

DOI 10.36074/logos-31.03.2023.51

VACCINE COVERAGE GAPS AND ERRORS

Sknar Solomiia

2nd year student at the Medical faculty 3
Bogomolets National Medical University

UKRAINE

Vaccine is a simple and at the same time effective way to protect an individual against harmful diseases before he or she contacts it. It makes his or her immune system stronger, using the body's natural defenses to build specific resistance to specific infections. Because of some non-modifying factors, such as age or health conditions which cannot be treated, some people should not get certain vaccines or should wait before getting them. Unfortunately, some preventable events that may cause or lead to inappropriate use of vaccine or patient harm exist and they are known as vaccine administration errors. The types of immunization errors include overdose, the use of adult dose in children, the use of unapproved vaccines, inappropriate scheduling between doses, preparation errors (for example, omitting a diluent before immunization, administering the wrong vaccine), and the use of expired doses or vaccines.

A vaccine administration error might have many consequences, such as inadequate immunological protection, possible injury to the patient, cost, inconvenience, reduced confidence in the health delivery system. These errors may be caused by insufficient staff training, lack of standardized protocols, easily misidentified products, distraction, patient misidentification, using nonstandard or error-prone abbreviations, changes in recommendations.

To understand the importance of proper use of vaccines, I suggest to consider the following case: in 2018 the commission of the Ministry of Health of Ukraine conducted an inspection in the village Petranka, Ivano-Frankivsk region, where at the beginning of October, 53 children aged from 5 to 13 years fell ill with measles. The most surprising thing is that almost 90% of children were vaccinated against measles. Why didn't the vaccine save them? Doctors assume that the vaccine could be of poor quality due to a violation of the cold chain (a specific regime of storing pharmaceutical products at a certain temperature to maintain their safety and quality). The village sometimes lost electricity for a day and the doctors did not have additional sources of electricity. After conducting an inspection, the Ministry of Health commission named three main reasons that led to the outbreak of measles:

1. A large number of children were not vaccinated against measles in previous years and are not included in the vaccination plan for this year.

2. The power outage could affect the quality of the vaccines stored in the refrigerator, because without light, the cold chain regime was violated.

3. Violations in the maintenance of medical documentation. For example, the lack of informed consent for vaccination from parents when vaccinations are carried out calls into question the very fact of vaccination for all children who have contracted measles.

As a consequence, there are 3 main reasons that caused a vaccination error in this case. All of them can be grouped into 6 categories:

1. Wrong vaccine, site, route, dosage (amount) or improperly prepared.
 2. Wrong patient.
-

3. Documentation errors.
4. Improperly stored and/or handles vaccine administered (for example, expired vaccine given).
5. Scheduling errors (for example, vaccine doses in a series administered too soon).

How to prevent these errors from happening?

Possible preventive actions for wrong vaccine, site, route, dosage(amount) or improperly prepared include the brand name with the vaccine abbreviation whenever possible in orders, medical screens, etc. You should circle important information on the packaging to emphasize the difference between the vaccines, separate vaccines into bins or other containers according to type and formulation, use color-coded identification labels on vaccine storage containers, store look-alike vaccines in different areas of the storage unit (for example, pediatric and adult formulations of the same vaccine on different shelves in the unit), do not list vaccines with look-alike names sequentially on computer screens, order forms, or medical records, if possible, consider using "name alert" or "look-alike" stickers on packaging and areas where these vaccines are stored and purchasing products with look-alike packaging from different manufacturers, if possible, establish "DO NOT DISTURB" or no-interruption areas or times when vaccines are being prepared or administered, prepare vaccine for one patient at a time (once prepared, label the syringe with vaccine name). Do not administer vaccines prepared by someone else, keep reference materials on recommended sites, routes, and needle lengths for each vaccine used in your facility in the medication preparation area, clearly identify diluents if the manufacturer's label could mislead staff into believing the diluent is the vaccine itself, integrate vaccine administration training into orientation and other appropriate education requirements, provide education when new products are added to inventory or recommendations are updated [1].

To prevent a "wrong patient" error verify the patient's identity before administering vaccines, educate staff on the importance of avoiding unnecessary distractions or interruptions when staff is administering vaccine, prepare and administer vaccines to one patient at a time. If more than one patient needs vaccines during the same clinical encounter (for example, a parent with two children), assign different providers to each patient, if possible. Otherwise, bring only one patient's vaccines into the treatment area at a time, labeled with vaccine and patient name [1].

The next error is a **documentation error**. Do not use error-prone abbreviations to document vaccine administration, change the appearance of look-alike names or generic abbreviations on computer screens, if possible [1].

Improperly stored and/or handles vaccine administered (for example, expired vaccine given) include the following preventive measures. Integrate vaccine storage and handling training based on manufacturer guidance and/or requirements, rotate vaccines so those with the earliest expiration dates are in the front of the storage unit (use these first), remove expired vaccines/diluents from storage units and areas where viable vaccines are stored, isolate vaccines exposed to improper temperatures and contact the state or local immunization program and/or the vaccine manufacturer [1].

To prevent scheduling errors create procedures to obtain a complete vaccination history using the immunization information system (IIS), previous medical records, and personal vaccination records, integrate vaccine administration training, including timing and spacing of vaccines, into orientation and other appropriate education requirements, for children (especially infants) schedule immunization visits

after the birthday. Post current immunization schedules for children and adults that staff can quickly reference in clinical areas where vaccinations may be prescribed and administered, counsel parents and patients on how important it is for them to maintain immunization records [1].

Besides these ways of preventing the errors, the most effective way is teamwork. Medical error is a leading cause of adverse events and patient death. Further, poor communication is a leading cause of medical error. These are the four teamwork modules and skills:

Module	Skill	Description
Communication	<ol style="list-style-type: none"> 1) SBAR 2) DESC 3) 2-Challenge 4) Check Back 5) Call Out 6) "Stop the Line" phrase 	<ol style="list-style-type: none"> 1) Structured technique for presentation of relevant patient information 2) Structured technique for conflict resolution 3) Concept that patient safety concern must be verbalized at least twice if it is not corrected 4) Orders and clinician needs must be repeated back to the sender to ensure that the receiver has understood the message correctly 5) Important events are called allowed, especially during rapidly changing situations. Facilitates anticipation of next steps. 6) A word or phrase understood by all to indicate a significant safety concern. It can be spoken in front of awake patients.
Situation monitoring	<ol style="list-style-type: none"> 1) Situation monitoring 2) Shared mental model 3) Situation awareness 	<ol style="list-style-type: none"> 1) Actively scanning the unit to assess patients and their plans of care, team member performance, and the environment; looking for potential errors 2) When caregivers are aware of the same information and are thus able to plan and problem solve together 3) The state of knowing one's surroundings and work condition
Mutual support	<ol style="list-style-type: none"> 1) Feedback 2) Advocacy 3) Task assistance 	<ol style="list-style-type: none"> 1) A form of verbal support that help colleagues to improve their teamwork 2) A form of verbal support that requires staff to advocate for patient safety 3) Asking for or offering assistance, when one team member is overworked or attempting to do something beyond their skill set
Leadership	<ol style="list-style-type: none"> 1) Resource management 2) Conflict resolution 3) Teamwork behaviors 4) Role clarity 	<ol style="list-style-type: none"> 1) Appropriately re-allocating resources or work load to ensure that no patient is at risk due to overworked staff 2) Leaders help resolve interpersonal or medical conflicts, using structured language and a chain of command 3) The leader ensures that team meetings, briefings, debriefings, and other teamwork behaviors occur 4) The leader is responsible for ensuring that the team members know their roles and responsibilities

Medical safety aims to prevent and reduce risks, errors and harm that occur to patients during provision of health care. A cornerstone of the discipline is continuous improvement based on learning from errors and adverse events. Patient safety is fundamental to delivering quality essential health services (The World Health Organization).

References:

- [1] Centers for Disease Control and Prevention. (2021). *Vaccine Administration: Preventing Vaccine Administration Errors* (CS 322033-A). <https://www.cdc.gov/vaccines/hcp/admin/downloads/vaccine-administration-preventing-errors.pdf>
-