

Immunization Data Technical Notes

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Wyoming immunization rates are available from multiple data sources. This document provides technical details on each of these data sources. Contact the Wyoming Immunization Unit at wdh.immunize@wyo.gov with any questions.

Wyoming Immunization Registry (WyIR)

Background:

The Immunization Information System (IIS) administered by the Wyoming Department of Health (WDH) is referred to as the Wyoming Immunization Registry (WyIR). The WyIR is a registry that maintains immunization records for people of all ages in Wyoming. It is a secure, web-based tool.

The WyIR was first established in 2000 and is hosted by STChealth. Reporting of all vaccines administered in Wyoming to the WyIR became mandatory for pharmacies in 2013 as a result of Wyo. Stat. § 33-24-157. All other healthcare providers are required to report all vaccines administered in Wyoming to the WyIR in accordance with administrative rule [Rules Wyo. Dep't of Health, Immunization Unit, ch.5 (2018)].

Methodology:

Due to the reporting rules described above, healthcare providers, including hospitals and primary care providers, must report all vaccines administered in Wyoming to the WyIR. Providers can manually enter data into the WyIR or send data via automatic, real-time HL7 connections from their electronic medical record systems to the WyIR.

New patient records are created in the WyIR when birth records for newborns in Wyoming are loaded into the WyIR, when a provider adds a new patient record, or when WDH receives an electronic immunization record for a new patient. New patient records are those that do not match the identifying information associated with an existing WyIR patient record. Birth records for infants born in Wyoming are loaded into the WyIR weekly. All providers are required to enter vaccination data within 30 days of administering a vaccine.



Wyoming also participates in a CDC-led data exchange project called IZ Gateway. This project supports the exchange of immunization record data across jurisdictional boundaries. As of November 2025, the WylR has IZ Gateway connections with twelve jurisdictions, including Alaska, Arizona, Washington D.C., Indiana, Louisiana, Mississippi, Ohio, Puerto Rico, South Dakota, Tennessee, Washington, and West Virginia. Connections are currently pending with Colorado, New Mexico, Nevada, Utah, and Virginia.

The WylR utilizes a concept called “patient status” to define who is responsible for vaccinating and maintaining records for a specific patient at a provider organization or geographic jurisdiction level. In the WylR, a patient's status may be set to active, inactive, or deceased. Active patients are those believed to be alive and living in Wyoming. If a provider or system administrator indicates that a patient has died, moved, or gone elsewhere (MOGE), their patient status is marked as inactive in the system. End users of the WylR cannot manually update the county and jurisdiction (statewide) status of a patient record in the WylR unless a patient's address is updated to an address in a different county or out of state. The Immunization Unit matches recent Wyoming Vital Statistics death records with the WylR on a weekly basis. These matches are manually reviewed, and then, if determined to be accurate, the patient is marked deceased. It should be noted that no patient information is deleted from the WylR if the patient record is marked inactive or deceased.

Coverage in the WylR is calculated using active patients and valid vaccinations. Valid vaccinations are those doses administered at the appropriate age and interval, as recommended by the Advisory Committee on Immunization Practices (ACIP) and the recommended immunization schedule. Doses can be marked as invalid for several reasons, including that the dose was administered to a patient outside the recommended age range for the vaccine preparation, the dose was given at an improper interval for the series, or the vaccine is marked as compromised.

While patient status is ideally maintained at the provider level, clinic staff often are not able to prioritize managing patient status within the WylR due to competing time demands. In 2018, the Immunization Unit recognized that the number of active WylR patient records exceeded Wyoming's population, and concluded that a mass patient status management project was necessary. Having so many extra active patients created an inaccurately large denominator, which falsely lowered Wyoming's immunization coverage rates. The first mass inactivation of patient records occurred in September 2018. Recognizing the need for ongoing patient status management at the database level, the Immunization Unit performed three mass inactivations at 6-month intervals between May 2024 and May 2025. Starting in November 2025, the Immunization Unit plans to continue maintaining patient status through mass inactivation on an annual cadence.

For the mass inactivations that were conducted from September 2018 through May 2025, patient records were marked inactive at the provider, county, and jurisdiction level if:

- A patient record had no vaccines recorded
- Patients aged 0-18 years had not had a vaccination recorded in 8 or more years
- Patients aged 19 and older had not had a vaccination recorded in 5 or more years

Beginning in November 2025, patient records will be inactivated at the provider, county, and jurisdiction level using the following criteria:

- Patients aged 3 years and older with no vaccines recorded on the patient record
- Patients aged 3-18 years who have not had a vaccination recorded in 8 or more years
- Patients aged 19 and older who have not had a vaccination recorded in 5 or more years

Limitations/Considerations:

Even though reporting was made mandatory for all providers in February 2018, it is likely that not all providers report all immunizations for their patients. Because Wyoming's immunization reporting requirements are determined at the state level, federal healthcare providers, such as those on military bases, are not obligated to report to the WylR. If a patient receives an immunization outside of Wyoming in a state not connected to Wyoming via the IZ Gateway, the WylR will not have records of those immunizations. When taken together, these considerations mean that WylR estimates of immunization coverage are likely lower than the true immunization rates.

Timeliness and completeness of reporting vary among providers. While the use of HL7 messaging standards has significantly improved the efficiency and completeness of data submission, reliance on data transmission introduces other challenges. Not all immunization providers may be successfully onboarded to submit data via HL7 interfaces, requiring them to use less timely or error-prone manual methods. The automated HL7 data transmission depends on accurate mapping and strict data quality rules. Messages containing structural or data validation errors (e.g., missing required fields, non-standard codes) may be rejected by the WylR, leading to silent data loss or delays until manual correction.

Not all patient demographic profiles are complete in the WylR. For example, race/ethnicity data is not available on some patients' records. However, data quality and completeness continue to improve as the registry matures. The increase in real-time HL7 connections

between providers and the WyIR means that more data is being entered into the WyIR, and this process is occurring more quickly and accurately. The Immunization Unit regularly monitors data quality in the WyIR and participates in monthly national data quality meetings and forums. The Immunization Unit meets with national partners from the American Immunization Registry Association (AIRA) quarterly to test data quality in the WyIR and ensure it meets a nationally accepted standard.

Coverage rate calculations require a reliable numerator (doses recorded in the WyIR) and an accurate denominator (the target population). Defining an accurate denominator from immunization information system data is a known challenge for many jurisdictions. The population of patients captured in the WyIR may differ from the true population of Wyoming.

Due to the recommended childhood immunization schedule and routine well-child visits, children are likely to have more frequent contact with a healthcare provider than most adults; thus, they are more likely to have their residency information updated in the WyIR in a timely manner. School immunization requirements in elementary and secondary schools also provide touchpoints for updating a child's information and confirming whether they remain Wyoming residents. Unless adults in Wyoming regularly receive immunizations, the Immunization Unit has fewer opportunities to verify whether an individual still resides in the state or has moved elsewhere. For these reasons, childhood coverage rates are considered to be the most accurate. The number of adults and adolescents is likely overestimated in the WyIR because not all individuals in these age groups who have moved out of the state have been marked as inactive by their healthcare providers.

To verify that the Immunization Unit is using the best methods for calculating Wyoming immunization rates, the Unit compared three potential denominator sources for the 5-18 age group: 1) 'Active' patients within the WyIR; 2) US Census Bureau annual county-level population estimates; and 3) a nonlinear logarithmic (ogive) weighted algorithm that weighted records based on length of time since a patient's last record activity. The Unit then validated all three denominator sizes against a high-fidelity administrative control population: official K-12 school and homeschool enrollment data from the Wyoming Department of Education. The 'active' WyIR patient denominator provided the closest match to the school enrollment control population. Census data underestimated the population in several rural counties, producing improbable coverage rates exceeding 100%. Conversely, the nonlinear weighted algorithm overcorrected for denominator inflation, leading to artificially small denominators and inflated coverage rates.

Despite ongoing deduplication efforts, the existence of duplicate patient records can lead to an artificially inflated denominator or, less commonly, complicate the accurate counting

of received doses.

Coverage rate calculations only include valid doses. Validity is based on ACIP-recommended immunization schedules, which assess the validity of a dose (e.g., minimum age and interval requirements). Errors in dates of birth, administration dates, or vaccine type can cause a valid dose to be incorrectly flagged as invalid, thereby reducing the calculated coverage rate.

National Immunization Surveys (NIS)

Background:

The National Immunization Surveys (NIS) are sponsored and conducted by the National Center for Immunization and Respiratory Diseases (NCIRD) at the Centers for Disease Control and Prevention (CDC). Currently, four phone surveys are conducted with parents to monitor vaccination coverage: children aged 19-35 months, teenagers aged 13-17 years, flu vaccinations for children aged 6 months to 17 years, and COVID-19 vaccinations for children and teenagers in eligible age groups, as well as for adults 18 years and older. Data collection for the first survey began in April 1994 to check vaccination coverage after measles outbreaks in the early 1990s.

Methodology:

The NIS provides current, population-based, state- and local-area estimates of vaccination coverage among children and teens using a standard survey methodology. The surveys collect data through telephone interviews with parents or guardians in all 50 states, the District of Columbia, and some U.S. territories. Landline and cell phone numbers are randomly selected to reach parents or guardians, who may then enroll age-eligible children from the household. During the interview, parents and guardians of eligible children are asked to provide the names of their children's vaccination providers and to grant permission to contact them. With this permission, a questionnaire is mailed to each child's vaccination provider(s) to collect information on vaccination types, number of doses, dates of administration, and other administrative data about the healthcare facility. Estimates of vaccination coverage are determined for child and teen vaccinations recommended by the ACIP. Children and teens are considered up to date based on the ACIP-recommended number of doses for each vaccine.

The current questionnaires used for each NIS survey can be found on the CDC's webpage [here](#).

Methodological differences between the NIS and WyIR

	WyIR	NIS
Data Collection	Mandatory report by Wyoming healthcare provider	Telephone survey of a representative sample
Immunizations counted towards completion	Standard coverage calculated using doses given at the correct age and interval between doses	More lenient, it does not account for the interval between doses or the child's age. Counts the number of doses received only.
Data consistency	Subject to changes as data quality and completeness improve over time	More or less consistent methodology over time; can compare year to year without caveats.

Limitations/Considerations

Limitations of NIS data include low response rates and non-response bias. Response rates in phone-based surveys are often low, which can introduce non-response bias. The characteristics of participants may not accurately reflect the target population, as those who choose to respond may be systematically distinct (e.g., higher socioeconomic status or baseline vaccination rates). The survey design also requires both an initial household interview and a subsequent provider record check. If a participant's vaccination history cannot be verified by their providers, the child is often excluded from the final coverage calculation.

The NIS is also optimized for high-level aggregated data. It is not designed to provide reliable estimates for small geographic areas or populations. NIS estimates are most robust at the state and national levels, but the sample size is often insufficient to accurately measure at the county level or smaller. NIS data is often highly delayed. This limits its utility for assessing the immediate impact of current public health campaigns or monitoring rates during rapid changes, such as during a pandemic.

Immunization Status Reports (ISRs)

Background:

Wyo.Stat. §§ 21-4-309 and 14-4-116 require an audit of the immunization status for all children attending a Wyoming public or private school or child care facility. This audit is conducted in accordance with rules and regulations prescribed by WDH. Data for homeschooled students are collected only for kindergarten students who are formally enrolled in a school district for auxiliary services such as therapies, extracurricular activities, or individual classes.

This audit traditionally takes place for schools after the 30-day exclusion period and for child care facilities at the beginning of the calendar year. School data regarding kindergarteners are reported to the CDC each spring for publication in the Morbidity and Mortality Weekly Report (MMWR). Data from the audit may also be used by WDH in reports and dashboards.

Methodology:

The process for collecting ISR data varies slightly based on the facility type. The ISR for schools is developed in collaboration with the CDC to ensure it captures all required data elements for federal reporting. The school ISR is a secure, web-based form sent directly to school principals, with a copy provided to the school's designated immunization contact person.

The ISR for child care facilities is sent directly to child care facility administrators, using the current licensure list provided by the Wyoming Department of Family Services. The child care ISR is a secure, web-based form; however, a hard copy format is also available upon request to accommodate facilities with limited internet access or specific reporting needs.

Limitations/Considerations:

The most significant limitation of the ISRs is that they are completed using self-reported, aggregate data from facility staff. Due to resource constraints within the Immunization Unit, the reported figures are not routinely validated against individual student health records. Data quality is heavily reliant on the competency and diligence of the individual staff member completing the report. This may introduce variability in how exemptions are counted, how partial immunization status is interpreted, and how records are reviewed.

Since the report captures the number of immunized students, it does not always clearly delineate between students who are truly unimmunized versus those with a documented medical or religious/philosophical exemption. This distinction is critical for public health risk assessment.