

# How to implement seasonal influenza vaccination of health workers

An introduction manual  
for national immunization programme managers  
and policy makers

**Pilot version 2019**



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# Contents

<b>Executive summary</b> .....	<b>1</b>
<b>About this manual</b> .....	<b>2</b>
<b>Objective</b> .....	<b>2</b>
<b>Audience</b> .....	<b>2</b>
<b>Structure of the document</b> .....	<b>3</b>
<b>Key related documents</b> .....	<b>4</b>
<b>Background and rationale</b> .....	<b>5</b>
<b>Current status of influenza vaccination in health workers</b> .....	<b>5</b>
<b>Summary of a rapid evidence appraisal on the rationale for influenza vaccination of health workers</b> .....	<b>6</b>
Evidence for health worker risk of influenza and impact of vaccination .....	<b>6</b>
Evidence of transmission of infection from health workers to patients and the impact of vaccination .....	<b>7</b>
Evidence for interventions to increase health worker vaccination uptake .....	<b>7</b>
<b>Global Action Plan for Influenza Vaccines</b> .....	<b>8</b>
<b>1. Establishing a policy to vaccinate health workers against seasonal influenza</b> .....	<b>10</b>
<b>The decision-making process</b> .....	<b>10</b>
<b>Considerations for decision-making</b> .....	<b>12</b>
Defining the public health objectives for vaccination .....	<b>12</b>
Economic analysis for establishing national policies .....	<b>13</b>
Characterizing the target groups for vaccination .....	<b>14</b>
Framing an immunization policy for health workers .....	<b>15</b>
Integration with Occupational Health Policies .....	<b>18</b>
Choice of vaccine product, schedule and timing of vaccination .....	<b>18</b>
Defining monitoring and disease impact measurement objectives .....	<b>20</b>

<b>2. Planning and managing vaccination of health workers .....</b>	<b>21</b>
<b>Planning for successful vaccine introduction.....</b>	<b>21</b>
<b>Costing and financing.....</b>	<b>22</b>
<b>Formative research to inform the planning process.....</b>	<b>24</b>
<b>Communication and vaccine acceptance .....</b>	<b>25</b>
Communications at the health facility level .....	26
Demand Generation at the Health Facility Level .....	27
<b>Vaccine procurement and supply chain management .....</b>	<b>29</b>
Vaccine procurement.....	29
Selection of the vaccine product and presentation.....	30
Logistics and cold chain management.....	31
Vaccination of health workers.....	32
Training of the vaccination team .....	33
<b>3. Monitoring and evaluation.....</b>	<b>34</b>
<b>Developing and updating information systems .....</b>	<b>34</b>
<b>Coverage monitoring .....</b>	<b>34</b>
Health facility registries .....	35
Administrative data .....	35
Surveys .....	35
<b>AEFI monitoring .....</b>	<b>37</b>
<b>Monitoring and evaluation of vaccine acceptance.....</b>	<b>38</b>
<b>Vaccine impact monitoring.....</b>	<b>38</b>
<b>Post-introduction evaluation .....</b>	<b>40</b>
<b>References.....</b>	<b>41</b>
Annex 1. Sample non-participation form.....	45
Annex 2. Complementary checklist for planning health worker immunization: national level .....	46
Annex 3. Health facility checklist .....	48
Annex 4. Sample questionnaire for conducting a survey among health workers.....	49
Annex 5. Communications and demand generation: Stratification of approaches to developing the content.....	51

## Executive summary

Health workers are at higher risk of influenza infection than the general population. In addition to morbidity among health workers, influenza infection may also lead to increased absenteeism, presenteeism<sup>1</sup> and disruption of medical services. Moreover, influenza infected health workers may contribute to nosocomial transmission of infection to their patients, including those at high risk for developing severe influenza disease and complications. Hence, the World Health Organization (WHO) considers health workers to be a priority target group for seasonal influenza vaccination. In addition, influenza vaccination of health workers contributes to influenza pandemic preparedness. Finally, studies have shown that health workers who are vaccinated against influenza themselves are more likely to recommend vaccination to their patients.

This manual serves as a resource to assist users in establishing a national policy for seasonal influenza vaccination of health workers. It provides guidance along with a catalogue of available tools to facilitate policy development, planning, implementation, monitoring and evaluation of influenza vaccination of health workers. The contents of the manual are meant to supplement the document titled “*Principles and considerations for adding a vaccine to a national immunization program: from decision to implementation and monitoring*”, published by WHO in 2014.

The main target audiences for this manual include national policy makers; national health planners; the national programme managers for immunization and occupational health; and those responsible for occupational health, health worker immunization and infection control in health facilities. Close collaboration between immunization managers, and occupational health and infection control programmes is essential to optimize vaccine uptake, and for a cohesive and comprehensive approach to influenza control in health facilities.

This manual summarizes the evidence and rationale, provides guidance on key issues, and lists available tools for influenza vaccination of health workers, covering three main components of vaccine introduction and management:

1. Establishing an evidence-based national policy for seasonal influenza vaccination of health workers.
2. Planning and management of health worker influenza vaccination.
3. Monitoring and evaluation, including assessing vaccination coverage, monitoring for adverse events following immunization, impact assessment and post-introduction evaluation.

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<sup>1</sup> Presenteeism refers to health workers who work while ill, yet have reduced accuracy and effectiveness and pose a risk to vulnerable patients in their care.

# About this manual

## Objective

This manual serves as a resource and catalogue of available tools to assist country officials in deciding upon, planning, implementing and monitoring health worker influenza vaccination in order to achieve optimal vaccination coverage. It is not meant to be a prescriptive document, but rather articulates general principles and key considerations to support policy formulation; planning and management of vaccination; and monitoring and evaluation of influenza vaccination of health care workers.

The manual also outlines measures to ensure integration of health worker influenza vaccination into existing national occupational health policies and occupational safety and health management systems of health facilities. It also addresses the opportunity for health worker influenza vaccination to promote an integrated approach for monitoring and optimizing the uptake of all interventions included in national occupational health policies. In addition, it refers to the relationship and contribution of health worker vaccination to pandemic influenza preparedness.

Seasonal influenza vaccination in health workers differs from other vaccine-preventable diseases in that vaccination is required annually. However, elements of this manual may be of relevance for health worker vaccination in general, particularly the sections on planning and management of vaccination and on monitoring and evaluation.

## Audience

The main target audience for the manual include:

1. National policy-making bodies and health planners.
2. Programme managers for immunization, infection control and occupational health programmes at national and subnational levels and those responsible for occupational health and infection control in health facilities.
3. Organizations of health workers and employers.

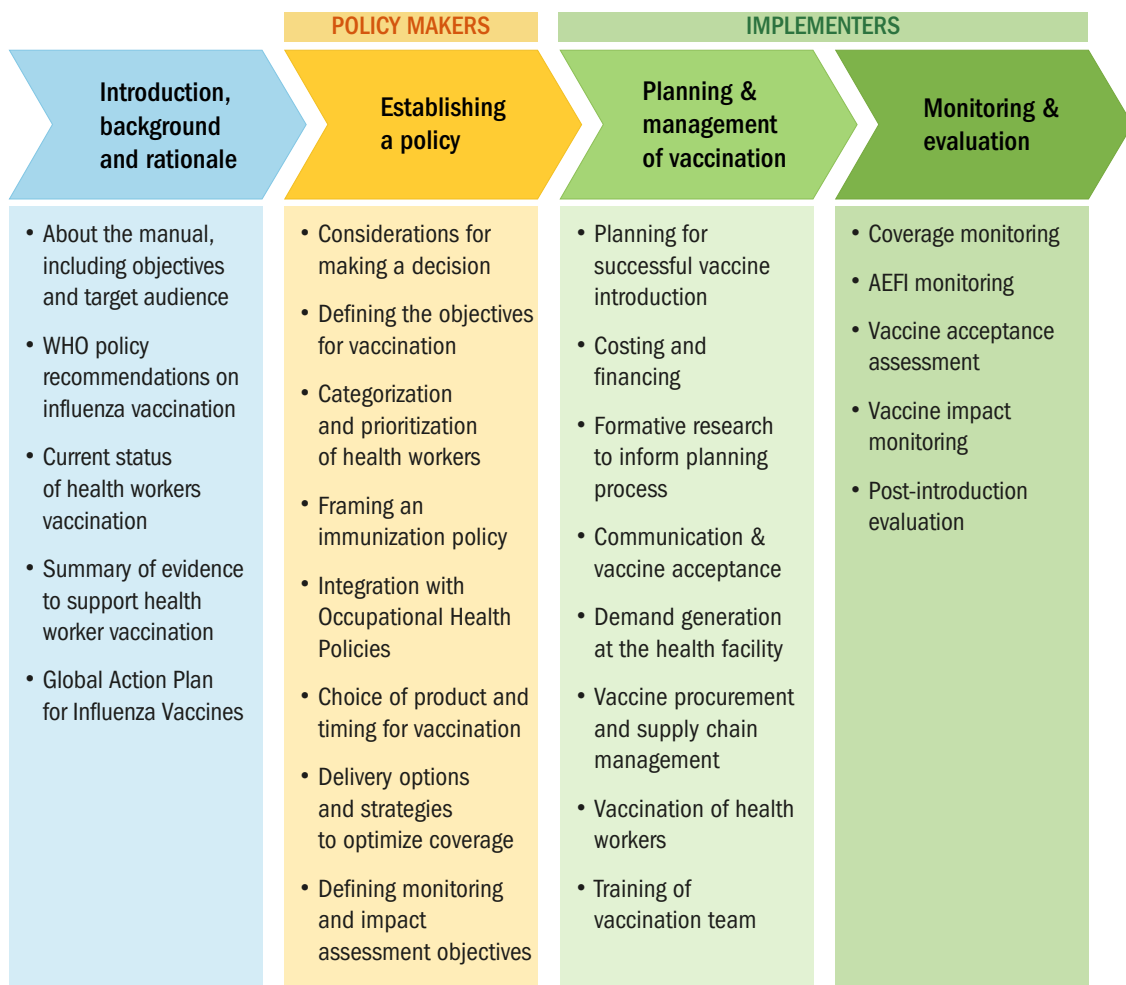
While the different sections of the document may be of greater relevance to one or the other group, it is advisable that the document be read as a whole because of the information on a particular topic may be found in the different sections of the manual.

The document may also be useful to other audiences with an interest in immunization or occupational health.

## Structure of the document

The manual consists of four sections as outlined in **Figure 1**. However, for clarity and completeness there is some overlap between some of the sections, with cross-references made to the other relevant sections.

**Figure 1. Structure of the document**





## Key related documents

The following documents are important resource materials that complement the guidance in this manual.

1. The WHO policy recommendations on seasonal influenza vaccination, including health worker vaccination are published in WHO Position Papers. These position papers are periodically updated.



**Vaccines against influenza: WHO position paper – November 2012**

<https://www.who.int/wer/2012/wer8747.pdf> (Accessed 14 Mai 2019)



**Principles and considerations for adding a vaccine to a national immunization program: from decision to implementation and monitoring.** Geneva, World Health Organization, 2014.

[http://www.who.int/immunization/documents/general/ISBN\\_978\\_92\\_4\\_15068\\_92](http://www.who.int/immunization/documents/general/ISBN_978_92_4_15068_92)

(Accessed 14 Mai 2019)

2. The following document provides detailed guidance to countries that already provide seasonal influenza vaccination to health workers on how to identify, analyse, and effectively target issues related to uptake:



**Tailoring immunization programmes for seasonal influenza (TIP FLU). A guide for increasing health care workers' uptake of seasonal influenza vaccination (2015).** Copenhagen, World Health Organization Regional Office for Europe, 2015.

<http://www.euro.who.int/en/health-topics/communicable-diseases/influenza/publications/2015/tailoring-immunization-programmes-for-seasonal-influenza-tip-flu.-a-guide-for-increasing-health-care-workers-uptake-of-seasonal-influenza-vaccination-2015>

(Accessed 14 Mai 2019)

3. While the contents of this manual can help inform national policies, the manual does not provide an exhaustive review of the available evidence to inform decision-making. A more detailed review of such evidence in support of vaccination of health workers is found in the following document:



**Rapid Evidence Appraisal: Healthcare Worker Influenza Vaccination – A global review of the evidence.** January 2017.

<https://www.sciencedirect.com/science/article/pii/S2590136219300373?via%3Dihub>

(Accessed 12 July 2019)

4. This manual is part of a series of introduction manuals on seasonal influenza vaccination developed by WHO. A manual on the implementation of influenza vaccination of pregnant women has been published earlier.



**How to implement influenza vaccination of pregnant women: an introduction manual for national immunization programme managers and policy makers.**

<http://apps.who.int/iris/bitstream/handle/10665/250084/WHO-IVB-16.06-eng.pdf>

(Accessed 14 Mai 2019)

## Background and rationale

Health workers are at risk of influenza virus infection and of transmitting infection to patients under their care who may be at high risk for severe disease, complications, and death (1). The increased risk in health workers compared to the general population may vary by occupation or setting (2). WHO considers health workers to be an important priority group for influenza vaccination, not only to protect themselves and maintain essential health-care services during influenza epidemics, but also to reduce the spread of influenza to vulnerable patient groups with whom they come into contact (1). Furthermore, many studies have found that a strong recommendation from health workers, especially from physicians, is highly likely to increase public uptake of vaccination (3–5). Health workers who have themselves been vaccinated are more likely to be knowledgeable about vaccination and be more effective in improving public acceptance of vaccination (3–5). Finally, because health workers are likely to be targets of vaccination programs during an influenza pandemic, establishing functional programs for seasonal influenza vaccination of health workers will facilitate timely and effective vaccination during a pandemic (6).

### Current status of influenza vaccination in health workers

Global adoption of a policy for influenza vaccination of health workers has been slow. In 2017, only 119 of the 194 countries reporting having a national influenza vaccination policy. Of these, 96 report targeting health care workers as a priority group. However, the proportion of Member States that reported having a policy varies by WHO region, with the majority of countries in the WHO regions of the Americas, Europe and Eastern Mediterranean reporting a national policy for influenza vaccination, whereas a lower proportion of countries report having such a policy in the Western Pacific, African and South-East Asian regions.

Information on influenza vaccination coverage in health workers is not available for most countries, though it varies widely and is reported to be low in many countries where such data are available. For example, data on coverage in health workers were available from only 26 (56%) countries in the European region for the 2014–15 season. The median coverage was 29.5% with a range of 2.6% to 99.5%; only three countries, namely Albania, Armenia and Belarus, reported coverage > 75% (7). More recent data from a systematic review through compulsory reporting from all hospitals in England showed an uptake of 69% in the 2017–18 season.<sup>2</sup> An internet survey of 2000 health workers in the United States demonstrated coverage to be 78% during the 2017–18 season, with higher coverage rates (95%) among those working in settings where they were required by their employers to be vaccinated (8). Higher vaccination coverage rates are reported when mandatory vaccination policies are implemented. In one systematic review that included eight studies, coverage rates exceeding 94% were achieved in all (9).

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<sup>2</sup> Seasonal influenza vaccine uptake in healthcare workers (HCWs) in England: winter season 2017 to 2018. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/710531/Seasonal\\_influenza\\_vaccine\\_uptake\\_HCWs\\_winter\\_season\\_2017\\_to\\_2018.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710531/Seasonal_influenza_vaccine_uptake_HCWs_winter_season_2017_to_2018.pdf) (Accessed 14 Mai 2019)

## Summary of a rapid evidence appraisal on the rationale for influenza vaccination of health workers

A rapid evidence appraisal of materials available in the English language, published since 2006, and considered to be of medium or high quality, was conducted by WHO (10). The questions considered, and the main findings of this appraisal are summarized here. Readers are referred to the published report for the details and for the relevant citations.

The review considered three issues, namely:

1. The evidence that health workers are at increased risk of influenza infection compared to the general population, and that vaccinating them reduces influenza or absenteeism and/or the wider economic impact of influenza in the health workforce.
2. The evidence that health workers transmit influenza to their patients in health care settings and, if so, whether vaccination protects the patients and the proportion of health workers who need to be protected to obtain this effect.
3. The evidence for successful practical interventions to increase vaccination uptake and the state of knowledge of social, behavioural and public health public policy research on vaccination uptake in health workers.

### Evidence for health worker risk of influenza and impact of vaccination

Studies comparing the risk of influenza infection in health workers compared to the general population are challenging, may measure different outcomes, or are executed in different settings, limiting the comparability across studies or the pooling of data from these studies. Recent systematic reviews suggest that health workers are at an increased risk of influenza infection compared to the general population (Odds Ratio = 2.08, 95% CI = 1.73 to 2.51) (2), though the evidence is strongest for asymptomatic laboratory-confirmed infection (11). However, health workers with asymptomatic infection may still transmit influenza virus to highly vulnerable patients in a health-care setting.

Respiratory illness is reported as a common cause of absenteeism among health workers. Epidemics or pandemics of influenza have been associated with increased rates of absenteeism among health workers (12). Vaccine efficacy in health workers has been shown to be as high as 90% for well-matched seasonal influenza vaccines (13, 14), which suggests that vaccination of health workers will reduce influenza-related morbidity and absenteeism. A systematic review showed a protective effect against laboratory confirmed influenza and shorter absenteeism due to influenza-like illness (ILI) in vaccinated groups (15). A recent study among health workers in the United Kingdom showed that a 10% increase in vaccination uptake is associated with a 10% decrease in absence due to illness (12). However, there are observational studies that provide conflicting results – though often constrained by poor study design, non-specific outcomes, high risk of bias, and failure to adjust for confounding factors (16–19).

Since the risk of illness following infection is based on the level of exposure, and absence behaviours may vary between different categories of health workers, it is possible that the lack of sufficiently granular data on absenteeism, e.g. stratified by health worker categories, may account for the mixed results seen in the different studies. On the other hand, the lack of impact on absenteeism

observed in some studies, despite evidence of increased rates of infection in health workers, raises the question as to whether health workers nonetheless continue to work when infected and lead to heightened concerns about the consequent risk of nosocomial transmission (20). Several studies have documented presenteeism in health workers with influenza-like illness (21–23), including one instance which was associated with nosocomial transmission in an oncology unit (24).

### **Evidence of transmission of infection from health workers to patients and the impact of vaccination**

Epidemiological studies using molecular subtyping approaches demonstrate evidence of transmission from health workers to patients. The use of automated collection of high-resolution contact data using wearable sensors combined with virologic data have allowed the identification of potential routes of transmission in cases of hospital-acquired influenza (25). The extent of direct transmission from health worker to patient in health care settings is difficult to capture because of the constant influx of visitors, interactions between patients, and the possibility of multiple simultaneous introductions of influenza (26–28). However, among those who may contribute to transmission of infection in the health care setting, health workers represent a sizeable vaccine-preventable portion since they are easier to target for vaccination.

The direct patient benefit of health worker vaccination can be measured in several ways, as illustrated in the literature. Several studies evaluate the impact on laboratory confirmed influenza, while others evaluate impact on non-specific outcomes such as ILI, respiratory illness, all-cause mortality, respiratory illness associated mortality, or incidence of nosocomial influenza infection. The evidence is stronger for non-specific outcomes such as ILI, all-cause mortality (29), and incidence of nosocomial influenza infection (30, 31). Although some studies have attempted to measure the number of health workers that need to be vaccinated for optimal protection, the evidence in support of a coverage threshold is weak, leading to disputes in the literature (32). However, it is likely that patient protection is positively associated with increasing health worker vaccination coverage but would also depend on other factors including the type of patient contact, vulnerability of the patient, use of other infection control measures, and the effectiveness of vaccination in a particular influenza season (33–35).

### **Evidence for interventions to increase health worker vaccination uptake**

There is a substantial body of evidence on successful interventions to increase health worker influenza vaccination uptake, much of which has been incorporated into existing toolkits aimed at increasing vaccine uptake.

Although the factors that contribute to the health worker decision-making pathway are diverse, some strategies appear to be more effective than others. No single intervention has been shown to rapidly and substantially increase and sustain vaccination uptake except for mandatory vaccination. However, mandatory health worker vaccination is an issue that has been extensively debated with many different perspectives for and against its use (20, 32, 36). Successful mandatory vaccination programmes require organizational and educational efforts to secure employee support prior to implementation (37).

A combination of one or more “soft mandates” such as active declination, required surgical mask use and exclusion of non-vaccinated staff from working with highly vulnerable patients may be used as alternatives to mandatory vaccination, although there are organizational, educational, monitoring and enforcement, and human and financial resource implications for applying such soft mandates.

Additional components that contribute to increased uptake include the following:

- Provision of free vaccine;
- Convenient access to vaccination, including on-site vaccination in health facilities;
- Knowledge and behaviour modification through education, reminders, and incentives tailored towards different health worker categories;
- Management and organizational approaches such as personnel assigned to oversee vaccination activities.

The reasons for low vaccination uptake are heterogenous and vary across different health worker categories and cultures. Therefore, approaches to increase uptake need to be tailored for different groups. Some studies have demonstrated that formative research, including surveys and qualitative research, can provide insights that assist in tailoring interventions to optimize uptake.

## Conclusion

Despite the ongoing debate in the literature, influenza vaccination is important for ensuring the safety of health workers, their patients, and the general population who rely on a functioning health system, especially during epidemic/pandemic periods. Studies to conclusively establish the value of health worker vaccination will be challenging though the emerging data on this issue will be closely monitored to inform any changes to existing WHO policies.<sup>3</sup>

## Global Action Plan for Influenza Vaccines

In an influenza pandemic, most of the world’s population will be highly susceptible to infection and it is likely that infection will spread rapidly. Vaccination is considered one of the key strategies to mitigate the potential impact of a pandemic. While it is expected that there will be a delay in the development of strain-specific pandemic vaccines, insufficient production capacity will further restrict the global access to the vaccines, at least in the early phases of the pandemic. Resource-constrained countries, especially those that lack local vaccine production capacity and those that do not have seasonal influenza vaccination policies, will face the greatest challenge in securing timely access to vaccines during a pandemic, and mitigating the substantial adverse effects of a pandemic.

To address this challenge a Global Action Plan for Pandemic Influenza vaccines was developed by WHO with short, medium and long term-strategies aimed at increasing influenza vaccine

<sup>3</sup> A working group of the WHO Strategic Advisory Group of Experts (SAGE) on immunization will be reviewing the emerging data and updates to the existing WHO recommendations are expected in 2020.

production and surge capacity before and during an influenza pandemic (38). The plan proposed three approaches to enhance access to pandemic vaccines: (i) an increase in the baseline use of seasonal influenza vaccination; (ii) an increase in global production capacity; and (iii) further research and development.

The first of the above three approaches relies on countries establishing clear and effective immunization policies to increase the baseline use of seasonal influenza vaccines – providing industry with better demand forecasts and stimulate increased production capacity.

While vaccination of health workers will only result in a modest increase in overall vaccine demand, it will establish a robust and functional platform for rapidly immunizing health workers and could contribute to achieving high coverage in the event of a pandemic, thereby protecting health service delivery during a pandemic. Furthermore, high uptake of vaccination by health workers is likely to build trust and increase the uptake of vaccination among other high-risk groups targeted for seasonal influenza vaccination in national policies. Health worker vaccination may also establish or strengthen processes that would allow rapid deployment of pandemic vaccines. Thus, seasonal influenza vaccination of health workers goes beyond the issue of immediate protection against seasonal influenza as outlined above and contributes to pandemic influenza preparedness.

# 1. Establishing a policy to vaccinate health workers against seasonal influenza

The decision to establish a policy to vaccinate health workers against seasonal influenza should be evidence-based, with a clear rationale, and with the required investments for sustainable implementation. The general principles and considerations for adding a vaccine to a national immunization programme are articulated in the 2014 WHO guidance document titled “*Principles and Considerations for Adding a Vaccine to a National Immunization Programme: From Decision to Implementation and Monitoring*” (39).

Health workers comprise a target population not usually included in the national immunization programmes of many low and middle-income countries. While hepatitis B vaccination programmes for health workers may exist, influenza vaccines are unique since vaccination for the foreseeable future must be repeated annually. This section of the manual deals primarily with additional considerations specific to annual seasonal influenza vaccination of health workers, building on the generic framework provided by the document cited above.

## The decision-making process

As with any other vaccine for which policies have to be established, Ministries of Health (MoH) would request National Immunization Technical Advisory Groups (NITAGs) or equivalent national or regional bodies to conduct a review of the evidence and provide advice on establishing a policy for seasonal influenza vaccination of health workers, and to make recommendations on the content of the vaccination policy.

Engagement of the many stakeholders affected by this policy is essential to secure their endorsement and facilitate high vaccination uptake, and is likely to result in a more coordinated approach to the control of influenza in health facilities. Stakeholder consultation should be broadly sought and include:

1. Professional associations and societies representing different health worker groups such as medical, nursing and allied health service associations, as well as representatives of private health care providers;
2. Medical and nursing councils and other health worker regulatory bodies;
3. Patient safety groups, where they exist, and organizations representing patients, since health worker immunization should also be regarded as a patient safety and quality of care issue;
4. Health worker unions, where they exist and when their participation is likely to be useful in promoting vaccination uptake.
5. Health facility managers.

The process should also include early engagement with the bodies that establish occupational health policies and regulations to ensure that the policies established for health worker vaccination against influenza are also reflected in the national occupational safety and health policies.

If vaccination policies for health workers exist for other vaccines, e.g. hepatitis B vaccination, a review of these policies may provide useful inputs for policy formulation for seasonal influenza vaccination and on strategies to optimize vaccination uptake.

Where available, NITAGs could access the information required from data available from the national influenza surveillance, the National Influenza Centres or other institutions participating in the Global Influenza Surveillance and Response System (GISRS) (see **Toolbox 1**).

### Toolbox 1. National Influenza Centers



To monitor and respond to the changes in the influenza virus antigenic structure and the subsequent necessity to change vaccine compositions, many countries have established national influenza centers (NIC) to collect and characterize virus specimens in their country and perform other analyses to inform the decisions of WHO and partners on the composition of the next year's influenza vaccine. In many countries, virologic surveillance is complemented by more systematic influenza surveillance for severe acute respiratory illness (SARI) and influenza-like illness (ILI).

A NIC in a country – or in a neighbouring country – can support evidence-based recommendations by providing data on the influenza disease burden and seasonality to the NITAG or other relevant national decision-making body. Involving these and other centers in NITAG discussions is key to bringing together all relevant information that is needed for the decision-making process.

A list of NICS, WHO collaborating centers and essential regulatory laboratories (ERLS) can be found at the following links:

➡ [http://www.who.int/influenza/gisrs\\_laboratory/national\\_influenza\\_centres/list](http://www.who.int/influenza/gisrs_laboratory/national_influenza_centres/list)  
(Accessed 14 Mai 2019)

➡ [http://www.who.int/influenza/gisrs\\_laboratory/collaborating\\_centres/list](http://www.who.int/influenza/gisrs_laboratory/collaborating_centres/list)  
(Accessed 14 Mai 2019)

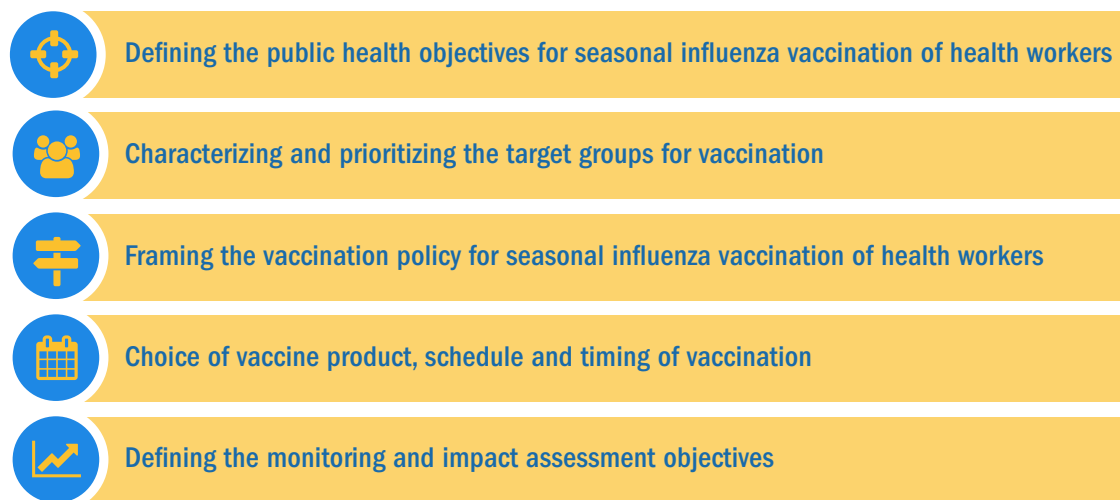
In places where local evidence is not readily available, especially on rates of disease amongst health workers and on transmission of disease from health workers to patients, efforts to generate such evidence could be time- and resource-intensive. Policy-makers would have to consider whether it is necessary to conduct local studies or whether data from other countries with similar epidemiological profiles and health system characteristics could be used to infer the likely burden of disease and support decision-making. NITAGs would need to balance the desire to have national data against the costs and delays that would result in generating the data and the consequent health impacts of this delay.



## Considerations for decision-making

In addition to the general considerations outlined in the WHO document “*Principles and Considerations for Adding a Vaccine to a National Immunization Programme: from decision to implementation and monitoring*” referred to earlier, other key issues need to be considered when framing a policy for health worker vaccination. These are listed in **Figure 2**.

**Figure 2.** Key considerations in establishing a vaccination policy for health workers



### Defining the public health objectives for vaccination

A critical first step in establishing a policy for vaccinating health workers with seasonal influenza vaccination would be to clearly define the aims and objectives of the vaccination programme. Such objectives may vary between countries but would underlie the prioritization of the health worker groups to be targeted for vaccination, set vaccination coverage targets, and provide guidance on the outcomes and scope for measuring the impact of vaccination.

Vaccination of health workers serves multiple objectives. These may include:

1. Prevention of infection in the health workers themselves, averting associated morbidity.
2. Prevention of transmission of infection from health workers to vulnerable patients, including those at high risk of severe disease, complications, and death.
3. Sustaining health services by reducing health worker absenteeism, especially during seasonal and pandemic influenza outbreaks, which is a period of increased health care demand.
4. Promoting uptake of seasonal influenza vaccination among other target groups and enhance public trust for influenza vaccination.
5. Contributing to influenza pandemic preparedness by:
  - Establishing a mechanism for rapidly immunizing health workers during a pandemic of influenza or epidemics of other vaccine-preventable diseases;

- Contributing to increasing demand for influenza vaccine and thereby enhance production capacity to improve timely access to vaccine in case of a pandemic.
- Establishing or strengthening national capacity for vaccine regulation.

One or more of the above could serve in defining the national objectives for health worker vaccination. Important considerations when defining vaccination objectives include:

1. Review of the available data on the burden of disease among health workers and health care-related infections in patients and residents of long-term care facilities. National data, where available, complemented with representative regional or global data or estimates developed through the use of mathematical models may be used for this purpose.
2. The cost and impact of vaccination and availability of vaccine supply.
3. Review of the national pandemic preparedness plan and consideration of how health worker vaccination could contribute to pandemic preparedness.

### Economic analysis for establishing national policies

While economic analysis is generally recommended prior to deciding on vaccination policies, lack of data for estimating and comparing the economic benefits of the different vaccination objectives may be a limiting factor, as will be the relatively small size of the target group. **Toolbox 2** lists the available tools for conducting economic analysis for influenza vaccination.

#### Toolbox 2. Tools for the economic analysis of seasonal influenza vaccination



Several tools are available for conducting economic analysis of influenza vaccination:

**WHO Guide for Standardization of economic evaluations of immunization programmes (WHO/IVB/08.14)**

 [http://apps.who.int/iris/bitstream/handle/10665/69981/WHO\\_IVB\\_08.14\\_eng.pdf](http://apps.who.int/iris/bitstream/handle/10665/69981/WHO_IVB_08.14_eng.pdf)

**WHO Manual for Estimating the Economic Burden of Seasonal Influenza (WHO/IVB/16.04)**

 <http://apps.who.int/iris/bitstream/handle/10665/250085/WHO-IVB-16.04-eng.pdf>

**Guidance on the economic evaluation of influenza vaccination (WHO/IVB/16.05)**

 <http://apps.who.int/iris/bitstream/handle/10665/250086/WHO-IVB-16.05-eng.pdf>

The costs and economic benefits of influenza vaccination of health workers are likely to depend on several factors, including the number and categories of health workers targeted, the incidence and severity of infection in the targeted health workers, their contribution to health care-associated transmission and the consequences of such infections. These factors may vary between different health facilities and will vary from one influenza season to another.

A recent systematic review of the epidemiological and economic effects of seasonal influenza vaccination of health workers found that vaccination of health workers was cost-saving, based on crude estimates of absenteeism averted through vaccination (15). However, all the studies included in this review were from high-income countries and took an employer perspective with a strong focus on absenteeism averted.

Initial decisions could take vaccination costs and the impact of these costs to the immunization and health budgets into consideration, with the option of measuring cost-effectiveness post-introduction, if required.

Further guidance on costing and budgeting of health worker influenza vaccination, with links to the available costing tools and resource materials on immunization financing are covered in the next section of this manual.

### **Characterizing the target groups for vaccination**

Ideally all health workers should be targeted for vaccination, including those who may not come into direct contact with patients. Even if not in direct contact, health workers could potentially transmit infection acquired in the community to colleagues and, thereby, participate in the chain of health care-associated transmission of infection. However, in situations where there are resource constraints or limited or unstable vaccine supplies, categorization and prioritization of health workers for vaccination would be required. Prioritization of health workers would depend on assessment of risk of infection among the health workers themselves, transmission of infection to their patients and the consequences of health care-associated transmission.

Even without financial resource constraints or limitations in vaccine supply, categorization of health workers would be useful when different policies are applied to different health worker categories, based on risk assessment. For example, a mandatory vaccination policy may be applied to select categories of health workers who work with patients at high risk of severe influenza and who are more likely to accept mandatory vaccination, while vaccination may be voluntary for other categories (40, 41).

**Table 1** provides an example of risk categorization of health workers based on risk to themselves and of those for whom they care.

The very high-risk category is also the one where the evidence for risk and impact of vaccination is the strongest and where there is a stronger justification for vaccination (10).

Those targeted for vaccination should also include part-time personnel, students, contractors, and volunteers at the health facility who have possible exposure to patients as health workers in the above categories.

Risk categorization of individual health workers may be too complex and resource intensive in many settings, especially in low- and middle-income countries. In these situations, simpler approaches wherein health worker categories are classified into only two groups, i.e. at high risk group (targeted for vaccination) and low risk groups (not targeted for vaccination) may be used.

Table 1. Risk categorization of health workers

Risk category	Health worker characteristics
Very High	<ul style="list-style-type: none"> <li>High risk health workers (see below) who work in clinical areas that admit patients at high risk for severe disease, complications, or death following influenza virus infection. These include intensive care units; transplant or oncology wards; antenatal, peri-natal or post-natal areas; and areas with elderly individuals, especially those with chronic diseases.</li> </ul>
High	<ul style="list-style-type: none"> <li>Health workers who come into direct physical contact with patients, or with infectious materials, including surfaces or equipment contaminated by infectious materials.</li> <li>Health workers who have contact which is not physical but that would allow the acquisition or transmission of diseases that are spread at short range (1 - 2 m) by respiratory means, e.g., counsellors who have prolonged fact-to-face contact (42, 43).</li> </ul>
Low	<ul style="list-style-type: none"> <li>Health workers who do not have contact with patients and whose normal work is not in a clinical area as defined above.</li> </ul>

To ensure targeted use of influenza vaccination of health workers and to address potential uptake issues, national policies for health worker vaccination should outline:

1. The classification of different health worker categories based on assessment of risk.
2. The policy for vaccination for each category, e.g. whether vaccination is recommended and whether the recommendation is for mandatory or voluntary vaccination.
3. Strategies for managing non-compliant health workers and vaccine refusers.

The following document provides an example of a framework for the assessment, classification and prioritization of health workers:



The policy directive of the New South Wales Ministry of Health on the Occupational Assessment, Screening and Vaccination Against Specified Infectious Diseases

[https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2018\\_009.pdf](https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2018_009.pdf) (Accessed 14 Mai 2019)

### Framing an immunization policy for health workers

Recommendations for health worker vaccination could propose either mandatory vaccination, voluntary vaccination or a mixed approach depending on the risks in the specific clinical setting.

Multiple studies across many countries has demonstrated that voluntary vaccination of health workers, even when accompanied by considerable efforts to educate them on the benefits and risks of vaccination and implementation of measures for convenient access to vaccination, results in low coverage that seldomly exceeds 70%. On the other hand, mandatory vaccination has resulted in close to 100% uptake in institutions in the United States where it has been applied (44–46). However, mandatory vaccination has been difficult to implement in some countries because of acceptability issues and because the attributable benefits of health worker vaccination have been a subject of debate (32). Furthermore, it may not be feasible to implement mandatory vaccination policies in resource-constrained settings.

### **Voluntary vaccination**

One option for a vaccination policy for health workers is voluntary vaccination wherein vaccination is recommended for health workers and offered but acceptance is voluntary or optional, i.e. not a requirement. Such programmes often have low vaccination coverage. Hence, with voluntary vaccination, extra efforts are required to optimize the uptake of vaccination. These could include:

1. A robust communications strategy, specifically tailored to the needs of different health worker categories, to explain the benefits and risks of vaccination, including the benefits to patients, especially those at high risk for severe disease. It needs to be emphasized that some of these patients, including the elderly and immunocompromised patients may not themselves respond to vaccination and that vaccination of health workers who come into contact with them is an important means for protecting them from infection, i.e. a professional ethics and moral argument
2. Convenient access to vaccination that is free of charge, and available to workers in every shift. Those who work during evening or night shifts might be provided access to vaccination either at the beginning or the end of their shifts or on designated days and times to cover their shift.
3. Other demand generation activities as outlined in the next section of this manual.

A number of soft mandates may also help in increasing vaccination uptake, including:

1. Requirement of active declination of vaccination through signing of forms indicating their non-participation with or without stating the reasons for not accepting vaccination (see **Annex 1** for a sample of an active declination form).
2. Reassignment of health workers who refuse vaccination to areas where they are less likely to come into contact with high risk patients, if this is feasible, or a requirement to wear masks when they do care for patients at high risk of influenza complications.
3. Use of face masks while in the health care facility.

### **Mandatory vaccination**

Mandatory vaccination makes vaccination of health workers a legal or regulatory requirement while allowing some exemptions, e.g. medical contraindications. There is no WHO or other uniformly applied definition for mandatory vaccination. Infant and childhood immunization programmes described as mandatory can vary widely, especially in terms of the exemptions allowed and the penalties for non-compliance (47).

Several experts have argued that mandatory immunization policies should be implemented against vaccine-preventable diseases that can be transmitted in the health-care setting and cause significant risk of morbidity or mortality to patients (20, 44, 48–50), as part of the professional ethics of a health care provider.

It has also been argued that few ethical mandates in the practice of medicine surpass the obligation to do no harm. Hence, ensuring conditions for safe patient care by minimizing transmission of communicable diseases represents a minimum ethical standard in health care practice settings (20). However, if mandatory vaccination policies are to be established, legal liability issues

will need to be addressed and consideration given to providing compensation in the rare event of an adverse event.

Mandatory vaccination could either be part of the national policy or implemented at individual health facilities as part of institutional policies. The enactment of legislation endorsing mandatory vaccination would facilitate the implementation of such a policy.

The Code of Colorado Regulations provides an example of a mandatory vaccination policy:



**Code of Colorado Regulations - Standards for Hospitals and Health Facilities 02 – General Licensure Standards (Part 10, Page 46)**

<https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=6020&fileName=6%20CCR%201011-1%20Chap%2002> (Accessed 14 Mai 2019)

Several countries with voluntary health worker vaccination policies for influenza do have mandatory vaccination of health workers for other infections such as measles and hepatitis B. These existing mandatory vaccination policies could be leveraged to also justify and establish mandatory vaccination policies for influenza, based on the protection afforded to the health worker as well as to vulnerable high-risk patients with whom they come into contact.

Published recommendations for the ethical implementation of mandatory vaccination policies are reproduced in **Toolbox 3**. These recommendations may be taken into consideration in framing the national policy based on the feasibility of implementation.

### **Toolbox 3. Recommendations for ethically implementing mandatory vaccination policies**



There must be a compelling employee and patient safety problem that is clearly communicated to employees.

- The least restrictive means should be used to achieve the safety objective.
- There should be clear opt-out criteria for medical reasons.
- Opt-out criteria based on personal views of the health worker should be allowed for current employees only. These determinations must be made in a transparent and objective manner.
- For those who do not meet medical or other exclusion criteria, or who refuse vaccination, institutions should offer alternative means for achieving transmission control, including temporary leave during peak times, mandatory mask wearing, re-assignment to non-clinical areas (if feasible) or frequent testing during peak influenza seasons.
- Prospective employees should be notified of the mandatory policy and recognize that failure to comply could be grounds for termination of employment.
- The process should be transparent, with a broad range of health worker perspectives involved in policy development.
- Institutions should support healthcare workers by implementing vaccination procedures that are free, easy to access, and include complete comprehensive coverage of adverse events. Particular attention should be paid to not burdening less advantaged members of the healthcare team.

*Source : Tilburt JC et al. Vaccine 26S (2008) D27-D30 (1)*

### *Mixed approach*

A mixed approach could also be adopted where a mandatory vaccination policy is applied to only certain categories of health workers likely to have direct physical contact with high-risk patients, while a voluntary vaccination policy is applied to the remaining categories.

Such a policy should clearly and unambiguously define the health worker groups to whom or work areas where mandatory and voluntary vaccination policies apply. Consideration should be given to the human and financial resource implications of mandatory vaccination policies or of soft mandates.

### **Integration with Occupational Health Policies**

Policies on seasonal influenza vaccination of health workers should be an integral part of the national occupational safety and health policies and regulations and the occupational safety and health management systems in health facilities.

Inclusion of seasonal influenza vaccination in occupational health policies will allow access to free vaccination for all the targeted health workers as per the Occupational Safety and Health Convention, 1981, Article 21<sup>4</sup> and the recommendations in the World Health Organization and International Labour Organization (WHO-ILO) Global Framework for National Occupational Health Programmes for Health Workers.<sup>5</sup> Such a policy would also put the responsibility for health worker vaccination on employers, rather than on the health workers alone.

An integrated policy will enable greater coordination and collaboration between occupational health and immunization programmes and promote a joint approach to control of influenza in health facilities wherein vaccination is part of an infection control program that includes other infection measures to protect both health workers and patients. The occupational health programme at the national level and the management system at the facility level also provide an enabling environment to create a culture for infection prevention within the workplace that will stimulate the implementation of the vaccination programmes.

### **Choice of vaccine product, schedule and timing of vaccination**

#### *Choice of product*

WHO provides recommendations for the composition of influenza vaccines based on the information provided by the WHO Global Influenza Surveillance and Response System.<sup>6</sup> Based on these recommendations, manufacturers formulate Northern Hemisphere (NH) and Southern Hemisphere (SH) vaccines, which are generally accessible around September (NH) and April

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<sup>4</sup> C155-Occupational Safety and Health Convention, 1981 (No. 155). [https://www.ilo.org/dyn/normlex/en/f?p=NO\\_RMLEXPUB:12100:0::NO::p12100\\_instrument\\_id:312300](https://www.ilo.org/dyn/normlex/en/f?p=NO_RMLEXPUB:12100:0::NO::p12100_instrument_id:312300) (Accessed 14 Mai 2019)

<sup>5</sup> The sectoral dimension of the ILO's work : Review of sectoral initiatives on HIV and AIDS Appendix II – WHO-ILO WHO-ILO Global Framework for National Occupational Health Programmes for Health Workers. [http://www.ilo.org/wcmsp5/groups/public/---ed\\_norm/---relconf/documents/meetingdocument/wcms\\_145837.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_145837.pdf) (Accessed 14 Mai 2019)

<sup>6</sup> Influenza: vaccines. <http://www.who.int/influenza/vaccines> (Accessed 14 Mai 2019)

(SH) of each year, respectively. A list of WHO prequalified vaccines with information on their characteristics is published on the WHO website.<sup>7</sup>

Several different types of vaccines are available, including inactivated influenza vaccines (trivalent and quadrivalent composition), live attenuated influenza vaccines, adjuvanted vaccine, and recombinant vaccine. Being a health worker per se does not lead to a preference for any vaccine type (subject to country-specific marketing authorizations).<sup>8</sup> Health workers who care for severely immunocompromised persons should preferably receive inactivated influenza vaccine (IIV).

Price and supply availability of each product are additional considerations in informing the choice of product.

### *Timing of vaccination*

In countries where influenza infection is seasonal and seasonality patterns are defined, vaccination should ideally be scheduled before the start of the influenza season, allowing approximately 14 days for induction of protective antibodies. Where delays in securing vaccine supply does not allow ideal timing to be met, vaccination should be initiated as soon as supplies are made available.

Furthermore, individual health workers should never be refused vaccination at any time during the influenza season if they are late in seeking vaccination.

In tropical and subtropical regions where several peaks may occur, vaccination should be timed before the main peak of transmission, using the most recent vaccine formulation available. Where no data on national influenza seasonality are available, countries could use data from epidemiologically similar countries. **Toolbox 4** provides published information of influenza seasonality in the tropics and subtropics.

#### **Toolbox 4. Guidance on choice of product and timing of seasonal influenza**



**Seasonal influenza policy use and effectiveness in the tropics and subtropics.** Geneva: World Health Organization, 2016.

 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4910173/pdf/IRV-10-254.pdf>  
(Accessed 14 Mai 2019)

➡ **Influenza seasonality in the tropics and subtropics – when to vaccinate**  
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0153003>  
(Accessed 14 Mai 2019)

➡ **WHO list of prequalified vaccines**  
[https://extranet.who.int/gavi/PQ\\_Web](https://extranet.who.int/gavi/PQ_Web) (Accessed 14 Mai 2019)

<sup>7</sup> WHO Prequalified Vaccines. [https://extranet.who.int/gavi/PQ\\_Web/](https://extranet.who.int/gavi/PQ_Web/) (Accessed 14 Mai 2019)

<sup>8</sup> In some countries the quadrivalent vaccine is the product of choice. The WHO Strategic Advisory Group of Experts (SAGE) in immunization is currently reviewing the evidence and expected to make a recommendation in 2020.



## Defining monitoring and disease impact measurement objectives

Ministries of Health would benefit from advice from the NITAG or other relevant advisory groups on the monitoring and impact measurement objectives so that they are taken into consideration during the planning and implementation of Monitoring and Evaluation (see **chapter 4**).

NITAGs, with additional inputs from other relevant advisory groups and academia, should make recommendations on:

1. Monitoring and reporting of vaccination coverage, where possible by unit and type of care provided.
2. Measurement of vaccination impact, including:
  - Target groups (health workers and or patients) for impact measurement.
  - Outcomes to be monitored. e.g. influenza-like illness, laboratory-confirmed disease, severe disease, death, absenteeism, patient-related outcomes, etc.
  - surveillance strategies for measuring impact; if at sentinel sites, the number and distribution of sites.
  - Time periods for impact measurement, e.g. continued monitoring for an indefinite period or limited to a certain number of seasons.

These measurements would be useful to the NITAG in reviewing the impact of vaccination and making recommendations for optimizing the impact and the cost-effectiveness of vaccination. Impact measurement could also generate empiric data to allow for estimation of cost-effectiveness of vaccination.

It should be noted that any such measurements should include data collection for multiple seasons since the intensity of transmission, the severity of infection and vaccine effectiveness varies from one season to another. For further details, see the section on Monitoring and Evaluation (**chapter 4**).

## 2. Planning and managing vaccination of health workers

### Planning for successful vaccine introduction

Once a national vaccination policy has been established, it is necessary to convert the policy into operational plans that are fully costed, budgeted and include granular detail on the various programme components related to the introduction of a new vaccine into the national programme.

The general concepts for addition of a new vaccine within the national immunization plans and the management of introduction are outlined in the WHO guide “*Principles and considerations to adding a new vaccine to a national immunization programme: from decision to implementation and monitoring*” (see Annex 3 for New Vaccine Introduction Plan Template). This section provides guidance on the additional elements specific to seasonal influenza vaccination of health workers.

A vaccine introduction plan integrated into the annual plan for immunization along with the associated checklists enable programme planners to ensure that all the necessary preparations are in place for the timely and efficient introduction of a vaccine into the national programme. For easy access the links to the relevant Annexes of the WHO guide are provided in **Toolbox 5**.


#### **Toolbox 5. Links to templates and checklists for a new vaccine introduction plan in “*Principles and considerations to adding a new vaccine to a national immunization programme: from decision to implementation and monitoring*”**




##### **Generic template to guide the development of a national introduction plan**

 [http://www.who.int/entity/immunization/programmes\\_systems/policies\\_strategies/vaccine\\_intro\\_resources/nvi\\_guidelines/Annex3\\_NVI\\_Template\\_EN.doc](http://www.who.int/entity/immunization/programmes_systems/policies_strategies/vaccine_intro_resources/nvi_guidelines/Annex3_NVI_Template_EN.doc) (Accessed 14 Mai 2019)

##### **New vaccine introduction checklist, activity list and timeline of WHO new vaccine introduction guide provides advice on planning budgeting, activities, distribution of roles and responsibilities and timelines**

 [http://www.who.int/immunization/programmes\\_systems/policies\\_strategies/vaccine\\_intro\\_resources/nvi\\_guidelines/Annex4\\_Instructions.pdf](http://www.who.int/immunization/programmes_systems/policies_strategies/vaccine_intro_resources/nvi_guidelines/Annex4_Instructions.pdf) (Accessed 14 Mai 2019)

##### **Corresponding checklist tool**

 [http://www.who.int/entity/immunization/programmes\\_systems/policies\\_strategies/vaccine\\_intro\\_resources/nvi\\_guidelines/Annex4\\_checklist\\_en.xls](http://www.who.int/entity/immunization/programmes_systems/policies_strategies/vaccine_intro_resources/nvi_guidelines/Annex4_checklist_en.xls) (Accessed 14 Mai 2019)

In addition to the generic vaccine introduction checklist, the complementary checklist in **Annex 2** contains a list of issues specific to health worker immunization. The elements of this checklist

should be added (as appropriate) to the more generic checklist of activities. A sample health facility checklist is also provided (**Annex 3**) to guide the preparations for vaccination at the health facility level.

The timelines for planning and introduction should be included in the checklists and/or as a separate Gantt chart to ensure that all the activities are completed in their appropriate order to allow timely implementation of vaccination activities.

Cross-reference should be made to the relevant sections of the occupational health strategies and plans at both the national and health facility level (see previous chapter on integration of health worker influenza policies into occupational health policies and requirements) to facilitate a more cohesive approach to planning and implementation.

The WHO-ILO Global Framework for National Occupational Health Programme for Health Workers recommends that all countries identify the responsible person(s) for occupational health, both at the national and workplace levels. These focal points should be a part of the planning team at the national and health facility levels, respectively. Inclusion of the occupational health focal points would allow for an integrated approach to prevention of influenza in the work place where vaccination forms part of a larger package of interventions for influenza control, including other infection control measures to protect both health workers and patients. The labour – management committees for occupational safety and health in health facilities, where they exist, can help in engaging the management and the workers’ representatives in the implementation of the vaccination programme.

In addition to the national operational plans for the implementation of health worker vaccination, the national comprehensive multi-year plan (cMYP) for immunization should also be updated to include health worker immunization (**Toolbox 6**).

### Toolbox 6. WHO-UNICEF guidelines for multi-year planning



WHO-UNICEF guidelines for developing a comprehensive multi-year plan (cMYP)

➡ [http://www.who.int/immunization/programmes\\_systems/financing/tools/cmyp](http://www.who.int/immunization/programmes_systems/financing/tools/cmyp)

## Costing and financing

As with the addition of any new vaccine to the national vaccination schedule, the vaccine and delivery costs should be estimated and included in the annual and multi-year immunization budgets. In addition to the costs of vaccines and supplies (syringes, needles, safety boxes etc.), costs for vaccine delivery (including human resources), annual communications/education and demand generation efforts at the national and health facility level, and monitoring and reporting would need to be included in the costs. Several tools and resources are available that could be used or adapted for costing, budgeting and securing finances for health workers vaccination (see **Toolbox 7**).

Since communications and other activities/interventions to enhance vaccination uptake will be required each year, these costs should be incorporated into the annual vaccine delivery costs and not considered only as a one-time activity.

## Toolbox 7. Resources for costing and financing



### cMYP Costing and Financing Tool

- ➡ [http://www.who.int/immunization/programmes\\_systems/financing/tools/cmyp](http://www.who.int/immunization/programmes_systems/financing/tools/cmyp)  
(Accessed 14 Mai 2019)

### Immunization Costing Action Network (ICAN) Immunization Delivery Cost Catalogue

This interactive website provides information on vaccine delivery costs across different low and middle-income countries through a variety of delivery strategies.

- ➡ <http://immunizationeconomics.org/ican-idcc> (Accessed 14 Mai 2019)

### WHO Flu tool for planning and costing maternal influenza vaccination (new name: SIICT tool)

This tool is being expanded to include all influenza risk groups, including health workers.

- ➡ [http://www.who.int/immunization/research/development/influenza\\_maternal\\_immunization/en/index2.html](http://www.who.int/immunization/research/development/influenza_maternal_immunization/en/index2.html) (Accessed 14 Mai 2019)

### Management Sciences for Health. Planning, costing and budgeting framework

- ➡ <http://www.msh.org/resources/planning-costing-and-budgeting-framework> (Accessed 14 Mai 2019)

### Immunization financing: a resource guide for advocates, policy makers and program managers

- ➡ <https://immunizationeconomics.org/imfin> (Accessed 14 Mai 2019)

In addition to costing and budgeting for annual health worker influenza vaccination, it may also be necessary to advocate with those responsible for allocating funds for health programmes to ensure that financing for vaccination is sustained. **Toolbox 8** provides links to resources for advocacy for sustainable financing.

## Toolbox 8. Resources for costing and financing



### Immunization advocacy library: Provides a number of tools and guides to convey the value of vaccination and the need to invest in vaccination

- ➡ <http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/communication-and-advocacy/immunization-advocacy-library> (Accessed 14 Mai 2019)

Two specific documents in this library are of relevance:

#### Workbook – advocacy for sustainable funding of immunization programmes

- ➡ <http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/2015/workbook-advocacy-for-sustainable-funding-of-immunization-programmes>  
(Accessed 14 Mai 2019)

#### How to prepare a financial profile of your immunization programme

- ➡ <http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/2015/how-to-prepare-a-financial-profile-of-your-immunization-programme>  
(Accessed 14 Mai 2019)

## Formative research to inform the planning process

To prepare for the launch of influenza vaccination, several countries have used formative research to better understand the factors affecting uptake of seasonal influenza vaccination in health workers, including concerns, beliefs, information needs, cultural issues, and barriers to vaccination in order to develop a tailored plan to address them.

Formative research can include both quantitative and qualitative research and, in some situations, might include a desk review. Quantitative research may be used to identify the main predictors for low uptake of vaccination among health workers and the main drivers for compliance with vaccination recommendations. Data may be collected through surveys and questionnaires administered to health workers. The sample should ideally include sufficient representation from the different categories of health workers since the perceptions and reasons for low uptake may vary between health worker groups, e.g. between doctors and nurses (40), as well as from a sample of primary, secondary and tertiary health care facilities and from different work areas within these facilities.

Qualitative research is insight research, based on understanding the audience's point of view. It elucidates new issues and provides a more in-depth understanding of the complex issues underlying the uptake of vaccination. Qualitative research methods commonly include focus group discussions and individual in-depth interviews. The WHO European Regional Office has published a step-by-step field guide to qualitative research for new vaccine introduction (see **Toolbox 9**). To be useful, formative research must be properly planned and well executed, failing which there is a risk of drawing wrong conclusions. This requires time and resources. While it is useful to conduct such research to inform the planning process, if time and resources do not permit, the lack of such research should not delay seasonal influenza vaccine introduction, unless attitudes of health workers are expected to be an issue that may significantly and adversely impact vaccine uptake.

### Toolbox 9. Field Guide for qualitative formative research



#### A field guide to qualitative research for new vaccine introduction

 [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/359878/EIW2018\\_FieldGuide\\_VaccineIntro.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/359878/EIW2018_FieldGuide_VaccineIntro.pdf)  
(Accessed 14 Mai 2019)

When data from formative research are not available, data from such studies conducted in other countries may be used to inform the planning process. While the reasons for low uptake of vaccine are heterogeneous, available evidence suggests that there is broad convergence on the major influencers of vaccine uptake among health workers, especially between countries within the same sub-region, which may be used in the initial planning process. The rapid appraisal of evidence (10) summarizes the key findings from the published literature and this evidence could be used, as applicable and appropriate, in the absence of locally conducted research.

Data from the published literature may be complemented with information obtained through quantitative formative research using rapid surveys in a sample of health workers, ideally including different health worker categories. These surveys may be less resource intensive than qualitative formative research and could be completed without resulting in any delays to vaccine introduction. **Annex 4** provides a sample questionnaire that may be used for such surveys.

Further research may be conducted if vaccine uptake remains persistently low. The TIPflu tool is an important resource that may be used in such situations.

## Communication and vaccine acceptance

Personal beliefs, cultural attitudes and perceptions about vaccination, in addition to official recommendations, often guide the actions of many of those responsible for delivery of vaccines and many recipients (51, 52). This also holds true at the level of health workers. Available evidence shows that there are often misperceptions about vaccination as well as a gap between knowledge and behaviours (53, 54). Thus, simply improving knowledge about the risks and benefits of vaccination among health workers has not proven to be sufficient to achieve optimal vaccination uptake. Achieving optimal vaccination coverage in health workers requires a multi-dimensional demand generation effort that is informed by a good understanding of the perception, motivators and barriers of vaccine acceptance among health workers, both as providers of vaccination and as recipients.

Communications messages need to be tailored to address the needs of different health worker groups since available evidence suggests that perceptions about the need, risks and benefits of vaccination may vary between these groups (55). Current efforts mainly focus on preparing fact-based approaches to preparing communication messages. However, these types of messages may need to be framed according to the intended audiences based on their level of education and understanding. Taking the preferred cognitive decision-making styles of the individual groups to be targeted into account may have greater impact (54). Framing such messages will require an understanding of vaccine psychology and cognitive decision-making and may require engagement of communication specialists.

A traditional approach to communications regarding immunization was through the use of mass media. However, research has shown that mass media alone and a one-way communication to health workers may not be sufficient to optimize the uptake of vaccination. Individual and group communications, in this instance at the health facility level, will be required to build trust and motivate health workers to accept vaccination.

Including information on the relevance of vaccination of health workers (self-protection, responsibilities towards patients, pandemic preparedness in the case of influenza) in pre-service curricula for medical schools, nursing schools and other training institutions targeting health professionals may help to better establish health worker vaccination as an organizing concept and create better informed health worker generations providing immunization.

Effective communications and demand generation activities are not a one-time event but need to be continuous and have the ability to quickly respond to the evolving perceptions about vaccination and quell rumours and mis-perceptions. Front line vaccination staff responsible for health worker influenza vaccination will need to be trained to be able to deal with vaccine hesitant health workers as well as vocal vaccine deniers<sup>9</sup> who may negatively impact the uptake of vaccination (56).

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<sup>9</sup> Vocal vaccine deniers are at the extreme end of the subgroup of vaccine refusers and actively advocate against vaccination, using science denialism techniques to justify their beliefs (reference 32).

A national vaccine communication working group that includes communications specialists will facilitate strong working relations with and collaboration among partners and allies, strengthen routine communication for immunization, and ensure well-coordinated and immediate response from all involved authorities to any safety event. Inclusion of members of the Occupational Safety and Health department and from professional societies in communicating with health workers contributes to building trust and improving acceptance of vaccination. Representation from health workers, professional associations, and unions and from the different health worker categories targeted for vaccination would ensure that the viewpoints of each health worker category is taken into consideration in developing tailored communication materials.

A number of tools and guidance documents are available that can be used for developing an effective communications strategy and for framing the communications messages that are specifically tailored towards different health worker groups, including a template terms of reference for a vaccine communication working groups (**Toolbox 10**).

### **Toolbox 10. Tools and guides for developing communications strategy and messages**




#### **Vaccination and trust library**

➡ <http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/vaccination-and-trust> (Accessed 14 Mai 2019)

#### **New vaccine introduction: checklist for planning communications and advocacy (2017)**

➡ <http://www.euro.who.int/en/health-topics/disease-prevention/vaccines-and-immunization/publications/2017/new-vaccine-introduction-checklist-for-planning-communication-and-advocacy-2017> (Accessed 14 Mai 2019)

#### **Template terms of reference for a vaccine communication working group**

 [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0005/337496/02\\_WHO\\_VaccineSafety\\_SupportDoc\\_TOR\\_Proof7.pdf](http://www.euro.who.int/__data/assets/pdf_file/0005/337496/02_WHO_VaccineSafety_SupportDoc_TOR_Proof7.pdf) (Accessed 14 Mai 2019)

In addition to vaccination, the information and education and communication materials should also include information on other infection control measures to reduce transmission of influenza in the work place and steps to be taken should a health worker develop an influenza like illness.

### **Communications at the health facility level**

Effective communications at the health facility level will benefit from a dedicated and well-trained team to deliver the communications strategy at the health facility level. Such a team should be established and trained well in advance of the planned introduction date and should include representation from the main health worker categories in the facility and an advocacy and communications specialist, if one is available. Ideally, communications for seasonal influenza vaccination should be part of a broader communications effort on control of influenza in health care settings.

Communication activities at the health facility level should begin sufficiently in advance of the planned date for the onset of vaccination, especially in countries introducing vaccination for the first time. Initial activities could include the display of information posters at all the relevant areas of the health facility. The manager of the health facility and the heads of all the relevant departments and clinical areas should be sent a formal communication along with sufficient copies of all information materials about vaccination to be displayed in each clinical area. Where possible, relevant information on influenza vaccination could also be sent to all health workers using e-mail and/or local social media networks.

In-person group briefings should complement the display and distribution of information materials. Existing staff meetings could be leveraged to conduct these briefings. The number of in-person group briefings will depend on the size of the health facility and the number of targeted health workers. Larger health facilities (e.g. secondary and tertiary level health facilities) may need to conduct several briefing sessions to cover all the targeted health workers. Since communications messages may differ between different categories of health workers, consideration should be given to holding separate briefing sessions for each health worker category using information and materials relevant to them. To allow better communication and enough time for questions from health workers to be addressed, the size of each group should be designed to allow sufficient opportunity for interaction. Provision should be made to facilitate the participation of health workers working night shifts. The schedule for the briefings should be widely publicized within the health facility and reminders sent to promote high attendance.

In-person meetings should:

1. Explain why vaccination is important for themselves, their patients and families and for wider society – with a particular focus on severe outcomes associated with influenza;
2. Inform health workers about national policies;
3. Provide information on the safety of seasonal influenza vaccines;
4. Provide information on the timing and venue(s) for vaccination;
5. Explain potential consequences of non-vaccination;
6. Allow sufficient time for questions.

Consideration may be given to establishing a telephone hotline or web-based system to address questions from individual health workers. In addition to the display of posters and other communications materials, the use of visible and removable stickers that can be displayed by health workers who have been vaccinated (e.g. on their ID badges) would serve as a visible reminder to their colleagues who have not been vaccinated. In addition, text messages, generic e-mails and social media platforms could be used to provide periodic reminders on vaccination.

### **Demand Generation at the Health Facility Level**

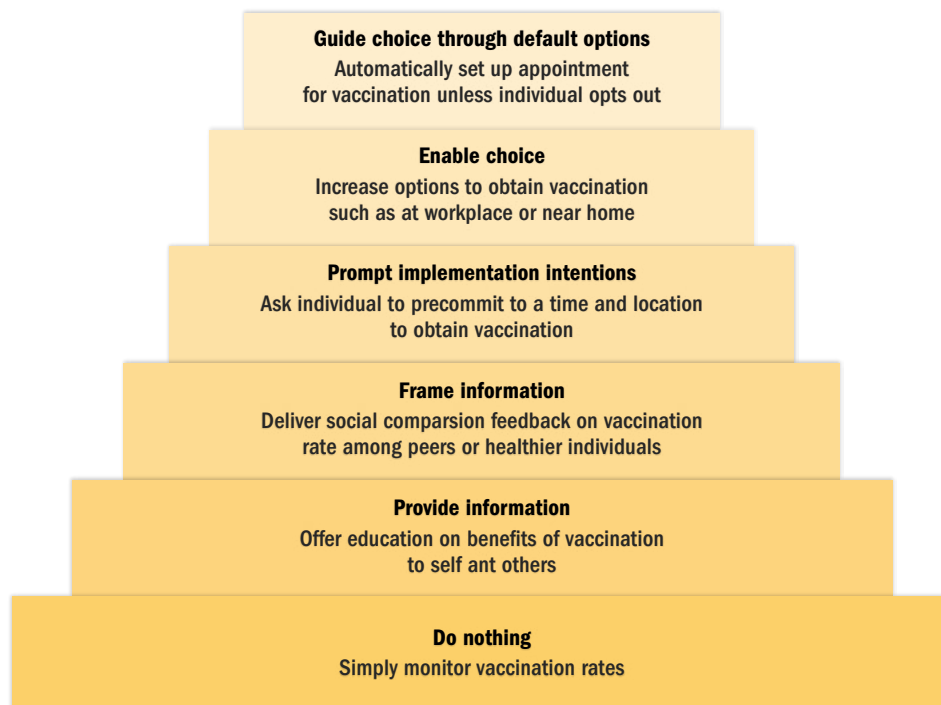
In addition to communication strategies, behavioural science-based demand generation efforts can be implemented prior to the availability of vaccines in order to prime health workers for vaccination. These nudge-based interventions work by creating an environment that can influence behaviour in a predictable way but does not eliminate choice (57), and have proven effective in a variety of healthcare settings (58). These interventions can narrow the gap between intention



and actual behaviour, which is usually caused by individuals or health workers forgetting to get their vaccination or through barriers to convenient vaccination. Additionally, these interventions frequently can be implemented for relatively low cost (59). The figure below (**Figure 3**), adapted from the Nuffield Council on Bioethics, demonstrates the hierarchy of nudge-based interventions to improve vaccine uptake (60).

Nudges lower on the ladder are less aggressive but can still have a measurable impact. By providing health-facility vaccination rate feedback, a process used in the United States to improve uptake of childhood vaccination, progress in health facilities can be monitored, and provide motivation to health workers to improve their own vaccination practices (61).

**Figure 3.** Ladder of nudge interventions to increase vaccination rates. Source: Patel MS (ref. 32)



Reminders to individuals to vaccinate can serve as a nudge, notifying individuals when they are due for a vaccine and prompting them to come to the vaccination site to receive the vaccine. These can be paper-based or mobile phone text message-based and have proven effective (62). In the health facility, health worker reminders through an immunization data collection tool (whether paper- or electronic-based) can help improve the delivery of vaccines by health workers (59).

A successful nudge-based strategy to reduce barriers to convenient vaccination and enable choice is standing orders. Standing orders are a policy put in place in a health facility that permits non-physician health workers to administer vaccines without a prescription or explicit order from a physician and have proven one of the most effective strategies for improving vaccine uptake when applicable (63). All of these strategies can be combined with communication approaches to create demand in the community.

### Going beyond nudges

Nudges are a favoured method for influencing demand since they preserve choice and are not coercive. However, some experts have argued that when nudges fail to achieve optimal uptake of vaccination in health workers, and this failure results in harm to their patients, decision-makers should consider adopting more forceful policies (64). This is not to imply that when nudges fail one should immediately go to measures that eliminate choice. There are interventions that exist across a continuum leading up to restriction of choice. The use of “soft mandates” provide examples of actions across this continuum.

#### Case study: The «flupalooza» campaign to increase uptake of seasonal influenza vaccination in health workers

Vanderbilt University Medical Center in Nashville, Tennessee, in the United States, employs over 24,000 health workers. Since 2011, the cornerstone of its seasonal influenza vaccination campaign for health workers has been its mass influenza vaccination event, playfully named “flupalooza”. This event vaccinates, on average, over 14,000 people in a single day. The closed point-of-dispensing (c-pod) design has been evaluated and refined over time to substantially increase administration efficiency and coverage rates. The event emphasizes a festive atmosphere while practicing critical pandemic vaccination skills among hospital occupational health and administrative leadership.

This event achieves high coverage among categories of health workers who are present that day; however, due to the structure of nursing shifts and ward responsibilities at the institution, less than 30% of nursing staff are typically vaccinated at the event. Thus, the medical center combines flupalooza with ward visits, mobile carts and other strategies to achieve its annual target of greater than 90% overall health worker vaccine coverage. Notably, although institutional policy gradually increased the difficulty of declination and eventually included disciplinary action in response for unexcused failure to vaccinate, it is notable that 92% coverage had been achieved in seasons before disciplinary policies were in place. Details of event design, workflow diagrams and practical, specific lessons learned are described in a publication available online.

Source: Swift MD, Aliyu MH, Byrne DW, et al. Emergency preparedness in the workplace: the flupalooza model for mass vaccination. *American Journal of Public Health*. 2017 sep;107(s2):s168-76.  
<http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2017.303953>

**Annex 5** provides a table that lists the different communications and demand creation approaches, along with an indication of the effort required to implement the approach and the expected impact.

## Vaccine procurement and supply chain management

### Vaccine procurement

Accessing vaccines at optimal prices requires a good understanding of procurement mechanisms and systems, vaccine market dynamics, and the elements of vaccine pricing. Procurement starts with forecasting vaccine demand, followed by tendering, contracting and procurement processes. The tools and resources for vaccine procurement are listed in **Toolbox 11**. Procurement of seasonal influenza vaccination may have some unique features and may require regulatory approvals

and advance purchase commitments with specific manufacturers shortly after the publication of the WHO recommendations on the seasonal vaccine formulation (in February for the northern and in September for the southern hemisphere) and well in advance of the influenza season.

### Toolbox 11. Vaccine procurement tools



#### Procurement mechanisms and systems

- ➡ [http://www.who.int/immunization/programmes\\_systems/procurement/mechanisms\\_systems](http://www.who.int/immunization/programmes_systems/procurement/mechanisms_systems)  
(Accessed 14 Mai 2019)

#### Vaccine product, price and procurement (V3P) web platform

- ➡ [http://www.who.int/immunization/programmes\\_systems/procurement/v3p/platform](http://www.who.int/immunization/programmes_systems/procurement/v3p/platform)  
(Accessed 14 Mai 2019)

#### Vaccine market

- ➡ [http://www.who.int/immunization/programmes\\_systems/procurement/market](http://www.who.int/immunization/programmes_systems/procurement/market)  
(Accessed 14 Mai 2019)

#### List of WHO prequalified seasonal influenza vaccines

- ➡ [https://extranet.who.int/gavi/PQ\\_Web/](https://extranet.who.int/gavi/PQ_Web/) (Accessed 14 Mai 2019)

## Selection of the vaccine product and presentation

As with any other vaccine, the choice of product and presentation will depend on multiple factors including supply availability, price, ease of use, storage and transport requirements, vaccine wastage and missed opportunities for vaccination (e.g. postponing vaccination due to reluctance to open a 10-dose vial for only one or two individuals). The choice of vial size should be based on the number of doses to be delivered at each vaccination point and the number of sessions to be held at each point. The currently prequalified injectable seasonal influenza vaccines are available in single dose pre-filled syringes and in single and 10-dose vials. All the 10-dose vial presentations contain thiomersal as a preservative. However, it may be noted that not all the currently available prequalified products in 10-dose vials have market authorization for storage up to 28 days once opened, and not all products have a vaccine vial monitor (VVM). These aspects should be taken into consideration in selecting the product and presentation. The specifications of each product and presentation should be checked to confirm that they meet the requirements of the programme before a procurement order is placed. Information on WHO prequalified vaccines may be found on the WHO website (see **Toolbox 11**).

Forecasting vaccine demand is an important first step in vaccine procurement. Forecasting demand requires an estimate of the number of health workers who will be targeted for vaccination, the expected vaccination coverage, and an estimate of vaccine wastage. Ideally health workers in both public and private facilities would be targeted for vaccination. This process of estimating the size of the target population for health workers vaccination is likely to be more complex than for other vaccines targeting the general populations. The data to derive such estimates may also be more difficult to find, especially in low and middle-income countries. **Toolbox 12** provides resources for estimating the size of the health work force and those that need to be targeted for vaccination.

## Toolbox 12. Resources for estimating target population size



### Global Health Observatory: Health Workforce

➡ [http://www.who.int/gho/health\\_workforce](http://www.who.int/gho/health_workforce)

### Global Health Workforce Statistics database. World Health Organization, Geneva

➡ <http://www.who.int/hrh/statistics/hwfstats>

### World Health Organization. Counting health workers: definitions, data, methods and global results. Geneva, 2007

📄 [http://www.who.int/hrh/documents/counting\\_health\\_workers.pdf](http://www.who.int/hrh/documents/counting_health_workers.pdf)

The global health workforce databases may not carry information on all the health workers categories that may be targeted for vaccination. For example, global databases may only have estimates of the numbers of doctors, nurses and midwives, but not other health worker categories. In such instances, rough estimates could be made based on ratios of those health workers for whom data are not available to those where data are available (e.g. ratio of physicians to laboratory workers). These ratios could be quickly obtained through a survey of a small representative sample (e.g. tertiary, secondary and primary) of health facilities.

Since each health facility may be required to prepare beneficiary lists with the names of those targeted for vaccination, for tracking vaccination delivery, and for maintaining records of those vaccinated; the initial demand forecasts could be refined in subsequent years using data from these beneficiary lists and vaccination records.

## Toolbox 13. Vaccine management and support resources



The resources that can assist programme managers in supply chain and logistics support planning may be found at the WHO website at:

📄 [http://www.who.int/immunization/programmes\\_systems/supply\\_chain/resources/tools/en/index4.html](http://www.who.int/immunization/programmes_systems/supply_chain/resources/tools/en/index4.html) (Accessed 14 Mai 2019)

## Logistics and cold chain management

The handling of influenza vaccine is similar to most other vaccines in the national immunization programmes. It needs to be stored at 2–8 degrees Celsius. Since vaccination of health workers is expected to occur annually during a relatively short window period each year before the onset of the influenza season, a plan needs to be developed to ensure storage and transport of vaccine at the different levels involved in the supply chain during the window period chosen for vaccination. Tools and resources for vaccine forecasting, management and logistics are available on the WHO website (**Toolbox 13**). The cold chain volume requirement for each WHO prequalified product and presentation are available on the WHO website (please select the vaccine type and click on

the links for each individual product and presentation to obtain this information).<sup>10</sup> At the health facility level, the focal point responsible for health worker vaccination should ensure that the vaccine doses required in the facility are included in the demand forecast and that sufficient storage space to accommodate the required vaccine doses is available prior to the anticipated date of vaccine arrival at the health facility.

## Vaccination of health workers

Vaccination of health workers should ideally take place at the health facilities where the targeted health workers normally work to ensure convenient access to vaccination.

### Case study: Using an immunization champion to enhance uptake of influenza vaccination in health workers in Oman

Oman has a universal free-of-charge, integrated health care system, which includes influenza vaccination of health workers. Oman is one of the few high-income countries in the WHO Eastern Mediterranean Region (EMR) that has achieved high influenza coverage among health workers (>80%). This was made possible by immunization champions. The minister of health in Oman is passionate about protecting the health of health workers and is at the forefront in taking the first influenza seasonal vaccine. As the patron of health worker community and an influential person in the country, this action has reinforced the importance of vaccination and continually helps promote influenza immunization programs. He has also been personally involved in the communication of vaccination messages to the health worker community.

Every health facility should prepare a health facility plan for implementing seasonal influenza vaccination of health workers well ahead of the influenza season. These plans should include measures to enable convenient access to vaccination for health workers in every shift. Different options may need to be determined at the health facility level to cover health workers during night shifts without resorting to 24-hour vaccination services, for example insuring the availability of vaccination just before or after a shift change.

A vaccination team should be established at the level of the health facility to coordinate the vaccination activities and optimize uptake under the overall supervision of the head of the facility. One person should be designated as the team leader. This could be either the occupational safety and health focal points, or the persons responsible for immunization activities in the health facility. In larger facilities the staff medical services may be tasked with this activity. Experience from some organizations and health facilities have shown that using “vaccination champions” from among the health workers may contribute to improving vaccination uptake among their peers. In some countries, a mobile team that goes to each clinical area in the health facility and provides vaccination has been successfully used.

<sup>10</sup> WHO prequalified vaccines. [https://extranet.who.int/gavi/PQ\\_Web/Browse.aspx?nav=3](https://extranet.who.int/gavi/PQ_Web/Browse.aspx?nav=3)

## Training of the vaccination team

Training workshops for health facility vaccination focal points should be conducted to conduct training in developing a health facility plan and in implementing and monitoring vaccination activities. A standardized agenda, curriculum, resource documents, checklists and model forms for recording data, as required, should be created at the national level for use in these workshops so that training is uniform across all health facilities. To further ensure uniform training, the workshops could be conducted using teams of trainers who are themselves trained centrally and are assigned to each region/ subregion, using a cascade training approach. Short training videos may be used to achieve uniformity in content in the training. Web-based self-learning modules may be considered for those who were unable to attend the training sessions.

The health facility vaccination team should have the capacity to classify health worker groups (see **chapter 2** for sample risk categorization of health workers) and establish a list of health workers eligible for vaccination, with their designations, and areas of work. Where different vaccination policies apply to different risk categories, either separate lists should be created, or mechanisms established to easily identify and monitor the vaccination status of those in each category. The beneficiary lists should be developed sufficiently in advance of the start of vaccination activities and the relevant health workers informed on the need for vaccination.

In addition to health workers employed at the health facility, provision may be made to include health workers in smaller facilities within their catchment area, including private facilities, as per the national policy, should vaccination not be available at all facilities.

A mechanism for defaulter tracking and for sending reminders should be established at each health facility. For health workers who come into contact with high risk patients, (e.g. those in organ transplant, oncology, intensive care or perinatal units), the supervisors of those who have not been vaccinated before the start of the influenza season may need to be informed (local confidentiality norms permitting) so that they can reinforce the written reminders or, in case of refusals, get active declination forms signed and institute infection control measures applicable to active refusals, e.g. reassignment of duties, wearing of masks etc. as per the established national of health facility policy.

## 3. Monitoring and evaluation

All countries should have a mechanism in place to monitor vaccine coverage as well as adverse events following immunization (AEFI) from the health facility to the national level and conduct at least one influenza vaccine post-introduction evaluation. However, measuring vaccine acceptance and vaccine effectiveness or impact will be necessary and feasible only in a setting where immunization targets are not reached and if funding is available.

### Developing and updating information systems

Appropriate forms and data entry modules for recording and reporting vaccination data at the health facility level and processes for reporting the data should be established.

In developing tools and guidance for data collection, the need to include both public and private health systems should be considered. This may require mapping of existing health information systems and immunization data collection instruments as well as guidance on how these systems may be used to collect data on seasonal immunization of health workers.

Data collection systems may vary across health facilities depending on the size and available infrastructure of the facility. However, each health facility must be provided with a standardized data reporting form to ensure that the data required for reporting to the national level are collected, irrespective of the data recording system used. This could include the name of the health worker, the health worker category, area of work, risk category, date of vaccination, the vaccine product and lot number. In developing the data reporting form, the advice provided by the NITAG on monitoring and impact assessment should be considered.

All data collection systems, whether paper-based or electronic should have the capability for defaulter tracking and a system for generating and sending out reminders to defaulters. When using such reminder systems, protecting the confidentiality of data on the health and vaccination status of health workers will be critical and access to the data should be restricted to the facility vaccination coordinator.

### Coverage monitoring

Several approaches for estimating health worker influenza vaccine coverage are available. The timing of such coverage measurement is important and should be coordinated with the timing of vaccination in the country. Given that influenza vaccine is usually administered in seasonal campaigns, frequent reporting (e.g. monthly) is recommended. Ideally, assessments should be done at the end of the season, when complete data are available and assessed and data cleaned for any inconsistencies.

## Health facility registries

Information on influenza vaccines administered to health workers should be included in existing records maintained as part of occupational health requirements and in vaccination registers as part of institutional monitoring mechanisms. Careful assessment of data discrepancies is required if reporting is done from multiple sources, and data protection issues should be judiciously considered. The minimum set of data will include the number of people receiving influenza vaccination during each annual season, the total number of targeted health workers, and the derived vaccination coverage (%). Often both numerator and denominator data can be obtained from the departments of occupational health at health facilities. For establishing more detailed denominators, nominal health worker records e.g. based on payrolls can be used as a first step. A beneficiary list of those targeted for influenza vaccination can be selected from these records by applying criteria related to the health worker's risk of infection or of transmitting the infection to those for whom they care (see section on 'Characterizing Target Groups for Vaccination' and **Table 1**). Depending on the capacity of the reporting system and program, this could include tallying numbers by health worker category and risk profile to allow coverage estimates by subcategories, such as doctors, nurses, laboratory workers, or staff working in Intensive Care Units or general (e.g. medicine or paediatric) wards, etc.

If a vaccination registry does not exist, a crude estimate of coverage among health workers could be calculated by using the number of vaccine doses distributed to each facility minus the number of vaccine doses returned (unused) divided by the estimated number of health workers targeted for vaccination at the facility.

A similar, rather imprecise method to assess coverage at the national level would be to use the regularly compiled data on health workers (as reported to WHO) to estimate the denominator (see **Toolbox 12**), as used for the vaccine demand forecast, and the overall number of vaccines administered as the numerator. This approach should only be used as a last resort where none of the other methods described are feasible.

## Administrative data

If vaccines are provided free to health workers with government, national insurance system or employers bearing the costs, there may be regular, sometimes mandatory, reporting on the number of health workers who have received vaccinations at the institutional level. Such administrative data may be available from well-documented national vaccine programmes or from health insurance records.

## Surveys

Surveys to obtain data on vaccinations and other interventions should be performed every 3 to 5 years and allow the identification of heterogeneity of coverage at the subnational level, important for the necessary adaptation of immunization practices. A representative sample of health workers can be selected through a stratified random sampling approach from national registries of health workers (e.g. professional organizations). If such registries are not available, a two-stage selection of health facilities and of health workers in these facilities can be done. If contact information is available, standardized interviews could be done face-to-face, by phone or via internet-based platforms. Without such information, online survey links could be provided to all health workers in the selected facilities with an invitation to access the survey platform using their mobile phones



or personal computers. It should be noted that when using this approach, self-reporting of vaccination may lead to overreporting.<sup>11</sup>

In all of these approaches to estimate coverage it will be important to specify the categories of health workers, e.g. those with or without direct patient contact, the latter including students, trainees, volunteers, maintenance, information technology, food service staff etc., who have been included in the numerators and denominators. It is also important to specify if part-time personnel working during the influenza season were included in the coverage estimates. Where individuals for whom vaccination is not recommended are vaccinated, such as back office workers or staff relatives, etc., care must be taken not to count these in estimating vaccination coverage. Refusal and completion rates of surveys will need to be monitored and adjustments for possible selection biases made in the analysis.

At times, influenza vaccination programs may merely set absolute number targets of health workers to be vaccinated, based on the number of vaccines procured and available in a specific area or location. Such an approach, while followed in some countries, will not allow the proper estimation of coverage rates, including coverage by risk category, or comparisons over time, which will be important for interpreting any data on impact. It will also not enable identification of determinants of vaccination or of refusers.

#### Toolbox 14. Monitoring and evaluation tools and indicators




**Immunization in practice series, module 7: Monitoring and using your data.** Describes how to collect and report data and how to monitor immunization performance

 [http://www.who.int/immunization/monitoring\\_surveillance/resources/IIP\\_Module7.pdf](http://www.who.int/immunization/monitoring_surveillance/resources/IIP_Module7.pdf)  
(Accessed 14 Mai 2019)

**Training for mid-level managers. Module 7: The EPI coverage survey** (Document WHO/IVB/08.07). Geneva: World Health Organization; 2008. Provides a step-by-step walkthrough, including relevant guidance and tools, to plan and conduct a coverage survey of a newly introduced vaccine

 [http://who.int/immunization/documents/MLM\\_module7.pdf](http://who.int/immunization/documents/MLM_module7.pdf) (Accessed 14 Mai 2019)

**WHO reference for estimating influenza vaccination coverage among target groups:** Outlines different methodologies that can be used to estimate national influenza vaccine coverage among high-risk groups targeted for vaccination

 [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/317344/Methods-assessing-influenza-vaccination-coverage-target-groups.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/317344/Methods-assessing-influenza-vaccination-coverage-target-groups.pdf) (Accessed 14 Mai 2019)

If available, data as well as methods used to estimate vaccination coverage for other regular health worker vaccinations should be accessed, e.g. for hepatitis B, measles, polio, pertussis or tetanus vaccines. It must be noted, however, that these vaccines are not provided on an annual basis and will often only be checked at entry to service.

**Toolbox 14** lists available tools for collecting and reporting immunization data and for estimating coverage.

<sup>11</sup> Lluvia A et al. Vaccination Behaviour Influences Self-Report of Influenza Vaccination Status: A Cross-Sectional Study among Health Care Workers. PLoS One 2012; 7(7):e39496. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3394773/>

## AEFI monitoring

As for any vaccine and target group, a functioning AEFI monitoring system is a basic requirement, since knowledge gaps and misperceptions about influenza vaccine safety among health workers are consistently identified in the literature.


The system utilized to monitor and investigate possible AEFIs when delivering influenza vaccine to health workers should ideally be integrated into existing AEFI surveillance systems in line with national regulations for the monitoring of vaccine safety. The NIP or other departments responsible for health worker influenza vaccination (e.g. occupational health) should work with the National Regulatory Authority to define roles and responsibilities in vaccine safety monitoring. In countries using influenza vaccines for the first time, it could be conceivable to intensify AEFI surveillance during the first year of influenza vaccine introduction in order to provide quick feedback to stakeholders to help assure them of the safety of the vaccines in use.

A functioning AEFI monitoring system will detect and elucidate problems with vaccines, which could be due to the product itself, its quality, or errors in the administration of the vaccines. All vaccine recipients reported as having an event (including minor events) perceived to be related to the influenza vaccine should be reported to the AEFI surveillance system using standard reporting forms (see **Toolbox 15**). Given adequate reporting, the monitoring system should be able to evaluate the observed rate of reactions to influenza vaccine and compare this to the expected rates reported in the literature. For serious AEFIs, causality will normally be assessed by a group of experts. Importantly, and as for any vaccine, such a system needs to be able to identify a previously unknown or unexpected vaccine reaction that should be investigated in more depth. Care must be taken to ensure that coincidental events are not mistaken for vaccine reactions.


### Toolbox 15. AEFI-related information sources



#### AEFI core variables, including data on case, vaccine, event and reporter

 [http://www.who.int/vaccine\\_safety/initiative/tools/AEFI\\_core\\_variables\\_basics\\_EN\\_Dec2015.pdf](http://www.who.int/vaccine_safety/initiative/tools/AEFI_core_variables_basics_EN_Dec2015.pdf)  
(Accessed 14 Mai 2019)

#### Sample form for AEFI recording with detailed description of reporting elements

 [http://www.who.int/vaccine\\_safety/initiative/tools/AEFI\\_reporting\\_form\\_EN\\_Jan2016.pdf](http://www.who.int/vaccine_safety/initiative/tools/AEFI_reporting_form_EN_Jan2016.pdf)  
(Accessed 14 Mai 2019)

#### Causality assessment of an AEFI: Provides the detailed methodology in a four-step process with access to a related software tool

 [http://www.who.int/vaccine\\_safety/publications/gvs\\_aefi/](http://www.who.int/vaccine_safety/publications/gvs_aefi/) (Accessed 14 Mai 2019)

#### Vaccine safety training resources providing access to vaccine and pharmacovigilance training packages

 [http://www.who.int/vaccine\\_safety/initiative/tech\\_support/](http://www.who.int/vaccine_safety/initiative/tech_support/) (Accessed 14 Mai 2019)

By establishing and enhancing AEFI systems, influenza vaccination can also be used to further improve the awareness of overall immunization safety in the health worker community.

## Monitoring and evaluation of vaccine acceptance

Key determinants of vaccine acceptance among health workers have been investigated and include the desire for self-protection and to protect family and patients. (see also section on communication and vaccine acceptance).

As part of an initial situation analysis of health worker influenza vaccination programmes, available information on policy, programmes and practices, the factors affecting acceptance and participation, and the influence of media and communications can be investigated through key informant interviews, or participatory workshops. Results of such an analysis could then be used to inform additional communication strategies addressing the identified concerns in a targeted manner.

Other determinants can be explored through formative research. Both qualitative and quantitative research methods can be used to evaluate changes in health workers' knowledge, attitudes, practices and behaviours. Behavioural determinants that differentiate health workers who get vaccinated from those who do not should be assessed regularly. Understanding the reasons and reasoning behind health workers' attitudes towards annual flu vaccination is useful for the development of communications messages and products. Involving health workers in behavioural research related to their perceptions, beliefs, emotions and potential conflicts also provides an opportunity for the health worker community to be engaged in the approach, which can result in greater acceptance of the vaccination program.

### Toolbox 16. Tools to assess vaccine acceptance among health workers



**TIP-FLU tool:** Provides an approach and tools grounded in behavior change theories and health programme planning models to tailor seasonal influenza vaccination to the needs and attitudes of frontline HWs.

➡ <http://www.euro.who.int/en/health-topics/communicable-diseases/influenza/publications/2015/tailoring-immunization-programmes-for-seasonal-influenza-tip-flu.-a-guide-for-increasing-health-care-workers-uptake-of-seasonal-influenza-vaccination-2015> (Accessed 14 Mai 2019)

**TIP FLU case study Montenegro:** Provides a practical example of the use of the TIP FLU tool.

📄 [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0007/281860/Tailoring-Immunization-Programmes-Seasonal-Influenza-TIP-FLU.pdf](http://www.euro.who.int/__data/assets/pdf_file/0007/281860/Tailoring-Immunization-Programmes-Seasonal-Influenza-TIP-FLU.pdf) (Accessed 14 Mai 2019)

## Vaccine impact monitoring

After an influenza vaccine has been introduced in a population, additional studies may help in evaluating the impact of the immunization program.

However, WHO does not recommend that vaccine impact or effectiveness studies be conducted by all countries with influenza vaccination programs, given their complexity and expense. A number of research networks worldwide conduct such studies and results can be expected to be applicable in other settings with similar influenza epidemiology and vaccination programs. The decision to carry out such studies should therefore be based on the need for country-specific estimates and on the local capacity to conduct such rigorous studies. If studies are not appropriately designed with adequate sampling of different health worker categories, there is a risk of arriving at wrong conclusions.

Before-after studies to demonstrate vaccine effectiveness are not advised for influenza, given that influenza vaccine effectiveness for preventing influenza symptoms in seasonal influenza epidemics display considerable heterogeneity.<sup>12</sup> Studies to evaluate the impact of seasonal influenza vaccination in health workers can be even more complex, given the varying risk of infection and transmission to patients among different categories of health workers.

In health workers, a general reduction in absenteeism or, if available, reduction in influenza-associated absenteeism is often used as a surrogate indicator for the impact of an influenza vaccination programme. For this, health facility institutional monitoring would need to include disease rates in health workers, and a measure of sickness absence. Where possible, reporting days of absenteeism due to influenza-like illness (ILI) (or respiratory infections) should be recorded. This will include self-reported ILI with or without virological confirmation. Other non-specific outcomes include severe acute respiratory infection (SARI) and all-cause pneumonia requiring hospitalization. It is important to note that all these clinical syndromes include various other respiratory pathogens against which influenza vaccine does not protect. If such assessments are done, they should ideally cover multiple seasons, since impact can vary substantially by season, else such studies will be quite difficult to interpret.

Laboratory-confirmed outcomes (e.g. by RT-PCR and other molecular diagnostic tests) improve the specificity of influenza disease classification. Where possible, establishment of sentinel sites with such capacity could be considered for collecting samples from health workers for laboratory confirmation. In these sites, vaccine effectiveness could be assessed using a case-control design and comparing vaccine coverage in laboratory-confirmed versus test-negative cases, if vaccine coverage is sufficiently high. Any of these approaches require sophisticated laboratory capacity which is not available everywhere.

The screening method is a study design which could also be used for health worker vaccine impact assessment: it uses individual-level data on vaccination history from cases and data on vaccination coverage in the health worker population from which the cases came. However, such a study requires accurate information on the vaccination status of the cases and of health worker vaccination coverage.

Given the indication that annual influenza vaccination for health workers could reduce illness among the patients they care for, studies can be designed to evaluate the effect of health worker influenza vaccination on mortality, hospitalization, and influenza cases in patients of healthcare facilities. Several research approaches have been used in this context such as randomized trials or case-control approaches. Given the complexity of study designs, the conduct of such studies should be limited to research institutions that have the capacity and experience to conduct such studies.

Economic assessments and cost-effectiveness evaluations may be considered once sufficient cost and impact data are available following influenza vaccine introduction. WHO provides a number of relevant resource documents, which are being further developed to specifically estimate vaccine introduction costs for health worker vaccination (**Toolbox 17**; see also **Toolbox 2**). Relevant data are not easily available everywhere and assessments can be difficult to perform, given the limited size of the group of health workers.

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<sup>12</sup> Evaluation of influenza vaccine effectiveness: A guide to the design and interpretation of observational studies, WHO 2017.


### Toolbox 17. Influenza in health workers: Study methodologies



**Evaluation of flu vaccine effectiveness 2017:** Provides detailed information for researchers who design observational influenza vaccine effectiveness studies and for public health scientists who interpret and apply the results of these studies. An annex will address the effectiveness of influenza vaccine in health workers

 <http://apps.who.int/iris/bitstream/handle/10665/255203/9789241512121-eng.pdf>  
(Accessed 14 Mai 2019)

**Manual for estimating disease burden associated with seasonal influenza:** Provides step-by-step approach to estimate influenza disease burden in the general population as well as those with specific conditions who are vulnerable to severe disease

 [http://www.who.int/influenza/resources/publications/manual\\_burden\\_of\\_disease/](http://www.who.int/influenza/resources/publications/manual_burden_of_disease/)  
(Accessed 14 Mai 2019)

## Post-introduction evaluation

National Immunization Program Reviews routinely assess the use of specific vaccines about every 5 years following a new vaccine introduction. Such NIP Reviews should include relevant items to identify possible programmatic areas related to the new vaccine use.

As needed in-between NIP Reviews, a specific influenza-related Post-Introduction Evaluation (I-PIE) tool may be performed after the first or second influenza immunization season.


The I-PIE package (**Toolbox 18**) includes a number of tools to support the planning and conduct of the evaluation, including standard questionnaires and data collection forms in paper or electronic format as well as reporting templates together with instructions on how to perform the I-PIE in a cost-efficient manner. These tools will need to be adapted to the specific country context and to the specifics of the vaccine formulation and presentations.

The I-PIE is performed at all levels of the health system and includes observation of practices at the points of vaccine administration, vaccine storage areas as well as data and record reviews. An I-PIE can thus provide a more immediate approach to assess the programmatic challenges and impact of influenza vaccine use, and to compare results across countries, enabling them to share and learn from each other's experiences.

### Toolbox 18. Influenza post-introduction evaluation tools



I-PIE tool with instructions and recording and reporting templates

 [https://www.who.int/immunization/research/development/influenza\\_maternal\\_immunization/en/index4.html](https://www.who.int/immunization/research/development/influenza_maternal_immunization/en/index4.html) (Accessed 14 February 2019)

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## Annex 1. Sample non-participation form

This form is to be used in cases of voluntary vaccination where health workers in the very high or high-risk categories who decline to participate in assessment, screening and vaccination in accordance with the national policy. Completion of the form is particularly important where failure to get vaccinated will result in reassignment or require the use of protective measures to protect patients as specified in the national policy.

### Non-participation in vaccination

1. I have read and understood the policy directive regarding seasonal influenza vaccination of health workers.
2. I decline to participate in vaccination against influenza.
3. I am aware of the potential risks to myself and/or others that my non-participation in vaccination may pose.
4. I am aware that my non-participation may result in my being reassigned to a non-high-risk area or in other requirements to protect others with whom I may come in contact, as per the national policy.
5. The reason for my non-participation is:

### Refusal to sign

In circumstances where the health worker refuses to sign this form, it should be noted on the form and the health worker should be notified of consequences, if any, as per the policy.

**Name of health worker:**

**Date of birth:**

**Health service/ facility:**

**Work area:**

**Signature:**

**Date:**

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I have discussed the potential risks that non-participation in vaccination may pose and the management of unvaccinated workers in accordance with the vaccination policy.

Name of vaccination team staff:

Designation:

Health facility /agency:

Signature:

Date:

## Annex 2. Complementary checklist for planning health worker immunization: national<sup>13</sup> level

*(To be adapted for local use)*

To account for the specifics of seasonal influenza vaccination of health workers, the following ADDITIONAL elements may be added to the generic new vaccine introduction check list, see Annex 4 of the document “Principles and considerations for adding a vaccine to a national immunization programme” for the checklist structure.

<b>Health worker seasonal influenza vaccination policy</b>	
1. National policy on seasonal influenza vaccination of health workers are published and disseminated to all relevant agencies and health facilities, including private health facilities and relevant professional societies.	
2. The policy on seasonal influenza vaccination of health workers is reflected in the national occupational health policies.	
3. The costs of seasonal influenza vaccination of health workers are included in either the immunization or occupational health budget, as appropriate.	
4. Surveillance system is in place for influenza activity, including defining start and end of the influenza season, to inform selection of the most appropriate vaccine formulation and timing of influenza vaccination.	
<b>Planning for successful vaccine introduction</b>	
5. A functional multidisciplinary coordination group is in place to discuss and promote access to a new target population of health workers, enabling the formation of partnerships which support and shape the national agenda.	
6. The group includes focal points from the occupational health and immunization programs, professional organization representatives, and other relevant stakeholders.	
7. A costed operational plan for health worker vaccination is developed and integrated into the national immunization plans and relevant occupational health plans.	
<b>Formative research (optional and to be included only if formative research is planned)</b>	
8. The need and scope of any formative research to be conducted in preparation for vaccine introduction is defined.	
9. A research group to conduct formative research has been identified and terms of reference for the research has been developed.	
<b>Communications</b>	
10. National communications working group established for planning communications strategy and developing communications materials for health worker vaccination against seasonal influenza.	

<sup>13</sup> In some countries, especially large countries with decentralized system, elements of this checklist may also apply at relevant subnational levels, e.g. provincial level.

11. Tailored communications messages and materials developed along with an overall communications strategy.	
12. Training for health facility communications teams is conducted.	
<b>Vaccine procurement and supply chain management</b>	
13. Target population size estimate developed and included in demand forecast.	
14. Individual health facility demand estimated, and vaccine distribution plan developed.	
15. Sufficient storage space for vaccines and supplies for seasonal vaccination at all levels established to accommodate vaccine during vaccination period.	
<b>Vaccine Delivery</b>	
16. Health facility vaccination delivery teams are established and trained.	
17. System for management of vaccination refusals and implementation of infection control measures in place for prevention of nosocomial transmission, e.g. reassignment, wearing of masks, mandatory leave in case of ILI.	
<b>Monitoring and evaluation</b>	
18. Data recording and reporting tools developed and distributed including for coverage monitoring (updated administrative data and health worker surveys) and AEFI monitoring.	
19. Post-introduction evaluation conducted within the first 2 seasons following vaccine introduction.	
20. Possibilities reviewed for operational research to assess health worker vaccine acceptance.	

## Annex 3. Health facility checklist

*(To be adapted for local use)*

<b>Communications</b>	<b>Person Responsible</b>	<b>Deadline</b>	<b>Status</b>
1. Health facilities communications working groups are established and trained			
2. Health facility communications plan and schedule for group communications with health workers finalized			
3. Adequate supplies of posters and information materials for health worker vaccination are available			
4. Notification of vaccination sent out to targeted health workers and supervisors			
5. Telephone hotline established to address individual queries from health workers			
<b>Storage capacity for vaccines and supplies</b>			
6. Adequate storage capacity for influenza vaccines and supplies during vaccination window period established			
7. Adequate supplies of influenza vaccines and supplies for health worker vaccination available			
8. Provision to deal with extra injection waste during period of vaccination			
<b>Vaccine Delivery</b>			
9. Vaccination delivery team established and trained and vaccination sites within health facility finalized			
10. Categorization of health workers completed and beneficiary list for vaccination developed			
11. System for management of vaccination refusals and implementation of infection control measures in place for prevention of nosocomial transmission, e.g. reassignment, wearing of masks, mandatory leave in case of ILI			
<b>Monitoring and evaluation</b>			
12. Data recording and reporting instruments available taking into account data protection issues			
13. System for defaulter tracking and reminders established			
14. Health facility registries updated to include influenza vaccination			
15. AEFI monitoring and reporting systems updated to identify AEFI in health workers			
16. Vaccine acceptance monitoring system to address uptake issues in health workers established (if uptake issues are observed)			

## Annex 4. Sample questionnaire for conducting a survey among health workers

1	<b>Name</b> (optional)	
2	<b>Age</b> (years)	
3	<b>Sex</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female
4	<b>Job category</b> <sup>14</sup>	<input type="checkbox"/> Doctor <input type="checkbox"/> Nurse/midwife <input type="checkbox"/> Laboratory technician <input type="checkbox"/> Other technical staff <input type="checkbox"/> Other (specify)
5	<b>Patient contact</b>	<input type="checkbox"/> Direct <input type="checkbox"/> Face-to-face but not direct <input type="checkbox"/> None
6	<b>Contact with high risk patients</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
7	<b>Work area</b> (name of clinical area of work)	

Statements		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	Vaccination of health workers against diseases such as hepatitis B and influenza are important					
2	If I was unvaccinated exposure to influenza would be a risk to my health					
3	Exposure to influenza poses a risk to my patients' health					
4	Influenza vaccination poses a risk to my health					
5	The benefits of vaccination are greater than the risks					
6	My receiving vaccination will protect my patients					
7	The best way to protect my patients is to combine seasonal influenza vaccination with other infection control measures					
8	I am sufficiently informed about risks of influenza infection					
9	I am sufficiently informed about the risks and benefits of influenza vaccination					

<sup>14</sup> Adapt for local use based on local health worker classification

The following factors that would influence my decision to accept vaccination						
10	Recommendations from the national policy-making body (e.g. NITAG)					
11	Endorsement of recommendation from the professional society to which I belong					
12	If it is part of occupational health regulations/ requirements					
13	Recommendation from my personal physician					
14	Availability of vaccination at no cost to me					
15	Easy access to vaccination at my place of work					
16	Colleagues having been vaccinated					
17	Previous experience with vaccination					
18	Protecting my patients					
19	Preventing/reducing absenteeism from work					
20	Contributing to pandemic preparedness					
Other factors that would affect my decision to accept influenza vaccination (list below)						
21						
22						
23						

## Annex 5. Communications and demand generation: Stratification of approaches to developing the content

Approach	Effort	Impact
Health facilities communications working groups are established and trained		
<b>Developing the content for communication messages</b>		
Framing information by delivering social comparison feedback on vaccination rates among peers or healthier individuals	Low	Medium
Tailored communication based on cognitive styles and cultural behaviours	Medium	High
<b>Communication methods</b>		
Distribution and display of Information, Education and Communication (IEC) materials	Low	Medium
Establish a specially trained communications team at health facility level to administer communications and demand generation approaches	Medium	High
Web-based (including FAQs and chat groups) and social media communications	Medium	Medium
Text message and e-mail reminders to health workers	Low	Medium
Small group in-person briefing meetings	High	Medium
Use immunization champions at national and health facility level	Medium	High
<b>Demand generation approaches</b>		
Provision of free vaccines	Medium	High
Provide vaccination in the work area using mobile teams	Medium	High
Provide incentives or stimulate competition, e.g. awards to clinical areas with highest vaccination coverage	Low	Medium
Visible reminders and peer-pressure, e.g. badges or stickers worn by those who have been vaccinated	Low	Medium
Ask individual to commit to a time and location to obtain vaccination	Low	Medium
Increase options to obtain vaccination, either near home or at workplace	Medium	High
Guide choice through default options, e.g. automatically set up appointment for vaccination unless individual opts out	Low	High
Establish standing orders to facilitate vaccination	Medium	High



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