative study that aimed at indicating common behaviors that might increase the risk of infection transmission, barriers to the adoption of the expected behaviors, educational needs, and preferred teaching methodologies through the voice of the vulnerable people.

ProY&O
Protecting You & Others
Community infection prevention behaviour change program



MOOC

(for carers of vulnerable individuals, with digital materials used offline by carers when working with vulnerable individuals)



3. PARTICIPATING ORGANISATIONS

The project involves five partners, named Medical University of Lublin (Poland), University of Udine (Italy), University of Novo Mesto (Slovenia), University of Barcelona (Spain), and Karadeniz Technical University (Türkiye).

Medical University of Lublin (Poland)



University of Udine (Italy)



University of Novo Mesto (Slovenia)



University of Novo mesto
Faculty of *Health Sciences*

University of Barcelona (Spain)



Karadeniz Technical University (Türkiye)



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Medical University of Lublin (Poland) (MUL)



The Medical University of Lublin (MUL), with an over 70-year history on the educational market, is a public higher education institution, whose main activities include research and education in the field of medical, biomedical, pharmaceutical and health sciences.

The University carries out tasks based on traditional academic values and principles of professional ethics. It provides supporting conditions for students and staff to develop their knowledge, skills and competences enabling them to achieve their professional goals at both national and international level.

Currently, at MUL, there are nearly 7,000 students enrolled in 18 programmes within 6 faculties. It has a 30-year long tradition in English-language teaching with over 1000 foreigners currently enrolled in medicine, including 2 joint degree programs, medical dentistry and nursing. The education of doctoral students at MUL is conducted at a Doctoral School created according with the new higher education reform carried out by the Polish government.

Faculty members of the Medical University of Lublin are very actively involved in various forms of research activity, including: national and international projects, research groups, cooperation with renowned world institutions; grants and scholarships for research projects, research visits abroad, hosting visiting professors in Lublin. Students are invited to become involved in the research projects and contribute to interest groups, volunteer groups and student associations.

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University of Udine (Italy) (UniUD)



The University of Udine (UniUD) is an Italian Public University founded in 1978 by National Law. Currently, UNIUD offers 40 first cycle degree courses, 38 second cycle degree courses and 3 single cycle courses. In addition, the University offers postgraduate teaching and research, with a broad and diverse range of training courses. It has 15,018 students and 692 professors and researchers. Scientific research is performed and coordinated by 8 Departments and 9 Research centers and supported by a central administrative office.

Since May 2016, the University of Udine officially obtained the HR Excellence in Research Award from the European Commission. In the health care sector, UniUD has 10 first cycle degree courses, 1 single cycle degree, 1 master degree course and 23 residency programs, and manage 2 PhD courses on Molecular Medicine and on Clinical and translational medical sciences.

The Department of Medicine (DMED) has almost 100 professors and researchers and almost 2,246 students. The Department of Medicine has managed from 2015 115 research projects funded on competitive calls for a budget of almost 11M€ in the framework of HORIZON 2020, International programs, Territorial cooperation and National and regional programs.

DMED's scientific interests are focused on different research topics. In particular, related to nursing field, DMED is interest in active ageing, degenerative and inflammatory diseases, diabetes and nutrition, education and simulation in health, exercise physiology, sport medicine and rehabilitation, imaging e advanced diagnostics, microbiology and infectivology, molecular and clinical oncology, neurosciences, pharmacology, precision medicine, public health and welfare, tissue regeneration and transplantation, women and children health.

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University of Novo Mesto (Slovenia) (UNM FHS)



The University of Novo mesto Faculty of Health Sciences (UNM FHS) is a private Higher Education Institution, that was established in 2007. The basic task and the priority of the faculty is to develop modern study programs in the field of health sciences and to educate graduates who will successfully and efficiently meet the needs of patients with various health problems in different stages of life and properly advise the patients about strengthening, maintaining and regaining health.

Faculty has eight accredited study programs. 1st cycle study programs are Nursing care, Physiotherapy and Phytotherapy. Students can continue their education on four different master programs: Nursing care, Physiotherapy, Education and Management in Healthcare and Integrated Health and Social Care as well as on doctoral study programme Health sciences. Postgraduate study programs are intended for a career development of registered nurses and other health care professionals. All programs include the common and elective study units. An important part of programs on 2nd and 3rd level is dedicated to the development of competences in research work, education, management and organization in health care.

About 700 registered students are attending faculty's study programs yearly. The students are provided with a friendly and modern educational environment, ensuring active cooperation with higher education teachers. Working on good interpersonal relationships between the staff members, the faculty is developing and building up the organizational culture and loyalty of the employees. Nevertheless, the Faculty is well integrated with community through various projects and constantly establishes international connections and cooperation with foreign universities, enabling the exchange of knowledge, students and lecturers.

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University of Barcelona (Spain) (UB)



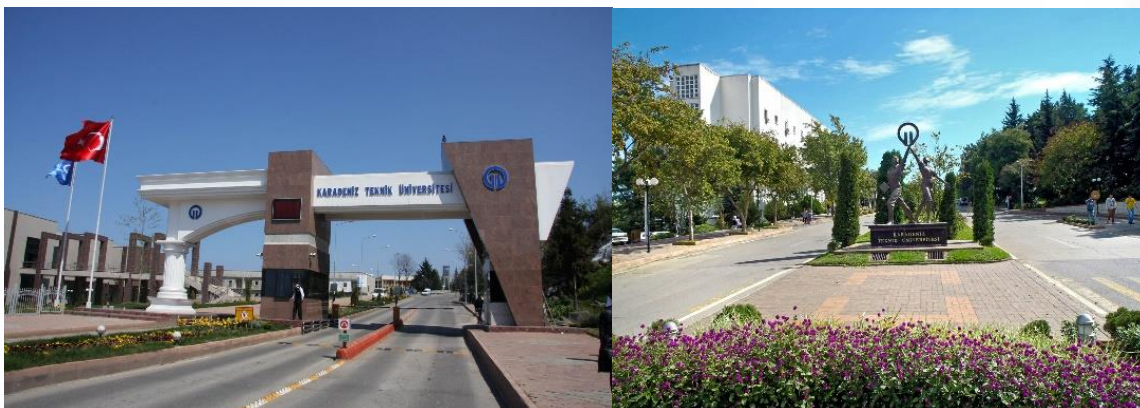
The University of Barcelona (UB) has 17 faculties - 6,328 professors and researchers and 62,252 students- 10 affiliated centers and a doctoral school. It also has a Science Park, a Science and Technology Centre service and 18 research institutes. Since its foundation in 1450, the University has the mission to provide a public service for higher education, with the highest level of quality, through study, teaching, research and effective management of knowledge transfer.

The UB has as well an active network. It founded CHARM-EU, an innovative higher education project that seeks to tackle interdisciplinary challenges while promoting accessibility and mobility. Additionally, the university is a member of LERU, a consortium comprising 23 research-intensive institutions dedicated to advancing innovation in Europe. The UB has been honored with the HR Excellence in Research recognition from the European Commission, demonstrating their dedication to fostering a supportive and stimulating research environment. It has also participated in the Erasmus+ program from its inception and reached a perfect score on their Erasmus Charter for Higher Education. The combination of all these factors has paved the way for the UB to retain its position of leadership among Spain's universities in the main international rankings.

The history of the UB's School of Nursing dates back to the 1977 when-university studies in nursing were officially constituted as a university diploma course. The tradition and history on which our current studies are built provided the foundations for the School of Nursing's conversion into the Faculty of Nursing in 2023. The city of Hospitalet de Llobregat is home to the Faculty of Nursing, located on the Bellvitge Campus. At the Faculty of Nursing, we are committed to the highest quality standards in teaching and research, making us one of the foremost faculties in our discipline.

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Karadeniz Technical University (Türkiye) (KTU)



Established 1955, Karadeniz Technical University (KTU), is one of the oldest and well-established universities in Türkiye where education and research activities are closely integrated with modern infrastructure, modern laboratories, good industry relations and well qualified staff. KTU's mission is to raise individuals that are open to development, to encourage the development of high-level scientific and technological products, and to pioneer the development and welfare of society, with all its practices in the fields of education, research, and social service. KTU has been in the research university category in Türkiye since 2021. KTU is one of the outstanding universities in Türkiye with its 12 faculties, 1 school, 6 graduate schools, 8 vocational schools, and 17 research and application centers as well as 2,116 well-qualified academics and total of 5,675 staff and nearly 40,000 students from Türkiye and many different countries. The institution, which is a member of the International European University Association and the Mediterranean University Association, is a nationally and internationally recognized university with its education and training services.

KTU Health Sciences Faculty Nursing Department has been providing nursing education since 1986. In this department bachelors', master, and doctorate degrees are available and the lesson credits are making according to the European Credit Transfer System (ECTS). The department is accredited by Association for Evaluation and Accreditation of Nursing Education Programs (HEPDAK) in the national level. Mission: to train professional nurses who can contribute to the development of basic education and nursing services, trained with contemporary science, technology, evidence-based approaches and methods; a holistic approach in protecting and improving the health of the individual, family and society; fulfilling the roles of caregiver, educator, researcher, manager and leadership effectively; can do academic work before and after graduation. Faculty members are very actively involved in various forms of national and international projects.

4. CHAPTER 1:

LITERATURE REVIEW ON DIGITAL EDUCATION EFFECTIVENESS, TO PROMOTE SELF-CARE BEHAVIORS PREVENTING RESPIRATORY VIRUS INFECTION SPREAD

The pandemic has given the importance to health prevention and knowledge of strategies to avoid the spread of respiratory infectious diseases. There is a lot of evidence on the standard behaviors to adopt, which however are not tailored for vulnerable and excluded populations. A review of the literature was conducted in order to summarize the effective public health strategies and interventions that have been adopted by vulnerable people to prevent respiratory infections and their spread in the community. PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Database of Systematic reviews, and Scopus were searched. From 1,294 articles found, 11 were included in the review. Moreover, a search in the references of the included studies and in the available networks and organizations was performed: just one more article was finally included.

Vulnerable populations were included in this review based on Gordon's classification (2020), previously described. In particular, children (considered vulnerable up to the age of 16), children with autism spectrum disorder, Diné public health students, racialized LGBTQ+ people, patients undergoing hematopoietic stem cell transplantation, a black American community and elderly (including a group of people with tuberculosis) were included.

In Figure 1, effective public health strategies and interventions targeted to vulnerable population for the prevention of respiratory infectious diseases are graphically resumed.

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FIGURE 1. Effective public health strategies and interventions targeted to vulnerable population for the prevention of respiratory infectious diseases

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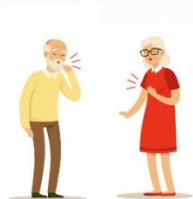
A summary of the characteristics of strategies and interventions are provided in Table 1 according to the studies retrieved.

TABLE 1. Characteristics of strategies and interventions for the prevention of respiratory infectious diseases for vulnerable people

Type of vulnerability	Characteristics of strategy or intervention
Children from kindergartens 	A WeChat education group was implemented to prevent hand foot mouth disease, in which health care workers could upload health educational materials and participants could ask them questions. At the end of the intervention, hand foot mouth disease decreased in the duration of the rash and lead to faster recovery in that specific kindergarten (Gold et al., 2021).
Primary schools' students 	A hygiene kit containing sanitizing products for students was provided in many schools for one month. In this study the idea was to train students in hand washing practice, to provide game and quiz to improve the performance. At the end of this training, the correct practices were improved by quite all the children and the rate of the infections decreased (Bricchi et al., 2023).
Children with autism spectrum disorder 	Telehealth mask wearing sessions were provided to prolong the consecutive minutes of mask wearing. At the end of the intervention, children wore a face mask for a period of 10 min without exhibiting challenging behavior (Sivaraman et al., 2021).
Diné public health students 	COVID-19 vaccine education materials tailored on how vaccines fit into Diné views of maintaining wellness were provided. Results showed a change in the attitudes and in the belief that getting the COVID-19 vaccine was a good idea, that the vaccine would prevent COVID-19, and that the vaccines would protect the community (Tutt et al., 2022).
Racialized LGBTQ+ people 	An intervention composed by 3-sessions was delivered on line: (1) a section focused on building rapport, goal identification and psychoeducation, adding content on knowledge about COVID-19; (2) a section focused on understanding and practicing COVID-19 protective behaviors; and (3) a section focused on understanding psychosocial issues, promoting awareness and improving mental health. Results show that there was not an increase in COVID-19

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Local residents aged >65 years with tuberculosis



knowledge. However, the intervention led to the increase in COVID-19 protective behaviors (Newman et al., 2024).

An intervention with many components was implemented. Main components were the following: (1) **health education** regarding tuberculosis with reading material, role plays and panel discussions provided by trained community health workers; (2) **psychotherapy** (Morita therapy) provided by psychologists, during which symptoms were explained as part of the natural ecology of human experience, negative emotions were explored and support in transitioning from preoccupation to acceptance of spontaneous affective experiences was discussed; (3) **self-management intervention**, provided by trained psychologists, community health workers and community administrators, composed by individual sessions, home visits and peer support. Every component lasted approximately 30 minutes per session. At the end of this intervention, behavior beliefs, behavior plan and self-efficacy were significantly improved (Chen et al., 2020).

Patients undergoing hematopoietic stem cell transplantation, their families and friends



A **5-minute education session** was provided to these patients and their families and friends in order to inform participants about the risks of respiratory virus infection, preventative measures, and their effectiveness for 60 days. At the end, participants declare an increase of awareness and knowledge (Linhares et al., 2022).

Black American community



In a black community in United States, **mHealth app** was used to explore COVID-19 information behavior among a population at high risk for COVID-19 and cardiovascular comorbidities. No specific description of the intervention was provided. However, this app was found to have visually appealing content and user-friendly design (Harris et al., 2023).

Older people



A **computer module** with an audio-visual, bilingual (English and Spanish) survey was provided to people who presented to the Walk-In Clinic with symptoms of an acute respiratory illness (cough, sore throat, nasal congestion, ear pain). The module was related to the appropriate use of antibiotics. At the end, participants declared to have learned something new (Leeman-Castillo et al., 2007).

Moreover, in a family clinic of a metropolitan area, **educational leaflets** on importance of vaccination against influenza were distributed among older patients. After 90 days, their knowledge was significantly improved (Linhares et al., 2022).

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Also, a repeated **50 minutes session** on hand hygiene, coughing etiquette, wearing a mask, oral hygiene, improving immunity exercise held to improved social capital (Han et al., 2021).

Another intervention provided for 7 days to older adults who speak Cantonese was a **telephone health education** regarding the use of prevention practice, as covering the mouth when sneezing-coughing, washing hands after sneezing-caught and feeding and wearing a mask in public. This strategy was found to be effective (Linhares et al., 2022). Focusing on vaccination education, some interventions were considered efficient: (1) interventions to **increase community demand**, as increasing perceptions and beliefs that vaccination is effective, decreasing concern about side effects and reminder letters followed by phone calls; (2) interventions to **enhance access**, as providing more clinics, bettering clinic hours, offering vaccination during existing home visits, arranging home visits to provide vaccination and decreasing economic barriers; (3) **provider- or system-based interventions**, as recommendation from healthcare workers and educational campaigns; and (4) **societal interventions**, as government policies and mandated programs and meeting for specific targets (Thomas & Lorenzetti, 2018). Finally, **videos messages on COVID-19** were provided for a group of white and black older with less than a college education. At the end of the videos, COVID-19 knowledge and shifted information-seeking and self-protective behaviours were increased. Effects did not differ by race (Torres et al., 2021).

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5. CHAPTER 2:

LITERATURE REVIEW ON EFFECTIVE BEHAVIORAL CHANGE THEORIES AND TECHNIQUES

Even knowing the important preventive behavior to avoid the spread of respiratory infectious disease, it is very difficult to make a person to change habits, especially for some vulnerable populations. Discovering theories or techniques that may inform the decision of the best way to apply interventions capable to change the behavior can be the key for a success implementation of preventive strategy. A review of the literature was conducted in order to summarize the effective behavioral change theories and techniques that can support vulnerable people in adopting preventing behaviors for respiratory infections and their spread in the community. PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, Cochrane, PsycInfo and Embase were searched. From 1,932 articles found, seven were included in the review. Moreover, an additional search in the references of the included studies was performed: just one more article was finally included.

In Figure 2, effective behavioral change theories and techniques for the prevention of respiratory infectious diseases useful for vulnerable populations are graphically resumed.



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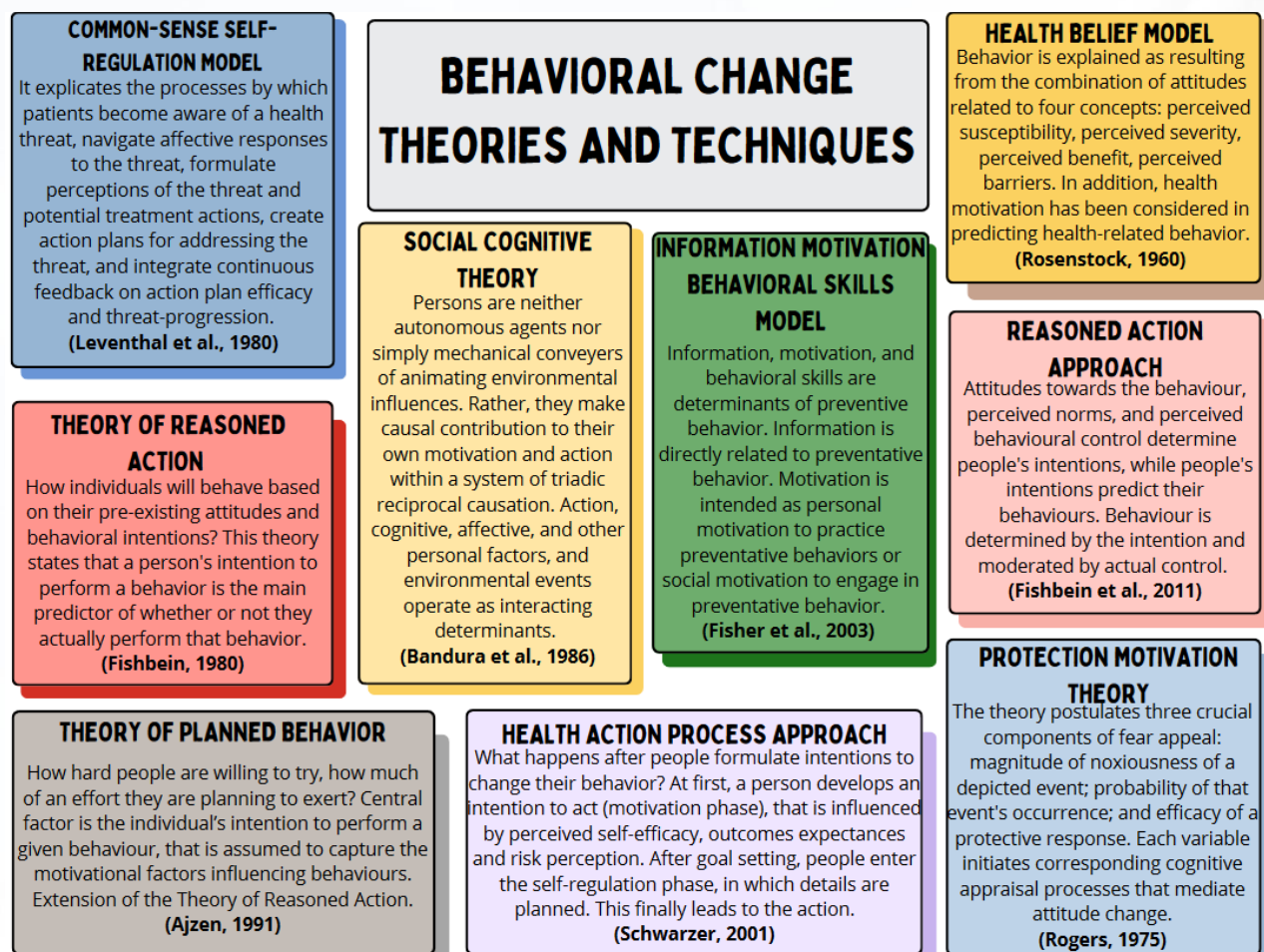
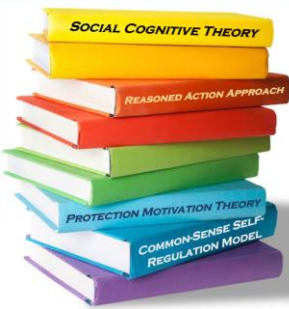


FIGURE 2. Effective behavioral change theories and techniques underpinning effective preventive interventions of respiratory infectious diseases useful for vulnerable populations

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A summary of the main characteristics of the main outcomes achieved documented in the included studies are presented in Table 2.

TABLE 2. Main characteristics of the behavior change theories and techniques

Behavioral change theory or technique	Main outcome achieved
	In the study of Dixon et al., 500 adults aged 16 or older were included and then stratified by Scottish Index of Multiple Deprivation, that measure the deprivation based on income, employment, education, health, access to services, crime, and housing. Using Common-Sense Self-Regulation Model, Reasoned Action Approach, Social Cognitive Theory, and Protection Motivation Theory, authors tried to understand the adherence and the predictors to transmission-reducing behavior, i.e., physical distancing, wearing a face covering and handwashing. Findings showed that interventions based on the constructs from all models predict transmission-reducing behaviors (Dixon et al., 2022).
	In the study of Payaprom et al., high risk urban dwelling Thai adults were included. Applying the Health Action Process Approach, stronger intention to obtain influenza vaccination was explained by changes in outcomes expectancies, perceived self-efficacy for arranging time and transportation and planning (Payaprom et al., 2011).
	In the study of Kan & Zhang, people with more than 60 years were involved. Using Health Belief Model and Theory of Reasoned Action, it was possible to identified the key factors of influenza vaccination behavior, as threat perception, behavioral beliefs, subjective norms, recommendations, past behavior and perceived barriers (Kan & Zhang, 2017). Moreover, in the study of Niu et al., adults with one or more cancers, chronic kidney disease, serious heart conditions, diabetes, liver disease, and hypertension or high blood pressure were included. Analyzing the results with Health Belief Model, it was highlighted that vulnerable populations' engagement in COVID-19-related preventive behaviors were significantly associated with barriers, benefits, self-efficacy, trust in doctors' social media, and

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trust in TV for COVID-19 related information (Niu et al., 2022).

In the study of Lee & Park, community-dwelling older adults aged ≥ 65 years were included. The results showed that applying an intervention based on **Information-Motivation-Behavioral Skill Model**, the level of knowledge, self-efficacy, self-reported engagement, and the quality of respiratory infection preventive behaviors was significantly improved (Lee & Park, 2021).

In the study of Wang et al., people over 60 years, without hearing impairment and with cognitive ability to understand a questionnaire were included. Applying the **Theory of Planned Behavior**, together with the **Protection Motivation Theory**, the willingness to accept COVID-19 vaccine booster was higher. Self-efficacy was the strongest predictor of vaccine booster willingness, while subjective norms, perceived severity, and perceived vulnerability showed positive effects on vaccine booster willingness. On the contrary, response cost had a negative effect on the willingness (Wang et al., 2023).

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Wang, J., Li, T., Ge, J., Zhou, M., Walker, A. N., Chen, J., Zhang, T., Zhang, K., Gu, S., & You, H. (2023). Applying two behavioral theories to predict the willingness to receive COVID-19 vaccine booster in the elderly: A cross-sectional study. *Research in social & administrative pharmacy: RSAP*, 19(3), 495–501. <https://doi.org/10.1016/j.sapharm.2022.10.011>



6. CHAPTER 3:

COMMON BEHAVIORS THAT MIGHT INCREASE THE RISK OF INFECTION TRANSMISSION, BARRIERS TO THE ADOPTION OF THE EXPECTED BEHAVIORS, EDUCATIONAL NEEDS, AND PREFERRED TEACHING METHODOLOGIES: QUALITATIVE STUDY ON NEEDS ANALYSIS

Scientific literature has showed that there are many important information and behaviors that citizens should know to have a good health and to prevent respiratory infections. However, many populations, defined as vulnerable for their characteristics, as social discrimination, medical disability or economic problems, are often excluded from research or it is not possible to involve, engage and empower them. Determining the needs in this field by involving vulnerable populations to identify common at-risk behaviors that might increase the risk of infection transmission, barriers to the adoption of the expected behaviors, educational needs, and preferred teaching methodologies also in a digital perspective would help in designing and tailoring educational programs to the available knowledge and the emerging needs.

A transnational qualitative study was performed interviewing people living with different vulnerabilities (n=76) and involving professionals or volunteers who take care of vulnerable people in focus groups (n=53). Cognitive or communicative vulnerability (e.g., children with cognitive impairment and their parents, people with language barriers), institutional vulnerability (e.g., older living in nursing homes and professionals who take care of them), medical vulnerability (e.g., people with disability and their caregivers), economic vulnerability (e.g., homeless and volunteers who help them), and social vulnerability (e.g., stereotyped groups) were involved according to the definitions available in literature to avoid forms of stigmatization (Gordon, 2020).

In Figure 3, all the experiences of respiratory infections, the behaviors adopted by participants, the most interesting information to learn, and the useful tools and methods for educating vulnerable people that emerged from interviews and focus groups are graphically presented.

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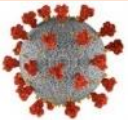
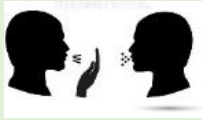
Experiences of respiratory infections  Diseases or symptoms • Cold • Cough • Fever • Flu • Pneumonia • Covid-19 • Bronchitis Causes • Non-compliant behavior with recommendations • Inappropriate environment • Living close to each other, sharing spaces and objects • Previous infections	Behaviour adopted by vulnerable populations  Appropriate behaviors • Adopting personal hygiene measures • Screening strategies • Developing a sense of responsibility toward others • Learning the importance of ventilation • Getting or being against vaccination • Being aware of the importance of mask and knowing how to wear it correctly • Being aware of the importance of washing hands • Understanding the importance of maintaining the distance from unhealthy people Inappropriate behaviors • Sharing personal objects • Not ensuring hygiene of environment • Having contacts with other • Having a street life • Having a bad nutrition • Not doing physical exercise • Not having educational opportunities • Not trusting in medicine • Staying in public place • Not covering mouth when sneezing or coughing • Unfeasible isolation when there is a respiratory disease • Refusing health care treatments and prefer self-care medications • Personal characteristics that influence preventive behaviors
Most interesting information to learn  • Appropriate hand hygiene • Appropriate personal hygiene • Disinfection and ventilation of places and objects • Diseases' mechanisms of transmission • Infectious agents and their actions • Functioning of immune system • Appropriate nutrition • Vaccinations, their timing, safety and effects • Individual and collective preventive basic behaviors • At-risk behaviors • How to ensure safe environment	Useful tools and methods for educating vulnerable people  Tools • Leaflets • Online education pills • Phone • Computer or tablet • Passive old-fashioned technologies Methods • Opinion leader • A person close to me or my network • Group education • Self-help group • A person who shows practically a behavior • Active/ modern strategies

FIGURE 3. Experiences of respiratory infections, behaviors adopted by vulnerable populations, most interesting information to learn, and useful tools and methods for educating vulnerable people

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In Table 3, the main findings of the interviews and of the focus groups, divided between the different types of vulnerability, are presented.

TABLE 3. Main findings from interviews and focus groups, divided between the different types of vulnerability

Cognitive or Communicative Vulnerability: people who have difficulty in comprehending information and making decisions (e.g., children or adults with cognitive impairment; language barriers)	
 People with cognitive or communicative vulnerability and their carers declared to have had experience of cold, cough, fever and Coronavirus-19. They affirmed that the only cause for these diseases was linked to the fact that they live with other people, sharing the same spaces and things. <i>"...they are in one centre, so they use one space, if someone comes infected, whether a co-worker or a disabled person, someone will usually catch it, someone will get infected, so COVID was circulating in our place over and over again." (Poland, Focus Group, participant 5)</i>	 This group of people and their carers declared that they used to share personal objects, to have contact with others and to have a bad nutrition. Moreover, they do not ensure the environment hygiene, adopt screening strategies, do physical exercise, have educational opportunities, use mask in the correct way, wash hands, cover mouth when sneezing or coughing, adopt isolation when there is a respiratory disease or maintain the distance from unhealthy people. These behaviors are influenced by linguistic and sensorial barriers, cultural habits, cognitive problems or fear of being stigmatized. <i>"...we observe the most important things at the very bottom, as risky behaviors and prevention, i.e., diet, exercise, and such basic things as if our participants are overweight, whether they use stimulants, for example, drink alcohol, smoke cigarettes, drink energy drinks, the body is weakened so much that many infections, not only those of the respiratory tract, become very easy. (...) Well, these are the basic things that we all know, the only question is how well we can implement them, yes." (Poland, Focus Group, participant 5)</i>
 Vulnerable people and their carers have expressed the desire of learning how to ensure appropriate hand hygiene, ensuring disinfection and ventilation of places and objects and how to ensure safe environment through appropriate ventilation, knowing diseases' mechanism of transmission and individual and collective preventive basic behaviors. <i>"In my opinion, the most important thing is prevention. Wearing masks on people who have an infection, washing your hands, wearing masks, keeping your distance, the kind of rules that you would do in a pandemic." (Poland, Interview, participant 15)</i>	 Doctors, group education, self-help group or a person who showed practically a behavior were the main way of educating people. Moreover, vulnerable people and their carers asked for leaflets or online educational pills, though phone, computer, tablet, television or radio. <i>"I think it's best to ask a doctor, as the first point of contact is always something we really don't know, but we need information about the disease. Well, first of all, the family doctor always helps." (Poland, Interview, participant 2)</i>

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Institutional Vulnerability: people who are under the formal authority of others who might have different values, goals, and priorities than those of the potential research participants (e.g., prisoners, institutionalised individuals)



People with **institutional vulnerability** and their carers declared to have had experience of cough, fever, flu, pneumonia, Coronavirus-19 and bronchitis. They affirmed that the transmission was caused due to many reasons, as non-compliant behaviors with recommendations (e.g., avoiding wearing masks, forgetting washing hands, avoiding maintaining distance due to limited spaces and being recovered in hospital), the impact of living close to other and because of previous infections.

"They were not wearing masks, they did not pay much attention to hygiene rules. They believed that nothing would happen to them." (Türkiye, Focus Group, participant 6)



These vulnerable people and their carers states that they share personal objects, have contacts with other people and sometimes are against vaccination. Moreover, they do not adopt personal or hand hygiene measures, screening strategies, have educational opportunities, develop a sense of responsibility toward others, ventilate environments, wear masks or know how to wear it correctly, isolate when they have a respiratory disease or maintain distance from unhealthy people. These behaviors are linked to cultural differences, communication or cognitive problems.

"It is difficult for our clients ...why to ventilate...it is difficult for them to understand the general measures." (Slovenia, Focus Group, participant 11)



Vulnerable people and their carers declared they want to learn the diseases' mechanisms of transmission, which are the main infectious agents and their actions, information about vaccinations and their modality, and finally main individual and collective preventive basic behaviors.

"Of course, I would like to learn more, how to act, more advanced things...What we know is the basics. If there is a person who is having respiratory problems, what you do is run and call the nurse and tell her what is going on. She gives us the instructions, but if she's not there.... So how do you deal with this?" (Spain, Focus Group, participant 9)



A reference person, an opinion leader, doctors, social workers, group education and self-help group were the adequate way to educate this group of vulnerable people. Also leaflets, online educational pills or videos can be useful through phone, computer, tablet, television and radio.

"The optimum number of individuals in need can be determined and mentor support can be provided. Trainings can be provided through these mentors." (Türkiye, Focus Group, participant 3)

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Medical Vulnerability: people who have serious health conditions for which no satisfactory standard treatment options are available



People with **medical vulnerability** and their carers declared to have had experience of cold, cough, fever, flu, Coronavirus-19 and bronchitis. They affirmed that the transmission was caused by non-compliant behaviors with recommendations, as avoiding wearing masks, washing hands inappropriately, avoiding maintaining distance due to limited spaces and staying in public environment, and for the impact of living close to other.

"Well, I don't know, I don't know why I got infected, I don't know where or from whom. Now this I can only suspect, but it's a suspicion that...that this neighbor infected me... probably him, or someone else in the market, because I only go there, to the neighbors and the market. ...because when my daughters are sick, they don't come, they follow that. That's what I know, I haven't thought about it too much, sickness is sickness, but from where? I don't know, my wife said from the wind, the cold well that's it. Yes, the ordinary reasons like that..." (Poland, Interview, participant 12)

This group of vulnerable people and their carers declared that they are used to share personal objects, have a bad nutrition, stay in public places and sometimes are against vaccination. Moreover, they do not ensure hygiene of environment, personal hygiene measures, have educational opportunities, a sense of responsibility toward others, ventilate the setting, use the masks or know how to wear it, wash hands, cover mouth when sneezing or coughing, apply isolation when there is a respiratory disease or stay distant from unhealthy people. These behaviors derived also from cultural habits, communication problems or from the fear of being stigmatized.

"My mother and sister stayed in quarantine in the village, but I know they wore their masks and went to the market or to buy bread even if they were positive." (Türkiye, Interview, participant 11)



Most interesting information for this group of vulnerable people and for their carers were how to ensure appropriate hand hygiene, disinfection and ventilation of places and objects, to be aware regarding the diseases' mechanisms of transmission, to know infectious agents and their actions, vaccinations, their timing, safety and effects and to learn individual and collective preventive basic behaviors.

"It was told to wear a mask, but details such as the shape of the mask, the fabric, how often it will be changed were not given. This kind of detailed information can be provided." (Türkiye, Interview, participant 5)

These people thought that education can be provided by healthcare centers, doctors, social workers, family members, group education or a person who practically showed a behavior. Leaflets, videos or films through phone, television or radio can help to provide education.

*"I would keep on doing what I've done until now: with the activities organised by our entertainer and I also agree with what the representative of the nursing home of **** said, healthcare social workers can help a lot in these activities, indeed." (Italy, Focus Group, participant 11)*

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Economic Vulnerability: including people who are disadvantaged in the distribution of social resources and services such as income, housing, or healthcare



People with **economic vulnerability** and their carers declared to have had experience of cold, cough, fever, flu and Coronavirus-19. They stated that the transmission of these diseases was caused by non-compliant behaviors with recommendations (avoiding wearing masks, avoiding maintaining distance due to limited spaces), by the inappropriate environment in terms of weather, the possibility of being in hospital setting or in public environments, and by the inevitable impact of living close to other.

"Usually, I think because of weather change. Because in Poland, one minute is hot, the next minute is cold. In the sense that when it is hot, I tend to wear less thick clothes (...)" (Poland, Interview, participant 6)



This group stated that they are used to share personal objects, have contacts with other people, have a "street life", have a bad nutrition, stay in public place, sometimes be against vaccination, refuse health care treatments and prefer self-care medications. Moreover, they do not ensure the hygiene of the environment, adopt personal hygiene measures, adopt screening strategies, have educational opportunities, trust in medicine, have a sense of responsibility toward others, ventilate the setting, know the importance of using mask and how to wear it correctly, wash hands, isolate when there is a person with a respiratory disease and maintain distance from unhealthy people. These behaviors are linked to linguistic barriers, cultural habits, fear of being stigmatized, economic issues as money for treatments and hospital process.

"Not taking the personal hygiene serious, like washing often hands, cleaning the house properly and too would be the people outside not taking the precautions, like me and I might be clean, I can decide I want to clean my house, I want to keep my family not infected, but what about the people outside. They might be no... So, I might decide to take my personal hygiene serious but when I go out, people don't take personal hygiene seriously." (Poland, Interview, participant 4)



For this group of vulnerable people and for their carers, ensuring personal and hand hygiene, disinfection and ventilation of places and objects, to ensure a safe environment, being aware regarding diseases' mechanisms of transmission, knowing infectious agents and their actions, knowing the functioning of the immune system, nutrition recommendations, vaccinations and their modality and being informed about individual and collective preventive basic behaviors were the main information they want to learn.

"And how it affects us in our system or how to prevent it..." (Spain, Interview, participant 1)



These vulnerable people and their carers suggested that an opinion leader, a person known personally, healthcare centers, family members or group education are the best way to educate them. Leaflets, webpages, social network, post by researchers and videos, through IT technologies are useful, also in native language.

"What really counts, what matters are relationships, so someone who comes and tells and builds a relationship with our residents, giving them practical, concrete examples in relation to certain behaviours. (...) I mean, that has to do with relationships, so leaflets are useless, because they won't read them. Eh, something that has to do with a direct relationship." (Italy, Focus Group, participant 6)

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**Social Vulnerability: people who belong to undervalued social groups
(e.g., stereotyped groups)**



People with **social vulnerability** and their carers declared to have had experience of cold, cough, fever, flu, pneumonia and Coronavirus-19. They indicate just two reasons for the spreading of these disease: the inappropriate environment, in terms of the weather or the impact of living close to others.

"It was difficult to say who passed on the covid to another. E.g., they said there was no one, just the daughter-in-law brought the bread, the neighbor took the rubbish and so on." (Slovenia, Focus Group, participant 9)



This group of people and their carers declared that they used to share personal objects, to have contact with others, to have a "street life", to stay in public place, to be often against vaccination, and to have a bad nutrition. Moreover, they do not adopt personal hygiene measures, have a sense of responsibility, ensure ventilation, have educational opportunities, use mask in the correct way, wash hands, cover mouth when sneezing or coughing, adopt isolation when there is a respiratory disease or maintain the distance from unhealthy people. These behaviors are influenced by linguistic and sensorial barriers, cultural habits, communication and cognitive problems.

"Yesterday for example, I met a man who picks up cigarette butts from the ground and smokes them, so that's what we're talking about, you know. Prevention here...speaking of prevention. It's clear that evidently having a high fever is less painful, for him probably, than suffering from his addiction, I mean, I think people's behaviors need to be understood, you know." (Italy, Focus Group, participant 9)



Vulnerable people and their carers have expressed the desire of learning how to ensure appropriate personal and hand hygiene, to ensure disinfection and ventilation of places, objects and a safe environment and how to be informed about individual and collective preventive basic behaviors.

"Ventilation of premises, hand hygiene, self-culling when infected or sick. I believe that education must be targeted at those who care for the vulnerable. They need more. They need to know more in general. For vulnerable groups, it is enough to watch some film about the matter, then practice things with them, repeat them to the mole, to get entrenched in their minds and to take them for granted." (Slovenia, Interview, participant 9)



An opinion leader, a person personally known, healthcare centers, doctors, family members, group education or a person who showed practically a behavior were the main way of educating people. Moreover, vulnerable people and their carers asked for leaflets or educational platforms or films though phone, television or radio.

"The best thing is to come and just show how things are done." (Slovenia, Interview, participant 2)

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7. SYNTHESIS OF THE FINDINGS

The presented report summarizes findings from three studies, two reviews and a qualitative study, planned and conducted in the second Work Package of the project PRO Y&O.

Overall, several strategies emerged for the prevention of respiratory infectious diseases for vulnerable people. Some of them have been assessed in their preference, feasibility and effectiveness in specific groups with special needs, as following:

- ❖ Phone apps groups, specifically appreciated by children from kindergartens and their parents, black American communities and older people.
- ❖ Hygiene kits, specifically designed for primary schools' students.
- ❖ Telehealth mask wearing sessions, dedicated to children with autism spectrum disorders.
- ❖ Vaccine education materials, for Diné public health students.
- ❖ A 3-sessions (content on knowledge about COVID-19, COVID-19 protective behaviors, and psychological issues) online intervention for racialized LGBTQ+ people.
- ❖ A 3-sessions (health education, psychotherapy, and self-management intervention) online intervention for residents with more than 65 years and with tuberculosis.
- ❖ A 5-minute education session to inform about the risks of respiratory virus infections and preventative measures for patients undergoing hematopoietic stem cell transplantation.
- ❖ Educational leaflet; and
- ❖ Telephone health education, for older people.

Regarding effective behavioral change theories and techniques underpinning effective preventive interventions of respiratory infectious disease useful for vulnerable populations, results emerged showed that:

- Common-Sense Self-Regulation Model, Reasoned Action Approach, Social Cognitive Theory, and Protection Motivation Theory were useful for adults deprived in terms of income, employment, education, health, access to services, crime, or housing for predicting transmission-reducing behaviors.
- High risk urban dwelling Thai adults' stronger intention to obtain influenza vaccination was explained by Health Action Process Approach;
- Health Belief Model and Theory of Reasoned Action allow to identify the key factors of influenza vaccination behavior in elderly;

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- Health Belief Model explains engagement in COVID-19-related preventive behaviors for adults with one or more cancers, chronic kidney disease, serious heart conditions, diabetes, liver disease, and hypertension or high blood pressure;
- Information-Motivation-Behavioral Skill Model improves the level of knowledge, self-efficacy, self-reported engagement, and the quality of respiratory infection preventive behaviors for community-dwelling older adults aged ≥ 65 years; and
- Finally, Theory of Planned Behavior, together with the Protection Motivation Theory, improve the willingness to accept COVID-19 vaccine booster for people over 60 years.

Finally, the European qualitative study conducted highlighted that vulnerable people and their carers:

- Had experience of many infectious respiratory disease due to non-compliant behavior with available recommendations, inappropriate environments, living close to each other sharing spaces and objects, and previous infections;
- Apply many preventive behavior in a context where they recognise to have several risky behaviors;
- Are motivated to learn, as appropriate hand hygiene, personal hygiene, disinfection and ventilation of places and objects, diseases' mechanisms of transmission, infectious agents and their actions, vaccinations, individual and collective preventive basic behaviors, at-risk behaviors, and how to ensure safe environment; and
- Suggest different specific tools (e.g., leaflets, online education pills, passive old-fashioned technologies) and methods (e.g., opinion leader, group education, active/ modern strategies) to educate vulnerable people.

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**Evidence-based strategies
for the prevention of
respiratory infections**

**Behavioural change
theories and techniques
underpinning effective
preventive interventions of
respiratory infections**

Phone apps groups

Hygiene kits

Telehealth mask wearing sessions

Vaccine education materials

Online intervention sessions

A 5-minute education session

Educational leaflet

Telephone health education

Group education

Opinion leader

Common-Sense Self-Regulation Model

Reasoned Action Approach

Social Cognitive Theory

Protection Motivation Theory

Health Belief Model

Information- Motivation- Behavioral Skill
Model

Theory of Planned Behavior

Heath Action Process Approach

**Vulnerable people and their
carers needs and
suggestions**

8. CONCLUSIONS

This report has summarized the main results of the second Work Package of PRO Y&O project regarding the state of the art of vulnerable populations, their behaviors and attitude towards prevention of infectious respiratory diseases.

Some interventions have been evaluated in their effectiveness in specific vulnerable populations demonstrating positive findings. However, more efforts are suggested to involve vulnerable individuals in future research given the limited evidence emerged. Moreover, many behaviors change theories and techniques have been documented as useful for improving prevention among vulnerable individuals; therefore, they can be considered while designing public health interventions to improve the health of citizens.

Finally, vulnerable people and their carers involved in face to face, individual and groups interviews, indicated the best ways for education in the process of prevention respiratory infections. The findings are unique, considering that these have been obtained at the European level thus filling-in a gap of the literature. Their contribution in developing the forthcoming Work Packages of the project will be valuable.



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Community infection prevention behaviour change program

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