

Interactive Health Data Application: Adverse Event Following Immunization – Report Level

OVERVIEW																
<b>Category:</b>	Immunization															
<b>Subset:</b>	Adverse Event Following Immunization – Report Level															
<b>Data Sources:</b>	<ul style="list-style-type: none"> <li>- Immunization and Adverse Reaction to Immunization (Imm/ARI)</li> <li>- Pharmaceutical Information Network (PIN before January 1<sup>st</sup> 2021)</li> </ul>															
<b>Case Definition:</b>	<p>Based on the Adverse Events Following Immunization (AEFI) policy for Alberta immunization providers, an AEFI is defined as “any untoward medical occurrence in a vaccinee which follows immunization and which does not necessarily have a causal relationship with the administration of the vaccine. The adverse event may be any unfavourable and/or unintended sign, abnormal laboratory findings, symptom or disease”.</p> <p>An AEFI report can be temporally associated with multiple vaccines on the same immunization date and multiple adverse event types. The records would be recorded in Imm/ARI as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">AEFI Number</th> <th style="width: 35%;">Vaccine</th> <th style="width: 40%;">Adverse Event</th> </tr> </thead> <tbody> <tr> <td>001</td> <td>MMR</td> <td>Allergic Reaction</td> </tr> <tr> <td>001</td> <td>Varicella</td> <td>Allergic Reaction</td> </tr> <tr> <td>001</td> <td>MMR</td> <td>Rash</td> </tr> <tr> <td>001</td> <td>Varicella</td> <td>Rash</td> </tr> </tbody> </table> <p>For the example above, AEFI number is counted as 1 for <u>report level</u>, 2 for <u>vaccine level</u>, and 4 for <u>event level</u>. Thus, the AEFI count at vaccine level or event level is larger than the AEFI count at report level.</p>	AEFI Number	Vaccine	Adverse Event	001	MMR	Allergic Reaction	001	Varicella	Allergic Reaction	001	MMR	Rash	001	Varicella	Rash
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<b>Methodology:</b>	<p>AEFI rates (report level) are calculated by dividing the number of AEFI (report level) of a given sex and age group in Alberta or zones (i.e., numerator) by vaccine doses administered in that sex and age group of that geography area (i.e., denominator).</p> <p>All rates are expressed as per 100,000 doses administered.</p> <p>Immunization dates are used to determine the year of AEFI.</p>															

INDICATORS AND ASSOCIATED MEASURES		
Indicator	Associated Measures	
AEFI Rate per 100,000	AEFI Count	Standard Error
	Doses Administered	Standard Score

Indicator	Valid Values			
	Year	Geography	Sex	Age Group
AEFI Rate per 100,000	2014-2023	AB (1) Zone (5)	Both Female Male	All <1 1-2 3-7 8-12 13-17 18-64 65+

NUMERATOR	
<b>Inclusion:</b>	AEFI cases are extracted from Imm/ARI and are reported by health practitioners across Alberta.
<b>Exclusion:</b>	No exclusion
<b>Geographic Assignment:</b>	Zone information is based on postal code of residence from administrative records where AEFI case definition was met.
<b>Age and Sex Assignment:</b>	Sex is determined by the administrative record where AEFI case definition was met. Age is calculated by subtracting date of birth from the date of immunization.

DENOMINATOR	
<b>Inclusion:</b>	The denominator is annual doses administered in a given sex and age group in Alberta or zones.
<b>Exclusions:</b>	No exclusion
<b>Geographic Assignment:</b>	The postal code of residence reported is linked to health region using Alberta Health Postal Code Translation File (PCTF).
<b>Age and Sex Assignment:</b>	The date of birth and sex are determined by the administrative records where the vaccine doses were administered. The age is calculated by subtracting date of birth from the date of immunization.

STANDARD ERRORS
<p>The standard error for AEFI crude rate is calculated as follows:</p> $SE(\hat{R}) = \sqrt{p(1-p)/N}$ <p>where <math>p</math> is the rate and <math>N</math> is doses administered.</p>

STANDARD SCORES		
<p>Standard scores are calculated for each of the four indicators as follows:</p> $SS(\hat{R}) = \frac{\hat{R}_{regional} - \hat{R}_{provincial}}{SE(\hat{R})_{regional}}$ <p>Standard scores allow for comparisons between regions and the provincial average. Standard scores are used for color-coding charts maps, and are coded as follows:</p>		
Standard Score	Interpretation	Color
> 2	Significantly higher than provincial average	Red
1 to 2	Higher than provincial average	Orange

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1 to -1	Average	Yellow
-1 to -2	Lower than provincial average	Light Green
< -2	Significantly lower than provincial average	Dark Green

<b>DATA ISSUES</b>
<p>As of January 1<sup>st</sup> 2021, as per the Immunization Regulation, all health practitioners must ensure that all immunizations are submitted to Imm/ARI (this applies to both provincially funded and privately purchased vaccines). However, immunizations administered prior to 2021 may be incomplete in the database.</p> <p>Imm/ARI is a live database, and thus AEFI reports are subject to change as new records or data corrections are submitted.</p>