Adverse Event Reporting: VAERS and WONDER

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Objectives

- Define VAERS and the data available in VAERS
- Provide descriptive statistics of VAERS/ WONDER data
- Discuss publicly available vaccine adverse event data – WONDER
- Discuss the limitations of the publicly available data
- Provide examples of WONDER output

What is VAERS?

- Vaccine Adverse Event Reporting System
  - A national vaccine safety surveillance program
  - Administered by the FDA and the Centers for Disease Control and Prevention (CDC)
  - Collects and analyzes data from reports of adverse events following vaccination

Source:
http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/ReportaProblem/VaccineAdverseEvents/QuestionsabouttheVaccineAdverseEventReportingSystemVAERS/default.htm

Vaccine Adverse Event Reporting System

- Reporting by paper or electronic versions of a standard form
- Contractor enters data and MedDRA codes
- 43,193 reports received in FY 2010
  - ~20% (9,846) serious
  - Serious AE reports are manually reviewed by medical officers to detect unexpected events
  - Nonserious reports assessed primarily through data mining

VAERS Strengths and Limitations

- Strengths
  - Open-ended for hypothesis generation
  - Potential detection of new or rare adverse events
  - Timeliness
  - Geographic diversity
  - Capability to monitor production lots
- Limitations
  - Missing and inaccurate data
  - Under-reporting and/or stimulated reporting
  - Absence of controls and denominators
  - Inability to assess causation
  - Low likelihood of detection for long latency events

Who can report to VAERS?

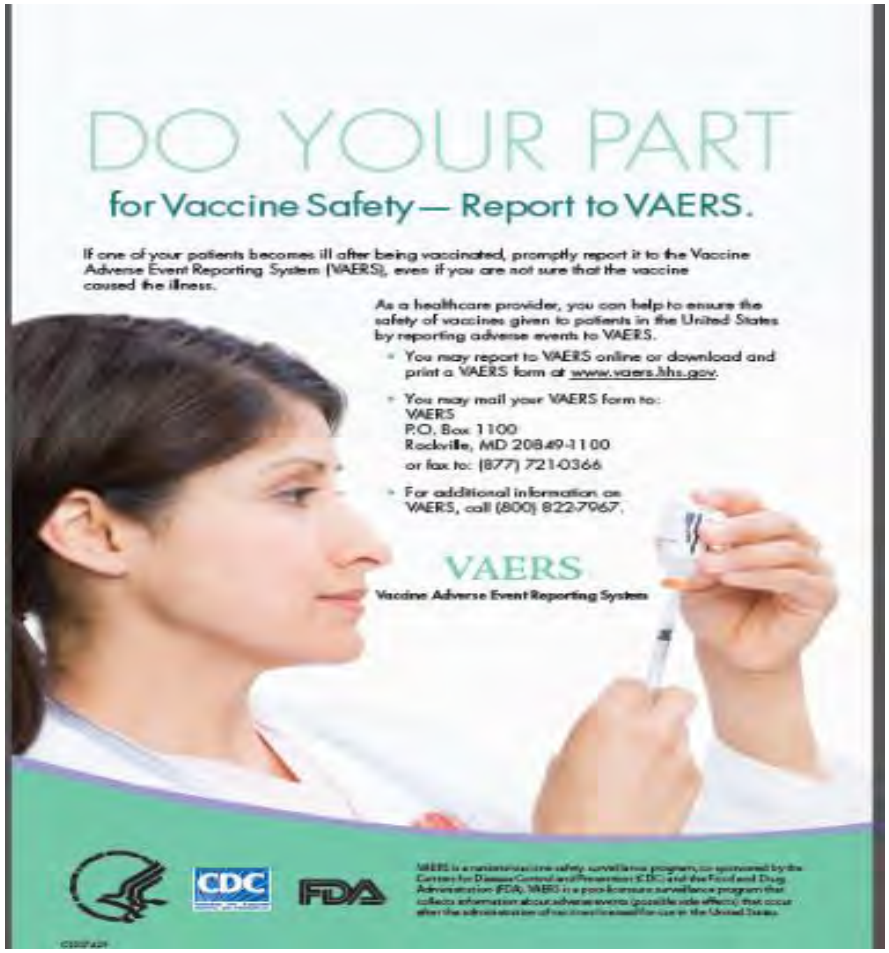
- **ANYONE**
- Vaccine manufacturers (37% of reports)
- Health care providers (36%)
- State immunization programs (10%)
- Vaccine recipients (or their parents/guardians) (7%)
- Other sources (10%)

Source: Vaers.hhs.gov/about/faqs

Reporting is Encouraged

"We encourage you to report any reaction following vaccination to VAERS, even if you cannot tell if the vaccine or another product caused it."

http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/ReportaProblem/VaccineAdverseEvents/QuestionsabouttheVaccineAdverseEventReportingSystemVAERS/default.htm



Source: http://www.cdc.gov/vaccinesafety/Activities/vaers_campaign.html

Outcomes that are Required to be Reported by Providers

- Any adverse event listed by the vaccine manufacturer as a contraindication to further doses of the vaccine.
- Any adverse event listed in the VAERS Table of Reportable Events Following Vaccination that occurs within the specified time period after vaccination.*
- Legally required under the National Childhood Vaccine Injury Act

*Table available at:
http://vaers.hhs.gov/resources/VAERS_Table_of_Reportable_Events_Following_Vaccination.pdf

Manufacturer Reporting Requirements

- Manufacturers shall:
  - Submit adverse event reports within 15 days to the FDA if serious and unexpected.
  - Submit other adverse event reports within 1 year
    - Periodic adverse experience report
    - Quarterly if product is <3 years old
- Serious adverse experience definition:
  - Death
  - A life-threatening adverse experience
  - Inpatient hospitalization or prolongation of existing hospitalization
  - Persistent or significant disability/incapacity
  - Congenital anomaly/birth defect
- Specified in the Code of Federal Regulations Title 21 Section 600.80

Important medical events that may not result in death, be life-threatening, or require hospitalization may be considered a serious adverse experience when, based upon appropriate medical judgment, they may jeopardize the patient or subject and may require medical or surgical intervention to prevent one of the outcomes listed in this definition

VACCINE ADVERSE EVENT REPORTING SYSTEM
24 Hour Toll-Free Information 1-800-822-7967
P.O. Box 1100, Rockville, MD 20849-1100
PATIENT IDENTITY KEPT CONFIDENTIAL

For CDC/FDA Use Only
VAERS Number
Date Received

Patient Name:
Last First
M.I.
Address
City State
Zip
Telephone no. (____)

Vaccine administered by (Name):
Responsible
Physician
Facility Name/Address
City State
Zip
Telephone no. (____)

Form completed by (Name):
Relation to Patient:
Vaccine Provider
Patient/Parent to Patient Manufacturer
Other
Address *(if different)*
City State Zip
Telephone no. (____)

1. State	2. County where administered	3.	Date of birth	4.	Patient age	5. Sex M F	6. Date form completed

7. Describe adverse events(s) (symptoms, signs, time course) and treatment, if any

Box 7 often provides the most complete information.

What? When? How was it treated?

8. Check all appropriate:

Patient died (date)
Life threatening illness
Required emergency room/doctor visit
Required hospitalization (_____days)
Resulted in prolongation of hospitalization
Resulted in permanent disability
None of the above

VAERS Form

9. Patient recovered YES NO UNKNOWN	10	Date of vaccination .	11.	Adverse event onset	
		AM		AM	
12. Relevant diagnostic tests/laboratory data	Time				

13.	Enter all vaccines given on date listed in no.	0

Vaccine (type) Manufacturer Lot number Route/
a.
b.
c.

14. Any other vaccinations within 4 weeks prior to the date listed in no. 10

Vaccine (type) Manufacturer Lot number Route/Site No Previous doses Date given
a.

b.

Boxes 10 and 11

Is time to onset typical?

Is time to onset biologically plausible?

VAERS Form – Important Info.

9. Patient recovered YES NO UNKNOWN	1	Date of vaccination 0 .	11.	Adverse event onset	
		AM		AM	
12. Relevant diagnostic tests/labor data					
13. Enter all vaccines given o					
Vaccine (type) Manufactu a. b. c.					
14. Any other vaccinations within 4 weeks prior to the date listed in no. 10 Vaccine (type) given Manufacturer Lot number Route/Site No Previous doses Date a. b.					

Box 12

Do these confirm or rule out the suspected diagnosis?

15. Vaccinated at: Private doctor's office/hospital Military clinic/hospital Public health clinic/hospital Other/unknown	16. Vaccine purchased with: Private funds Military funds Public funds Other/unknown	17. Other medications
18. Illness at time of vaccination (specify)	19. Pre-existing physician-diagnosed allergies, birth defects, medical conditions (specify)	

20. Have you reported adverse event previously?
No
To health departn
To doctor
To manufacturer

Only for children 5 and under

23. No. of brothers and sisters

21. Adverse even
specify)
Adve
Ever

submitted by
mmunization

In patient

In brother or sister

proj. report no.

25. Date received by mfr./imm.proj.

26. 15 day report?
Yes No

27. Report type
Initial
Follow-Up

→ Boxes 18 and 19:

Was there a pre-existing illness or medical condition that could explain the reported event?

What is WONDER?

- WONDER: “Wide-ranging On Line Data for Epidemiologic Research
- “An easy-to-use internet system that makes the information resources of the CDC available to public health professionals and the public at large”
- Provides access to a wide array of public health information
    - Vaccine adverse events
    - Birth and cancer statistics
    - Mortality statistics (including infants)
    - Population/census data

Source: http://wonder.cdc.gov/wonder/help/vaers.html#

CDC WONDER

WONDER Home | FAQ | Help | Contact Us | Search

WONDER online databases utilize a rich ad-hoc query system for the analysis of public health data. Reports and other query systems are also available.

WONDER Systems | Topics | A-Z Index

WONDER Online Databases

- AIDS Public Use Data
- Births
- Cancer Statistics

Environment

- Daily Air Temperatures

Mortality

Underlying Cause of Death

- Detailed Mortality
- Compressed Mortality
- Multiple cause of death (Detailed Mortality)
- Infant Deaths (Linked Birth/Infant Death Records)
- Online Tuberculosis Information System

Population

- Bridged-Race Population (from NCHS)
- Population (from Census)
- Sexually Transmitted Disease Morbidity
- Vaccine Adverse Event Reporting

Reports and References

Prevention Guidelines (archive)

Scientific Data and Documentation

Other Query Systems

- Healthy People 2010
- MMWR Morbidity Tables
- MMWR Mortality Tables

Denotes numerical data available to query or download

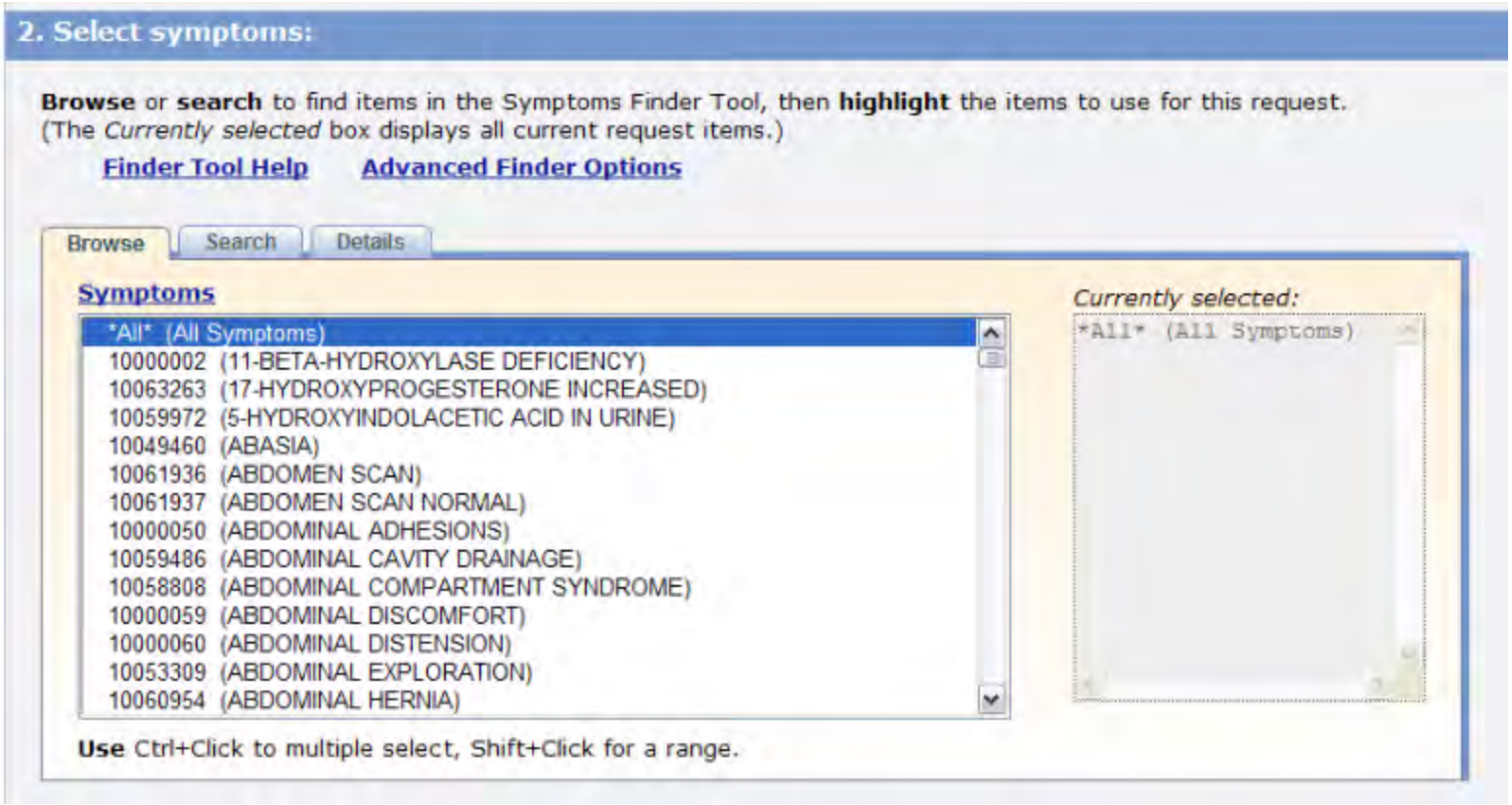
This page last reviewed: Friday, January 20, 2012

Difference between Public and Private Datasets

- No patient identifiers such as names, date of birth, address
- WONDER is updated monthly
- Follow-up is conducted on serious reports but **follow up info is not entered into WONDER**
- In order to protect confidentiality, results of very granular searches may not provide results and will be labeled "SUPPRESSED"

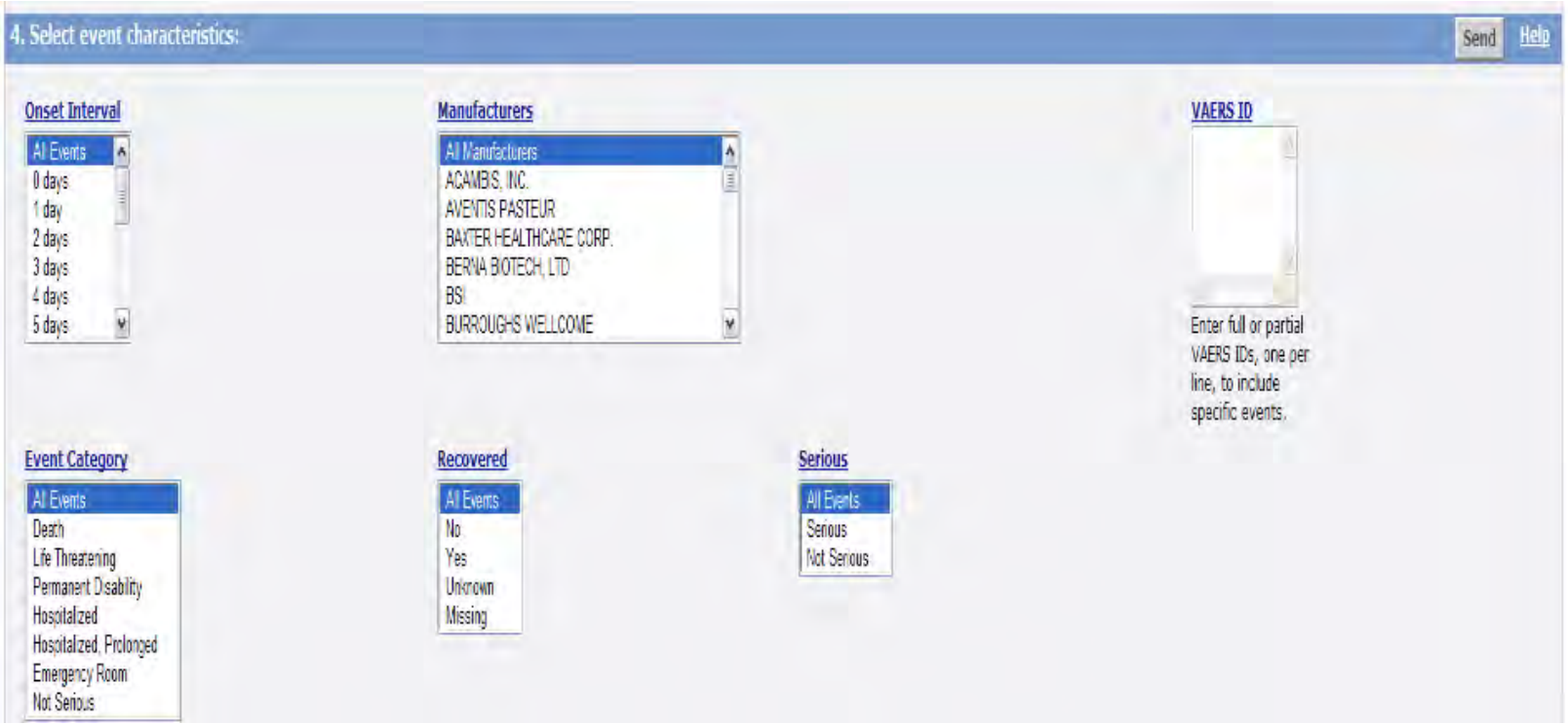
Searches Available in WONDER

- Symptom or diagnosis
- Vaccine product



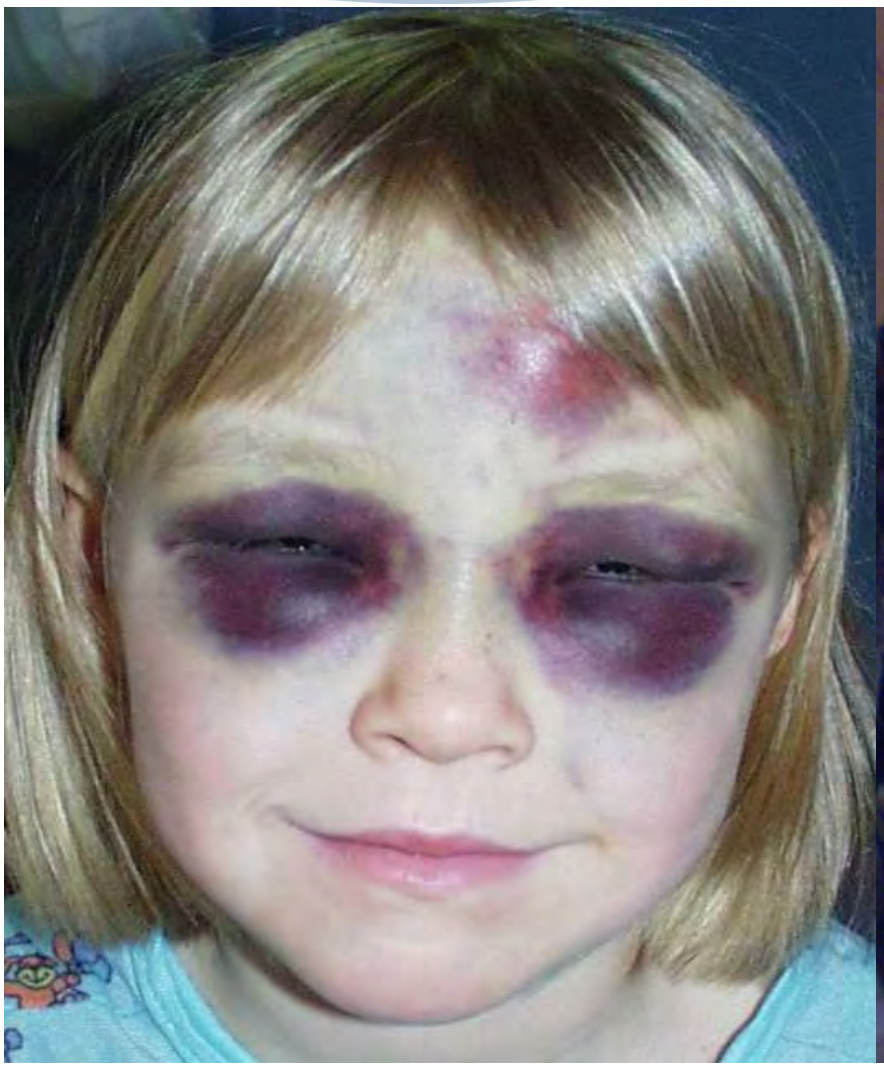
Event Characteristic Searches in WONDER

- Search by onset, event, manufacturer, recovered, serious, or VAERS ID



Search by Location, Age, Gender, Dates

- Location: All, U.S., any state or states
- Age: Must select from age groups on menu
- Date of Vaccination
- Date reported



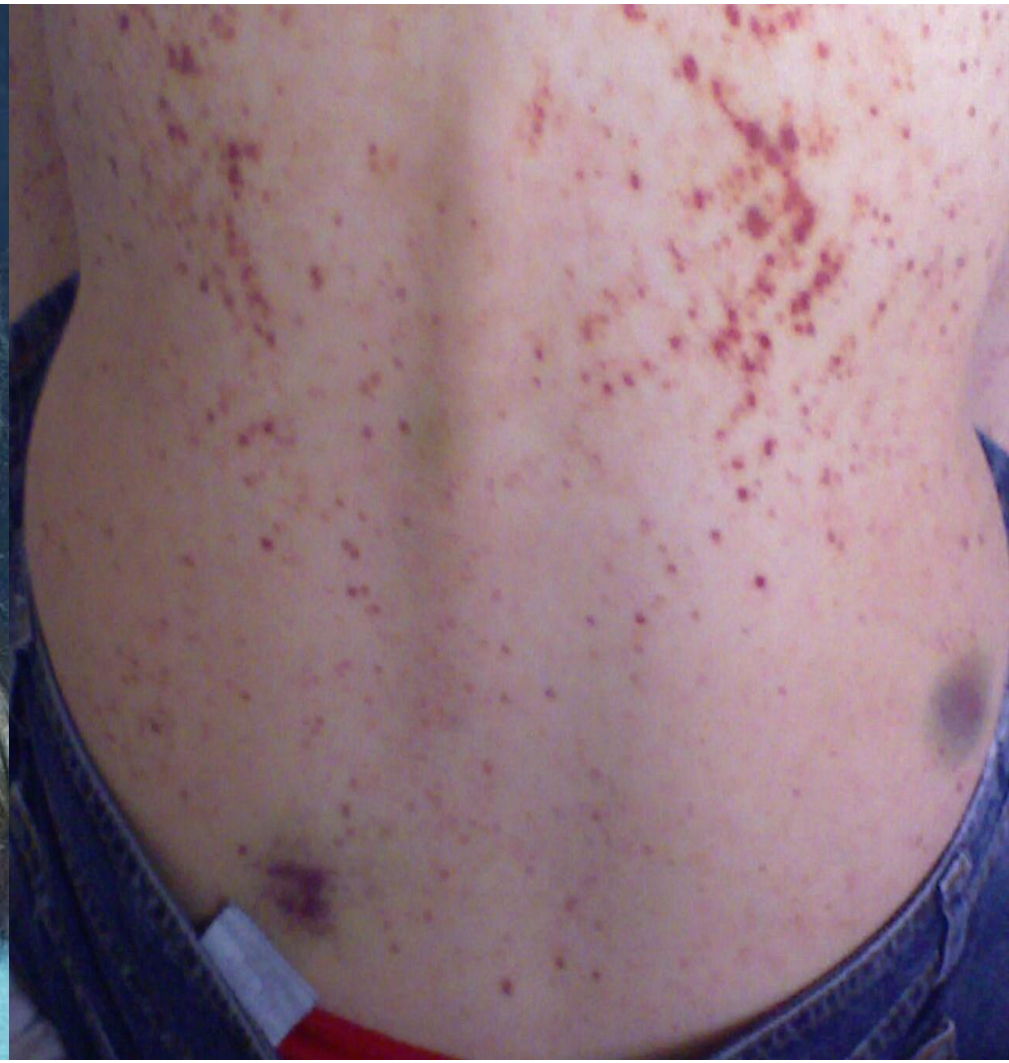


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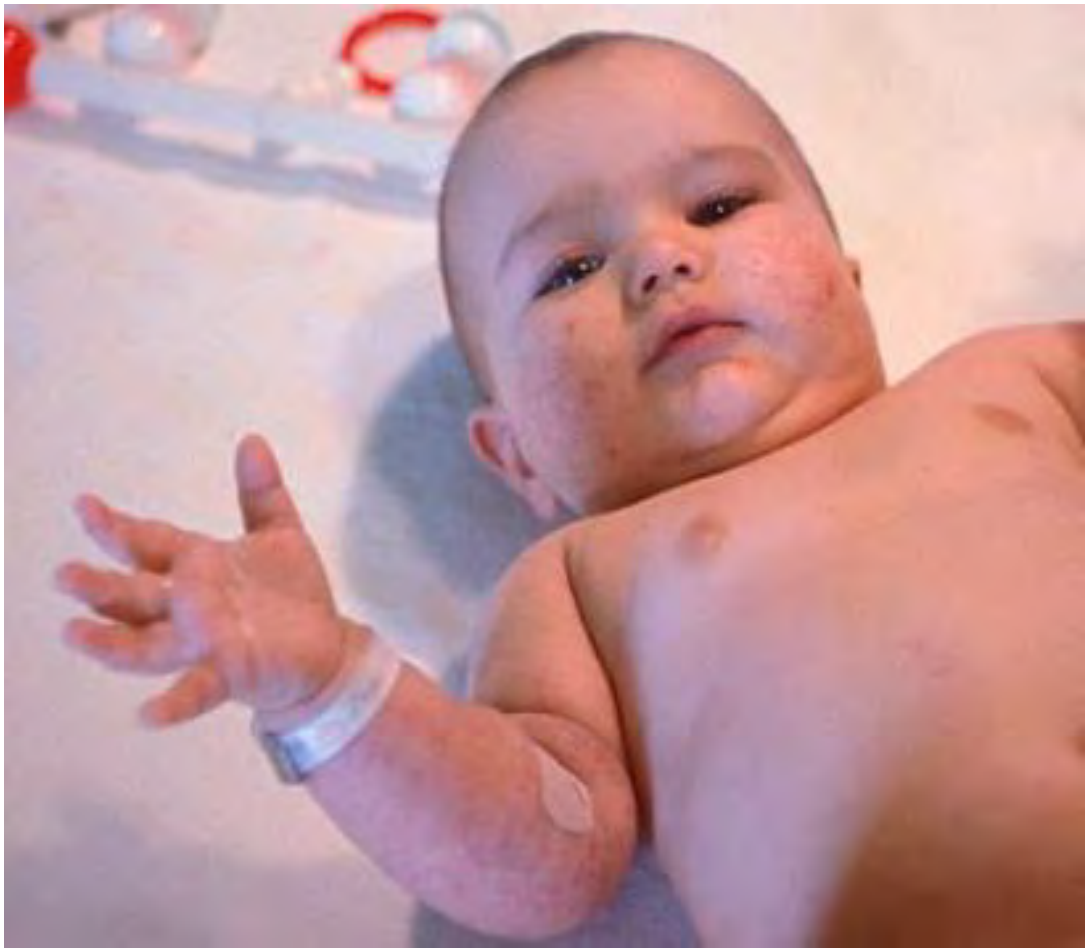
Image 2: Used with permission; © Angel T. Brown, DermAtlas; http://www.DermAtlas.org

Example 1: MMR and ITP

Question: What is the time to onset reported for ITP following vaccination with MMR in children?



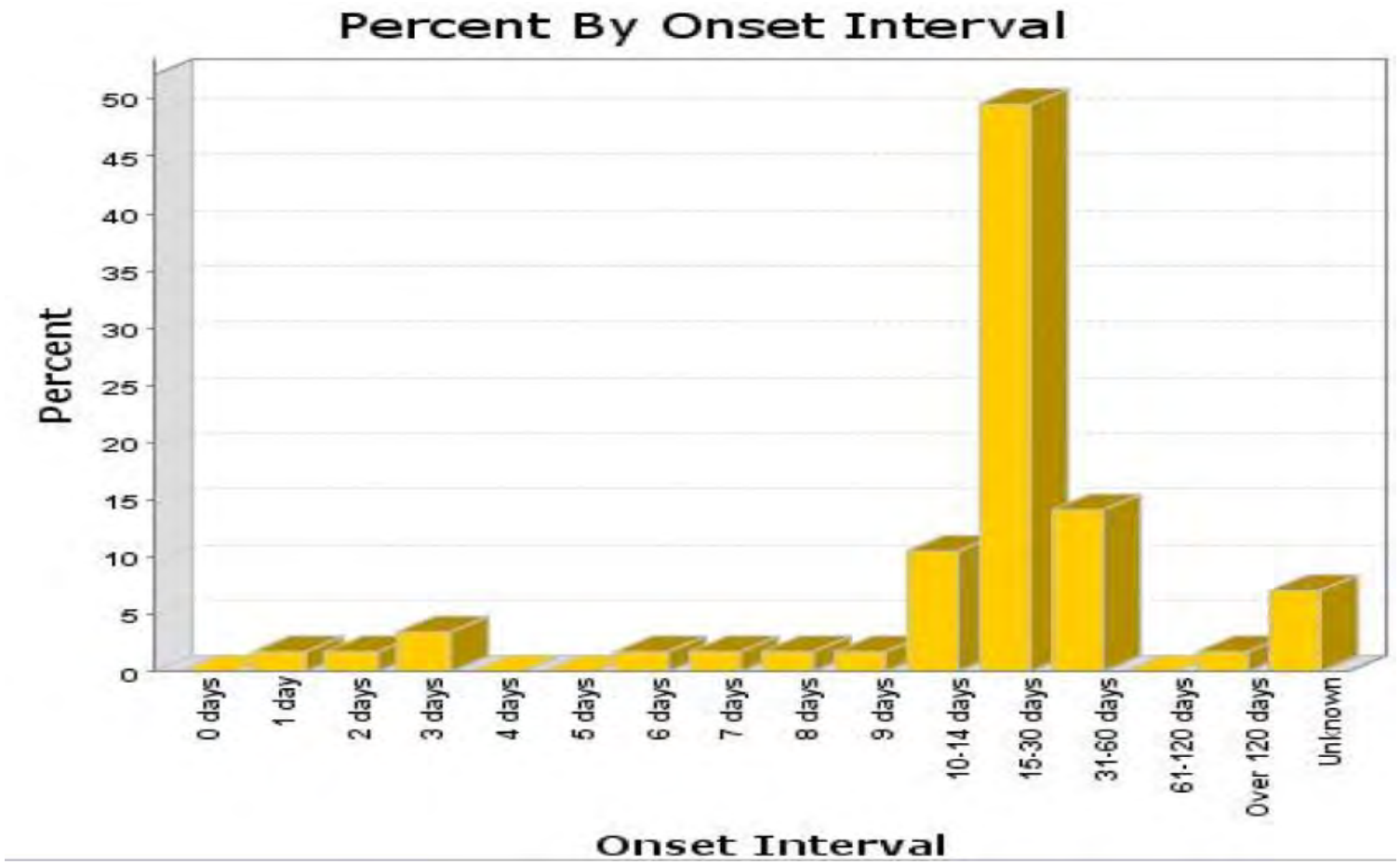
Source: Public Health Image Library

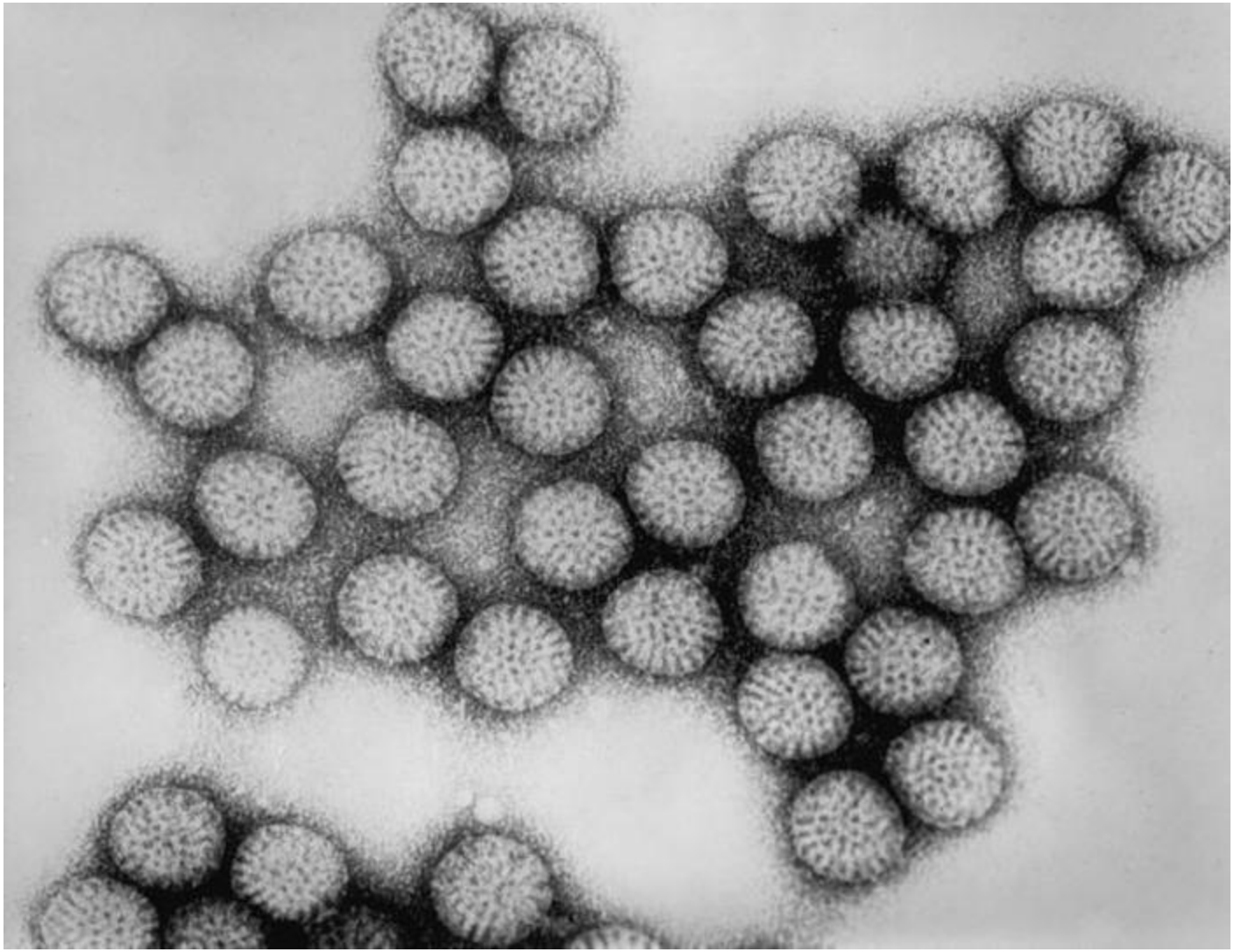
Searches in WONDER: MMR and ITP

- Search strategy
  - Symptoms: Idiopathic Thrombocytopenic Purpura
  - Vaccine: MMR and MMRV
  - Locations: ALL
  - Age: <6 months, 6-11 months, 1-2 years, 3-5 years, 6-17 years
- Group results by:
  - Onset interval
- Display as:
  - Bar Chart 3D
  - Plot orientation vertical

Onset Interval for ITP following MMR, patients <18years

Source: CDC WONDER





Source: Public Health Image Library

Question: What adverse events resulting in hospitalization have been reported following rotavirus vaccines given in 2011?

- Search Strategy
  - Vaccines: ROTH5, ROT, ROTH1
  - Event category: Hospitalized
  - Locations: All
  - Age: <6 months, 6-11 months
  - Date vaccinated: 2012
- Group results by:
  - Symptoms
- Display as:
  - Chart (converted to Excel)

Symptoms reported following Rotavirus vaccines, resulting in hospitalization, for 2011

Note: 9 most frequent results shown. "Percent" = # events reported/ # reports. Reports may have > 1 event (symptom) reported.
Source: CDC WONDER

Symptoms	Events Reported	Percent
	2340	
VOMITING	90	27.69%
INTUSSUSCEPTION	88	27.08%
PYREXIA	55	16.92%
DIARRHOEA	43	13.23%
HAEMATOCHEZIA	38	11.69%
HYPOTONIA	37	11.38%
CONVULSION	35	10.77%
PALLOR	32	9.85%
CRYING	28	8.62%

60 yr F with LE weakness

Source: Public Health Image Library

Question: What was the number of reported cases, by state, of GBS following H1N1 influenza vaccine?

- Search Strategy:
  - Symptoms: Guillain-Barre Syndrome
  - Vaccine: FLU(H1N1) (Influenza A (H1N1) 2009 monovalent)
  - Location: U.S., Territories, and Unknown
  - Date vaccinated: 2009, 2010
- Group results by:
  - State/territory
- Display as:
  - Map

Cases of GBS following H1N1 vaccine

- Note important limitation: This map displays the number of reported GBS cases for each state. WONDER can also display cases as a percentage of total cases reported. This **does not** account for population density. This **is not** a rate.

Map source: CDC WONDER

Review Questions

Which of the following is a strength of VAERS?

A) Stimulated reporting

B) Ability to detect rare events

C) Availability of denominator data

D) Ability to assess causation

Answer: B) Ability to detect rare events. Stimulated reporting, the lack of denominator data, and the inability to assess causation are limitations of VAERS

Manufacturer must submit an adverse event report within 15 days if:

A) The event is serious and unexpected

B) The event is rare

C) The event is not described in the label

D) The event resulted in a visit to a healthcare provider

E) All of the above

Answer: A) Serious and unexpected. A rare event or an unlabeled event may not necessarily be a serious event.

Important differences between public and private vaccine adverse event data include all of the following EXCEPT:

A) Public data is updated monthly

B) Patient age is removed from the public data to protect confidentiality.

C) Follow-up information is not added to the public data

D) Names and addresses are removed from public data to protect confidentiality

Answer: B) Patient age is removed…Date of birth is removed but many reports do contain the patient's age.

Limitations of publicly available vaccine adverse event searches include:

A) Limited age intervals

B) Limited selection of symptoms

C) Ability to select only by vaccine type and not brand

D) Inability to obtain the narratives of individual cases

Answer: A) Limited age intervals. Time to onset intervals are also limited. Individual case narratives are available, as long as the search would not jeopardize patient confidentiality