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Managing Patients with Adverse Events Following Immunization

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Dalhousie University
IWK Health Centre
NS Health Authority

Disclosures

- Received grants from GSK to my institution and consultancy fees from Pfizer to my academic account, unrelated to this work.

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Objectives

By the end of this session, participants will be able to:

- Incorporate best practices for adverse event following immunization (AEFI) management into their work
- Assess AEFI scenarios and plan a course of action for reporting and management
- Access evidence-based resources for managing patients with complex AEFIs

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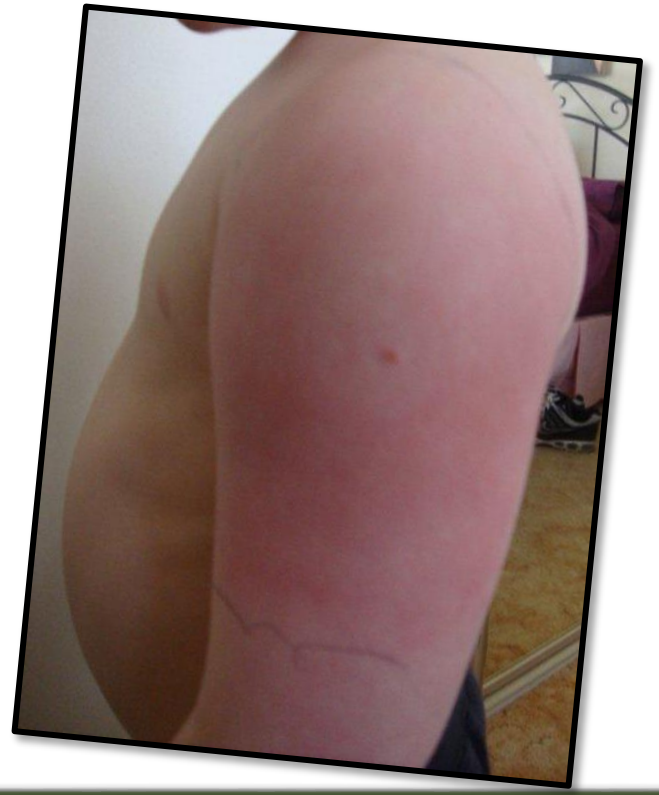
Let's start with a case…

- 18 month old boy, previously healthy and fully immunized, presents for well child visit with family MD
- Receives 4th dose DTaP-IPV-Hib booster in left deltoid
- 5 minutes later, noted to have redness and swelling of arm that extends from shoulder to elbow
- 90 mins post-vaccination: Temp 102 F



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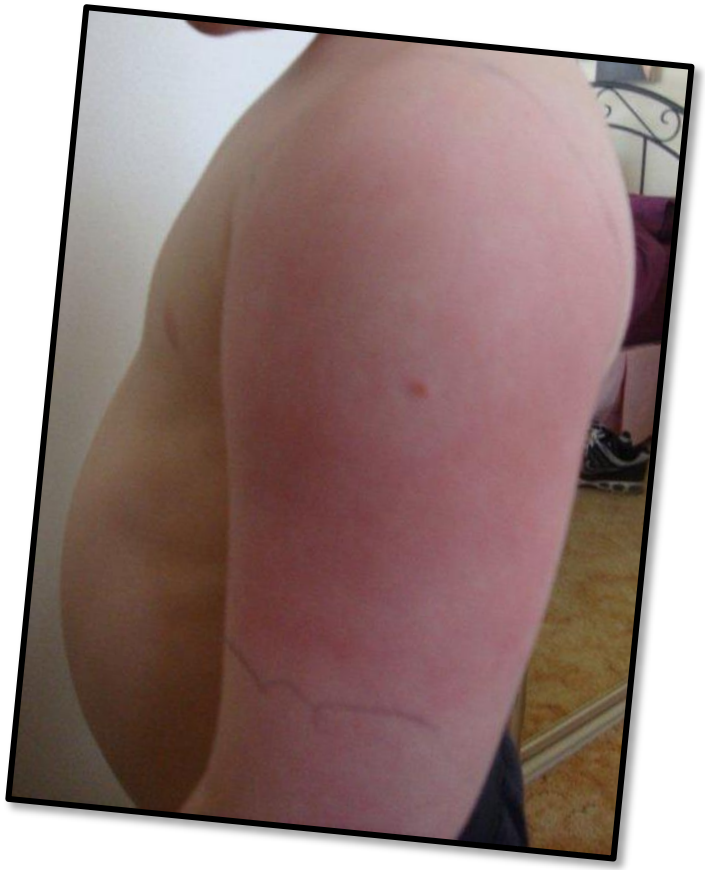
Case 1 Questions

- What is your diagnosis?
- What is your immediate management?
- Is this a reportable event?
- What will you suggest for the next immunization?



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Patients with special immunization needs

- Adverse events following immunization (AEFIs) cause concern among patients and healthcare providers regarding future vaccinations
- AEFIs may contribute to vaccine hesitancy among patients and families
- In the absence of clear, evidence-based guidance, clinicians may opt to withhold immunization from these patients putting them at risk of vaccine-preventable diseases

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Special Immunization Clinics

- **SICs were established in 2013 to:**
  - Standardize and improve clinical care of patients with previous AEFIs or underlying medical conditions
  - Determine the rate of AEFI recurrence
  - Develop a research platform

- **The SIC Network has built a national team of expert clinicians with an interest in vaccine safety**
  - Infectious disease specialists
  - Allergists and clinical immunologists
  - Other specialists on an *ad hoc* basis

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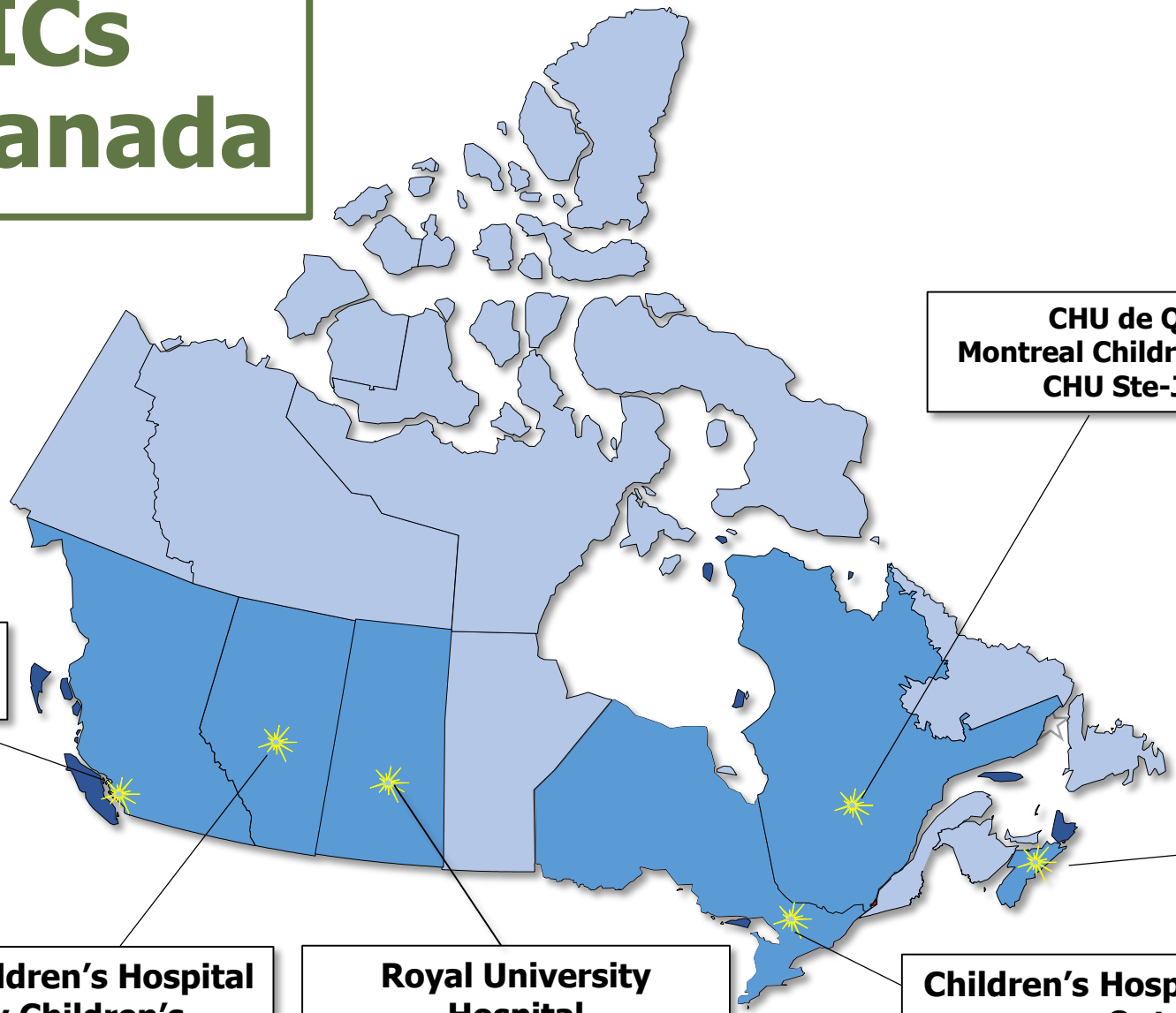
Active SICs across Canada



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Montreal Children's Hospital
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BC Children's Hospital

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Alberta Children's Hospital
Stollery Children's Hospital

Royal University Hospital

Children's Hospital of Eastern Ontario
Hospital for Sick Children
McMaster Children's Hospital

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SIC Network approach

- Patients are referred by a healthcare provider
- Types of referrals of particular interest:
  - Large local reactions (>10 cm)
  - Allergic symptoms <24 hours after vaccination
  - Fever >40°C
  - Hypotonic hyporesponsive episode <48 hours after vaccination
  - Neurological symptoms
  - Other AEFI or underlying conditions of concern

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SIC approach

- Patients undergo standardized assessment of the AEFI
  - Causality assessment of previous AEFI
  - Recommendations regarding (re)vaccination are made based on network protocols
- Patients are revaccinated in the clinic
- Follow up post-vaccination
- De-nominalized clinical information is entered in national database

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636 patients assessed for AEFIs in the SIC Network from 2013–2019

Demographics	%
Male Sex	49
Age, in years	
<2	36
2–6	27
7–17	28
≥18	9
Province	
NS	19
QC	28
ON	30
SK	4
AB	8
BC	12

Credit: *Caroline Munoz, MSc Candidate*

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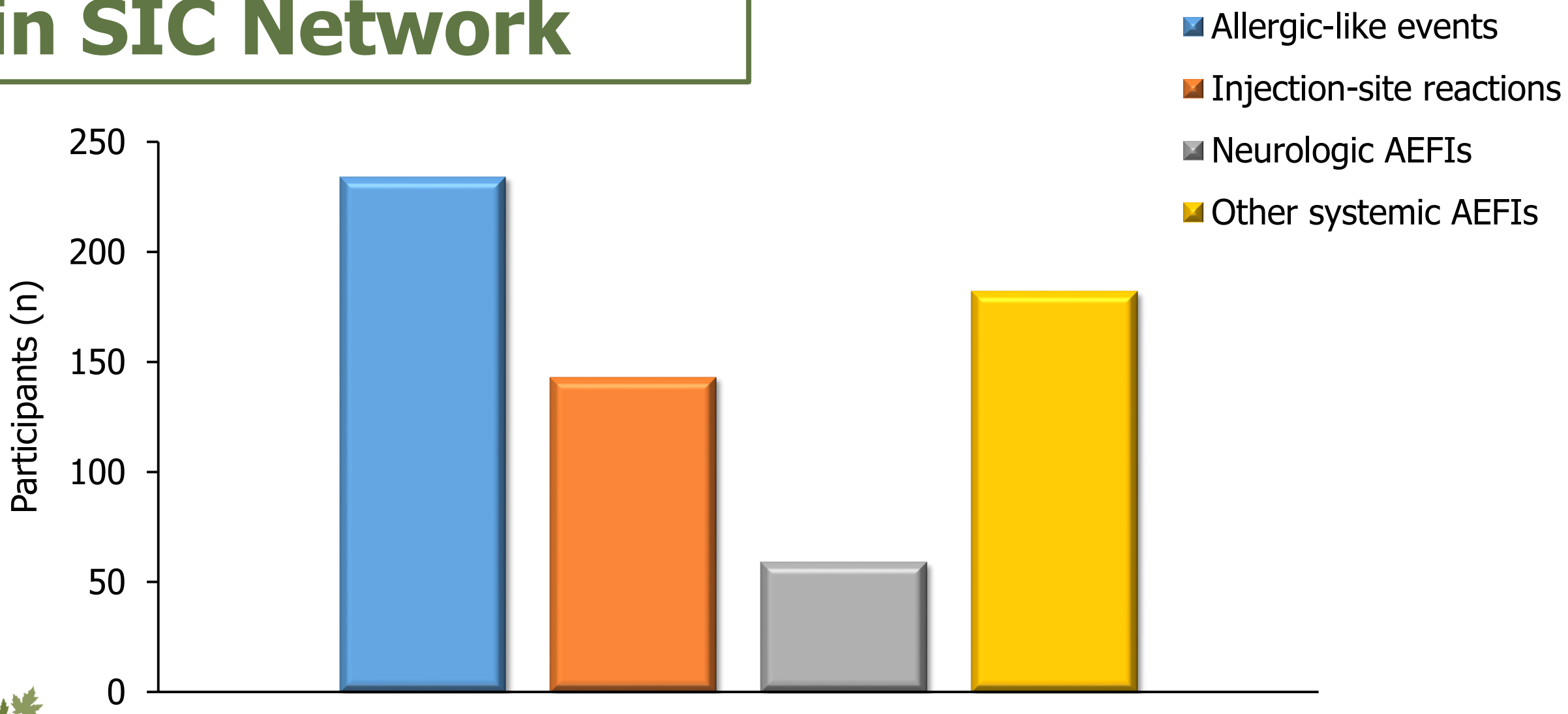
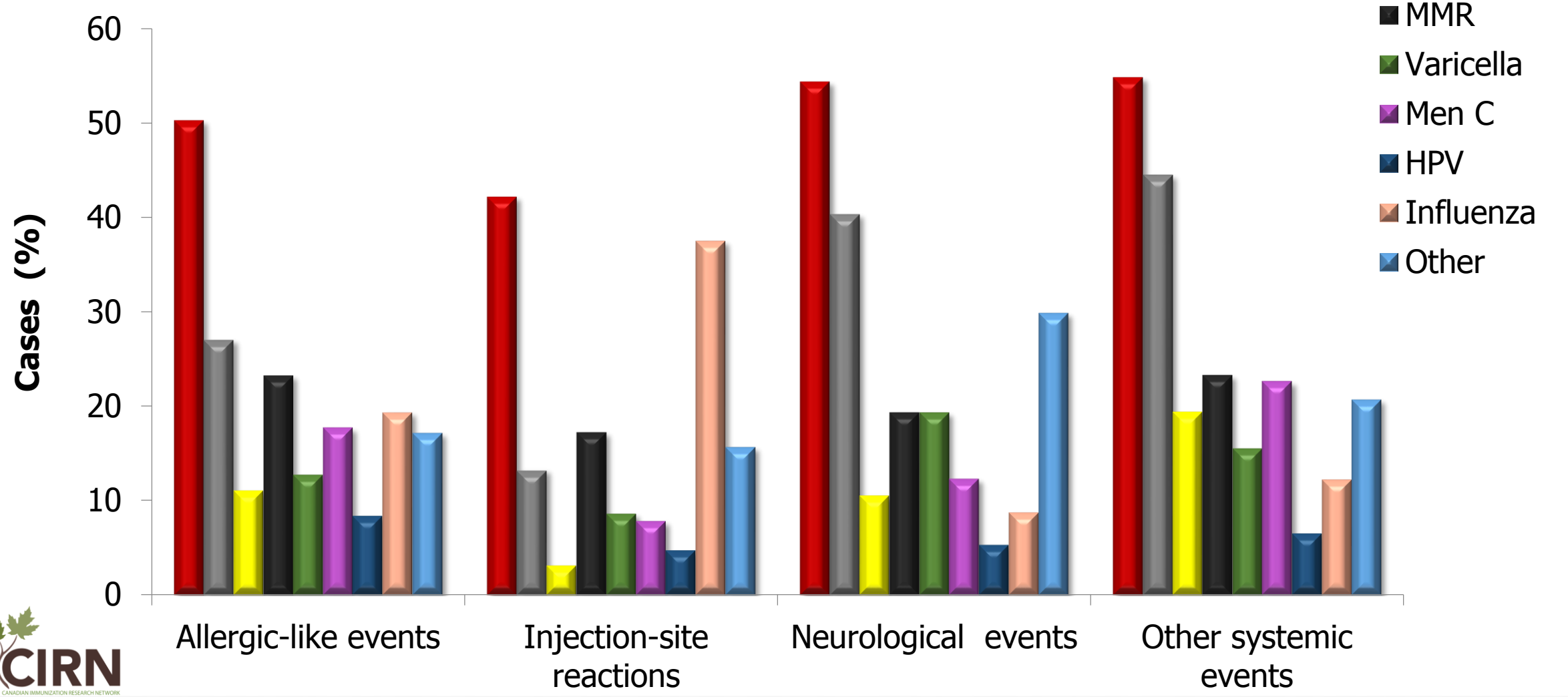
Type of AEFIs seen in SIC Network

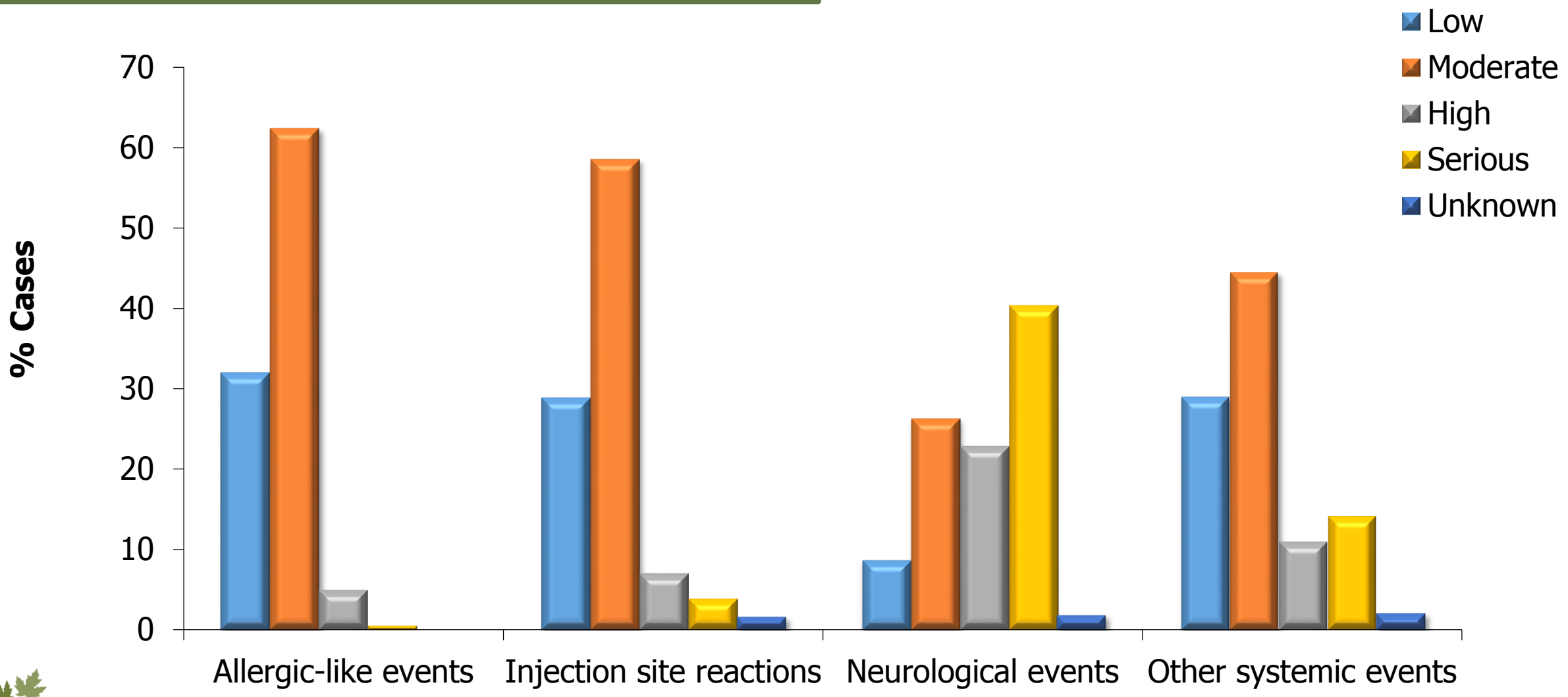


Credit: *Caroline Munoz, MSc Candidate*

AEFI types and temporally associated vaccines

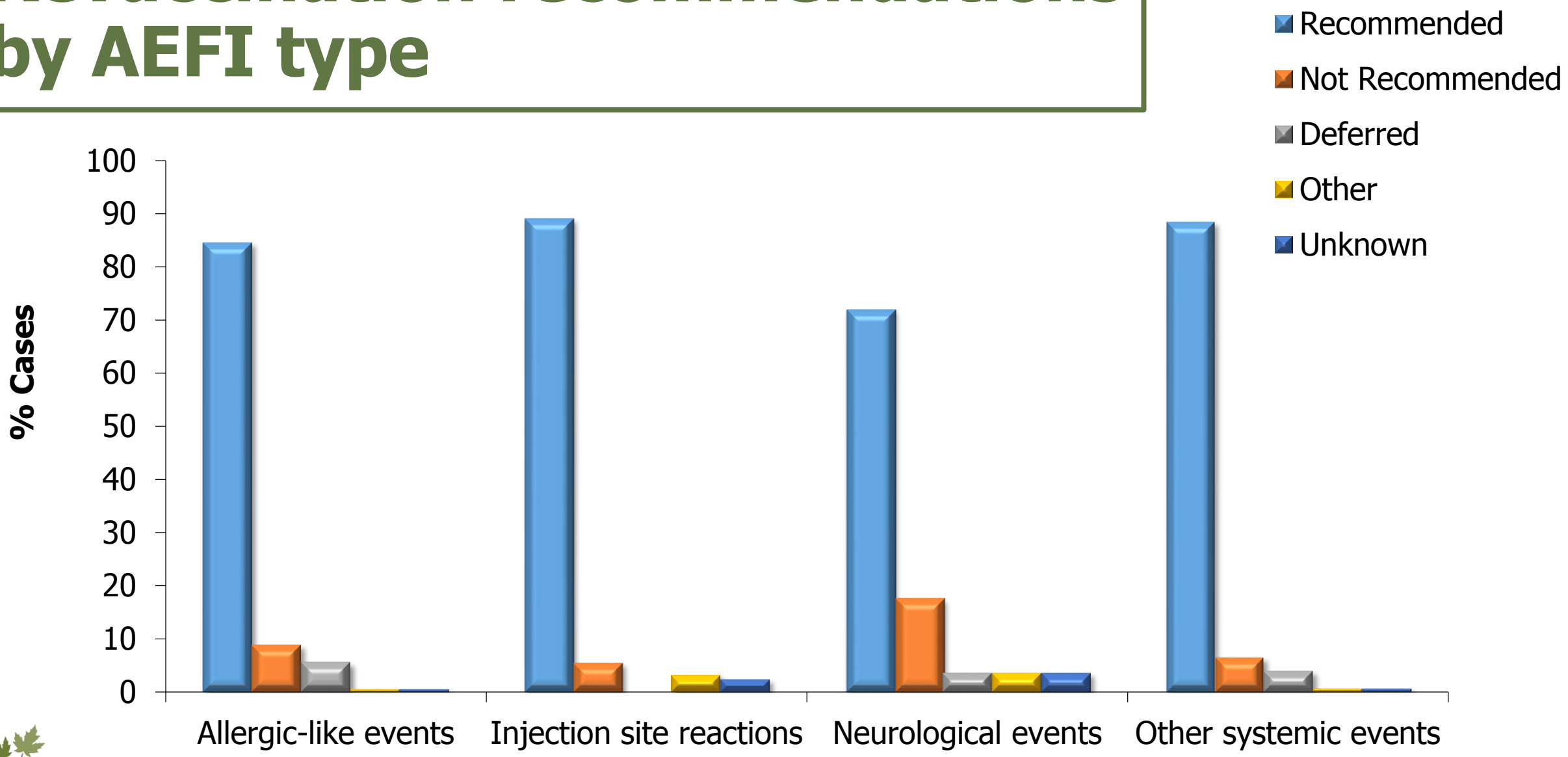


Severity of the AEFI



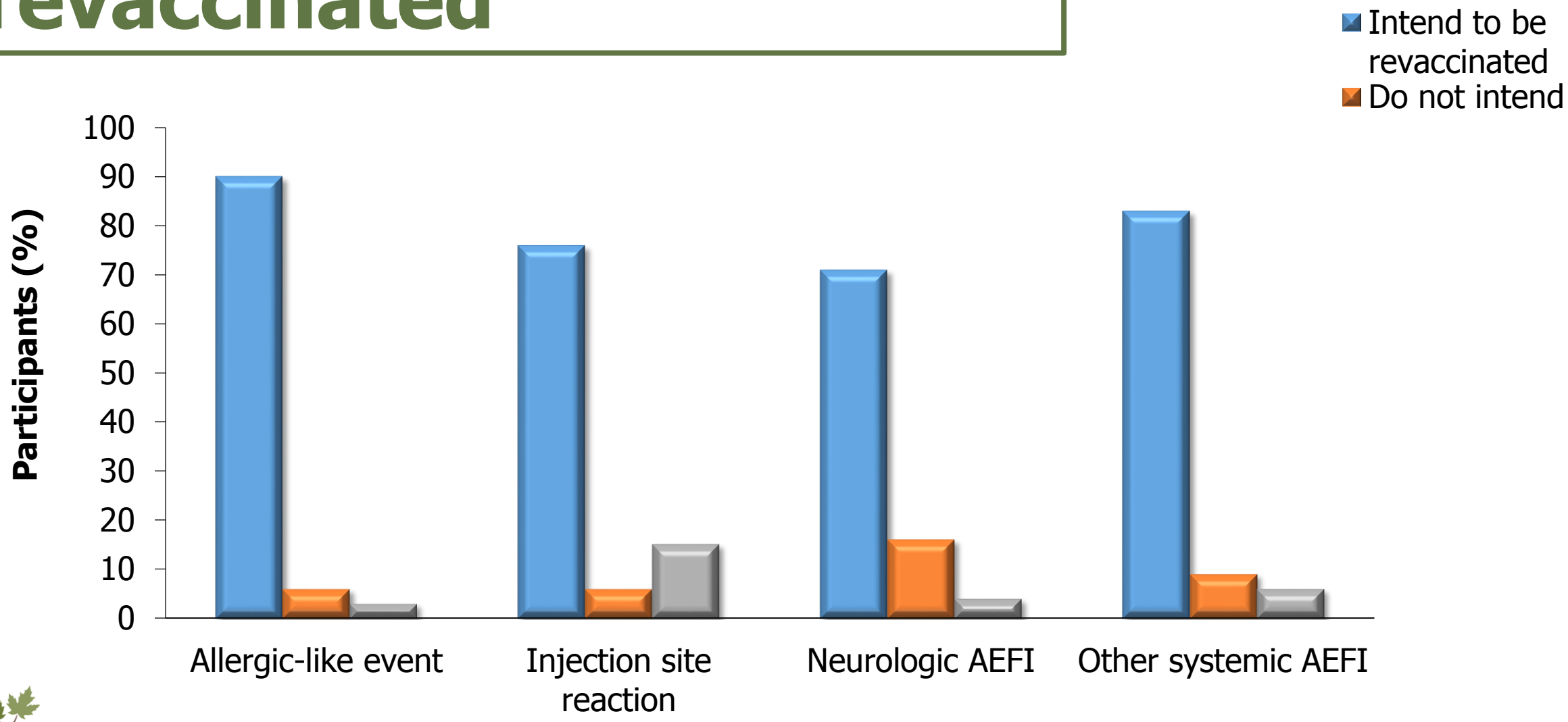
Credit: *Caroline Munoz, MSc Candidate*

Revaccination recommendations by AEFI type



Credit: *Caroline Munoz, MSc Candidate*

Participant intention to be revaccinated



Credit: *Caroline Munoz, MSc Candidate*

Revaccination status and outcomes

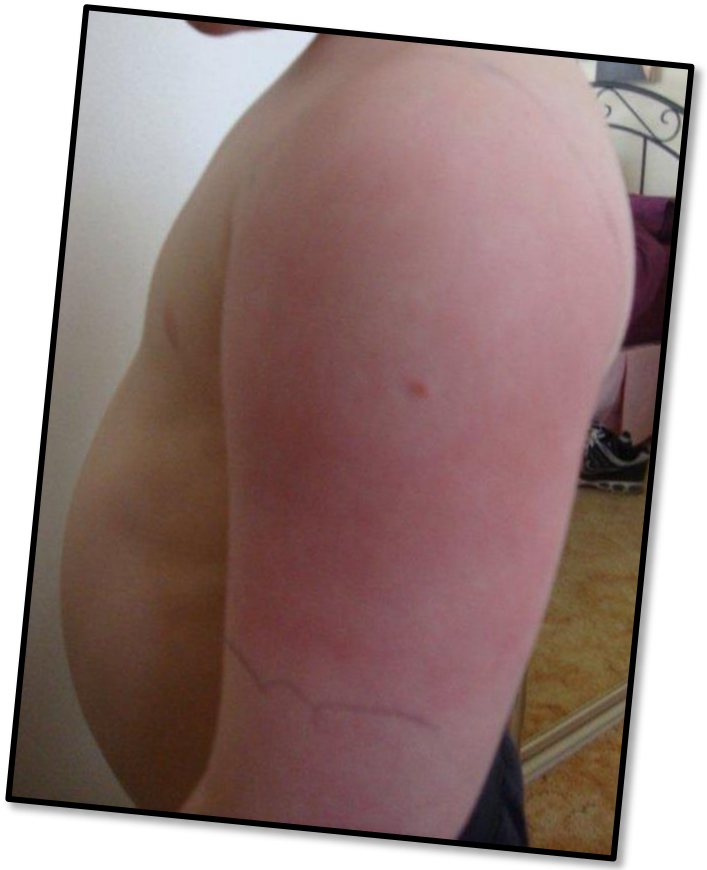
	Allergic like event N=147 N (%)	Injection site reaction N=71 N (%)	Neurologic AEFI N=24 N (%)	Other systemic AEFI N=90* N (%)
AEFI recurrence	10 (7%)	17 (24%)	0 (0%)	6 (7%)
Impact relative to initial AEFI				
Milder	7 (70%)	13 (76%)	0 (0%)	2 (33%)
Same severity	2 (20%)	1 (6%)	0 (0%)	4 (67%)
More severe	1 (10%)	3 (18%)	0 (0%)	0 (0%)

No recurrences were serious adverse events

Credit: *Caroline Munoz, MSc Candidate*

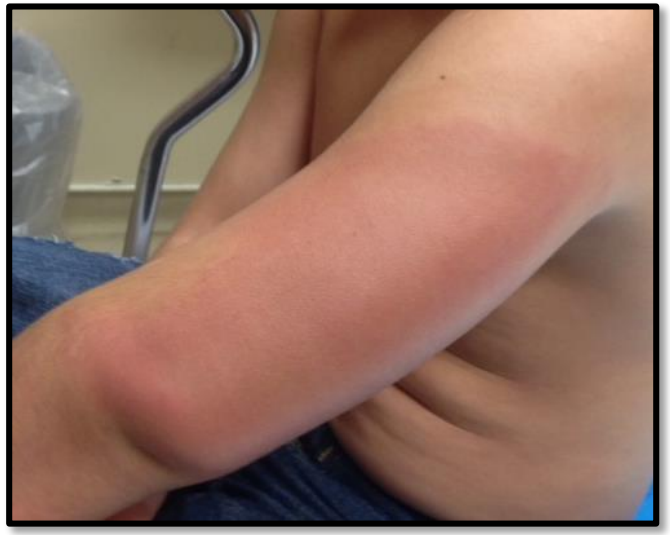
Back to the case…

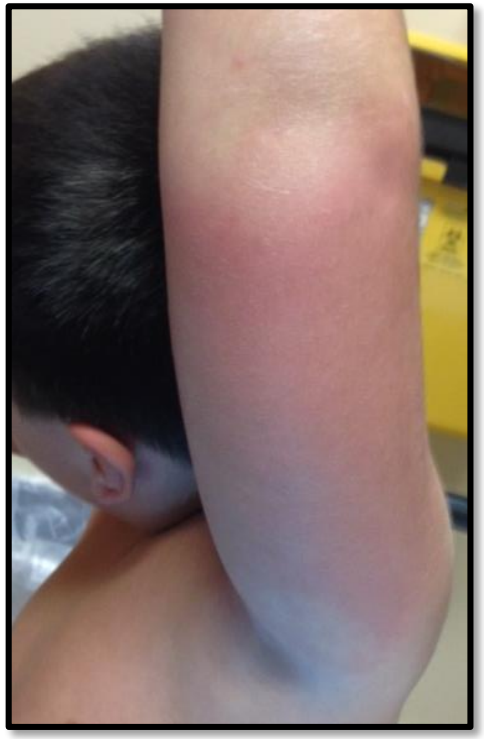
- What is your diagnosis?
- What is your immediate management?
- Is this a reportable event?
- What will you suggest for the next immunization?

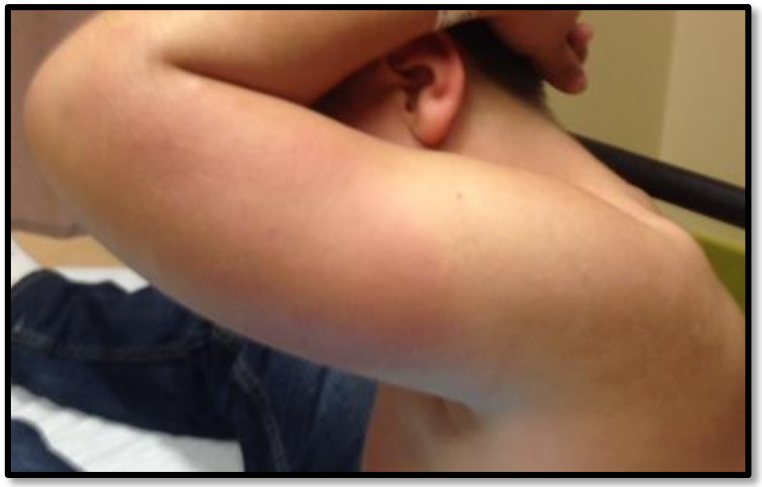


Case 1 Conclusion

- **Diagnosis: extensive limb swelling**
  - Usually mild pain/discomfort, marked swelling without induration







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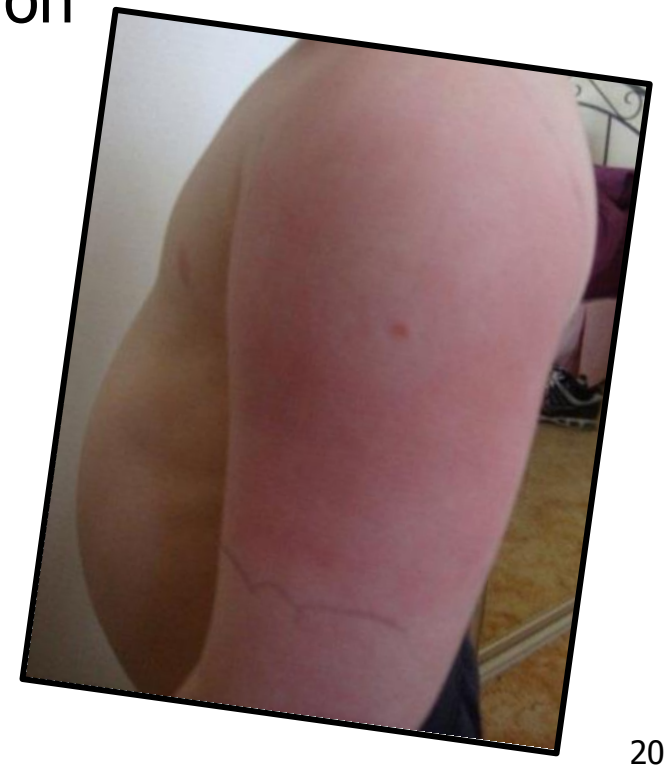
SIC approach to reimmunization

- Injection site reactions: REVACCINATE
  - Reactions are self-limited, resolve without sequelae
  - Cellulitis/infectious abscess is rare – suggests immunization error
  - Arthus reactions: consider extending interval between vaccinations



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Case 1 Conclusion

- **Management:**
  - Symptomatic with antipyretics, analgesics and/or antihistamines
- **Reporting:**
  - Generally not a reportable event, consider reporting if required ED visit or admission or history of multiple recurrences
- **Next immunization:**
  - Continue with preschool booster of Tdap-IPV
  - Risk of recurrence is ~25-50%

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Case 2

- 5 year old boy receives his 1st dose TIV in left deltoid in family physician's office
- 5 minutes later, complained that mouth "felt funny", gagged, went limp, pale, unable to stand up
- Epinephrine given IM and EHS called
- When EHS arrives 20 mins post-vaccination: LOC improving, vital signs normal
- Brought to ED: Back to baseline after 1 hour, no hives noted, ?mild periorbital edema
- No history of allergy, asthma, and no AEFIs with routine immunizations

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Case 2 Questions

- What is your assessment?
- Is this a reportable adverse event?
- What resources are available to help you manage this patient?
- What do you recommend regarding the next immunization?

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Anaphylaxis versus immunization stress-related response

	Anaphylaxis	Vaso-vagal syncope	Sympathetic stress reaction
Onset	Shortly (5-60 minutes) after vaccination	Before, during or shortly (<5 min) after vaccination	Before, during or soon after vaccination
Skin	Hives, swollen eyes and face, generalized rash	Pale, sweaty, cold, clammy	Pale, sweaty, cold, clammy
Respiratory	Cough, wheezing, stridor	Normal to deep breathing	Rapid and shallow (hyperventilation)
Cardio-vascular	↑ heart rate, ↓ blood pressure, dysrythymias, cardiac arrest	↓ heart rate, +/-transient ↓ blood pressure	↑ heart rate, normal or ↑ systolic blood pressure
Gastro-intestinal	Nausea, vomiting, abdominal cramps	Nausea, vomiting	Nausea, vomiting
Neurologic	Uneasiness, restlessness, agitation, loss of consciousness, little response once supine	Transient loss of consciousness, good response once supine, tonic/clonic seizure	Fearful, light-headed, weakness, numbness/tingling sensation on face, spasms hands/feet

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World Health Organization, https://www.who.int/publications-detail/WHO-MVP-EMP-SAV-2019.08

SIC approach to reimmunization

- Allergic-like events:
  - If anaphylaxis → refer to allergist for skin testing
  - If onset <1 hour after vaccination, need to differentiate allergic, vasovagal reaction, sympathetic stress response, HHE → refer
  - Otherwise: REVACCINATE
  - **Contraindications**: anaphylaxis to vaccine, severe cutaneous or delayed-type hypersensitivity reactions

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Case 2 Conclusion

- **Assessment: Vasovagal syncope versus anaphylaxis**
- **Reporting:** Reportable event (epi given)
- **Management of next immunization:**
  - Refer for assessment to rule-out anaphylaxis - allergist, infectious disease specialist, SIC
- Patient seen by Allergy, underwent skin prick testing (negative)

➢Received TIV the next season without adverse event

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Case 3

- 13 month old male developed refusal to walk, lower limb pain, irritability ~14 days after PCV13, MMRV, Men-C-C
- Previously healthy, developmentally normal, walked at 11 months
- Parent report patient became unsteady on feet and irritable, refused to be held
- Progressed over 3 weeks to being unable to pull to stand, difficulty sitting independently, reflexes decreased
- Referred to neurology: **possible Guillain-Barré syndrome**
- Reached a plateau then gradually returned to baseline over 5 weeks
- History of acute otitis media ~10 days prior to onset of refusal to walk

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Guillain-Barré Syndrome

- Autoimmune disorder of peripheral motor and sensory nerves, including cranial nerves.
- Bilateral, flaccid weakness of the limbs and decreased or absent deep tendon reflexes.
- Gradually progresses to reach a nadir between 12 hours and 28 days after onset, followed by a clinical plateau and gradual recovery.
- Elevation of cerebrospinal fluid protein with mild or no elevation of white blood cells and/or electrophysiological studies consistent with GBS can help to confirm the diagnosis.

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Case 3 Questions

- What is your assessment?
- What will you suggest regarding the next immunization?

SIC approach to reimmunization: Neurologic events

- Seizures: REVACCINATE
- Severe neuro events → refer for assessment of risk-benefit
- Guillain-Barre Syndrome
  - Within 6 weeks of influenza vaccination – generally contraindication to influenza vaccine
  - Within 6 weeks of Tetanus-containing vaccine – consider risks and benefits
  - Within 6 weeks of other vaccines – consider revaccination

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Case 3 Conclusion

- **Causality: difficult to determine**
  - Unable to confirm diagnosis (no LP or nerve conduction studies)
  - Preceding otitis media may have triggered GBS, cannot rule out vaccines
  - GBS not known to be associated with PCV, MenC, MMRV
- **Management:** Refer for further evaluation
- **Recommendations from SIC:**
  - Follow-up prior to next MMRV dose (due at 4-6 years), consider serology to determine need for additional dose

➢ **Follow-up:**

- Patient received MMRV, Tdap-IPV without sequelae, recommended to receive adolescent MenACWY

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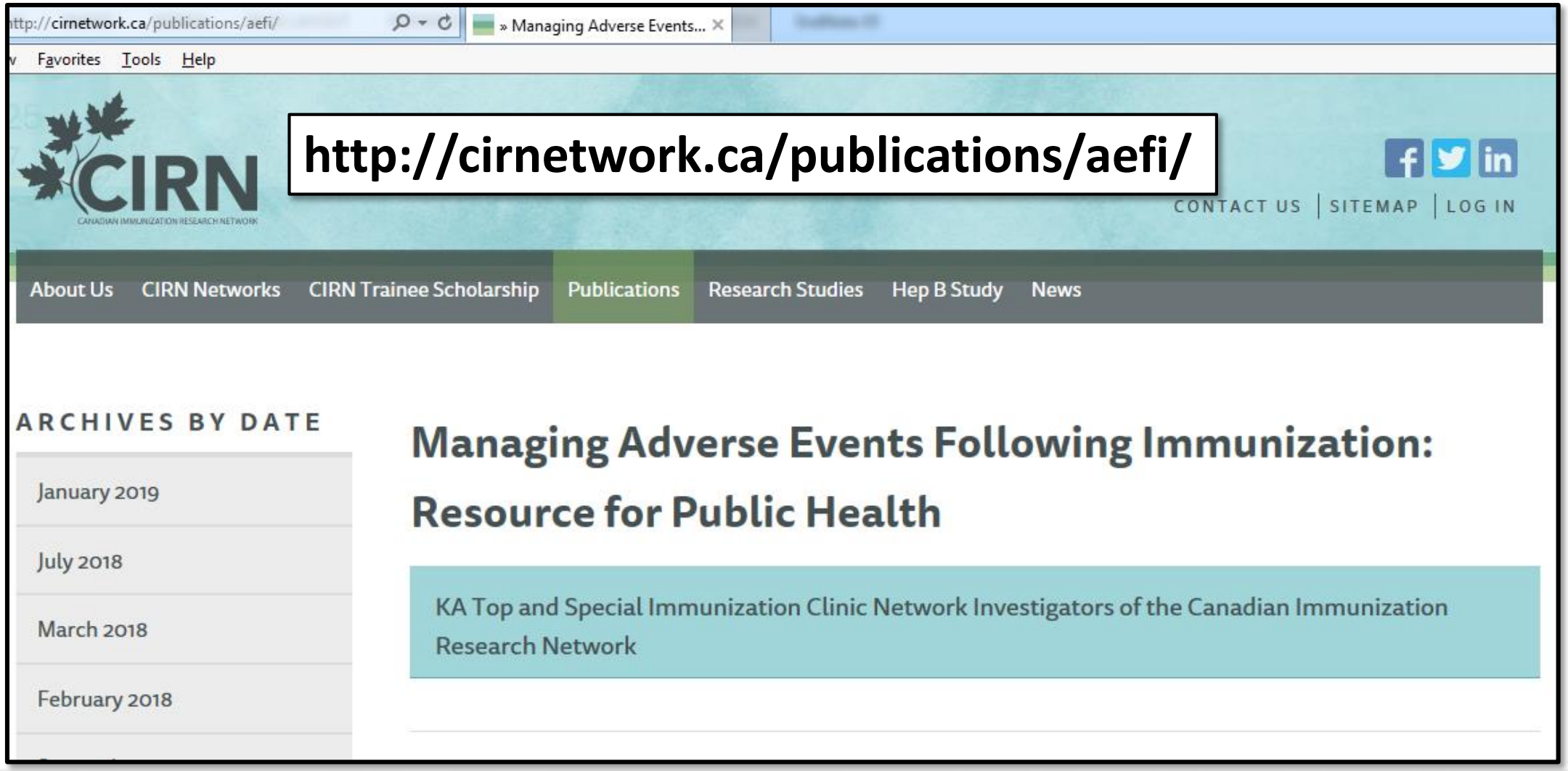
SIC approach to reimmunization

- Other systemic events: REVACCINATE
  - Hypotonic hyporesponsive episodes
  - Persistent crying
  - High fever
  - Thrombocytopenia – post-MMR → refer, may check vaccine serology
  - Apnea → refer for assessment, may need monitoring in-hospital

Resources for managing patients with AEFIs



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AEFI Resources

Government of Canada | Gouvernement du Canada

Search Canada.ca

MENU

Home > Health > Healthy living > Vaccines and immunization > Canadian Immunization Guide

Canadian Immunization Guide: Part 2 - Vaccine Safety

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Organization:

Public Health Agency of Canada

Updated: see Table of Updates

Related Topics

https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-2-vaccine-safety.html

Canadian Paediatric Society

Protecting and promoting the health and well-being of children and youth

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PRACTICE POINT

Canada's eight-component vaccine safety system: A primer for health care workers

Posted: Jun 15 2017

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Principal author(s)

Noni E MacDonald, Barbara J Law; Canadian Paediatric Society, Infectious Diseases and Immunization Committee

Paediatr Child Health 22 (4):e13-e16.

Take home messages

- Risk of recurrence of AEFIs is low
- Most patients with mild-moderate AEFIs can be revaccinated safely
- The SIC Network has expertise in evaluation and management of patients with AEFIs
- SIC AEFI Management Resource is available to support Public Health in managing people with AEFIs

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Acknowledgments and Contacts

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- http://cirnetwork.ca/network/special-immunization/

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Thank you!

Questions?

Additional resources

- World Health Organization: https://www.who.int/vaccine_safety/publications/en/
- Zafack JG et al, Risk of Recurrence of Adverse Events Following Immunization: A systematic review. Pediatrics, 2017;140:e20163707; http://pediatrics.aappublications.org/content/140/3/e20163707.long
- Zafack JG, Rate of Recurrence of Adverse Events Following Immunization: Results of 19 years of surveillance in Quebec, Canada. Pediatr Infect Dis J, 2018 Sep 10; https://www.ncbi.nlm.nih.gov/pubmed/30204662; https://www.sciencedaily.com/releases/2018/09/180914154344.htm
- Zafack JG, Clinical Approach Use in Medical Consultations for Allergic-Like Events Following Immunization, J Allergy Clin Immunol Pract, 2017: 5:718; https://www.ncbi.nlm.nih.gov/pubmed/27914816

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