

## Review Article

# Influenza vaccination in discharge protocol for patients with comorbid conditions: an expert review

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### ABSTRACT

Influenza remains a significant global health challenge, contributing to substantial morbidity and mortality, particularly among individuals with chronic comorbidities such as cardiovascular disease, chronic obstructive pulmonary disease (COPD), asthma, diabetes mellitus, and chronic kidney disease (CKD). Despite strong recommendations, influenza vaccine uptake in India continues to be low. The aim of this consensus was to assess the role of influenza vaccination as part of hospital discharge protocols for patients with comorbidities in clinical settings. A focused expert advisory meeting was conducted with nine leading pulmonologists from India to evaluate the role of influenza vaccination as part of hospital discharge protocols in patients with comorbidities. The discussion was supported by a comprehensive literature review. Current national and international guidelines were also analyzed to provide contextual insights. Annual influenza vaccination significantly reduces complications, hospitalizations, and all-cause mortality among high-risk populations. Evidence demonstrates reductions in cardiovascular events, respiratory morbidity, and exacerbations in COPD and asthma. In patients with diabetes and CKD, vaccination is associated with decreased hospitalization rates, fewer ICU admissions, and slower progression of renal decline. However, barriers such as limited awareness, absence of standardized hospital protocols, and logistical constraints impede vaccine uptake. Incorporating influenza vaccination into discharge protocols and enhancing patient education can substantially improve coverage in these vulnerable groups. Hospital-based vaccination programs represent a feasible and effective strategy to mitigate influenza-related morbidity and mortality in India. Expert consensus strongly supports the inclusion of influenza vaccination in discharge protocols for patients with comorbidities.

**Keywords:** Influenza, Vaccination, Comorbidities, Cardiovascular disease, COPD, Asthma, Diabetes mellitus, Chronic kidney disease, Hospital-based vaccination

### INTRODUCTION

Influenza, commonly known as “the flu,” is a vaccine-preventable disease and a global public health concern.<sup>1</sup> Influenza is one of the leading causes of morbidity and mortality worldwide in both the pediatric and adult populations. It can cause annual seasonal epidemics and sporadic, unpredictable global pandemics.<sup>2</sup> Influenza affects around 10% of the global population annually, which represents a significant public health burden worldwide.<sup>3</sup>

The World Health Organization (WHO) estimates about 3 to 5 million cases of severe influenza illness worldwide annually. WHO has identified groups at high risk of severe influenza or complications which include: older adults, pregnant individuals and women up to 2 weeks postpartum, and individuals with comorbid diseases such as chronic cardiac disease, asthma, chronic pulmonary disease, chronic renal disease, metabolic disorders, endocrine disorders (e.g. diabetes), neurological and neurodevelopmental disorders, liver disease; hematological diseases and immunosuppressive conditions (e.g. HIV/AIDS), among other groups.<sup>4</sup>

Influenza affects people of all ages and is associated with high mortality during pandemics, epidemics, and sporadic outbreaks.<sup>3</sup> Globally, up to 32% of viral pneumonia cases are complicated by bacterial co-infections, mainly due to *Streptococcus pneumoniae* and *Staphylococcus aureus*, which are challenging to distinguish clinically.<sup>5,6</sup>

Due to the diverse geography and climate, influenza circulates throughout the year in India. Temperature and humidity are found to be major environmental factors influencing transmission.<sup>7</sup> The influenza surveillance studies from India have identified two main patterns of influenza circulation: in north India, peak circulation of influenza occurs during the winter months (January–April), late monsoon peaks occur in Chennai and Vellore, situated in the Southwest, and in the rest of India peak activity of influenza occurs during the monsoon months (June–October), with minor peaks during winter.<sup>8</sup>

Even though nucleic acid amplification tests (NAATs), such as the reverse transcriptase polymerase chain reaction (RT-PCR), have revolutionized the diagnosis of influenza, these tests are expensive and available only in limited settings.<sup>9</sup> Treatment of flu also poses several challenges. Moreover, rising trends of resistance to currently available anti-viral drugs such as oseltamivir have been reported globally.<sup>10</sup> Hence, the prevention of the disease is important.

Despite clear national and international guidelines recommending annual vaccination for high-risk groups such as individuals with diabetes, chronic obstructive pulmonary disease (COPD), and pregnant women, vaccine uptake in these populations remains suboptimal.<sup>11</sup> This gap highlights the need to enhance awareness about influenza vaccination in high-risk groups.

### **Aim**

The aim of the study was to assess the role of influenza vaccination as part of hospital discharge protocols for patients with comorbidities in clinical settings.

### **METHODS**

To explore the role of influenza vaccination in individuals with chronic comorbid conditions as part of hospital discharge protocol, a focused expert advisory meeting was organized, bringing together nine leading pulmonologists from across India. The advisory meeting brings together distinguished leaders in pulmonology, recognized for their extensive clinical expertise, active academic and research contributions, and pivotal roles in shaping guidelines and advancing professional societies. These experts were engaged in a structured discussion aimed at evaluating current evidence and sharing practical insights on influenza immunization in patients with comorbidities such as cardiac diseases, asthma, chronic obstructive pulmonary disease (COPD), diabetes mellitus, and chronic kidney disease (CKD). An extensive literature review was

done using databases including PubMed, Cochrane Library, and Google Scholar. The search strategy incorporated relevant keywords such as “influenza,” “influenza vaccination,” “diabetes,” “cardiac diseases,” “COPD,” “asthma,” and “CKD” and the data was presented to the experts. In addition, current national and international guidelines on influenza vaccination in patients with comorbidities were critically examined to provide a contextual framework for the discussion.

Following the meeting, the findings from the literature and the clinical perspectives shared by the experts were compiled and a comprehensive overview of the importance and implementation of influenza vaccination for patients with chronic comorbidities as part of discharge protocol was developed.

### **BURDEN OF INFLUENZA IN PATIENTS WITH COMORBID CONDITIONS**

Influenza continues to pose a significant global health challenge, with annual epidemics accounting for approximately 4 million cases of severe illness and nearly 500,000 deaths worldwide, according to WHO estimates.<sup>3</sup> Patients with underlying chronic conditions have disproportionately higher rates of complications, hospitalization, and mortality versus healthy individuals.<sup>12</sup> Comorbidities such as cardiovascular disease, COPD, diabetes mellitus, chronic kidney disease, and obesity result in a significantly increased vulnerability to severe influenza outcomes.<sup>13</sup> Data obtained from recent influenza seasons indicate that about 90% of adults hospitalized with influenza had at least one underlying health condition.<sup>12</sup>

### **IMPACT OF INFLUENZA IN PATIENTS WITH COMORBIDITIES**

The influenza virus is implicated in causing community-acquired pneumonia (CAP), and it is associated with an increased incidence of CAP-associated hospitalizations and mortality.<sup>14</sup>

The key comorbid diseases where influenza infection has a negative impact on outcomes are: cardiovascular disease, such as acute myocardial infarction (MI) and heart failure (HF), respiratory disorders, such as COPD and asthma, diabetes, and CKD (Table 1).

Influenza has an adverse effect on the prognosis of hospitalized patients, resulting in more complications, increased duration of hospital stays, and higher mortality.<sup>14</sup> Influenza-related respiratory infections increase the risk of ischemic heart disease by 49%.<sup>14</sup> There is a bidirectional relationship between influenza infection and acute myocardial infarction (AMI). The influenza virus can induce a thrombophilia state and thrombosis of a pre-existing, subcritical atherosclerotic plaque, resulting in acute coronary occlusion and, ultimately, AMI (Figure 1). It can also cause tachycardia and hypoxia and trigger the release of inflammatory cytokines, thus resulting in the

development of AMI. Studies have proven that a 6- to 10-fold increased risk of AMI occurs in the first week of influenza infection and a 3- to 8-fold increased risk of stroke.<sup>14</sup>

Patients with heart failure (HF) are at a higher risk of hospitalization in the influenza season compared to the non-influenza season. Worldwide, 18.4 annual deaths due to ischemic heart disease per 100,000 adults aged ≥50 years related to influenza have been reported. Of these, approximately 21.3% occur in the 50–64 age group.<sup>1</sup>

Respiratory viruses, including the influenza virus, precipitate COPD exacerbations and result in increased morbidity and mortality. The influenza virus is ranked among the top 3 viruses causing COPD exacerbations, with prevalence ranging from 7% to 31%. Influenza infection is associated with progressive airway inflammation due to the release of pro-inflammatory cytokines and tissue injury, which result in declining pulmonary function and further deterioration of clinical status. Secondly, disruption of the respiratory epithelial barrier predisposes patients to bacterial superinfection.<sup>15</sup> Respiratory infections are also more strongly associated with worsening asthma symptoms in adults as compared to

children, with prevalence rates ranging from 20% to 25% and can also result in increased rates of hospitalization.<sup>16</sup>

Diabetes as a comorbidity was present in nearly 30% of adult influenza-related hospitalizations. Influenza infection can adversely affect glycemic control and can also lead to increased glycemic variability, resulting in increased risk of development of microvascular and macrovascular complications of diabetes.<sup>17</sup>

Despite strong recommendations for vaccination in end-stage renal disease (ESRD) patients, data on influenza presentation in this group remain limited. During the H1N1 pandemic, hospitalization rates among ESRD patients were markedly higher (38% versus 6–7% in the general population), with mortality also elevated (≈5% versus 0.4%).<sup>18</sup> Renal involvements has been reported in about 24.4% of hospitalized children with seasonal influenza A infection, with 11% children developing acute renal failure.<sup>19</sup>

A large U.S. military cohort study reported renal and liver disease, and circulatory disorders, as independent risk factors for severe influenza outcomes.<sup>20</sup>

**Table 1: Burden and impact of influenza in patients with comorbid diseases.**

Diseases	Prevalence	Pathogenic factors	Impact
<b>Cardiovascular disease</b>	Acute cardiovascular events: 12%, acute heart failure: 54%, acute ischemic heart disease: 49%, hypertensive crisis: 8%, and cardiogenic shock: 3%. <sup>21</sup>	Influenza virus replication occurs in arteries and has direct inflammatory effects on atherosclerotic plaques, leading to plaque instability. This results in myocardial infarction, myocardial injury, cardiac dysfunction, and heart failure. <sup>22</sup>	Influenza-related respiratory infections, increase the risk of acute myocardial infarction (AMI), have an adverse effect on the prognosis of hospitalized patients, results in more complications, increased duration of hospital stays, and higher mortality. <sup>14</sup>
<b>COPD</b>	Exacerbations of COPD: 8.2%. <sup>23</sup>	Influenza increases airway inflammation, leading to further damage to the lungs and increased exacerbations of COPD and pneumonia. <sup>24</sup>	Vaccination rejection among COPD patients results in increased exacerbations. <sup>25</sup>
<b>Asthma</b>	Acute infection prevalence during exacerbations: 40.19%. <sup>26</sup>	Influenza viruses infect the airway epithelium. Viral replication in the respiratory system can cause damage and induce death in epithelial cells, increasing the risk of complications such as pneumonia.	Influenza infection can exacerbate asthma symptoms, which necessitate medical attention and hospitalization. <sup>27</sup>
<b>Diabetes</b>	14% of diabetic patients suffer from influenza infection. <sup>28</sup>	During severe influenza virus infection, pulmonary endothelial cells produce cytokines that increase pulmonary lesions in diabetic patients with hyperglycemia. <sup>29</sup>	Patients with diabetes are more likely to be hospitalized or to require ICU care. <sup>30</sup> Loss of glycemic control due to influenza infection leads to increased microvascular and macrovascular complications. <sup>30</sup> Deaths occur in 5 to 15% diabetes patients with influenza infections. <sup>30</sup>
<b>CKD</b>	Renal involvement has been reported in 24.4% of hospitalized children with influenza infection. <sup>19</sup>	Dysregulation of cytokine expression due to viral antigen deposition in the kidney results in T-cell-mediated kidney injury due to influenza virus infection. <sup>31</sup>	Severe influenza infection can cause renal complications such as acute kidney injury (AKI) and progression to CKD. <sup>32</sup> Influenza virus infection was shown to be associated with severe renal failure. <sup>31</sup>

### **Expert opinion**

Clinical observations suggest that approximately 10–15% of patients presenting to outpatient departments require hospitalization, with 10–20% of these hospitalized individuals necessitating intensive care unit (ICU) admission. Influenza contributes to nearly 10% of ICU admissions, underscoring its significant burden on acute care settings.

Cardiovascular disease is one of the most common comorbidities of hospitalized influenza patients and is associated with a more severe disease course. Influenza has been linked to both ischemic and myocardial complications, including myocardial infarction (MI), stroke, exacerbation of heart failure (HF), myocardial injury, and, in lower magnitude stress, cardiomyopathy, myocarditis, and pericarditis. The ischemic complications are attributed to the adverse effects of inflammation on atherosclerotic plaque stability in the arteries.<sup>33</sup>

COPD exacerbations are frequently triggered by upper respiratory tract infections.<sup>34</sup> Influenza infection results in an exaggerated cellular influx into the lungs and elevated concentrations of inflammatory mediators, resulting in severe symptoms and poor disease outcome.<sup>34</sup>

Asthmatic patients have a high risk of being infected with a respiratory virus such as the influenza virus. There is a slight overlap in the symptoms of influenza and asthma (cough, rhinorrhea, and breathlessness). Influenza infection increases the risk of hospitalization in asthmatic patients.<sup>35</sup>

People with diabetes mellitus, even if they are well managed, have a higher risk of developing serious complications of influenza, such as pneumonia, bronchitis, sinus infections, and ear infections. Some of these complications can result in hospitalization and sometimes even death.<sup>36</sup>

In CKD patients, the diagnosis of influenza is likely to be missed until patients do not respond to fluid removal and antibiotics. The presence of diabetes, obesity, respiratory/heart/liver diseases, immunosuppression, and CKD has been shown to be associated with higher mortality.<sup>37</sup>

### **BENEFITS OF INFLUENZA VACCINATION IN PATIENTS WITH COMORBIDITIES**

Annual influenza vaccination is a proven preventive strategy that reduces disease-specific complications, hospital admissions, and all-cause mortality in these high-risk groups. This section reviews evidence supporting its role in mitigating morbidity and mortality among patients with comorbidities.

Influenza vaccination has been shown to significantly reduce cardiovascular (CV) and respiratory risks in high-

risk populations. A meta-analysis of 75 studies, including 47 observational cohorts, 22 case-control studies, and 6 RCTs, demonstrated that vaccination was associated with a 26% lower risk of CV diseases, 20% lower risk of stroke, 16% reduced risk of myocardial infarction, and a significant 37% reduction in risk of major adverse cardiovascular events (MACEs). Vaccination also reduced respiratory disease risk by 13% and all-cause mortality by 43%.<sup>38</sup>

Influenza vaccination in patients with COPD has been consistently associated with significant clinical benefits. Two large Canadian studies (N=4,755 and N=21,748) demonstrated that vaccination reduced laboratory-confirmed influenza-related hospitalizations by 38% and 22%, respectively (95% CI: 15–27% and 35–52%) compared to unvaccinated patients.<sup>39</sup>

A UK retrospective case-control study (N=194,319; 1,830,772 patient-years) reported a 55% overall reduction in laboratory-confirmed influenza across six seasons (95% CI: 45.8–62.7) in patients with asthma.<sup>40</sup> A US cohort study in children (aged 1–6 years) found vaccination reduced asthma exacerbations by 22–41% during the 1993–1996 seasons (incident rate ratios: 0.78, 0.59, and 0.65;  $p < 0.001$ ).

Influenza vaccination offers important benefits for patients with diabetes mellitus (DM) as well. Data from the US Influenza Hospitalization Surveillance Network (2012–2017; N=31,934) showed adults with DM had higher rates of influenza-associated hospitalization, ICU admission, pneumonia, mechanical ventilation, and in-hospital death compared to non-DM patients.<sup>27</sup> A Taiwanese cohort study (N=48,017) found vaccination significantly reduced the incidence of chronic kidney disease (adjusted HR: 0.48 [95% CI: 0.45–0.50];  $p < 0.001$ ) and dialysis rates (adjusted HR: 0.48 [95% CI: 0.44–0.52];  $p < 0.001$ ) in patients with type 2 diabetes.<sup>32</sup> Additionally, prior-season vaccination maintained a protective effect, reducing influenza-related hospitalization by 44–46%, reinforcing annual vaccination recommendations for diabetic patients.<sup>41</sup>

In patients with CKD, the risk of developing renal cell carcinoma was reduced by 50% after influenza vaccination.

### **Expert opinion**

In India, the rising prevalence of chronic diseases, including chronic respiratory conditions, among younger populations, combined with the phenomenon of immunosenescence, supports the recommendation that influenza vaccination should be considered from the age of 50 years onward, even in individuals without comorbidities. Importantly, vaccination should not be restricted by age alone; current evidence and clinical practice advocate influenza immunization for all individuals aged  $\geq 6$  months.

**Table 2: Global and Indian guidelines for influenza vaccine.**

Recommendations	Guidelines
<b>Global recommendations for influenza vaccine</b>	
Global initiative for chronic obstructive lung disease (GOLD 2024 report)	The influenza vaccine decreases the incidence of lower respiratory tract infections. Influenza vaccine reduces the risk of serious infections and death in patients with COPD. Influenza vaccine decreases the risk of ischemic heart disease in the elderly with COPD.
GINA guidance	People with asthma should have an annual influenza vaccination.
American College of Cardiology and American Heart Association (ACC and AHA)	The American Heart Association (AHA) and American College of Cardiology (ACC) recommend influenza vaccination with a Class I recommendation for all patients with established coronary artery disease (CAD), including those who have experienced an acute coronary syndrome (ACS)
The Centers for Disease Control and Prevention Advisory Committee on Immunization Practices and the KDIGO (kidney disease: Improving Global Outcomes) guidelines	The CDC and KIDGO guidelines recommend seasonal influenza vaccination for patients with CKD (grade 1A)
<b>Indian recommendations for the influenza vaccine</b>	
Research Society for the Study of Diabetes in India (RSSDI)	The influenza vaccine helps prevent cardiovascular and cerebrovascular events, especially among people with cardiovascular risk or a previous history of cardiovascular events, primarily by preventing influenza infection and its associated complications. <sup>42</sup>
Indian Chest Society	Influenza vaccination is recommended for adult Indians with specific medical conditions and indications that predispose them to a high risk of complications due to influenza. One dose annually is recommended in patients with diabetes, COPD, chronic liver disease, cancer, renal diseases, and hematological disorders. <sup>43</sup>
Indian Society of Nephrology	Influenza vaccine should be given annually before the beginning of the influenza season for persons 6 months of age or older on dialysis. Household contacts and health care workers should also be vaccinated annually to decrease the transmission to high-risk CKD patients.
The Indian Association of Preventive and Social Medicine (IAPSM). <sup>44</sup>	The Government of India's recommendation is to vaccinate high-risk priority groups like health care workers, pregnant women, and those with chronic diseases, including "heart disease" patients. It is desirable to provide influenza vaccination to individuals $\geq 65$ years of age and children aged six months to 8 years of age. <sup>45</sup>
FOGSI	Women who are or will be pregnant during influenza season should receive the inactivated influenza vaccine (IIV) or recombinant influenza vaccine (RIV) (grade A). <sup>46</sup>

Influenza vaccination has been associated with a significant reduction in cardiovascular events, including myocardial infarction, particularly in high-risk populations. Preventing influenza infection helps mitigate systemic inflammation and vascular stress, thereby lowering the risk of acute cardiac complications.

Patients with type 1 diabetes, including younger and pediatric populations, should be encouraged to receive the influenza vaccine. Similarly, individuals with chronic respiratory diseases such as COPD and asthma derive significant clinical benefit from vaccination. Studies have demonstrated a reduction in acute exacerbations of COPD following immunization, which translates into fewer hospitalizations and improved outcomes. In asthma patients, influenza vaccination is associated with a lower risk of exacerbations and complications requiring hospitalization.

Additionally, influenza vaccination has been linked to a reduction in myocardial infarction risk, as demonstrated in

multiple studies. Collectively, these findings underscore the broad protective benefits of influenza vaccination across diverse patient populations, including those with chronic respiratory, cardiovascular, metabolic, and renal conditions. Therefore, influenza immunization should be strongly recommended for all individuals aged  $\geq 6$  months, irrespective of age or comorbidity status.

## GUIDELINES FOR INFLUENZA VACCINATION

Although influenza vaccines are widely available, vaccination uptake remains suboptimal in several countries. Despite the benefits demonstrated, influenza vaccination has been historically underutilized in both the general adult population and patients with CVD. Studies have demonstrated that the vaccines have a robust safety profile and acceptable reactogenicity in adults and older people. Influenza vaccination represents the most effective and safest measure to prevent flu and its complications.<sup>14</sup> Both global and Indian guidelines for

diabetes and cardiovascular disease recommend influenza vaccines (Table 3).

## **BARRIERS IN INDIA TO VACCINE UPTAKE**

Annual influenza vaccination is strongly recommended for high-risk groups, including individuals with HIV infection, organ transplant recipients, and patients with chronic kidney or liver disease. Vaccination of healthcare workers is essential due to their increased exposure risk. Despite these recommendations, vaccination coverage among pregnant women remains low.<sup>47</sup>

Awareness of influenza vaccination among healthcare professionals varies significantly. While physicians are generally informed and supportive of vaccination, awareness among nursing staff remains limited. In some corporate hospitals, influenza vaccines are provided free of cost to healthcare personnel; however, uptake is still incomplete. These observations highlight that physician advocacy and motivation play a critical role in improving vaccination rates among both healthcare workers and patients.<sup>48</sup>

Costs could also be one of the significant barriers to influenza vaccination once the knowledge barrier has been overcome, specifically in those countries with less supportive reimbursement strategies. Limited availability of the vaccine is another important barrier to vaccination.<sup>49</sup> The evidence captured by this review suggests that the main barriers to influenza vaccine uptake are a combination of limited vaccine knowledge and negative attitudes towards healthcare services.<sup>49</sup>

### **Expert opinion**

Experts highlighted that influenza vaccination uptake in India remains low. One major barrier is limited hospital acceptance for vaccine storage, primarily due to inadequate personnel and insufficient cold-chain facilities. Awareness about influenza vaccination is poor among both hospital staff and patients, and this low uptake is largely attributed to inadequate patient education regarding influenza risks and the benefits of annual vaccination.

To address this gap, experts emphasized the need for training healthcare personnel to strengthen patient and caregiver counseling. Such initiatives would enable vaccination of hospitalized patients prior to discharge, thereby improving coverage and reducing influenza-related complications.

## **STRATEGIES TO IMPROVE INFLUENZA VACCINATION COVERAGE**

Many countries have a national influenza vaccination policy targeting specific WHO-defined high-risk groups. Yet the uptake of the recommended influenza vaccinations in high-risk groups has been suboptimal.

Hospital- and tertiary-care-based programs for improving influenza vaccination rates generally depended on the physician and included standing orders and reminders to hospital staff. The standing order protocols have been reported to be significantly more effective than other individual interventions.<sup>50</sup> In order to improve annual influenza vaccination rates in the high-risk groups, an effective strategy would be to target venues frequented by high-risk groups. These venues include nursing homes, specialized tertiary-care facilities, and cardiology units.<sup>50</sup>

Influenza vaccination during a hospital admission in patients with acute heart failure can improve their survival and reduce the likelihood of readmission to the hospital over the subsequent 12 months. The integration of influenza vaccination into inpatient care could offer a widely applicable strategy for an underserved high-risk patient group.<sup>51</sup> Hospitalized children are also at increased risk of influenza-related complications. Hence, they must be given the influenza vaccine at discharge.<sup>52</sup>

Pregnant individuals may receive IIV at any time during pregnancy to protect themselves and their infants. Those who do not receive it during pregnancy should receive the influenza vaccine before hospital discharge. Those who decline the vaccine during hospitalization should be encouraged to discuss influenza vaccination with their obstetrician, family physician, nurse midwife, or other trusted clinician. Patient awareness must be increased through these discussions.<sup>53</sup>

The effect of centralized reminder/recall (auto dialer, postcard, text reminders), a state-wide immunization information system (IIS) for seasonal influenza vaccine reminders from local health departments, large-scale messaging using mobile applications, and a free national text service providing influenza vaccination education and reminders have been studied. A modest impact has been reported with these interventions on improving influenza vaccination coverage.<sup>50</sup>

### **Expert opinion**

There is a need to increase awareness of influenza vaccination among healthcare workers. Hospitals must create a hospital discharge checklist that includes influenza vaccination advice. Introducing a vaccination card and stamps can help ensure patients receive vaccinations. Discussion and counseling, even by the support staff and research assistants, can be helpful in increasing vaccination coverage among patients. Distribution of pamphlets will also help create awareness. Patient awareness material also increases the uptake of vaccination.

## **CONCLUSION**

Influenza infection remains one of the leading causes of morbidity and mortality worldwide. Influenza vaccination is essential for patients with co-morbidities. Although

influenza vaccines are widely available, vaccination uptake remains suboptimal. Establishing hospital protocols for influenza vaccination can be an important step toward increasing vaccination uptake. Adult vaccination cards can play a crucial role in the uptake of vaccines. Vaccination of patients and family members is also extremely important, especially when the patients are elderly. This can prevent infections in immunocompromised patients. Hospitals need to develop and adopt protocols for influenza vaccination so that at-risk populations can be administered the influenza vaccine at discharge, with education and counseling about the benefits of annual vaccination with the influenza vaccine.

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