

Vaccine Safety Datalink (VSD)

Overview

**Immunization Safety Branch
National Immunization Program**

Institute of Medicine (IOM) Reports on Vaccine Safety

- **"Many gaps and limitations" in current knowledge + research capacity:**
 - **Infrastructure for vaccine safety surveillance inadequate**
 - **Needed: Population laboratory under active surveillance**

Vaccine Safety Studies: Pre-Licensure

- Laboratory
- Animals
- Humans
 - Phases I: gross toxicity (N: ~ 10)
 - Phase II: dosing range/ reactogenicity (N: 10-100)
 - Phase III: efficacy (+ preliminary safety) (N: 1000-10,000)
 - Advantages:
 - Close, detailed follow-up
 - Randomized, placebo-controls => causality assessment easy
 - Disadvantage:
 - Poorly detected reactions: rare, delayed onset, subpopulations
 - No standard case definition for "safety"

Vaccine Safety Studies: Post-Licensure

- Traditional tools
 - passive surveillance (spontaneous reporting system)
 - ad hoc controlled epidemiologic studies
- New tools
 - Phase IV trials "linked" to licensure of new vaccine
 - Large-Linked Database (LLDB) in HMO population
 - N ~10,000
 - pre-organized LLDB's (Vaccine Safety Datalink)
 - ongoing safety monitoring
 - controlled epidemiologic studies

Vaccine Safety Datalink

- Collaboration between CDC and managed care organizations (since 1991)
- Powerful, cost-effective resource for the ongoing evaluation of vaccine safety
- Planned vaccine safety studies and timely investigations of safety concerns

Advantages of HMOs for Health Research

- Identifiable (large) population
 - incidence rates and attributable risks
- Computerized data bases
- Cost data
- Integrated systems
- Infrastructure

Vaccine Safety Datalink

- Population under “active surveillance”
 - 8 HMOs
 - >7 million members
- Large-linked databases
 - Exposure (vaccination)
 - Outcome (ER, OPD, hosp, lab)
 - Covariates (birth, death certificates)
- Scientifically rigorous hypothesis testing

VSD DATA LINKAGES

**Vaccination
Records**
(Vaccine type,
Date of Vaccination,
Manufacturer, Lot #,
Injection Site)

**Health
Outcomes**
(Hospitalizations,
ER visits,
Outpatient visits)

**Patient
Characteristics**
(Birth Certificates, Census
Data)

**VSD Linked
Analysis Database**

VSD Analytic Approach

- Screening analyses (automated data)
 - preliminary assessment of vaccine-outcome associations
- In-depth studies (chart reviews, interviews)
 - validate outcomes (and dates)
 - verify vaccination history (and dates)
 - additional risk factor or clinical information

VSD SELECTED FINDINGS

(from over 50 publications)

- **Diabetes**: did not find a risk after Hib or HBV vaccine
- **Multiple Sclerosis or Optic Neuritis**: did not detect a risk after HBV vaccine
- **Intussusception**: noted increased risk in Days 3 – 7 after rotavirus vaccine
- **Seizures**: detected an association with vaccination (MMR and DTP) and febrile seizure but no association with long term seizure disorders

More Selected Findings from VSD Studies

- **Chronic arthropathy**: No increased risk among women receiving rubella vaccine
- **Aseptic meningitis**: No increased risk after Jeryl-Lynn mumps vaccine (in U.S. MMR)
- **Safety of second MMR**: Risk of clinical events after vaccination greater at 10-12 than at 4-6 years of age

A Case-Control Study of MMR and Other Measles-Containing Vaccines and Inflammatory Bowel Disease.

Study Question:

Is vaccination with MMR or other MCV associated with increased risk for Crohn's disease or ulcerative colitis?

- Case-Control study

- Eligible population:

 - Born between 1958 and 1989

 - Enrolled from 6 months of age or younger

- Medical record review of diagnoses of either Crohn's disease or ulcerative colitis: (ICD-9 codes 555.* and 556.*)

- Databases:

 - Hospitalizations (all four sites)

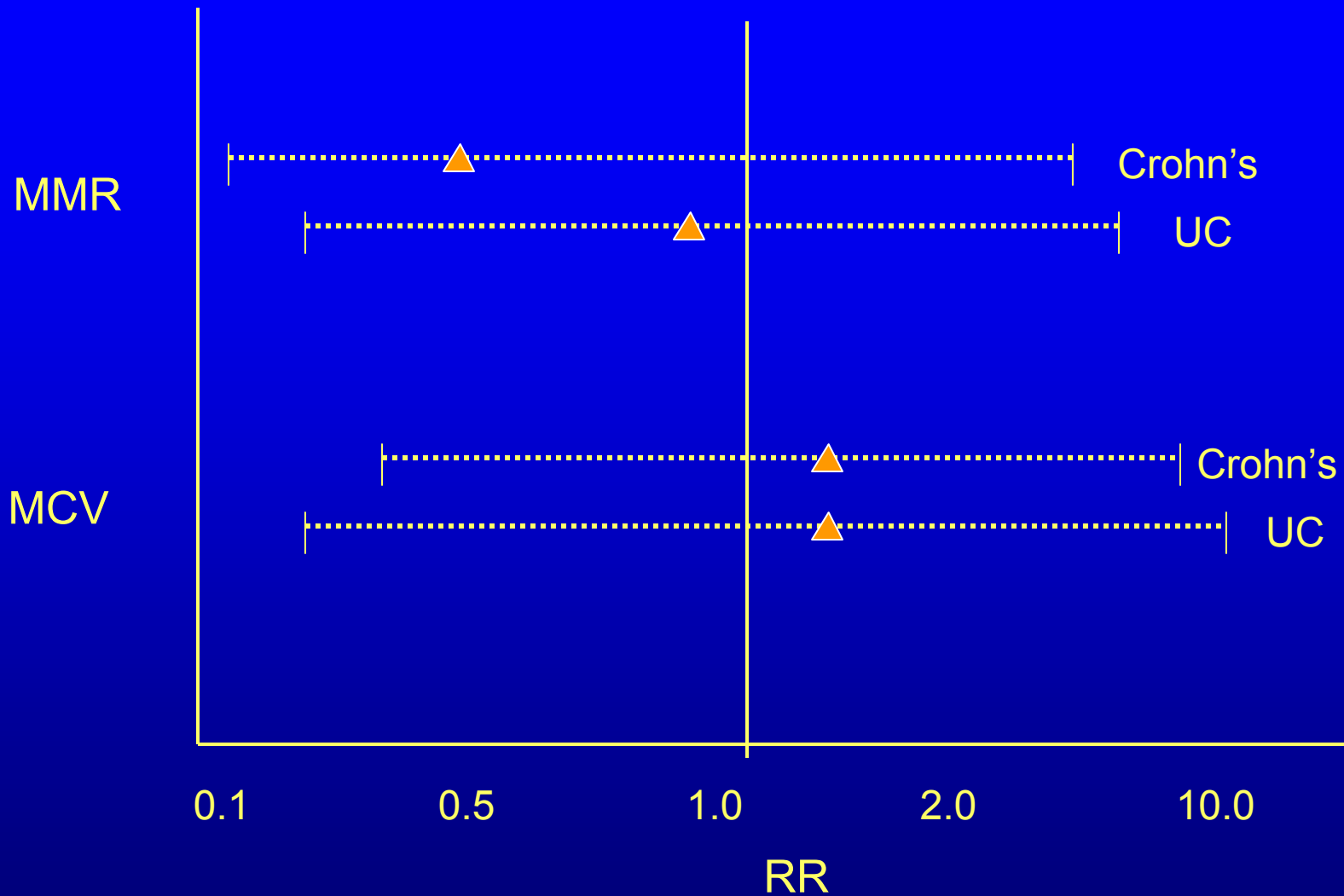
 - Outpatient/Emergency dept visits (three sites)

Exposure measurement:

- Medical record review of lifetime vaccination history

Analysis:

- Up to 5 controls matched by HMO, gender and birth year
- Conditional logistic regression
 - accounting for matching/enrollment criteria
 - adjusted for race



*Adjusted for race, HMO, gender, and birth year

Research in VSD: Conclusions

- Managed care is the dominant health care delivery system in the U.S.
- VSD provides ability to perform for population-based research: unbiased; generalizable
- Immunization research in VSD allows timely and efficient monitoring of vaccine safety