

Supplementary Table 1: Terms that were included in VAERS dictionary and were tagged as time modifiers and time units; others represented the concepts of negation and second level diagnosis (subdivided into certainty, possibility and impression).

| Time Modifiers | Time Units ⁱ | Negation | 2 nd level diagnosis | | |
|----------------|-------------------------|----------|---------------------------------|--------------------------|-------------------------|
| | | | Certainty ⁱ | Possibility ⁱ | Impression ⁱ |
| ago | minute.* | non | unk.* | possib.* | experienc.* |
| before | hour.* | no | undetermined | probab.* | suffer.* |
| post | day.* | not | unexplained | question.* | develop.* |
| within | week.* | denies | natural | unconfirm.* | impress.* |
| wi | month.* | denied | nos | pending.* | assess.* |
| p | year.* | without | | suspect.* | |
| following | hrs | wo | | unsure.* | |
| later | min | any | | unspecif.* | |
| after | mins | none | | | |
| for | hr | negative | | | |
| | second.* | neg | | | |
| | wks | wouldnt | | | |
| | wk | couldnt | | | |
| | evening | shouldnt | | | |
| | morning | wont | | | |
| | noon | cannot | | | |
| | afternoon | gone | | | |
| | midnight | | | | |

ⁱ wildcard characters “.*” were used in only a few cases.

Supplementary Table 2: Counts for all types of matches between *Vae*TM and reference standard.

| | Features | | SYMPTOM | DIAGNOSIS | TIME_TO_ONSET | VACCINE | LOT_NUMBER | CAUSE_OF_DEATH | 2nd LEVEL DIAGNOSIS | RULE_OUT_DIAGNOSIS | DRUG | FAMILY_HISTORY | MEDICAL_HISTORY |
|----------------------------|-------------------------------|--|---------|-----------|---------------|---------|------------|----------------|---------------------|--------------------|------|----------------|-----------------|
| | Counts | | | | | | | | | | | | |
| 1 st Evaluation | Full-Matches | | 600 | 68 | 29 | 71 | 9 | 2 | 63 | 3 | 229 | 1 | 8 |
| | Conceptual-Matches | | 507 | 41 | 1 | 22 | 0 | 2 | 35 | 3 | 16 | 0 | 15 |
| | Non-matches (1) ⁱ | | 773 | 71 | 13 | 40 | 4 | 2 | 87 | 0 | 69 | 1 | 23 |
| | Non-matches (2) ⁱⁱ | | 204 | 3 | 1 | 15 | 0 | 0 | 2 | 1 | 26 | 0 | 6 |
| 2 nd Evaluation | Full-Matches | | 568 | 148 | 2 | 73 | 4 | 6 | 82 | 2 | 171 | 0 | 3 |
| | Conceptual-Matches | | 419 | 60 | 9 | 21 | 8 | 2 | 70 | 0 | 27 | 0 | 8 |
| | Non-matches (1) ⁱ | | 339 | 45 | 10 | 20 | 5 | 6 | 108 | 0 | 55 | 2 | 24 |
| | Non-matches (2) ⁱⁱ | | 187 | 29 | 1 | 18 | 0 | 1 | 13 | 0 | 17 | 0 | 0 |
| 3 rd Evaluation | Full-Matches | | 231 | 39 | 70 | 222 | 28 | 1 | 159 | 0 | 157 | 2 | 75 |
| | Conceptual-Matches | | 266 | 22 | 30 | 60 | 36 | 0 | 96 | 2 | 25 | 2 | 51 |
| | Non-matches (1) ⁱ | | 218 | 10 | 52 | 66 | 8 | 2 | 80 | 3 | 37 | 6 | 118 |
| | Non-matches (2) ⁱⁱ | | 257 | 4 | 3 | 15 | 4 | 0 | 34 | 4 | 23 | 0 | 6 |

ⁱ either no agreement between *Vae*TM and reference standard or *Vae*TM did not extract any text

ⁱⁱ *Vae*TM extracted a non-existing feature

| | | | | | | | | | | | | | |
|----------------------------------|---|-------------------------------|-----|----|----|-----|----|---|-----|---|-----|---|-----|
| 3rd Evaluation | CA vs PA₁ⁱ | <i>Matched_ annotations</i> | 10 | 26 | 69 | 164 | 44 | 0 | 150 | 3 | 103 | 5 | 133 |
| | | <i>Missed_ annotations</i> | 42 | 7 | 2 | 3 | 0 | 0 | 7 | 0 | 9 | 0 | 2 |
| | | <i>Incorrect_ annotations</i> | 18 | 0 | 7 | 0 | 3 | 0 | 12 | 0 | 14 | 0 | 42 |
| | CA vs PA₂ⁱ | <i>Matched_ annotations</i> | 347 | 31 | 81 | 181 | 28 | 3 | 162 | 2 | 104 | 5 | 99 |
| | | <i>Missed_ annotations</i> | 3 | 7 | 0 | 0 | 0 | 0 | 16 | 0 | 3 | 0 | 10 |
| | | <i>Incorrect_ annotations</i> | 30 | 2 | 0 | 1 | 2 | 0 | 10 | 0 | 0 | 3 | 2 |

ⁱCA: Consensus Annotator; PA: Primary Annotator.

Supplementary Table 4: Examples of differences between *Vae*TM and reference standard (first evaluation). The extracted span of text is followed by the feature name in brackets; the type of difference is also included per example, while ‘Not extracted’ means that *Vae*TM did not extract anything.

| Sentence ⁱ | Reference Standard ⁱ | <i>Vae</i> TM ⁱⁱ | Type of difference |
|--|--|--|-------------------------------|
| Pt had no further problems after being treated for the second time | no further problems [SYMPTOM] | <i>Not extracted</i> | Occurrence |
| after receiving the Herpes Zoster vaccine, pt began experiencing hand itching | Herpes Zoster vaccine [VACCINE], itching [SYMPTOM] | <i>Not extracted</i> | Occurrence |
| Dx: 1) smallpox vaccination reaction | smallpox vaccination reaction [DIAGNOSIS] | <i>Not extracted</i> | |
| Tx't: IVIG, steroids, w/ no noticeable improvement | IVIG [DRUG], steroids [DRUG] | steroids [DRUG] | Occurrence |
| Treated with IV Benadryl, Decadron, and Famotidine and then epinepherine | IV Benadryl [DRUG], Decadron [DRUG], Famotidine [DRUG], epinepherine [DRUG] | benadryl [DRUG], decadron [DRUG], famotidine [DRUG] | Textual extent, Occurrence |
| The patient does not drink alcohol | no alcohol [MEDICAL_HISTORY] | alcohol [DRUG] | Typing |
| She was followed for prenatal care and diagnosed with mild pregnancy-induced hypertension, for which she was not treated | pregnancy-induced hypertension [DIAGNOSIS] | diagnosed mild pregnancy hypertension [DIAGNOSIS] | Granularity |
| DIAGNOSIS OF SARCOID | SARCOID | diagnosis sarcoid | Term decomposition; |

| | | | |
|---|--|---|-----------------------------------|
| AND POSTERIOR VITREOUS DETACHMENT WITH DAMAGE TO THE RETINA | [DIAGNOSIS], POSTERIOR VITREOUS DETACHMENT [DIAGNOSIS], DAMAGE TO RETINA [DIAGNOSIS] | posterior vitreous detachment [DIAGNOSIS] | occurrence |
| Presents to ER with c/o allergic reaction to pneumonia vaccine | allergic reaction [SYMPTOM], pneumonia vaccine [VACCINE] | allergic reaction [SYMPTOM], pneumonia [SYMPTOM] | Term ambiguity |
| Ringling and ache in R ear | Ringling [SYMPTOM], ache in R ear [SYMPTOM] | ache ear [SYMPTOM] | Locus modification; occurrence |
| The patient had no further seizures and was discharged home | no further seizures [SYMPTOM] | no seizures [SYMPTOM] | Textual extent |

ⁱ span of text as in the original report without any normalization

ⁱⁱ span of text as normalized by *VaeTM*