Staff Educational Topics and Teaching Points to Prevent Errors During Vaccine Administration

Topic or Teaching Points (Additional Resources)	Rationale	Details from the ISMP VERP
General Vaccine Knowledge		
CDC approved vaccine abbreviations (www.ismp.org/sc?id=2866; www.ismp.org/node/226)	There are dozens of similar vaccine abbreviations prone to confusion. Some abbreviations include specifiers (e.g., the numerals in IIV3 and IIV4 for inactivated influenza vaccine, trivalent and quadrivalent) to distinguish vaccines, which may be left off when prescribing and documenting administration.	The most frequent abbreviation mix-ups are between Tdap and DTaP; DT and Td; MMR and MMRV; PCV13 and PPSV23; Hib and HepB; HepA and HepB; and DTaP-HepB-IPV, DTaP-IPV/Hib, and DTaP-IPV.
Vaccines for the same targeted disease available in different age-specific formulations (www.ismp.org/node/208)	Choosing among age-specific formulations of vaccines intended to prevent the same diseases has led to errors, particularly if the vaccine label is not prominently marked with the targeted age groups.	Most frequent mix-ups are between pediatric and adult formulations of HepA and HepB, age-specific formulations of the influenza virus vaccine, and combination vaccines that target diphtheria, tetanus, and/or pertussis.
Differences between the various diphtheria, tetanus, and/or pertussis vaccines (www.ismp.org/ext/47)	Mix-ups are often caused by different age-dependent formulations, similar vaccine abbreviations, and confusion regarding vaccine components.	Most frequent mix-ups are between Tdap and DTaP, and DT and Td.
Combination vaccines (www.ismp.org/ext/37, p. 32)	Unfamiliarity with the components of combination vaccines has led to administration of a combination vaccine when only one component was needed, administration of a single vaccine already contained in a combination vaccine, or administration of an unintended component.	Examples of errors include administration of: Kinrix (DTaP-IPV) by staff who thought it contained HepB; Pediarix (DTaP-HepB-IPV) by staff who thought it contained Hib; Pentacel (DTaP-IPV/Hib) along with separate DTaP and IPV vaccinations; MMR and MMRV; and MMRV and Varivax.
Vaccines with a conjugate polysaccharide antigen (www.ismp.org/node/1090)	The conjugate antigen (i.e., tetanus toxoid, diphtheria, meningococcal) listed on some vaccine labels has been mistaken as the target vaccine name.	Wrong vaccine errors have occurred with the conjugate vaccines that protect against *Haemophilus* b (PedvaxHIB, Hiberix, ActHIB), meningococcal (Menveo), and pneumococcal (Prevnar 13) infections.
Two-component vaccines, and vaccines that require a special diluent (www.ismp.org/sc?id=364; www.ismp.org/node/584)	Diluents have been administered without the active vaccine, often due to similar cartons or vial labels. Or, the wrong diluent has been used, often due to the mistaken belief that vaccine diluents are interchangeable or substitutable. Only one of two-component vaccines has been administered, due to unfamiliarity with preparing these vaccines or the mistaken belief that the liquid vaccine component is a standard diluent.	Administering diluents alone has occurred most frequently with ActHIB, Varivax, and Zostavax. Administering one component of two-component vaccines has most frequently involved Pentacel and Menveo (and more recently, Shingrix). The wrong diluent (including a neuromuscular blocking agent) has been used to reconstitute MMR and MMRV vaccines.
Patient Screening Before Vaccination		
Verify the patient's immunization status and/or date of the prior vaccine dose by checking the health record, vaccination record, and vaccine registry, and/or contacting previous healthcare providers. If records cannot be located, start the patient on an age-appropriate vaccination schedule. (www.ismp.org/ext/48)	Failure to check the patient's record and/or vaccine registry has led to duplicate vaccines, omissions, wrong patient, and wrong interval errors. Except for the influenza virus vaccine, only electronic or written, dated records should be accepted as evidence of vaccination and prior doses, not self-reported doses. Uncertainty has been reported regarding whether to immunize patients who are unsure about prior vaccination.	Duplicate vaccines, omissions, and wrong patient errors are most frequent with vaccines that target diphtheria, tetanus, and/or pertussis; influenza virus vaccines; HepA; HepB; and MMRV. Wrong vaccine interval errors are most common with vaccines that target diphtheria, tetanus, and/or pertussis; HepB; HepA; and 9vHPV.

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Check the vaccination schedule and VIS for the recommended ages, and then verify the patient's age by asking the patient/caregiver for a full date of birth and comparing it to the health record, vaccine record, and/or eMAR. (www.ismp.org/ext/38, www.ismp.org/ext/39, www.ismp.org/ext/40)	Failure to check or verify the vaccination schedule and the patient's age has led to invalid or early doses, or missed opportunities to vaccinate.	Not verifying the patient's age contributes to about 1 in 5 errors in which a patient has been vaccinated with a vaccine, formulation, or dose not indicated at that time interval or age. While this type of error can happen with any vaccine, the most frequent reports involve administration of 9vHPV to children younger than 9 or older than 26.
Screen patients for contraindications (including pregnancy) and precautions, and to confirm the need and indication for vaccination. (www.ismp.org/ext/44; www.ismp.org/ext/43; www.ismp.org/ext/37, pp. 52-58)	Criteria and/or a checklist to follow help staff determine whether it is safe to administer a vaccine to a patient and to verify that vaccination is appropriate at that time. Staff must also know the next steps to take if a contraindication, precaution, or inconsistency with the indication is encountered during the screening process.	The most frequent problem has been forgetting to screen patients, particularly if a screening protocol or checklist is not provided and integrated into the vaccination process. Administration of a pregnancy-contraindicated vaccine (e.g., live, attenuated or live bacterial vaccine) to women who are pregnant or did not know to avoid pregnancy within 3 months of vaccination has also been reported.
Patient Education		
Provide all patients and/or caregivers with a VIS (paper or electronic media) in their primary language, with enough time to read it prior to vaccination (required by federal law for most vaccines). (www.immunize.org/vis/)	The VIS provides details regarding the vaccine indication, contraindications, age specifications, interval, risk and benefits, and what to do if a serious reaction occurs. The VIS can help inform patients and involve them in the verification process. Patients/caregivers who read the VIS can help prevent wrong age and wrong interval errors, and even wrong vaccine errors if staff state the vaccine name and show the patient the label on the syringe.	Frequent errors associated with the wrong vaccine, wrong age, and wrong interval have been reported. These errors might have been prevented if patients and/or caregivers had been given a VIS and time to read it prior to vaccination.
Vaccine Preparation (See General Vaccine Knowledge for teaching points associated with preparing vaccines with diluents and two-component vaccines)		
Check the expiration date on each prefilled syringe or vial prior to vaccine preparation or administration.	The potency of vaccines is not guaranteed after the expiration date. If an expired vaccine is administered in error, it must be repeated (e.g., at least 4 weeks later if a live virus vaccine; immediately if not a live virus vaccine). Expiration dates are prone to misinterpretation given their lack of format uniformity and difficult-to-read small font sizes. Diluents may have a different expiration date than the vaccine.	Failing to conduct a routine check for expired vaccines is a common contributing factor associated with administration of an expired vaccine. While this type of error occurred with many vaccine types, it was most frequent with Hib; DTaP; and the live, attenuated influenza virus vaccine, which has a short shelf life of about 18 weeks. Confusion regarding how the expiration date is expressed on the label has been reported.
Per CDC, do not draw a single vaccine or batches of vaccines into syringes well in advance of administration. As a safer alternative, use commercially available, prefilled and labeled syringes of vaccines from manufacturers whenever possible.	Filling a syringe before it is needed increases the risk of an error. Predrawn syringes may be unlabeled and difficult to tell apart from other syringes. Also, there is no data on the stability of vaccines stored in syringes filled by providers. Bacterial contamination and growth can occur in syringes that do not contain a bacteriostatic agent.	Several errors associated with possible loss of potency and/or contamination have been reported when vaccines were drawn into syringes up to 24 hours prior to administration. The predrawn syringes were also unlabeled. Some cases led to revaccination of clinic patients.
If prefilled syringes are not available, prepare each vaccine dose immediately prior to administration for one patient at a time, and label the container unless the vaccine is prepared in front of the patient and administered immediately.	Unlabeled syringes can lead to misidentification of the vaccine and administration to the wrong patient at the wrong age or by the wrong route. Preparing more than one vaccine at a time for multiple patients can lead to wrong patient errors. Patients should be taught to never accept immunizations from unlabeled syringes.	Dozens of wrong vaccine, wrong age, wrong patient, and wrong route errors have involved unlabeled syringes. In some cases, staff used colored stickers or markings to identify the syringes, or they banded the vial to the unlabeled syringe; however, errors still occurred.

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Topic or Teaching Points (Additional Resources)	Rationale	Details from the ISMP VERP
Vaccine Administration		
If multiple adults and children are being vaccinated at the same time, separate them into distinct treatment areas when possible. Bring only one patient's vaccines into the treatment area at a time, each labeled with the vaccine name and patient's name.	Preparation of different vaccines or different age-formulations of the same vaccine for more than one patient has led to wrong patient errors, particularly when treating multiple patients in the same treatment area, and when vaccine syringes are unlabeled.	Examples of errors include administration of an adult influenza vaccine to children while their parents received the pediatric influenza vaccine, or sibling confusion in which one child received a vaccine intended for another child in the treatment area.
Verify the patient's identity using two unique identifiers (e.g., full name and full date of birth) before administering each vaccine.	Failure to verify the patient's identity has led to wrong patient errors, particularly when preparing vaccines in unlabeled syringes and administering vaccines to more than one patient in the same treatment area.	Preparation of different vaccines or different age-formulations of the same vaccine in unlabeled syringes for multiple siblings in the same treatment area was the most frequent contributing factor with wrong patient errors. Some of these errors involved administration of an unused vaccine intended for a previous patient.
Verify the vaccine's route of administration and recommended needle size prior to administration. (www.ismp.org/sc?id=501; www.ismp.org/ext/37, pp. 98-99)	Most vaccines are administered IM or subcutaneously, but a few are administered orally (rotavirus), intranasally (FluMist), intradermally (Fluzone Intradermal), or percutaneously (BCG). Except for the hepatitis B, rabies, and rotavirus vaccines, vaccines given by the wrong route are often counted as valid.	Because many vaccines are administered IM, most of the wrong route errors involved administration of a subcutaneous (e.g., ZVL, IPV, MMR, VAR, MMRV) or oral (rotavirus) vaccine by the more common IM route. Tetanus vaccines have been administered intradermally after being mistaken as a tuberculin test (PPD).
When available, utilize barcode scanning technology.	Barcode scanning technology is an automated redundancy used to verify that the correct vaccine and dose are being administered to the correct patient.	Wrong vaccine errors have occurred when the barcode on a prefilled syringe was not scanned. Many reports involve complaints about the quality of the barcode and inability to scan it.
Documentation		
Prior to vaccine administration, document the vaccine's National Drug Code (NDC) number, lot number, and expiration date of each vial (e.g., both vials of two-component vaccines; both diluent vials and lyophilized powder vaccine vials) or syringe in the vaccination record, along with the publication date of the VIS and date it was given to the patient/caregiver. Documenting actual administration of the vaccine should always occur *after* it is given.	Documenting the NDC number, lot number, and expiration date of each vial or syringe on the patient's record immediately before administration allows for redundant reading of the label, which may help detect an expired vaccine or an error, particularly vaccines that require two components to be mixed together prior to administration. Requiring documentation of the VIS dates prior to administration can remind staff to distribute these statements before administration, which allows the patient to be involved in the verification process. Actual documentation of vaccine administration should only occur after the vaccine has been given.	Approximately 1 in 10 reports of vaccine errors are related to documentation errors in which accurate and all necessary information has not been documented in the patient's health record. These reports frequently reference missing documentation of prior vaccine administration. Examples of detecting errors when documenting NDC numbers, lot numbers, and expiration dates have been reported, most often associated with expired drugs, wrong vaccines, and wrong doses.
Document all vaccine administration in the local or state vaccine registry (if available). (www.ismp.org/ext/51)	Vaccine registries (immunization information systems) are confidential, community-wide, computerized databases that record vaccines administered by participating healthcare professionals. The registry helps consolidate vaccination records for patients and allows staff to assess patients' immunization status prior to vaccination. This reduces the risk of unnecessary vaccine doses or missed opportunities to vaccinate. Uncertainty has been reported regarding how to access the registry, and missing information has been a concern since documentation is not always mandatory.	Most reports were associated with incomplete information in the vaccine registry when it was queried prior to administration, resulting in duplicate doses and wrong interval errors. Some errors involved not checking the registry prior to administration, although lack of confidence in the registry was often cited. Some reports also involved entering the wrong search criteria or name into a registry, or misinterpreting the registry information. However, many reports noted how checking and documenting in the registry helped prevent or detect errors.