

# Facilitating COVID-19 vaccination acceptance and uptake in the EU/EEA

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## Key messages

- A successful COVID-19 vaccination programme can only be built on an understanding of, and a proper response to individuals' and communities' beliefs, concerns and expectations regarding the vaccine and the disease. The '5Cs' model – Confidence, Constraints, Complacency, Calculation, and Collective responsibility – can be used as a framework for understanding these concerns and designing strategies to facilitate COVID-19 vaccination acceptance and uptake.
- Taking the 5Cs model as a basis, the drivers of low vaccination acceptance and uptake can be diagnosed by analysing cross-sectional, population-level data. The World Health Organization's Regional Office for Europe has developed a survey tool on behavioural insights relating to COVID-19 which can be used for this purpose. Collaboration with civil society may also offer the possibility to leverage operational data – quantitative and/or qualitative – that may provide insights into individuals' and communities' vaccination beliefs, concerns and expectations.
- Vaccination efforts in many countries are currently focussing on reaching pockets of unvaccinated people from older age groups and those in socially-vulnerable populations, while also facilitating uptake among younger age groups (including children and adolescents who are eligible for vaccination). Healthcare workers have a key role to play in this work. The specific challenges faced by each of these groups in accepting, accessing (and, for healthcare workers, facilitating) vaccination need to be properly understood and addressed.
- This document presents examples of some of the measures being implemented by countries to increase vaccine acceptance and uptake, depending on the drivers identified in a given context. They may need to be adapted at sub-national or local level – there is no 'one-size-fits-all' approach. Drivers can also change over time, which means that diagnoses may need to be repeated on a regular basis.
- Many of the interventions reviewed for this report focused on the provision of accessible services, often paired with accompanying risk communication strategies. Some countries have also opted for measures based on incentives and sanctions. Fewer strategies were identified that aimed to build trust in the healthcare system and engage with communities.
- Establishing the effectiveness of an intervention to facilitate vaccination acceptance and uptake is methodologically challenging. Good evaluations of these interventions can still be conducted, using both quantitative and qualitative data, although the findings from process evaluations will generally be easier to interpret than those from impact evaluations.

## Scope and purpose

This technical report presents considerations for European Union/European Economic Area (EU/EEA) countries when diagnosing barriers to acceptance and uptake of COVID-19 vaccination, and designing and implementing interventions to increase uptake. The report uses the '5Cs' model to organise and explain the various causes of low vaccination acceptance and uptake, and to categorise potential interventions. The key concepts included in the 5Cs model are Confidence, Constraints, Complacency, Calculation, and Collective responsibility. In addition to discussing the facilitation of COVID-19 vaccination for the general population within this framework, specific population groups have also been included in the report, such as healthcare workers and socio-economically vulnerable groups. Given that eligibility for vaccination has been extended to children and adolescents in many countries, parents are also included as a group.

The report highlights the importance of diagnosing the drivers of sub-optimal vaccine acceptance and uptake in a given population to ensure that appropriate interventions are implemented in response. It also presents examples of interventions that have been implemented in the EU/EEA, any of which could be adapted for use in other settings where similar drivers of low vaccination uptake have been identified. Finally, the report discusses the importance of evaluating interventions to increase COVID-19 vaccine uptake, as well as some of challenges associated with such evaluations. Resources for diagnosis, implementation and evaluation that may be used by EU/EEA countries are also included in the report.

## Target audience

This document is intended for national and regional public health authorities, risk communication specialists, and policymakers in EU/EEA countries.

## Background

As of 12 October 2021, over 74% of all adults aged 18 and over in the EU/EEA have received full vaccination against COVID-19 [2]. This is a remarkable achievement in the space of just a few months, but it leaves over one quarter of all adults without full protection. Furthermore, although overall vaccine uptake has been impressive at EU/EEA level, coverage across the EU/EEA is far from uniform, ranging from 23.5% fully vaccinated in Bulgaria to 92% fully vaccinated in Ireland [2]. The consequences of the low vaccination rates in some countries are currently being reflected in overloaded healthcare systems and high mortality rates [3]. In addition, there are pockets of relatively low coverage among particular populations in some Member States [4], which has prompted the instigation of mandatory vaccination for certain professional groups in some settings [5].

There is a wide range of reasons for these variations in COVID-19 vaccination coverage, including supply dynamics and service provision in health systems, as well as people's beliefs, attitudes, and behaviour. Underlying issues can all combine to create conditions where vaccination uptake is lower than desired. Examples of these are mistrust in government; disease risk perception; historical events, such as vaccine scares; convenience of vaccination; uncertainty about the safety and effectiveness of the vaccines, and evolving political decisions related to pandemic management.

Provision of equitable and timely access to vaccines for everyone in the EU therefore requires more than simply ensuring the supply of safe and effective vaccines and convenient access. A successful vaccination programme can only be built on an understanding of, and a proper response to individuals' and communities' concerns and expectations regarding the vaccine in combination with their perceptions and concerns about COVID-19 itself.

## The 5Cs model

The 5Cs model is based on five antecedents that can affect an individual's vaccination behaviour: confidence, constraints, complacency, calculation, and collective responsibility. It is based on and complementary to other established theoretical models of vaccine hesitancy and acceptance [5-7] and it relates these models to behavioural insight theories that can help explain health behaviour [8]. The five constructs that comprise the 5Cs model are briefly described below.

**Confidence** is related to multiple aspects of trust. This includes trust in the effectiveness and safety of the vaccines. Moreover, it is related to trust in the health system providing the vaccination, including the professionalism and quality of the health workers administering it. Finally, it is related to trust in the policymakers who are perceived as the overall decision-makers on vaccines and vaccination [9].

**Constraints** to vaccine uptake can include physical availability, affordability and willingness to pay, geographical accessibility, ability to understand (language and health literacy), and appeal of immunisation services [9]. This implies that constraints to vaccination can be both structural and psychological.

**Complacency** is related to an individual's perception of risk of the disease. If a person has a low risk perception of the threat posed by a vaccine-preventable disease, they may also have a low desire and intention to be vaccinated [10,11]. Thus, this antecedent is related to a specific disease, though individual factors such as age, health and responsibilities may also affect levels of complacency. Complacency is also affected by an individual's perceived self-efficacy, or their perceived ability to take action in order to be vaccinated.

**Calculation** refers to the extent to which someone searches for information about a vaccine and/or about the disease in question, and then conducts their own individual risk-benefit analysis about whether or not to be vaccinated. People who engage in high levels of calculation may be more risk-averse than those who do not, so they may be less likely to vaccinate due to the high availability of anti-vaccination sources on the Internet [12].

**Collective responsibility** refers to people's willingness to protect others by being vaccinated, as part of the collective effort to achieve herd immunity. It should correlate positively with collectivism (as opposed to individualism), communal orientation and empathy, thereby signalling a willingness to vaccinate in another person's interest [9].

These five antecedents combine to create a psychological state which can lead to an individual being vaccinated or not. However, it is important to note that each of these antecedents can change over time [13], which means that a person may vacillate back and forth across a spectrum between not wanting to be vaccinated and wanting to be vaccinated. A range of enablers and barriers to vaccination can influence movement across this spectrum. This may be at individual and community level (e.g. beliefs in health promotion, or experience of health systems and healthcare workers), in a national or regional context (e.g. perception of leaders, historical events, messaging and communication), or related to the vaccine itself (e.g. perceived risk versus benefits, novelty of the vaccine, schedule, method of administration, etc.) [10].

## Key target populations for COVID-19 vaccination

In all countries, continuous efforts should be made to vaccinate everyone who is eligible. However, in countries with low overall COVID-19 vaccination coverage, it remains a priority to vaccinate older adults and those with underlying health conditions. In countries where good overall vaccination coverage has been achieved, there are still sub-populations in which coverage remains lower than desired. Note that even though these key groups may be discussed as single entities, they are extremely heterogeneous, a fact that needs to be taken into account when designing strategies to promote vaccine acceptance and uptake. Two of the key target populations are identified below.

**Socially vulnerable and hard-to-reach populations:** people from marginalised ethnic minorities, undocumented migrants, people experiencing homelessness, and those with disabilities face a range of challenges in getting vaccinated against COVID-19. Key areas of concern for these population groups can include a general distrust of the authorities, language barriers, challenges in physically accessing vaccination sites, and fear of stigmatisation [14,15]. Furthermore, these communities are often at elevated risk of infection, due to crowded and sometimes sub-standard living conditions, which means that their need to be vaccinated is especially high. In spite of this elevated risk, disaggregated data on migrant, ethnic minority status, etc. are not widely available, which means that the particular challenges that they may face remain invisible to decision-makers [16].

**Children and adolescents who are eligible for vaccination, and parents.** A number of EU/EEA countries have started offering COVID-19 vaccinations to children and adolescents above the age of 12 years [2]. Although they more frequently only experience mild disease, people in this age group still face the risk of developing post COVID-19 condition, and they can also act as a reservoir for the virus. Vaccinating them against COVID-19 brings a very particular set of challenges, primarily due to the fact that since they are legally dependent, their parents or guardians are likely to be involved in any decision to vaccinate, especially for younger age groups [17]. Thus, the views and concerns of parents will play a critical role in any efforts to provide COVID-19 vaccinations to children and adolescents. However, it is essential that the views and experiences of the young people themselves are also taken into account, that their autonomy is respected, and that they are included in the discussions about vaccination in an age-appropriate manner [18].

While not a population that is seen, overall, as having low vaccination rates, healthcare workers nonetheless represent an additional priority group for COVID-19 vaccination in countries across the world, including in the EU/EEA. This is due to the high levels of exposure to COVID-19 and other infectious diseases that they face, and the fact that they can quite easily spread the virus to patients or colleagues. Furthermore, the trust that people have in healthcare workers gives them a key role in influencing their patients' perceptions of both a vaccine and the associated disease. Therefore they can have a significant impact on people's decisions to be vaccinated [19-21]. Since some healthcare workers are known to have questions and concerns about COVID-19 vaccinations, [22,23], it is important to support and empower them to accept and receive COVID-19 vaccination. This will have a direct protective effect on themselves and on possible transmission in healthcare settings. It may also facilitate their patients' decisions to vaccinate, thereby protecting the wider population [24].

## Diagnosing drivers and barriers to vaccination acceptance and uptake

While all EU/EEA countries track COVID-19 vaccine coverage in their countries, and some track reported confidence in COVID-19 vaccines, not all of them seek to identify the reasons for lower-than-desired vaccination coverage in different population groups. Strategies may therefore be targeting the wrong combination of '5C' antecedents, which could undermine the effectiveness of efforts to facilitate vaccination uptake, and waste both financial and time resources in an emergency situation. The heterogeneity that exists in vaccination intentions and behaviour, even within a defined sub-population in a given country, also means that there can be no 'one-size-fits-all' approach. Strategies need to be targeted to different groups according to their specific needs.

During the pandemic, some EU/EEA countries have been collecting large-scale, cross-sectional data about people's acceptance of and adherence to non-pharmaceutical COVID-19 interventions, as well as their perceptions, intentions and reported behaviour related to vaccination. The most widely used tool for collecting these data at population level in the EU/EEA has been the survey tool on behavioural insights on COVID-19 made available by the World Health Organization (WHO) Regional Office for Europe. This tool has been adapted for use in several countries to track behaviour and attitudes towards different preventive measures and policies [25-27]. The topics covered by the WHO survey tool have evolved as conditions have changed over the course of the pandemic, and they now include questions on vaccination behaviour and intentions. Interim guidelines for conducting both quantitative and qualitative diagnostic research into behavioural and social drivers of COVID-19 vaccination acceptance and uptake have also been developed by WHO and UNICEF [28] but these are not yet formally validated.

There are several other published instruments that assess the drivers of vaccine confidence and acceptance. These are generic and not specific to the COVID-19 pandemic. They include the Vaccine Confidence Index [29], the Vaccine Acceptance Scale [30], and Parental Attitudes about Childhood Vaccines [31]. Note that these instruments tend to focus primarily on confidence, and they take less account of the other four 'Cs' [9]. They may not therefore be as effective as WHO's survey tool in providing a diagnosis of people's COVID-19 behaviour and intentions, and thereby helping to define the most appropriate interventions to facilitate vaccination uptake. In contrast, WHO's survey tool provides an accessible, easily adapted, and importantly, comparable method that can be deployed rapidly to facilitate strategy design and implementation based on behavioural insights [32].

### Diagnosis of factors affecting vaccination acceptance and uptake in Finland

The Finnish Institute for Health and Welfare (THL) conducted an adapted version of WHO's survey study three times in the spring of 2020, once in the autumn of 2020, and once in the spring of 2021. Around 1 000 respondents participated in each survey round, selected to ensure that they were representative of the adult population in Finland in terms of age, gender and place of residence. Questions on vaccination intentions were included in the earlier rounds [1], and on actual vaccination behaviour in the last round. The findings were well received by decision-makers, and they provided a good basis for the country's risk communication efforts and for the wider COVID-19 control strategy.

However, due to the cost of conducting the WHO survey as a standalone activity, some of the vaccination-related questions were subsequently incorporated into the ongoing and more general national Citizens' Pulse survey, which is conducted every three or four weeks by the Prime Minister's Office in Finland. This substantially reduced the costs and made the survey more sustainable, while also providing the opportunity to monitor vaccine acceptance levels more regularly. Furthermore, by comparing the results from the two different surveys, it was possible to assess the reliability and validity of the data that had come out of the WHO survey tool-based survey. However, it should be noted that the rapid rollout and changing circumstances of the COVID-19 vaccination programme made it necessary to adapt some of the questions, which makes comparison over time challenging. For example, an earlier question that asked 'Would you take the vaccine if it was available?' has become redundant, highlighting the need to keep an overview of the questions that are relevant to the context of the day.

One major outcome of this diagnostic work has been that the data have clearly shown how low vaccine confidence in Finland is just one of several factors that inhibit uptake - the other Cs also play a significant role. This has facilitated more appropriate message development which, in turn, has steered the public debate away from focusing only on low vaccine confidence, and towards more informed discussions about other equally important issues (e.g. how vaccination services are organised and issues relating to complacency and risk perception). It has also led to better strategic decision-making for the immunisation programme, while also supporting the programme at municipality level by providing information on the factors affecting people's vaccination behaviour.

Qualitative research should always be considered as an important component of any comprehensive diagnostic analysis of vaccination intentions and behaviour. It can provide insights into potentially important nuances, while also answering the 'how' and 'why' questions that commonly-used surveys may not be able to illuminate [33]. In addition to the qualitative component of the WHO/UNICEF tool mentioned above [28] a qualitative research tool developed by WHO's Regional Office for Europe has been used in seven countries with health workers. This tool explores the drivers and barriers to COVID-19 vaccination for health workers, and the work they do recommending vaccination to patients. The tool provides a rapid approach to data analysis so that insights can inform tailored interventions for target groups in a timely manner, and it has now been further developed to use with other target groups for COVID-19 vaccination. This tool will soon be published and for access to the tool and support the developers can be contacted at [euvaccine@who.int](mailto:euvaccine@who.int).

It is likely that most EU/EEA countries have the capacity to conduct this sort of diagnostic research – whether quantitative or qualitative – even if that capacity may not be available within national public health institutes or other state bodies. University-based social scientists often have the technical know-how to implement such work, as do some civil society organisations who may also be able to leverage their operational data and feedback from service beneficiaries. Where resources are limited in the public sector, Member States may find it beneficial to map out and identify their in-country expertise, and then make use of it by contracting out the research. In addition to providing relevant diagnostic data on COVID-19 vaccine behaviour and intentions, this approach would help to build an in-country social and behavioural science community of practice that could also be put to good use for investigations into other health questions in the future. An example of such collaboration can be seen in Denmark, where the country's diagnostic study has been carried out by the University of Copenhagen [27].

## Strategies to increase COVID-19 vaccine acceptance and uptake

This section presents strategies that have been implemented in different EU/EEA countries, targeting each of the 5Cs. While each strategy presented has been categorised into one specific, targeted 'C', many strategies actually target two or more of the Cs simultaneously. For example, a community-based approach that focuses on increasing confidence in the vaccination programme may also seek to address accessibility constraints. Because of this overlap, it may be helpful for readers to review all the interventions listed when seeking to identify potential strategies for particular populations. Note also that the strategies presented should be seen as inspiration which can be adapted to different settings, rather than as a prescriptive approach that should be rigorously followed.

The strategies presented here were identified through a scoping review including a range of materials and sources, and they were selected to showcase the diversity of populations served and the geographical regions represented. The inclusion of a particular strategy in a particular country should not be seen as an indication that it is 'better' than another one implemented in another country. Similarly, the exclusion of a particular strategy in a certain country does not in any way imply that it was 'less appropriate' than one that has been included. In addition, while countries have invariably adopted multifaceted approaches to facilitating COVID-19 vaccination acceptance and uptake, we include here specific examples of initiatives, campaigns or tools intended to highlight how a particular 'C' has been addressed, either for the general population or a sub-population. These examples provide a snapshot of some elements of the broader initiatives being implemented at country level.

**Confidence:** Strategies are related to building trust – trust in the health system providing the vaccine, trust in the policymakers deciding on the vaccine, and trust in the safety and effectiveness of the vaccine itself [9].

Member State	Who is targeted	Barrier targeted	Example of intervention
Belgium	Vulnerable communities and general population	Trust in the health system	This was a pilot programme involving community health workers who had been tasked with increasing people's knowledge of the healthcare system and their trust in it, to increase COVID-19 uptake in socially vulnerable populations in Flanders [34]. A community mapping exercise was conducted in each primary care zone in the region, during which trusted stakeholders were identified for each community. The team worked with these trusted community members, as well as with other primary care, social welfare, and patient associations to design and implement a vaccination strategy [35]. Members of the communities themselves informed their peers of the COVID-19 vaccine, linked them to care, and accompanied them to their first vaccination, as well as doing follow-up activities after vaccination [35,36]. These community-led and community-based teams are linked to the regional data dashboard on coverage, and they also have access to aggregated, anonymised data submitted by GPs in the region on co-morbidities. With this information, they can target areas with low vaccination coverage and high risk [35].
Ireland	Young people	Trust in safety of vaccines and trust in health system	SciComm is an initiative that uses a network of science communicators to create a dialogue and answer young people's questions and concerns, with the aim of fostering trust and thereby increasing vaccine uptake in young people [37]. The network was created by the Department of Health, by sending out a request to graduate students working in health science and science communication [37]. The goal was to reach young people in online communities where they are already active, and engage them in an area from which they have felt excluded [37,38]. The science communicators network meets bi-monthly with officials from the Department of Health to answer their own questions, and then defines weekly messages based on concerns flagged by young people (as identified by the Ministry of Health through focus groups and questionnaires [38]), as well as on current scientific developments. The network actively posts content and interacts on social media (Facebook, Instagram, Tik Tok), thereby engaging with young people across the country, sharing experiences, answering questions, and responding to misinformation/disinformation concerning COVID-19 vaccination [39].
Netherlands	Healthcare workers	Trust in safety of vaccines	The Dutch National Institute for Public Health and the Environment (RIVM) has developed an e-learning module that is made publicly available to healthcare professionals in the Netherlands [40]. It provides training on the development of vaccines, and information on vaccine safety and effectiveness. It also provides dialogues and scripts on how to discuss COVID-19 vaccination with patients [41]. The module is currently in the process of being validated for accreditation.
United Kingdom (non-EU/EEA country)	General population	Trust in vaccine safety and effectiveness	The Universities of Nottingham, Southampton, and Kings College London have partnered with the National Institute of Health Research to create a chatbot to discuss and create a dialogue with individuals on their concerns about COVID-19 vaccination [42,43]. The chatbot asks several initial questions regarding the individual's concerns and, based on the responses, it presents scientific evidence in a non-judgmental way [44]. While this chatbox answers concerns on vaccination by drawing on pre-programmed answers, Johns Hopkins University and IBM have launched a similar chatbot that interacts with users using artificial intelligence. This chatbox is more flexible, allowing users to type free text, and providing answers on vaccine concerns [45].

**Constraints:** strategies targeting constraints generally focus on increasing accessibility, people's ability to understand information (health literacy and language), attractiveness of immunisation services, and addressing perceived or actual barriers to affordability.

Member State	Who is targeted	Barrier targeted	Example of intervention
Norway	Linguistic minorities	Difficulties in understanding information on vaccination	Information on vaccination has been translated and is available in over 45 languages, and this is used in efforts to engage with vulnerable populations [46,47]. In Oslo, Somali-speaking 'ambassadors' from communities, identified by health workers in collaboration with the communities themselves, have been sharing information about COVID-19 in Somali language [48]. This work has been conducted in partnership with civil society organisations, academia, and the Norwegian Institute for Public Health.
Italy	Migrants	Attractiveness of services	In some regions, registration requirements have been changed so that people being vaccinated do not need a health number, and there is also an assurance that personal data will not be shared with non-health authorities (e.g. police or immigration) [49]. In other regions, for example Tuscany, vaccination sites have been used for individuals who do not have a health card as a means of facilitating access for undocumented migrants [50]. In the region of Sicily, national health authorities have partnered with civil society organisations for the vaccination of migrants, and are using cultural mediators to communicate on vaccination services [51].
Germany	General population	Physical accessibility	Authorities implemented a nationwide 'Vaccination Week' in September that coincided with the end of the summer holidays and the return to school. The Vaccination Week intervention, using the hashtag '#HierWirdGeimpft' ('vaccination taking place here'), focused on making vaccination easily available in frequently accessed areas (e.g. places of worship, youth clubs, sports clubs, markets) to facilitate opportunistic access to vaccine, and thereby boost coverage before the autumn [52].
Czech	General population	Physical accessibility	Regional municipalities have mobile teams deployed to reach individuals with limited mobility, as well as in communities having difficulties reaching vaccination centres. GPs in low coverage areas has also been collaborating in attempts to vaccinate their patients by offering increased accessibility [47].
Spain	Young people and students	Accessibility and time constraints for young people who may be more mobile due to studies.	<i>Vacunabuses</i> (Vaccination buses) is a partnership between the health authority of Madrid and the Spanish Red Cross. The intervention consists of 18 mobile teams working across public and private higher education institutes [53,54], open for drop-in vaccination until the end of the first month of school. The aim is to increase coverage in low-coverage populations and not to be dependent on achieving vaccination through centres at students' primary residence locations [55].

**Complacency:** complacency relates to low perceived risk of the disease which can impede an individual's motivation to be vaccinated [56]. For example, earlier in the pandemic young people and children were often identified as being at very low risk of COVID-19 compared to older adults. As such, strategies that aim to address complacency may need to focus on explaining the risk of COVID-19 to young people and enhancing their understanding of the underlying importance of vaccination more generally.

Member State	Who is targeted	Barrier targeted	Example of intervention
Germany	General population	Understanding of risk versus benefits of COVID-19 disease and vaccination.	The Robert Koch Institute publishes a weekly set of Q&As, based on questions and concerns identified by a regular survey related to COVID-19 (COVIMO) [26,57]. The Q&As use a risk communication approach and highlight the risk of COVID-19 and the benefits of the vaccine. Questions for particular vulnerable groups (e.g. pregnant women) or groups of interest (e.g. children) are also included. Answers contain links to further information.
Netherlands	Parents, children and young people	Perception of risk of children/young people to COVID-19, risk and safety of vaccination.	A study was carried out to investigate the drivers of COVID-19 vaccine hesitancy in parents and children [58]. Based on the findings of the study, an online interview was conducted with a paediatrician who chairs of the Dutch Paediatrics Association and who is involved in the country's Outbreak Management Team. He addressed questions on the risk of COVID-19, and the benefits of vaccination [59]. There have also been partnerships established between education establishments, education associations and health institutes to provide information on the risk of COVID-19 for young people and children, and the benefits of vaccination [47].
Poland	General population	Perception of risk of COVID-19	A team was set up by the National Health Fund to call individuals who have not yet been vaccinated, as identified through medical records. Individuals are asked why they have not been vaccinated, and they are engaged in a discussion, focused on the risks versus the benefits of vaccination. An effort is made to convince them that vaccination is beneficial for them, and then are able to offer and accept registration for vaccination [47].



**Calculation:** Calculation in the 5C model refers to an individual's analysis of the perceived risks and benefits of vaccination [9]. Strategies addressing calculation may therefore aim to provide accurate information addressing vaccine-critical sources, including misinformation and disinformation, and emphasising the rationale for and importance of vaccination.

Member State	Who is targeted	Barrier targeted	Example of intervention
Austria	General population	Access to accurate information, debunking misinformation	A website has been set-up that provides updates on vaccination strategy. It includes links on where and how to get vaccinated, with general information on COVID-19 and vaccination. The format includes short videos, interviews with healthcare workers (as a trusted source), a series called 'Science Busters', and a series called 'Consultation Hour', in which experts are interviewed about vaccination [60]. These outputs are all tailored to particular concerns identified in different communities. [47]. These resources are available on the website as well as on YouTube. Another page lists doctors who are involved in the Austria Vaccinates Initiative and who can be contacted with questions [61]. A further webpage provides regional information about where vaccination services can be found.
Spain	General population	Mass media campaigns	Several mass media campaigns have been used in Spain to disseminate information on the benefits of COVID-19 vaccination, and these have also addressed common concerns. One such campaign focused on explaining the safety of vaccines, and used advocates from the Spanish Agency for Medicines and Health Products (AEMPS) [62] to prime or speak to individuals who may not have been vaccinated due to information circulating about the fact that the COVID-19 vaccines were developed too quickly. Another campaign, #yomevacunaseguro, presents personal pleas from young people, older adults and scientists on why it is important to be vaccinated [63].
Netherlands	General population	Debunking misinformation and disinformation	The National Institute for Public Health and the Environment has invested in big data analytics to identify the most frequently searched-for questions regarding vaccination and vaccines and to analyse the content of vaccine-critical websites. They use these analyses to produce accessible and easily-understood information aimed at countering common misinformation claims published online. The monitoring team also responds directly to misinformation on vaccination online, depending on its source and reach. Finally, they have a Misinformation Thinktank, coordinated by the Ministry of Health, where experts volunteer to debunk vaccine misinformation using their own personal social media accounts [64].

**Collective responsibility:** strategies targeting collective responsibility could involve communication campaigns on COVID-19 vaccination that address psychosocial factors associated with the intention to be vaccinated, such as the belief that personal vaccination will protect others (thus promoting a sense of moral duty), and that vaccination is the key to reopening society [65].

Communicating the social benefit of vaccination can lead to an increase in intention to vaccinate. However, research on this topic highlights several factors that can impact the effectiveness of such messages: cultural and social contexts (in some societies vaccination is already perceived as a collective responsibility); pro-social values of those receiving the message; communication formats and channels used (e.g. showing how community protection works via an interactive simulation can be more effective than just using a short text) and the level of hesitancy in individuals [66]. With regard to the last point, strongly-hesitant individuals are less likely to see the collective benefit of vaccination, and thus it may be more effective to highlight the personal benefit for these individuals [67].

Member State	Who is targeted	Barrier targeted	Example of intervention
Sweden	General population	Messages that include appeals to collective responsibility.	At the start of the vaccine roll-out, the information campaign from the Swedish public health authority, together with other organisations, included messaging based on the principle of 'Protect yourself and others' in various media. The information was also translated into several languages [68]. A further campaign, with videos and posters translated into several languages, contained the message 'Together towards better times' (e.g. joy of meeting friends and family again). Materials also included short videos with vaccination experts explaining the importance of vaccination as a means of controlling disease spread, returning to normal life, and ending the pandemic [69]. It should be noted that collective responsibility was not the primary strategy adopted by the Swedish authorities, but elements of the strategy did include this 'C' as a focus.

## Additional strategies to increase vaccine uptake

In some countries, when other types of interventions have been deemed insufficient to achieve high vaccine coverage, measures based on incentives, requirements for certificates and mandates have been introduced. However, it is important to note that although these initiatives may prove effective as a trigger in prompting those who are ambivalent, or against vaccination, they seek to shape behaviour, rather than changing how people think and feel about vaccination. In addition, incentives or sanctions can minimise the opportunities for delaying vaccination by requiring it for an individual to obtain a desired outcome (e.g. access to education, employment, entertainment or travel) [70].

Based on this principle, and building on a recognition from the COVID-19 pandemic that there may be additional components to ensuring that a population is vaccinated, 'compliance' has recently been proposed as an additional element for the 5C model [71]. 'Compliance' refers to vaccination policies that go beyond addressing people's feelings of collective responsibility and focus instead on societal monitoring and sanctioning of those who are not vaccinated. More research will be needed to assess how such initiatives have contributed to vaccine uptake during the COVID-19 pandemic.

**Incentives:** behavioural research done in the past suggests that whilst incentives may affirm the importance of vaccination, they can also signal that some people are not choosing to get vaccinated, which in turn gives a message that vaccination is not a normative behaviour. Furthermore, a synthesis of reviews of incentive strategies indicates a divergence in recommendations, with some studies asserting that the approach is effective, while others contend that the evidence for effectiveness is inconclusive. However, this may be due to the heterogeneity of the interventions and quality of the studies, as well as the fact that it can be difficult to ascertain the effects of incentives when these are combined with other strategies [70].

Research done during the introductory phase of the COVID-19 vaccination roll-out challenged initial suggestions that monetary incentives could foster willingness to get vaccinated. This research cautioned that initially, when a new vaccine becomes available, the focus of the campaigns should be on raising confidence, particularly regarding the safety of the vaccines. Once safety concerns are reduced, monetary incentives could further drive vaccine uptake, but more research is needed on this topic [72]. A large randomised controlled trial conducted in Sweden in May–July 2021 showed that even modest monetary incentives can increase COVID-19 vaccination rates (by 4.2 percentage points from a 71.6% baseline rate), irrespective of the sociodemographic background of participants. This study also highlights other issues that need consideration: ethical aspects, possible variations of the effect depending on the vaccination rates in a country, who is giving the incentive (in this study it was the research team), and the potential risk of incentives undermining people's willingness to get vaccinated in the future (e.g. getting boosters) without being paid [73]. Other studies highlight the fact that financial incentives to 'get vaccinated' may seem appealing when

focused on groups with persistently low vaccination rates, possibly producing a short-term increase in vaccination, but they are not a panacea. Broader, complementary strategies will still be needed, such as identifying sources of resistance, addressing barriers to access and uptake, and communicating in a transparent manner to build public trust [74]. Incentives for specific target groups, such as healthcare workers, should be planned and developed in collaboration with representatives from those groups [24].

**Requirements for certificates:** several EU/EEA countries have implemented requirements to show proof of vaccination, by means of a certificate, green- or health pass, that can also include proof of recovery from COVID-19 and proof of a negative test result. People are required to have such certificates in order to access certain venues, engage in recreational, cultural or specific professional activities, travel, or access workplaces. For the purposes of this report, we are separating this type of certificate requirement from 'vaccine mandates' discussed below, although in the literature the terms may be used interchangeably. In addition, by focusing not only on proof of vaccination but also proof of recovery or a negative test result, such certificates are not specifically 'mandating' vaccination. The EU Digital COVID-19 certificate is an example of a requirement that, in this case, aims to ease free movement within the EU [75].

Researchers caution that the impact of 'passport proposals' on vaccination intentions may vary depending on what these certificates cover (vaccination, recent test, antibodies), what type of activities these apply to (international travel, access to venues, employment), and when they are introduced (immediately or after everyone has been offered vaccination). This, in turn, will impact people's perceptions of the certificates as regards legitimacy, equity, and feelings of compulsion [76]. The researchers indicate that 'vaccine passports' can make those who already intend to get vaccinated even more positive about their intention, but they may have the opposite effect on those who have concerns about the vaccine. Requirements for certificates have provoked opposition from some political and economic actors, as shown in England when the government backtracked on its plan to introduce a 'vaccine passport' for those wishing to access nightclubs and crowded events, amid criticisms of implementation problems and costs [77]. A study done in the UK and Israel concluded that domestic vaccine passports may have a detrimental effect on people's autonomy, motivation and willingness to get vaccinated, and that messaging on autonomy and relatedness, rather than pressure and control, should be favoured instead [78]. Based on a study done in the UK, researchers flag up the potential polarising effect of vaccine passports. Even if generally supported in a country, there can be large variations in the appeal of vaccine passports to specific population groups (e.g. young people, ethnic minorities, etc.), and this may risk deterring specific populations and geographically-based clusters from vaccination [76]. More research will be needed on the potential unintended consequences of such 'vaccine passports'.

**Requirements for vaccination/mandates.** Even though mandates can be highly effective, researchers caution that other strategies may be sufficient or more advisable, depending on the reasons for under-vaccination. However, in some specific target groups, such as healthcare workers, requirements have been shown to increase vaccine coverage [70]. Mandates signal policy support for immunisation and can therefore increase resources for vaccination infrastructure. However, they can also be counterproductive in any population that does not widely support vaccination [79]. Based on past experiences with vaccine mandates (e.g. in the US) and the challenges that the introduction of the new COVID-19 vaccines posed, researchers noted prior to the vaccination roll-out that limited mandates with public support, in specific settings, could be part of a comprehensive package of interventions [79]. However, mandates require a legal framework allowing authorities to restrict personal freedoms for public health reasons, and approvals at policy level. As such, they can also be challenged in the courts, generate debates on personal freedom and, although they might encourage some of those reluctant to get vaccinated, they can also fuel resistance [80,81]. Careful weighting of ethical considerations in relation to mandates is also needed, as highlighted by WHO [82].

Some EU/EEA countries have implemented mandates for COVID-19 vaccination, other countries are contemplating this strategy, while others favour a voluntary approach to vaccination [47,83]. Several EU/EEA countries have implemented vaccine mandates in the past for specific vaccines and population groups, in particular young children [84], to address falling vaccination rates, vaccine hesitancy and recurring outbreaks, for measles in particular. For example, in 2017, Italy introduced a law that expanded a list of mandatory vaccinations for infants from four to ten vaccines (e.g. polio, diphtheria, hepatitis B, measles, mumps, rubella, varicella, etc). Vaccination was required for a child to access schools, and a lack of compliance would lead to monetary fines. A review of the policy found that vaccine coverage had increased for all vaccines, although the authors recognised that vaccine hesitancy continued to be a problem and that the political and social debate on mandatory vaccination was still ongoing [85].

**Examples of incentives, certificates and mandates**

Member State	Who	Barrier targeted	Description of strategy
Poland	General population/ municipalities	Incentives to increase uptake	In July 2021, a lottery with in-kind and cash prizes was launched for those who get vaccinated [86]. Municipalities also competed to achieve the highest vaccination rates. The 500 first municipalities that managed to vaccinate 75% of their population were to receive cash prizes, and the 49 municipalities that reached the highest vaccination rate in their respective region would also receive a cash prize [87].
Belgium – Brussels capital region	General and specific population groups	Requirements/certificates to increase uptake	In Belgium, a Covid Safe Ticket (CST) was introduced in August to access events involving more than 5 000 people. Due to lower vaccination rates in the Brussels capital region than in other regions in the country, plans were made to extend the ticket in Brussels for the autumn to include accessing venues such as restaurants, bars, fitness centres, events involving more than 50 people indoors, and hospitals or nursing homes. The duration of this measure will depend on the epidemiological situation. The ticket certifies if the person is fully vaccinated, has a negative COVID-19 test or has a recovery certificate. It will be requested from any person aged 16 years and upwards, but also from those aged 12 years if they are visiting hospitals and nursing homes [88,89].
Italy	Professional groups (healthcare)	Mandates	On 1 April 2021, Italy approved a decree whereby vaccination became mandatory for healthcare professionals. Despite having initially opted for recommendations, the Italian State adopted the mandatory system to achieve the highest possible degree of vaccination among health professionals, in order to guarantee the safety of treatment and the protection of patients' health [90]. It was the first country in Europe to do this for COVID-19 vaccines. The mandate applies to healthcare professionals that carry out their activities in health, social or welfare structures, public or private, and in pharmacies, para-pharmacies, and professional offices. Those who refuse to have the vaccine will either be transferred to duties that do not risk spreading the virus, or suspended without pay for up to a year. The decree also protects doctors who administer the vaccines from criminal liability, as long as the shot has been carried out in accordance with the Ministry of Health's instructions [91].

## Evaluation of programmes that aim to increase COVID-19 vaccine acceptance and uptake

Any public health intervention should, if possible, be evaluated [92]. Ideally, evaluations will be conducted in order to ascertain if an intervention has been implemented in an acceptable way, how effective it may have been (including, where relevant, in different sub-populations), and also whether it may have had any unanticipated or negative impacts [92]. In addition, evaluations would be needed to establish whether public money is being invested cost-effectively [93], which is especially important in a crisis situation, when resources need to be carefully targeted.

However, conducting evaluations of behavioural interventions can be methodologically challenging, as it is difficult to establish causality between an intervention that, for example, aims to increase COVID-19 vaccination uptake, and actual uptake by members of the public. This is because many other unrelated factors can also affect vaccination rates, and it is not easy to disentangle which factors have had an impact. The gold standard

epidemiological tool for ascertaining intervention effectiveness – the randomised controlled trial – is logistically complex and methodologically demanding, so it is unlikely to be viable for evaluating most interventions that aim to facilitate vaccination acceptance and uptake. The lack of a rigorous, easily applied methodology for ascertaining the effectiveness of these interventions also means that it may not be possible to establish their cost-effectiveness. Nevertheless, pre- and post-intervention evaluations can be used to ascertain whether any changes in vaccination uptake may have taken place in a specific area during the period of any intervention, and it may also be possible to compare vaccination uptake in different geographical areas or in specific populations where one has received the intervention another has not. However, great care should be taken in these efforts to avoid ascribing causality between intervention and uptake levels, as it cannot and should not be assumed [9].

Despite these challenges, it is still possible to make good evaluations of interventions to increase vaccination uptake, although for the reasons just mentioned the primary focus of these evaluations will generally be restricted to an assessment of process, including intervention acceptability and the identification of possible unintended consequences. Such process evaluations should ideally include both quantitative and qualitative data linked to the implementation process. Quantitative data could be based on what has been delivered through the intervention (e.g. the number of outreach events), and how this has been received by the target population (e.g. data collected through online or offline surveys). Qualitative research (in the form of semi-structured interviews, observations, focus group discussions, and online social media monitoring, etc.) provides the opportunity to understand the 'whys' and 'hows' of what has happened during implementation [94]. This may make it possible to highlight hitherto unidentified issues, including unintended consequences, that may not be visible in the findings from quantitative data. Important nuances within communities can also then be recognised and addressed. Process evaluations should ideally collect data from the perspectives of both the service users (e.g. those who should be receiving the vaccination) and the service providers (e.g. those who are administering the vaccination). Where possible, evaluations should also involve community organisations and partners in meaningful collaboration as a means of ensuring that the research design is relevant to the needs of the communities that are the focus of the research [95].

WHO's Regional Office for Europe has developed and is currently piloting an evaluation framework for COVID-19 behavioural and cultural interventions, including those that aim to facilitate acceptance and uptake of vaccination. Recognising that interventions themselves can bring about unintended positive and negative impacts, the evaluation framework includes a focus on the broader effects of the intervention, including well-being, social cohesion and trust. The framework and more information can be obtained from [euinsights@who.int](mailto:euinsights@who.int).

Note that many health service providers have limited capacity to conduct their own evaluations. Therefore, it is important to have realistic expectations about the extent and depth of any such work. However, it may also be possible for health services to collaborate with universities or other research institutes who may have both the technical capacity and the human resources to conduct methodologically more advanced evaluations, by using innovative methods such as realist evaluation. Such approaches can help disentangle expected and unexpected outcomes arising from a complex intervention [96,97].

## Evaluation of interventions to increase COVID-19 vaccination acceptance and uptake in the Netherlands

By September 2021, the Netherlands had achieved an overall COVID-19 vaccination rate well above the EU average [2], but pockets of under-vaccinated people, many of whom were socially vulnerable, were known to exist. Extra efforts were therefore made to vaccinate these populations; and in October 2021, the Dutch National Institute for Public Health and the Environment (RIVM) launched a national survey, sent out to municipal health services across the country, to map the COVID-19 vaccination promotion activities implemented for these under-vaccinated populations. The questions in the survey focused on a range of issues, including the populations that have been targeted, the types of vaccination information provided to the different populations, the channel/s by which the information had been transmitted, practical support given to people at the vaccination sites, and when (not if) the interventions would be evaluated. Given the heavy workload of the municipal health services, the RIVM team has worked to find a balance between obtaining high quality data on the key issues and – by not including too many questions – trying to ensure a good response rate.

This mapping exercise amounts to a national-level evaluation of what has been implemented at local level, where the expectation is that other, more focused evaluations will be conducted. The RIVM team reports that the colleagues implementing the interventions at local level generally have a rich understanding of the issues and challenges facing the different populations that they are seeking to vaccinate, and they have adapted their interventions accordingly. Furthermore, the evidence being used at local level to fine-tune their interventions is reportedly often 'practice-based', in the sense that the colleagues can see for themselves what works in their interactions with the target communities, rather than through formal evaluations.

RIVM has instituted a national initiative that supports municipal health services to share locally-derived good practices and ideas, and this has led to numerous informal exchanges and the adaptation of interventions that have been seen as successful. However, while this initiative facilitates a good exchange of practical experience and ideas between the municipalities on how to reach people with the COVID-19 vaccination, there is little or no evidence on how effective the various interventions have been. This is due to a lack of structural evaluation or monitoring tied to the interventions. However, there are now plans to link these interventions to fine-grained data on vaccination uptake, thereby providing insights into temporal associations between interventions and uptake – albeit with the understanding that any associations are not necessarily causal.

## Conclusions

As we move into autumn and towards winter, there is a real risk of a high COVID-19 case load and high mortality rates in unvaccinated populations across the EU/EEA [98]. Facilitating acceptance and uptake of COVID-19 vaccination services is therefore an urgent and immediate priority. The tools and interventions presented in this report provide authorities with materials that can be adapted and used in response to this call. However, the ongoing crisis also creates an opportunity for identifying and institutionalising good practices for vaccination programmes, and highlighting knowledge gaps that need to be filled. By doing this, we will be able to address future outbreaks of vaccine-preventable diseases more effectively.

Two key areas of good practice can be identified from what has been presented above, and national authorities may want to consider seeking ways to embed these within their national vaccination plans. Firstly, community engagement strategies were adopted in relatively few of the interventions reviewed. Given the broad and recognised impact that these can have on building confidence in health systems, it may be worth reflecting on how such approaches could be utilised more widely in efforts to diagnose, implement, and evaluate COVID-19 vaccination programmes [99]. Secondly, efforts by national authorities in some countries to collaborate with local, regional, and civil society actors have helped to diagnose the drivers of low COVID-19 vaccination acceptance and uptake in specific populations. They have also helped with the design and implementation of strategies targeting these drivers. While the challenges in ascertaining the effectiveness of these interventions are acknowledged, initiatives to share experiences and lessons learned could facilitate the implementation processes in other settings, thereby potentially increasing their impact [15].

Two significant data gaps have also been identified. First, disaggregated data regarding vaccine coverage in different sub-populations often do not exist, which means that low vaccination levels or other problems regarding vaccine uptake may remain invisible to decision-makers, and therefore unresolved. Strategies for data collection on refugee and migrant populations have been outlined [100], and similar approaches could be considered for other socially-vulnerable populations. Secondly, there are limitations in the methodologies currently available for evaluating the impact of interventions to facilitate acceptance and uptake of vaccination services. The development of new, innovative methodologies in this area by social and behavioural scientists would be of great benefit, especially if they could be applied in settings with modest financial and technical capacity.

## Contributing experts

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- The external experts have each submitted a declaration of interest and a review of these did not reveal any conflicts of interest.

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# Annex 1. Tools and guides to support strategies for facilitating COVID-19 vaccination acceptance and uptake

To further support EU/EEA countries in the planning and implementation of strategies to increase COVID-19 vaccine acceptance and uptake, a list of useful reference materials is provided below.

## Acceptance and demand

- Set of tools for generating acceptance and demand for COVID-19 vaccines (WHO Regional Office for Europe). Includes an acceptance and demand interim guidance, communication plan template, guidebook for designing, targeting and evaluating interventions, community engagement guide and a misinformation management guide: [Generating acceptance and demand for COVID-19 vaccines](#)
- Guidance for communication on COVID-19 vaccine safety (WHO): [Safety Surveillance Manual - COVID-19 Vaccine Safety Communication](#).
- US Centers for Disease Control and Prevention set of resources on reinforcing confidence in COVID-19 vaccines, including strategies, community assessment tools, guide on tailoring information, etc: [Vaccinate with Confidence](#).
- Guidance from WHO Technical Advisory Group (TAG) on Behavioural Insights and Sciences for Health on the drivers for facilitating uptake of COVID-19 vaccination
- [Training materials](#) to assist health workers in interpersonal communication during COVID-19 vaccination consultations (WHO Regional Office for Europe)
- [Communicating with health workers about COVID-19 vaccination](#) (WHO Regional Office for Europe).

## Behavioural insights

- A comprehensive overview of behavioural science evidence and advice about COVID-19 vaccine uptake: [The COVID-19 Vaccine Communication Handbook & Wiki](#)
- Data for action: achieving high uptake of COVID-19 vaccines, a [comprehensive guide](#) to collecting, analysing and interpreting qualitative and quantitative data on COVID-19 vaccine acceptance: [WHO and UNICEF](#).
- Survey tool and guidance on behavioural insights on COVID-19 (WHO Regional Office for Europe): [Survey Tool and Guidance](#).
- Tailoring Immunization Programmes – a guide for exploring and addressing barriers to low vaccination uptake (WHO Regional Office for Europe): [TIP guide](#).

## Addressing misinformation

- ECDC study that explores the vaccine misinformation landscape in a selection of EU countries and describes strategies to address online vaccine misinformation: [Countering online vaccine misinformation in the EU/EEA](#)
- Handbook that summarises the current state of the science of misinformation and its debunking, including on vaccination and available in several languages (George Mason University – Center for Climate Change Communication): [The Debunking Handbook 2020](#)
- Guidance for addressing a global infodemic and fostering demand for immunisation, available in several languages (UNICEF): [Vaccine Misinformation Management Field Guide](#).

## General vaccination information

- The European Vaccination Information Portal (EVIP) is an initiative of the European Union and provides information on vaccines and vaccination in all EU/EEA languages. It was developed by ECDC in partnership with the European Commission and the European Medicines Agency (EMA): [vaccination-info.eu](#)
- COVID-19 vaccines and vaccination explained: [videos and podcast for health workers and the public](#) that address common questions about COVID-19 vaccines (WHO Regional Office for Europe).

## Resources for evaluation

- Better Evaluation is a global non-profit organisation that brings together knowledge and practices on conducting quality evaluations from across sectors. Their site includes a knowledge base to support individuals and organisations conducting various types of evaluations <https://www.betterevaluation.org/>.