IMMUNION

Compilation report of four National toolboxes

Deliverable 6.1

This project is co-funded by the European Union's Health Programme 2014-2020.

Project no. 101018210

Project acronym: IMMUNION

Project title: Improving IMMunisation cooperation in the European UNION

Instrument: European Union 3rd Health Programme

Start date of project: Apr 1, 2021

Duration: 24 months

Deliverable title: D 6.1 Compilation report of four National toolboxes

Due date of Deliverable: M12

Organisation name of lead contractor for this Deliverable: Istituto Superiore di Sanità (ISS)

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Dissemination level		
PU	Public	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

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DOCUMENT HISTORY

VERSION	DATE	NOTE	ISSUED BY
0.1	Feb 25 2022	First version	Paola De Castro Valentina Possenti Roberto Croci
1.1	Mar 10 2022	Intermediate Version	All contributors
1.2	Mar 29 2022	Reviewed	EHNet & ISS
1.3	Mar 30 2022	Submitted	EHNet

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Introduction

In 2015, the SAGE Working Group on Vaccine Hesitancy emphasised the importance of acting upon specific concerns raised by each sub-category of the broadly classified vaccine-hesitant groups to design valuable interventions. Indeed, a "one size fits all" strategy to tackle vaccine hesitancy is unlikely to be effective [1]. Many reviews and theoretical frameworks have identified promising strategies to increase vaccination coverage [2, 3].

Even in countries with relatively high overall immunisation rates, scientific evidence shows that significant segments of society are still unvaccinated – or only partially vaccinated – due to a combination of factors: deprived socioeconomic status, lack of health literacy or lack of access, active vaccine hesitancy. Addressing hard-to-reach subpopulations is both an epidemiologic and an ethical imperative [4, 5].

Traditionally, vaccination strategies are designed to protect the most vulnerable strata: pregnant women, children, and elderly or immunocompromised persons. Surprisingly, though, recent robust meta-analyses indicate that, in these same groups, negative sets of knowledge, beliefs, and attitudes towards immunisation tend to prevail. A substantial proportion of older adults refuse the seasonal influenza vaccine [6]. Similarly, pregnant women's acceptance of the recommended vaccines remains suboptimal, even when the suggestion comes explicitly from a healthcare professional (HCP) [7]. Furthermore, parents and caregivers are shown to have, on average, a lower acceptance rate of the COVID-19 vaccination than the general population [8].

It is a paradox that the categories benefiting the most from vaccination campaigns should display the fiercest scepticism.

In such a scenario, HCPs represent a crucial target for vaccine communication strategies. Even a minimal degree of active vaccine scepticism in this group entails negative public health consequences. Vaccine-hesitant health professionals are likely to fuel more hesitancy, acting as negative examples within their communities [9].

To optimally tackle vaccine hesitancy or other forms of reluctance, HCPs need to be properly trained and supported by appropriate communication tools. To ensure that a plurality of target populations be addressed, these tools should include a variety of digital and offline material [10]. The former should be accessible by multiple channels and search keywords to diversify and amplify the target audience, while the latter would ideally be agile and easy to read [11,12].

Importantly, vaccine communication needs to be implemented as a two-way process, whereby HCPs and other experts should persuade and voice their reasons, but also listen actively and receive feedback from their communities [13].

In the context of the IMMUNION project, WP6's final aim is developing, discussing and piloting communication and community engagement tools to increase vaccine uptake in target communities in four project-partner countries: Greece, Italy, Latvia and Romania.

This Deliverable describes the methodology and process underlying the development of the four National toolboxes of communication and community engagement tools to increase vaccine uptake (Task 6.2). The Toolboxes themselves are included in an Annex. They are in the process of being made available online on the Coalition for Vaccination/IMMUNION website, where they will be made easily accessible to end-users. These tools are not intended as a standalone final product. Indeed, they will be continuously updated after completing the Deliverable, considering both partners' and stakeholders' suggestions.

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Methods

This section describes how the tools included in the four national toolboxes were identified and selected. We acknowledge that all WP6's tasks are interconnected within WP6 and other IMMUNION WPs and contribute to reaching the broader aim of the IMMUNION project, which is to increase vaccine confidence and uptake across the EU.

The envisioned steps to develop the toolboxes were planned as follows:

1. Consider the data that emerged from the Reference grid (M6.1), using a flexible approach (the grid report and all annexes are available on the IMMUNION/Coalition for Vaccination website, here, section "National Toolboxes")
2. Collect communication and community engagement tools.
3. Identify possible connections between the Grid and the communication tools.
4. Organise toolboxes and make them available online.

Since the beginning of Task 6.2 (i.e., M5 – August 2021), these steps were collectively agreed upon with partners during dedicated WP6 meetings and re-adjusted at different stages of the toolboxes' development.

We aimed to gather and produce a suite of communication, media and peer engagement tools to meet the requirements of the different national scenarios (as depicted in the Reference Grid) and address specific target groups within each participating country. This activity has been planned to create awareness of existing difficulties and strengthen the necessity of cooperating with stakeholders.

We divided the tasks as follows:

- Each partner collected their national tools (Greece, Italy, Latvia, Romania) and contributed to gathering the ones generated by European projects or other initiatives.
- ISS Team collected international tools.

STEP 1. Consider the data that emerged from the Reference grid (M6.1), using a flexible approach

During the first six months of the project's activities, we developed a ***Reference Grid (M6.1)*** to investigate national scenarios in the four partner countries regarding vaccine hesitancy and uptake (Task 6.1). This activity aimed to answer questions such as: *Which are the major determinants of vaccine hesitancy in Greece, Italy, Latvia, and Romania? Which vaccines and population groups do they address primarily? Which key country-specific issues should be considered?*

The Reference Grid included an analysis of the scientific and grey literature on vaccine hesitancy determinants and barriers to uptake in each of the four countries. It served essentially as a first brick in building up an overview of national scenarios, mainly based on the vaccine hesitancy determinants as grouped in Box 1, below.

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BOX 1 - Three vaccine determinants reference categories. IMMUNION M6.1, D6.1

C - Contextual influences

Influences arising due to historical, socio-cultural, environmental, health system/institutional, economic or political factors: Communication and media environment, Negative exposure to media; Influential leaders, immunisation programme gatekeepers and anti- or pro-vaccination lobbies, Violation of human rights; Historical influences; Religion/culture/gender/socio-economic, Religious fatalism; Politics/policies; Geographic barriers; Conspiracy theories; Perception of the pharmaceutical industry;

I - Individual influences

Influences arising from the personal perception of the vaccine or influences of the social/peer environment: Personal, family and/or community members' experience with vaccination, including pain; Previous negative experiences; Beliefs, attitudes about health and prevention, Vaccination not a priority, Against vaccination in general, Alternative prevention methods, Diseases are beneficial, Healthy bodies, Low risk/severity of disease; Knowledge/awareness. Lack of information; Health system and providers – trust and personal experience, Mistrust in health institutions; Risk/benefit (perceived, heuristic), Responsibility if something bad happens, Vaccine safety, Vaccines not effective, Fear of injection, Humans too weak to fight vaccines, Immunization as a social norm vs. not needed/harmful, Social norms;

V - Vaccine specific influences

Vaccine/vaccination – specific issues directly related to vaccine or vaccination: Risk/ benefit (epidemiological and scientific evidence). No medical need; Vaccine novelty. Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine; Mode of administration; Design of vaccination programme/Mode of delivery (e.g., routine programme or mass vaccination campaign); Reliability and/or source of supply of vaccine and/or vaccination equipment; Vaccination schedule; Access; Costs. Financial cost; The strength of the recommendation and/or knowledge base and/or attitude of healthcare professionals. Lack of recommendation from providers. Conflicting advice from providers.

Two main limitations of the exercise carried out in Task 6.1 concern on the one hand, the challenge of including all the relevant literature on the topic (particularly as regards grey literature) and, on the other, of not having specifically covered social media and online information, which seem to play a primary role in hesitant attitudes and behaviours toward vaccines and vaccinations. For the above reasons, M6.1 is to be conceived as an "open" document, amenable to periodic updating throughout IMMUNION and perhaps afterwards.

The analysis provided helpful background for collecting tools, yet it is worth noting that its full applicability might be impaired by the heterogeneity of outcomes and overlapping data.

In particular, peer-reviewed records displayed substantial heterogeneity in the two main outcomes, as well as in other relevant findings: geographic setting, population, study design and the vaccinations studied, as detailed below.

Main outcomes:

Outcome 1: Knowledge, Attitudes, Practices/Behaviours (KAP/B) on vaccines and vaccinations (in general and against specific disease), intentions to get vaccinated and coverage. There was a lack of validated scales to assess KAP/B and objective methods to assess coverage, reduced statistical power due to non-probabilistic sampling strategies (i.e., convenience sampling).

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Outcome 2: determinants of vaccine hesitancy, vaccine refusal of missed/incomplete schedules. There was a lack of validated and/or standardised instruments to assess vaccine hesitancy.

Other findings

Geographic heterogeneity: 60% of the studies were based in Italy, and only 12% were multi-country based. None investigated the four nations (Greece, Italy, Romania and Latvia) simultaneously.

Population heterogeneity: only about one-fifth of the articles dealt with the general population. More than a third explored vaccine hesitancy determinants within the broadly defined health workforce (such as physicians, nurses and other HCPs or nursing and medical students). Among the other investigated subpopulations were parents/guardians of underage children, young adults, migrants and refugees, pregnant women, and adults with medical comorbidities.

Study design heterogeneity: studies were primarily cross-sectional (85%) or other observational studies, not allowing causal inference.

Vaccination heterogeneity. The studies addressed the following vaccinations: nearly one-third about influenza, one study out of five was on early childhood vaccines, HPV vaccine (18%), all vaccines generically (16%), COVID-19 vaccine (14%); residually, recommended vaccinations for the health workforce (6%), and vaccines against measles (2%) and varicella (2%).

Grey literature, instead, had more homogeneous results. As for the outcomes, the focus was mainly on vaccine hesitancy prevalence and determinants and instruments to fight it. The accrued documents offered technical guidance on various topics, including communication issues (traditional and social media). We also collected internationally available representative surveys, which quantified vaccine confidence both during COVID-19 and in the pre-COVID era. Even in this second part of the work informing the Reference Grid, the role played by HCPs is considered relevant to tackling vaccine hesitancy both among different population groups and in the health professional categories.

Consequently, we have considered results from M6.1 as an introductory guide to better evaluate the communication tools to be collected.

Step 2 was focused on collecting the tools, and Step 3 on matching the results and showing possible gaps and solutions.

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STEP 2. Collect communication and community engagement tools

This step has two phases: the Design phase and the Output phase

1. Design phase

First, we structured a consensus definition of "Toolbox", highlighted in the following Box 2.

BOX 2 - *How to define Toolboxes*

The ISS Team has non-systematically scanned the available scientific literature, consulted grey literature sources, and solicited expert opinions from different scholars in scientific dissemination and vaccine-preventable diseases.

As a result, the ISS team has proposed an *ad-hoc* working definition for Toolbox.

Within the IMMUNION project, National *Toolboxes for vaccination communication and community engagement*:

- are printed or electronically published items meant to reach specific intended targets or end-users (e.g., citizens, consumers) to deliver vaccine communication;
- represent a set of instruments to support actions to improve vaccine hesitancy among the general population as well as in specific subpopulations (i.e., immunocompromised, elderly, pregnant women);
- should serve as a supporting mechanism to tackle reluctant attitudes and behaviours toward vaccines and vaccinations by fostering partnerships with relevant stakeholders and end-users;
- encompass a wide range of communication channels and technologies, including social media and mobile-based digital platforms (i.e., smartphone applications);
- are available in English mostly but can also include tools elaborated in the languages of participating Countries (Greek, Italian, Latvian, Romanian);
- are designed for advanced users, such as relevant stakeholders and authorities (e.g., vaccine experts, health professionals, researchers) who may benefit by using them to increase vaccine compliance in their reference population group(s).

Subsequently, to further increase the added value from this activity, we identified a two-tier recognition for mapping and selecting *Tools for vaccination communication and community engagement.* Specifically, partners agreed the tools should originate from the following sources, within the last decade:

a. national Ministries of Health, public health institutes and relevant organisations or national-level associations in the four Country Partners (Greece, Italy, Latvia, Romania), such as federations and/or societies representing professional categories (e.g., General Practitioners, Paediatrician, Nurses, Obstetricians);
b. international bodies, authorities, organisations, EU-based projects and programs, and other comparably relevant experiences in the field.

Partners collected the tools through desk research. It is worth noting that detailed exchanges with stakeholders, including national/regional health authorities and health professionals, will take place in each of the four countries following the publication of the toolboxes. These exchanges will

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serve to discuss the next steps for these activities (e.g., moving towards piloting), as well as gather input on the existing tools as well as new tools if relevant. As emerged from the IMMUNION survey conducted amongst HCPs within WP4, associations of health professionals are a trusted source of information for them, and it will thus be critical to include them in these discussions.

The organisations involved in WP6 are represented by the National Institutes of Public Health in three Country Partners (Italy, Latvia, Romania) and the Institute of Preventive Medicine, Environmental and Occupational Health in Greece; thus, Task 6.2 is conceived according to an institutional perspective. The four partners recognised the relevant role that subnational agencies have played in vaccine communication over time.

Following the consensus about "tools", we elaborated a grid (in an Excel sheet) to provide:

1. A list of descriptive items for each selected tool;
2. Indicators to evaluate specific dimensions of each tool.

The descriptors included in the Excel spreadsheets are explained in the following Table, divided into two sections: A – Descriptive; B – Evaluation. The evaluation, or quality appraisal, served to assess the quality and reliability of the collected tools through text readability, graphic layout, and level of complexity. The table includes all the explanations shared with partners to deliver a homogenous tool.

It is worth noting the differentiation between "*Intended users*" and "*Intended targets*": the former indicates those who will use and disseminate the materials as part of their jobs, namely health authorities or HCPs, and the latter group comprises targets addressed by the materials to increase vaccine confidence, compliance and uptake. As explained in the Table below, HCPs could be recognised as both intended users and intended targets.

ITEM	DESCRIPTION	FURTHER DETAILS
DESCRIPTIVE SECTION (A)		
Name of Resource	Title or identifier of the tool.	
Link to resource	The URL where the tool is located and available to be visualised and/or downloaded.	
Publication year / Update(s)	Publication date and updates.	
Source	The body, authority or group entity that elaborated and developed the tool.	
Origin	Country of origin or relevant international level (e.g., European or other).	
Language(s)	Indicate in which language(s) the tool is available.	Partners are welcome to add tools in both English and their national language. If the tool is not in English, it is helpful to provide a summary/abstract in English.
Area of focus	One of the three macro areas of determinants from the "Reference Grid" elaborated in T6.1; namely:	Please refer to the final Milestone available on the Coalition for Vaccination/IMMUNION website, here (section on "National Toolboxes").

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	- (C) Contextual influences, - (I) Individual and group influence, - (V) Vaccine/vaccination specific issues.	
Disease	Indicate the Vaccine-Preventable Disease(s) that the tool refers to.	
Intended user	- Health authorities - HCPs	Those who will actually use and disseminate the materials as part of their jobs, namely health authorities or HCPs.
Intended target	General population and/or specific subgroups - Parents, Family & Children - Higher Risk Conditions - Pregnant Women - Schools & Child Care - Young Adults - Older Adults - Migrants - Socially deprived or marginalised groups - Businesses/Employers - Public Administration and services (transportation, police, etc.) - Media	Intended target of the materials, meaning which target groups the materials focus on to increase vaccine confidence, compliance and uptake. We might also have HCPs as the intended target in a vaccination campaign organised by health authorities such as the national Ministry of Health or professional associations and organisations.
Document type	- Print Materials (general) - Poster - Flyer - Factsheets - Infographics - Data Visualization - Web Resources (general) - Social Media Images & Messages - Videos - Widgets - Buttons, banners and badges - Podcasts and audios	A material can have dual format (paper and electronic), but necessarily has to be available as a digital object.
Endorsement / validations	If applicable.	It can be helpful in the case of the tools generated by other sources than those developed at national or international levels, such as category *c.* (e.g., from EU-funded projects). Or at the national level as tools elaborated by non-institutional organisations (i.e., associations and not the Ministry of Health).
Suggested by	Indicate the Reference Country Partner who selected the tool.	It can be helpful mainly in the case of the tools generated by other sources than the ones developed at national or international levels, such as for the category c. (e.g., from EU-funded projects).

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ITEM	DESCRIPTION	FURTHER DETAILS
EVALUATION SECTION (B)		
Text readability**	Level 1 – low (<40%) Level 2 – average (41-70%) Level 3 – high (>71%)	To retrieve the score of Text readability, launch the link to the tool in https://www.webfx.com/tools/read-able/flesch-kincaid.html If the tool can be transformed into a Word document, this other resource can be applied https://support.microsoft.com/en-us/office/get-your-document-s-readability-and-level-statistics-85b4969e-e80a-4777-8dd3-f7fc3c8b3fd2 (*For further details see the text below***)
Graphic layout	Positive ≥12 Negative ≤11	The assessment of the tool per the graphic is based on four items, each of them can be assigned a score ranging from 1-poor to 5-high: - Readability (e.g., size of characters) - Appropriateness (efficacy of graphic choice) - Quality (use of colours and image definition) - Impact (arrangement of text and figures)
Level of complexity	Level 1 - simple Level 2 - average Level 3 - very complex (i.e., demands advanced prior knowledge)	
Link with WP6 tools and SEKI platform	The SEKI platform (developed by partner ViVI) will bring together training and education tools for health professionals on vaccines and vaccination.	If partners come across any such tool that is more likely to be intended for training, they are welcome to include it, flagging or indicating the training function.
Additional notes	Partners can include additional elements which can be helpful to frame the tool included.	

***Text readability** –There is an open debate on the readability of vaccine-related documents and communications, even more strongly accentuated within the COVID-19 pandemic. ISS has performed a literature search on readability scores and evaluation methods[1]. Out of 170 pertinent records extracted, about 60% mention the Flesch-Kincaid Reading Ease and the Flesch–Kincaid Grade Level. We found a free website (https://goodcalculators.com/flesch-kincaid-calculator/) that offers both formulae. A more complete website (https://www.webfx.com/tools/read-able/flesch-kincaid.html) also calculates other scores, namely the Gunning Fog score, the Coleman Liau index, the Automated Readability Index (ARI), and the SMOG index. Furthermore, Microsoft Word's word processing program has a function to calculate readability statistics on textual inputs based on the two Flesch-Kincaid formulae above.*

[1] The search has been developed and validated by an expert librarian (Dr Scilla Pizzarelli) by querying the collection "Health Research Premium Collection" (ProQuest), which enables research simultaneously in a database of bibliographic records, including the following databases: Consumer Health Database, Health & Medical Collection, Healthcare Administration Database, Medline, Nursing & Allied Health Database, Psychology Database, Public Health Database.

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2. Output phase

The figures below show a screenshot of the excel sheet (the sheets are linked in full in the Technical Annex), which is the outcome of the mapping, selection and evaluation exercise. All partners contributed to completing these sheets.

Name of Resource	Link to resource	Publication year/Update(s)	Source	Origin (country or EU/international level)	Language(s)	Area of focus (3 macroreas of determinants from the Reference Grid elaborated in T6.1)	Disease
10 reasons to vaccinate my child	http://www.infovac.gr/wp-content/uploads/2016/12/%CE%94%CE%95%CE%9A%CE%91-%CE%9B%CE%9F%CE%93%CE%9F%CE%99-	2016	The College of Greek Pediatricians	Greece	Greek	C,V	VPDs-included in National Vaccination Plan
Get vaccinated against the seasonal flu	https://eody.gov.gr/wp-content/uploads/2019/01/afisa_gripi_website.jpg	2019	National Organisation of Public Health	Greece	Greek	I	Seasonal influenza flu
Why should I get vaccinated? Bravery and responsibility award (for children)	http://www.infovac.gr/wp-content/uploads/2016/12/%CE%93%CE%99%CE%91%CE%A4%CE%99-%CE%9D%CE%91-%CE%9A%CE%91%CE%9D%CE%A9-%CE%95%CE%9C%CE%92%CE%9F%CE%9B%CE%99%CE%91.pdf	2016	The College of Greek Pediatricians	Greece	Greek	C	VPDs-included in National Vaccination Plan

Intended user (e.g., those who will disseminate the materials in the context of their profession, such as health professionals)	Intended target (e.g., target groups the materials focus on in terms of increasing uptake, such as pregnant women, adolescents, etc.)	Document type	Additional notes	Text readability	Graphic layout	Endorsements/validations (if applicable)	Level of complexity (Level 1 - simple; Level 2 - average; Level 3 - very complex, i.e. demands advanced prior knowledge)	Suggested by (Reference Country Partner)
Healthcare professionals	Parents/Children	Leaflet	N/A	23,2	Negative	National and Kapodistrian University of Athens, WHO	2	Greece
Healthcare professionals	General population	Poster	N/A	77,1	Positive	N/A	1	Greece
Healthcare professionals	Children	Print material	N/A	80,4	Positive	National and Kapodistrian University of Athens, WHO	1	Greece

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STEP 3. Identify possible connections between the Grid and the Communication Tools

The ISS team asked national partners to provide comments and considerations on the retrieved communication tools, based on, but not limited to some of the following trigger questions:

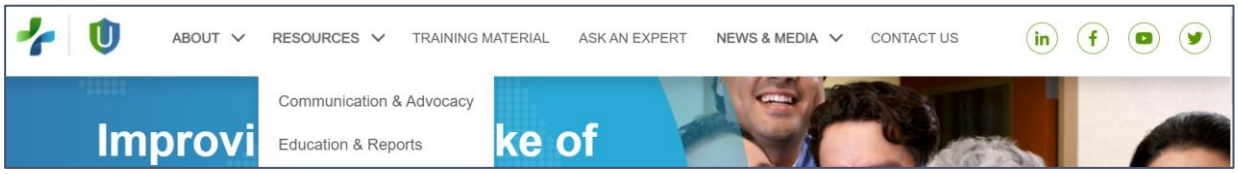
- What is the level of institutional endorsement, validation or acknowledgement by governments, public health institutions or other organisations such as scientific associations?
- Which country-specific issues should be considered? For example, which were the main difficulties or challenges in developing this vaccine communication tool collection?
- How can the National Toolboxes serve as grounding materials for discussion within the planned Stakeholder Roundtables (Task 6.3)?

This step intended to link the different tasks of WP6 in a logical frame. However, we were aware of the difficulty of matching theoretical results coming from literature with the selected tools.

The results of this exercise are reported in the following section, "Results".

STEP 4. Organise toolboxes and make them available online

WP6 is discussing with WP2 and other partners how best to make the communication tools appear online, on the IMMUNION/Coalition for Vaccination website. We will construct a user-friendly searchable database. Partners will decide which features of the Excel file should be made searchable online, enabling users to filter the tools according to their needs. The searchable items are likely to be: disease or vaccine, language, intended target. The webpage will also include an introduction explaining how to use the toolbox. The toolboxes will be available in a new, dedicated tab under "Resources".



As mentioned, this exercise will not end once the tools mapped in the context of D6.1 are made available online. Instead, the database will be a living document, open to suggestions from partners as well as external stakeholders. IMMUNION partners are exploring how to put in place a sustainable evaluation process for the addition of new tools.

Training activities on vaccine communication and confidence organised by WP5 could also benefit from such an online database, which has been a discussion topic in joint meetings with WP5 partners since March 2022.

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Results

Below, we report the results from national-level searches performed by the four countries and an analysis of the items from international organisations, European initiatives, and projects that, as explained previously, are an additional contribution to enlarging the database of valid vaccine communication tools.

Each country description includes three sub-sections:

- **Brief description of the tools gathered**, including the main results in terms of quantity and types of tools, vaccinations and targets covered.
- **Link with Reference Grid (Task 6.1).** As explained above, the present task is not supposed to fully answer whether the tools respond to gaps and needs retrieved by the analysis using the Reference Grid. Instead, it is a way to deepen our knowledge about existing gaps, which will be further discussed during the national roundtables.
- **Connection with national roundtables of key stakeholders (Task 6.3):** engaging with national stakeholders in vaccines and vaccinations will contribute to using the IMMUNION toolboxes and further selecting additional material, thus developing the contents of the toolboxes themselves. Furthermore, according to Task 6.4, the toolboxes will also be used to pilot tools, either as they are, slightly amended, or co-creating entirely new ones.

Vaccine communication tools in the four countries

1. Greece

Brief description of the tools gathered

- We have collected a total of 43 tools; 21 (48,8%) tools cover vaccinations against vaccine-preventable diseases in general, 3 (6.9%) cover vaccinations against HPV, 11 (25.6%) cover COVID-19 vaccinations, 6 (14%) cover vaccinations against seasonal flu and 2 (4.6%) cover vaccinations against measles. Most have been issued or validated by official authorities or global organisations (33/43, 77%), while the remaining have been issued by pharmaceutical companies (4/43, 9%), national scientific societies (3/43, 7%) and other organisations (3/43, 7%).
- The target group of the identified communication tools is often the general population (21/43, 49%) or specific subgroups, such as people at high risk, migrants or children/parents (17/43, 39%). Some tools also address HCPs (5/43, 12%). In most cases, those who disseminate the material are HCPs (41/43, 95%), while the remaining are disseminated by public administration services (2/43, 5%). Tools targeting migrants are also disseminated by staff and social workers working for NGOs. Also, some of the tools are disseminated by both HCPs and public administration personnel.
- The most common format of the identified tools was web resources (10/43, 23%), print material (8/43, 19%), leaflets and posters (8/43, 19%). 10 (23%) tools can be found in multiple languages, 3 (7%) are only available in English, and one video uses sign language and adapted Greek or English subtitles.
- Readability was easy in most cases: high Flesch-Kincaid reading ease score = 89.1 (excluding 2 lowest and 1 highest outlier), InterQuartile Range 72.7-98.4; as such, they should be understood by elementary school students. In most cases, graphic layout (where applicable) was positive (27/33, 82%).

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Link with Reference Grid (Task 6.1)

- The majority of the tools collected address at least 2 of the determinants of vaccination hesitancy (25/43, 58%): specifically, 19 (44%) address 2 determinants and 6 (14%) address all 3 determinants of vaccination hesitancy. A non-negligible minority of 18 (42%) tools address one determinant of vaccination hesitancy. 25 (58%) tools have a vaccine-specific focus, 26 (60%) have an individual and group influence focus and 23 (53%) have a contextual influences focus.
- Unawareness and misinformation seem to be the main barriers for vaccination uptake. Thus most of the tools use vaccine-related and vaccine-preventable-disease-related information as key enablers. Another typical driver among tools collected is the perception of getting vaccinated for the common good and not only for protecting oneself, thus addressing the social norm barrier. Furthermore, when it comes to children, information about vaccines disseminated by paediatricians tends to be more informal and playful to address the misinformation barrier adequately for children. Moreover, some tools exploit a "Q&A" or a "myths and truths" format to address personal and social environment beliefs, perceptions and influences barriers.

Connection with national roundtables of key stakeholders (Task 6.3)

- Most of the tools have been issued or validated by the Ministry of Health, the National Public Health Organisation (https://eody.gov.gr/en/) or scientific associations. In Greece, the cost of vaccines recommended by the National Vaccination Schedule (for both children and adults) is covered by the public healthcare system. Nevertheless, vaccine communication is delivered by both the public and private healthcare sector. Hence, some of the tools collected have been issued by pharmaceutical companies or societies. Since information and guidance about vaccination are given both by the private and the public health care system, the tools collected cover the vast majority of the barriers to address and a variety of tool styles for stakeholders to choose according to their background, the target group they are addressing and their communication skills.
- Vaccine communication strategies and tools seem to be vital for addressing vaccination hesitancy. The Stakeholder Roundtables (Task 6.3) will build a discussion about the existing barriers in vaccine communication that reflect vaccination hesitancy. The National Toolboxes will be fundamental for the Stakeholder Roundtables discussion because they include tools that address the most common barriers to increased vaccination hesitancy. The tools for adult vaccination should be specifically discussed since adults more often neglect to be vaccinated according to the National Vaccination Schedule compared to children and adolescents. A part of the discussion should also be dedicated to tools addressing HPV vaccine communication, an important vaccine-preventable disease with only a few collected tools.

2. Italy

Brief description of the tools gathered

- Out of the 42 tools gathered, 19 (45%) cover childhood or adolescent vaccines, 17 (40%) deal with all vaccines, while 4 (10%) deal with the COVID-19 vaccine. More than two thirds (30/42, 71%) are issued by governmental bodies (mainly the Ministry of Health). Scientific societies and one academic hospital have issued the rest (12/42, 29%).
- The target of communication tools is often the general population (28/42, 67%) or specific subgroups, such as parents. Such tools address childhood and adolescence vaccinations. In a few cases, intended users are HCPs in general or specific categories, such as paediatricians.

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- Most tools retrieved were posters or flyers or other written materials (33/42, 79%), and about one fifth (9/21, 21%) were multimedia or web resources. Readability was easy in most cases: median Flesch-Kincaid reading ease score = 77.3, InterQuartile Range 64.9-92.3; as such, they should be understood by middle school students. Overall, the predominant communication style used is institutional and somehow 'formal'.

Link with Reference Grid (Task 6.1)

- A non-negligible minority of the tools (18/42, 43%) have a vaccine-specific focus. In contrast, the remaining tools address the other two vaccine hesitancy determinants: 10 tools (10/42, 24%) cover contextual influences, while nine deal with individual determinants. Of note, no single tool deals simultaneously with all three determinants.
- The main drivers of vaccine hesitancy and uptake or refusal are acknowledged: for instance, when tools deal with paediatrician vaccinations, potential adverse effects and safety or effectiveness issues are recognised as the main obstacles, while perceived efficacy is the primary enabler.

Connection with national roundtables of key stakeholders (Task 6.3)

- The Ministry of Health has issued most of the vaccine communication tools retrieved for Italy, with others issued by public health institutions or organisations such as scientific associations. Unlike the other three countries, they received further official endorsement, validation or acknowledgement, such as from the Italian Drug Agency (AIFA) or the Italian National Institute of Health (ISS). In Italy, the public health service is regionalised in 21 local bodies. Keeping in mind the subnational level's relevance, tools issued by national entities were selected because they are then further exploited at the local level according to the specific needs and characteristics of the territory. Besides the spatial framing, a watershed for the Italian vaccine communication practices and policies was the national Law 119/2017 mandating ten childhood vaccinations to allow populations aged 0-16 to attend educational places and state schools. After that, a valuable improvement has been made in making vaccinations more shared with several targets and easier to understand.
- The National Toolboxes can serve as grounding materials for discussion within the planned Stakeholder Roundtables, indicating the priorities in vaccine communication (as vaccinations and populations of interest) in Italy. Vast space for improvement in terms of communication is to be dedicated to non-mandatory vaccinations, such as HPV vaccine-related to other issues (i.e., cancer prevention, reproductive health, and sexually transmitted infections).

3. Latvia

Brief description of the tools gathered

- Out of the 52 tools gathered, 19 (37%) cover the COVID-19 vaccine, 16 (31%) deal with HPV vaccines, 7 (13%) cover the influenza vaccine, while 5 (9.6%) deal with other vaccines and 5 (9.6%) deal with general vaccination issues. More than two thirds (41/52, 79%) are issued by governmental bodies (mainly the Centre for Disease Prevention and Control of Latvia). Scientific societies, academic hospitals, one university and one research centre, have issued the rest (11/52, 21%). The target of communication tools is mainly the general population (44/52, 85%) or specific subgroups, such as parents, pregnant women, children. Such tools address childhood and adolescence vaccination (for example, HPV), influenza and COVID-19 vaccine. In a few cases (8/52, 15%), intended users are HCPs in general or specific categories, such as paediatricians. Such tools (mainly guidelines and manuals) usually address general vaccination issues.

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- Approximately half of the tools retrieved were brochures or flyers, or other written materials (27/52, 52%), and another half (25/52, 48%) were multimedia (video) or web resources. Readability was easy in most cases; as such, middle school students should understand them.

Link with Reference Grid (Task 6.1)

- Tools mainly cover vaccine and vaccination-specific issues (10/52, 19%), influences arising from the personal perception of the vaccine or influences of the social/peer environment (13/52, 25%), or both (27/52, 52%). The remaining tools (2/52, 4%) address influences arising from historical, socio-cultural, environmental, health system/institutional, economic, or political factors.
- Of note, no single tool deals simultaneously with all three determinants.
- The main drivers of vaccine hesitancy and uptake or refusal are acknowledged: for instance, in the case of COVID-19 vaccines, tools deal with issues like vaccine novelty, mode of administration, the strength of the recommendation, attitude of HCPs. In the case of childhood vaccines, tools often deal with issues like beliefs, attitudes about health and prevention, medical necessity of taking vaccines.

Connection with national roundtables of key stakeholders (Task 6.3)

- Most of the tools identified have been developed by the Latvian Centre for Disease Prevention and Control (CDPC), an IMMUNION partner. The materials developed by the CDPC are usually distributed throughout the country to municipalities, schools, kindergartens, hospitals, health centres, GP practices. These tools are mainly addressed to the general public or one of the groups. They are also often developed in public information campaigns, such as influenza or HPV.
- The tools developed by the Ministry of Health are about Covid-19 vaccination, as the Ministry of Health played a leading role in informing the public during the pandemic. The tools identified here explain the need for vaccination to the general public. The National Health Service (an authority under the Ministry of Health) also developed materials on Covid-19 vaccination during the pandemic, as it was responsible for organising the vaccination.
- Some tools have been developed by professional healthcare associations (The Latvian Association of Gynaecologists and Obstetricians), universities and hospitals (Children Clinical University Hospital). These authorities have issued tools (mainly guidelines and manuals) for HCPs on general or specific vaccination issues. Children's Clinical University Hospital has also issued simple tools for parents about childhood vaccines.
- The National Toolboxes can serve as grounding materials for discussion within the planned Stakeholder Roundtables (T6.3), indicating the priorities in vaccine communication (as vaccinations and populations of interest). All these stakeholders identified will be crucial to include in the discussions as they are the main actors in vaccination in Latvia. Together, stakeholders can discuss the effectiveness of different tools and which could be piloted for which target groups.

4. Romania

Brief description of the tools gathered

- Out of the 35 communication tools gathered, 15 tools (43%) cover childhood or adolescent vaccines, 17 (49%) deal with all vaccines, while 3 tools (8%) deal with the COVID-19 vaccines.

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- The majority of tools (28/35, 80%) are issued by governmental bodies: Ministry of Health; National Institute of Public Health; Ministry of Education). Scientific or professional societies and UNICEF Romania have issued the rest of the tools (7/35, 20%).
- The target of communication tools is often the general population (22/35, 63%) or specific subgroups, such as parents, family and children. Such tools address childhood and adolescence vaccinations. In the rest of the cases (13/35, 27%), the intended users are pregnant women, vulnerable and higher-risk conditions groups, HCPs.
- Most tools retrieved were infographics, posters, flyers, factsheets, guidelines or other written materials (26/35, 75%), and about one third (9/35, 25%) were multimedia, Social Media Images and Social Media Messages or other web resources.
- The score of text readability had average reading ease of about 60.7 of 100, corresponding to Level 2 – average (41-70%). It should be easily understood by 11- to 12-year-olds.

Link with Reference Grid (Task 6.1)

- The majority of the communication tools (19/35, 64%) address separately the vaccine hesitancy determinants, as follows:
    - Several communication tools (11/35, 31, 4%) cover vaccine and/or vaccination specific issues;
    - Some communication tools (5/35, 14%) cover contextual influences;
    - A minority of the tools (3/35, 8, 6%) cover individual and group influence.
- Many tools (16/35, 46%) cover all three areas of determinants, at the same time: contextual influence; individual and group influence; vaccine and vaccination specific issues.
- The results confirm that all three areas of determinants influence behavioural decisions to accept, to postpone or refuse some vaccines or all vaccines. The most important factors that lead either to vaccine hesitancy or uptake of the vaccines are:
    - The potential adverse effects and safety or effectiveness issues are the main barriers;
    - The perceived effectiveness is the main contributing factor to the acceptance of vaccination.

Connection with national roundtables of key stakeholders (Task 6.3)

- Romanian public health activities are coordinated by the Ministry of Health and National Institute of Public Health and are locally implemented by 42 County Public Health Directorates. The National Institute of Public Health is responsible for carrying out national vaccination programmes and vaccination and vaccine-related Information-Education-Communication national campaigns in Romania. The Ministry of Health and the National Institute of Public Health issued the vaccine communication tools retrieved for Romania. These tools can be used at the local level according to specific needs. It will be crucial to involve these stakeholders in the roundtable discussions.
- The COVID-19 pandemic has clearly illustrated how easily misinformation can spread online and how rapidly new narratives can emerge and evolve. Vaccine misinformation can be dangerous: it decreases vaccine confidence and can lead to vaccine hesitancy and reduced vaccination uptake. Currently, the Romanian public health authorities have neither the capacity nor the resources for dedicated efforts to counter online vaccine misinformation. There is room for improvement in communication on contextual influences; individual and group influence; vaccine and vaccination specific issues.
- The National Toolboxes can serve as materials for debates within the planned Stakeholder Roundtables (Task 6.3), indicating the priorities in vaccine communication in Romania.

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Vaccine communication tools from international sources

This part focuses on supranational-level vaccine communication tools and intends to provide added value in this activity, besides the country-specific analysis. Among the collected tools in this additional section, 21 were issued by international organisations, and 11 came from EU-based projects.

Within the former, more than half (11/21) were issued by the United States Centers for Disease Prevention and Control (CDC), while a third (7/21) were issued by the European Centre for Disease Prevention and Control (ECDC).

ECDC's materials focus more on childhood vaccinations, such as those against measles, mumps and rubella (4 out of 7 tools). All the tools address HCPs, authorities, providers or policymakers as intended users. The intended targets are represented by either the general population (3/7 tools) or specific subgroups (e.g., parents and caregivers: 3 tools, or childbearing women: 1 tool).

The US CDC has issued specific materials about influenza and COVID-19 vaccines (respectively, 2 and 1 out of 11 tools). The vaccine communication strategy which emerges from the collected tools is twofold: on the one hand, the predominant audience is the general population, in a 'citizen science' perspective (7 out of 11 tools); on the other hand, some materials (4 out of 11 tools) are intended to be used by health professionals, but they comprise the lay public as targets.

This heterogeneity mirrors the dichotomy of the retrieved international tools in terms of document types: leaflets, booklets and infographics are mainly delivered by ECDC (6 out of 7 tools), whereas the US CDC seem to deliver more internet-based tools: 3 out of the 11 tools provide interactive digital resources or Social Media Images & Messages.

European Union-funded projects and initiatives generate another relevant group of vaccine communication tools elaborated by international sources. These resources address both the general population (5 out of 11 tools) or specific groups, such as newly arrived migrants or refugees (2/11 tools) as intended targets and health professionals/authorities or researchers as intended users (6 out of 11 tools, comprising both). The peculiar characteristics of this additional tool cluster are the high interactivity and a very innovative graphic layout (i.e., multimedia, banners or design items).

The heterogeneous cluster of tools from international sources provides added value to the national toolboxes due to the wide range of communication techniques implemented, which could help increase awareness and improve the extent and variety of tools issued in the four countries of interest. The national partners can thus use the international tools as sources of inspiration and comparison during their roundtable discussions and further WP6 activities.

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Final considerations

The grid to evaluate vaccine communication tools has shown itself to be useful, flexible and applicable to both the national and international levels, in particular when linked with the previous WP6 exercise (Reference Grid) that aimed to collect data and better understand vaccine hesitancy determinants in the four participating countries (Greece, Italy, Latvia, Romania).

The SARS-CoV-2 pandemic has had a role in re-igniting anti-vax stances. SARS-CoV-2 vaccine guidelines and policies (including, in some cases, mandates) have been enforced diffusely across Europe. They have exerted a beneficial role in rising vaccination coverage, but, conversely, they might also have had a role in fuelling – or giving mediatic echo – to anti-vax beliefs [14, 15]. *Ad hoc* communication strategies toward marginal groups acquire even greater importance in this perspective.

The activities performed within Task 6.2 show a rich and challenging context for vaccine communication tools. Theoretically, institutional communication tools might be conceived as being frequently consulted by citizens, even though differences in health literacy levels and the digital divide act as decisive mediating factors. Pragmatically, though, we could not investigate their effective use, as we could not extract relevant proxy indicators (i.e., downloads for materials or unique visitor logins for websites) [16].

We acknowledge a significant limitation in the failure to collect other online tools circulating via social media, which have been shown to play a relevant role in the development of vaccine hesitancy [12]. Furthermore, we have only performed content analysis of institutional or scientifically endorsed items. Other groups have performed sentiment analysis of online materials and media regarding vaccinations [17, 18]. These results need to be considered to gain a broader perspective and possibly contribute to monitoring the efficacy of public health measures to improve vaccine confidence.

Some overarching themes that emerged from our search are: 1) measuring the success and objectively assessing impacts is a common challenge of most health communication campaigns; 2) cross-cultural adaptation of materials is important: some documents appear to be directly translated from other languages, generally English, but health promotion messages which are initially framed in the local languages have more potential to be effective.

The results of this exercise show, on the one hand, significant heterogeneity of the contexts in which the exercise was applied (Greece, Italy, Latvia, Romania). On the other hand, they offer the opportunity to compare, learn from each other and stimulate an approach shared at the European level. This last aspect is fundamental in a globalised world, where borders are blurred and allow increasingly frequent exchanges.

This aspect could, in the future, stimulate a European approach aimed at improving vaccine intake and tackling the determinants of vaccination hesitancy. Communication tools and vaccination campaigns could be developed in a coordinated and collaborative way using available evidence. Besides an initial context analysis, identifying target groups, monitoring and evaluating each action or intervention implemented, we strongly recommend stakeholder involvement in the different stages of new campaigns and the assessment or creation of new communication tools.

The results achieved through the Reference Grid (M6.1) and these national toolboxes (D6.1) pave the way for further WP6 activities. The national-level stakeholder roundtable discussions on piloting or co-creating new tools will need to consider specific communication tools in each country, according to national priorities.

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Building upon Tasks 6.1 and 6.2 achievements, additional items can be added to the initial selection of communication tools, and stakeholder representatives can be directly involved in the appraisal of selected tools, can propose new existing tools to be included in the toolboxes, and possibly co-create new ones.

It is also desirable that the toolboxes remain updated and operational after the termination of IMMUNION project, thanks to their inclusion in the existing website. Discussion are under way on how to operationalize such continuous updating to guarantee sustainability with the support of the Coalition for Vaccination and other HCP associations.

This project is co-funded by the European Union's Health Programme 2014-2020.

References

[1] Eskola J, Duclos P, Schuster M, MacDonald NE, the SAGE Working Group on Vaccine Hesitancy. How to deal with vaccine hesitancy. Vaccine 2015.

[2] Jarrett C, Wilson R, O'Leary M, Eckersberger E, Larson HJ. Strategies for addressing vaccine hesitancy – a systematic review. Vaccine 2015.

[3] Dubé E, et al. Strategies intended to address vaccine hesitancy: Review of published reviews. Vaccine (2015), http://dx.doi.org/10.1016/j.vaccine.2015.04.041.

[4] Ozawa S, Yemeke TT, Evans DR, Pallas SE, Wallace AS, Lee BY. Defining hard-to-reach populations for vaccination. Vaccine. 2019;37(37):5525-5534. doi:10.1016/j.vaccine.2019.06.081

[5] Fournet N, Mollema L, Ruijs WL, et al. Under-vaccinated groups in Europe and their beliefs, attitudes and reasons for non-vaccination; two systematic reviews. BMC Public Health. 2018;18(1):196. Published 2018 Jan 30. doi:10.1186/s12889-018-5103-8

[6] Okoli GN, Lam OLT, Racovitan F, et al. Seasonal influenza vaccination in older people: A systematic review and meta-analysis of the determining factors. PLoS One. 2020;15(6):e0234702. Published 2020 Jun 18. doi:10.1371/journal.pone.0234702

[7] Kilich E, Dada S, Francis MR, et al. Factors that influence vaccination decision-making among pregnant women: A systematic review and meta-analysis. PLoS One. 2020;15(7):e0234827. Published 2020 Jul 9. doi:10.1371/journal.pone.0234827

[8] Norhayati MN, Che Yusof R, Azman YM. Systematic Review and Meta-Analysis of COVID-19 Vaccination Acceptance. Front Med (Lausanne). 2022;8:783982. Published 2022 Jan 27. doi:10.3389/fmed.2021.783982

[9] European Centre for Disease Prevention and Control. Vaccine hesitancy among healthcare workers and their patients in Europe – A qualitative study. Stockholm: ECDC; 2015

[10] Arede M, Bravo-Araya M, Bouchard É, et al. Combating Vaccine Hesitancy: Teaching the Next Generation to Navigate Through the Post Truth Era. Front Public Health. 2019;6:381. Published 2019 Jan 14. doi:10.3389/fpubh.2018.00381

[11] Krupenkin M, Yom-Tov E, Rothschild D. Vaccine advertising: preach to the converted or to the unaware?. NPJ Digit Med. 2021;4(1):23. Published 2021 Feb 11. doi:10.1038/s41746-021-00395-7

[12] Arede M, Bravo-Araya M, Bouchard É, et al. Combating Vaccine Hesitancy: Teaching the Next Generation to Navigate Through the Post Truth Era. Front Public Health. 2019;6:381. Published 2019 Jan 14. doi:10.3389/fpubh.2018.00381

[13] Holt D, Bouder F, Elemuwa C, et al. The importance of the patient voice in vaccination and vaccine safety-are we listening?. Clin Microbiol Infect. 2016;22 Suppl 5:S146-S153. doi:10.1016/j.cmi.2016.09.027

[14] Ward JK, Gauna F, Gagneux-Brunon A, et al. The French health pass holds lessons for mandatory COVID-19 vaccination. Nat Med. 2022;28(2):232-235. doi:10.1038/s41591-021-01661-7

This project is co-funded by the European Union's Health Programme 2014-2020.

[15] Mills MC, Rüttenauer T. The effect of mandatory COVID-19 certificates on vaccine uptake: synthetic-control modelling of six countries. Lancet Public Health. 2022;7(1):e15-e22. doi:10.1016/S2468-2667(21)00273-5

[16] Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. Health Commun. 2015;30(6):566-576. doi:10.1080/10410236.2013.873363

[17] Porreca A, Scozzari F, Di Nicola M. Using text mining and sentiment analysis to analyse YouTube Italian videos concerning vaccination. BMC Public Health. 2020;20(1):259. Published 2020 Feb 19. doi:10.1186/s12889-020-8342-4

[18] Alamoodi AH, Zaidan BB, Al-Masawa M, et al. Multi-perspectives systematic review on the applications of sentiment analysis for vaccine hesitancy. Comput Biol Med. 2021;139:104957. doi:10.1016/j.compbiomed.2021.104957

This project is co-funded by the European Union's Health Programme 2014-2020.

Technical Annex

The current Deliverable includes a Technical Annex featuring the four country-specific Excel Toolboxes and the comprehensive international and EU-based tools. The Annex, in excel format, is available here: IMMUNION D6.1 Technical Annex - National Toolboxes.xlsx

These tools will also shortly be available on the Coalition for Vaccination/IMMUNION website.

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