National Community Oncology Dispensing Association, Inc.
PASSION FOR PATIENTS

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Summit Cancer Centers
Updated 12/31/19

Positive Quality Intervention: Vaccination for Non-Transplant Patients with Cancer

Description of PQI: Patients undergoing cancer treatment are more susceptible to infections due to their compromised immune system. This PQI will review which vaccinations patients can or cannot use for proper protection against preventable infections.

Background: Cancer treatments weaken the immune system rendering it more susceptible to infections.[1,2] In order to prevent these infections, cancer patients can either take antimicrobial prophylaxis, get vaccinated, or avoid contact with germs.[2] Generally, it is best to get vaccinated prior to the start of cancer therapy. Live vaccines should be administered at least four weeks prior to the start of chemotherapy and/or at least 3 months after completion of treatment.[1,3] Inactive vaccines should be administered 2 weeks prior to the start of therapy for maximal effect; however, they can be given during therapy. Patients vaccinated during chemotherapy treatment with an inactive vaccine should consider revaccination at least 3 months after therapy as they could be rendered ineffective.[3]

PQI process:

- Obtain patient vaccination history and reference with CDC recommendations to ensure they are current.
- Determine type of vaccination chemotherapy patient needs.
    - Non-replicating (inactive) vaccines: should be given at least *2 weeks* before the initiation of chemotherapy or other immunosuppressive therapy to maximize immune response.[1]
        - For a healthy immune system, it typically takes up to 2 weeks after vaccination for the immune system to respond to exposed pathogen. Immunocompromised patients may have reduced or no response to vaccine, which may hinder the effectiveness of immunity for patient. Vaccination, 2 weeks prior to chemotherapy, allows immune systems to build an immune response against the targeted pathogen.
        - Antibody response is suboptimal if given vaccination during immunosuppressive therapy but is better than not vaccinating.[1]
        - The immune response to vaccine antigens is not as good as that of an immunocompetent patient; repeat vaccination or boosters may be beneficial in prolonging immunity.[4]

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- Replicating live vaccines: should be given at least *4 weeks* prior to and at least *3 months* after immunosuppressive therapy.[1]
  - Live vaccinations contain a weak *live* version of the virus it is intended to vaccinate against; however, an immunocompromised system will not be able to fight against it. The live virus could cause vaccine-derived infections
  - An adequate immune response usually occurs *3 to 12 months* after the completion of chemotherapy. Patients should wait at least 3 months after the completion of therapy to receive live vaccination.[5]
  - Vaccination should be delayed for at least *6 months after* treatment if the patient is receiving anti-B-cell antibodies.[2]
- Based on chemotherapy regimen
  - Guide patients to reference the package insert for all oncolytic specific vaccination suggestions

Patient Centered Activities:

- If patient has **not** been vaccinated, counsel patient on the importance of vaccination.
- Patients who are immunocompromised are at higher risk for certain diseases; additional vaccines are recommended.[4]
  - Immunocompromised patients recommended to receive TIV and polysaccharide-based vaccines (PCV, PPV, MCV4, MPSV, and Hib vaccines).[8]
  - Do recommend flu vaccination. **Do NOT** recommend nasal mist flu vaccine since it is a live vaccine. Live vaccinations are not recommended for immunocompromised patients.
    - Influenza-related hospitalization is 3 to 5 times higher in cancer patients.
  - Pneumococcal vaccine (PCV13 and PPV23)
    - Immunocompromised children and adults should receive PCV13 and are recommended to receive PPV23 vaccine about 8 weeks later.[7,8] Patients then receive a second dose of PPV23 5 years after the first PPV23.[8]
    - Patients that received at least one dose of PPV23 should receive PCV13 no sooner than 1 year after last PPV23 dose.[8]
    - Help patients with weak immune systems fight off serious lung, blood, or brain bacterial infections.[7]
    - Beneficial for patients with multiple myeloma, lung cancer, chronic lymphocytic leukemia, and lymphoma.[1]
  - Zostavax® vs Shingrix®
    - Zostavax® is a live attenuated vaccine whereas Shingrix® is an inactivated recombinant zoster vaccine.

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    - Zostavax® is contraindicated in immunocompromised patients due to it being a live attenuated vaccine.
    - While Shingrix® is not contraindicated in immunocompromised persons, it is not recommended by ACIP at this time due to its lack of research.[9]
- Counsel patients who are on immunotherapy on vaccination recommendations and precautions.
    - Immunotherapy has variable immunomodulatory and immunosuppressive effects. Patients undergoing immunotherapy may or may not experience a suppressed immune response.
    - Vaccine may be triggering an exaggerated immune response in certain patients.[11]
        - Recent reports suggest that influenza vaccines given to patients on certain types of immunotherapy triggered an amplified immune-related adverse reaction.[10,11]
        - Some patients receiving immune checkpoint inhibitors experienced an intensified immune response.[11]
    - Consult with prescriber if vaccination is appropriate with current immunotherapy.
- Follow up with patient 3 months after chemotherapy is complete.
    - If patient had inactive vaccine during chemotherapy, remind patient to get revaccinated 3 months after treatment.
    - If patient is over 65 or has an altered immune system, the CDC recommends a flu vaccine every year and pneumonia vaccine (PPSV23) every 5 years. PCV13 vaccine should only be given once.
    - Booster Tdap vaccination should be considered for patients who have completed chemotherapy.[1] Tdap booster should also be given every 10 years since last Tdap/Td vaccination.
- Counsel family on receiving live vaccines around patients undergoing chemotherapy.

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Supplemental Information:
Vaccination Flow Chart:

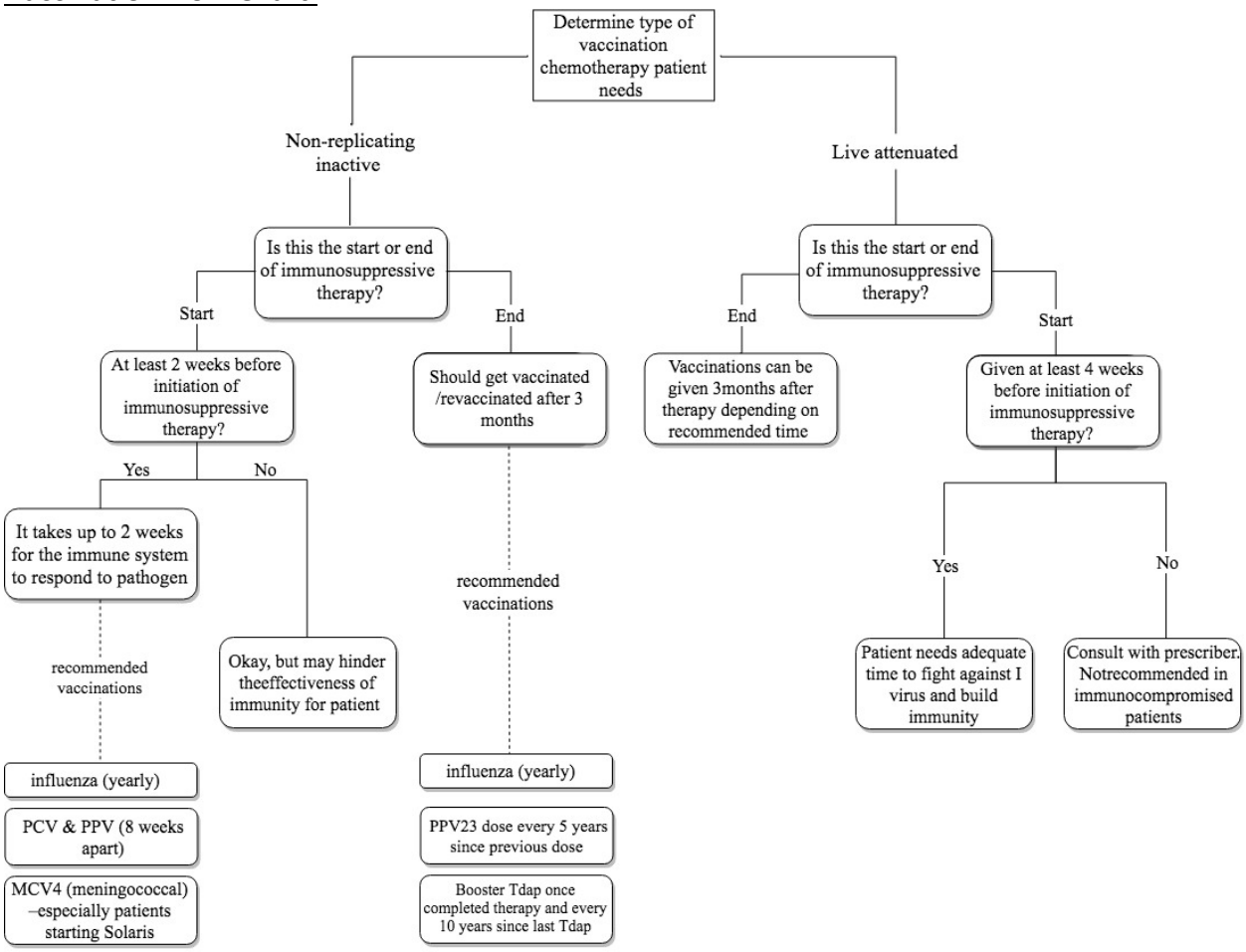

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Table 1: Types of Vaccines

Type of Immunization	Principle of Action	Examples	Comments
Non-replicating vaccines	Based on toxoid, protein subunits, bacterial, antigens, or immunogenic proteins obtained with recombinant, technology.	Tetanus, diphtheria, pertussis, poliomyelitis, hepatitis B, influenza, varicella zoster (shingles) (Shingrix®), Haemophilus influenza, pneumococcus, meningococcus	Usually requires 3–5 doses; antibody titers diminishes with time
Replicating live vaccines	Produced by disabling the virulent properties of a disease-producing virus or bacterium	Measles-mumps-rubella, varicella (chicken pox), varicella zoster (shingles) (Zostavax®) intranasal influenza, yellow fever, oral polio, oral typhoid	Severe reactions are possible; transmission of live pathogen may occur; most provide immunity with 1 dose
Passive immunization	Antibodies are infused to provide short-term protection	Varicella Immunoglobulin, hepatitis B immunoglobulin	Protection diminishes after weeks or months