Adverse events following immunization:
Pathophysiology and Communication to
Parents and the Public

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Where does the information come from?

- The Parents
  - iPHIS
  - The referring doctor
The referral:

8 mm Hg f 1.1% sechon
for 4 mL completion 90% accurate cataract
is approved.

Thank you
Hives

- 10 month old
- 2 month immunizations fine
- 4 months: within 10 minutes hives and edema of the lower lip
- Adrenaline given s/c and im
- Rushed to ER
Hives

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“But doctor, did he come to any harm because his 6 month vaccines were not given on time”
Vaccine Adverse Events:
Report from Institute of Medicine 1991

- Can it?
Vaccine Adverse Events:
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- Can it?
- Did it?
Vaccine Adverse Events: Report from Institute of Medicine 1991

- Can it?
- Did it?
- Will it?
Vaccine Adverse Events:

Can it?

- Strength of association
- Analytic bias
- Biologic gradient
- Consistency
- Biologic plausability
Vaccine Adverse Events: Did it?

- Previous general experience
- Is there another etiology
- It happened before to this recipient
- Timing
After this:

- 4 year old boy
- Pre-school visit
- 2 hours later: widespread hives
- Soon after wheezing, itchy eyes
- Goes to the ER
Vaccine Adverse Events: Will it?

- Rechallenge
After this:

- 4 year old boy
- Pre-school visit
- 2 hours later: widespread hives
- Soon after wheezing, itchy eyes
- Goes to the ER

- It is all in the story……..
Mechanisms of Adverse Events:

1) The immunization process

- Poor injection technique

- Vaso-vagal
  - faints
  - Funny turns
  - Hypotonic/Hyporesponsive Episode (HHE)
Mechanisms of Adverse Events:

1) The immunization process

- Dermographism
Mechanisms of Adverse Events:

1) The immunization process

- Dermographism
Long term consequences:

- 15 year old girl
- At 2 months old had received a single immunization
- 2 hours later, found limp, grey and unresponsive
- Paramedics ++
- ER: “likely reaction to pertussis component”
- MHO: “Hypotonic/Hyporesponsive Episode”, “will never recur”
Long term consequences
15 year old girl continued:

- It did!
- At 4 months:
  - 2 hours later; eyes rolled back and went limp
  - Pediatrician; “we are not doing that again”
- No immunizations since
Mechanisms of Adverse Events:

2) Direct effect of vaccine components

- Viral replication
- Local suppuration and adenitis (BCG)
Mechanisms of Adverse Events:

3) Host immune response

- Local inflammation results from the innate immune response
  - Toll-like receptors (TLRs)
  - Macrophages and dendritic cells move in
  - Results in redness and swelling
Mechanisms of Adverse Events:  
3) Host immune response

- The Arthus reaction
  - Antigen deposit is met with lots of antibody
  - Redness, swelling AND Pain
Mechanisms of Adverse Events:

3) Host immune response

- Systemic inflammatory response
  - Fever
  - Irritability
  - Nausea
  - Vomiting
  - Muscle aches
Mechanisms of Adverse Events: 3) Host immune response

- **Systemic inflammatory response - host factors:**
  - Age – younger less likely
  - Gender – girls worse than boys
  - Genetics - ??
  - Previous infection
  - Previous doses of vaccine
Mechanisms of Adverse Events:
3) Host immune response;
   Allergic reactions

- Type I hypersensitivity reactions
  - Urticaria
  - Angio-edema
  - anaphylaxis
Mechanisms of Adverse Events:

3) Host immune response;

Allergic reactions

- Type IV hypersensitivity reactions
  - 72-96 hours after immunization
  - Especially thiomersal containing vaccines
Mechanisms of Adverse Events:

3) Host immune response

- “Other”
  - Thrombocytopenia
  - Autoimmune
  - Guillain-Barré syndrome
  - Etc, etc, etc.
The future:

- CISA (and similar)
- Clinical Immunization Safety Assessment Network
- Goals:
  - Clinical evaluation, diagnosis and management of AEFIIs
  - Understand AEFIIs at the individual level
  - Evidence based algorithms for the next shot
  - Experts for inquiries
Summary

- It is all in the story
- Parents remember
- There are individual and family consequences to what you say
- Give a clear account of why you think what happened
- If you don’t know – say so