

Exploratory Analysis Subgroup of the Arizona BioSense Workgroup

January 25, 2018



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

Objectives

- Welcome and Attendance
- Onboarding Updates
- ADHS Weekly Flu Activity Reports
 - New Addition: Hospital Influenza-Like Illness (ILI) Surveillance
- NSSP Update
 - Arboviral Syndromic Surveillance Success Story
- Community of Practice Updates
 - January [NSSP CoP](#) Call
 - ISDS Conference 2018 in Orlando, FL
 - 01/30/2018-02/2/2018
- Demo:
 - How do I drill down in ESSENCE to look for:
 - Only ED Visits
 - Only Inpatient Visits
- Questions and Open Discussion
- Next Meetings



Onboarding Updates

- Banner UMC Tucson Facilities
 - Banner University Medical Center-South Campus
 - Banner University Medical Center-Tucson Campus
- Transitioning from EHR System on 10/1/2017
 - ADHS is in the **process of revalidating** the data
 - Impacts both Syndromic Surveillance and ELR

January NSSP Update

[Download the January issue as a PDF](#) 

January 2018

OVERALL NSSP UPDATES

Welcome to NSSP Update

NSSP Update is published monthly by the National Syndromic Surveillance Program (NSSP) and brings you the latest news about the BioSense Platform.

To learn more, visit the [NSSP website](#). Link to more resources via the Syndromic Surveillance Community of Practice [Portal](#). 

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Message from the Program Manager, NSSP

I'd like to highlight our accomplishments in 2017 and then lay out a realistic vision for NSSP in 2018.

In 2017:

- We expanded NSSP participation to 56 sites nationwide. Most states are now represented, in full or part, improving our national picture and readiness *as events occur*.
- Our NSSP Team developed online trainings for ESSENCE users and led three training sessions for CDC program staff. This training helps experts across CDC to understand what NSSP has to offer. Not surprisingly, use of ESSENCE has increased (more than 1,100 active users), and seeds have been planted for new collaborative projects.
- We ramped up our collaboration with CDC's National Center for Injury Prevention and Control in support of CDC's Enhanced State Opioid Overdose Surveillance (ESOOS) program. We worked together to create and finalize heroin and opioid overdose definitions in the BioSense Platform, brokered data access among ESOOS funding recipients, reported monthly on opioid and heroin overdose trends, and collaborated with ESOOS to write a *Vital Signs* publication. This is a *model collaborative project*. It expands the number of CDC personnel who understand and use the BioSense Platform for their surveillance needs; shows that syndromic surveillance (SyS) data are useful for real-time decision making; and shares information—pushing the envelope of one surveillance platform that serves many needs.



IN THIS ISSUE:

- Overall NSSP
- Questions and Tips **New Feature**
- Data Quality Corner **New Feature**
- Spotlight on SyS Practice
- Upcoming Events
- Last Month's Technical Assistance
- NSSP Participation
- Onboarding Updates
- CDC Funding Recipients and Partnerships
- Community of Practice
- Archived *NSSP Update*



Female *Aedes aegypti* mosquito

Lessons Learned

- **Syndromic surveillance can be used to identify cases of arboviral disease.** This case illustrates that arboviral disease records may be identifiable in the syndromic surveillance data *before* laboratories or healthcare providers are required to report.
- **Syndromic surveillance can improve situational awareness of arboviral diseases.** Syndromic surveillance best serves as part of an integrated approach to surveillance. In the absence of other surveillance, such as mosquito surveillance, syndromic data may be useful.

Syndromic Surveillance for Arboviral Diseases in Arizona

Public Health Problem

Arizona reports an average of 116 cases of West Nile virus (WNV) each year, and in 2015, Arizona saw a reemergence of St. Louis encephalitis (SLE) virus. In addition, Arizona is at risk for importation of viruses such as chikungunya, dengue, and Zika due to an abundance of *Aedes aegypti* mosquitoes in many parts of the state. Rapid identification of potential cases of arboviral disease (borne by mosquitoes and ticks) is critical to implementing appropriate public health responses. These include mosquito surveillance and control to eliminate infected mosquitoes and education about mosquito avoidance to prevent further transmission during the viremic period, when people are either symptomatic or asymptomatic and can transmit the virus.

Actions Taken

In 2015, Arizona's BioSense Exploratory Analysis Subgroup, which includes representatives from the Arizona Department of Health Services (ADHS) and seven Arizona counties, collaborated to develop a query and standard procedure for identifying potential arboviral disease cases by using the National Syndromic Surveillance Program's (NSSP) BioSense Platform. In Arizona, syndromic surveillance data contains emergency department and inpatient hospital records, including chief complaint (CC) and discharge diagnosis (DD) fields. The arboviral query identifies keywords and ICD-9-CM and ICD-10-CM diagnosis codes for chikungunya, dengue, SLE, WNV, and Zika in the combined "CC and DD" field. The query results are monitored by ADHS twice a week during the primary WNV season and once a week during the rest of the year, and ADHS staff notifies the county health departments when a record is identified for their jurisdiction. County investigators can use a "Case Investigation Decision Tree."

January NSSP CoP Call

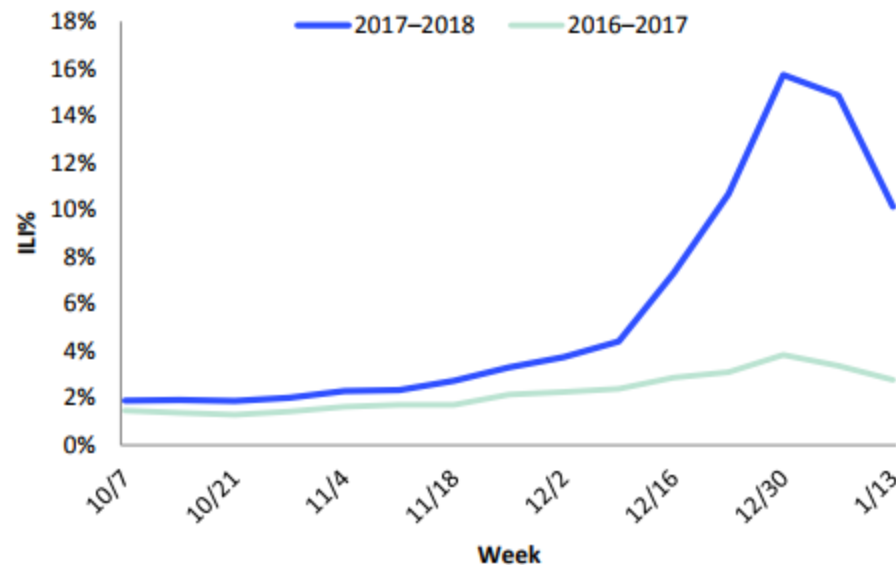
- Syndrome Definition Bulk Upload
- Conference Announcements and Overview
- CoP-related Activities at the Conference
 - Steering Committee Swap Meet Table - Krystal Collier
 - R Group - Eric Bakota
 - Analytic Solutions Committee - Teresa Hamby
 - Data Quality Committee - Jill Baber

Patient Class Query Options in ESSENCE

Hospital Influenza-Like Illness (ILI) Surveillance

Hospital influenza-like illness data are analyzed using tools in the national BioSense Platform. More than 20 hospitals in Arizona share limited data about all emergency department visits and inpatient admissions (hospitalizations) with public health officials via an automated feed. Additionally, data from participating healthcare facilities in other states provide a national comparison. Patients meeting an ILI syndrome have a diagnosis of influenza or fever plus either a cough or a sore throat.

10% of Emergency Room visits are ILI in the past week compared to **3%** for the same week in the **2016-2017** season.



Query Wizard

Datasource: Facility Location (Full Details) ▼ Time Resolution: Weekly ▼ Detector: No Detection ▼ As Percent Query: CC and DD Category ▼ Start Date: 35 ▼ End Date: 4 ▼
2016 ▼ 2018 ▼

Available Query Fields

- Facility Location (Full Details)
 - Geography System
 - Hospital HHS Region
 - Hospital State
 - Hospital Region
 - Hospital
 - Site
 - Patient Location
 - Medical Grouping System
 - ChiefComplaintSubSyndromes
 - Syndrome
 - ChiefComplaints
 - Triage Notes Orig
 - Age Group
 - CDC ILI Reporting Age Group
 - NCHS Age Group
 - Ten Year Age Group
 - Distribute Age Group
 - Age Range
 - Sex
 - Race
 - Ethnicity
 - Patient Class
 - Disposition Category
 - Discharge Diagnosis
 - ICD10 Discharge Diagnosis

Selected Query Fields

- Geography System
 - Hospital State
- Hospital State
 - Arizona
- Medical Grouping System
 - ESSENCESyndromes
- CC and DD Category
 - ILI CCDD v1

Table Builder Time Series Data Details Graph Builder Overview Adv Qry Reset

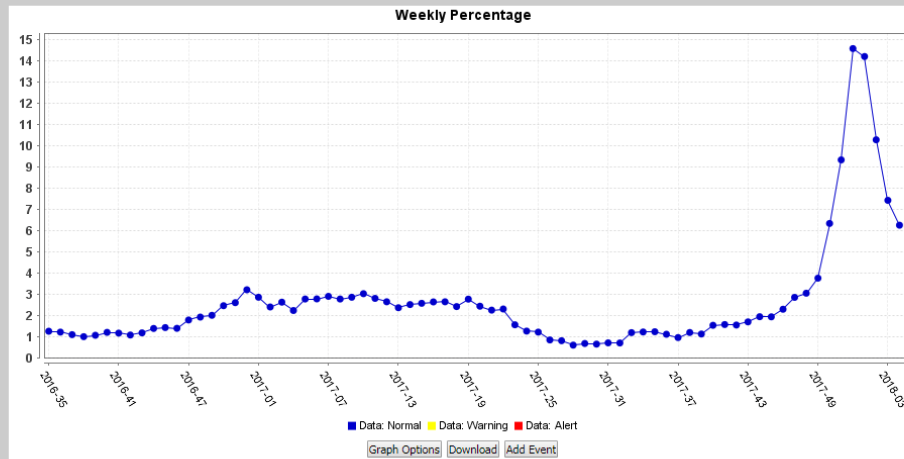


☐ Description
☐ Query Options

Query name: [Save Query](#) [Create myAlert](#) [Save Report Query](#)

[Add to myESSENCE](#) [Share URL](#)

☐ Configuration Options
☐ Data Series Options
☐ Graph

[Add Overlay](#)[\[Data Details | Map View\]](#)Summary Statistics: [Submit](#)

Select options for creating stacked graph:

Site: [Submit](#)

Select detectors to compare: [Submit](#)

[Download to Excel](#)

August NSSP Update

NSSP Refines Calculated Patient Class: Future Updates to Algorithm

Current Definition

The NSSP data flow has a calculated field that stores the “best available” Patient Class found in the incoming message. This field is named *C_Patient_Class*.

To date, we’ve defined the algorithm hierarchy as follows:

- Use the incoming Patient Class (PV1-2) if non-null (using whatever data was reported “as is”)
- Else, infer the Patient Class based on the incoming Facility Type (OBX)
- Else, infer the Patient Class based on the Facility Type registered in the Master Facility Table (MFT)

Note. Inference from Facility Type maps Patient Class code based on a [standard facility type value](#).

Operational Quality Assurance Findings

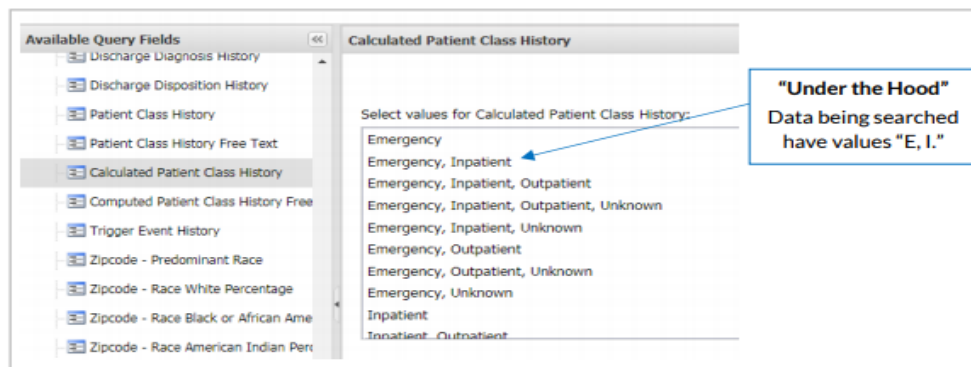
As we checked operational quality assurance (QA) against the new NSSP data flow, we discovered that some incoming Patient Class data did not conform with the [Patient Class Standard](#). These incoming data contained nonconforming values that were *descriptions* of Patient Class, not *preferred standard codes*. For example, “Emergency” or “EMERGENCY” was sent instead of “E.” Many sites have worked with facilities to adjust their feeds so that incoming Patient Class data adhere to a standard single-character code. However, some issues remain, and, of course, retrospective data does not conform with a standard code.

Trickledown Effect in ESSENCE

In NSSP data, the length of the Calculated Patient Class was set to 3. Accordingly, an incoming value of “Emergency” is stored as “Eme.” The negative aspect of this is a trickledown effect on the “history” fields in ESSENCE. Calculated Patient Class History now has a value of “Eme” instead of “E.” For this reason, an ESSENCE query using the Calculated Patient Class “drop down” *would not capture visits* with “Eme” (instead of “E”) in the Patient Class.

That is, ESSENCE drop-down values are “descriptive” versions of “codes” being searched. For example, a selection of “Emergency, Inpatient” results in a search for “E, I.” Thus, visits with values such as “Eme, Inp” are not found.

August NSSP Update



UPDATED Definition

Calculated Patient Class data were intended to have *pristine* Patient Class data. Such data can facilitate queries and be used to create binary flags in ESSENCE that indicate if the visit was “ever in a specific Patient Class.” For example, a flag can indicate if the Patient Class history has “E” somewhere in the history. Binary flags can certainly improve query performance—but *only* if data are pristine.

We talked with practitioners whose sites have feeds that send descriptive Patient Class values. After these discussions and examining the QA findings of incoming Patient Class data, we’ve decided to make some improvements. We will update the NSSP Calculated Patient Class definition to align with the original intent of having pristine data. Here’s how the updated algorithm will be hierarchically defined:

- Use the incoming Patient Class (PV1-2) if non-null *and* if the value adheres to the [Patient Class Standard](#)
 - Else, “map” specific nonconforming Patient Class values to a standard value (for example, incoming value of “Emergency” will be mapped to the standard value “E”)
 - Else, infer the Patient Class based on the incoming Facility Type (OBX)
 - Else, infer the Patient Class based on the Facility Type registered in the MFT
- Note. Inference from Facility Type is based on a mapping established to map a Patient Class code based on a [standard facility type value](#).

When applied, both prospective and retrospective data will reflect the updated Calculated Patient Class algorithm. Add to this, your ESSENCE queries leveraging Calculated Patient Class will ensure that you pull Visits of Interest based on your Patient Class *combinations* of interest. And as noted above, this sets the tone to move forward with the ESSENCE “ever in a specific Patient Class” binary fields.

Look for updates on this improvement to Calculated Patient Class in upcoming issues of *NSSP Update*. If

October NSSP Update

Update: Refinement of Calculated Patient Class Algorithm

In the [August issue](#) of *NSSP Update*, we described some changes we're making to the *C_Patient_Class* field. This field stores the "best available" Patient Class found in incoming messages. Calculated Patient Class data were intended to have *pristine* Patient Class data. Such data can facilitate queries and be used to create binary flags in ESSENCE that indicate if the visit was "ever in a specific Patient Class." For example, a flag can indicate if the Patient Class history has "E" somewhere in the history. Binary flags can certainly improve query performance—but *only* if data are pristine. The updates we're making to the NSSP Calculated Patient Class definition align with the original intent of having pristine data.

During September, we updated the retrospective data in the NSSP Archive, which is the *processed* table. Next, we'll apply this update to existing data in ESSENCE. Then we'll introduce the "ever in" flags that will be part of the updated definition (see details in August issue).

If you have questions, the NSSP Analytic Data Management Team will be pleased to explain how these changes affect your data. Simply submit a Support Request to the [NSSP Service Desk](#).

- Patient Class
- Patient Class History
- Calculated Patient Class History
- Has Been Emergency
- Has Been Inpatient
- Has Been Outpatient

Variable/Query Field	Description	Values
Patient Class (Patient_Class_Code)	Direct input form HL7 message PV1-2.1	Emergency
		Inpatient
		Outpatient
		Pre-admit
		Recurring patient
		Obstetric
		Direct Admit
		Observation Patient
		Unknown
Patient Class History	All patient class updates deduplicated and listed alphabetically based on Patient_Class_Code	Emergency
		Emergency, Inpatient
		Emergency, Inpatient, Outpatient
		Emergency, Inpatient, Outpatient, Unknown
		Emergency, Inpatient, Unknown
		Emergency, Outpatient
		Emergency, Outpatient, Unknown
		Emergency, Unknown
		Inpatient
		Inpatient, Outpatient
		Inpatient, Outpatient, Unknown
		Inpatient, Unknown
		Outpatient
		Outpatient, Unknown
		Unknown
Calculated Patient Class History	All patient class updates deduplicated and listed alphabetically based on C_Patient_Class	Emergency
		Emergency, Inpatient
		Emergency, Inpatient, Outpatient
		Emergency, Inpatient, Outpatient, Unknown
		Emergency, Inpatient, Unknown
		Emergency, Outpatient
		Emergency, Outpatient, Unknown
		Emergency, Unknown
		Inpatient
		Inpatient, Outpatient
		Inpatient, Outpatient, Unknown
		Inpatient, Unknown
		Outpatient
		Outpatient, Unknown
		Unknown
Has Been Emergency	Was ever classified "Emergency" (based on Calculated Patient Class History)	No
		Yes
Has Been Inpatient	Was ever classified "Inpatient" (based on Calculated Patient Class History)	No
		Yes
Has Been Outpatient	Was ever classified "Outpatient" (based on Calculated Patient Class History)	No
		Yes

C_Patient_Class

"Set to the first non-NULL entry:

1. Patient_Class_Code if not NULL
2. ELSE use C_FacType_Patient_Class
3. ELSE assign class value based on the inferred patient class associated with the primary entry on the MFT"

Counts of Patient_Class_Code in Archive
Processed in the last year

Patient_Class_Code	Count	Percent
E	10292573	60.553%
I	6571506	38.661%
O	124665	0.733%
P	1204	0.007%
R	264	0.002%
NULL	7335	0.043%
Total	16997547	100%

Counts of C_Patient_Class in Archive
Processed in the last year

C_Patient_Class	Count	Percent
E	10299908	60.596%
I	6571506	38.661%
O	124665	0.733%
P	1204	0.007%
R	264	0.002%
Total	16997547	100%



+ Description

- Query Options

Query name: [Save Query](#) [Create myAlert](#) [Save Report Query](#)[Add to myESSENCE](#) [Share URL](#)

+ Configuration Options

- Data Series Options

Data Series Options

Within Graph Stratification: Has Been Inpatient

Across Graphs Stratification:

Graph Options: ☒ Single Graph ☐ Multiple Graphs (Large) ☐ Multiple Graphs (Small)

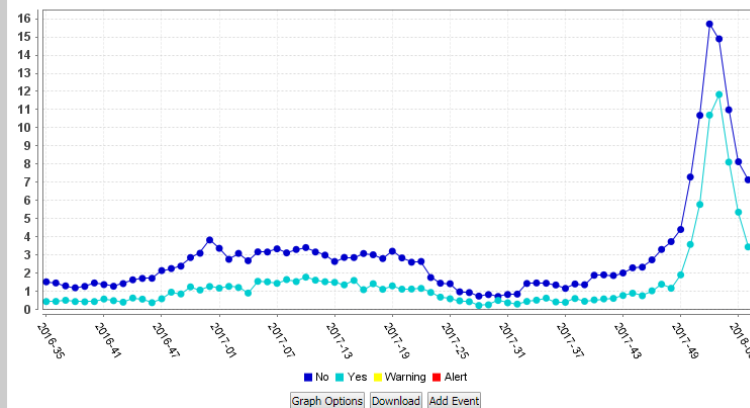
Remove Zero Series: [Help](#) ☒

Graph Start Week: 1

[Update](#)

- Graph

Weekly Percentage (Stratification : Has Been Inpatient)

*Click anywhere on the graph to [switch to interactive view](#)[Add Overlay](#)[Data Details](#) | [Map View](#)

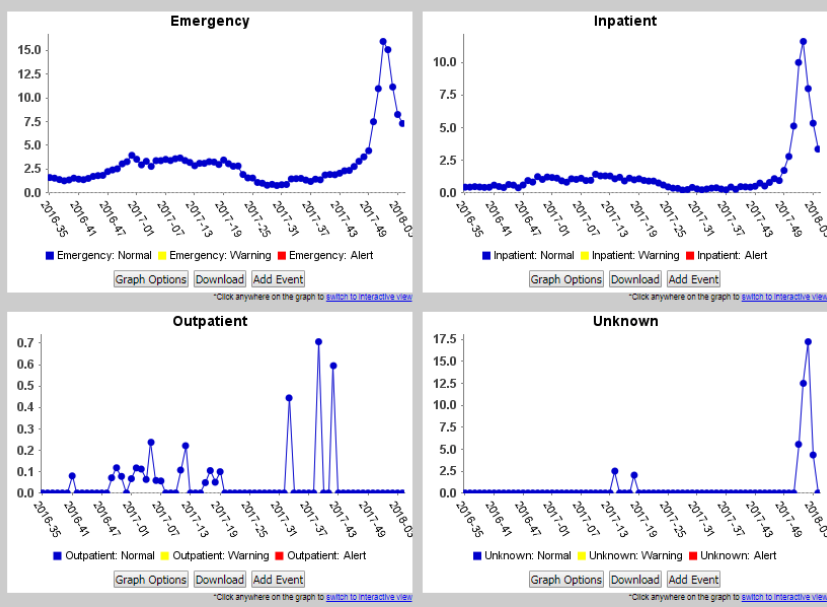
- Popup Options

+ Description
- Query Options
Query name: Save Query Create myAlert Save Report Query
Add to myESSENCE Share URL

- + Configuration Options
- Data Series Options

Data Series Options	
Within Graph Stratification:	
Across Graphs Stratification:	Patient Class
Graph Options:	☐ Single Graph ☐ Multiple Graphs (Large) ☒ Multiple Graphs (Small)
Remove Zero Series: Help	☒
Graph Start Week:	1
Update	

Graph



Popup Options

Description
Query Options
Query name: Save Query Create myAlert Save Report Query
Add to myESSENCE Share URL

Configuration Options

Query Wizard

Datasource: Facility Location (Full Details) Time Resolution: Weekly Detector: No Detection As Percent Query: CC and DD Category Start Date: 35 End Date: 4
2016 2018

Available Query Fields << Has Been Inpatient >> Selected Query Fields >>

Available Query Fields

- CC and DD Category
- CC and DD
- CC and DD Category Free Text
- Syndrome Free Text
- SubSyndrome Free Text
- Chief Complaint (Orig) Free Text
- Chief Complaint (Combo) Free Text
- Admit Reason Code
- Admit Reason Combo
- Facility Type
- Clinical Impression
- Chief Complaint History
- Discharge Diagnosis History
- Discharge Disposition History
- Patient Class History
- Patient Class History Free Text
- Calculated Patient Class History
- Computed Patient Class History Free
- Trigger Event History
- Has Been Emergency
- Has Been Inpatient**
- Has Been Outpatient
- Zipcode - Predominant Race
- Zipcode - Race White Percentage
- Zipcode - Race Black or African Ame
- Zipcode - Race American Indian Per

Has Been Inpatient

Select values for Has Been Inpatient:

No

Yes

Select Help

Select Help

Table Builder Time Series Data Details Graph Builder Overview Adv Qry Reset

Selected Query Fields >>

Geography System

Hospital State

Hospital State

Arizona

Medical Grouping System

ESSENCE Syndromes

CC and DD Category

ILI CCDD v1

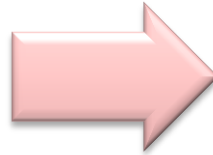
Has Been Inpatient

Yes

Upcoming Meetings

AZ BioSense Workgroup

- Wed. Feb. 14
from 1:00 – 2:00



Exploratory Analysis Subgroup

- Thurs. Feb. 22
from 1:00 – 2:00



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

THANK YOU

syndromicsurveillance@azdhs.gov | 602-542-6002

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