2011 Institute of Medicine (IOM) Report generated Proposals for Updates to the Vaccine Injury Table (VIT)

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Shoulder Injury Related to Vaccination Vasovagal Syncope

- Proposals will add these injuries to the VIT for all vaccines administered by injection
- The only vaccines currently on the table which will not add these injuries are the nasal flu vaccine and the oral rotavirus vaccine

Shoulder injury related to vaccine administration (SIRVA)

- The IOM reviewed the scientific and medical literature finding that the evidence convincingly supported a causal relationship between vaccine administration and deltoid bursitis.

- Atanasoff et al. published an case series reporting the experience of the Vaccine Injury Compensation Program with regard to shoulder injuries following vaccination. The IOM reviewed this article and commented that the cases were consistent with deltoid bursitis.

Shoulder Injury Related to Vaccine Administration (SIRVA)

- Black, S., H. Shinefield, J. Hansen, E. Lewis, L. Su, and P. Coplan. 2004. A post-licensure evaluation of the safety of inactivated hepatitis A vaccine (VAQTA, Merck) in children and adults. *Vaccine* 22(5-6):766-772.
- Atanasoff, S., T. Ryan, R. Lightfoot, and R. Johann-Liang. 2010. Shoulder injury related to vaccine administration (SIRVA). *Vaccine* 28(51):8049-8052.
- Vellozzi, C., D. R. Burwen, A. Dobardzic, R. Ball, K. Walton, and P. Haber. 2009. Safety of trivalent inactivated influenza vaccines in adults: Background for pandemic influenza vaccine safety monitoring. *Vaccine* 27(15):2114-2120.
- Bodor M, Enoch M. Vaccination related shoulder dysfunction. Vaccine 25(2007) 585-587.

Shoulder Injury Related to Vaccine Administration (SIRVA)

Proposed QAI

Shoulder Injury Related to Vaccine Administration (SIRVA). SIRVA manifests as shoulder pain and limited range of motion occurring after the administration of an injected vaccine. The pain and other symptoms are thought to occur as a result of unintended injection of vaccine antigen or trauma from the needle into and around the underlying bursa of the shoulder resulting in an inflammatory reaction. SIRVA is caused by an injury to the musculoskeletal structures of the shoulder (e.g. tendons, ligaments, bursae, etc.). SIRVA is not a neurological injury and abnormalities on neurological examination or nerve conduction studies (NCS) and/or electromyographic (EMG) studies would not support SIRVA as a diagnosis (even if the condition causing the neurological abnormality is not known). A vaccine recipient shall be considered to have suffered SIRVA if such recipient manifests all of the following:

- No prior history of pain, inflammation or dysfunction of the affected shoulder prior to vaccine administration;
- Pain occurs within the specified time frame;
- Pain and reduced range of motion are limited to the shoulder in which the vaccine was administered; and
- No other condition or abnormality is present that would explain the patient's symptoms (e.g. EMG/NCV or clinical evidence of radiculopathy, brachial neuritis, mononeuropathies, or any other neuropathy).

Shoulder Injury Related to Vaccine Administration (SIRVA)

Proposed VIT

Vaccine	Injury	Time Interval
All vaccines administered by injection	Shoulder Injury Related to Vaccine Administration	≤ 48 hours

Shoulder Injury Related to Vaccine Administration (SIRVA)

Justification for proposed QAI

- **Injury: SIRVA versus deltoid bursitis**
  - Shoulder Injury Related to Vaccine Administration is thought to result from the unintentional injection of a vaccine into tissues and structures lying underneath the deltoid muscle of the shoulder.
  - The experience at the Vaccine Injury Compensation Program (Atanasoff 2010) suggests that vaccine injection may infrequently cause severe, persistent shoulder pain with prolonged restriction of function that can include but is not limited to a medical diagnosis of deltoid bursitis. Other medical diagnoses may include tendonitis, rotator cuff tear, frozen shoulder, impingement syndrome, adhesive capsulitis, and shoulder bursitis.

Shoulder Injury Related to Vaccine Administration (SIRVA)

- **Time Interval**
  - In published case series (Atanasoff 2010, Bodor 2007) three quarters of patients developed symptoms within 24 hours and 93% (14 of 15) developed symptoms consistent with SIRVA within 48 hours of vaccination
- With regard to both the injury (SIRVA vs. deltoid bursitis) and timing – where scientific uncertainty exists the guiding principles of the Advisory Commission on Childhood Vaccines encourage an approach which favors the petitioner. In keeping with these guiding principles the Injection-related Injury Workgroup recommends a more expansive diagnostic category (SIRVA) and a maximum time interval of 48 hours between vaccine administration and symptom onset.

Vaccine	Injury	Time Interval
All vaccines administered by injection	Shoulder Injury Related to Vaccine Administration	≤ 48 hours

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- Pain occurs within the specified time frame;
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Vasovagal Syncope

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Vasovagal Syncope

Summary Justification for Proposed Changes to the VIT

- Following a comprehensive literature review the IOM reported in 2011 that the evidence convincingly supported a causal relationship between injection of a vaccine and syncope based on 35 cases presenting definitive clinical evidence.
- The IOM noted “that the injection, and not the contents of the vaccine, contributed to the development of syncope.”
- The IOM stated that the latency of 15 minutes or less between vaccine injection and the onset of syncope in many of the cases reviewed suggested vasovagal syncope as the mechanism.

Vasovagal Syncope

Listing of relevant literature (evidence for justification)

- Buttery, J. P., S. Madin, N. W. Crawford, S. Elia, S. La Vincente, S. Hanieh, L. Smith, and B. Bolam. 2008. Mass psychogenic response to human papillomavirus vaccination. *Medical Journal of Australia* 189(5):261-262.
- D'Souza, R. M., S. Campbell-Lloyd, D. Isaacs, M. Gold, M. Burgess, F. Turnbull, and E. O'Brien. 2000. Adverse events following immunisation associated with the 1998 Australian measles control campaign. *Communicable Diseases Intelligence* 24(2):27-33.
- Keyserling, H., T. Papa, K. Koranyi, R. Ryall, E. Bassily, M. J. Bybel, K. Sullivan, G. Gilmet, and A. Reinhardt. 2005. Safety, immunogenicity, and immune memory of a novel meningococcal (groups a, c, y, and w-135) polysaccharide diphtheria toxoid conjugate vaccine (MCV-4) in healthy adolescents. *Archives of Pediatrics & Adolescent Medicine* 159(10):907-913.
- Meyer, K., A. Galler, R. Lietz, and W. Siekmeyer. 2001. Neurocardiogenic syncope in a 10-*year*-old boy. *Pediatric* Cardiology 22(5):415-416.
- Braun, M. M., P. A. Patriarca, and S. S. Ellenberg. 1997. Syncope after immunization. *Archives of Pediatrics and Adolescent Medicine* 151(3):255-259.

Vasovagal Syncope

- Laribiere, A., G. Miremont-Salame, H. Reyre, A. Abouelfath, L. Liege, N. Moore, and F. Haramburu. 2005. Surveillance of adverse effects during a vaccination campaign against meningitis C. *European Journal of Clinical Pharmacology* 61(12):907-911.
- Miller, E. R., and E. J. Woo. 2006. Time to prevent injuries from postimmunization syncope. *Nursing* 36(12 Pt.1):20.
- Slade, B. A., L. Leidel, C. Vellozzi, E. J. Woo, W. Hua, A. Sutherland, H. S. Izurieta, R. Ball, N. Miller, M. M. Braun, L. E. Markowitz, and J. Iskander. 2009. Postlicensure safety surveillance for quadri-valent human papillomavirus recombinant vaccine. *Journal of the American Medical Association* 302(7):750-757.
- Konkel, G., C. Runge, U. Szillat, S. Wiersbitzky, R. Bruns, and U. Schmidt. 1993. Cerebral convulsions: Encephalitis following MMR, OPV, hib or DPT vaccination. [German]. *Kinderarztliche Praxis* 61(6):232-234.
- Zimmerman, R. K., M. P. Nowalk, C. J. Lin, D. E. Fox, F. S. Ko, E. Wettick, G. Cost, L. Hand, J. Hayes, and M. Michaels. 2010. Randomized trial of an alternate human papilloma-virus vaccine administration schedule in college-aged women. *Journal of Women's Health* 19 (8):1441-1447.

Vasovagal Syncope

Proposed QAI

Vasovagal syncope. Vasovagal syncope (also sometimes called neurocardiogenic syncope) means loss of consciousness (fainting) and postural tone caused by a transient decrease in blood flow to the brain occurring after the administration of an injected vaccine. Vasovagal syncope is usually a benign condition but may result in falling and injury with significant sequelae. Vasovagal syncope may be preceded by symptoms such as nausea, lightheadedness, diaphoresis, and/or pallor. Vasovagal syncope may be associated with transient seizure-like activity, but recovery of orientation and consciousness generally occurs simultaneously with vasovagal syncope. Loss of consciousness resulting from the following conditions will not be considered vasovagal syncope: organic heart disease, cardiac arrhythmias, transient ischemic attacks, hyperventilation, metabolic conditions, neurological conditions, and seizures. Episodes of recurrent syncope occurring after the applicable time period are not considered to be sequelae of an episode of syncope meeting the Table requirements.

Vasovagal Syncope

Current VIT

Not applicable

Proposed VIT

Vaccine	Injury	Time Interval
All vaccines administered by injection	Vasovagal syncope	≤ 1 hour

Vasovagal Syncope

Justification for proposed QAI

Time Interval & Injury

- Vasovagal syncope following vaccination is considered to be an adverse response to a painful or stressful stimulus
- Syncope occurred within 1 to 60 minutes of vaccination in 27 of the 35 case reports reviewed by the IOM.
- In an unpublished DVIC case series time of onset was recorded in 6 of the 8 cases and ranged from 1 to 15 minutes
- The 2011 IOM report noted that the latency of 15 minutes or less between injection of a vaccine and the development of syncope in many of the cases reviewed suggested vasovagal syncope as the mechanism.

Vasovagal Syncope

Justification for proposed QAI

- "Episodes of recurrent syncope occurring after the applicable time period are not considered to be sequelae of an episode of syncope meeting the Table requirements."
  - There is no medically accepted mechanism by which a vaccination can cause recurrent syncope.
  - Petitioners claiming such an injury as evidence of 6 month sequelae do not meet the definition of a table injury.

Vaccine	Injury	Time Interval
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Vasovagal syncope. Vasovagal syncope (also sometimes called neurocardiogenic syncope) means loss of consciousness (fainting) and postural tone caused by a transient decrease in blood flow to the brain occurring after the administration of an injected vaccine. Vasovagal syncope is usually a benign condition but may result in falling and injury with significant sequelae. Vasovagal syncope may be preceded by symptoms such as nausea, lightheadedness, diaphoresis, and/or pallor. Vasovagal syncope may be associated with transient seizure-like activity, but recovery of orientation and consciousness generally occurs simultaneously with vasovagal syncope. Loss of consciousness resulting from the following conditions will not be considered vasovagal syncope: organic heart disease, cardiac arrhythmias, transient ischemic attacks, hyperventilation, metabolic disturbances, neurological conditions, and seizures. Episodes of recurrent syncope occurring after the applicable time period are not considered to be sequelae of an episode of syncope meeting the Table requirements.