Administering Influenza Vaccines in Special Populations

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Introduction

- The annual influenza epidemic substantially affects health care systems worldwide.
- Most people recover from influenza illness without requiring medical attention; however, among some special groups, influenza can cause severe illness, complications, and death.
- Because of these risks, **influenza vaccination is a critical strategy to prevent infection in this patient population.**
- Here, we mention some of these groups.

Considerations for patients who are immunocompromised

- Individuals who are immunocompromised are at high risk of severe influenza and complications.
- For persons 6 months and older who are immunocompromised, IDSA recommends **use of an annual inactivated influenza vaccination**, **except in those who are very unlikely to respond** (eg, those undergoing intensive chemotherapy or those receiving antibodies that target B cells within 6 months).

- Inactivated vaccines should be administered **at least 2 weeks prior to immunosuppression.**

Two important role in vaccination in IC patients

Safety of the vaccine

- **live vaccines**

Can cause serious adverse events in some immunocompromised people as a result of uncontrolled replication of the vaccine virus.

Efficacy of the vaccine

- **Inactivated vaccines**

The antigens in the vaccine ca nnot replicate and there is no increase in the risk of vaccine-associated adverse events; ho wever, the magnitude of vacci ne-induced immunity is often reduced.

Increasing the immunogenicity of influenza vaccines

- Strategies to improve the immunogenicity of influenza vaccines in immunocompromised persons are currently being studied.
- These include the use of **adjuvanted vaccines**, **high-dose vaccines, booster doses, and intradermal vaccination** and the **temporary discontinuation of immunosuppressant** regimens.
- However, results of larger, randomized controlled trials are necessary to further elucidate the impact of these strategies.

Flu vaccine in SOT

Immunization of Solid Organ Transplant Candidates and Recipients: A 2022 Update

- **SOT recipients** are at a higher risk of influenza-associated complications, including pneumonia, shock organ rejection, and death.

- **Influenza vaccination is the mainstay for the prevention of influenza** disease and has been shown to decrease morbidity and mortality from influenza in transplant recipients.

- Currently, **annual vaccination** with **standard-dose** inactivated influenza vaccine is recommended for SOT recipients **six months of age and older**.

- **Both humoral and cellular immunity** contribute to protection following influenza immunization.

- **However, SOT recipients are known to have suboptimal immunologic response to influenza vaccination.**

- Although the Advisory Committee on Immunization Practices (ACIP) guidelines do not currently recommend alternative influenza vaccination strategies for SOT recipients , **several novel strategies have been evaluated to improve immunogenicity in these hosts**, including **booster doses** in the same season and immunizing with the **high-dose influenza** vaccine formulation.
- Other strategies such as **intradermal delivery** or **novel adjuvants** **have not shown significantly better immunogenicity** over the standard-dose vaccine

summary of evidence

- Randomized controlled trials comparing high-dose influenza vaccine with standard dose influenza vaccine in a single influenza season in adult SOT recipients have shown that the **high-dose vaccine resulted in significantly increased seroconversion rates and antibody titers** compared to standard dose.
- A recent randomized trial showed that the **high-dose vaccine** elicited a **superior CD4 and CD8** influenza-specific T-cell response compared to standard-dose vaccine in SOT recipients.

- **These findings suggest the high-dose influenza vaccine in SOT recipients may be preferred over the standard-dose formulation in SOT recipients.**

Timing of vaccination

- Due to the seasonal nature of influenza infection, timing of vaccination is of particular importance; **however, the optimal timing of influenza vaccination relative to the transplant procedure remains unclear.**
- The current recommendations from the Infectious Diseases Society of America suggest administering the vaccine **after two months posttransplant unless a community outbreak of influenza is identified**, in which case the vaccine may be administered **as soon as one-month posttransplant**.
- The American Society of Transplantation guidelines recommend **allowing influenza vaccination as early as one-month posttransplant**, as some recent studies indicate that vaccination in this period is both safe and immunogenic.

In summary,

1) **high-dose influenza vaccine is more immunogenic in SOT recipients.**
2) If **standard-dose** vaccine is administered, **a booster dose four weeks following the initial dose** in the same season should be considered.
3) Optimal timing of vaccination relative to transplantation is not yet defined, and additional strategies to optimize immunogenicity in pediatric and adult transplant recipients require investigation.

Flu vaccine in HSCT recipients

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- Flu vaccine → From 6 m after transplantation, annually at beginning of flu season.

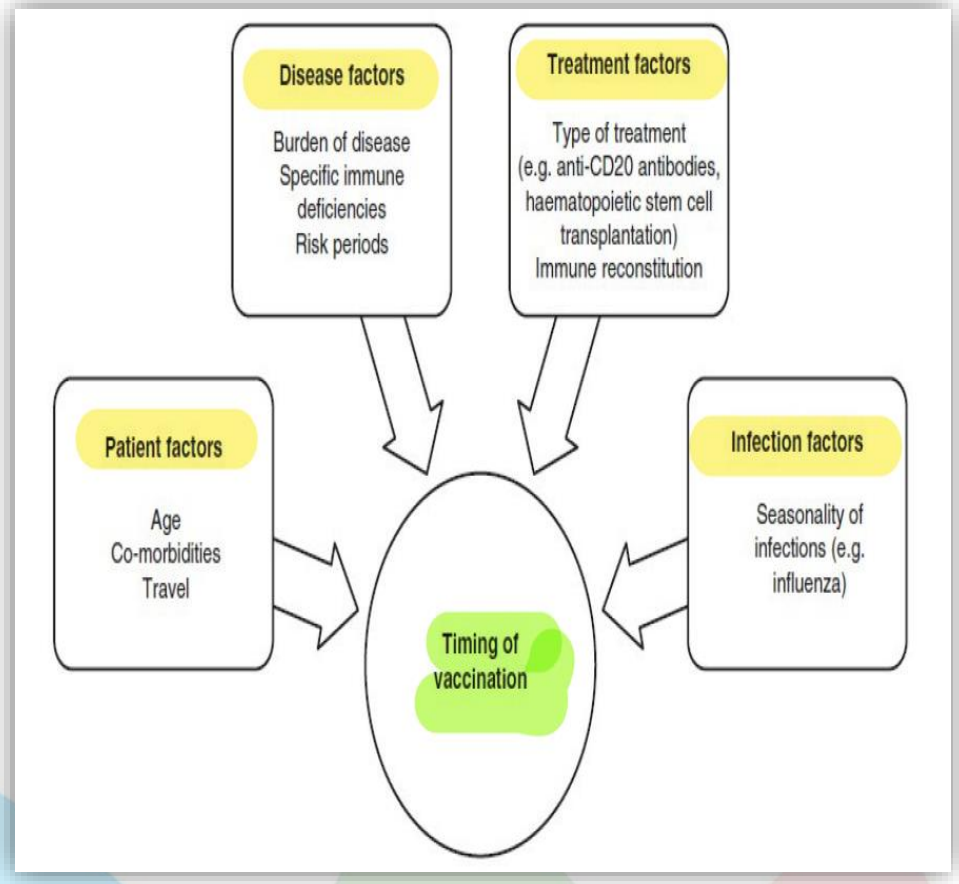
- In severe GVHD patients → a second dose 3-4 weeks after the first dose.

- In the setting of community outbreak

IIV 3 m after transplantation & a second dose 3-4 weeks later

Flu vaccine for adults with cancer

- **Patients with cancer** may have compromised immune systems for a variety of reasons.
- The malignancy itself can alter the immune system; treatments can modulate the immune response to target malignant cell markers; or immunosuppression is a side effect of treatment.



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Immunisation for adults with cancer who are not taking immunosuppressive disease modifying drugs

- Where feasible, vaccination is ideally given **2-4 weeks prior** to planned treatment.
- Non-live vaccines can be administered **during or after chemotherapy or immunotherapy, hormonal treatment, radiation or surgery**, but response s are likely to be better **when the malignancy is in remission and chemotherapy completed at least 3 months previously**.

- However, seasonal influenza vaccine should be administered during treatment when indicated – where possible vaccines should be given immediately before a chemotherapy cycle.

- Individuals who receive only **localized radiotherapy** can be vaccinated at **any time prior to, during, or after radiotherapy**.

Vaccination of individuals with chronic kidney disease

- Individuals immunized during the early stages of chronic kidney disease (CKD) generally respond to vaccination.
- However, **the immune system response to vaccination decreases with advancing kidney disease**.

- Individuals with CKD who are not receiving immunosuppressive therapy to manage their condition can receive vaccination as per the usual Immunisation Schedule.

  - **There is no relationship between vaccination and deterioration of renal function or a reduction in the efficacy of dialysis.**

Effect of flu vaccine on cardiac disease

- A study found that administering influenza vaccine shortly after a heart attack, or in high-risk coronary heart disease patients, led to a **lower risk of a combined outcome of death**, **heart attack** or **stent thrombosis** **at 12 months,** along with reduced risks of all-cause death and cardiovascular death compared to a placebo.

Flu Vaccines for People with Diabetes

- Flu vaccination is especially important for people with **diabetes** because they are **at higher risk of developing serious flu complications**. Flu vaccination also has been associated with reduced hospitalizations among people with diabetes (79%)

Flu vaccination in elderly

- Influenza vaccination provides older people with **low to modest protection against influenza infection.**

- Older people who have been vaccinated but subsequently get influenza are **less likely to develop a severe illness**, be **hospitalized** or require admission to an ICU.

- Influenza vaccination also reduces **influenza related complications** including **heart failure**, **haemorrhagic stroke**, **acute coronary syndrome** , and **respiratory failure** in older people with underlying chronic conditions.

summary of evidence

- Studies show **influenza vaccine efficacy** for the prevention of **acute myocardial injury** during the year following influenza illness is between **19% and 45%,** which is similar to other measures to reduce cardiovascular disease risk factors such as smoking cessation (32–43%), statin use (19–30%) and treatment of hypertension (17–25%).

- Influenza vaccine effectiveness against **pneumonia** for the older person living in the community and the frail older person living in care range from **25% to 53%.**

- **Advancing age** and **increasing frailty** **limit an older person's response to vaccines and decrease vaccine efficacy** against acute infection.

- The use of **adjuvanted influenza** vaccine can enhance the immune response in older adults and increase protection against the influenza infection and complications.

- A systematic review, comparing adjuvanted, high-dose and standard influenza vaccines, concluded that the **'enhanced' vaccines offered better protection than standard vaccines in adults aged over 65 years**.

- Additional preventative strategies to reduce older people's risk of exposure to influenza are also important.

- These **include influenza vaccination of those who are in close contact with older people**, for example living or working with older people.

- **A reduction in circulating influenza disease/increase in herd immunity in the community** through increased influenza vaccination coverage provides extra protection for the older person as it reduces the likelihood of transmission of influenza to the older person.

Flu vaccine in patients with mental disease

- A US study examining the association between **mental distress** and **influenza vaccination coverage** found that **individuals with mental illness had a lower likelihood of receiving the seasonal influenza vaccination**.

- In addition, the study notes that individuals with mental health disorders are at an increased risk of comorbid health conditions that predispose them **to severe complications associated with influenza disease.**

Influenza vaccine during pregnancy

- Data from the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance identified that **pregnant women with influenza were five times more likely to be hospitalised than non-pregnant women**.
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- A normally healthy person who is pregnant has a similar risk for complications from influenza as a non-pregnant person who has comorbidities. **This risk increases with gestation time**.
- When pre-existing medical conditions are superimposed on pregnancy, the risks become even higher.

- **The inactivated quadrivalent influenza vaccine** is recommended each in fluenza season during pregnancy. This is not a live vaccine and safe to be administered during pregnancy.

Best time to be vaccinated

- Influenza vaccination can be given at **any time during pregnancy**.
- It is preferable to vaccinate as soon as the vaccine is available, well before the start of winter.

- This ensures protection against influenza while pregnant. It also allows **placental transfer of protective antibodies to the baby** in utero and gives them **protection from influenza up to 6 months of age**.

- Influenza vaccine can be administered alongside COVID-19 and Tdap vaccines.

Conclusion

- **Influenza vaccination remains the best method for influenza prevention.**

So, it`s better for any person older than 6 months, healthy or immunocompromised, to receive annual influenza vaccine at the best time.

Thanks for your kind attention!