In compliance with continuing education requirements, all presenters must disclose any financial or other associations with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters as well as any use of unlabeled product(s) or product(s) under investigational use.

CDC, our planners, content experts, and their spouses/partners wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters.

Planning committee discussed conflict of interest with each presenter to ensure there is no bias.

Content will not include any discussion of the unlabeled use of a product or a product under investigational use.

CDC did not accept commercial support for this continuing education activity.
Surveillance Shared Services: Laboratory Testing at VPD Reference Centers (RCs) and Electronic Routing of HL7 Result Messages

May 17, 2018

Presenting To
National Immunizations Conference

Susan Robinson, MPH | Vaccine Preventable Disease Epidemiologist
Project goal
The goal of this project was for the jurisdictions to be able to receive HL7 messages from CDC that contained the laboratory results from the VPD RC
Current process?
ARIZONA DEPARTMENT
OF HEALTH SERVICES
ARIZONA DEPARTMENT OF HEALTH SERVICES

VPD Reference Center

CDC

STARLIMS®

MEDSIS

Medical Electronic Disease Surveillance Intelligence System
Why would this matter?
The bacteria or virus has pressed the start button before we even know about it…
How did we go about this?
Final results!
Arizona was able to pull messages from CDC that contained the data sent from the VPD RC.
Arizona was able to pull messages from CDC that contained the data sent from the VPD RC.

This is a common hub that all states should be able to connect to!
Additional considerations
Messages from the VPD RC are not in the traditional HL7 message format
- Messages from the VPD RC are not in the traditional HL7 message format

- No names
- Messages from the VPD RC are not in the traditional HL7 message format

- No names

- Issues in finding the AZ-specific specimen ID within the message
- Messages from the VPD RC are not in the traditional HL7 message format
- No names or DOBs
- Issues in finding the AZ-specific specimen ID within the message

Arizona was not able to consume the HL7 messages into our ELR system
START
THANK YOU

Susan Robinson | Vaccine Preventable Disease Epidemiologist
Susan.Robinson@azdhs.gov | 480-435-3929

azhealth.gov

@azdhs

facebook.com/azdhs
Enhancing Vaccine-Preventable Disease (VPD) Surveillance through the Epidemiology and Laboratory Capacity for Infectious Diseases – R1 Cooperative Agreement (ELC R1 CoAg)

Holly Vins, MPH

National Immunization Conference

May 2018
Background for ELC R1 CoAg

- Initiated August 1, 2015
- 52 funded jurisdictions as of 3rd project year (8/2017 – 7/2018)
- Required Tier 1 activities
  1. Coordinate NNDSS surveillance for selected VPDs
  2. Enhance surveillance for meningococcal disease
  3. Enhance surveillance for varicella
  4. Support/establish surveillance for acute flaccid myelitis (AFM)
- Optional Tier 2 activities & special projects
Enhanced VPD Surveillance Activities and Achievements
Surveillance Coordination Activities and Achievements*

- 52 of 52 jurisdictions have identified a VPD Surveillance Coordinator who serves as the point of contact for VPDs and supports VPD surveillance activities in their jurisdiction.

- At least 44 of 52 jurisdictions have made efforts to integrate (e.g., manual, electronic) their immunization information systems with their surveillance data/reports in order to increase the efficiency of case investigations and improve data quality.

*From August 2015 – April 2018, based on awardee activity summaries, annual ELC application responses, and CDC SME progress reports.
Enhanced meningococcal data have been received on 871 cases from 48 of 52 jurisdictions.

758 associated meningococcal isolates have been received from 48 of 52 jurisdictions.

* From August 2015 – April 2018, based on supplemental meningococcal disease data and isolate submissions. Remaining jurisdictions did not submit data/isolates because no cases were reported or isolates were not available for shipment to CDC.
Varicella Surveillance Activities and Achievements*

- Varicella is reportable is 38 of 52 jurisdictions.
- Annual data completeness reports for key varicella variables† have been received from 30 of 38 jurisdictions.
- For annual varicella data completeness reports submitted on 2014, 2015 and 2016 data:
  - Completeness was >50% for all key varicella variables at baseline for all 30 jurisdictions (many had completeness >90%)
  - In 20/30 jurisdictions, completeness increased from baseline for at least 4 key variables
  - In 11/30 jurisdictions, completeness did not change for at least 3 key variables (most had 100% completeness at baseline)
  - In 6/30 jurisdictions, slight decreases in completeness were seen for at least 3 key variables

* From August 2015 – February 2018, based on varicella data completeness report submissions. Remaining jurisdictions did not submit data because varicella cases not reportable in jurisdiction, varicella cases became reportable in jurisdiction within the last year, or report was not complete at time of analysis.

† Key varicella variables include: age, disease severity (based on number of lesions), hospitalization status, case status, lab testing for varicella, outbreak-related case, vaccination status, and number of vaccine doses.
Varicella Surveillance Activities and Achievements*

- Case-based varicella outbreak surveillance data have been received from 51 of 52 jurisdictions.
- For 2,976 outbreak- and cluster-related cases submitted via varicella outbreak reports:
  - 291 clusters (961 cases) and 163 outbreaks (1,951 cases) were reported.
  - 61% of case-patients associated with clusters or outbreaks were in children 1-9 years of age.
  - 84% of case-patients associated with clusters or outbreaks were under-vaccinated (unvaccinated and 1-dose vaccine recipients).

* From August 2015 – January 2018, based on varicella outbreak report submissions. Remaining jurisdiction did not submit data because there were no outbreak-related cases reported.
Acute Flaccid Myelitis Surveillance Activities and Achievements

- A standard operating procedure for AFM case classification at CDC has been developed.
- A streamlined patient summary form has been created for jurisdictions to use when submitting suspect case information to CDC.
- From August 1, 2015 - February 15, 2018, CDC received 350 reports of suspect AFM cases.

![AFM Case Classification Status Chart]

- 310 classified
- 40 awaiting classification/unable to classify
- 187 classified as confirmed
- 39 classified as probable
- 84 ruled out as not a case
Acute Flaccid Myelitis Surveillance Activities and Achievements*

- 51 of 52 jurisdictions have reported increasing awareness and/or providing educational materials on AFM.
- 37 of 52 jurisdictions have plans to add or have already added AFM to their list of reportable conditions.
  - 15 have added AFM; 7 have plans to add AFM.
  - 15 have added AFM as implicitly reportable through the “unusual cases” reporting category.
- 25 of 52 jurisdictions have added AFM to their electronic disease surveillance system to assist with surveillance.
- 18 of 52 jurisdictions are exploring use of syndromic surveillance to enhance AFM surveillance.

*From August 2015 – April 2018, based on awardee activity summaries, annual ELC application responses, and CDC SME progress reports.
**Optional Tier 2 & Special Project Activities and Achievements**

**H. influenzae – Tier 2 Activity***

- 15 jurisdictions have submitted data reports and/or isolates to CDC as part of the optional enhanced *H. influenzae* surveillance activities.
- Data on 899 cases were submitted, with following completeness achieved:
  - For 565 non-typeable *H. influenzae* cases, **88% completeness** for the variable: Did another case of non-typeable *H. influenzae* occur (in the same county) within 60 days of this case?
  - For 207 non-b serotype cases, **82% completeness** for the variable: Did another case of the same non-b serotype occur (in the same county) within 60 days of this case?
  - For 321 cases indicating ‘yes’ for whether another non-typeable or same non-serotype case occurred (in the same county) within 60 days, **79% completeness** for the variable: Was the case epi-linked?

*For 2016, as of November 2017 submissions. *H. influenzae* data and isolates are due annually following the end of the project year (e.g. the 2017 data/isolates will be due from jurisdictions in August/September 2018).*
Optional Tier 2 & Special Project Activities and Achievements

Pertussis – Tier 2 Activity*
- 6 jurisdictions have submitted data reports and 53 isolates to CDC as part of the optional enhanced pertussis surveillance activities.

Varicella – Tier 2 Activity**
- 16 jurisdictions have submitted data reports on varicella hospitalizations in 2017 as part of the optional enhanced varicella surveillance activities. These data allow for comparison of varicella hospitalizations between vaccinated and unvaccinated case-patients.

Mumps Outbreak Data – Tier 2 Activity/Special Project**
- 22 jurisdictions have submitted mumps case-based outbreak reports as part of the enhanced mumps activities. Reports include extended epidemiologic data (e.g. symptoms, outbreak details, testing information, vaccination history) that would otherwise not have been transmitted to CDC.

*For 2016, as of November 2017 submissions. Pertussis data and isolates are due annually following the end of the project year (e.g. 2017 data/isolates will be due from jurisdictions in October 2018).

**As of April 2018 submissions.
Optional Tier 2 & Special Project Activities and Achievements

MMR Vaccination Coverage – Special Project
- 2 jurisdictions are examining vaccination records for students with documented exemption to school-entry immunization requirements in order to assess true MMR vaccination status.

Varicella Second Dose Coverage – Special Project
- 4 jurisdictions are obtaining second dose coverage among 4 - 6 year old children from 2014 – 2017 using immunization registry data in order to determine the coverage needed to prevent varicella outbreaks.

Investigation of Rash Illness Suspected as Varicella – Special Project
- 1 jurisdiction is participating in a project to gain better understanding of varicella disease trends and is working with laboratories and physicians to promote testing and specimen submission to the state laboratory.
Conclusions

- In three years, the ELC R1 CoAg has been able to provide infrastructure to enhance VPD surveillance in 52 jurisdictions.
- Bi-directional communication between CDC and jurisdictions has improved due to the designation of a VPD Surveillance Coordinator in each jurisdiction.
- Data quality and completeness for several VPDs has improved since the implementation of the ELC R1 CoAg.
- Infrastructure provided through the ELC R1 CoAg supports jurisdiction public health officials’ relationships with providers (e.g., AFM education, case finding).
Thank you!

VPDsurvELC@cdc.gov

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov  Web: www.cdc.gov
National Center for Immunization and Respiratory Diseases (NCIRD) Support for Standardization and Harmonization of NNDSS Surveillance Data: 2014–2018

Hannah Fast, BS
National Immunization Conference
May 17, 2018
NMI Message Mapping Guides (MMGs) Development for NCIRD Conditions

• Disease-specific MMGs are needed for 15 of the 19 nationally notifiable conditions (NNCs) for which NCIRD has primary responsibility
  • 3 are in pilot testing: mumps, pertussis, varicella
  • 8 have development underway: measles, rubella, Congenital Rubella Syndrome, invasive *S. pneumoniae*, *H. influenzae*, *N. meningitidis*, legionellosis*, psittacosis*,
  • 4 are in the requirements gathering phase: diphtheria, tetanus, pediatric influenza deaths, novel influenza A

• The remaining 4 NNCs use only the Generic V2 MMG:
  • Polio (paralytic), polio virus infection (nonparalytic), SARS, and STSS

* These 5 conditions are included in the Respiratory and Invasive Bacterial Disease (RIBD) MMG
MMG Development Overview

• Current and historical data sources are used to inform MMG development and harmonization process (e.g., variables, values), including:
  • Worksheets
  • Older MMGs (HL7)
  • National Electronic Telecommunications System (NETSS)
  • NEDSS Base System (NBS)
  • Electronic laboratory reporting (ELR)
  • Immunization Information Systems (IIS)

• MMG content requirements are documented by NCIRD as “pre-work” and delivered to CSELS to begin technical development
METHODS
NCIRD Harmonization Process Overview

• NCIRD harmonization process includes:
  • Identifying overlapping and similar concepts across conditions and data sources
  • Proposing structural, wording, or value changes to historical questions/variables, with outcomes including:
    o Changes in wording or structure
    o Introduction of repeating groups and formatting adjustments
    o Removal or addition of variables/values
    o Retention of variables/values in a unique format (no change)
  • Documenting decisions made by subject matter experts (SMEs) for each current and proposed variable

• For variables on MMG to be considered harmonized:
  • “Data Element Name” must be the same (technical instructions*, 4/12/16)
  • NCIRD preference is for both “Data Element Name” and “Data Element Identifier” to be the same across MMGs; defer to technical guidance

* Technical leads - CSELS, DHIS; Programmatic leads - NCIRD Surveillance Office, disease programs
Example of Harmonized Outcome

• Historical data elements for vaccination were specific to each disease, e.g.,
  • MUM122 “Received mumps vaccine”
  • MEA039 “Did the patient receive a measles-containing vaccine?”
  • PRT044 “Did the patient receive a pertussis-containing vaccine?”
  • VAR101 “Did the patient receive a varicella-containing vaccine?”

• After harmonization, one data element and description are being used for all of the NCIRD VPD disease-specific guides
  • VAC126 “Did the subject ever receive a vaccine against this disease?”

<table>
<thead>
<tr>
<th>Data Element (DE) Name</th>
<th>DE Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the Subject Ever Receive a Vaccine Against This Disease</td>
<td>VAC126</td>
</tr>
</tbody>
</table>
Harmonization Process: Comparison & Alignment

1. Input data sources
2. Suggest harmonization, determine inclusion
3. Create “pre-work” & quantify outcomes

<table>
<thead>
<tr>
<th>MMG Sections</th>
<th>Data Source 1</th>
<th>Data Source 2</th>
<th>Harmonization Opportunities</th>
<th>SME Questions and Feedback</th>
<th>MMG Inclusion? Y/N</th>
<th>Proposed Data Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Variables</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject Related Variables</td>
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<tr>
<td>Epidemiologic Questions</td>
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<tr>
<td>Laboratory Section</td>
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<tr>
<td>VPD Lab Variables</td>
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<tr>
<td>Epi Lab Repeating Group</td>
<td></td>
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<tr>
<td>CSELS Lab Template</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historical Variables to be Excluded</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

NCIRD Surveillance Office and Program SME feedback and decisions entered in these columns

This column becomes requirements gathering “pre-work” which is sent on to CSELS for technical development
Calculation of Harmonization Results

- Harmonization results were calculated at the end of the requirements gathering phase for each condition (e.g., between 2014–2017)
- Results are calculated in terms of total percent harmonized:
  \[
  \frac{\# \text{Variables Harmonized}}{\text{Total Variables Included in } "\text{Prework}"}
  \]
- Results are also calculated by MMG section
- Note: NCIRD’s participation in harmonization and alignment continues at a high level of effort throughout MMG development
RESULTS
NCIRD Harmonization Results for Disease-Specific MMGs: Overall

• 11 conditions with completed “pre-work” for MMG development:
  • Mumps, pertussis, varicella, measles, rubella, Congenital Rubella Syndrome, invasive \textit{S. pneumoniae}, \textit{H. influenzae}, \textit{N. meningitidis}, legionellosis, psittacosis

• Results do not include Generic V2 MMG (Gen V2) components

• Overall, harmonization across all sections of the 11 guides is on average 77%, with a range of 40%–95% per guide
NCIRD Harmonization Results for Disease-Specific MMGs: MMG Sections

Average harmonization by select MMG sections:

• **Vaccine-related** sections across the 9 VPDs* are on average **97% harmonized**
  • Range of 84% (Congenital Rubella Syndrome) to 100% (7 conditions)

• **Laboratory-related** sections** across the 11 conditions are on average **93% harmonized**
  • Range of 85% (measles, psittacosis) to 100% (rubella, *H. influenzae*, legionellosis)

• **Epidemiologic-related** sections across the 11 conditions are on average **64% harmonized**
  • Range of 19% (legionellosis) to 100% (measles, invasive *S. pneumoniae*)

• **Clinical-related** sections across 10 conditions*** are on average **69% harmonized**
  • Range of 13% (Congenital Rubella Syndrome) to 100% (invasive *S. pneumoniae*, *H. influenzae*, *N. meningitidis*)

* Legionellosis and psittacosis do not include vaccination variables
** The 5 conditions included in the RIBD guide do not include CSELS lab template in the laboratory section calculations
*** Legionellosis does not include clinical variables
# Harmonization Results for Disease Specific MMGs by Condition*

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>TOTAL**</th>
<th>VACCINE</th>
<th>LAB</th>
<th>EPI</th>
<th>CLINICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Harmonized</td>
<td>% Harmonized</td>
<td>% Harmonized</td>
<td>% Harmonized</td>
<td>% Harmonized</td>
</tr>
<tr>
<td>Mumps</td>
<td>83</td>
<td>100</td>
<td>92</td>
<td>92</td>
<td>29</td>
</tr>
<tr>
<td>Pertussis</td>
<td>68</td>
<td>100</td>
<td>92</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Varicella</td>
<td>75</td>
<td>100</td>
<td>89</td>
<td>67</td>
<td>41</td>
</tr>
<tr>
<td>Measles</td>
<td>87</td>
<td>88</td>
<td>85</td>
<td>100</td>
<td>81</td>
</tr>
<tr>
<td>Rubella</td>
<td>88</td>
<td>100</td>
<td>100</td>
<td>68</td>
<td>80</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>58</td>
<td>84</td>
<td>96</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td><em>H. influenzae</em></td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>87</td>
<td>100</td>
</tr>
<tr>
<td><em>N. meningitidis</em></td>
<td>89</td>
<td>100</td>
<td>93</td>
<td>79</td>
<td>100</td>
</tr>
<tr>
<td>Invasive <em>S. pneumoniae</em></td>
<td>95</td>
<td>100</td>
<td>88</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Legionellosis</td>
<td>40</td>
<td>N/A</td>
<td>100</td>
<td>19</td>
<td>N/A</td>
</tr>
<tr>
<td>Psittacosis</td>
<td>65</td>
<td>N/A</td>
<td>85</td>
<td>36</td>
<td>80</td>
</tr>
<tr>
<td><strong>AVERAGE</strong></td>
<td>77%</td>
<td>97%</td>
<td>93%</td>
<td>64%</td>
<td>69%</td>
</tr>
<tr>
<td><strong>RANGE</strong></td>
<td>40%‒95%</td>
<td>84%‒100%</td>
<td>85%‒100%</td>
<td>19%‒100%</td>
<td>13%‒100%</td>
</tr>
</tbody>
</table>

* Data do not include Gen V2 variables.
** "Total" column also contains variables which do not fit within the four categories on this slide (e.g., system variables)
NCIRD Harmonization Key Findings

• Harmonization is possible across clinically and epidemiologically distinct conditions, particularly for laboratory and vaccine variables
• Harmonization efforts require support by Center surveillance infrastructure, Program SMEs, and NMI partners
• NCIRD methods are extensible across program areas but may be challenged by lack of variable repositories as scope broadens
• Harmonization efforts still necessary to maintain even after submitting content requirements due to MMG updates and changes
Thank you!