

Syndromic Surveillance – BioSense Onboarding in Arizona

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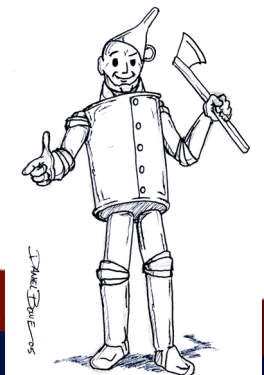
Health and Wellness for all Arizonans

Outline

- Introductions
- Background
- Onboarding Process
 - Onboarding Prep
 - Kick-Off
 - Testing
 - Validation
 - Production
- Future Idea
- Challenges
- Questions

Background

- BioSense is the only syndromic surveillance system used for MU/hospitals in AZ. ADHS does not receive data when facilities are in production – goes directly to BioSense.
- No HIE active with Public Health in AZ
- Started with a major focus on planning and coordination with local jurisdictions, collaborative process (AZ BioSense Workgroup)
- Created onboarding documentation and AZ specific implementation guide
- Onboarding focused on MU distinctions:
 - EH, CAH only, no EP
 - Accepting ED and Inpatient data from hospitals, if they are able to send it
 - EH does not need to have an ED, but they are placed lower in prioritization for onboarding
- New to Syndromic Surveillance and still learning. New to BioSense (1st hospital on BioSense 2.0 kick off January 2014)
- **The onboarding process is changing all the time**
- 22 Hospitals in Production
- 7 Hospitals in Testing or Validation



Staffing

- AZ resources for syndromic surveillance are:
 - Program Manager – Epi and HL7 background (also leads ELR and other informatics projects)
 - HL7 Analyst – hospital IT/HL7 background
 - Epi Informatician – MPH degree and interest in data and informatics
 - Project Specialist – helps with coordination and organization (also staffs the Meaningful Use Helpdesk for the agency)
- We use a combination of State staff and long term contractors (using contractors can help with recruitment of qualified candidates)
- This informatics program is housed within the Office of Infectious Disease Services

Onboarding Process

Onboarding Prep (Registration, DUA, Guidance)

Kick-Off (Conference call with all partners)

Testing (NIST, HL7 validation at ADHS)

Validation (Send to BioSense Stage, Data Quality)

Production (Go-Live Call, Ongoing Data Quality)

Onboarding Prep

- Registration of Intent on ADHS website
 - All hospitals are sent onboarding packet with guidance
- Data Use Agreement
 - Contact request form to get official names and positions to be included in contract
 - DUA
 - Procurement process, can take a while
 - Standard contract, do not make hospital specific edits
- Hold queue
 - Prioritization based on readiness, size (bed count), geographic area, vendor, etc.
 - Utilize the hold queue to your benefit if you have multiple facilities to onboard! Do what makes sense for you and your resources.

Guidance Documents

- **Roadmap** (onboarding checklist)
- **Flowchart** (visual process diagram)
- **Arizona specific Implementation Guide**
- **Facility template** (BioSense)
- **Clinical questionnaire** (to understand how and when data is collected)
- **Implementation resources** (to gather contacts including Data Manager at hospital)

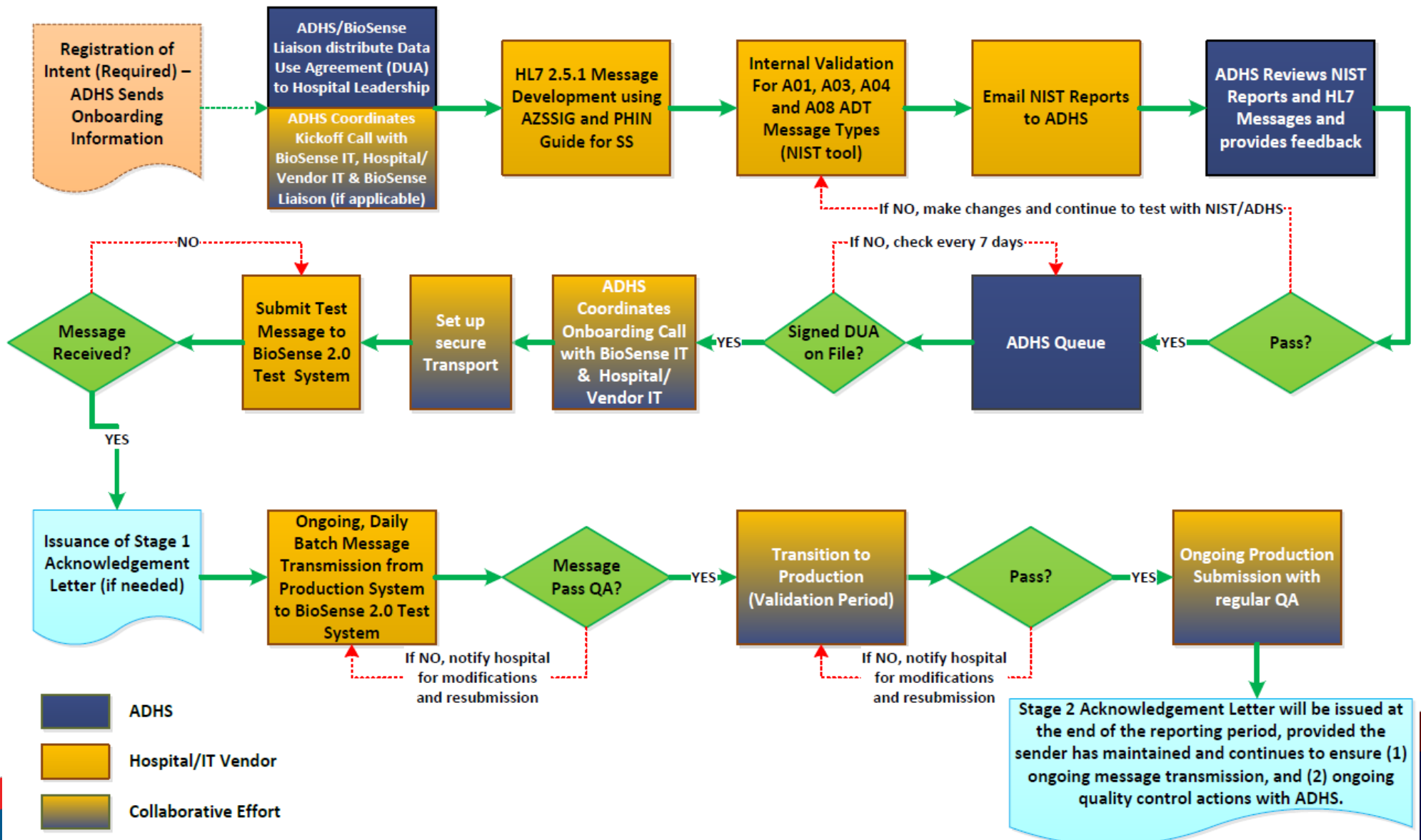
Syndromic Surveillance Roadmap to Success!

This checklist will prepare Eligible Hospitals (EHs) and Critical Access Hospitals (CAHs) to fulfill Syndromic Surveillance (SS) interoperability with the Arizona Department of Health Services (ADHS) and begin the process of meeting Stage 2 Requirements for Meaningful Use (MU). Please contact the SyndromicSurveillance@azdhs.gov mailbox for additional assistance.

Step 1: Register Intent to Submit SS		
	Yes	Comments & Resources
Go to the ADHS website https://app.azdhs.gov/MeaningfulUse to register your intent to submit Syndromic Surveillance (SS) data	<input type="checkbox"/>	Required by Centers for Medicare and Medicaid Services for Stage 2. You will be asked to provide additional information including but not limited to the following: <ul style="list-style-type: none"> Hospital name, locations The name of the IT/EHR vendor creating/sending messages
Either ADHS or a BioSense Liaison will send a Data Use Agreement (DUA) Contact Request Form. <i>When the DUA Contact Request Form is returned to ADHS, your organization may be placed in a queue based on the workload and availability of BioSense and ADHS staff.</i>	<input type="checkbox"/>	Please complete the DUA Contact Request Form and return it to ADHS so the DUA can be sent to the hospital leadership for review and signature. SyndromicSurveillance@azdhs.gov .
ADHS will coordinate a kick off call with your identified leadership (IT Director, Meaningful Use Coordinator, etc.), any IT EHR vendor staff you deem appropriate, the County BioSense Liaison, and the BioSense IT Team to answer questions and set project expectations.	<input type="checkbox"/>	BioSense IT will ask you to identify a person to act as the Data Manager for your facility – please ensure this person is present for the kick off call.
Step 2: Obtain Necessary Documentation for SS Implementation		
	Yes	Comments & Resources
Download the Public Health Information Network (PHIN) Messaging Guide for Syndromic Surveillance: Emergency		Available for download through the Centers for Disease Control and Prevention (CDC) website:

ARIZONA DEPARTMENT OF HEALTH SERVICES

Syndromic Surveillance (SS) Onboarding Process





Arizona Syndromic Surveillance
Implementation Guide (AZSSIG) for Critical Access
Hospitals (CAHs) and Eligible Hospitals (EHs)
Version 1.0 | June 2014

HL7 2.5.1 Admission, Discharge and Transfer (ADT) Messaging Specifications for A01, A03, A04, and A08

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OBX – OBSERVATION/RESULT SEGMENT

This segment is used to transmit observations related to the patient and visit.

OBX – Observation/Result Segment								
SEQ	LEN	DT	Usage	Cardinality	TBL#	Element Name	Required/Recommended/Literal Value	Description/Comments
1	4	SI	RE	[0..1]		Set ID – OBX	Set ID	OBX 1 ... OBX 2 ...
2	3	ID	R	[1..1]	0125	Value Type	Value Type	Identifies the structure of data in OBX-5. PHVS ValueType HL7 2x Supported values: TS, TX, NM, CWE, XAD
3	478	CE	R	[1..1]		Observation Identifier	Identifier (Syndromic Surveillance) ^ Description ^ Coding System ^ Alternate Identifier ^ Alternate Description ^ Alternate Coding Sys.	Identifies the data to be received in the observation value (OBX-5). See OBX-5 for specific values.
4	20	ST	X	[0..1]		Obs. Sub-ID		Not used.
The OBX – 5 field is used to transmit a variety of observations related to the patient and the visit. Reportable observations are outlined below based on Data Type.								
5	24	TS	RE	[0..1]		Date of Onset	YYYYMMDDHHMMSS.SSSS +/- ZZZZ	Date of Onset OBX-3 = 11368-8^IllnessorInjuryOnsetDate andTime^LN OBX-5: Date of Onset For TS, the minimum acceptable precision is to the nearest day.
5	65536	TX	RE	[0..1]		Triage Note	Text Value	Triage Note (Emergency Department Element = ED) OBX-3 = 54094-8^ EmergencyDepartmentTriageNote^LN OBX-5: Triage Note Free Text

Data Elements	Description of Data Elements	Query	Response
Triage Note	Process of determining the priority of patients' treatments based on the severity of their condition for the visit	<ol style="list-style-type: none"> 1. What does the triage note contain? 2. Is there free text or ICD9/ICD10/SNOMED coded information other than chief complaint? If so, what is the field called and how is it used? 3. Is there a specific template or form that is used for triage notes? 4. Would you be willing to share an example of the template or form with ADHS? 	
Travel History	To indicate patient's travel history and/or other risk factors for infectious disease, e.g. Ebola	<ol style="list-style-type: none"> 1. Where is this information entered in your system for inpatients and ED patients? 2. When is this information collected? 	
Clinical Impression	Preliminary diagnosis under consideration as per healthcare personnel.	<ol style="list-style-type: none"> 1. Where is this information entered in your system for inpatients and ED patients? 2. When is this information collected? 	
Procedure Information	All the procedures performed on the patient. It could be coded as CPT4 or ICD9/ICD10.	<ol style="list-style-type: none"> 1. Where is this information entered in your system for inpatients and ED patients? 2. Is it coded as CPT4 or/and ICD9/ICD10? 	
Diagnosis Information	All the diagnosis performed on the patient during the visit. It could be coded in EHR System as ICD9/ICD10.	<ol style="list-style-type: none"> 1. Where is admitting diagnosis entered in your system for inpatients and ED patients? 2. Is admitting diagnosis free text or a dropdown coded as ICD9/ICD10/SNOMED? 3. Where is working diagnosis entered in your system for inpatients and ED patients? 4. Is working diagnosis free text or a dropdown coded as ICD9/ICD10/SNOMED? 5. How long does it typically take to code the final diagnosis after patient discharge? 	



Syndromic Surveillance

BioSense 2.0 Data Providers
Implementation Resources

1 Implementation Resources Contact Information

Please add all the resources that will be supporting the Syndromic Surveillance implementation. The contact information provided will be used for meetings, correspondence and reports during this implementation process and future ongoing submission of Syndromic Surveillance data to the BioSense 2.0 System.

The following requirements must be met:

- At least one person needs to be specified for each category on the right.
- At least one Data Manager (must be from the Facility).
- At least one Technical Assistance Resource (must be from the Facility).
- At least one Technical Assistance Resource (must be from the Vendor-EHR Software Company if using one for this project).

Data Manager Role: Facility primary point of contact and is responsible for ensuring that the data submissions are occurring daily and are in the proper format.

Technical Assistance Resource Role: point of contact that can be from the Facility or the Vendor-EHR Software Company that is directly involved with creating/sending/maintaining the Syndromic Surveillance HL7 messages.

To add more Implementation Resources, please reprint this page.

Data Manager
Technical Assistance Resource

First Name	<input type="text"/>	Last Name	<input type="text"/>	Company	<input type="text"/>			<input type="checkbox"/>	<input type="checkbox"/>
Email	<input type="text"/>	Title	<input type="text"/>	Phone Number (Direct Line/Mobile)	<input type="text"/>	Fax Number	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Name	<input type="text"/>	Last Name	<input type="text"/>	Company	<input type="text"/>			<input type="checkbox"/>	<input type="checkbox"/>
Email	<input type="text"/>	Title	<input type="text"/>	Phone Number (Direct Line/Mobile)	<input type="text"/>	Fax Number	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
First Name	<input type="text"/>	Last Name	<input type="text"/>	Company	<input type="text"/>			<input type="checkbox"/>	<input type="checkbox"/>
Email	<input type="text"/>	Title	<input type="text"/>	Phone Number (Direct Line/Mobile)	<input type="text"/>	Fax Number	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>

Kick-Off Call

- Partners
 - ADHS Syndromic Surveillance staff
 - Local jurisdiction Epi staff
 - Hospital staff (IT, informatics, sometimes Infection Control)
 - Vendor
 - NSSP team
- Official start (out of Hold Queue)
- Have done joint calls with multiple hospital systems using the same vendor product
- Go over intro to BioSense and documents including onboarding process, IG and mention where we differ from the PHIN guide (problem list)

Kick-Off Agenda

- **Introduce Partners**
- **BioSense 2.0 System Overview**
- **Arizona Department of Health Services Onboarding Process**
 - **Registration of Intent and Data Use Agreement**
 - **Hospital A**
 - Hospital A has registered their intent for the Meaningful Use Public Health Objective: Syndromic Surveillance (SS) with ADHS
 - Hospital A facilities all have an executed Data Use Agreement with ADHS
 - **Obtain Necessary Documentation for SS Implementation**
 - BioSense 2 Data Provider Implementation Resources form
 - Data Manager
 - Hospital Roadmap to SS Success
 - SS Implementation Process Diagram
 - AZ SS Implementation Guide
 - Public Health Information Network (PHIN) Messaging Guides for Syndromic Surveillance
 - BioSense Facility Template
 - Hospital Implementation Clinical Questionnaire
 - **Develop Admit Discharge Transfer (ADT) Message Types and Perform Internal Message Validation**
 - Test message types are as follows: A01 = Admit/Visit; A03 = Discharge/End Visit; A04 = Registration; A08 = Update Patient Information
 - Email the raw HL7 messages and the test message [NIST reports](#) to SyndromicSurveillance@azdhs.gov.
 - **Onboarding and Validation**
 - Communication Process
 - Timelines
 - Weekly Onboarding Calls
 - **Production and Data Quality**
- **BioSense 2.0 Onboarding Process**



Testing

- Start with hospital/vendor sending NIST report with <5 errors for each message type (A01, A04, A03, A08), initial validation of these messages
- Set up SFTP with ADHS for easy transfer of test/prod messages for testing
 - When test messages look good enough, if facility is ok with it, we ask them to start sending production data on a daily basis (easier for them than creating test messages and more representative of what they will eventually send)
 - When hospital data is coming from Production, watch for consistency and timeliness of data feeds

ADHS validation of Test messages

- HL7 Messaging Workbench – built in our guide's requirements, structural validation
- Interface Explorer – Can be used to:
 - parse messages for easier viewing of data elements
 - compare what is sent in a field across the file (example: look at all entries for race, do they use the codes in the guide?)
 - look at % complete for certain fields within a file
- Create an HL7 Data Element Report

HL7 Data Element Report

- % complete for elements of interest – start broad with almost everything in the IG, then determine what the facility can send. Example: Some facilities cannot send height and weight.
- Content evaluation: proportions of entries for a field (examples: race, ethnicity, patient class, county codes, country codes, message type) – ensure it represents the population served by the hospital
- This, in addition to the clinical questionnaire, is a starting point for discussion

Trigger Event (MSH.9.2)

208	4.6%	A01
225	4.9%	A03
212	4.6%	A04
3930	85.9%	A08

Date of Birth (PID.7)

1	(0.02%)	"Blank"
4574	(99.98%)	Populated

Ethnicity (PID.22)

1969	43.1%	2135-2^HISPANIC OR LATINO^CDCREC
2394	52.3%	2186-5^NOT HISPANIC OR LATINO^CD
212	4.6%	^^CDCREC

Patient Class (PV1.2)

2568	56.2%	E	Emergency
2007	43.8%	I	Inpatient

OBX Information in OBX.5 Data Element (OBX.3)

2,999	(65.55%)	"11289-6^BODY TEMPERATURE:TEMP:ENCTRFI
597	(13.05%)	"11368-8^ILLNESS OR INJURY ONSET DATE AND T
4570	(99.89%)	"21612-7^AGE TIME PATIENT REPORTED^LN"
2,810	(61.42%)	"3141-9^BODYWEIGHT^LN"

Testing

- **Weekly meetings** with hospital, vendor, ADHS to go over any concerns from the HL7 Data Element Report.
 - Discuss hospital workflow to determine how and when some data is collected and sent
 - May determine the hospital is unable to send a data element of interest
 - Ensure they can send the more important (Chief complaint, diagnosis, Medical Record Number) and easier (race, ethnicity, address) fields
- Once every data element of interest is discussed and action items for the hospital/vendor are completed, AND the proportion of *messages* with key fields complete is roughly high enough, the hospital starts sending data to BioSense Staging site.
- Our thresholds for certain fields are flexible.
 - A facility may not be able to send triage note because their system doesn't have a free text triage note that makes sense to send.
 - For chief complaint and diagnosis we try to reach 98%, but may accept less after discussions with the hospitals.

Validation

- Send JIRA request to set up hospitals in BioSense Staging (if possible, we have the hospital send to both BioSense and ADHS SFTP so we can continue to see the HL7 messages for troubleshooting of any additional issues)
- The main goal of this phase is to validate the aggregate data by *visit*, instead of looking at it by *message*.
- Run a Data Quality report for the hospitals each week (R Studio, SAS)
 - Look at % complete for key variables by visit
 - Look at proportions of entries for a field by visit
 - Can break down by
 - facility if there are multiple hospitals in the implementation
 - patient class to view differences between ED and Inpatient
 - message type
 - complete visits only (A01 or A04 AND A03)

Data Quality Report

C	H	I	K	L	M
Variable	NOBS	miss_count	% Complete		
Data_Overflow	141	141	0		
Update_Date_Time	141	141	0		
Diagnosis_Date_Time	141	141	0		Diagnosis_Date_Time not populated with Diagnosis
Initial_ED_Assessment	141	141	0		
Blood_Pressure	141	141	0		
Blood_Pressure_Units	141	141	0		
Death_Indicator	141	134	4.96		
Death_Date_Time	141	134	4.96		
Clinical_Impression	141	124	12.06		
Date_of_Onset	141	70	50.35		
Triage_Notes	141	57	59.57		
Discharge_Disposition	141	35	75.18		
Disposition_Date_Time	141	35	75.18		
Chief_Complaint	141	31	78.01		Far lower than average (98% across facilities)
Diagnosis_Text	141	21	85.11		Above average completion
Diagnosis_Code	141	21	85.11		Above average completion
Diagnosis_Type	141	21	85.11		Above average completion
Initial_Pulse_Oximetry	141	19	86.52		
Initial_Pulse_Units	141	19	86.52		
Initial_Temperature	141	6	95.745		
Initial_Temp_Units	141	6	95.745		
Proc_Code_Naming_System	141	3	97.872		
Procedure_Code	141	3	97.872		Contents may need to be limited to physician initiate
Procedure_text	141	3	97.872		Contents may need to be limited to physician initiate
Procedure_Date_Time	141	3	97.872		Contents may need to be limited to physician initiate
Create_Date_Time	141	0	100		
Medical_Record_Number	141	0	100		
Age	141	0	100		
Age_Units	141	0	100		
Gender	141	0	100		
City	141	0	100		

Data Quality Report – Field Values

Gender		
Value	Count	Percent
F	2290	62.57
M	1368	37.38
U	2	0.05
mode=F Valid n=3660		
Zip_Code		
Value	Count	Percent
85712	318	8.69
85710	249	6.8
85711	225	6.15
85706	193	5.27
85730	141	3.85
85705	133	3.63
NA	120	3.28
85716	111	3.03
85750	108	2.95
85715	100	2.73
85713	99	2.7

State		
Value	Count	Percent
AZ	3473	94.89
NA	117	3.2
VA	15	0.41
CA	8	0.22
MX	8	0.22
NM	7	0.19
NY	6	0.16
U	6	0.16
ID	3	0.08
MN	3	0.08
ON	3	0.08
County		
Value	Count	Percent
1377	2912	79.56
NA	195	5.33
12	188	5.14
2	170	4.64
14	59	1.61
5	43	1.17
8	16	0.44
1427	15	0.41

Validation

- **Ensure hospital is able to send consistent and timely daily files**
- Have BioSense run their validation report and compare to ours.
- Once all parties are comfortable with the levels of completeness, we work with BioSense to move them to production
 - create a JIRA ticket

Production

- Hold a Go-Live call to make sure everyone is on the same page
 - Participants include
 - ADHS Syndromic Surveillance staff
 - Vendor (optional)
 - Local PH jurisdiction
 - Hospital – **include Infection Control** since this is the group that PH works with most and the group we would contact if more info was needed about a patient or cluster of patients
 - NSSP team
 - One of the main goals is to connect everyone and make sure Infection Control understands this data is being sent to PH and they may be contacted about it (and that we don't have patient names).
 - MRN is the ID used to communicate with Infection Control

Go-Live Call Agenda

- **Arizona Department of Health Services Ongoing Submission**
 - Overview of the BioSense 2.0 System
 - Purpose of the syndromic surveillance system
 - How does Syndromic Surveillance differ from other Surveillance?
 - Future impact to the hospital of the BioSense 2.0 System – When will we contact you?
 - Data Sources and Data Sharing
 - Data Providers submitting syndromic surveillance data to the BioSense 2.0 System
 - Hospital System A
 - Users of the BioSense 2.0 System
 - State Level: Arizona Department of Health Service staff
 - Local Public Health Jurisdictions (LPHJs) Level: County Public Health Staff
- ***Local Public Health Jurisdictions***
 - **BioSense Liaisons**
 - Local County Department of Public Health: Friendly Liaison
 - **Next Steps**
- ***Questions***

Production Data Quality

- Daily monitoring to ensure data is received (phpMyAdmin site and front end)
 - If data is not received, work with the hospital, vendor and BioSense to get the missed data – can be very difficult to determine what is missed if you do not receive consistent files, due to the nature of ADT messaging where you receive messages on multiple days for a single visit.
 - If data is received *really* late, BioSense will have to run a special processing of the data for it to update in the front end (biosen.se site)
 - Have started looking at how many messages were received in a file and which visit dates the files cover – this can be very time consuming so we are not able to do it for every facility. We focus on those that have the most issues with sending daily data and/or are working on sending back data.
- Weekly data quality reports for all prod facilities (R Studio, SAS)
 - Watch for % completeness to drop for key fields

	A	B	C	D	E	F	G
1	Variable	Hospital A number missing	Hospital A total	Hospital A percent	Hospital B number missing	Hospital B total	Hospital B percent
2	Blood_Pressure	2580	2580	0	2044	2044	0
3	Blood_Pressure_Units	2580	2580	0	2044	2044	0
4	Clinical_Impression	2580	2580	0	2044	2044	0
5	Country	2580	2580	0	2044	2044	0
6	Data_Overflow	2580	2580	0	2044	2044	0
7	Date_of_Onset	2580	2580	0	2044	2044	0
8	Diagnosis_Date_Time	2580	2580	0	2044	2044	0
9	Initial_ED_Assessment	2580	2580	0	2044	2044	0
10	Procedure_Date_Time	2580	2580	0	2044	2044	0
11	Triage_Notes	2580	2580	0	2044	2044	0
12	Update_Date_Time	2580	2580	0	2044	2044	0
13	Death_Date_Time	2578	2580	0.08	2042	2044	0.1
14	Death_Indicator	2578	2580	0.08	2042	2044	0.1
15	Proc_Code_Naming_System	2419	2580	6.24	1949	2044	4.65
16	Procedure_Code	2419	2580	6.24	1949	2044	4.65
17	Procedure_text	2419	2580	6.24	1949	2044	4.65
18	Diagnosis_Type	1487	2580	42.36	700	2044	65.75
19	Diagnosis_Code	1291	2580	49.96	626	2044	69.37
20	Diagnosis_Text	1291	2580	49.96	626	2044	69.37
21	Initial_Temp_Units	981	2580	61.98	662	2044	67.61
22	Initial_Temperature	981	2580	61.98	657	2044	67.86
23	Initial_Pulse_Oximetry	318	2580	87.67	155	2044	92.42
24	Initial_Pulse_Units	318	2580	87.67	155	2044	92.42
25	Discharge_Disposition	201	2580	92.21	193	2044	90.56
26	Disposition_Date_Time	185	2580	92.83	169	2044	91.73
27	County	41	2580	98.41	15	2044	99.27
28	Chief_Complaint	2	2580	99.92	2	2044	99.9
29	Medical_Record_Number	1	2580	99.96	0	2044	100

Future Idea

- Send reports to hospitals starting with completeness of certain fields and potentially comparison to the other facilities sending data (aggregate)
 - Some facilities may be interested in this because during the implementation we looked closely at completeness and they went back into their system or training to ensure the completeness was up to their expectations.

Challenges

- Stability of daily feeds
- BioSense not accepting all data
 - Only taking one procedure (bug)
 - Blood pressure not using LOINC codes in PHIN guide
- Major differences in use of fields of interest by vendor product (example: some don't use a triage note field)
- “Customization” is no problem for some vendors but others will charge for optional data elements
- Hospitals may have the information but not in the system that sends messages (patient country)
- Out of country addresses – country often in state or ZIP field
- Hospital/vendor not using standard codes
- Learning curve – BioSense system, hospital capabilities, etc.

Questions?



SyndromicSurveillance@azdhs.gov

