KANSAS HEALTH INSTITUTE

VACCINATIONS IN KANSAS
A CLOSER LOOK

February 2023

Acknowledgments

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Who We Are

- Nonprofit, nonpartisan educational organization based in Topeka.
- Established in 1995 with a multi-year grant by the Kansas Health Foundation.
- Committed to convening meaningful conversations around tough topics related to health.

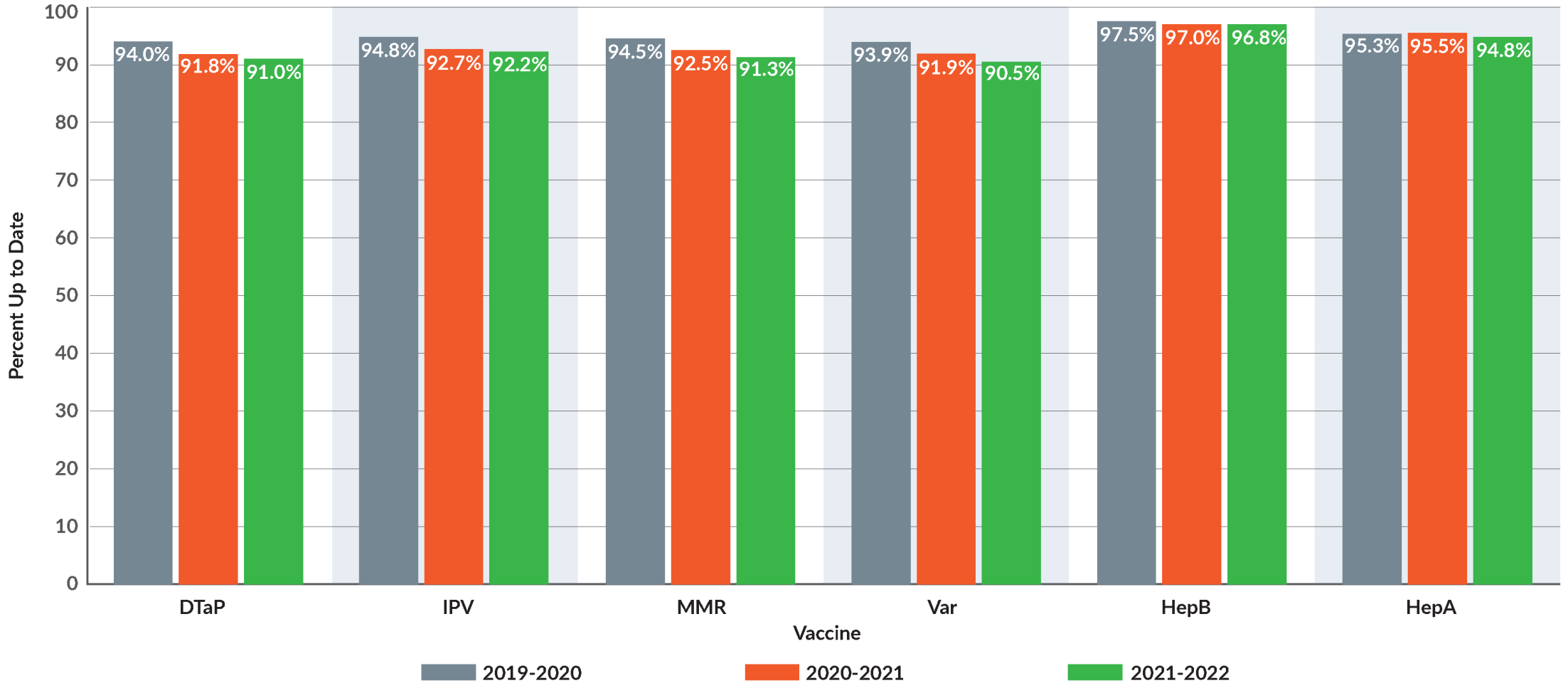
School Immunization Requirements for the 2022-2023 Kansas School Year, Required and Recommended

Vaccine Required for School Entry	Vaccine Preventable Disease(s)
DTaP/Tdap	Diphtheria, Tetanus, Pertussis
IPV	Polio
MMR	Measles, Mumps, Rubella
VAR	Chickenpox
HepB	Hepatitis B
HepA	Hepatitis A
MenACWY*	Meningitis
Recommended Vaccine	**Vaccine Preventable Disease**
HPV	Human Papillomavirus
Influenza	Flu

*Note: MenACWY is required beginning at 7th grade. Licensed child care facilities and early childhood programs operated by schools also have vaccination requirements.

Source: Kansas Department of Health and Environment; https://www.kdhe.ks.gov/DocumentCenter/View/21272/2022-2023-School-Requirement-K-12-PDF

Kansas Kindergarten Immunization Rates by Vaccine Type and Academic Year

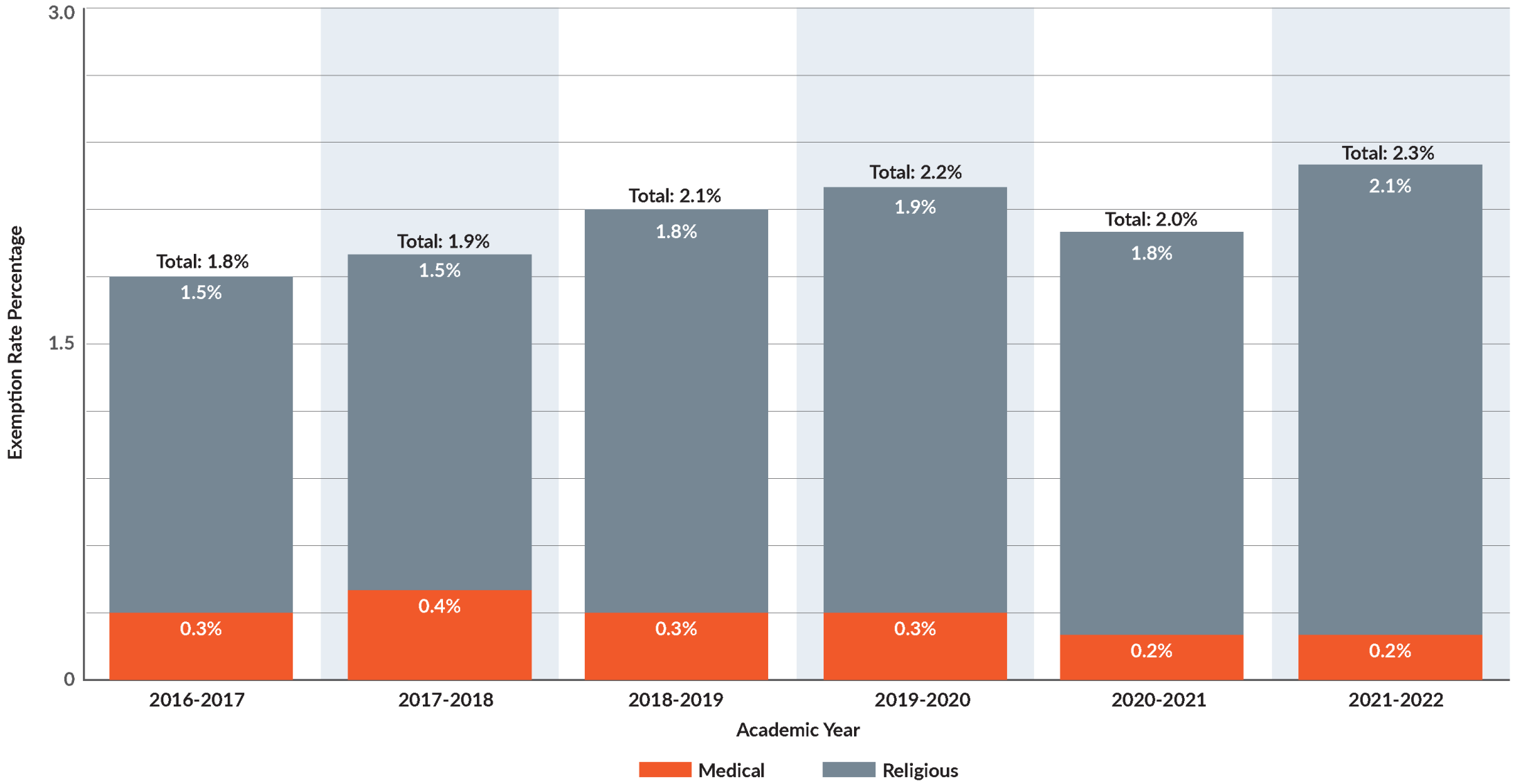


Academic Year	DTaP5	Polio4	MMR2	Var2	HepB3	HepA2
2019-2020	94.0 %	94.8 %	94.5 %	93.9 %	97.5 %	95.3 %
2020-2021	91.8 %	92.7 %	92.5 %	91.9 %	97.0 %	95.5 %
2021-2022	91.0 %	92.2 %	91.3 %	90.5 %	96.8 %	94.8 %

Note: Two changes in methodology occurred in the academic year 2019-2020. Data are now collected at the school district level. Data in prior years were collected at the county level. The current data reflect compliance at the 60th day of the school year versus the first day of school. Additional children vaccinated in the 60-day grace period are now reflected in the statewide estimates.

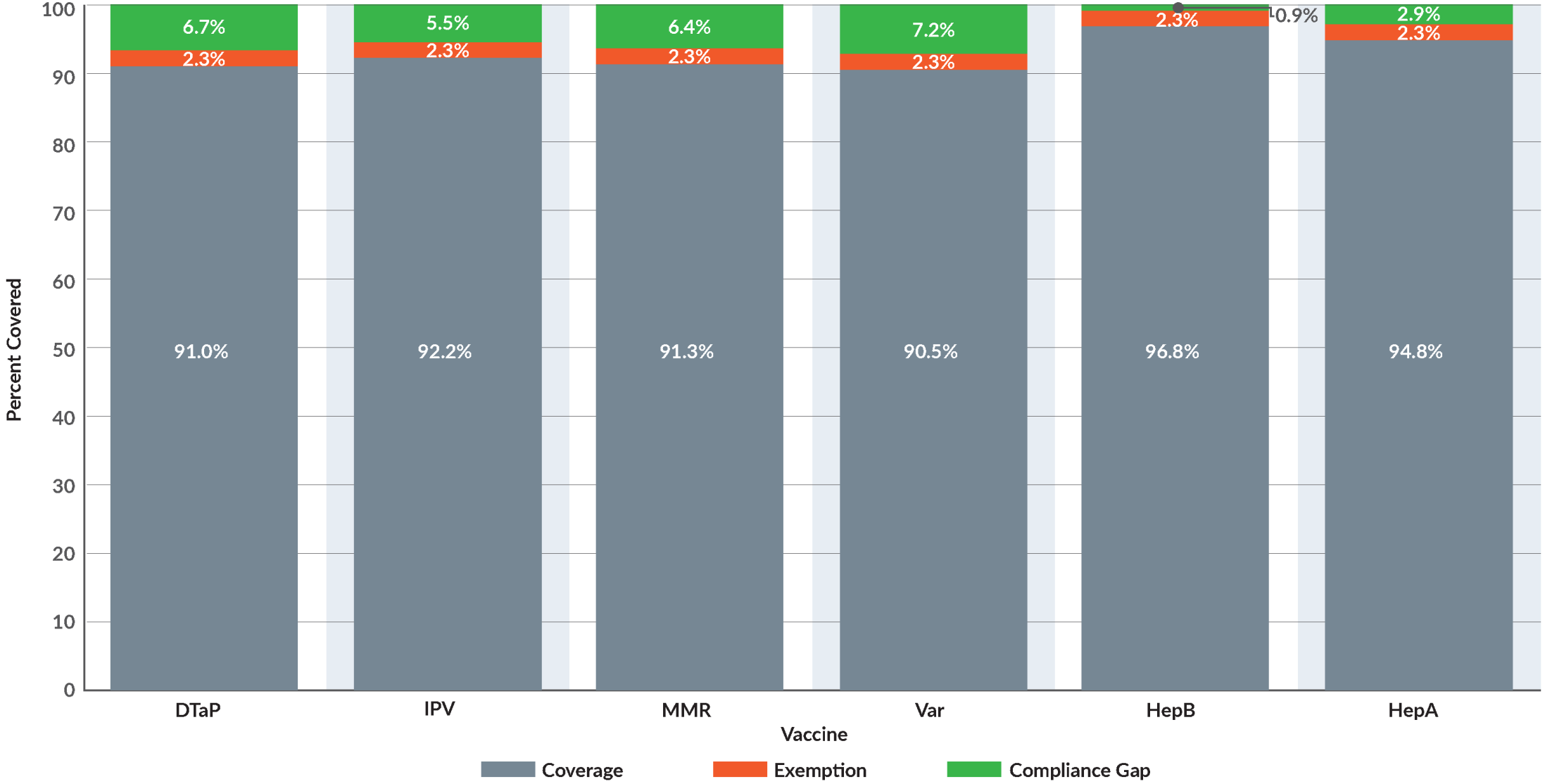
Source: Kansas Health Institute analysis of kindergarten immunization rates obtained through the Kansas Department of Health and Environment in December 2022.

Kansas Kindergarten Immunization Medical and Religious Exemptions by Academic Year



Note: Medical and religious exemptions are reported through a survey to the Kansas Department of Health and Environment. All public and private schools in Kansas are surveyed.
Source: Kindergarten medical and religious exemption rates from Kindergarten Immunization Rates in Kansas obtained through the Kansas Department of Health and Environment in December 2022.

Compliance to Kansas Kindergarten Vaccinations, Exemptions, and the Compliance Gap for the 2021-2022 Academic Year



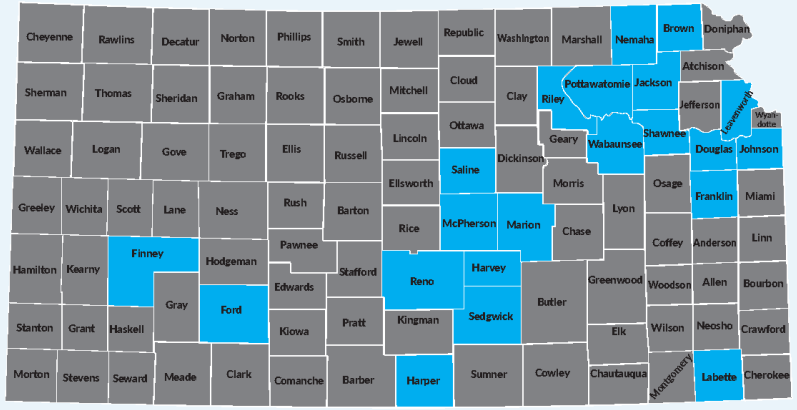
Note: Most recent vaccination compliance rates are compared using medical and religious exemptions, and the resulting compliance gap. The compliance gap includes students that are in the process of becoming up to date, but not fully compliant as of the 60th day of school. Exemptions were calculated in aggregate but vary by vaccine.

Source: Kansas Health Institute analysis of kindergarten immunization rates and kindergarten medical and religious exemption rates from Kindergarten Immunization Rates in Kansas obtained through the Kansas Department of Health and Environment in December 2022.

Kansas Maps of Vaccine Preventable Disease in Kansas between 2010 and 2019

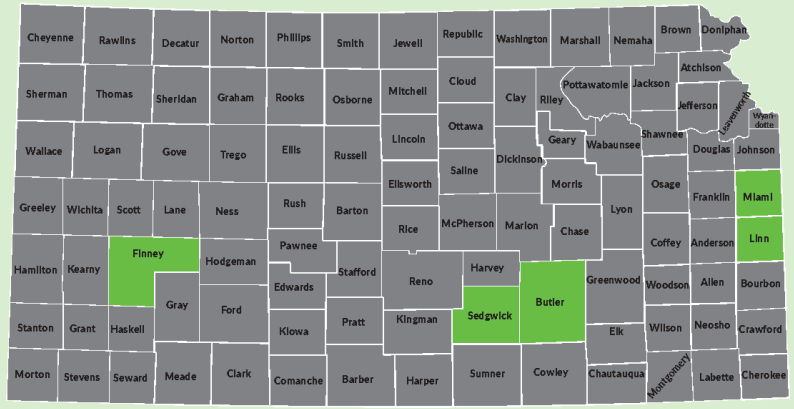
WHOOPING COUGH

*A total of **2,967** cases of whooping cough reported and of those cases, **879** were associated with **45** whooping cough outbreaks.*



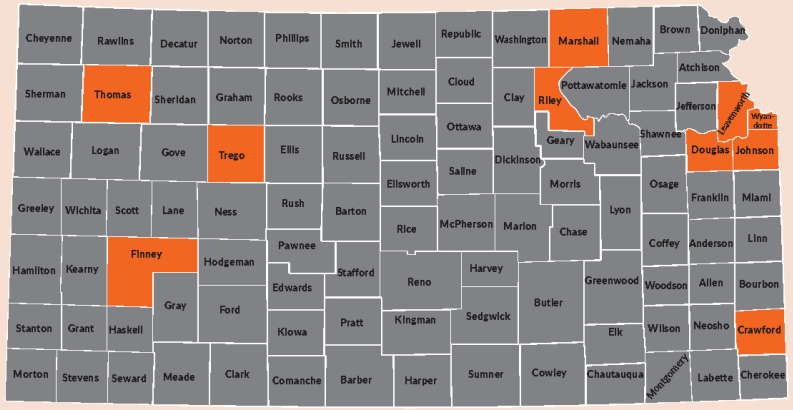
MEASLES

*A total of **50** cases of measles reported and of those cases, **43** were associated with **4** measles outbreaks.*



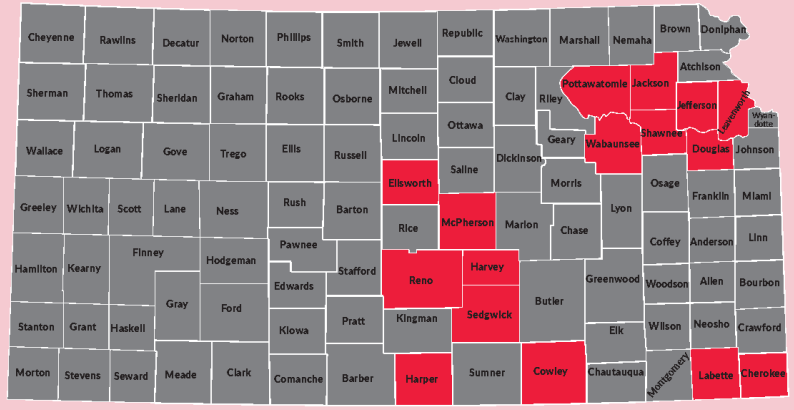
MUMPS

*A total of **209** cases of mumps reported and of those cases, **140** were associated with **14** mumps outbreaks.*



CHICKEN POX

*A total of **2,475** cases of chicken pox reported and of those cases, **206** were associated with **14** chicken pox outbreaks.*



Note: KDHE investigation reports related to diseases potentially prevented through required school entry vaccinations are included in the data set. For outbreaks that include out-of-state cases, only Kansas cases are included in the figure. Refer to Appendix A for more details on outbreaks in Kansas of vaccine preventable diseases from 2010-2019.

Source: Kansas Health Institute analysis of KDHE publicly available investigation reports for years 2010-2019 accessed through the KDHE website December 2022 and data provided by KDHE's Bureau of Epidemiology and Public Health Informatics in January 2023.

Kansas Statutes Related to School Entry Vaccines

Statute	Subject/Topic	Description
K.S.A. 72-6161	Health tests and inoculations; definitions	(a) "School Board" means the board of education of a school district and the governing authority of any nonpublic school; (b) "school" means all elementary, junior high, or high schools within the state. (c) "local health department" means any county or joint board of health established under the laws of Kansas and having jurisdiction over the place where any pupil affected by this act may reside; (d) "secretary" means the secretary of the state department of health and environment; (e) "physician" means a person licensed to practice medicine and surgery
K.S.A. 72-6262	Health tests and inoculations, certification of completion required, alternatives; duties of school boards	(a) In each school year, every pupil enrolling or enrolled in any school for the first time in this state, and each child enrolled for the first time in a preschool or day care program operated by a school, and such other pupils as may be designated by the secretary, prior to admission to and attendance at school, shall present to the appropriate school board certification from a physician or local health department that the pupil has received such tests and inoculations as are deemed necessary by the secretary by such means as are approved by the secretary. Pupils who have not completed the required inoculations may enroll or remain enrolled while completing the required inoculations if a physician or local health department certifies that the pupil has received the most recent appropriate inoculations in all required series. Failure to timely complete all required series shall be deemed non-compliance. (b) As an alternative to the certification required under subsection (a), a pupil shall present: (1) An annual written statement signed by a licensed physician stating the physical condition of the child to be such that the tests or inoculations would seriously endanger the life or health of the child, or (2) A written statement signed by one parent or guardian that the child is an adherent of a religious denomination whose religious teachings are opposed to such tests or inoculations (c) On or before May 15th of each school year, the school board of every school affected by this act shall notify the parents or guardians of all known pupils who are enrolled or who will be enrolling in the school of the provisions of this act and of any policy regarding the implementation of the provisions of this act adopted by the school board. (d) If a pupil transfers from one school to another, the school from which the pupil transfers shall forward with the pupil's transcript the certification or statement showing evidence of compliance with the requirements of this act to the school to which the pupil transfers
K.S.A. 72-6263	Duties of public health departments and officers; fees, exception to payment	The county, city-county, or multi-county health department shall provide without delay, and to the extent that funds are available, the tests and inoculations required by this act to such pupils as are not provided therewith by their parents or guardians and who have not been exempted on religious or medical grounds. Such tests and inoculations may be provided on a sliding fee scale for administrative charges, with the exception that no child may be denied inoculations for inability to pay an administrative fee. The local health officer shall counsel and advise school boards concerning the administration of this act.
K.S.A. 72-6464	Duties of secretary; forms and certificates; regulations	The secretary shall prescribe the content of forms and certificates to be used by school boards in carrying out this act and shall provide, without cost to the school boards, sufficient copies of this act for distribution to pupils. Schools shall utilize the reporting form adopted by the secretary for documentation of all immunizations. Audit information shall be obtained from this adopted form. The secretary may adopt such regulations as are necessary to carry out the provisions of this act.
K.S.A. 72-6265	Exclusions of pupils from school attendance; adoption of policy; notice; hearing; compulsory attendance law not applicable	a) The school board of every school affected by this act may exclude from school attendance, or by policy adopted by any such school board authorize any certificated employee or committee of certificated employees to exclude from school attendance, any pupil who has not complied with the requirements of K.S.A. 72-6262. A pupil shall be subject to exclusion from school attendance under this section until such time as the pupil shall have complied with the requirements of K.S.A. 72-6262. The policy shall include provisions for written notice to be given to the parent or guardian of the involved pupil. The notice shall (1) indicate the reason for the exclusion from school attendance, (2) state that the pupil shall continue to be excluded until the pupil has complied with the requirements of K.S.A. 72-6262, and (3) inform the parent or guardian that a hearing thereon shall be afforded the parent or guardian upon request therefor. b) The provisions of K.S.A. 72-3120 do not apply to any pupil while subject to exclusion from school attendance under the provisions of this section.

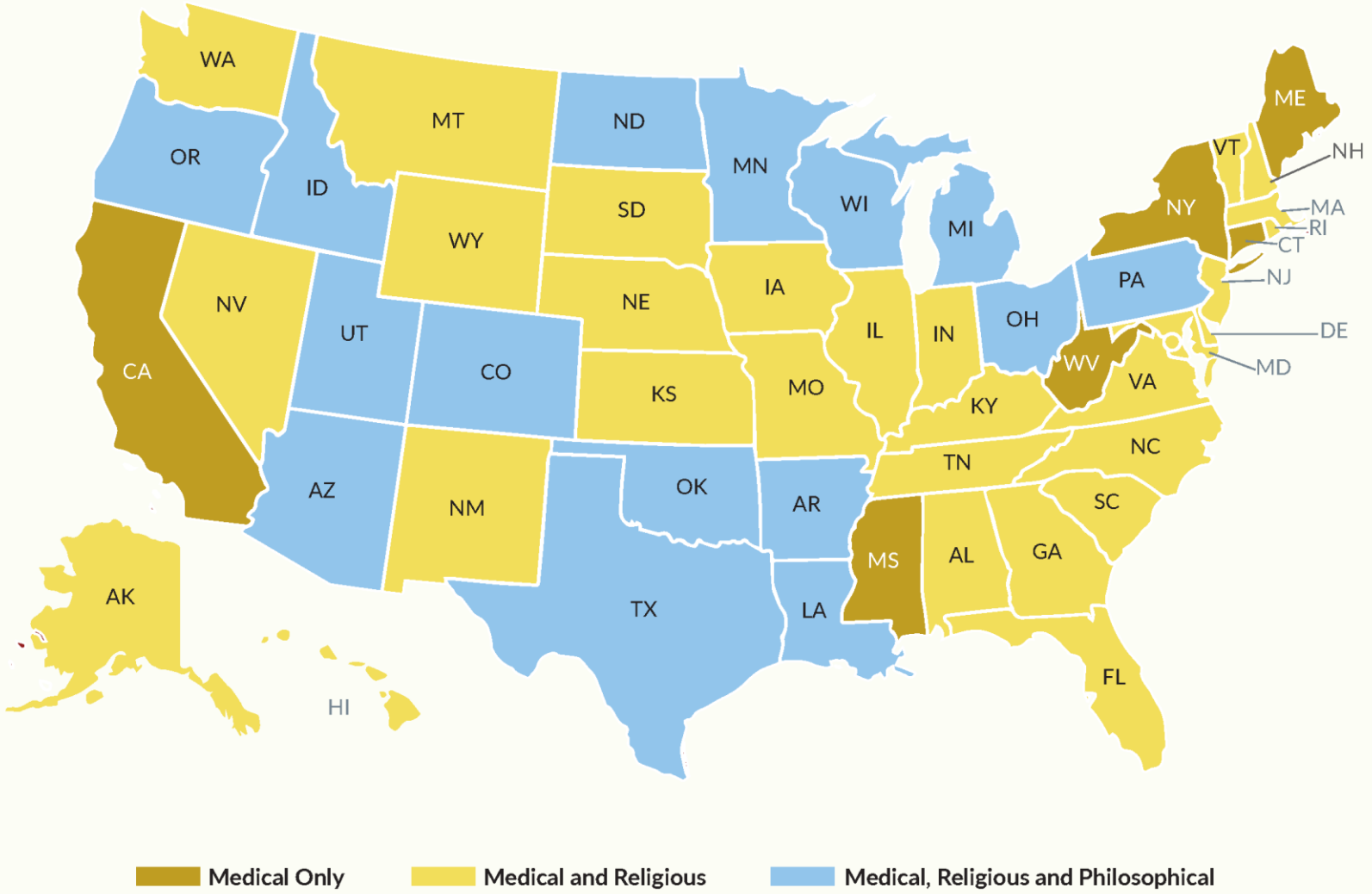
Source: Kansas Department of Health and Environment, https://www.kdhe.ks.gov/DocumentCenter/View/1233/Kansas-Statutes-Related-to-School-Immunizations-PDF Accessed December 2022.

Required and Recommended Vaccinations for Attending School in Kansas

Vaccination	Required Dosage	Notes
Required		
Diptheria, Tetanus, Pertussis (DTaP/ Tdap)	5	Doses should be given at 2 months, 4 months, 6 months, 15-18 months, and 4-6 years (prior to kindergarten entry). The 4th dose may be given as early as 12 months of age, if at least 6 months have elapsed since dose 3. The 5th dose is not necessary if the 4th dose was administered at age 4 years or older. A dose of Tdap is required at entry to 7th grade.
Hepatitis A (Hep A)	2	Doses should be given at 12 months with a minimum interval of 6 months between the 1st and 2nd dose.
Hepatitis B (Hep B)	3	Doses should be given at birth, 1-2 months, and 6-18 months. Minimum age. Minimum age for the final dose is 6 months.
Measles, Mumps, and Rubella (MMR)	2	Two doses required. Doses should be given at 12-15 months and 4-6 years (prior to kindergarten entry). Minimum age is 12 months and interval between doses may be as short as 28 days.
Meningococcal-Serogroup A,C,W,Y (MenACWY)	2	Two doses required. Doses should be given at entry to 7th grade (11-12 years) and 11th grade (16-18 years). For children 16-18 years, with no previous Men-ACWY, only one dose is required.
Poliomyelitis (IPV/OPV):	4	Doses should be given at 2 months, 4 months, 6-18 months, and 4-6 years (prior to kindergarten entry). Three doses are acceptable if 3rd dose was given after 4 years of age and at least 6 months have elapsed since dose 2.
Varicella (Chickenpox)	2	Doses should be given at 12-15 months and 4-6 years (prior to kindergarten entry). The 2nd dose may be administered as early as 3 months after the 1st dose, however, a dose administered after a 4-week interval is considered valid. No doses are required when student has history of varicella disease document-ed by a licensed physician.
Recommended		
Human Papillomavirus (HPV)	2	Recommended at 11 years of age or three doses if the series is started after 15 years.
Influenza	Dependent upon age and doses given in previous years	Recommended for all ages > 6 months of age.

Source: Kansas Department of Health and Environment; https://www.kdhe.ks.gov/DocumentCenter/View/21272/2022-2023-School-Requirement-K-12-PDF.

State School Vaccine Exemptions by Type



Type of Exemption	Number of States	States
Medical only	6	CA, CT, NY, ME, MS, WV
Medical and Religious	29	AL, AK, DE, FL, GA, HI, IL, IN, IA, KS, KY, MA, MD, MO, MT, NE, NV, NH, NJ, NM, NC, RI, SC, SD, TN, VT, VA, WA, WY
Medical, Religious and Philosophical	15	AZ, AR, CO, ID, LA, MI, MN, ND, OH, OK, OR, PA, TX, UT, WI

Source: Centers for Disease Control; https://www.cdc.gov/phlp/docs/school-vaccinations.pdf Updated by KHI with recent changes in exemptions from States with Religious and Philosophical Exemptions from School Immunization Requirements published by the National Conference on State Legislature, 2022.

History of Vaccines Through the Years (1774-1960)

1774:
Benjamin Jesty tested his hypothesis that infection with cowpox could protect a person with smallpox.

1796:
English physician Edward Jenner expanded on Jesty's discovery and inoculated an 8-year-old for smallpox using cowpox from another individual. The child made a full recovery.

1806:
French Emperor Napoleon Bonaparte and American President Thomas Jefferson acknowledged Jenner's work and endorsed the smallpox vaccine.

1885:
Louis Pasteur successfully prevented rabies through post-exposure vaccination, but the treatment was controversial. Injecting humans with a disease agent was still new and uncertain.

1937:
Max Theiler, Hugh Smith and Eugen Haagen develop the 17D vaccine against yellow fever. The vaccine is approved in 1938 and over a million people have receive it that year. Theiler goes on to be awarded the Nobel Prize.

1939:
Bacteriologists Pearl Kendrick and Grace Eldering demonstrate the efficacy of the pertussis (whooping cough) vaccine. The scientists show that vaccination reduces the rates at which children get sick from 15.1 per 100 children to 2.3 per 100.

1945-1946:
The first influenza vaccine is approved for military use and in 1946 for civilian use. Research and development began in 1918 in an effort to address the Spanish Flu which killed an estimated 20-50 million people and every 1 in 67 U.S. soldiers.

1957:
Residents of **Protection, Kansas**, came together in the spring of 1957 to make their town the first in the nation to be fully inoculated against polio.

1952-1955:
The first effective polio vaccine developed by Jonas Salk. Mass trials involving over 1.3M children took place in 1954.

1960:
A second type of the polio vaccine was approved for use and developed by Albert Sabin.

Source: Kansas Health Institute Analysis of World Health Organization "A Brief History of Vaccination", Kansas Department of Health and Environment and Kansas Legislative Research Department publications; KCUR https://www.kcur.org/news/2021-01-11/this-kansas-town-was-the-first-to-line-up-for-polio-vaccine-but-now-pandemic-skeptics-abound

History of Vaccines Through the Years (1961-2006)

1961:
- Kansas legislature passes statutes related to immunizations (K.S.A. 72-6261, 6262, 6263, 6264)

1963:
The measles vaccine was developed.

1967:
The mumps vaccine was developed.

1969:
- The rubella vaccine was developed.
- Dr. Baruch Blumberg worked with microbiologist Irving Millman to develop the first hepatitis B vaccine.

1971:
The measles vaccine is combined with vaccines against mumps and rubella into a single vaccination called MMR.

1978:
Kansas legislature passes statute allowing school boards to exclude pupils from school attendance for failing to comply with vaccine requirements (K.S.A. 72-6265).

1980:
The World Health Assembly declares smallpox eradicated.

1986:
The National Childhood Vaccine Injury Act of 1986 created a National Vaccine Injury Compensation Program (VICP).

1993:
Federally funded Vaccines for Children (VFC) is enacted by Congress to ensure that children have a better chance of getting recommended vaccinations on schedule. It provides vaccines at no cost to eligible children through VFC enrolled healthcare providers.

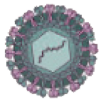
1994:
Polio is eradicated by the Americas followed by Europe in 2002.

1995-2006:
Researchers began work on a human papillomavirus (HPB) vaccine. The first vaccine for HPV was approved in 2006.

Source: Kansas Health Institute Analysis of World Health Organization "A Brief History of Vaccination", Kansas Department of Health and Environment and Kansas Legislative Research Department publications; Kansas Department of Health and Environment. (2019). https://www.kdhe.ks.gov/DocumentCenter/View/1233/Kansas-Statutes-Related-to-School-Immunizations-PDF; Kansas Legislative Research Department. (2022). http://www.kslegresearch.org/KLRD-web/Publications/BriefingBook/2022-Briefing-Book.pdf; Kansas Department of Health and Environment. (n.d.). https://www.kdhe.ks.gov/215/Vaccines-for-Children-Program.

How Kansas-Required and -Recommended School Entry Vaccines are Made

- Antigens are a toxoid or foreign substance that induces an immune response.
- Adjuvants are non-antigen components of the vaccine that stimulate the immune response. Live attenuated and inactivated vaccines have a natural adjuvant.

Vaccine Type[1]	Vaccine Preventable Disease	How It's Made[2]
Live attenuated 	Measles, Mumps, Rubella, Chickenpox, Influenza (nasal), Rotavirus (oral form)	The most common method is passing the disease-causing virus through a series of cell cultures. Eventually, the attenuated virus will not replicate well in human cells.
Inactivated 	Polio, Influenza (injectable form)	These types of vaccines are created through heat or chemicals that destroy the pathogen's ability to replicate, but leave it intact enough that the immune system can recognize it. IPV, used in the United States, is of this form and cannot mutate to a virulent form like the OPV used in other countries.
Virus like particles 	HPV	When isolated proteins are expressed, virus-like particles (VLP) are created. These VLPs contain no genetic material from the virus, but prompt an immune response.
Toxoid 	Diphtheria, Tetanus	Because some bacterial diseases such as tetanus cause symptoms through the toxins they produce, this process is similar to inactivated viruses. Like inactivated viruses, these inactive toxins are created through heat or chemical processing.
Recombinant subunit 	Hep A, Hep B, Pertussis	These vaccines are created from isolating a specific protein and presenting it as an antigen. Recombinant vaccines use gene coding for a vaccine protein to insert into another virus or cells in a culture.
Conjugate 	Pneumococcal, Meningitis	Similar to recombinant vaccines, however, conjugate vaccines are made using pieces from the coats of bacteria that are chemically linked to a carrier protein.

[1]Iwasaki, A., & Omer, S. B. (2020). Why and how vaccines work. Cell, 183(2), 290-295.
[2]The College of Physicians of Philadelphia. (2022). https://historyofvaccines.org/vaccines-101/what-do-vaccines-do/different-types-vaccines

Enacted Legislation Related to School Vaccines by State, 2017-2021

2020: Colorado
Exemption and Education
Requires a person seeking a nonmedical exemption (either religious or personal belief) to submit a certificate of completion of an online educational module or a certificate of nonmedical exemption. It establishes an immunization goal of 95% of each school's student population and requires schools to publish their immunization and exemption rates on a document that is distributed to parents, guardians and students.

2019: Washington
Exemptions
Removes the personal belief exemption for the measles, mumps and rubella vaccine requirement for public schools, private schools and day care centers.

2018: Illinois
Education
Provides for the distribution of written information about the link between HPV and certain types of cancers to all students entering sixth grade and their parents or legal guardians.

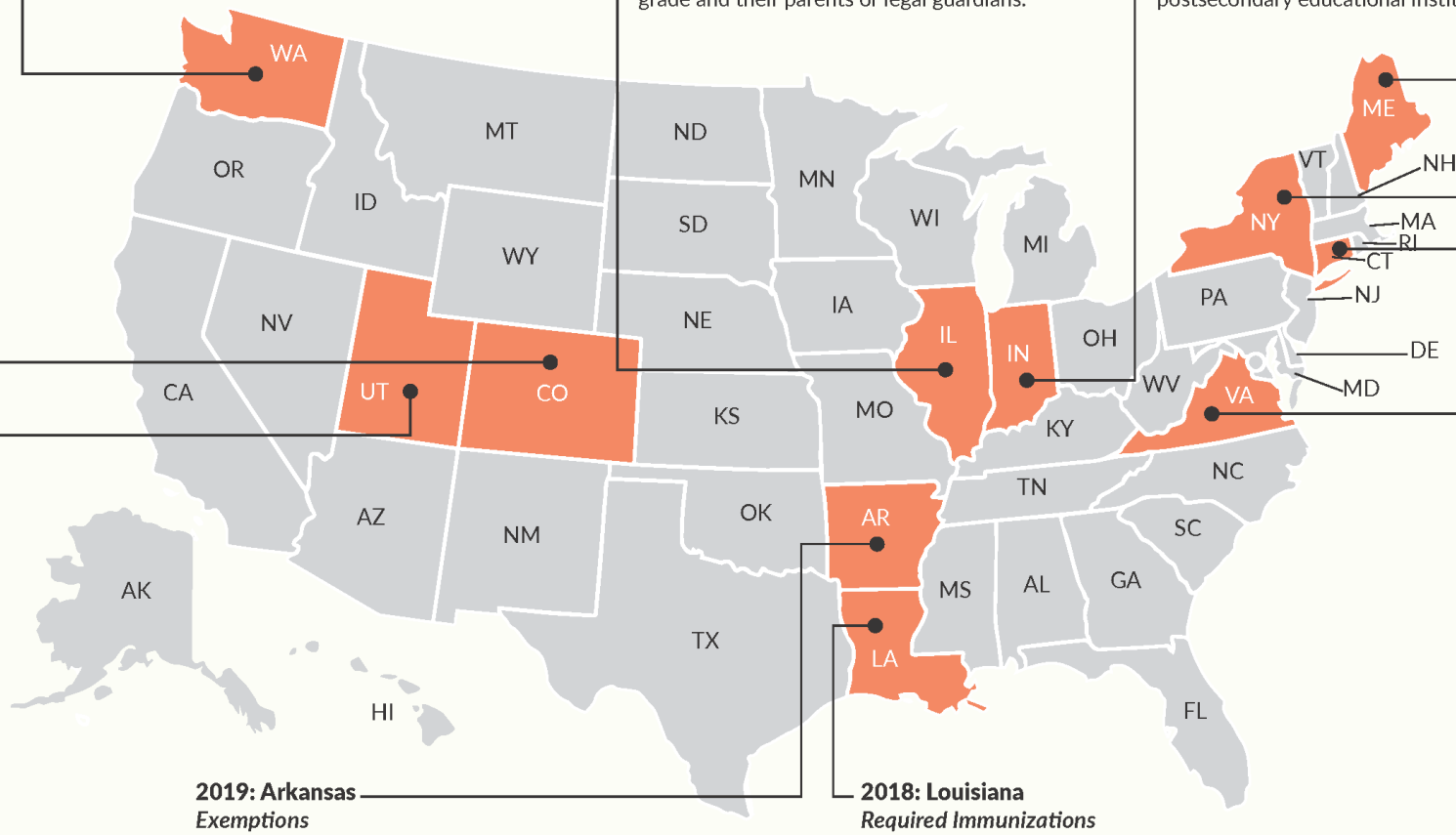
2017: Indiana
Required Immunizations
Added meningitis to required immunizations a student enrolling in a residential campus of an approved postsecondary educational institution.

2019: Maine
Exemptions
Removes personal and religious belief exemptions for public school immunization requirements.

2019: New York
Exemptions
Removes the religious exemption for public school immunization requirements.

2021: Connecticut
Exemptions
Removes the religious exemption for vaccine requirement for children in grade 12 or below.

2020: Virginia
Required Immunizations
Provides that the Board of Health's Regulations for the Immunization of School Children shall be consistent with the Immunization Schedule developed and published by the Centers for Disease Control and Prevention, the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, and the American Academy of Family Physicians.



2017: Utah
Education
Requires the Department of Health to create an online education module regarding certain preventable diseases; amends the grounds for exemptions from required vaccines; requires the renewal of a student's vaccination exemption under certain conditions; creates a new vaccination exemption form; allows for the vaccination exemption form to be completed online in conjunction with the education modules, and discontinued the practice of allowing local health departments to vaccinate students and recover costs.

2019: Arkansas
Exemptions
Requires a public or private school to create and maintain a report that provides certain information regarding the number and percentage of students who have an exemption from the requirement to obtain vaccinations.

2018: Louisiana
Required Immunizations
Requires students who are entering eleventh grade or who are 16 and entering any grade to provide satisfactory evidence of current immunization against meningococcal disease as a condition of school entry and provides for exceptions.

Source: Kansas Health Institute Analysis of States with Religious and Philosophical Exemptions from School Immunization Requirements published by the National Conference of State Legislatures, 2022.

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