Acute Flaccid Myelitis (AFM) – Surveillance updates and CDC activities, 2018
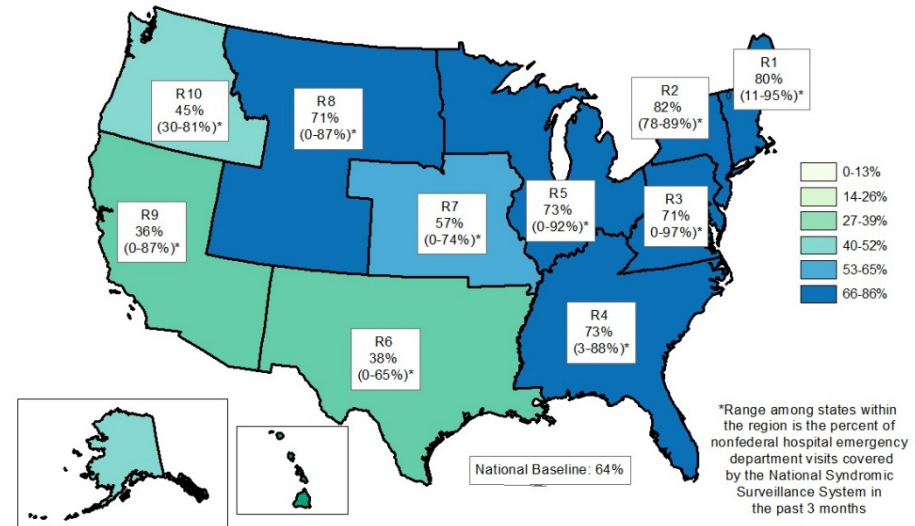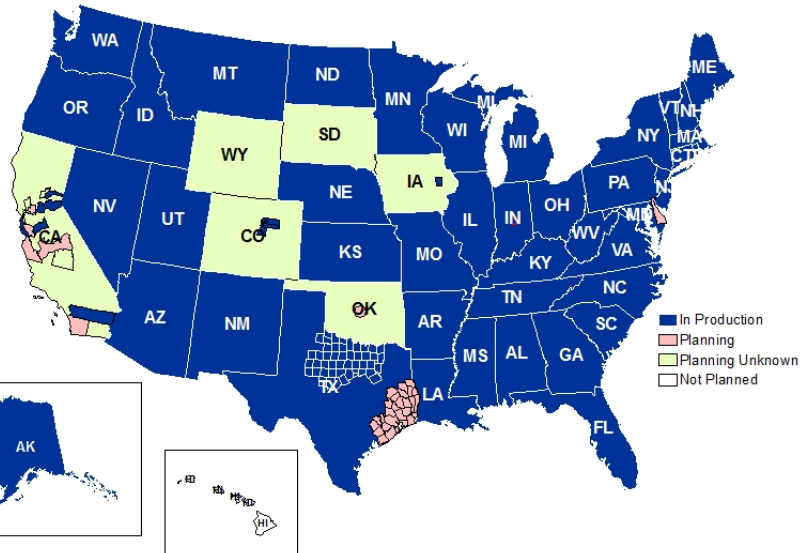
Zach Stein, MPH (ICF Contractor Supporting CSELS Division of Health Informatics & Surveillance)
December 20, 2018
ISDS Webinar

NSSP Participation: October 2018

Percent of non-Federal Emergency Deptment visits covered by the National Syndromic Surveillance Program in the 50 States and Washington DC By Department of Health and Human Services Region (R) October 2018

Map legend (left map): In Production, Planning, Planning Unknown, Not Planned

Region data (right map):
- R1 80% (11-95%)*
- R2 82% (78-89%)*
- R3 71% (0-97%)*
- R4 73% (3-88%)*
- R5 73% (0-92%)*
- R6 38% (0-65%)*
- R7 57% (0-74%)*
- R8 71% (0-87%)*
- R9 36% (0-87%)*
- R10 45% (30-81%)*

Legend:
- 0-13%
- 14-26%
- 27-39%
- 40-52%
- 53-65%
- 66-86%

*Range among states within the region is the percent of nonfederal hospital emergency department visits covered by the National Syndromic Surveillance System in the past 3 months

National Baseline: 64%

Although NSSP is pleased with participation to date, sites with data in production do not always translate into sites with strong data representativeness or broad coverage. NSSP continues to work closely with sites to improve data representativeness.

2

AFM Syndromic Query Methods

- Available fields for consistency across States and jurisdictions

  - Chief Complaint Processed

  - Chief Complaint Raw/Updates

  - Discharge Diagnosis

    - ICD10 CM

    - 5% SNOMED CT

  - All this is incorporated into a query through a series of AND, OR, and ANDNOT statements

  - Most often, terms are shortened and bookended with carats.

    - This allows the term ^weak^ to capture Weakness, Weak, Weakening, Tweak, Etc.

Sample CC and DD Data
FALLFROM 7 8 FEET | ;T14.8XXA;R07.89;
FALL | ;S01.511A;S02.2XXA;W19.XXXA;Y92.129;E11.9;K21.9;J44.9;F41.9;E78.5;Z79.84;Z79.899;Z79.4;
ALCOHOL FALL | ;S09.90XA;S09.90XA;

AFM Syndromic Query Methods

- Borrowing from methods and practices already available
  - AFM ICD10 definition from the Kansas Department of Health and Environment (Sourced from NCIRD guidance) https://www.surveillancerepository.org/acute-flaccid-myelitis-diagnosis-codes-kansas-department-health-and-environment
  - Free text queries from Colorado, Washington, and NSSP test language
    - Colorado focused on EVA71/HFM possibilities and AFM mentions
    - Washington/NSSP focused on limb weakness and AFM mentions

AFM Syndromic Query Methods

- After reviewing available materials, we have these rough clusters of terms and diagnosis codes related to:

  - Direct mentions of AFM

  - Acute Myelitis

  - Unspecified Motor Neuron Disease

  - Paralysis

  - General Weakness

  - Specific Limb-Weakness

  - Infectious Agents

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AFM Syndromic Query Pieces - Chief Complaint

- Mentions of AFM or Myelitis (and not osteomyelitis)
- Muscle, Extremity Weakness, and Plegia
  - AND NOT common known causes, stroke, AMI, seizures, etc.
- General Weakness
  - The term "Weak" and no negation terms
- Infectious Agent Mentions

AFM Syndromic Query Pieces – Discharge Diagnosis

- AFM-Related ICD10 CM

  - Infectious Agents: A80.9

  - Acute Myelitis: G04.02, G04.89, G05.4

  - Unspecified Motor Neuron Disease: G12.20, G12.29, G12.8, G12.9

  - Paralysis (Paraplegia): G82.20, G82.21, G82.22, G83.0, G83.82, G83.9

- SNOMED CT

  - The above codes were fed through the SNOMED International Mapping tool and reviewed: https://mapping.ihtsdotools.org/#/project/records

- Other General Weakness

  - R53.1, R29.810, M62.81

Narrow AFM Syndromic Query

- Components
  - (Chief Complaint Terms)(Negations) OR (Discharge Diagnoses)
  - Chief Complaint terms roughly map to
    - (AFM and Myelitis)(Negations) OR (Muscle and Limb Weakness)(Negations)
  - Discharge Diagnoses roughly map to
    - (AFM-Related ICD10 CM) OR (Optional SNOMED CT)

Narrow AFM Syndromic Query

^Acute_Flac^,or,^acuteflac^,or,^AFM^,andnot,^Afmit^,Or,^A_F_M^,ANDNOT,(,^A_F[a-z]M^,or,^A[a-z]F_M^,or,^A_F_MVC^,or,^A_F_MVA^,or,^A_F_Motor^,),Or,(,^M[ye][ye]li^,or,^Mialitis^,),ANDNOT,(,^Osteom[ye][ye]^,or,^dem[ye][ye]lin^,),or,(,(,^Muscle^,and,^Weak^,),or,^Leg weak^,or,^arm weak^,or,^extremity weak^,or,^ext weak^,or,^limb weak^,or,^weakness in limb^,or,^weakness in leg^,or,^ weakness in arm^,or,^weakness in ext^,or,^weak leg^,or,^weak arm^,or,^weak extrem^,or,^weak ext^,or,^weak limb^,or,^plegia^,or,(,^[;./]RLE[;./]^,or,^[;./]LLE[;./]^,or,^[;./]RUE[;./]^,or,^[;./]LUE[;./]^,or,RLE[;./]^,or,LLE[;./]^,or,RUE[;./]^,or,LUE[;./]^,or,^[;./]RLE,or,^[;./]LLE,or,^[;./]RUE,or,^[;./]LUE,),AND,(,^weak^,),),ANDNOT,(,^Denies^,or,^Stroke^,or,^Ischem^,or,^heart attack^,or,^AMI^,or,^Infarct^,or,^abf^,or,^blood flow^,or,^angina^,or,^Sepsis^,or,^Ulcer^,or,^Cellulitis^,or,^Bleed^,or,^Back pain^,or,^Back spasm^,or,^Sciatic^,or,^paresthes^,or,^Testical pain^,or,^CVA^,or,^Cerebrovascular accident^,or,^Seizure^,or,^Reaction^,or,^Disc^,or,^Confusion^,or,^Stenosis^,or,^Necrotic^,or,^Urinary tract^,or,^UTI^,or,^Physical Therapy^,or,^Vasc^,or,^Numb^,or,^Syncope^,or,^Neoplasm^,or,^Tumor^,or,^clot^,or,^spastic^,),or,(,^A809^,or,^G0402^,or,^G0489^,or,^G0491^,or,^G054^,or,^G1220^,or,^G1229^,or,^G128^,or,^G128^,or,^G8220^,or,^G8221^,or,^G8222^,or,^G830^,or,^G8382^,or,^G839^,or,^A80.9^,or,^G04.02^,or,^G04.89^,or,^G04.91^,or,^G05.4^,or,^G12.20^,or,^G12.29^,or,^G12.8^,or,^G12.8^,or,^G82.20^,or,^G82.21^,or,^G82.22^,or,^G83.0^,or,^G83.82^,or,^G83.9^,),or,^398102009^,or,^398256009^,or,^398327006^,or,^446312004^,or,^429436007^,or,^426266003^,or,^721245001^,or,^74772000^,or,^267576008^,or,^29197009^,or,^33346005^,or,^39367000^,or,^41370002^,or,^421315006^,or,^713341001^,or,^71981002^,or,^8528005^,or,^37340000^,or,^711483003^,or,^717964007^,or,^81211007^,or,^84590007^,or,^715565004^,or,^85672005^,or,^88923002^,or,^95647008^,or,^230249003^,or,^230250003^,or,^230253001^,or,^723612001^,or,^163604003^,or,^163677009^,or,^163678004^,or,^1845001^,or,^23042008^,or,^290401000119108^,or,^290411000119106^,or,^60389000^,or,^609553000^,or,^698291007^,or,^271702003^,or,^698292000^,or,^723158004^,or,^84455002^,or,^95651005^,or,^97391000119102^,or,^163606001^,or,^54099005^,or,^6481005^,or,^723156000^,or,^129614001^,or,^48163001^,or,^50314001^,or,^702463005^,or,^702464004^,or,^702465003^,or,^78119002^,or,^78357006^,or,^88715005^,or,^9753004^,or,^127378008^,or,^162241004^,or,^163598001^,or,^23728006^,or,^25045008^,or,^29188005^,or,^29426003^,or,^39157001^,or,^409624004^,or,^425491009^,or,^44695005^,or,^698293005^,or,^50314001^,or,^702463005^,or,^702464004^,or,^702465003^,or,^78119002^,or,^78357006^,or,^88715005^,or,^9753004^

Narrow AFM Syndromic Query

- (Chief Complaint Terms)(Negations) OR (Discharge Diagnoses)
  - Chief Complaint terms roughly map to
    - (AFM and Myelitis)(Negations) OR (Muscle and Limb Weakness)(Negations)

^Acute_Flac^,or,^acuteflac^,or,^AFM^,andnot,^Afmit^,Or,^A_F_M^,ANDNOT,(,^A_F[a-z]M^,or,^A[a-z]F_M^,or,^A_F_MVC^,or,^A_F_MVA^,or,^A_F_Motor^,),Or,(,^M[ye][ye]li^,or,^Mialitis^,),ANDNOT,(,^Osteom[ye][ye]^,or,^dem[ye][ye]lin^,),or,(,(,^Muscle^,and,^Weak^,),or,^Leg weak^,or,^arm weak^,or,^extremity weak^,or,^ext weak^,or,^limb weak^,or,^weakness in limb^,or,^weakness in leg^,or,^ weakness in arm^,or,^weakness in ext^,or,^weak leg^,or,^weak arm^,or,^weak extrem^,or,^weak ext^,or,^weak limb^,or,^plegia^,or,(,^[;./]RLE[;./]^,or,^[;./]LLE[;./]^,or,^[;./]RUE[;./]^,or,^[;./]LUE[;./]^,or,RLE[;./]^,or,LLE[;./]^,or,RUE[;./]^,or,LUE[;./]^,or,^[;./]RLE,or,^[;./]LLE,or,^[;./]RUE,or,^[;./]LUE,),AND,(,^weak^,),),ANDNOT,(,^Denies^,or,^Stroke^,or,^Ischem^,or,^heart attack^,or,^AMI^,or,^Infarct^,or,^abf^,or,^blood flow^,or,^angina^,or,^Sepsis^,or,^Ulcer^,or,^Cellulitis^,or,^Bleed^,or,^Back pain^,or,^Back spasm^,or,^Sciatic^,or,^paresthes^,or,^Testical pain^,or,^CVA^,or,^Cerebrovascular accident^,or,^Seizure^,or,^Reaction^,or,^Disc^,or,^Confusion^,or,^Stenosis^,or,^Necrotic^,or,^Urinary tract^,or,^UTI^,or,^Physical Therapy^,or,^Vasc^,or,^Numb^,or,^Syncope^,or,^Neoplasm^,or,^Tumor^,or,^clot^,or,^spastic^,),

Narrow AFM Syndromic Query

- (Chief Complaint Terms)(Negations) OR (Discharge Diagnoses)
  - Discharge Diagnoses roughly map to
    - (AFM-Related ICD10 CM) OR (Optional SNOMED CT)

,(,^A809^,or,^G0402^,or,^G0489^,or,^G0491^,or,^G054^,or,^G1220^,or,^G1229^,or,^G128^,or,^G128^,or,^G8220^,or,^G8221^, or,^G8222^,or,^G830^,or,^G8382^,or,^G839^,or,^A80.9^,or,^G04.02^,or,^G04.89^,or,^G04.91^,or,^G05.4^,or,^G12.20^,or,^G12. 29^,or,^G12.8^,or,^G12.8^,or,^G82.20^,or,^G82.21^,or,^G82.22^,or,^G83.0^,or,^G83.82^,or,^G83.9^,),or,^398102009^,or,^3982 56009^,or,^398327006^,or,^446312004^,or,^429436007^,or,^426266003^,or,^721245001^,or,^74772000^,or,^267576008^,or,^ 29197009^,or,^33346005^,or,^39367000^,or,^41370002^,or,^421315006^,or,^713341001^,or,^71981002^,or,^8528005^,or,^37 340000^,or,^711483003^,or,^717964007^,or,^81211007^,or,^84590007^,or,^715565004^,or,^85672005^,or,^88923002^,or,^95 647008^,or,^230249003^,or,^230250003^,or,^230253001^,or,^723612001^,or,^163604003^,or,^163677009^,or,^163678004^,o r,^1845001^,or,^23042008^,or,^290401000119108^,or,^290411000119106^,or,^60389000^,or,^609553000^,or,^698291007^,or, ^271702003^,or,^698292000^,or,^723158004^,or,^84455002^,or,^95651005^,or,^97391000119102^,or,^163606001^,or,^54099 005^,or,^6481005^,or,^723156000^,or,^129614001^,or,^48163001^,or,^50314001^,or,^702463005^,or,^702464004^,or,^70246 5003^,or,^78119002^,or,^78357006^,or,^88715005^,or,^9753004^,or,^127378008^,or,^162241004^,or,^163598001^,or,^23728 006^,or,^25045008^,or,^29188005^,or,^29426003^,or,^39157001^,or,^409624004^,or,^425491009^,or,^44695005^,or,^698293 005^,or,^50314001^,or,^702463005^,or,^702464004

Broad AFM Syndromic Query

- Components
  - (Chief Complaint Terms) OR (Discharge Diagnoses)
  - Chief Complaint terms roughly map to
    - (AFM and Myelitis) OR (Weakness) OR (Infectious Agents)
  - Discharge Diagnoses roughly map to
    - (AFM-Related ICD10 CM) OR (Optional SNOMED CT) OR (Weakness ICD10)

Broad AFM Syndromic Query

- ^Acute_Flac^,or,^acuteflac^,or,^AFM^,andnot,^Afmit^,Or,^A_F_M^,ANDNOT,(,^A_F[a-z]M^,or,^A[a-z]F_M^,or,^A_F_MVC^,or,^A_F_MVA^,or,^A_F_Motor^,),Or,(,^M[ye][ye]li^,or,^Mialitis^,),or,^weak^,or,(,^Aden^virus^,or,^WNV^,or,^W_N_V^,ANDNOT,(,^w n/v^,or,^w/n/v^,or,^w_n[a-z]v^,or,^w[a-z]n_v^,),or,^West^Nile^,or,^Polio^,or,^Enter^virus^,or,^EV68^,or,^EV_68^,or,^Picorna^,or,^EV_71^,or,^EVA_71^,or,^EVA71^,or,^EVA_71^,or,^coxsack^,),ANDNOT,(,^Vacc^,or,^Shot^,),or,(,^[;/]A809^,or,^[;/]G0402^,or,^[;/]G0489^,or,^[;/]G0491^,or,^[;/]G054^,or,^[;/]G1220^,or,^[;/]G1229^,or,^[;/]G128^,or,^[;/]G128^,or,^[;/]G8220^,or,^[;/]G8221^,or,^[;/]G8222^,or,^[;/]G830^,or,^[;/]G8382^,or,^[;/]G839^,or,^[;/]A80.9^,or,^[;/]G04.02^,or,^[;/]G04.89^,or,^[;/]G04.91^,or,^[;/]G05.4^,or,^[;/]G12.20^,or,^[;/]G12.29^,or,^[;/]G12.8^,or,^[;/]G12.8^,or,^[;/]G82.20^,or,^[;/]G82.21^,or,^[;/]G82.22^,or,^[;/]G83.0^,or,^[;/]G83.82^,or,^[;/]G83.9^,),or,^398102009^,or,^398256009^,or,^398327006^,or,^446312004^,or,^429436007^,or,^426266003^,or,^721245001^,or,^74772000^,or,^267576008^,or,^29197009^,or,^33346005^,or,^39367000^,or,^41370002^,or,^421315006^,or,^713341001^,or,^71981002^,or,^8528005^,or,^37340000^,or,^711483003^,or,^717964007^,or,^81211007^,or,^84590007^,or,^715565004^,or,^85672005^,or,^88923002^,or,^95647008^,or,^230249003^,or,^230250003^,or,^230253001^,or,^723612001^,or,^163604003^,or,^163677009^,or,^163678004^,or,^1845001^,or,^23042008^,or,^290401000119108^,or,^290411000119106^,or,^60389000^,or,^609553000^,or,^698291007^,or,^271702003^,or,^698292000^,or,^723158004^,or,^84455002^,or,^95651005^,or,^973910000119102^,or,^163606001^,or,^54099005^,or,^6481005^,or,^723156000^,or,^129614001^,or,^48163001^,or,^50314001^,or,^702463005^,or,^702464004^,or,^702465003^,or,^78119002^,or,^78357006^,or,^88715005^,or,^9753004^,or,^127378008^,or,^162241004^,or,^163598001^,or,^23728006^,or,^25045008^,or,^29188005^,or,^29426003^,or,^39157001^,or,^409624004^,or,^425491009^,or,^44695005^,or,^698293005^,or,^50314001^,or,^702463005^,or,^702464004^,or,^702465003^,or,^78119002^,or,^78357006^,or,^88715005^,or,^9753004^,or,^R53.1^,or,^R29.810^,or,^M62.81^,or,^R531^,or,^R29810^,or,^M6281^

Broad AFM Syndromic Query

- (Chief Complaint Terms) OR (Discharge Diagnoses)
  - Chief Complaint terms roughly map to
    - (AFM and Myelitis) OR (Weakness) OR (Infectious Agents)

^Acute_Flac^,or,^acuteflac^,or,^AFM^,andnot,^Afmit^,Or,^A_F_M^,ANDNOT,(,^A_F[a-z]M^,or,^A[a-z]F_M^,or,^A_F_MVC^,or,^A_F_MVA^,or,^A_F_Motor^,),Or,(,^M[ye][ye]li^,or,^Mialitis^,),or,^weak^,or,(,^Aden^virus^,or,^WNV^,or,^W_N_V^,ANDNOT,(,^w n/v^,or,^w/n/v^,or,^w_n[a-z]v^,or,^w[a-z]n_v^,),or,^West^Nile^,or,^Polio^,or,^Enter^virus^,or,^EV68^,or,^EV_68^,or,^Picorna^,or,^EV_71^,or,^EVA_71^,or,^EVA71^,or,^EVA_71^,or,^coxsack^,),ANDNOT,(,^Vacc^,or,^Shot^,),or,

  - Discharge Diagnoses roughly map to
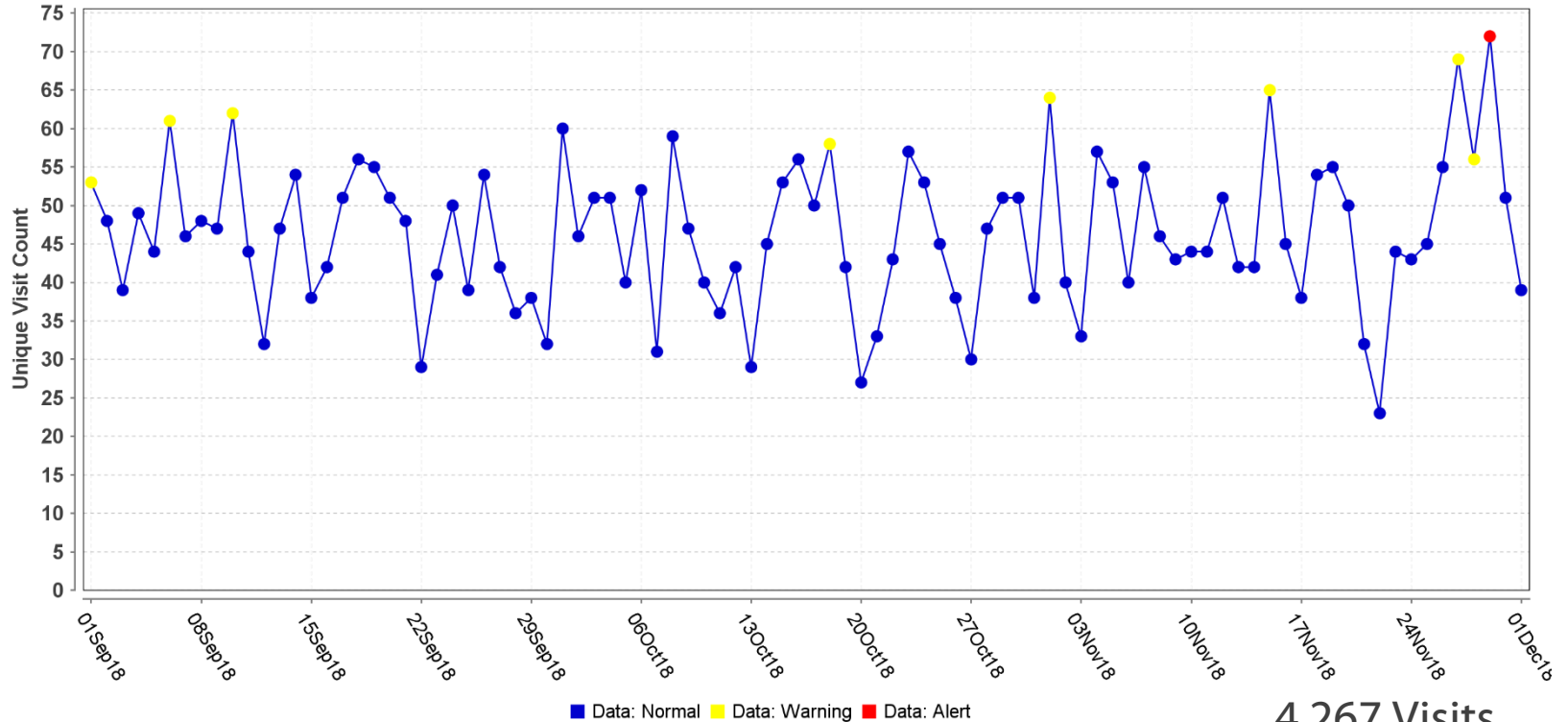   - (AFM-Related ICD10 CM) OR (Optional SNOMED CT) OR (Weakness ICD10)

(Same as Narrow) OR (Same as Narrow), OR,^R53.1^,or,^R29.810^,or,^M62.81^,or,^R531^,or,^R29810^,or,^M6281^

The key to all this? Restricting data by patient age

- Both queries return a lot of false positive visits when run "wide-open"

- Muscle weakness, it's etiologies, and the possible causative comorbid conditions are very common in older populations

- We have a unique instance here where the age restriction fits the disease of interest, limits the returns to a number feasible to investigate, and also limits the false positives significantly

- Multiple age cutoffs were tried. NCIRD guidance suggests 18 years as the best cutoff. CCDD Category was left unrestricted so users can choose their own.
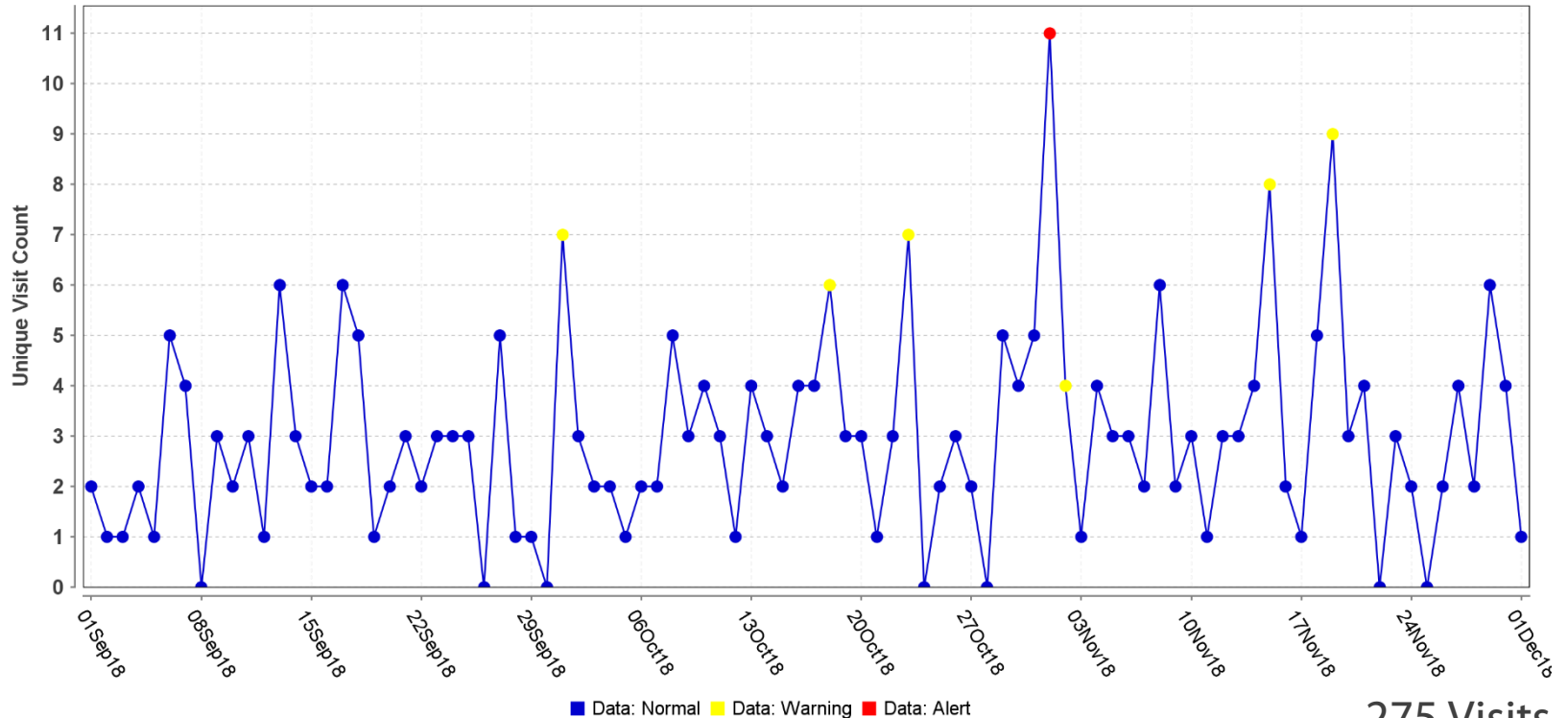
Query Results –
HHS Region 4, 0-18 years old, Sept-Nov, Broad AFM Query
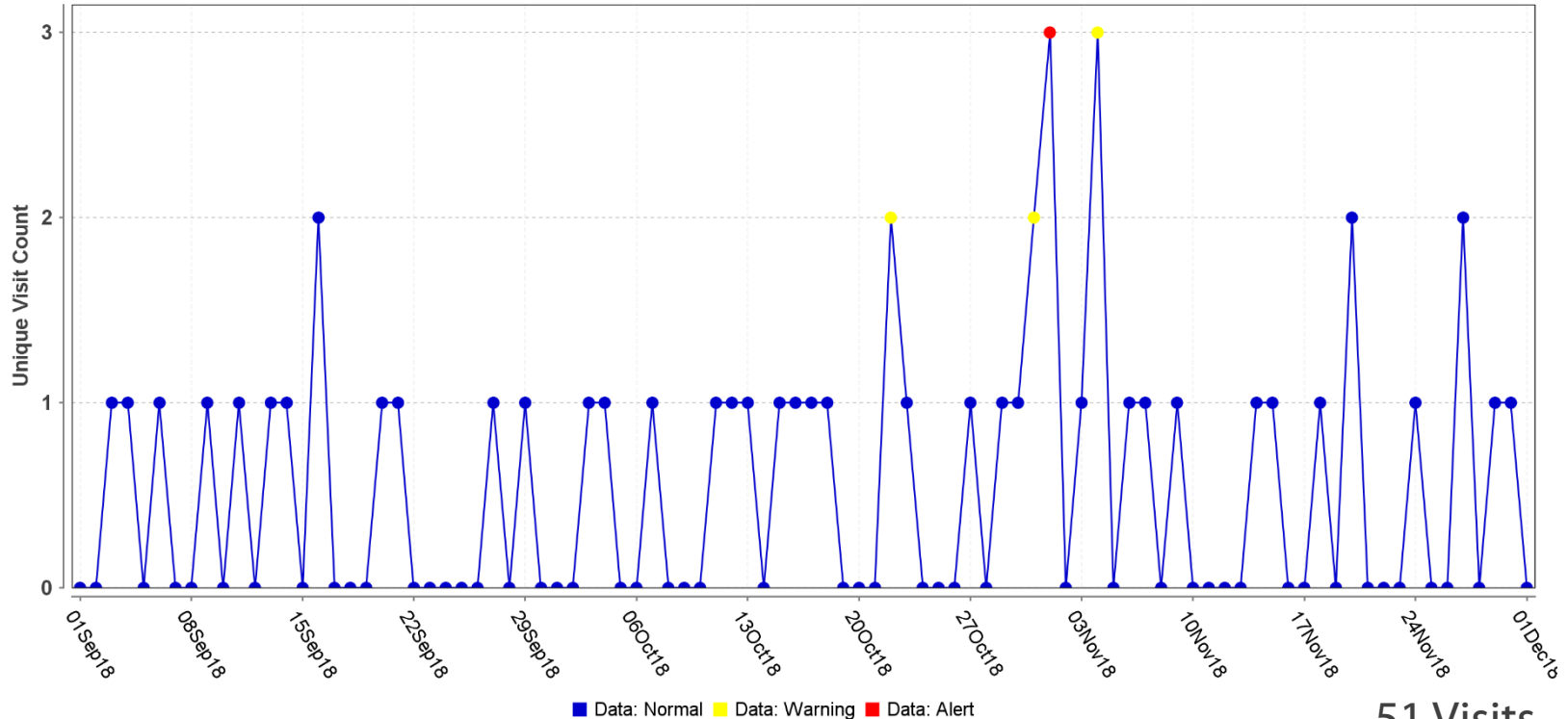

4,267 Visits

16

Query Results –

HHS Region 4, 0-18 years old, Sept-Nov, Narrow AFM Query

275 Visits

Query Results –

Georgia Residents, 0-18 years old, Sept-Nov, Narrow AFM Query

51 Visits

Summary

- AFM syndromic query methods based on methods and practices previously available

- AFM Syndromic Query Pieces
  - Chief Complaint
  - Discharge Diagnosis

- Narrow and Broad AFM Syndromic Query now available

- Questions

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348   www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.