Ref. Ares(2023)3215841 - 08/05/2023

VAX-TRUST PROJECT

Addressing vaccine hesitancy in Europe

Project no. 965280

H2020-SCI1-2020-Single Stage-RTD

D5.1

Guidelines for the implementation of the intervention targeted at healthcare professionals agreed upon by members of the consortium

Start date of project: 01 March 2021 Duration: 36 months

Deliverable nature:	Report	
Dissemination Level:		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	
Due date:	31 December 2022	
Submission date:	1st version 15 December 2022, 2nd version 4 May 2023	
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Lead beneficiary:	UNICLAM	
Work package:	Work Package 5 - Design and implementation of tailored and evidence-based interventions	
Version:	2	
Total number of pages:	22	

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.

Instruction for citation

De Vito, E., Esposito, M., Sannella, A., Ferrara, M., Langiano, E., Lombardi, R. and Sbaragli, S. (2022) Guidelines for the implementation of the intervention targeted at healthcare professionals agreed upon by members of the consortium. VAX-TRUST Deliverable 5.1. Available at: https://cordis.europa.eu/project/id/965280/results

Document Revision History

Date	Name	Affiliation	Position/ Role	Action
3.5.2023	Elisabetta de Vito	UNICLAM	WP Leader	Approved for publication
28.04.2023	Pia Vuolanto	TAU	PI	1. Approved for publication 2. Editorial, formatting & spelling changes, clarifications
26.04.2023	Annariina Koivu	TAU	Project Manager	Editorial, formatting & spelling changes, clarifications
15.04.2023	Maurizio Esposito	UNICLAM	WP Leader	1. Approved for distribution 2. Tables and figures have been modified to comply with copy rights. 3. Titles of the items of the Tidier checklist are made uniform.

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Table of Contents

Instruction for citation 1
Document Revision History 1
Executive Summary 1
1. Introduction 2
1.1 Vaccine hesitancy and the broad aims of VAX-TRUST 2
1.2 The process of development of guidelines for interventions' implementation 2
2. Background 3
3. A theoretical framework for intervention in Public Health 4
3.1 Theory, intervention, evaluation 4
3.2 Three theoretical approaches 5
3.3 Conclusions on the three theoretical approaches 6
4. Development and Implementation of a complex intervention in Public Health 6
4.1 Key steps in interventions' development 6
5. Intervention development 10
6. VAX-TRUST interventions' design 13
7. Checklist for VAX-TRUST interventions' development 15
References 18

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Executive Summary

The document sets the theoretical basis of interventions for health care professionals (HCPs) aimed at addressing vaccine hesitancy.

On the one hand, we present key sociological theories supporting interventions, on the other hand, we introduce theories supporting the design of "complex interventions" in public health, with a final focus on the connection between theories and interventions.

The deliverable has been prepared by UNICLAM (Italy), Università degli Studi di Cassino e del Lazio Meridionale, and commented and developed by the other members of the VAX-TRUST consortium.

Abbreviations

HCP	Healthcare professional
WP	Work Package
MRC	The UK Medical Research Council
ANT	*Actor-Network Theory*
PHI	Public health interventions
NPT	Normalisation Process Theory
STS	Science and technology studies
TIDieR	Template for Intervention Description and Replication
PHS	Primary health system
ICHI	Classification of Health Interventions
6SQuID	Six steps in quality intervention development
SLR	Systematic literature Review

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1. Introduction

1.1 Vaccine hesitancy and the broad aims of VAX-TRUST

Vaccine hesitancy is a critical issue for healthcare professionals (HCPs) who increasingly meet challenges in building trusting relationships with their patients. The HCPs face difficult working circumstances not only regarding communication problems or other limitations in their communication skills as such, but also due to the working conditions requiring more and more competences in a diversity of issues ranging from computer programs and online applications to insurance "jungles". Their struggles culminate in individuals coming to the consultancy rooms with ready-made diagnoses, firm trust in internet information and misinformation, and often with critical attitudes toward expert HCPs.

The Report of the SAGE Working Group on Vaccine Hesitancy (2014) provides the following definition: "Vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context-specific, varying across time, place, and vaccines. It is influenced by factors such as complacency, convenience, and confidence".

Vaccine hesitancy, as a complex, transnational yet region and context-specific phenomenon facing today's societies, is part of a wider phenomenon, a challenge toward expertise which has an impact on the public views but also on experts' views and behaviour. HCPs are urgently in need of knowledge and support to address these challenging conditions. VAX-TRUST aims at supporting healthcare professionals' expert position when meeting with vaccine hesitancy and related challenges to expertise, specialist knowledge, and evidence-based recommendations. For this purpose, VAX-TRUST develops interventions for HCPs.

1.2 The process of development of guidelines for interventions' implementation

This deliverable presents the development of guidelines for the implementation of tailored and evidence-based interventions for HCPs. The guidelines were developed through a participatory approach in VAX-TRUST project, which includes National Stakeholder Advisory Boards (e.g. healthcare authorities, healthcare professional associations).

We identified a standard methodological framework to implement tailored interventions. The guidelines' development process was based on a large systematic literature review, a grey literature analysis at the Target Region level, the review of existing studies in WP2, media analysis in WP3, ethnographic studies conducted in WP4, and observations stemming from frequent consortium meetings. The guidelines' development begun with agreeing upon the common goal for the interventions:

> *VAX-TRUST interventions are designed specifically for healthcare professionals to increase awareness on the complexity of vaccine hesitancy among healthcare professionals involved in discussing childhood vaccines with parents.*

The guidelines are intended as a standard instrument inside the VAX-TRUST project to design and conduct interventions in the Target Regions by placing in a standard general methodological framework beginning with the analysis of contextual factors and consisting of the identification of tools and criteria that each country team can adopt as an innovative and strategic approach.

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Specifically, these guidelines present a shared methodological approach to the intervention by which the margins of adaptability and tailoring in different contests are defined, considering, as much as possible, differences in the settings.

The guidelines systematise the evidence that emerged from the systematic literature review, a grey literature review at the Target Region level, the results of the WP2, WP3 and WP4, and from ideas occurred by the cross-fertilization of ideas and opinions with each country's research team.

We aim this document to be a valuable and accessible guide supporting the design and implementation of tailored interventions, which are readily adaptable in different social and cultural contexts. The guideline is divided into seven chapters: 1. Introduction, 2. Background, 3. A theoretical framework for intervention in Public Health, 4. Developing and implementing a "complex intervention" in Public Health, 5. Interventions development, 6. VAX-TRUST interventions' design, 7. Checklist for VAX-TRUST interventions' development.

2. Background

The design and implementation process for interventions needs to take in to account a large variety of contextual factors. For this reason, it is essential to build methodological guidelines that are flexible enough to be adopted in different societal and healthcare contexts. The guidelines also need to consider different target audiences because the HCPs acting as primary vaccinators vary from country to country. Moreover, common guidelines are essential for the interventions' evaluation (see D6.2 and other deliverables of WP6 of VAX-TRUST) focused at assessing the effectiveness and transferability of the implemented interventions, and to form evidence-based recommendations in WP7 of VAX-TRUST.

It is widely known that the interventions designed and implemented under these conditions are defined as "complex interventions in public health". Complex interventions include a wide variety of non-pharmacological interventions, including those that seek to promote behavioural change at the individual level (Michie et al., 2009), or via population-level public health strategies (Ogilvie et al., 2011).

Complex interventions are made up of various components "*of a material, human, theoretical, social or procedural nature*" (Clark, 2013) that interact with each other and make them difficult to standardise, because they are particularly susceptible to the characteristics of the context in which they are evaluated and characterised by a complex articulation of causal links between intervention and outcome. The long-term impact of interventions, the effectiveness of which has been demonstrated in the experimental setting, depends on their role in the actual context and on appropriate implementation, especially with complex interventions whose effectiveness mechanisms include modes of interaction with the context, multiplicity of behaviours, professionals, services, outcomes, and which require flexibility in implementation (Craig et al., 2008).

To guarantee the effectiveness and appropriateness of interventions, to reduce the variability and subjectivity of the choices regarding methodologies and educational actions, and to facilitate the evaluation process, the UK Medical Research Council (MCR) introduced the concept of complex

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intervention defining it as an "*intervention with several interacting components*" (Craig et al., 2008). This definition takes into account the degree of flexibility and non-standardisation to which the interventions are subject to (Hawe et al., 2004; Petticrew, 2011). Yet, the interventions must conform to specific processes guided by theory.

In the design and implementation process, the theory phase, where the theoretical basis - that hypothesises the intervention's ability to produce specific outcomes - is made explicit, and the modelling phase, which details the intervention's mechanisms of action, constitute the most critical moments.

There is a growing consensus that evaluations of complex interventions, such as social change programmes, would benefit from theorising how interventions work and understanding which components contribute to change, for whom and in what situations and contexts (Astbury & Leeuw, 2010; Bonell et al., 2012; Howarth et al., 2016; Moore et al., 2015).

A review of guideline implementation strategies conducted by Davies et al. (2010) found that only 10% of the identified studies provided an explicit rationale for their strategies. A poor theoretical basis makes it difficult to understand and explain how and why interventions' implementation succeeds or fails, thus limiting the opportunity to identify factors that predict the likelihood of successful implementation.

Modelling aims to understand how to control the different components, including those that determine the conditions that enable complex interventions to be integrated into the work of healthcare organisations. The identification of these components can be made explicit using theories that make it possible to describe the observed phenomena and propose robust explanations by providing the necessary starting points for predicting their future behaviour (O'Cathain, 2019).

3. A theoretical framework for intervention in Public Health

3.1 Theory, intervention, evaluation

Studies show that effective design links theory to model: "*the choice of intervention and use of theory in implementation research must be justified. The research must explicitly identify the justification for the interventions. Use of explicit theory to understand barriers, design interventions, and explore mediating pathways and moderators is needed to advance the science of implementation research*" (Davies et al., 2010). On the other hand, the research considers the change of design approach. This involves an approaching shift to think that "*in intervention research, intervention is not a separate entity from context, but rather that there is an interventional system that is different from the sum of its parts, even though each part does need to be studied in itself*" (Cambon et al., 2019).

This theorization considers effective the introduction of the notion of the interventional system "*as a set of interrelated human and non-human contextual agents within spatial and temporal boundaries generating mechanistic configurations – mechanisms which are prerequisites for change in health*". The interventional system concept "*underlines that the boundaries between intervention and context are blurred". "The evaluation focal point is no longer the interventional ingredients taken separately from their context, but rather mechanisms punctuating the process of change, considered key factors*

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in the intervention system" (Cambon et al., 2019). It encourages a move towards theorization in evaluation designs to analyse the interventional system more effectively. More particularly, it promotes theory-driven evaluation alone or combined with experimental designs.

The second assumption, resulting from the first, is "*to move towards a theorization within evaluation designs, to analyse the interventional system more effectively*". This allows researchers "*to design the most appropriate methods and modalities for characterising the interventional system*" (Cambon et al., 2019). Next, we will discuss three theoretical approaches for interventions after which we will present considerations on their potential for the VAX-TRUST intervention.

3.2 Three theoretical approaches

The three theoretical approaches considered were: The Actor-Network Theory (ANT), the Normalisation Process Theory (NPT) and the Social Worlds Framework (SWF). Key characteristics of these approaches are summarized in Table 1.

Table 1. Summary of the three theoretical approaches considered

Theoretical approach	ANT	NPT	SWF
Original developers, years of key developments	Latour, Callon 1980s onwards	Murray et al. 2000s onwards	Clarke, Star, Mead 1960s onwards
Disciplinary origins	social sciences, science and technology studies	implementation science	social sciences, science and technology studies
Key characteristics important for complex health interventions	(1) deals with systems made up of human and non-human entities and proposes a relational view of the action; (2) provides an understanding of intervention-context interactions; and (3) it is a tool to open the 'black box' of intervention	(1) addresses the factors necessary for the successful implementation and integration of interventions into routine work (normalisation) (2) healthcare is a collective activity requiring many interactions between professionals, patients, managers and others	(1) Social worlds are shared and deeply relational discursive spaces, emphasis on the inter-institutional mechanisms through which people organise social life (2) theory, methods and intervention are in continuous interaction with each other
Core concepts	action, relation, social interaction, translation, networks of actors, translation, controversy	coherence (or sense-making); cognitive participation (or involvement); collective action (work done to enable the intervention); and reflective monitoring (formal and informal evaluation of the benefits and costs of the intervention).	social world, situational analysis, arena, infrastructure

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Core arguments	1. Conceptualization of context in relation to networks of actors and their actions by identifying the various relevant components in a situation (social actors, physical objects, symbolic objects), analysing their attributes, strategic positions, and power relations 2. A process of connections and translations (problematization, interessement, enrolment, and mobilisation) that produces change, which, in turn, needs interaction, negotiation, and closure of controversies.	1. Focuses on the work that individuals and groups do to enable an intervention to normalize. 2. Interventions' components are not linear but are in dynamic relationships with each other and with the broader context of the intervention, such as the organisational context, structures, social norms, group processes and conventions.	1. Beginning of research is not approached with a kind of tabula rasa but with a baggage of existing traditions, hypotheses, theories and resources that serve as primary metaphors, applicable to the situation of investigation.

3.3 Conclusions on the three theoretical approaches

The three theories may be significant for the support of complex interventions in public health, such as VAX-TRUST interventions, for the following reasons:

- Inspiration for social scientists implementing VAX-TRUST interventions: for the development of practical tools and core elements of the intervention
- Building common ground and understanding of key findings of VAX-TRUST within the consortium
- Highlighting the close connection and continuous interaction between theory and methods even in practically oriented activity such as interventions targeted at HCP
- Linking interventions' implementation to evaluation

4. Development and Implementation of a complex intervention in Public Health

4.1 Key steps in interventions' development

Once a problem has been identified as needing intervention, the process of designing an educational intervention can be broken down into six crucial steps (Steps for Quality Intervention Development (6SQuID):

(1) defining and understanding the problem and its causes
(2) identifying which causal or contextual factors are modifiable: which have the most significant scope for change and who would benefit most
(3) deciding on the mechanisms of change

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(4) clarifying how these will be delivered
(5) testing and adapting the intervention
(6) collecting adequate evidence of effectiveness to conduct a rigorous evaluation.

Some aspects of complexity include:

- The number of components and interactions within the intervention
- The number and diversity of behaviour of those who deliver or receive the intervention
- The number of organisational groups or levels within the of the intervention
- The number and variability of outcomes
- The degree of flexibility or adaptation allowed by the intervention

Fundamental characteristics – including duration, dose or intensity, mode of delivery, core processes and monitoring – can influence effectiveness and reproducibility; for complex interventions, this level of detail is required for each intervention component (Clark et al., 2007).

Common mistakes that one should not make when designing this type of intervention are:

- the adoption of an inflexible study design
- lack of attention to the development and implementation phases of studies
- the choice of outcomes
- lack of attention to context

Fundamental characteristics – including duration, dose or intensity, mode of delivery, core processes and monitoring – can influence effectiveness and reproducibility; for complex interventions, this level of detail is required for each intervention component (Clark et al., 2007).

It is therefore necessary to understand the context of the intervention, implementation, and impact mechanisms (Moore et al., 2015). Context consists of the pre-existing conditions or everything external to the intervention that can influence the outcome. Implementation includes how the intervention is delivered, e.g., staff training, timing, and dosage.

In Figure 1, a framework for the development for complex health-improving interventions is shown. The best results is achieved by identifying and defining the components and their interrelationships. The development of an understanding of the intervention and its components may require exploratory work with qualitative methods, such as focus groups, surveys, observational studies, and case studies, to shed light on the components and their relationships.

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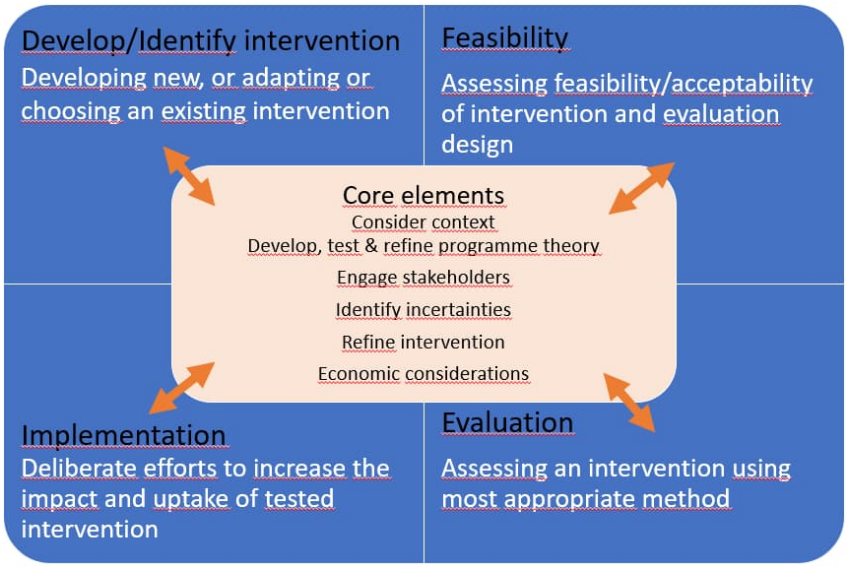

Figure 1. A framework for the development and evaluation of complex interventions. Adapted from: Skivington et al., 2021. *BMJ*: 374.

Mechanism of impact refers to the causal mechanism, or what created the change, and must be understood to facilitate the transfer of the intervention to different contexts or populations. As already pointed out, in designing a public health intervention, it is essential to describe in detail all the elements to be considered to evaluate the effectiveness of the intervention itself. It is also very important to describe the parts for the estimation of the effect of the intervention (Hoffman et al., 2014). Fundamental characteristics - including duration, dose or intensity, mode of delivery, key processes, and monitoring - can influence efficacy and reproducibility.

When complex interventions are adopted, open and non-rigid approaches are needed for evaluation (Minary et al., 2019). Model of the intervention is achieved by identifying and defining the many components and how they interrelate.

An effective implementation of complex interventions aims at making them practicable and integrated. When designing and planning the educational activity it is therefore important to carefully assess the structure to be given to the intervention and to consider all the components of a complex intervention, defined according to their function and form, but also the related components that can have an impact on the results, such as the culture and the characteristics of the persons delivering and receiving the intervention. On all this depends the effectiveness and the impact it will have on the users of the educational action (Campbell et al., 2000). The choice on the type is strictly dependent on the desired results and must follow principles that require certain preconditions which structure the educational relationship (Bradley et al., 1999, Campbell et al, 2000, van Meijel et al., 2004).

4.2 Key steps for VAX-TRUST interventions development

VAX-TRUST interventions are planned as training or educational interventions. Key steps in the development process are detailed here.

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Objectives: In the planning of the educational intervention, it is essential to make the objectives, both general and specific, explicit in a clear manner, also indicating through which modalities, activities, and proposals they can be achieved.

The objective (outcome) to be clear and specific must answer the questions:

- What do I want to achieve?
- Why is this objective important?
- Who is involved?

Furthermore, it must be uniquely measurable, as the intervention will be adapted to the specific characteristics of the target region, so that the training action can be monitored, motivation can be sustained and there is a measure or evidence of the achievement of the objective. To be realistic and achievable, we must answer the question: How can I achieve this goal? At this point, it is necessary to make a clear distinction between outcome and impact objectives; it is important to understand whether the intervention will contribute to a change and to an improvement of knowledge and skills in the target group (HCP) not only in the short and medium term (outcome) but also in the long term (impact) by changing attitudes and behaviour in both direct (HCP and indirect targets (general population) (e.g. adherence to vaccination programmes). The outcome goals must be achievable with the available resources and defined in time.

These specific objectives must be considered in the different contextual situations, regarding the following indicators:

- *Knowledge on evidence-based risks and benefits of vaccines*
- *Communication strategies skills*
- *Complexity of parents' hesitancy*
- *Trusting (or untrusting) relationships between HCPs and parents*

Intervention design: What activities are planned? Indicate the type of study you intend to undertake by identifying the most appropriate way in which to implement change.

Technical team: What resources will be involved? (e.g., facilitator; sociologist; communication expert; investigator/researcher)

Target group: Healthcare professionals

Expected results: What impacts the intervention should generate on the target group (e.g., impacts on knowledge and/or attitude and/or behaviour and/or awareness).

Evaluation analysis and indicators: The analysis of the work done makes it possible to understand whether the implementation of the intervention went well or whether there were problems.

Therefore, it is important to be able to verify the work done to understand what worked and whether the objectives (of results and/or impact) set were achieved. It is necessary to identify and use valid, unambiguous, and comparable indicators based on the outcomes chosen by each target region. This will be useful to optimise the intervention model and to make the interventions of the individual units comparable to collect data on the progress of the intervention. In relation to the specific objective

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chosen, relevant indicators can be used to measure the effectiveness of the intervention and the method of measurement, which will depend on the methodology adopted: qualitative, quantitative, or mixed, should be indicated. Plans for data collection should be incorporated into the study from the beginning through the production of descriptive statistics.

To improve the quality of the intervention, it is also useful to consider advantages and critical points.

Advantages

1) The importance of intervention in changing knowledge, habits, behaviour, and awareness is not an one-off event but a routine or repeated event over time.
2) It is important to identify and adopt effective communication methodologies and/or strategies.
3) The reporting will allow the replication and adaptability of the intervention to the different contexts.

Critical issues

1) Convenience sample may not be representative: selection bias, recall bias, response bias.
2) Non-randomised pre-and post-test design, which does not include a control group for comparison
3) Anonymity does not allow pairing of pre with post questionnaires.
4) Consideration must be given to determining participant adherence to evaluate long-term efficacy (follow up approximately 6 months after intervention).

5. Intervention development

In order to understand the process to be used to develop the intervention design, the six 6SQuID actions, are presented in detail below, along with factors that were considered in the development of the main steps of the intervention design.

Following the review of the published evidence, considering the needs of the primary (target) and secondary (general) population, and drawing on the sociological theories to identify how and why change can be influenced, with and for health workers, the intervention design and the selection of the most appropriate tools and approaches will be developed.

Application of 6SQuID

The 6SQuID (Six Steps in Quality Intervention Development) framework provides a useful model for determining how to develop interventions to maximise their effectiveness.

Each of the six steps of the 6SQuID are related to determinants of vaccine hesitancy (vaccine knowledge, attitude to trust, communication skills) to further improve the development of effective, relevant, and sustainable interventions (Wight et al., 2016). This implies incorporating the specific socio-cultural contexts involved in the project.

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The stages outlined in Table 2 are considered in relation to the socio-cultural context of the target population and to the attitudes and behaviours related to the value of vaccination in preventive actions.

Table 2. Six Steps in Quality Intervention Development framework by Pringle et al., 2018

Step	6SQuID steps	Details
1	Define and understand the problem	Clarify the problem, utilising the existing research. Establish how the issues are socially and spatially situated, including any immediate / underlying influences. Diagrams may help.
2	Clarify which causal / contextual factors are malleable and have greatest scope for change	Identify the factors shaping the problem and having the greatest scope to be changed. Diagram in Step 1 may establish the most effective intervention point(s) in causal pathways
3	Identify how to bring about change: the change mechanism	Articulate the theory of change and mechanism(s) for incorporation in the intervention
4	Identify how to deliver the change mechanism	Investigate the means / options for delivering the intervention, target groups, and context
5	Test and refine on a small scale	Identify a means of testing the intervention in an appropriate setting, for a small target group sample
6	Collect sufficient evidence of effectiveness to justify rigorous implementation or evaluation	Collect evidence that the intervention has worked as intended to warrant larger scale application. This may include examining any unintended/detrimental effects.

Adapted from Pringle et al., 2018. Pilot Feasibility Studies, 4: 69.

Step 1. Define and understand the problem

The existing evidence on interventions for HPCs help to define and understand the issues. Related social, community and personal influences should be examined to define and improve understanding of issues that are particularly important for the development and implementation of interventions for HPCs.

The overview of intervention development aims to coordinate the evidence to address vaccine hesitancy issues, while referring to individual areas of interest to support those who will implement interventions and to improve the likelihood of targeted and appropriate implementation.

Step 2. Clarify which causal or contextual factors are malleable and have greatest scope for change

Factors that can lead to change and increase the likelihood of positive outcomes should be identified in relation to both their direct influence on the HCP and their indirect influence on the general population:

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- *Knowledge and skills of healthcare professionals on the complexity of vaccine hesitancy*
- *Using effective communication strategies in relationships with hesitant parents*
- *Understanding the complex factors that lead to parents' hesitation about vaccines*
- *Trust relationship set up between health professionals and hesitant parents*
- *Correct and evidence-based information about benefits and risks of vaccines*

It should not be underestimated that competing and conflicting influences may come into play, such as different social and health contexts, different health systems and different governance or policies, etc., which may be more difficult to change in the short term.

Step 3. Identify how to bring about change: the change mechanism

Step 3 allows the linking and support of the interventions to a relevant theory and helped to identify how and why change can be influenced (e.g., the context, personal knowledge, and the social-health structure).

The theories introduced in Chapter 3 take into consideration the individual's self-efficacy (e.g., in terms of confidence, conviction, ability, motivation, etc.) which is particularly relevant element to be considered and strengthened because it is at the basis of the development of greater decision-making capacities that can manage impulsive actions, which in the case of vaccinations can dominate deliberative decisions, especially in parents of young children. This is something that needs to be understood by HCPs to sensitize them to vaccine hesitancy.

Furthermore, behavioural factors can influence decision-making in specific ways (e.g., social media pressure). Giving HCPs the skills to communicate effectively and strengthen their confidence to act in uncertain or risky circumstances can have very constructive benefits. Furthermore, improving knowledge, increasing confidence in science, and encouraging safe behaviour are in the interest of society.

Incorporating all these factors into interventions for HPCs ensures that a wide range of influential elements and contexts are taken into consideration.

Step 4. Identify how to deliver the change mechanism

As the susceptibility of intervention beneficiaries to change may differ from subject to subject, the identification of change mechanisms, which answers questions about what works, for whom and under which circumstances, can help to understand the conditions on which the effectiveness of an educational intervention depends and how to achieve the objective. Change and change processes may concern changes in e.g. knowledge, skills, behaviour or awareness.

Step 5. Test and refine on a small scale

The intervention setting must be assessed by the person who carries out the intervention and who knows the context in which it will be delivered best, to have an optimal receptivity.

Furthermore, the beliefs and personal choices of the target group must be respected and preferably known before the intervention is carried out. Issues concerning knowledge of the context in which the intervention is carried out could be tested with the target population in a pilot study and adjustments and refinements could be made during the intervention.

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The outcome evaluation should include baseline information, where possible, to enable a comparison of pre- and post-intervention scores. Process evaluation can be used to inform the interpretation of measures and should include assessments of implementation, mechanisms, and context. Process evaluation is necessary to identify implementation problems (Craig, et al. 2008) and can provide valuable feedback on content relevance and acceptability. This information can be applied in 6SQuID step 6 to modify, define, and justify the deployment of the intervention.

Step 6. Collect sufficient evidence of effectiveness to justify rigorous implementation or evaluation

Step 6 allows the development of a full-scale intervention and the collection and examination of data to ensure that the intervention works as intended, using the knowledge gained in the previous five phases.

Each phase can thus be seen as a construction of the previous phases, so that information is incorporated rather than duplicated. This illustration of the pathways through which the 6SQuID process works demonstrates its usefulness in the development of interventions. Although rigid standardisation of intervention delivery may be inappropriate in different groups and contexts, it is important that evaluation during and after phase 6 includes assessment of implementation fidelity. This will ensure that any adjustments needed to adapt to different contexts, while allowing for flexibility, do not alter or compromise the active components and delivery of the intervention (Moore et al. 2015).

6. VAX-TRUST interventions' design

VAX-TRUST intervention is designed specifically for HCPs *to increase awareness on the complexity of vaccine hesitancy among healthcare professionals involved in discussing childhood vaccines with parents.*

We will design and implement a tailored intervention for healthcare professionals in each Target Region, which can be referred to the International Classification of Health Interventions (ICHI) by WHO:

2.1.1. VD1.PH.ZZ: Training to influence health service-related behaviours, unspecified.

2.1.2. VD1.VA.ZZ Capacity building targeting health service-related behaviours, unspecified.

ICHI is a common tool for reporting and analysing health interventions covers interventions carried out by a broad range of providers across the full scope of health systems and includes public health interventions (https://www.who.int/standards/classifications/international-classification-of-health-interventions).

The interventions will use the same common design, but there will be regional variation in its detailed design, specifically tailored taking into account the most effective approach and tools emerging from SLR and GLR (both in D5.2) and what emerged at regional level in previous steps of VAX-TRUST in terms of: HCP profile and number, environment of setting (online, in presence, etc.), and tools for

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training activities, offering the necessary flexibility in the implementation to better tailor to the specific Target Region characteristics.

For this reason, the indicators for the evaluation of interventions will be defined referring to the specific approach and tools. The report and analysis on the most effective approaches and tools for training activities, as emerged from SLR and GLR, will be the objective of the Deliverable 5.2, where it is developed a theoretical rationale to support the design of the interventions.

The interventions target at healthcare professionals and will contain the following elements:

1) Up-to-date tailored information about vaccine hesitancy in the Target Region: population-level latest information on vaccine hesitancy and its social determinants (WP2), media coverage on vaccination (WP3) and qualitative study on vaccine hesitancy and vaccine encounters (WP4).
2) Training activities where healthcare professionals gain deeper information on vaccine hesitancy and where they learn from each other in peer groups and find new strategies to handle vaccine hesitancy and situations where the healthcare professional is challenged by the parents.
3) When possible and relevant, training activities where healthcare professionals are in direct contact with representatives of parent associations or using video installations about vaccine hesitant parents or other arts-based tools.
4) Up-to-date information activities to encourage for the use of social media tools to find peer support for dealing with vaccine hesitancy.

Based on what was discussed above and considering the different country context in which the intervention will be designed and implemented, the consortium will be oriented to realise interventions in two possible groups of HCPs:

A. intervention targeted at healthcare personnel involved in the vaccination strategies of the target region, enrolled among doctors of various specialisations, nurses, midwives, pharmacists, etc.
B. Intervention targeted at the cohort of healthcare personnel who were involved in the ethnographic study (WP4).

This dual target strategy was inspired by two main consideration: first, the group B is a very motivated cohort of HCPs on vaccination issues as they are all staff of vaccination centres so they are in need of an upper level of intervention compared with the HCPs group A. Second, the concurrent pressure of the war in Ukraine in some of the countries involved in the VAX-TRUST would create difficulties in recruiting the HCPs group A at a sufficient number while the HCPs group B is already involved and available to continue on tailored interventions.

The expected outcomes will be:

a) Understanding of the position of healthcare professionals administering vaccines and contribution to enhance their capacities to address and to form dialogue with vaccine hesitant parents at everyday work situations.
b) Enhancing healthcare professionals' abilities to handle interaction with vaccine-hesitant parents.

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c) Providing support, peer support and evidence-based information for healthcare professionals to meet with vaccine hesitancy in everyday parent encounters.
d) Developing practical and readily implementable guidelines to aid national and regional public health authorities in the EU and Associated Countries to increase vaccination rates, the qualitative study, and the development, testing and evaluation of interventions to vaccine hesitant parents and healthcare professionals.

7. Checklist for VAX-TRUST interventions' development

The TIDieR (Template for Intervention Description and Replication) checklist is recommended for the country teams to plan their local interventions (Hoffman et al., 2014). The TIDieR checklist can be applied to all evaluative study designs. It should be based on the essential elements listed below:

- Name
- Why
- What material
- What procedure
- Who provides the material
- How
- Where
- When and how much
- Tailoring
- Modification
- How well

In detail an explanation of the individual items of the TIDieR checklist follows.

Item 1. Short name: Describe the health intervention with a name or a sentence.

Providing the name and short description of the health intervention can aid identification and facilitate linking with other studies conducted on the same intervention.

Examples: VAX-TRUST-Educational intervention for health workers on addressing vaccine hesitancy.

Item 2. Why: Describe any possible rationale, theory, or objective of the essential elements of the health intervention. References to the theories and objectives behind the chosen intervention, especially for those interventions aimed at behaviour change, help to understand which elements of the intervention are essential and which can be optional. Finally, explaining the rationale behind a relevant element of an intervention may influence the acceptability of the participants.

Examples: NPT, ANT theories provided useful information to identify the supposed mediators of the intention to improve knowledge, increase confidence and change behaviour that are specific goals of the educational intervention.

Item 3. What (materials): Describe physical materials and information/communication tools used in the intervention, including those provided to participants or used in the delivery of the intervention

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or in the training of the deliverer. Indicate where the materials can be found (e.g., online appendix, URL). The full description of the intervention should include the different materials and tools used, the list of materials should be considered as an "ingredients" list of a recipe, including materials provided to participants, training materials used for those delivering the intervention etc.

Examples: The educational package includes PowerPoint presentations, accompanied by a class discussion, distribution of a booklet summarising the key messages of the intervention and simulations. Detailed information on the intervention content and the training programme is available at (URL, login, and password).

Item 4. What (procedures): Describe all procedures, activities and/or processes used in delivering the intervention, including any preparatory or support activities. Explaining the processes and describing in detail the actions that who delivering the intervention will carry out is important for its replication. This item refers to the "methods" section of a recipe, of which the intervention materials ("ingredients") are part and describes what is to be done with them.

Examples: All healthcare professionals participating in the intervention will be given a KAB (Knowledge, Attitude, Behaviour) questionnaire pre-intervention, followed by 6 hours of training on general characteristics of vaccinations and local legislation and most appropriate and effective communication approach. Key messages will be based on information and recommendations on vaccines, their efficacy and safety, and the importance of HPCs/patient communication. At the end, a post-intervention KAB questionnaire will be administered.

Item 5. Who provides: Describe the background, expertise and specific training for each professional category involved in providing the intervention. The providers of the intervention are all the professionals involved in its implementation; they have specific competences, skills, and previous experience which can positively influence the outcome of the intervention. The description should include the number of persons involved in the delivery of the intervention. Other information can include whether this is part of their normal activities or whether they have been specifically recruited for the study; whether they have been reimbursed for their time or incentivised in other ways (if so, which ones), and whether such time or incentives might be needed to replicate the intervention.

Examples: Facilitator; sociologist; expert in communication; Investigator/researcher.

Item 6. How: Describe how the intervention is delivered (e.g., in-person or other modalities such as Internet or telephone) and whether it is delivered individually or in groups. Specify the number of persons participating in the intervention and whether it was delivered in person and/or remotely (e.g., in person, asynchronous, blended mode). Finally, make explicit who organised the intervention and contacted the participants and indicate whether the session will be interactive (e.g.simulations) or not. Any other intervention delivery characteristics considered essential might influence the outcome and facilitate replication.

Examples: The in-person didactic session includes traditional tools such as the projection and commentary of explanatory slides and active lectures (question and answer sessions) and includes a part of the interventions focused mainly on role-plays and simulations.

Item 7. Where: Describe the type(s) of place(s) where the intervention is delivered, including any necessary infrastructure or relevant requirements. Specifying the location where the intervention will

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be delivered (university, primary care centres, local public health agencies, medical centre; hospital; etc.) and determining its characteristics (public or private agencies, availability of facilities or equipment useful for the delivery of the intervention) could be relevant for the replication of the intervention and influence various aspects of the intervention, such as the feasibility or adherence of the deliverer and the user of the intervention.

Examples: The in-person didactic session will be delivered at the university or hospital (and specify the settings).

Item 8. When and how much: Report how many times the intervention was delivered and in which period, including the number of sessions and their time schedule, duration, intensity. As the duration of the educational intervention is short and involves 6 hours of training in total, the information in this item should consider the type of intervention to be delivered. In any case, it is necessary to draw up a calendar of days and hours, especially for in-person, role-play, and digital learning interventions.

Examples: In the in-person intervention, it was agreed that the timetable of the educational intervention (6 hours in total) could be divided into 2 sessions of 3 hours each or 1 session of 6 hours.

Item 9. Tailoring: the intervention is planned to be tailored, so describe what, why, when, and how.

In tailored interventions, not all participants or groups of participants receive the same intervention; it depends on the target group being trained. For these reasons, a brief explanation of how personalisation is implemented and why, are needed.

Examples: In in-person intervention, if the participants have a different background (i.e., doctors, nurses, pharmacists etc...) or trainees and students, a mixed type of intervention can be adopted with traditional lectures and simulations for professionals and role-plays for trainees and students.

Item 10. Modifications: If some changes happen in the plan or during the implementation, describe the changes (what, why, when, and how). Unforeseen changes to the intervention may occur during its delivery, especially in long-term interventions. If this happens, it is essential to explain what was changed, why and when the changes were made, and how the intervention differed from the original (e.g., the change affects who delivered the intervention or changes the materials, etc.).

Examples: Due to recruitment problems, the start of the course is postponed; a member of the expert team is no longer available, so the part for which they are responsible could be delivered differently (at a distance) or replaced.

Item 11. How well (planned): If adherence and fidelity to the intervention were assessed, describe how and by whom and any strategies used to maintain or improve adherence. The concept of adherence refers to the objectives sought and can influence its effectiveness. It depends on the professionals involved, the implementer's adherence to the intervention delivery procedures, the participant's compliance, and the fidelity in the intervention delivery. All materials used to ensure adherence should be included, providing bibliographic references, or indicating where they can be found.

Examples: The training will be carried out in each target region. To ensure standardised training, all teams must apply the same training methodology but free to choose the approach or tool most

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appropriate to their context. The training will be shared with all trainers. Furthermore, the project leader, as an observer during the first two training sessions in each centre, will provide feedback to the trainers to further standardise the training.

Item 12: How well (provided): If adherence and fidelity to the intervention were assessed, describe the extent to which the intervention was delivered as planned. Sometimes an intervention may not be delivered as scheduled, thus affecting adherence to the intervention. In this case, it is necessary to write down to what extent the intervention delivered differs from what was planned. This information can help explain the study's results, minimise misinterpretation of study outcomes, influence future changes to the intervention, and, in the case of poor adherence, may indicate the need for further studies or strategies to improve fidelity.

Examples: Use of an approach not included in the shared methodology or inclusion of intermediate outcomes other than those shared.

References

Astbury B. & Leeuw, F. L. (2010). Unpacking black boxes: mechanisms and theory building in evaluation. *American Journal of Evaluation*, 31: 363e381.

Barreto M. L. (2005). Efficacy, effectiveness, and the evaluation of public health interventions. *J Epid. Community Health*, 59(5): 345-6. doi: 10.1136/jech.2004.020784.

Bilodeau A. & Potvin L., (2016). Unpacking complexity in public health interventions with the Actor–Network Theory*, Health Promotion International*, 33:173–181 doi: 10.1093/heapro/daw062 Advance Access Publication Date: 2 August 2016.

Bisset S. L. & Potvin L. (2007). Expanding our conceptualization of program implementation: lessons from the genealogy of a school-based nutrition program. *Health Education Research*, 22: 737–746.

Blume H. ([1969]1993). *Symbolic Interactionism: Perspective and Method* (Englewood Cliffs, NJ: Prentice-Hall, 1969; Berkeley: University of California Press, 1993).

Blumer, Herbert ([1969]1993) *Symbolic Interactionism: Perspective and Method* (Englewood Cliffs, NJ: Prentice-Hall, 1969; Berkeley: University of California Press, 1993).

Bonell C., Fletcher A., Morton M., Lorenc T. & Moore L. (2012). Realist randomised controlled trials: A new approach to evaluating complex public health interventions. *Social Science Medicine*, 75: 2299–2306.

Bradley, J. C., Waliczek, T. M., & Zajicek, J. M. (1999). Relationship between Environmental Knowledge and Environmental Attitude of Light School Students. The Journal of Environmental Education, 30, 17-21. http://dx.doi.org/10.1080/00958969909601873

Cambon L., Terral P. & François A. (2019). From intervention to interventional system: towards greater theorization in population health intervention research, *BMC Public Health*, 19: 339 https://doi.org/10.1186/s12889-019-6663-y

Campbell M., Fitzpatrick R., Haines A., Kinmonth A. L., Sandercock P. & Spiegelhalter D. et al. (2000). Framework for the design and evaluation of complex interventions to improve health. *BMJ*, 321: 694-6.

Clark A. M., MacIntyre P. D. & Cruickshank, J. (2007). A critical realist approach to understanding and evaluating heart health programmes. *Health* (London). 11(4): 513-39. doi: 10.1177/1363459307080876.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.

Clark A. M. (2013). What are the components of complex interventions in healthcare? Theorizing approaches to parts, powers, and the whole intervention. *Soc Sci Med*. 93: 185-93. doi: 10.1016/j.socscimed.2012.03.035.

Clarke A. E. & Star, S. L. (2008). *The Social Worlds Framework: A Theory/Methods Package,* January 2008, DOI: 10.1002/9780470377994.ch6, Publisher: The MIT Press.

Clarke A. E. & Fujimura J. (Eds.). *The Right Tools for the Job: At Work in Twentieth Century Life Sciences (*Princeton, NJ: Princeton University Press): 3–44. French translation : *La Matérialité des Sciences : Savoir-faire et Instruments dans les Sciences de la Vie* (Paris: Synthelabo Groupe, 1996).

Collins H. Are We All Scientific Experts Now? Polity Press, Cambridge 2014. Pp. vi + 144. ISBN 978-0-7456-8204-4.

Craig P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Medical Research Council Guidance. Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ*, (29): 337: a1655. doi: 10.1136/bmj.a1655.

Davies, P., Walker, A. E., & Grimshaw, J. M. (2010). A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implement Sci*, 5: 14. doi: 10.1186/1748-5908-5-14.

Duff, C. (2011). Networks, resources and agencies: On the char- acter and production of enabling places. *Health and Place*, 17: 149–156.

European Commission, Directorate-General XVI, Regional Policy and Cohesion, Indicators for Monitoring and Evaluation: An indicative methodology. The New Programming period 2000-2006 Methodological working papers; 2000.

Ewles, L., Ina, S. (1999). *Promoting health: a practical guide*. London, UK: Bailliere Tindall.

Giarelli, G. (2004). Il sistema sanitario: modelli e paradigmi. in Cipolla C. (Ed.) *Manuale di sociologia della salute*. Vol. I Teoria. Milano: Franco Angeli, pp. 107-140.

Giarelli, G. & Venneri, E. (2009). *Sociologia della salute e della medicina. Manuale per le professioni mediche, sanitarie e sociali,* Franco Angeli, Milano.

Giddens, A. (2000). *Fondamenti di Sociologia*, Il Mulino, Bologna.

Glaser, B. G., & Strauß, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Routledge.

Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *Am J Public Health*, 89(9): 1322-7. doi: 10.2105/ajph.89.9.1322. PMID: 10474547; PMCID: PMC1508772.

Hariton, E. & Locascio, J.J. (2018), Randomised controlled trials - the gold standard for effectiveness research: Study design: randomised controlled trials. *BJOG*, 125(13): 1716. doi: 10.1111/1471-0528.15199. Epub 2018 Jun 19. PMID: 29916205; PMCID: PMC6235704.

Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D. E., & Finkelstein, J. (2006). The use and interpretation of quasi-experimental studies in medical informatics. *J Am Med Inform Assoc*., 13(1): 16-23. doi: 10.1197/jamia.M1749. Epub 2005 Oct 12. PMID: 16221933; PMCID: PMC1380192.

Harris, R., Wathen, N., & Wyatt, S. (eds.) (2020). *Configuring Health Consumers. Health Work and the Imperative of Personal Responsibility*. Basingstoke: Palgrave MacMillan, ISBN 978-104039-9131-7.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.

Hawe, P., Shiell, A., Riley, T. (2004). Complex interventions: how "out of control" can a randomised controlled trial be? *BMJ*, 328: 1561-3. doi:10.1136/bmj.328.7455.1561.

Hoffmann, T.C., Glasziou, P.P., Boutron, I., Milne, R., Perera, R., Moher, D., Altman, D.G., Barbour, V., Macdonald, H., Johnston, M., Lamb, S. E., Dixon-Woods, M., McCulloch, P., Wyatt, J.C., Chan, A.W., & Michie, S. (2014). Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ*, 348: g1687. doi: 10.1136/bmj.g1687.

Howarth, E., Devers, K., Moore, G., O'Cathain, A., & Dixon-Woods, M. (2016). Contextual issues and qualitative research. In Raine R., Fitzpatrick R., Barratt H., Bevan G., Black N., Boaden R. et al. (eds.) Challenges, solutions, and future directions in the evaluation of service innovations in health care and public health. Services and Delivery Research 2016;4(16):105–20.

Klapp, O. (1972). *Heroes, Villains and Fools: Reflections of the American Character* (San Diego, CA: Aegis).

Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers through Society*. Harvard University Press, Cambridge.

Latour, B. (2005). *Reassembling the Social*. *An Introduction to Actor-Network-Theory*. Oxford University Press, New York.

Lombardi, L. (2013). *Percorso 21, Lezione 1 Comunicazione e società*; *Lezione 12 Interazioni situate e contesti istituzionali*; *Lezione 13 Spazi, contesti e comunicazione*; In: Costantini W. e Calistri D. (a cura di), OSTETRICA. La patologia in ostetricia e ginecologia (Libro III). vol. 3, p. 979 seguire, PADOVA: PICCIN, ISBN: 9788829921485.

Lomazzi, M. (2016). A Global Charter for the Public's Health-the public health system: role, functions, competencies, and education requirements. *The European Journal of Public Health*, 26(2): 210–212.

May, C. R., Mair, F., Finch, T., MacFarlane, A., Dowrick, C., Treweek, S., Rapley, T., Ballini, L., Ong, B. N., Rogers, A., Murray, E., Elwyn, G., Légaré, F., Gunn, J., & Montori, V. M. (2009). Development of a theory of implementation and integration: Normalization Process Theory. *Implement Sci,* 2(4): 29. doi: 10.1186/1748-5908-4-29.

May, C. R., Cummings, A., Girling, M., Bracher, M., Mair, F. S., May, C. M., Murray, E., Myall, M., Rapley, T., & Finch, T. (2018). Using Normalization Process Theory in feasibility studies and process evaluations of complex healthcare interventions: a systematic review. *Implement Sci*, 13(1): 80. doi: 10.1186/s13012-018-0758-1.

Mead G. H. ([1938]1972). The Philosophy of the Act (Chicago: University of Chicago Press).

Michie, S., Fixsen, D., Grimshaw, J. M., & Eccles, M. P. (2009). Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implement Sci*, 16 (4):40. doi: 10.1186/1748-5908-4-40.

Minary L, Trompette J, Kivits J, Cambon L, Tarquinio C, Alla F. Which design to evaluate complex interventions? Toward a methodological framework through a systematic review. BMC Med Res Methodol. 2019 May 7;19(1):92. doi: 10.1186/s12874-019-0736-6. PMID: 31064323; PMCID: PMC6505260.

Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., Moore, L., O'Cathain, A., Tinati, T., Wight, D., & Baird, J. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ*, 350: h1258. doi: 10.1136/bmj.h1258.

Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, Moore L, O'Cathain A, Tinati T, Wight D, Baird J. (2015). Process evaluation of complex interventions: Medical Research Council guidance. BMJ, 350:h1258.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.

Murray, E., Treweek, S., Pope, C., MacFarlane, A., Ballini, L., Dowrick, C. et al. (2010). Normalisation process theory: a framework for developing, evaluating, and implementing complex interventions. *BMC medicine*, *8*(1): 1-11.

Nichols, T. (2017). *The Death of Expertise: The campaign against established knowledge and why it matters*. New York: Oxford University Press, ISBN: 9780190469412.

O'Cathain, A., Croot, L., Duncan, E., Rousseau, N., Sworn, K., Turner, K. M., Yardley, L., & Hoddinott, P. (2019). Guidance on how to develop complex interventions to improve health and healthcare. *BMJ Open*, 9(8): e029954. doi: 10.1136/bmjopen-2019-029954. PMID: 31420394.

Ogilvie, D., Cummins, S., Petticrew, M., White, M., Jones, A., & Wheeler, K. (2011). Assessing the evaluability of complex public health interventions: five questions for researchers, funders, and policymakers. *Milbank Q*, 89: 206-25. doi:10.1111/j.1468-0009.2011. 00626.x

Petticrew, M. (2011). When are complex interventions 'complex'? When are simple interventions 'simple'? *Eur J Public Health*, 21(4): 397-8. doi: 10.1093/eurpub/ckr084.

Pringle J, Doi L, Jindal-Snape D, Jepson R, McAteer J. (2018) Adolescents and health-related behaviour: using a framework to develop interventions to support positive behaviours. Pilot Feasibility Studies 4:69. doi: 10.1186/s40814-018-0259-7.

Potvin, L. and Clavier, C. (2013) Actor-Network Theory: The governance of intersectoral initiatives. In Clavier, C. and De Leeuw, E. (eds.) Health Promotion and the Policy Process. Oxford University Press, Oxford, pp. 82–103.

Roke, C., Cloatre, E., & Dingwall, R. (2012). The regulation of nicotine in the United Kingdom: How nicotine gum came to be a medicine, but not a drug. Journal of Law and Society, 39(1): 39–57.

Rushton, C. (2014). Whose place is it anyway? Representational politics in a place-based health initiative. Health and Place, 26: 100–109.

Skivington, K., Matthews, L., Simpson, S. A., Craig, P., Baird, J., Blazeby, J. M., Boyd, K. A, Craig, N., French, D. P., McIntosh, E., Petticrew, M., Rycroft-Malone, J., White, M., & Moore, L. (2021). A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ,* 374: n2061. doi: 10.1136/bmj.n2061.

Star, S. L. & Karen, R. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, 7: 111–34.

Strauss, A. L. (1978). A Social World Perspective. *Studies in symbolic interaction*, 1: 119-128.

Timpka, T., Nordqvist, C. & Lindqvist, K. (2009). Infrastructural requirements for local implementation of safety policies: the discordance between top-down and bottom-up systems of action. *BMC Health Services Research*, 9: 45-53.

Van Meijel, B., Gamel, C., van Swieten-Duijfjes, B., Grypdonck. M.H. The development of evidence-based nursing interventions: methodological considerations. J Adv Nurs. 2004 Oct;48(1):84–92. doi: 10.1111/j.1365–2648.2004.03171.x. PMID: 15347414.

Volonté, P. (2017). Il contributo dell'Actor-Network Theory alla discussione sull'agency degli oggetti. *POLITICA & SOCIETÀ*, 1: 31-58.

Weber, M. (1995). *Economia e società*, Edizioni di Comunità, Milano.

WHO Ottawa Charter for Health Promotion. WHO 1986, Geneva.

WHO Jakarta Declaration on Leading Health Promotion into the 21st Century. WHO 1997, Geneva.

WHO European vaccine action plan 2015-2020. WHO Regional Office Europe 2015, Copenhagen.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.

Wight, D., Wimbush, E., Jepson, R., & Doi, L. (2016). Six steps in quality intervention development (6SQuID). *J Epid. Comm. Health*, 70(5): 520-5. doi: 10.1136/jech-2015-205952. Epub 2015 Nov 16. PMID: 26573236; PMCID: PMC4853546.

Young, D., Borland, R. & Coghill, K. (2010). An actor- network theory analysis of policy innovation for smoke-free places: Understanding change in complex systems. *American Journal of Public Health*, 100(7): 1208–1217.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 965280.