WFPHA World Federation of Public Health Associations

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Building a More Resilient Healthcare Workforce: Strategies to Enhance Vaccination Uptake Among Health Professionals

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Executive Summary

This report, developed by the World Federation of Public Health Associations (WFPHA), highlights strategies to boost vaccination uptake among health professionals. In response to the global challenges posed by declining immunization rates, including within the health community, the WFPHA convened an expert forum, bringing together professionals from diverse health sectors and regions to address the issue and suggest practical solutions.

The report identifies key factors driving successful vaccination campaigns and highlights critical gaps, drawing from a systematic analysis of the literature, case studies from diverse regions, and expert discussions within the forum. The main gaps center around the lack of data, particularly in low-resource settings, and the limited involvement of health professionals in policy development, despite their crucial leadership role throughout the decision-making process. Factors that support health professionals' participation in vaccination efforts include their commitment to patient safety, the availability of convenient and accessible vaccination services, and the vital importance of strong leadership backing. Tailored strategies addressing local challenges, as well as peer-to-peer influence, have also proven highly effective in boosting vaccination rates. Importantly, integrating health professionals' vaccinations into occupational safety plans is identified as a potential game changer.

The report offers adaptable, real-world solutions to help policymakers and health professionals design effective, context-specific vaccination strategies for health professionals. These efforts will not only strengthen healthcare systems but also enhance global health resilience by protecting those on the front lines of care and prevention.

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Introduction

Vaccination is one of the most effective tools for preventing infectious diseases and safeguarding public health, saving millions of lives annually [1–3]. However, in recent years, vaccine hesitancy and misinformation causing skepticism have increasingly posed challenges to achieving vaccination uptake worldwide, decreasing rates and increasing global public health risk[4–6]. The World Health Organization (WHO) named vaccine hesitancy one of the top ten threats to global health in 2019, citing vaccination as one of the most cost-effective preventive health measures and warning of the rise in incidence of diseases such as measles in recent years[7]. Combatting vaccine hesitancy is on the WHO's Immunization 2030 agenda, defined as "indisputable human right" [8]. However, vaccine hesitancy is not the only factor affecting vaccination uptake. A broader range of issues come into play, including access, financial constraints, logistical challenges, and knowledge gaps.

Health professionals play a pivotal role in global vaccination uptake as the key demographic administering vaccines, allowing them to shape public opinion, educate the public, and advocate for and enhance confidence in preventive measures. Vaccinated health professionals are likelier to recommend and administer vaccines to their patients[9]. Their vaccination protects them individually, their families, and significantly contributes to achieving collective immunity, reducing the spread of contagious diseases, and benefiting vulnerable populations unable to receive vaccinations due to medical reasons. Moreover, they are often in contact with vulnerable people and are therefore at higher risk of transmitting infection with more devastating consequences [10-11].

Alarmingly, the current global trend of decreasing vaccine uptake also applies to health professionals [12]. Several studies exploring contributing factors to the decreased uptake in this population found a combination of concerns. These included the safety and efficacy of vaccines, consideration of oneself as unsusceptible, lack of personnel and time, and lack of knowledge about vaccines[10,13–16]. To reverse this trend among health professionals, it is essential to develop targeted strategies based on evidence-based behavior-change models specifically tailored to this group. Moreover, beyond coverage gaps, particularly in low-income settings, there is a notable lack of targeted data focusing on this specific population in these regions, which further complicates the implementation of effective interventions.

Different strategies are implemented across countries to protect healthcare professionals, with the most robust efforts typically found in high-income countries (HICs). In these settings, vaccination is often integrated into occupational health protocols, ensuring that healthcare workers receive timely immunizations. This not only protects their health but also enables them to contribute more effectively and confidently to public health initiatives. Integrating vaccination into occupational safety and health frameworks not only protects health professionals from preventable diseases but also empowers them to advocate for vaccination as a key component of a broader public health strategy. This approach would represent the gold standard in safeguarding both health professionals and the communities they serve in a sustainable way. However, vaccination is often not a formal component of occupational safety plans. This omission undermines the potential to establish vaccination as a routine, particularly in regions where healthcare systems are already under-resourced. Without this legal safeguard, health professionals may face challenges accessing vaccines and championing immunization efforts within their communities. The absence of such policies also exposes health professionals to higher risks of preventable infections, reducing their ability to perform their duties effectively and safely. Strengthening policy frameworks to incorporate vaccination as part of workplace safety will be a key step in achieving equitable protection for healthcare workers and bolstering global health systems. However, recognizing the complexity of implementing such policies and the need for affordable solutions across various contexts, this report offers a range of potential strategies that can be adapted to fit different settings more effectively.

This report aims to explore and delineate effective actionable strategies to enhance vaccination rates among health professionals, supplementing existing advice such those published by the WHO[17,18]. In this context, health professionals encompass all professionals who face a high risk of infection in their line of duty. We believe that collaboration between health professionals and policymakers is crucial for developing best practices, addressing immediate needs, and creating effective solutions. By fostering this collaboration and elevating the voices of health professionals, we aim to ensure their perspectives are fully integrated into policymaking, leading to policies that are more relevant, practical, sustainable and impactful. Our goal is to contribute to building a more resilient health workforce that is better equipped to protect both themselves and the communities they serve against infectious diseases through equitable, inclusive and effective strategies, increasing health security on a global scale.

Methodology

First, a systematic review of the literature focused on strategies to increase vaccination uptake among health professionals was conducted and published in a peer reviewed journal[21].

Second, an engagement forum, consisting of key opinion leaders (KOLs) from both within and beyond the healthcare sector and representing diverse global regions, has been established under the leadership of the WFPHA International Immunization Policy Taskforce. This forum was created to discuss gaps, needs and develop actionable strategies. Over the course of eight months, the forum has convened multiple times through virtual meetings and email communications. This collaborative effort ensures a comprehensive and informed approach to enhancing vaccination strategies worldwide, specifically focusing on the often-overlooked areas of low-income regions, where resource constraints and access issues frequently compound the challenges of healthcare delivery and disease prevention.

Third, specific examples of successful real-life vaccination campaigns were selected to provide concrete examples and promote knowledge exchange. One case study from each WHO region was chosen, each focusing on improving vaccination rates for a vaccine recommended for health professionals by the WHO (Table 1). An example targeting student healthcare workers was also included.

Building on this foundation, the KOLs reached a consensus on recommendations to drive a transformation in vaccination strategies for health professionals across various nations and contexts.

Table 1: Recommended vaccinations for health professionals (Adapted from WHO[19])

Antigen	Recommended Vaccination for Health Professionals
Diphtheria	Health professionals who may have occupational exposure to C. diphtheriae.
Hepatitis B	Immunization is suggested for groups at risk of infection who have not been vaccinated.
Influenza	Health professionals are an important group for influenza vaccination. Annual immunization with a single dose is recommended.
Measles	All health professionals should be immune to measles, and proof of immunity or immunization is required as a condition of enrolment into training and employment.
Meningococcus	Persons at risk of exposure may be given one booster dose 3-5 years after the primary dose.
Pertussis	Health professionals should be prioritized as a group to receive the pertussis vaccine.
Polio	All Health professionals should have completed a full course of primary vaccination against polio.
Rubella	If the rubella vaccine has been introduced into the national programme, all health professionals should be immune, and proof of immunity or immunization is required as a condition of enrolment into training and employment.
SARS-CoV-220	Health professionals with direct patient contact should receive 1 dose if unvaccinated or revaccinate every 12 months if they've had at least one dose.
Tuberculosis	BNC vaccination is recommended for unvaccinated TST- or IGRA-negative persons at risk of occupational exposure in low and high TB incidence areas.
Varicella	Countries should consider vaccinating potentially susceptible health-care workers with 2 doses of varicella vaccine.

Systematic Review

A systematic review of the literature on vaccination campaigns targeting healthcare workers has been conducted across PubMed, EMBASE, and MEDLINE databases, supplemented by a search of gray literature (For more details, please check de Koning et al. [21]). The focus was on types of interventions and their outcomes, employing thematic analysis to pinpoint key strategies. The interventions included educational programs, customized information materials, mobile vaccination units, and expanded access hours. Notable strategies were targeted educational campaigns, reminder systems, and incentives, emphasizing leadership engagement to address specific barriers to vaccination. The outcomes highlight the importance of combining educational efforts, improved accessibility, and motivational incentives to elevate vaccination rates among health professionals (Table 2). Additionally, we observed a notable scarcity of articles from low-income and lower-middle-income countries (LICs and LMICs).

Table 2: Overview of results from the systematic review (adapted from de Koning et al[21])

Interventional category	**Intervention**	**Recommendations**
Education	Lectures	Face-to-face training leads to higher vaccination rates than online training. Organize lectures during existing staff meetings requires fewer resources.
	Materials	Tailor educational messages to institution-specific misconceptions and concerns.
Reminders		Opt-out vaccination appointment reminders are more effective than opt-in. Reminder letters sent along with pay slips are more effective.
Incentives	Gifts	Incentivize staff to attend clinics with food/beverages.
	Prizes	Group prizes encourage accountability among colleagues.
	Leadership commitment	Public commitment by leadership figures encourages vaccine confidence.
Access	Signposting	Convenience through clear messaging improves vaccination uptake.

	Extended hours	Expanded vaccination hours beyond regular office hours.
	Vaccination clinics	On-site vaccination that allows for walk-ins leads to increased vaccination uptake.
	Mobile carts	Carts that are wheeled into wards are the most effective.
Feedback		Publishing departmental rates encourages friendly competition. Sending managers lists of unvaccinated employees allows for further direct inquiry about reasons for noncompliance.
Policy	Active declination	Asking for a reason for declination provides information for future campaigns. Asking for a declination form during a lecture improves uptake. Declination interviews are an opportunity to correct misconceptions and improve accountability.
	Mask mandates	Where mandatory vaccination is considered too extreme, a masking mandate has been proven effective.
	Mandatory vaccination	Developing and implementing mandatory vaccination policies when deemed appropriate within specific contexts.

Gaps & Needs

Addressing specific gaps is essential to develop and implement effective vaccination strategies for health professionals. The engagement forum's experts have defined as key areas data, research, and leadership.

Lack of data and research

- Lack of data from LMIC settings: the lack of comprehensive data on health professionals' vaccination in less developed countries or settings significantly hampers the formulation and execution of effective vaccination strategies and can present an impediment to achieving equity. Without reliable information on vaccination coverage, rates, and outcomes among health professionals, policymakers face challenges in identifying gaps, allocating resources, and designing targeted interventions. This data scarcity can lead to suboptimal protection for health professionals, who are at the frontline of healthcare delivery, thereby increasing their vulnerability to infectious diseases. Furthermore, the absence of detailed data undermines efforts to monitor vaccine efficacy and safety, ultimately impacting public health outcomes and the overall resilience of healthcare systems in these regions. Addressing this data gap in each country is hindered by specific challenges such as limited resources, diverse political contexts, economic constraints, and ongoing conflicts. These factors are critical to improving the health and safety of health professionals and developing robust, equitable international vaccination strategies.
- Insufficient understanding of motivations: While substantial research exists on health professionals' perceptions of vaccination and their pivotal role in encouraging community vaccination, there is a significant lack of data on what specifically concerns and motivates health professionals to get vaccinated themselves[22–24]. The research does not discuss the findings from a behavior change point of view, which hinders the development of evidence-informed targeted strategies to increase vaccination rates among health professionals.
- Reliance on outdated data: In some regions, particularly in the Eastern Mediterranean region, obtaining recent data has been challenging, making it difficult to develop strategies that reflect current trends[25]. However, experts from the engagement forum and studies have found that strategies like reminder/recall systems and pop-up clinics from older studies remain applicable and effective in hospitals today[25,26]. Although reliance on older research may be a limitation, these strategies have proven their enduring relevance and effectiveness.

Lack of effective and inclusive leadership

- Insufficient participation of health professionals in the decision-making: Both on-the-ground implementers and target populations such as health professionals are often not adequately represented at the policy-making stage. This exclusion can result in misaligned strategies that fail to fully address the needs and circumstances of those most affected. When the voices and experiences of health professionals are not considered, vaccination strategies may overlook critical factors such as local healthcare infrastructure, cultural attitudes towards vaccination, and logistical challenges in vaccine delivery. Consequently, the strategies may be less effective, leading to lower vaccination uptake and increased health risks for health professionals and the communities they serve. Ensuring inclusive and participatory decision-making processes is essential for developing and implementing vaccination strategies that are responsive to the ground realities and protect the health and well-being of health professionals in every country[27–29].
- Undervaluation of Health Professionals as Leaders: Every health professional has both the potential and responsibility to assume leadership roles within their work environment, particularly in decision-making processes, including those related to the development of vaccination strategies. This leadership potential extends to all health professionals. As healthcare becomes increasingly complex and value-driven, there is a growing need to expand leadership opportunities across all health professions. Physician-led organizations, for example, are associated with greater physician engagement, higher quality of care, and improved cost efficiency. Similarly, nurse leaders have demonstrated their ability to influence, coordinate, and advocate for positive health outcomes for patients, families, and the nursing profession. These leadership principles equally apply to pharmacists and other healthcare professionals. Facilitating this broader inclusion in leadership requires investment in leadership training from the university level onwards and a shift in mindset regarding how decisions should be made. This approach is critical not only for vaccination strategy but also for broader public health initiatives[27–29].

Case studies

This part of the report presents seven case studies of effective immunization campaigns for health professionals spanning various regions. The examples included are not intended to represent the definitive strategy for each region, nor do they serve as judgments of their efficacy. Instead, they aim to facilitate the sharing of ideas and support the transfer of knowledge regarding good practices in immunization.

Each case study concludes with a note on the country's legislation concerning occupational safety[30], as the presence of policy encouraging health professionals' safety is recognized as a major factor in supporting vaccination, according to the KOLs of the engagement forum.

African Region (AFR)

Hepatitis B in Zambia

Description and results of the campaign

Health professionals face a high risk of contracting hepatitis B in healthcare settings. The Hepatitis B vaccine is a recommended preventive measure, yet vaccine uptake among health professionals in Sub-Saharan Africa remains low. In response, Zambia introduced a targeted vaccination campaign in 2020 for healthcare workers and nursing students in the Kalulushi district of Copperbelt Province[31]. The vaccine was offered free to ensure accessibility and affordability for all participants.

Steps of the campaign

1. **Access:** The vaccine was offered at work premises for on-duty health professionals, and transport refunds were offered to those who needed to travel to the facility.
2. **Affordability:** The vaccine was provided at no cost to the health professionals.
3. **Awareness:** The Ministry of Health (MoH) and study team provided information about viral hepatitis B, the vaccine characteristics, dose intervals, side effects, and the importance of the vaccine at a vaccine launch event at the hospital. This contributed to a higher vaccination rate at that district hospital. It was noted that awareness of the vaccine and hepatitis B was insufficient in rural areas and could contribute to resistance.
4. **Reminders:** To ensure participants did not miss their vaccination appointments, the vaccination team provided appointment cards and made telephone calls when the team was in the area.
5. **Peer Influence:** Support from colleagues was a key factor in completing the vaccination schedule. Seeing colleagues support the vaccination effort and witnessing the severe impacts of hepatitis B motivated them to get vaccinated.

Takeaways

The 2020 campaign in Zambia highlighted that overcoming logistical and informational barriers with positive peer influences can lead to higher acceptance and vaccination completion rates. Ensuring transportation reimbursement and easy access to free vaccines was pivotal. The perceived susceptibility to hepatitis B led to high acceptance of the vaccine among health professionals, who viewed it as a crucial preventive measure.

Occupational health and safety legislation

The Occupational Health and Safety Act 36 of 2010 and the Factories Act are the two pieces of legislation that govern and regulate conditions for workers in Zambia. Neither of these pieces of legislation contains information specific to healthcare workers or vaccination[32].

Region of the Americas (AMR)

MMR vaccination in Canada

Description and results of the campaign

Canada's immunization guidelines for health professionals aim to prevent the spread of measles, mumps, and rubella (MMR), protecting workers and patients[33]. With a goal of 95% vaccination coverage by 2025 to achieve community immunity, vaccination is essential to protect health professionals and reduce transmission of infections[34]. Institutions commonly mandate proof of vaccination as a condition of employment, requiring health professionals to undergo immunization assessments, complete vaccine series, and receive booster doses to adhere to current guidelines and mitigate occupational risks[33].

Steps of the campaign

1. **Access:** Health professionals get free MMR vaccines (combination products only) through workplace programs or public clinics.
2. **Education:** Government agencies and organizations educate health professionals about MMR vaccination, emphasizing safety, efficacy, and herd immunity, such as:
    a. The Women's College Hospital's "Long Term Care, Homecare, Essential Workers Campaign" boosts MMR vaccine awareness among non-physician healthcare practitioners and essential workers.
    b. The Canadian Association of Midwives offers tailored education to improve midwives' knowledge of vaccines, including MMR.
    c. CANImmunize Inc. App tracks immunizations, provides vaccine information, and sends appointment reminders.
    d. Canadian Paediatric Society Workshop providers access workshops and online modules to address vaccine hesitancy.
3. **Regulatory requirements:**
    a. Health professionals need documentation of two doses of MMR vaccine, a history of lab-confirmed infection, and lab evidence of immunity. Those lacking evidence undergo testing and temporary removal from work or isolation.
    b. Notify Occupational Health and/or Infection Control for the facility where the case works.
    c. The case is also obligated to inform Occupational Health of their illness.

   d. The Medical Health officer should exclude them from work for at least 4 days after the appearance of a rash.

4. **Surveillance:**
   a. Canadian Measles/Rubella Surveillance System (CMRSS) monitors the spread of measles and rubella across Canada. Managed by the Centre for Immunization and Respiratory Infectious Diseases, it gathers weekly reports from provinces and territories, which are then shared with the Pan American Health Organization. Confirmed cases are recorded, and lab tests help identify virus types, aiding outbreak understanding.
   b. The Measles and Rubella Surveillance (MARS) pilot is a program to monitor for cases of measles and rubella. It collects information about these diseases in real time using a website. When a case is found, it quickly sends alerts to health experts. MARS helps track cases each week and month, making it easier to monitor outbreaks.

Takeaways

The 2023 Canadian Adult National Immunization Coverage Survey revealed significantly higher vaccination rates among health professionals, with measles vaccination rates at 94.8% compared to 86.6% among non-health professionals[35]. These findings underscore the effectiveness of strategies tailored to the health professional population, validating the importance of targeted vaccination campaigns and initiatives aimed at this critical group.

Occupational health and safety legislation

The Occupational Health and Safety Act in Canada[36] guarantees workers three fundamental rights:

- The right to know about workplace hazards and receive necessary training
- The right to participate in decisions concerning health and safety
- The right to refuse unsafe work

Additionally, the Public Health Agency of Canada develops infection prevention and control guidelines to support monitoring, preventing, and managing healthcare-associated infections[37]. These guidelines assist organizations in implementing policies and procedures that protect healthcare professionals and improve patient outcomes.

Key measures include implementing alcohol-based hand rub use, single patient rooms, respiratory hygiene, and precautions during medical procedures[38]. They emphasize aseptic techniques (preventing contamination during medical procedures), organizational risk assessments, and infection control measures to enhance healthcare quality and safety across various healthcare settings[38].

Eastern Mediterranean Region (EMR)

Influenza vaccination in Qatar

Description and results of the campaign

With annual influenza vaccination not being mandatory in Qatar, acceptance rates have historically been low, despite influenza vaccination being recommended annually for healthcare workers[39]. Each year, the Ministry of Public Health (MoPH), Hamad Medical Corporation (HMC), and the Primary Health Care Corporation (PHCC) launch an influenza campaign that prioritizes healthcare workers among other at-risk populations[40–42]. The campaign described here was conducted in the Hamad General Hospital and the National Center for Cancer Care and Research in Doha in 2014, with all interventions implemented in parallel[43].

Steps of the campaign

1. **Administration:** To manage the campaign, a vaccination team consisting of infectious disease physicians, nurses, epidemiologists, pharmacists, and administrators was established.
2. **Education**:
    a. Group educational sessions were conducted before and during the campaign. These sessions were held during different departments' morning reports, lectures, and educational activities.
    b. Lecture materials, posters, announcements, newspaper articles, and email communications were distributed.
    c. The content of the educational sessions and materials highlighted the benefits of influenza vaccination and the health risks associated with influenza.
3. **Reminders:** Intranet and social media were used to spread awareness about the campaign
4. **Access**:
    a. Vaccination was free of charge.
    b. Clinics were set up at multiple hospital locations, open between 8:00 and 14:00.
    c. Mobile vaccination units visited different departments, clinics, and operating theaters to facilitate access for Health professionals. Two nurses ran the units:

one administered the vaccine and the other collected health professionals' information.

d. Extra nurses were recruited to facilitate extended vaccination periods.

5. **Incentives**:
    a. To encourage vaccination, various promotional materials and small incentives, such as badges, pens, magnets, key chains, brochures, and mugs, were distributed.
    b. Friendly competition was encouraged between different departments and hospitals to improve uptake.
6. **Leadership involvement**:
    a. Senior hospital management actively participated in the campaign by disseminating supportive messages and showcasing their vaccinations.
    b. Posters and photos of senior staff and management receiving vaccines were placed across the hospital.
7. **Hotline**: A dedicated telephone hotline was available 24/7 to provide information and support related to the vaccination campaign.
8. **Feedback**:
    a. Vaccination rates were tracked weekly.
    b. Compliance reports were sent to management weekly.
9. **Policy implementation**: Health professionals who refused vaccination in specific high-risk areas (such as intensive care units) were required to sign a declination form to help track vaccination rates and understand reasons for refusal.

Takeaways

This campaign led to a significant increase in vaccination uptake, with the mean value for both hospitals rising from 37.2% in the 2013/2014 influenza season to 64.3% after the campaign. It is a good example of the effective use of a mandatory declination form for healthcare workers in high-risk areas, which not only tracked vaccination rates across the health workforce but also aimed to understand why the unvaccinated were declining vaccination. This strategy, coupled with the involvement of senior management in publicly endorsing the vaccination and a multidisciplinary team approach, created a strong institutional culture for supporting influenza vaccination.

Occupational health and safety legislation

There is no single law governing health and safety legislation for workers in Qatar; instead, decrees have been issued to cover migrant workers, medical examinations of workers, occupational injuries, and work inspections[44].

European Region (EUR)

Pertussis vaccination in the United Kingdom

Description and results of the campaign

During the 2012 pertussis outbreak in the UK, two hospitals successfully implemented booster vaccination programs for frontline health professionals[45]. One hospital provided a single dose of Revaxis© (low-dose diphtheria, tetanus, acellular pertussis) to eligible frontline pediatric staff over three months, while another hospital focused on frontline midwifery and pediatric staff over two months[45].

Steps of the campaign

1. **Campaign Promotion:**
    a. Both hospitals maintained a line listing (a table detailing individual cases or events[46]) of eligible staff.
    b. Conducted 'drop-in' and ward-based vaccination sessions with extended hours.
    c. Raised staff awareness using promotional materials, posters, and face-to-face conversations with infection control and occupational health staff.
2. **Active Follow-up**:
    a. Non-vaccinated staff were actively followed up and strongly encouraged to receive the vaccination unless contraindicated.
    b. Staff who declined vaccination were provided with information on the risks and benefits.
3. **Post-Vaccination Survey:** After the vaccination campaign, all staff offered the booster were invited to complete an anonymised online survey questionnaire. The questionnaire revealed insights into staff attitudes, perceptions, and reasons for vaccination acceptance or refusal.

Takeaways

The non-mandatory pertussis vaccination campaign for healthcare workers achieved high uptake, with rates over 85% across both hospitals. Key motivators included the desire to protect vulnerable patients, self, and family, strong support from clinical and hospital leadership, and the campaign's specific response to a local incident. The ease of accessing

vaccinations on the ward and the availability of flexible appointment times further encouraged participation. This highlights health professionals' commitment to patient wellbeing and underscores the effectiveness of targeted campaigns, emphasizing the importance of trust, leadership support, and accessibility in future efforts.

Occupational health and safety legislation

The Health and Safety at Work etc Act 1974 is the primary occupational health and safety legislation in the UK. It mandates infection risk assessments and regular reviews to guide care planning and necessary control measures, such as isolation or PPE[47]. The UK uses a hierarchy of controls system to reduce workplace risk, emphasizing public health measures like vaccinations, modifying activities, improving ventilation, and minimizing staff movement[48]. Additionally, standard infection control precautions including hand and respiratory hygiene, PPE, and safe management of equipment, laundry, and waste, are implemented to protect health professionals and minimize infection transmission[48].

South-East Asia Region (SEAR)

Hepatitis B vaccination in India

Description and results of the campaign

In India, the Ministry of Health and Family Welfare decided to attempt to vaccinate all health professionals against hepatitis B[49], after finding low levels of coverage and awareness among this population[50]. This campaign was designed by the hospital infection control and prevention unit of a tertiary teaching hospital in Southern India, with a campaign called "Get it to 100%" implemented over the course of 5 years, from 2016 to 2021[51]. A root cause analysis was conducted prior to the start of the campaign to identify key barriers and tailor the intervention design accordingly.

Steps of the campaign

1. **Education**:
    a. Regular educational sessions were conducted to inform healthcare workers about the risks of hepatitis B, the benefits of vaccination, and the importance of completing the full vaccination schedule. Sessions included a special focus on students.
    b. Pamphlets were distributed across the hospital and circulars were sent to heads of department.
2. **On-site vaccination**: Convenient on-site vaccination clinics in the department of microbiology were established to provide easy access to the vaccine, reducing barriers related to time and location.
3. **Vaccination clinics**: On-site mop-up vaccination camps were held for specific departments, as well as student vaccination camps for new joiners.
4. **Resource availability**:
    a. Vaccines and reliable testing methods were made available free-of-charge.
    b. Infection control nurses were recruited for tracking infection.
    c. Technicians were brought on board for anti-HB and hepatitis B antigen testing.
    d. Data operators were introduced for data management.
5. **Vaccination policy**:
    a. A standard protocol for vaccination composed of three doses of vaccine followed by testing was created.

b. Vaccination cards were introduced and made mandatory to obtain, which kept track of vaccination status.

Takeaways

The baseline HBV coverage was 45.6% and only 2.5% of health professionals were completely vaccinated prior to introduction of the campaign. At the end of the campaign, vaccination levels increased to 84.2% and complete protection increased to 50.2%. The success of the campaign was attributed to its multi-modal nature and the involvement of the hospital intervention and control unit, alongside mop-up camps to make vaccination easy, which made the resources available free of cost, introduced mandatory vaccination at time of joining, organized educational interventions, and conducted vaccination camps.

Occupational health and safety legislation

Workplace safety and health laws have been put into place to protect workers, and specific regulations have been put in place for manufacturing, mining, ports, and construction[52]. Additionally, the National Policy on Safety, Health, and Environment at the Workplace encourages a national effort to enhance employee wellbeing and asks for every ministry or department to use these guidelines to produce their own detailed policy[53]. The most recent piece of legislation, the Occupational Safety, Health, and Working Conditions Code of 2019 still provides no guidance around hazards and recommendations specific to healthcare workers[54].

Western Pacific Region (WPR)

COVID-19 vaccination in New Zealand

Description and results of the campaign

New Zealand's (NZ) COVID-19 vaccination campaign adopted a holistic approach, prioritizing high-risk groups such as frontline health professionals with free vaccines, and incorporating public awareness campaigns, training, and mandates. The elimination strategy also involved rigorous reporting and monitoring to boost vaccine uptake and social distancing measures to effectively stop community transmission[55].

Steps of the campaign

1. **Prioritization of health professionals:** Health professionals were identified as priority recipients of the COVID-19 vaccine, ensuring prompt access for frontline workers across the entire country by April 7, 2021.
2. **Free and accessible vaccines**:
    a. COVID-19 vaccines were provided free of charge.
    b. Over 100 vaccination sites were operational nationwide by March 23, 2021.
    c. Facilitating on-site vaccinations at healthcare facilities made it easier for providers to receive the vaccine without leaving work or facing logistical barriers.
    d. Allowing staff to get vaccinated during work hours without loss of pay removed financial and time-related barriers.
3. **Building trust and communication:**
    a. Leadership demonstration through COVID-19 Response Minister Chris Hipkins and Associate Health Minister Ayesha Verrall publicly received their first doses of the vaccine.
    b. Public health campaigns, social media, NZ Government websites, district health boards (DHBs) and news outlets all provided information on vaccine advice.
    c. Medsafe served as the regulatory authority, providing detailed information and updates on vaccine approvals and safety reports.
    d. Resources such as the Āwhina app delivered personalized COVID-19 updates directly to health professionals, facilitating informed decision-making and compliance with vaccination protocols.

   e. Reporting systems for adverse events following immunization were in place, encouraging healthcare professionals to report any incidents for monitoring and evaluation.
   f. Healthcare settings held internal conversations and regular updates about the vaccine, boosting healthcare workers' knowledge and increasing vaccine uptake.
4. **Workforce training:**
   a. Over 4,000 healthcare professionals underwent initial training to administer the vaccine.
   b. Ongoing education on cold chain management and vaccine-specific protocols was provided.
   c. The Immunization Advisory Centre (IMAC) facilitated this training through a variety of methods, including online courses, face-to-face workshops, and workplace assessments.
   d. Access to training was available via the IMAC Learning Management System (LMS), ensuring competency and adherence to best practices.
5. **Mandates**: Specific healthcare roles, including general practitioners, pharmacists, community health nurses, midwives, paramedics, and those working in sites treating vulnerable patients, were required to be fully vaccinated. These mandates incentivized uptake, with the first vaccine dose mandated by October 30th 2021.
6. **Resources for health professionals:** Access to training, educational materials, and necessary equipment was guaranteed.

Takeaways

NZ's COVID-19 vaccination campaign protected health professionals by prioritizing them as a vulnerable group, ensuring clear communication and pathways to access the vaccine with role modeling, providing accessible vaccination sites, offering comprehensive in-person and online training, and securing sufficient vaccination supplies and protective equipment. This approach not only safeguarded frontline workers but also built trust within the system. As a result, nearly 90% of health professionals had already received two doses of the vaccine by the time the government announced the mandates in October 2021[56].

Occupational health and safety legislation

NZ's Health and Safety at Work Act 2015 aims to protect workers from health, safety and welfare risks by eliminating or minimizing hazards[57]. The Act promotes workplace representation, consultation, and cooperation and encourages unions and employers to

enhance health and safety to mitigate risks[58]. These include encouraging vaccination, maintaining hand hygiene and staying home when sick[59]. Organizations should also implement standard infection prevention practices such as using PPE, respiratory hygiene, safe disposal of sharps, aseptic techniques, cleaning and disinfecting surfaces, waste management, and safe handling of linen[59]. These measures help create a safer workplace and reduce disease transmission.

Targeting student health care workers

COVID-19 vaccination in Sudan - pharmacy students

Description and results of the campaign

In March of 2021, over 800'000 COVID-19 vaccines were delivered to Sudan through the COVAX initiative, to be distributed in a campaign launched by the Federal Minister of Health[60–62]. This first campaign ran from the 15th of March to the 15th of May and was aimed at health professionals and older persons with chronic conditions[63,64]. The campaign described here looked specifically at increasing vaccination levels in pharmacy students[65].

Steps of the campaign

1. **Education**: These educational campaigns involved providing detailed information about the benefits and safety of COVID-19 vaccines through seminars, workshops, and distribution of educational materials. This aimed to address misinformation and improve the knowledge base of the students regarding the vaccines.
2. **Peer influence**: Leveraging influential students and peer leaders to advocate for vaccination. These peers shared their positive vaccination experiences to influence others.
3. **Reminders**: Students were sent periodic reminders to be vaccinated.
4. **Access**: Vaccination sites were set up within the university campus to make the process more convenient for students. Additionally, mobile vaccination units were deployed to reach students in more remote areas.
5. **Incentives**: Offering incentives such as free health check-ups and small rewards to those who received the vaccine was another strategy used to encourage uptake.

Takeaways

Results from these campaigns were collected through surveys sent to all students. Two institutions, which introduced vaccination campaigns, had higher vaccination uptakes and lower hesitancy levels (coverage between 77.1 % and 84.2 % depending on the institution). In the institution tested without a vaccination campaign only 28.3 % of the students were vaccinated. This was a significant difference. Targeting health professionals early in their career path and with the use of influential student leaders can be a fruitful strategy to dispel myths about vaccination and secure permanent engagement with vaccination, as people with a crucial imminent role in improving public health and encouraging vaccination.

Occupational health and safety legislation

Occupational health and safety in Sudan is covered in the Labour Code of 1997, and the List of Factories Decree and List of Factories (Occupational Health), both of 1981[66]. These do not refer specifically to the regulation of healthcare worker safety. In 2020, the Sudanese Law on the Protection of Doctors was passed, which covers legal protection of healthcare workers but does not comment on their safety from a healthcare perspective[67].

Recommendations

Protecting health professionals within their regions/countries requires understanding their unique social, political, economic, and cultural contexts. This necessitates surveying each country's specific situation and adapting strategies based on local needs and capabilities. The approach should be applicable to various entities, including hospitals, professional unions, NGOs, and independent organizations like midwife associations. Furthermore, it is crucial to collaborate with local community leaders and staff from pertinent institutions to co-develop a detailed plan for the vaccination campaign to understand the needs and assets before it begins. Here, we provide key strategies for implementations grouped into three categories. The recommended strategies are designed to support advocacy for the development and implementation of improved immunization among health professionals. However, they should be interpreted and adapted to align with specific national and local contexts. This also applies to the proposed categorization.

Entry-Level

These recommendations are straightforward to implement and generally require minimal resources, time, and organizational changes. These actions are generally low-cost and can be quickly adopted by healthcare facilities and staff with existing infrastructure.

- **Educational lectures**
  - Can be tailored and delivered to different health professional subgroups
  - These can be introduced as designated lectures about vaccination, or can be introduced into already existing staff meetings
- **Educational materials**
  - Produce materials about the target pathology, risks of disease, vaccination, benefits and side effects of vaccination, etc.
  - Graphs and figures are effective methods for communicating information
  - Provide easy to understand comparisons with other health preventive approaches
  - Provide in-person or recorded testimonials (storytelling)
  - These materials can be physical, handed out to hospital staff members, or virtual, dispersed through intranet, emails, etc.
- **Reminders**
  - Existing communication networks such as email, intranet, and text message can be used to send out periodic reminders for vaccination
- **Gifts**

- ➢ These can be in the form of pens, mugs, stickers, T-shirts, or other small tokens to motivate vaccination

❖ **Prizes**
- ➢ Prizes for the most vaccinated or most improved department can encourage friendly competition within hospitals and motivate vaccination

❖ **Extended vaccination hours**
- ➢ Increasing hours in the evenings, weekends, and nights can allow more staff members working unsociable hours to be vaccinated

❖ **Sign-posting of vaccination sites**
- ➢ This can be done through posters or signage in the institution with dates, times, and locations of vaccination

❖ **Peer-to-Peer Initiatives**
- ➢ Implement peer-to-peer vaccination programs where trusted colleagues advocate for vaccination

Mid-Level

These recommendations require moderate resources and effort to implement and are more resource-intensive than entry-level recommendations. These actions might involve some changes to existing practices or infrastructure, additional training, or moderate financial investment or resourcing.

❖ **Involve International Bodies**
- ➢ Engage international bodies like the International Hospital Federation to ensure a coordinated approach.

❖ **Workshops and conferences**
- ➢ Organize workshops and conferences to discuss vaccination strategies and share experiences.

❖ **On site vaccination**
- ➢ One designated location to be set up in the healthcare facility in question, either for temporary or permanent use for vaccination

❖ **Mobile vaccination carts**
- ➢ These carts are often manned by two staff members, one to vaccinate and one to fill in the prerequisite forms

❖ **Cost-neutral vaccination**
- ➢ Provide vaccines for free

- ➢ Reimburse transportation costs for health professionals not on duty on the time of the vaccination to allow them to get to the vaccination point without having any costs

❖ **Active declination**
- ➢ Ask staff members to sign a form confirming refusal to vaccinate and provide a reason
- ➢ Declination interviews can be conducted to further elucidate reasons for refusal

❖ **Regular Surveys**
- ➢ Conduct regular surveys to collect data on vaccination uptake and hesitancy among health professionals.

❖ **Feedback**
- ➢ Maintain detailed vaccination records and provide information to healthcare managers and staff members to encourage further vaccination

Advanced-Level

These recommendations are the most challenging to implement, requiring significant resources, time, and effort, as well as careful planning and execution. These actions often involve large-scale changes to organizational practices, substantial financial investment, and extensive coordination among various stakeholders.

❖ **Mask mandation**
- ➢ Introduce policies that mandate mask wearing for those staff members who refuse vaccination

❖ **Mandatory vaccination**
- ➢ Introduce policies that mandate vaccinations for health professionals working in high-risk areas

❖ **Vaccination advisor**
- ➢ Hire a vaccination advisor, trained in health and behavior change, who will coordinate all the actions outlined above and set up face-to-face meetings with hesitant health professionals.

❖ **Collect Data**
- ➢ Collect vaccination data and update regularly databases
- ➢ Share those data with national registries
- ➢ Advocate for the establishment of immunization data registries for health professional if they do not already exist in the country

❖ **Advocacy with the government**

- ➢ Encourage governments to amend occupational safety laws to include vaccination

❖ **Comprehensive approach**

- ➢ Apply all the suggestions above to all health facilities, including those in remote areas

Conclusions

This report presents a series of case studies and recommended strategies aimed at increasing vaccination uptake among health professionals. The goal is to protect these professionals, the communities they serve, and to enhance global health security.

The proposed actions are designed to be adaptable to specific contexts, with all recommendations focused on ensuring long-term protection for health professionals. This includes fostering routine immunization to consistently cover the target population and promoting a sustainable behavioral shift when necessary.

A key point highlighted in the report is the inclusion—or lack thereof—of immunization within occupational safety laws across different countries. In many nations, particularly those with fewer resources, occupational safety laws often overlook health professionals, and even when they do, vaccination is rarely considered. Significant efforts are needed to encourage governments to amend occupational safety laws to include vaccination as a critical aspect of health professionals' protection. Implementing such laws would help ensure both funding and sustainability for these preventive measures. This initiative must be supported by awareness campaigns and effective communication.

The World Federation of Public Health Associations is committed to collaborating with member associations, partner organizations, and the WHO to unite efforts in protecting health professionals worldwide through prevention, protection and health promotion.

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