ISDS
INTERNATIONAL SOCIETY FOR DISEASE SURVEILLANCE

Draft Guidelines for Syndromic Surveillance Using Inpatient and Ambulatory Clinical Care EHR Data

A Report from the International Society for Disease Surveillance

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Acknowledgments

ISDS Meaningful Use Workgroup

- Geraldine Johnson, MS (Workgroup Chair), New York State Department of Health
- David Buckeridge, MD, MSc, PhD (ISDS Board Liaison), McGill University
- Shandy Dearth, MPH, Marion County Public Health Department
- Jeffrey Ditty, MPH, PMP, Public Health Foundation Enterprises
- Lyn Finelli, MS, DrPH, Centers for Disease Control and Prevention
- Richard S. Hopkins, MD, MSPH, Florida Department of Health
- Jeff Hummel, MD, MPH, Qualis Health
- Larissa May, MD, MSPH, George Washington University
- Michelle Siefert, MT (ASCP), Cerner Corporation
- Corey Spears, McKesson Corporation
- Iona Thraen, ACSW, PhD, Utah Department of Health

Centers for Disease Control

- Taha Kass-Hout, MD, MS
- Katherine Spears

ISDS Board of Directors

- Julia E. Gunn, RN, MPH (President and Board Chair), Boston Public Health Commission
- Aaron Kite-Powell, MS (Vice President), Florida Department of Health
- Joseph S. Lombardo, MS (Treasurer), Johns Hopkins University Applied Physics Laboratory
- Atar Baer, PhD, MPH, Public Health—Seattle and King County
- John S. Brownstein, PhD, Harvard Medical School
- David Buckeridge, MD, MSc, PhD, McGill University
- Howard Burkom, PhD, Johns Hopkins Applied Physics Laboratory
- Wendy W. Chapman, PhD, University of California San Diego
- Bill Lober, MD, University of Washington Schools of Medicine, Nursing, and Public Health
- Marc Paladini, MPH, New York City Department of Health and Mental Hygiene
- Rosalie Phillips, MPH (Secretary, *ex officio* non-voting member), Tufts Health Care Institute

Project Team

ISDS

- Laura Streichert, PhD, MPH (Executive Director)
- Charlie Ishikawa, MSPH
- Tera Reynolds, MPH
- Amanda Schulte
- Becky Zwickl

HLN Consulting, LLC

- Noam H. Arzt, PhD
- Maiko Minami

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Abstract

Recent federal investments in health information technology (HIT) are driving innovation in the science and practice of disease surveillance in the United States (US). As electronic clinical data become more accessible through these investments, public health agencies (PHA) are challenged to adapt their information management and surveillance processes for greater health data volume, new transmission standards, and higher public expectations for more timely information and effective responses. Guidelines that harmonize the force of federal HIT investments with state and local PHA infrastructure and priorities are critical to fostering and sustaining public health improvements.

A previous recommendation by the International Society for Disease Surveillance (ISDS) recommended Meaningful Use guidelines for public health syndromic surveillance (PHSS) using EHR health data collected in Emergency Department (ED) and Urgent Care settings. As a supplement to this prior work, ISDS is continuing a collaboration with the Centers for Disease Control and Prevention (CDC) to develop new guidelines for PHSS using health data from certified hospital inpatient and ambulatory clinical care EHR technology. A multi-stakeholder ISDS Meaningful Use Workgroup of experts in public health surveillance, EHR technology, and healthcare delivery are advising and overseeing development.

The following presents the initial attempt to describe necessary elements for effective and timely PHSS using inpatient and ambulatory clinical care EHR data. This document introduces the current project, describes the guidelines development process, and sets forth analytic and data reporting guidelines for stakeholder consideration and comment. Stakeholder comments will inform further guideline development.

About ISDS

The International Society for Disease Surveillance (ISDS) is a 501(c) 3 nonprofit organization founded in 2005 and dedicated to the improvement of population health by advancing the science and practice of disease surveillance. ISDS's 400+ membership represents professional and academic subject matter experts in the fields of public health surveillance, clinical practice, health informatics, health policy, and other areas related to national and global health surveillance.

ISDS works toward a vision of timely, effective, and coordinated disease prevention and response among a skilled public health workforce through programs that position us at the vanguard of the disease surveillance field. Ongoing ISDS activities include:

- Building and sustaining a surveillance Community of Practice (CoP).
- Fostering innovations in surveillance research and practice.
- Increasing public health capacity by providing support and technical expertise to local, regional, and federal public health practitioners in the United States and around the world.
- Developing targeted resources to inform and expand the dialogue on timely topics of interest to the surveillance community.
- Hosting surveillance education and training activities that build workforce competencies.
- Convening the ISDS Annual Conference and disseminating findings by publishing abstracts in print and online proceedings.

ISDS is governed by a ten member Board of Directors that represents national and international leaders in disease surveillance.

Disclaimer

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Introduction

Recent federal investments in health information technology (HIT) are driving innovation in the science and practice of disease surveillance in the United States (US). As electronic clinical data become more accessible through these investments, public health agencies (PHA) are challenged to adapt their information management and surveillance processes for greater health data volume, new transmission standards, and higher public expectations for more timely information and effective responses. Guidelines that harmonize the force of federal HIT investments with state and local PHA infrastructure and priorities are critical to fostering and sustaining public health improvements.

Meaningful Use

The number of US healthcare providers using electronic health records (EHR) is increasing due to an estimated $27 billion government investment made in the American Reinvestment and Recovery Act (ARRA) of 2009. Under ARRA, the Health Information Technology for Economic and Clinical Health (HITECH) Act authorizes the Centers for Medicare and Medicaid Services (CMS) and the Office of the National Coordinator of Health Information Technology (ONC) to support EHR adoption and modernization through technology incentive payments and adjustments in Medicare reimbursements. To qualify for the incentive payments and to avoid reduced Medicare reimbursements, eligible hospitals (EH) and professionals (EP) must demonstrate that their EHRs can perform a range of measurable functions that support healthcare quality, safety and effectiveness[i]. Also known as 'meaningful use requirements', these functions include collecting and sending health data to PHA for the purpose of improving public and population health (Figure 1).

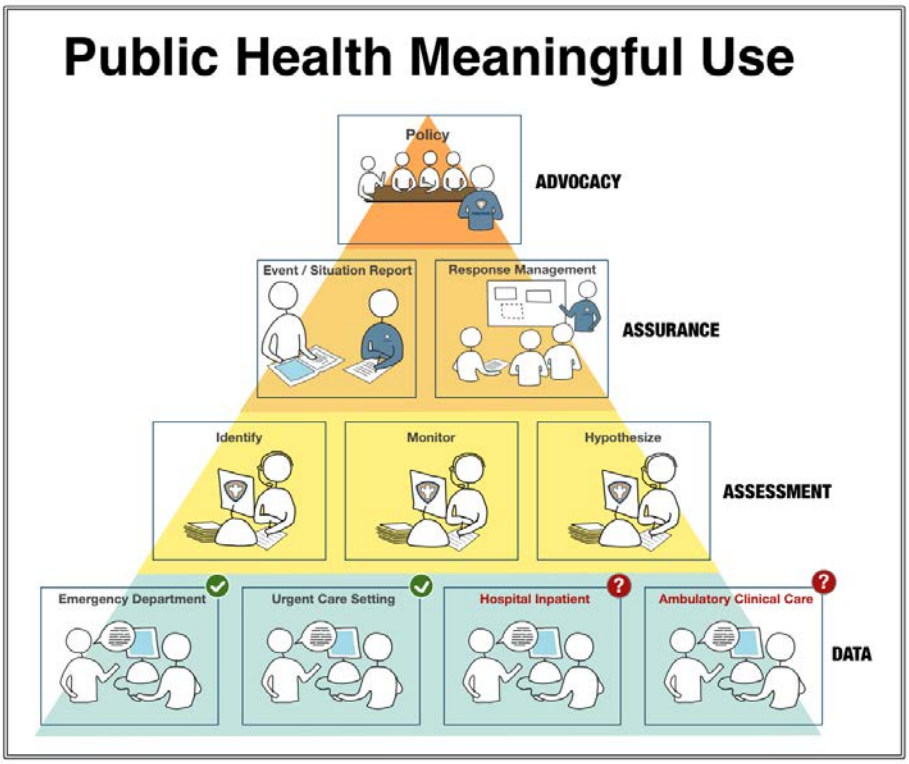
Meaningful Use (MUse) is an opportunity and a challenge for PHAs. It is an opportunity because the programs address critical technical barriers to health data sharing partnerships and formalize certification and testing to ensure public health data requirements. Increased data access and technical requirement fulfillment, however, are not the only elements necessary for increasing surveillance capability, nor are they sufficient for improving public and population health. PHA infrastructure must be expanded to manage, process, analyze and apply the data for public health action. Although required for meeting the public health objective of MUse, these critical components are not within the scope of HITECH. It is therefore incumbent upon PHAs to achieve MUse goals by leveraging their existing resources.

Syndromic Surveillance for Meaningful Use

Syndromic surveillance uses individual and population health indicators, which are available before confirmed diagnoses or laboratory confirmation, to identify outbreaks or health events and monitor community health status. It is one of several approaches to public health surveillance, unique in its use of limited data sets that are reported and analyzed in near real-time. PHSS systems are also notable for their ability to monitor pre-determined and *ad hoc* health indicators without impacting data provider workflows.

PHSS systems receive and analyze data from a range of clinical and non-clinical data sources. The clinical data sources monitored by the vast majority of these systems are from emergency departments (ED) and urgent care centers (UC). Non-clinical sources include emergency medical services (EMS), 911 and poison control centers, and school absenteeism.

Figure 1 – A Public Health Meaningful Use Vision: EHR data supports core public health functions with information necessary for protecting and assuring the conditions within which populations can be healthy. Previous work by ISDS and the CDC recommended guidelines for ED and UC data. The current project seeks to identify similar guidelines for hospital inpatient and ambulatory clinical care data.



Under MUse Stage 1, sending PHSS data to PHA is an optional incentive measure for EHs and EPs. In its current form, however, the measure lacks a syndromic surveillance data content standard for EHR certification. For MUse stage 2, the CDC's Public Health Information Network (PHIN) Messaging Guide for Syndromic Surveillance, a translation of a 2011 ISDS Recommendation, is proposed for the measure (See NPRM filed on February 23, 2012)[1]. The 2011 ISDS *Final Recommendation*, which was developed through input from a committee of syndromic surveillance experts and stakeholder input, specifies core EHR data requirements based on business processes that are common among PHSS systems. Adoption of the CDC *PHIN Messaging Guide* for MUse Stage 2 should better align the aims of HITECH with the PHA infrastructure, and set the stage for success in future MUse stages.

Notably, the current CDC *PHIN Messaging Guide* and 2011 ISDS *Final Recommendation* cover only two clinical settings: Emergency departments (ED) and urgent care centers (UC). This is because few PHAs routinely receive and analyze clinical data from other settings. Among early adopters, however, it appears that integrating inpatient hospitalization (IH) and ambulatory clinical care (AC) health data has significant potential for enhancing public health situation awareness.

[1] Office of the Federal Register. Centers for Medicare and Medicaid Services Proposed Rules: Electronic Health Record Incentive Program-Stage 2. NPRM #: 2012-04443. Filed: 2/23/2012. Published: 3/7/2012. Link

This Document

This report presents the initial product of a new ISDS and CDC initiative to advance surveillance practice and further clarify Meaningful Use standards for PHSS, specifically with regard to health data from hospital inpatient and ambulatory clinical care settings. This initiative aims to bring the entire stakeholder community together for a dialogue on leveraging existing public health assets and Meaningful Use investments for more timely and effective disease prevention, public health response, and health outcomes.

These guidelines, as an initial attempt, are subject to revision and refinement based on the input of the stakeholder community. Subsequently, the technical specifications necessary for implementation will need to be developed through, for example, a message implementation guide, similar to the one previously developed for ED and UC data.

This report describes:

1. The process ISDS is using to develop a new recommendation for PHSS using hospital inpatient and ambulatory clinical care EHR data.
2. The core analytics for PHSS using these data sources as developed by a multi-stakeholder committee of experts in public health surveillance, medical informatics, and clinical healthcare.
3. Reporting parameters for the transmittal of EHR data within the scope of Meaningful Use requirements for inpatient and ambulatory clinical care EHR data.
4. A set of data elements to support the recommended core analytics.

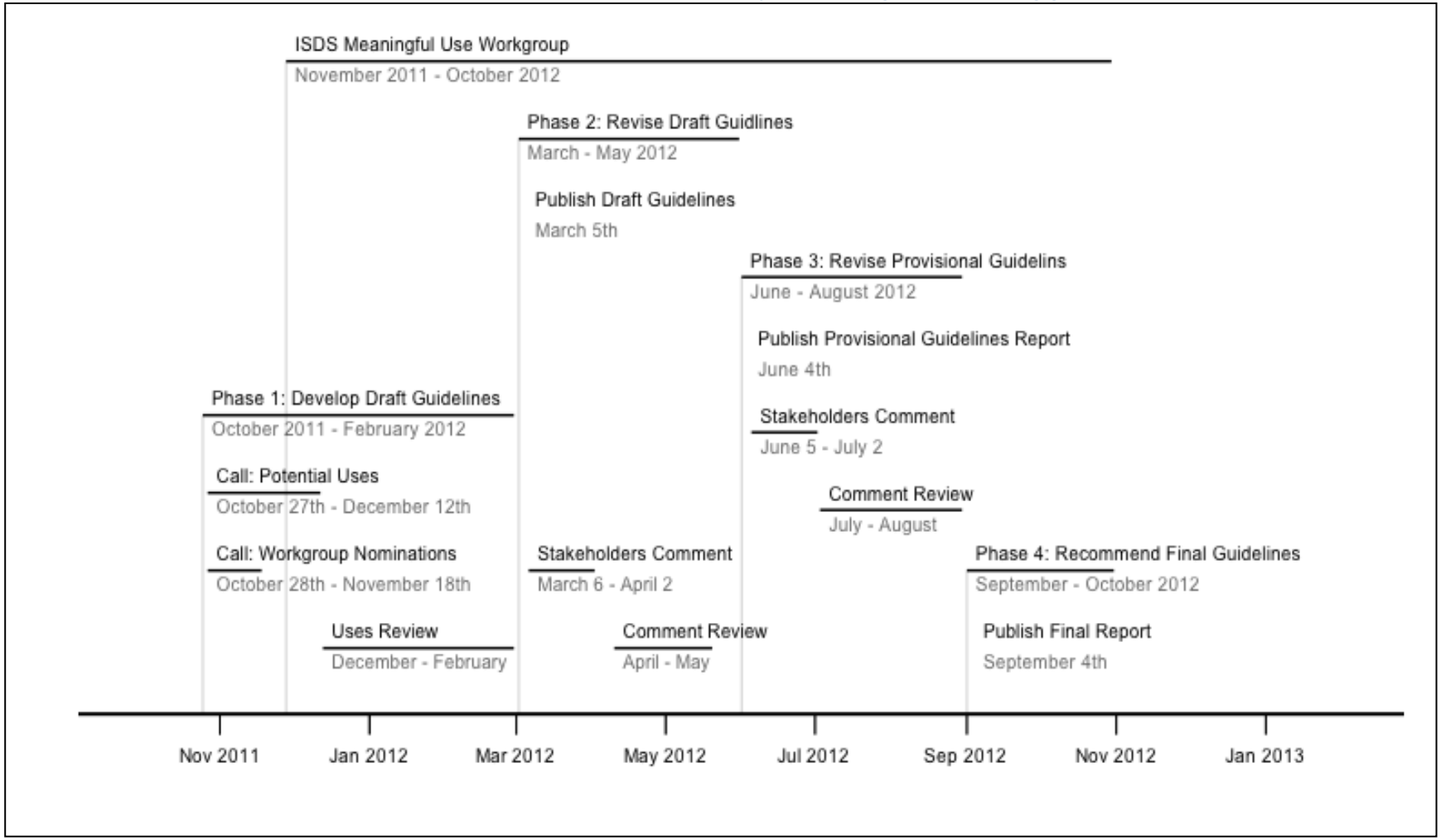
Future Guideline Versions

Readers of this report are urged and encouraged to comment on its contents. All comments will be rigorously analyzed, presented back to the community, and used to inform future iterations of these guidelines before a final report is released in September 2012 (see Figure 2: Project Timeline).

In addition to changes based on stakeholder input, future guideline versions may also include the following:

- Further results from the current state analysis
- Generalized documentation of relevant public health and clinical business processes
- Incorporation of information exchange or transport requirements
- Information regarding message implementation guide development

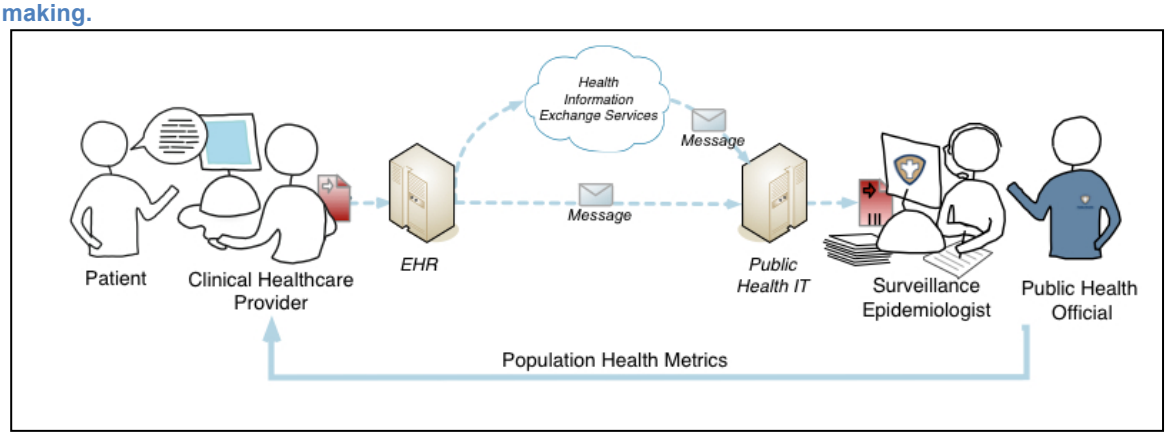
Figure 2 – Project Timeline: New guidelines for PHSS are being developed by using a community consensus-driven process that gathers stakeholder input upon project initiation, following draft guidelines, and again following the release of provisional guidelines. A multi-stakeholder committee of experts in public health surveillance, medical informatics, and healthcare delivery are advising and overseeing guideline development.



Guidelines Development Process

A syndromic surveillance standard for Meaningful Use should guide EHR technology in a manner that improves community health (Figure 3). Standards that inform what data will be sent from providers to PHAs must also be feasible for all eligible hospitals, eligible professionals and PHAs, regardless of their technological and workforce capabilities. As more clinical settings implement the use of EHRs, the need for standards in the type and format of the data becomes apparent. For example, Meaningful Use dictates that messages be transmitted in an HL7 format. The new standard also needs to build upon best practices and prior work, comply with existing Meaningful Use standards, and operate within a variety of health information exchange (HIE) architectures. The challenge is developing a standard that balances feasibility, best practices, compliance, and interoperability without constraining innovation.

Figure 3 – Information Exchange Among Healthcare Providers and Public Health Officials: Transmission of EHR data to PHA results in population health metrics that can inform healthcare and public health decision-making.



ISDS Meaningful Use Workgroup

To develop new guidelines for inpatient and ambulatory clinical care use of EHR data for PHSS, ISDS convened a multi-stakeholder Meaningful Use Workgroup. Members were nominated by peers and selected based on the depth and breadth of their expertise; the strength of their affiliations with key stakeholder groups (*e.g.*, NACCHO, ASTHO, HIMSS/EHRA, CSTE); and past experience in developing national policy recommendations. The reason for including a mix of stakeholder perspectives is to ensure that the standards developed will be feasible and practical to public health, clinical care, vendors, and other key stakeholder communities.

Stakeholder Input, Phase 1: Identify Potential Uses

To determine current and potential uses of inpatient and ambulatory EHR data for public health syndromic surveillance purposes, ISDS solicited input from local, state and federal public health practitioners as well as other stakeholders with surveillance experience. A *Call for Potential Uses* was widely disseminated by ISDS and partner organizations, including the National Association of County and City Health Officials (NACCHO) and the Council of State and Territorial Epidemiologists (CSTE). The *Call for Potential Uses* (Call) was also publicized using other ISDS media (*e.g.*, ISDS Newsletter, ISDS Blog, Twitter and during monthly ISDS Committee Meetings).

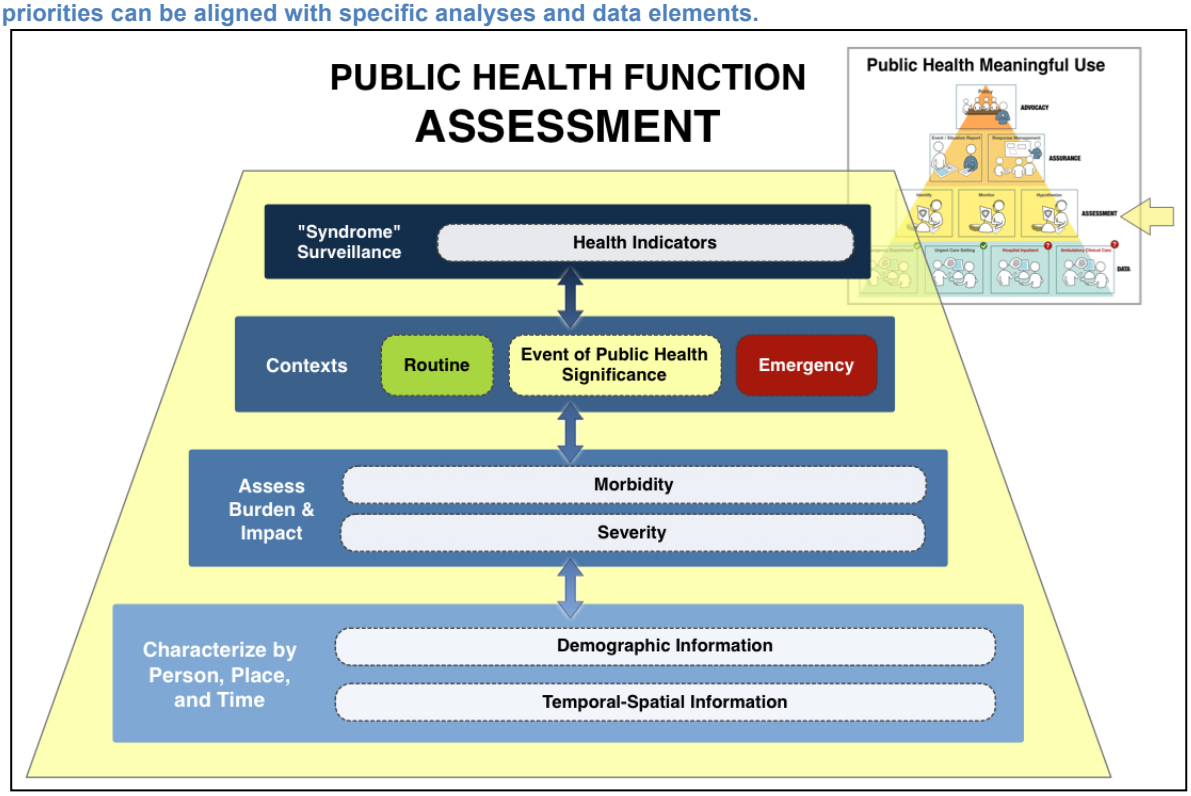
Stakeholders were directed to a web-based survey where open-ended responses were collected for the following questions:

1. What outcomes (*i.e.*, health indicators or behaviors) can public health authorities routinely monitor with a syndromic surveillance approach and translate into public health action using hospital inpatient EHR data, or ambulatory clinical care EHR data?
2. What data elements (*i.e.*, description and vocabulary) are required for syndromic surveillance using hospital inpatient EHR data, or ambulatory clinical care EHR data?
3. What evidence (*i.e.*, anecdotal or documented) supports your required data elements for syndromic surveillance using hospital inpatient EHR data, or ambulatory clinical care EHR data?
4. What ambulatory clinical care settings collect health data that is of potential use to public health practice through syndromic surveillance?

All responses (N=18) received during the six-week response period were analyzed by three independent reviewers and organized by common themes. De-identified stakeholder responses and a responses analysis are available on the ISDS website at: http://www.syndromic.org/meaningfuluse/IAData/PotentialUsesPHSS

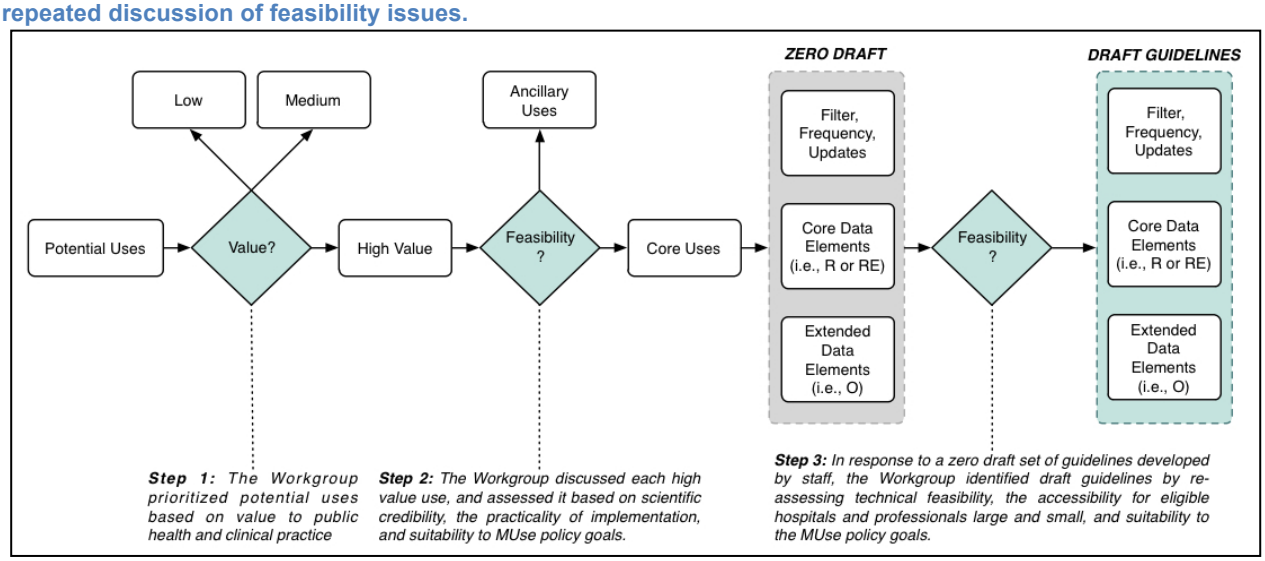
Stakeholders submitted a range of responses to the *Call for Potential Uses.* Response specificity varied from general statements describing PHA program areas (e.g., infectious disease surveillance) and situations where such data would help (e.g., emergencies), to specific data element names and vocabulary. To cogently review this input, a framework was developed (Figure 4). The framework expands the public health assessment or surveillance function into four inter-related components: Syndrome surveillance, the surveillance approach relevant to these guidelines; Context or the conditions influencing analyses and data use; Assess burden and impact, a component intended to represent interpretation, and; Characterize by person, place and time with various analytic methods. Using this framework, surveillance priorities can be aligned with specific analyses and data elements.

Figure 5 – Framework Used to Assess *Call for Potential Uses* Results: Using this framework, surveillance priorities can be aligned with specific analyses and data elements.



The ISDS Meaningful Use Workgroup developed draft guidelines by identifying Core PHSS Analytics, or general surveillance purposes and related analyses, as a basis for an inpatient and ambulatory clinical data PHSS Data Reporting Model. The three-step process (Figure 5) drew upon stakeholder input received during the *Call for Potential Uses*, the expertise of Workgroup members, and the results of an on-going current state analysis (see below).

Figure 6 – Workgroup decision process for identifying core analytics. In three steps, the Workgroup identified guidelines using a top-down approach that began with prioritizing potential uses, and included repeated discussion of feasibility issues.



Current State Analysis, Phase 1: Identify Existing Implementations and Use Cases

To be implementable across the health information technology environment, the design of a syndromic surveillance standard for Meaningful Use certification must account for the current state of surveillance practice, public health business needs, and EHR adoption. ISDS staff members are currently conducting a literature search and key informant interviews to describe the existing state of practice.

There is growing evidence that a syndromic surveillance approach to using inpatient and ambulatory clinical care EHR data enhances public health prevention and response activities. Health authorities that routinely receive inpatient data and use a syndromic approach have found it useful in monitoring infectious diseases, characterizing outbreaks, maintaining situational awareness during disasters, and monitoring chronic disease risk factors. Ambulatory clinical care data suggests that a syndromic approach is particularly well suited to fill a need for more timely population health information on critical health threats including chronic disease exacerbations and health disparities.

There are, however, significant differences in how the current surveillance systems use and collect syndromic data from these clinical sources across a number of parameters (Table 1). These differences include: The frequency at which analyses are performed; the clinical data elements collected; and how the data are shared between clinical settings and PHAs. Variations in the mandates and levels of technical and epidemiological resources with which the PHAs operate are mainly responsible for these differences. PHA business needs vary and result in significant differences in surveillance priorities.

Currently, EHR installations in hospital inpatient and ambulatory clinical care settings are also significantly variable. As healthcare providers have gradually adopted electronic technology for multiple purposes, including administrative and clinical information management, interoperable solutions to support PHSS data needs have been lacking. EHR installations may vary from single integrated, enterprise-wide system to multiple sub-systems supporting individual departments. As a result, the relevant data elements of public health interest are likely to differ in name, vocabulary, and location both within and across institutions.

Table 2 – Current State Analysis Results: Examples of PHA with syndromic surveillance systems that use inpatient or ambulatory clinical care data.

Name	Clinical Data Source(s)	Description of Program/System	Sample Use Case(s)
NYCDOHMH Primary Care Information Project[2]	Ambulatory	Promotes the use of electronic health records in primary care practices, especially in underserved communities; allows for tracking of disease patterns	Influenza-like illness
Missouri ESSENCE[3]	Hospital Inpatient	Groups chief complaint data into syndrome groups for real-time analysis; also can be used to track known health events through data querying	Gastrointestinal illness Carbon monoxide poisoning
Syndromic Surveillance Event Detection of Nebraska	Hospital Inpatient	Utilizes syndromic surveillance for statewide tracking of cardiovascular disease-related hospitalizations	Cardiovascular disease
Healthcare Associated Infection and Influenza Surveillance System (Veterans Administration)	Hospital Inpatient and Ambulatory	Utilizes the VA's linked electronic health record system to detect health events both in ambulatory and inpatient care settings	Healthcare associated infections Influenza-like illness
Washington State	Hospital Inpatient	Collects electronic data from two regions in Washington State and submits to the Washington Department of Health for analysis	Influenza-like illness
CDC BioSense[4]	Hospital Inpatient	Aggregates data from local, state and federal public health for CDC analysis	Detect emergency health-related threats

[2] http://www.nyc.gov/html/doh/html/pcip/pcip.shtml
[3] http://health.mo.gov/data/essence/
[4] http://www.cdc.gov/biosense/

Draft Guidelines

Background

Current PHSS business processes, as described in ISDS's prior recommendation, *Final Recommendation: Core Processes and EHR Requirements for Public Health Syndromic Surveillance*[5], can incorporate health data from inpatient and ambulatory clinical care encounters. The fundamental characteristics of syndromic surveillance systems must be recognized in order to see how PHSS processes harbor this potential. The characteristics that distinguish syndromic surveillance from other approaches to surveillance are:

1. Timeliness: The system attempts to maximize timeliness of transmission of records to the public health agency.
2. Prediagnostic: In order to maximize timeliness, the system accepts reductions in diagnostic specificity and positive predictive value of individual records.
3. Population focus: The system provides information primarily about the health status of the community, rather than about individuals.
4. De-identified Data: PHSS data do not contain any personal health information (*e.g.*, patient name, street address or date of birth), except where this is permissible under state or local laws.
5. Unfiltered records: PHSS data represent all the patient encounters of a particular type (*e.g.* admissions, outpatient clinic visits) in each facility, not a subset based on specific selection criteria. There is no filtering on the facility's end.

The following guidelines for syndromic surveillance using hospital inpatient and ambulatory clinical care data were drawn to support public health authorities in using certified hospital inpatient and ambulatory clinical care EHR data for timely and effective public health prevention and response. These guidelines preserve the fundamental characteristics of PHSS data while striving to achieve objectives within a clear scope and set of assumptions (

Table 3).

Table 3 – Goals and Objectives, Scope, Assumptions

Goals and Objectives
1. Articulate a business case for the routine exchange of a limited EHR data set in inpatient and ambulatory care settings 2. Define the sending and receiving parameters required for inpatient and ambulatory care settings 3. Identify priority conditions that can be monitored with existing resources using syndromic surveillance 4. Define the EHR data elements necessary for monitoring identified priority conditions 5. Identify the types of information interchange architectures that can support syndromic surveillance
Scope
1. This Guideline addresses syndromic surveillance EHR data in the inpatient and ambulatory clinical care settings. 2. The CMS EHR Reimbursement Program (a.k.a., Meaningful Use programs) encourages public health authorities to exchange surveillance data with healthcare providers • Health data under consideration are those within an Electronic Health or Medical Record

[5] International Society for Disease Surveillance. Final Recommendation: Core Processes and EHR Requirements for Public Health Syndromic Surveillance. 1/31/2011. Link

- Message and Vocabulary Standards must support current and continued public health surveillance improvements and maintain consistency with the CMS EHR Reimbursement Program

Assumptions

1. Surveillance is a core public health function that assesses community and population health for all hazards.
2. New capabilities and business practices will emerge and the business requirements for syndromic surveillance may change.
3. Significant variability exists in the regulations, policies, practices, technology, and resources among federal, state, and local public health jurisdictions.
4. Guidelines may require personalized additions to comply with existing or future state and local laws.
5. State and local laws may further restrict covered entities (*e.g.*, healthcare organizations) from sharing health records with public health agencies.
6. The majority of public health authorities have or will have the infrastructure, capability and capacity to receive, manage, analyze, and meaningfully use the specified health data.
7. Eligible health care professionals will have the infrastructure, capability and capacity to send the heath data specified by these guidelines.
8. Electronic Health Record installations vary from a single integrated system to multiple individual departmental systems, which may affect consistency and workflow.

Hospital Inpatient EHR Data

The routine transfer of data based on hospital inpatient EHR records between individual hospitals and PHAs will enhance awareness of community health trends, especially during events and emergencies that threaten public health safety or welfare. By leveraging existing syndromic surveillance business processes, PHAs should be able to process a limited EHR data set and routinely monitor hospitalization trends related to infectious disease agents, environmental hazards, health behaviors, population vulnerabilities, and disasters. This information can then be shared (with appropriate permission levels) with health officials and data providers, and used in strategic initiatives to improve population health.

Hospitalization PHSS Core Analytics

Among the many ways that timely hospitalization data can enhance public health surveillance, the ISDS Meaningful Use Workgroup identified five purposes of syndromic surveillance to drive Data Reporting Model development. These are as follows:

1. Gauge or assess the severity of infectious disease outbreaks with greater sensitivity and timeliness
2. Characterize spatial-temporal associated hospitalizations during a hazardous material-related event with greater sensitivity
3. Detect or identify injury trends (including severity) related to violence or motor-vehicle use with greater sensitivity and timeliness
4. Gauge or assess incident-related mortality with greater timeliness
5. Assist with identifying and characterizing health disparities with greater sensitivity and timeliness

These processes are mainly extensions or new applications of PHSS purposes that are widely used with other clinical and non-clinical data sources (*e.g.*, statistical time-series and spatial analyses). While the Data Reporting Model described below is designed to support these core analytics, it will likely support a flexible range of routine and ad hoc analyses.

Ambulatory Clinical Care EHR Data

The routine transfer of ambulatory clinical care EHR data between healthcare professionals and PHAs will enhance awareness of community health trends, especially during events and emergencies that threaten public health safety or welfare. By leveraging syndromic surveillance business processes, PHAs should be able to process a limited EHR data set and thus routinely monitor ambulatory encounter trends related to infectious diseases, chronic disease, population vulnerabilities, and disasters. The addition of ambulatory EHR data will provide new opportunities in PHSS while also enriching existing data.

Ambulatory Clinical Encounter PHSS Core Analytics

Among the many ways that timely ambulatory clinical care encounter data can enhance public health surveillance, the ISDS Meaningful Use Workgroup identified five purposes of syndromic surveillance to drive Data Reporting Model development:

1. Characterize and assess the morbidity of non-reportable conditions with greater sensitivity and timeliness
2. Gauge or assess the morbidity associated with infectious disease outbreaks with greater sensitivity and timeliness
3. Identify and characterize spatio-temporal patterns of epidemics with greater sensitivity and timeliness
4. Characterize incident-related exacerbation of chronic disease conditions with greater sensitivity and timeliness
5. Identify and characterize healthcare access-related disparities with greater sensitivity and timeliness

These processes are mainly extensions or new applications of PHSS purposes that are widely used with other clinical and non-clinical data sources (e.g., statistical time-series and spatial analyses). While the Data Reporting Model described below is designed to support these core public health analytics, it will likely support a flexible range of routine and *ad hoc* analyses.

PHSS Data Reporting Model

All parties involved in the data transaction (*e.g.*, eligible healthcare provider, EHR technology vendor, information brokers, and PHA), will need to determine and agree upon the specific requirements, per the applicable jurisdictional laws and practices.

Facility Registration

When data sharing partnerships are established (as described in the business process: Establish and Maintain Data Sharing Partnerships (BP2) from the 2011 ISDS *Final Recommendation*, some PHAs should register facility metadata to minimize report payload and identify, validate, and assess data transmissions. The use of facility registration data may streamline data transmission by eliminating the need for select data elements, such as treating facility address and data transmitter address, to be sent repeatedly.

The metadata captured to register a facility may include, but is not limited to:

- Facility Name
- Facility Location / Address
- Unique Facility Identifier
- Umbrella Organization, if applicable

- Facility Type or Specialty

As State-wide Health Information Exchanges (HIEs) develop, facility registration must be further developed to ensure that the facility metadata are current, complete, and accessible to PHAs for PHSS.

Reporting Parameters

Frequency of Hospital Inpatient Settings: At a minimum, data should be provided daily to the PHA within 8 hours of the end of the following time periods (See Figure 6):

- Every patient upon admission between midnight and 11:59 pm
- Every patient upon discharge between midnight and 11:59 pm

Frequency of Ambulatory Care Settings: At a minimum, data should be provided daily to PHA within 8 hours of the end of the following time period

- Every patient encounter between midnight and 11:59 pm (See Figure 7).

Unfiltered Data: Data providers ***should not*** filter the records unless otherwise specified under jurisdictional laws and practices. Sending facilities should transmit all records meeting the inclusion criteria and include all the specified data elements of interest for all transmitted records.

Updates: Updates are ***not*** required. If providers wish to send updates, the updates should follow the same specifications as the original transfer.

Record Linkage: Linking patient data between different or repeat encounters is **not** required. This operates under the assumption that discharge records contain all the data from the admission record in addition to any new data.

Anonymized / Pseudonymized Data: Anonymizing data is the process that removes the association between identifying data and the patient. Pseudonymizing data is the process by which identifying fields within a data record are replaced by artificial identifiers. In addition to HIPAA, variations in state and local laws restrict or allow various degrees of identifying data to be transmitted between data providers and the PHA. Individual jurisdictions should develop their specifications in accordance with applicable state and local laws. HITSP/C39 provides guidance on this issue.

Figure 6 – Graphic depiction of PHSS reporting parameters for inpatient setting: Data elements of interest are sent to PHA every 24 hours. Records are unfiltered containing data that become available following admission and discharge hospital events.

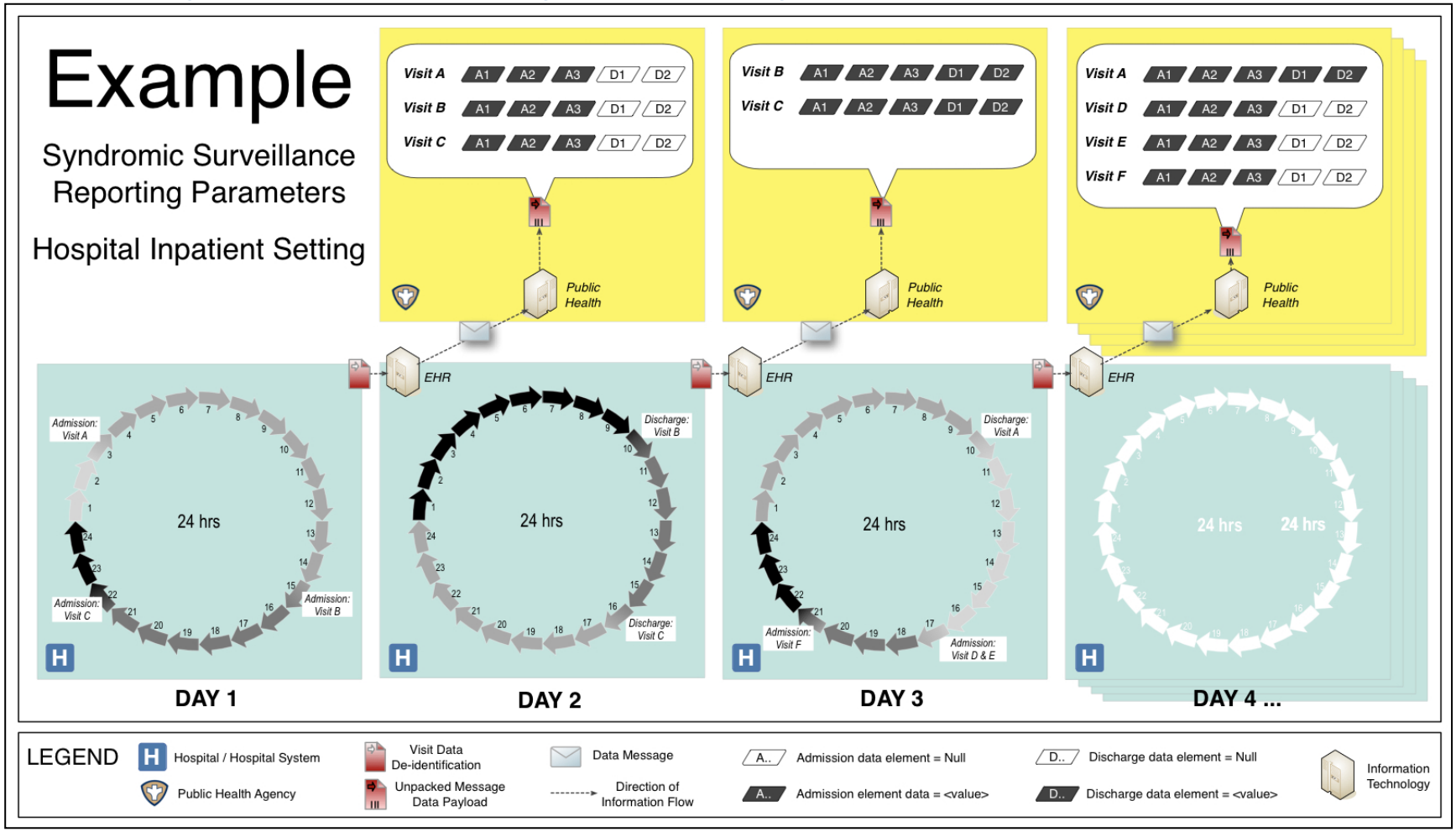
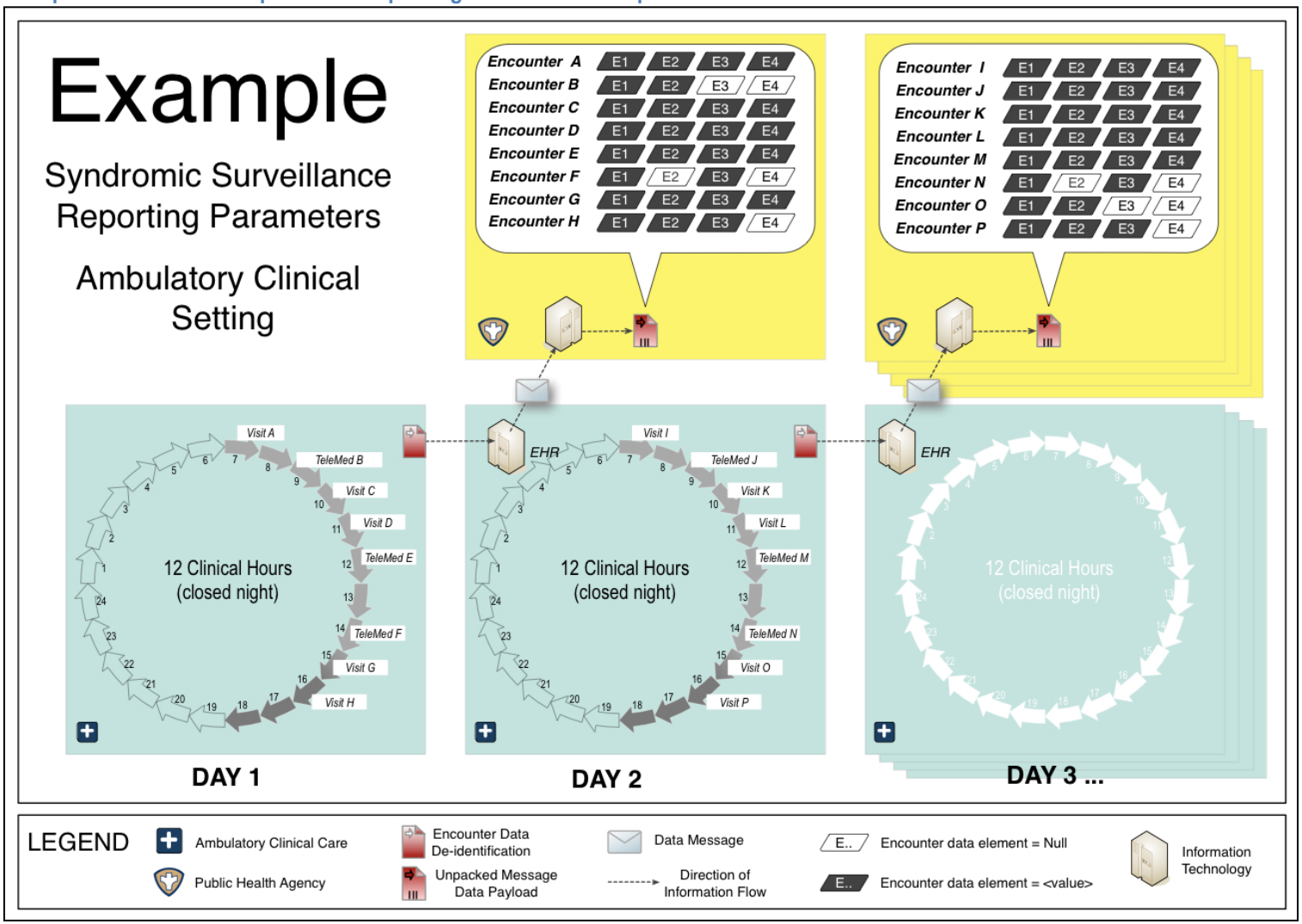


Figure 7 – Graphic depiction of PHSS reporting parameters for ambulatory clinical care setting: Data elements of interest are sent to PHA every 24 hours. Records are unfiltered containing data available at the end of the reporting period. In some cases, elements of interest may be sent empty due to the pace of clinical work processes. Updating records is not required.



Record Parameters: Data Elements of Interest

Table 4 presents the minimum data required to support the indicated inpatient and ambulatory PHSS Core Analytics. This list may not represent the entire list of data elements needed to support the full spectrum of practice. Therefore, the actual data elements and specifications are subject to change in accordance with applicable state and local laws and practice.

Table 5 presents the optional recommended data elements. These data elements will support and enhance the use of inpatient and ambulatory clinical care data but will not be required.

See Appendix 2 and 3 for more detailed descriptions of these data elements, their vocabulary and any relevant notes.

Table 4 – Summary Table of Core Data Elements of Interest: The following elements are proposed as required for the core PHSS analytics with inpatient and ambulatory clinical care EHR data.

#	Data Element Name	Description of Field	Applicable Setting (I = Inpatient A = Ambulatory)
1	Facility Identifier (Treating)	Unique facility identifier of facility where the patient is treated (original provider of the data)	I, A
8	Report Date/Time	Date and time that the report is created / generated from original source (from treating facility)	I, A
9	Unique Visit / Encounter ID	Unique identifier for a patient visit or encounter	I, A
10	Unique Patient Identifier	Unique identifier for the patient	I, A
11	Age	Numeric value of patient age at time of visit	I, A
12	Age units	Unit corresponding to numeric value of patient age (*e.g.* Days, Month or Years)	I, A
13	Gender	Gender of patient	I, A
14	Race	Race of patient	I, A
15	Ethnicity	Ethnicity of patient	I, A
16	Patient ZIP Code	ZIP Code of patient residence	I, A
17	Patient County	County of patient residence	I, A
19	Patient Country	Country of patient residence	I, A
20	Admit or Encounter Reason	Short description of the reason for admission or patient encounter recorded when seeking care	I, A
21	Admission or Encounter Date/Time	Date and time of admission or patient encounter	I, A
22	Admission or Encounter Type	Type of admission or patient encounter	I, A
23	Patient Class	Patient classification within facility	I, A
24	Diagnosis / External Cause of Injury Code	Diagnosis code or external cause of injury code (for injury-related visits) of patient condition	I, A
25	Diagnosis Type	Qualifier for Diagnosis / Injury Code specifying type of diagnosis	I, A

#	Data Element Name	Description of Field	Applicable Setting (I = Inpatient A = Ambulatory)
26	Diagnosis Priority	Priority of the diagnosis	I, A
27	Discharge Disposition	Patient's anticipated location or status following discharge	I
28	Discharge Date/Time	Date and time of discharge	I
29	Preliminary Cause of Death	Preliminary cause of death of patient	I
32	Chief Complaint (from the ED/UC if applicable)	Short description of the patient's chief complaint during a ED/UC visit, if applicable	I
34	Hospital Unit	Hospital unit where patient is treated	I
35	Pregnancy Status	Pregnancy status of the patient	I, A

Table 5 – Summary Table of Extended Data Elements of Interest: The following data elements are proposed as optional for the core PHSS analytics with inpatient and ambulatory clinical care EHR data.

#	Data Element Name	Description of Field	Applicable Setting (I = Inpatient A = Ambulatory)
2	Facility Name (Treating)	Name of the treating facility where the patient is treated	I, A
3	Facility Location (Treating) • Street address	Street address of treating facility location	I, A
4	Facility Location (Treating) • City	City of treating facility location	I, A
5	Facility Location (Treating) • ZIP Code	ZIP Code of treating facility location	I, A
6	Facility Location (Treating) • County	County of treating facility location	I, A
7	Facility Location (Treating) • State	State of treating facility location	I, A
18	Patient State	State of patient residence	I, A
30	Procedure Code	Procedures administered to the patient	I, A
31	Problem List	Problem list of the patient condition(s)	I, A
33	Date of Onset (of Chief Complaint)	Date that patient began having symptoms reported under Chief Complaint	I

Appendix

1. Description of Data Elements
2. Extended Data Elements Tables
3. Glossary of Terms
4. References

Appendix 1: Data Element Terminology Defined

Table 6: This table defines the columns used in Appendices 2 and 3 that present the data elements of interest, their vocabulary, and notes.

Column Name	Definition
Data Element Name	Name of the minimum data set element.
Description of field	Description of the data element
Applicable Setting	Refers to whether the data element is applicable to either Inpatient or Ambulatory Care settings, or both. The codes used in this field are: I = Inpatient Care A = Ambulatory Care
Usage	Refers to whether an element is a required or optional field. The Usage codes are: **R** – Required: Indicates that the field is a required field and must be supported by the EHR system. A real value, not "none" or any other incomplete value, must be present in the field in order for the message to be accepted and to avoid receiving an error message. **RE** – Required, but can be empty: Indicates that the EHR system must to include the capability to provide this variable to public health, but clinical settings may not use or populate all records with this value. If data are present, then they must be reported. However, if no data are or have yet been captured for the element in the clinical setting, the message may be sent with the field containing no data. **O** – Optional: Indicates that this field must be supported by the EHR system, but clinical settings or PHA may opt not to send or receive it. Specific usage of these data elements shall be determined at the state or local-level jurisdiction. **C** – Conditional: Indicates that the field contains an associated condition or predicate that must be met, as defined in the Notes field.
Cardinality	Minimum and maximum number of times the element may appear.
Value Set	Vocabulary or value set to be used for the data element
Notes	Additional notes that describes rules pertaining to the data element, how the data element field should be processed, or identifies relevant values for the data element.

Appendix 2: Core Data Elements of Interest

Table 7 – Detailed table of required and core data elements of interest

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
Treatment Facility Identifiers							
1	Facility Identifier (Treating)	Unique facility identifier of facility where the patient is treated (original provider of the data)	I, A	R	[1..1]	National Provider Identifier	• Use facility identifier for state or local reporting only. This is due to agreements with many health data providers that explicitly state that states or localities will not expose them to a third party like the federal government when reporting above state level. • This number should be specific for each facility location (not a number representing an umbrella business). • It is recommended that National Provider Identifier (NPI) be used for the Facility Identifier.
8	Report Date/Time	Date and time that the report is created / generated from original source (from treating facility)	I, A	R	[1..1]		If data flows through an intermediary or third party, the intermediary must keep the original date/time of report creation / generation.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
9	Unique Visit / Encounter ID	Unique identifier for a patient visit or encounter	I, A	C	[0..1]	HL7 Table 0203 http://phinvads.cdc.gov/vads/ViewValueSet.action?id=0B1911BC-E324-E011-B71B-00188B39829B	• Conditional: Either Unique Visit / Encounter ID AND/OR Unique Patient Identifier must be sent. Send both Unique Visit / Encounter ID and Unique Patient ID if a combination of both is required to create a unique identifier. • This data element may be used as the unique identifier used between the data sender and receiver to identify the record. A unique ID is necessary to conduct reach-back. • Unique Visit/Encounter ID may pose fewer concerns related to patient de-identification/privacy.
10	Unique Patient Identifier	Unique identifier for the patient	I, A	C	[0..*]	HL7 Table 0203 http://phinvads.cdc.gov/vads/ViewValueSet.action?id=0B1911BC-E324-E011-B71B-00188B39829B	• Conditional: Either Unique Visit/Encounter ID AND/OR Unique Patient Identifier must be sent. Send both Unique Visit/Encounter ID and Unique Patient ID if a combination of both is required to create a unique identifier. • This data element may be used as the unique identifier used between the data sender and receiver to identify the record. A unique ID is necessary to conduct reach-back. • Examples of Unique Patient Identifiers are Patient Account number or a Master Patient Index (MPI) number. • The cardinality allows multiple identifiers to accommodate situations where a data provider sends multiple identifiers, such as patient MPI number in addition to patient account number. • In addition, if the message goes through a data intermediary, such as an HIE, then multiple patient identifiers may exist. In such cases, it is important that all intermediaries retain and provide all associated patient identifiers for the patient, such that they are required to be able to identify the patient at the treating facility.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
Patient Demographics							
11	Age	Numeric value of patient age at time of visit	I, A	RE	[1..1]		• Sending DOB may not be an acceptable alternative to sending age due to possible restrictions in patient privacy. Data providers and receivers should determine specific data restrictions on age for their jurisdiction. • The data requested is the patient's age at time of visit. The age should not update over time as the patient ages. • For patients age 65 or older, do not provide a specific numeric age. Instead, provide their age grouped as "65 or older" or similar. This will reduce patient identification based on age since prevalence of patients 65 or older may be less than other age groups. • Round ages up to the nearest year. For example, if the patient is 35 years and 8 months old, round up to 36 years. If an infant is 3 months old, round up to 1 year old. • Age is RE since there may be instances (i.e. unconsciousness) where patients cannot provide the information needed for this field.
12	Age units	Unit corresponding to numeric value of patient age (e.g. Days, Month or Years)	I, A	C	[1..1]	UCUM Age Units Relevant Age Unit values: • Days • Weeks • Months • Years	• Conditional: If Age is provided, Age Units must be provided. • Use the unit that is applicable to and describes the numerical age value

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
13	Gender	Gender of patient	I, A	RE	[0..1]	HL7 v2.5.1 Administrative Sex (Table 0001) Values include: A = Ambiguous F = Female M = Male N = Not applicable O = Other U = Unknown	
14	Race	Race of patient	I, A	RE	[0..*]	CDC Race Category Value Set: http://phinvads.cdc.gov/vads/ViewValueSet.action?id=67D34BBC-617F-DD11-B38D-00188B398520 Values include: • American Indian or Alaska Native • Asian • Black or African American • Native Hawaiian or Other Pacific Islander • White • Other Race	The patient may have more than one race defined.
15	Ethnicity	Ethnicity of patient	I, A	RE	[0..*]	CDC Ethnicity Group Value Set: http://phinvads.cdc.gov/vads/ViewValueSet.action?id=35D34BBC-617F-DD11-B38D-00188B398520 Values include: - Hispanic or Latino - Not Hispanic or Latino	

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
16	Patient ZIP Code	ZIP Code of patient residence	I, A	RE	[0..1]	USPS	• Provide 5 digits for domestic ZIP Code. • Foreign postal codes should be supported. • This data element helps identify spatio-temporal patterns of epidemics and target public health interventions and investigations.
17	Patient County	County of patient residence	I, A	RE	[0..1]	Free text	• This data element helps identify spatio-temporal patterns of epidemics and target public health interventions and investigations. • County helps to further target spatio-temporal patterns since ZIP Code can cross multiple counties
19	Patient Country	Country of patient residence	I, A	RE	[0..1]	ISO 3166-1 Country Value Set	Use 3 character codes
Patient Health Indicators							
20	Admit or Encounter Reason	Short description of the reason for admission or patient encounter recorded when seeking care	I, A	RE	[0..*]	ICD-9 or -10 Clinical Modification diagnosis code Or SNOMED Disorder/ Disease domain Or Free Text	• Senders should send the richest and most complete description of the patient's reason for admission or encounter. If both free text and drop down selection text are available, send both. If only drop down list fields are available, then concatenate all drop down list values selected and submit.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
21	Admission or Encounter Date/Time	Date and time of admission or patient encounter	I, A	RE	[0..1]		
22	Admission or Encounter Type	Type of admission or patient encounter	I, A	RE	[0..1]	Vocabulary for Admission Type: HL7 Table 007 A = Accident C = Elective E = Emergency L = Labor and Delivery N = Newborn (Birth in healthcare facility) R = Routine U = Urgent Vocabulary for Encounter Type TBD (possibly Current Procedure and Terminology designated for Evaluation and Management): Relevant examples include: • Routine, • Acute appointment, • Follow up, • Well baby, • Vaccination / blood draw	

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
23	Patient Class	Patient classification within facility	I, A	RE	[0..1]	HL7 Table 004 https://phinvads.cdc.gov/vads/ViewValueSet.action?id=2E275396-9717-E011-87A0-00188B39829B Examples of values used in this field include: • E: Emergency • I: Inpatient • O: Outpatient • P: Pre-admit • R: Recurring patient • B: Obstetrics	• It is recommended that public health constrain the transmitted data using the patient class code set. There is a potential for a large amount of data if not constrained. • If the PHA does not choose to constrain these data with separators, this field will be critical to process, constrain, and/or filter the data as needed by the PHA.
24	Diagnosis / External Cause of Injury Code	Diagnosis code or external cause of injury code (for injury-related visits) of patient condition	I, A	RE	[0..*]	ICD-9 or -10 Clinical Modification diagnosis code (including E-codes and V-codes) Or SNOMED Disorder/ Disease domain Or Free Text	• Admitting Diagnosis and Discharge Diagnosis should be provided (if available). • Diagnosis from the provider (EHR) is preferred over the diagnosis provided through billing. • This field is a repeatable field so multiple codes may be sent. • The first diagnosis code should be the principal diagnosis. • Include V-codes and E-codes • When the first-listed diagnosis code (principal diagnosis) is an injury, also provide one or more supplemental external-cause-of-injury codes or E-codes. E-codes provide useful information on the mechanism and intent of injury, place of occurrence, and activity at the time of injury.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
25	Diagnosis Type	Qualifier for Diagnosis / Injury Code specifying type of diagnosis	I, A	RE	[0..*]	HL7 v2.5.1 Diagnosis Type (Table 0052) Values include: A = Admitting F = Final W = Working	
26	Diagnosis Priority	Priority of the diagnosis	I, A	RE	[0..1]		Field that indicates whether the diagnosis is primary, secondary, etc.
27	Discharge Disposition	Patient's anticipated location or status following discharge	I	RE	[0..1]	National Uniform Billing Committee (NUBC) – Patient Status (UB04 -Field 17 Codes) http://phinvads.cdc.gov/vads/ViewValueSet.action?id=29D34BBC-617F-DD11-B38D-00188B398520#	• Include both the code and text description of the code. • This field should indicate patient death, if applicable.
28	Discharge Date/Time	Date and time of discharge	I	RE	[0..1]		

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
29	Preliminary Cause of Death	Preliminary cause of death of patient	I	RE	[0..1]		
32	Chief Complaint (from ED or UC, if applicable)	Short description of the patient's chief complaint, during an ED or UC visit if applicable.	I	RE	[0..*]	Free text (Preferred) Or ICD-9 or -10 Clinical Modification diagnosis code (including E-codes and V-codes) Or SNOMED Disorder/ Disease domain	• Senders should send the richest and most complete description of the patient's chief complaint. • If both the free text chief complaint text and drop down selection chief complaint text are available, send both. • If the chief complaint is available only from drop down list fields, then concatenate all drop down list chief complaints selected for that record/visit and submit. • Some hospital systems automatically overwrite chief complaint with final diagnosis when the final diagnosis code is assigned. The chief complaint text should NOT be replaced with other information either manually or by the data provider's system. Keep the chief complaint the same as how it was captured at time of admission.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
34	Hospital Unit	Hospital unit where patient is treated	I	RE	[0..*]	TBD. (Possibly NUCC) Examples of values used in this field may include: • General Surgery, • Medical ICU, • Adult ICU, • Medical Surgical, • Burn, • Pediatric ICU, • Pediatric, • Negative Pressure Isolation • Isolation	If multiple values are available, send all values.
35	Pregnancy Status	Pregnancy status of the patient	I, A	RE	[0..1]	ICD-9 or -10 Clinical Modification diagnosis code; V-Codes	Pregnancy status helps determine the risk factor for certain diseases or conditions, such as H1N1 influenza, Arboviral, Brucellosis, gastroenteritis, Acute Hepatitis B, Acute Hepatitis C, Hepatitis D & E, Listeriosis, Lyme disease, Malaria, Q Fever, Relapsing Fever, Rubella, West Nile Virus, and Yellow Fever.

Appendix 3: Extended Data Elements of Interest

Table 8: Detailed table of optional data elements of interest

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
Treatment Facility Identifiers							
2	Facility Name (Treating)	Name of the treating facility where the patient is treated	I, A	O	[0..1]	Free text	• If this data element is captured and maintained as part of the facility registration process, it may not be sent with every message. See section describing Facility Registration. • This data element captures data for the treating facility where the patient is treated.
3	Facility Location (Treating) • Street address	Street address of treating facility location	I, A	O	[0..1]	Free text	• If this data element is captured and maintained as part of the facility registration process, it may not be sent with every message. See section describing Facility Registration. • This data element captures data for the treating facility where the patient is treated.
4	Facility Location (Treating) • City	City of treating facility location	I, A	O	[0..1]	Free text	• If this data element is captured and maintained as part of the facility registration process, it may not be sent with every message. See section describing Facility Registration. • This data element captures data for the treating facility where the patient is treated.
5	Facility Location (Treating) • ZIP Code	ZIP Code of treating facility location	I, A	O	[0..1]	USPS	This data element helps identify spatio-temporal patterns of epidemics and target public health interventions and investigations

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
6	Facility Location (Treating) • County	County of treating facility location	I, A	O	[0..1]	Free text	• If this data element is captured and maintained as part of the facility registration process, it may not be sent with every message. See section describing Facility Registration. • This data element captures data for the treating facility where the patient is treated.
7	Facility Location (Treating) • State	State of treating facility location	I, A	O	[0..1]	FIPS 5-2 Use numeric codes	• If this data element is captured and maintained as part of the facility registration process, it may not be sent with every message. See section describing Facility Registration. • This data element captures data for the treating facility where the patient is treated.
Patient Demographics							
18	Patient State	State of patient residence	I, A	O	[0..1]	FIPS 5-2 Use numeric code	
Patient Health Indicators							
30	Procedure Code	Procedures administered to the patient	I, A	O	[0..*]	ICD-9 or -10 Clinical Modification diagnosis code (including E-codes and V-codes) Or Current Procedure and Terminology-4 Or Free Text	All procedure codes available at time of transmission.

#	Data Element Name	Description of Field	Applicable Setting	Usage	Cardinality	Value Set	Notes
31	Problem List	Problem list of the patient condition(s)	I, A	O	[0..*]	ICD-9 or -10 Clinical Modification diagnosis code (including E-codes and V-codes) Or SNOMED Disorder/ Disease domain Or Free Text	
33	Date of Onset (of Chief Complaint)	Date that patient began having symptoms reported under Chief Complaint	I	O	[0..1]		If possible, send the Date of Onset linked to the corresponding Chief Complaint.

Appendix 4: Glossary of Terms

Ambulatory care: Ambulatory care is provided on an outpatient basis. For the purposes of this recommendation, ambulatory care refers to primary care offices and other outpatient care settings (*e.g.*, OB/Gyn, cardiologist, etc.).

Analytics: The science of analysis. Analytics is the process of developing optimal or realistic decision recommendations based on insights derived through the application of statistical models and analysis against existing and/or simulated future data[ii].

Business Process: A collection of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a particular customer or customers[iii].

Collaborative: When two or more organizations join and work together, share knowledge and expertise, and build consensus toward meeting common goals.

Electronic Health Record (EHR): A systematic collection of electronic health information about patients or populations[iv].

Electronic Health Record System (EHR-S): An organized infrastructure for the collection of Electronic Health Record information.

Eligible Professional (EP): Eligible professionals are defined separately for Medicaid and Medicare.
See: https://www.cms.gov/EHRIncentivePrograms/15_Eligibility.asp#TopOfPage for more information.

Health Information Exchange (HIE): Organizations that provide a mechanism for the sharing of clinical and administrative healthcare data among healthcare institutions, providers, and data repositories.

Inpatient care: Inpatient care, in contrast to ambulatory care, occurs upon admission to a hospital or health care facility. Therefore, information from inpatient electronic health records will generally offer information on illness and injury severity.

Limited data set: Health information in a limited data set is not directly identifiable, but may contain information that does not meet HIPAA criteria for de-identified data. A data-use agreement must establish who is permitted to use or receive the limited data set and stipulate lawful uses of the data.

Program: An organized set of projects and services intended to meet a public need. Programs often establish policy and may develop and recommend interventions. Programs may manage surveillance systems and support tools and services.

Public Health Quality: Quality in public health is the degree to which policies, programs, services, and research for the population increase desired health outcomes and conditions in which the population can be healthy[v]. This differs from health care quality.

Population Health: The health outcomes of a group of individuals, including the distribution of such outcomes within the group; this grouping includes health outcomes, patterns of health determinants, and policies and interventions that link the two[vi]

Public Health: The science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals[vii]

Registry: A structured information collection system used to track and monitor the registered entity.

Sensitivity: The degree to which a surveillance system is able to detect a goal event, condition, etc.; this differs from specificity in that there may be a high level of false positives in an extremely sensitive system.

Specificity: The degree to which a surveillance system is able to identify a given condition or event with a low level of false positive results.

Surveillance System: An organized infrastructure that enables the ongoing, systematic collection, management, analysis, and interpretation of health-related data followed by their dissemination to those who require the information in order to: 1) monitory populations to detect unusual instances or patterns of disease, toxic exposure, or injury; 2) act to prevent or control these threats; 3) intervene to promote and improve health. The term applies to both electronic and paper-based systems.

Tool: An application that supports surveillance by enabling a very specific task (*e.g.*, message transport, data transformation, communications, identity management). Tools differ from systems mainly in size, complexity, and the number of functions they support. A system can be comprised of multiple tools independently.

Urgent Care Center: A health care center that is often open longer hours than physician offices, does not require an appointment, and is ideally used for urgent, but non-emergency, diseases and conditions.

Timeliness: The ability of a surveillance system to detect an event, condition, or emergency of public health concern in real-time, or as close to real-time as possible.

*Except where otherwise noted, definitions are quoted or adapted from the Centers of Disease Control website at www.cdc.gov.

References

[i] U.S. Department of Health and Human Services, Centers for Medicare & Medicaid, Electronic Health Record Incentive Program: 42 CFR Parts 412, 413, 422, and 495 CMS-0033-P, RIN 0938-AP78

[ii] Analytics. Wikipedia.org. Accessed March 2, 2012. http://en.wikipedia.org/wiki/Analytics.

[iii] Lee LM, Teutsch SM, Thacker SB, St. Louis ME. 2009. Principles and Practice of PUBLIC HEALTH SURVEILLANCE, 3rd Ed. Oxford University Press: New York. (p. 69).

[iv] Gunter TD, Terry NP. The Emergence of National Electronic Health Record Architectures in the United States and Australia: Models, Costs, and Questions. J Med Internet Res 2005;7(1):e(3).

[v] Honore PA, Wright D, Berwick DM, Clancy CM, Lee P, Nowinski H, Koh HK. Creating a Framework for Getting Quality Into the Public Health System. Health Affairs 2011;30(4):737-745.

[vi] Kindig D, Stoddart G. What Is Population Health? Am J Public Health 2003;93(3):380-383.

[vii] Winslow C-E A. The Untilled Fields of Public Health. Science 1920;51(1306):23-33.