



What's New? NIOSH Update on Electronic Occupational Data for Health (ODH)

Genny Luensman, PhD

CSTE OH Subcommittee Webinar

November 9 2017

Goal: Facilitate Improving Worker Health

- Objective: Enhance OH surveillance data collection
 - Data structured at the source, i.e., EHRs
- Objective: Improve patient care
 - Structured data needed to trigger (right person, place, time)
 - Awareness for events, newly discovered conditions
 - Support prevention, diagnosis, management, treatment
 - *Also provides clear value to those burdened by data collection*



Collection, Standardization of Industry & Occupation Data

	Death Records, Cancer Registries, Surveys	EHRs
Objective	Convert concepts to standard results	
Process	<u>Separated steps:</u> Interpret: respondent-to-entry Translate: entry-to-standardized-data	<u>Combined step:</u> Interpret and identify/select: respondent-to-standardized-data
Who uses results	Public health	Patient care, population health, <i>and</i> public health
Desired results	Categories	Detailed titles that can be categorized

CDC_CensusOccupation- *based on* Census Classification System (*ditto* Industry!)

544 Occupation Categories

Carpenters (6230)

Categorized to



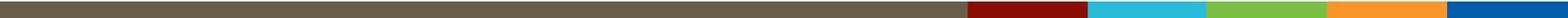
**~31,000 Occupation Titles
(modified Census
Alphabetical Index)**

**Cabinet installer
Miniature set builder
Overhead garage door hanger
Rustic fence builder**

Patient Entry of Industry & Occupation: Preliminary Investigation Results

- Industry & occupation can be captured from patient using a series of questions and feedback
- Patients require context to understand the level of granularity required (to get useful, usable data)
- Standardized language needs to be plain English

Catherine Staes, University of Utah



Systems for Collecting, Standardizing Industry & Occupation

	NIOCCS: NIOSH Industry & Occupation Computer- Assisted Coding System	System for Collecting Industry & Occupation from Patients
Shared Components	Knowledge base, coding scheme	
The need	Help trained staff standardize entries (2 nd step)	Help patient understand the request and <u>identify/select</u> standardized entry
Feedback to collect usable entry relies on	Interviewer skills and/or survey instructions (1 st step)	On-screen instructions and computer tools (e.g., search engine, tool tips, etc.)
What it does	<u>Translates</u> previously recorded text	Makes standard selections accessible

Collecting Industry and Occupation for EHRs:

Prototype 1(mod)

Industry and Occupation Tool

1. Industry 2. Occupation 3. Review & Verify 4. Finish

Industry describes your employer's type of business or service. When you select your job industry, please think of the employer who pays you. Please enter your job industry from the choices below.

Your Industry Selection

Start to type here and choose from the dropdown menu. [Select](#)

You can also enter an industry by choosing from the list below. Click the + sign to see more options. Click the **Select** button above once you have made a selection.

- Agriculture, Forestry, Fishing, and Hunting, and Mining
- Construction
- Manufacturing
- Wholesale Trade
- Retail Trade
- Transportation and Warehousing and Utilities
- Information
- Finance and Insurance, and Real Estate, and Rental and Leasing
- Professional, Scientific, and Management, and Administrative, and Waste Management Services
- Educational Services, and Health Care and Social Assistance
- Arts, Entertainment, and Recreation, and Accommodation and Food Services
- Other Services, Except Public Administration
- Public Administration
- Military
- Unpaid - NIOSH Added

Can't find your industry? [Click Here](#)

Collecting Industry and Occupation for EHRs:

Prototype 2

Industry and Occupation Tool

Information > 1. Industry > 2. Occupation > 3. Review & Verify

Welcome to the Industry and Occupation Tool.

Your work may affect your health. Your doctor or nurse can give you better care if he or she knows what kind of work you do. The information you provide is part of your medical record.

You can choose your work with this tool.

 The **first part** asks you to choose the **industry** you work in. When you think about industry, think about the company you work for and what that company makes or does.

 The **second part** asks you to choose your **occupation**, or what job you do.

If you have more than one job, please think of only one job at a time. (Once you have finished entering your first job, please use the tool again to choose another job.)

[Next](#)

Collecting Industry and Occupation for EHRs:

Prototype 3-

Example of Hover Tool Tip

Job Information for Your Health Industry and Occupation Review & Verify

Health and work are sometimes connected ([move your mouse over this link to learn more](#)). Your care provider would like to know your employer's **industry** and your **occupation**. If you have more than one job, please answer for one job, submit all answers, and then use the app again.

[Help](#)

Industry

Employer Name

This company mainly does/ is a(n)

Type here and select from the choices.

Industry describes your employer's type of business or service. Think about the company you work for and what that company makes or does.

Industry Examples

- Barbeque Stand
- Coffee Shop
- Fast Food Restaurant

[I can't find it.](#)

Collecting Industry and Occupation for EHRs:

Prototype 3-

Industry and Occupation on the Same Screen

Job Information for Your Health

Industry and Occupation Review & Verify

Health and work are sometimes connected ([move your mouse over this link to learn more](#)). Your care provider would like to know your employer's **industry** and your **occupation**. If you have more than one job, please answer for one job, submit all answers, and then use the app again.

[Help](#)

Industry

Employer Name

This company mainly does/ is a(n)

Occupation

My job is a(n)

[I can't find it.](#)

If you want to use the selections in the boxes above, please click the submit button.

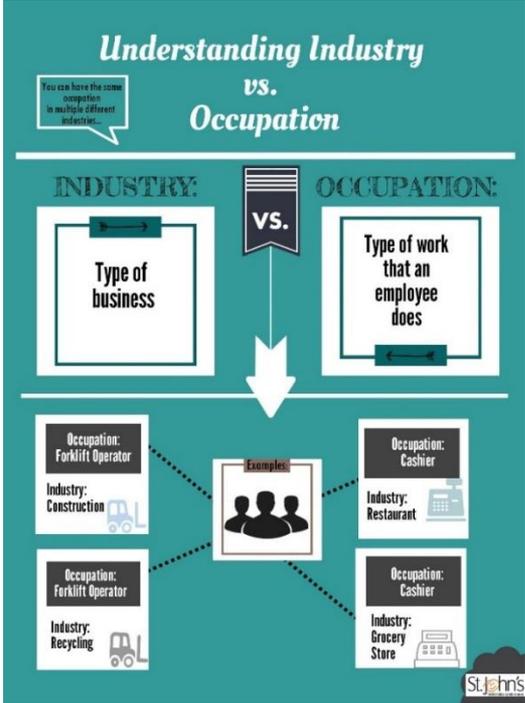
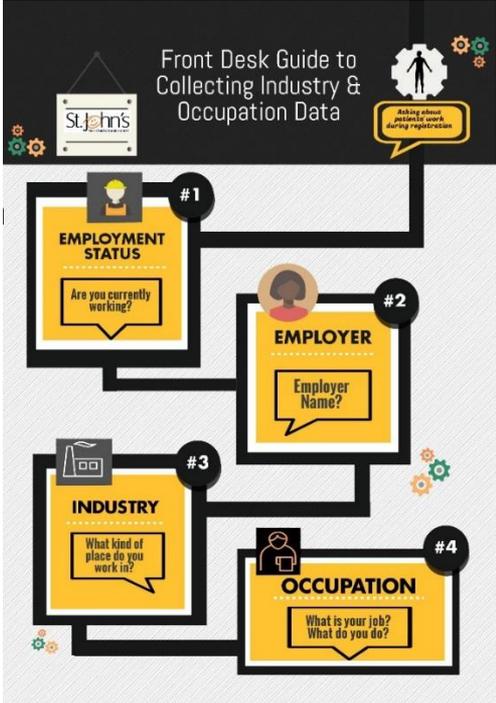
Demonstration of Data Collection in a Clinical Setting: St. John's Well Child and Family Health Center, Results

Patient visits	Unique Patients	Employment Status Recorded	%
26,480	10,384	<u>10,359</u>	99.8

Employment Status	N	%
Unemployed	7043	68.0
Employed	<u>2968</u>	28.7
Retired	348	3.4

I/O Recorded	N	%
Industry	2290	77.2
Occupation	2968	100

Demonstration of Data Collection in a Clinical Setting: Desk References, St. John's Well Child and Family Health Center



EHR System Instructions

So what does
the EHR have to
do with these
data?



EHR System Instructions

- **HL7 EHR-System Functional Model**

- Extensive outline of desirable software features (functionality)
- **Profiles** are specifications for a particular domain (e.g., child health) and serve as the source of changes for future updates to the Functional Model

- Work and Health Functional Profile

- For collection, management, and use of Occupational Data for Health (ODH)
- **Example:** (new!) function and one of its ~60 “conformance criteria”

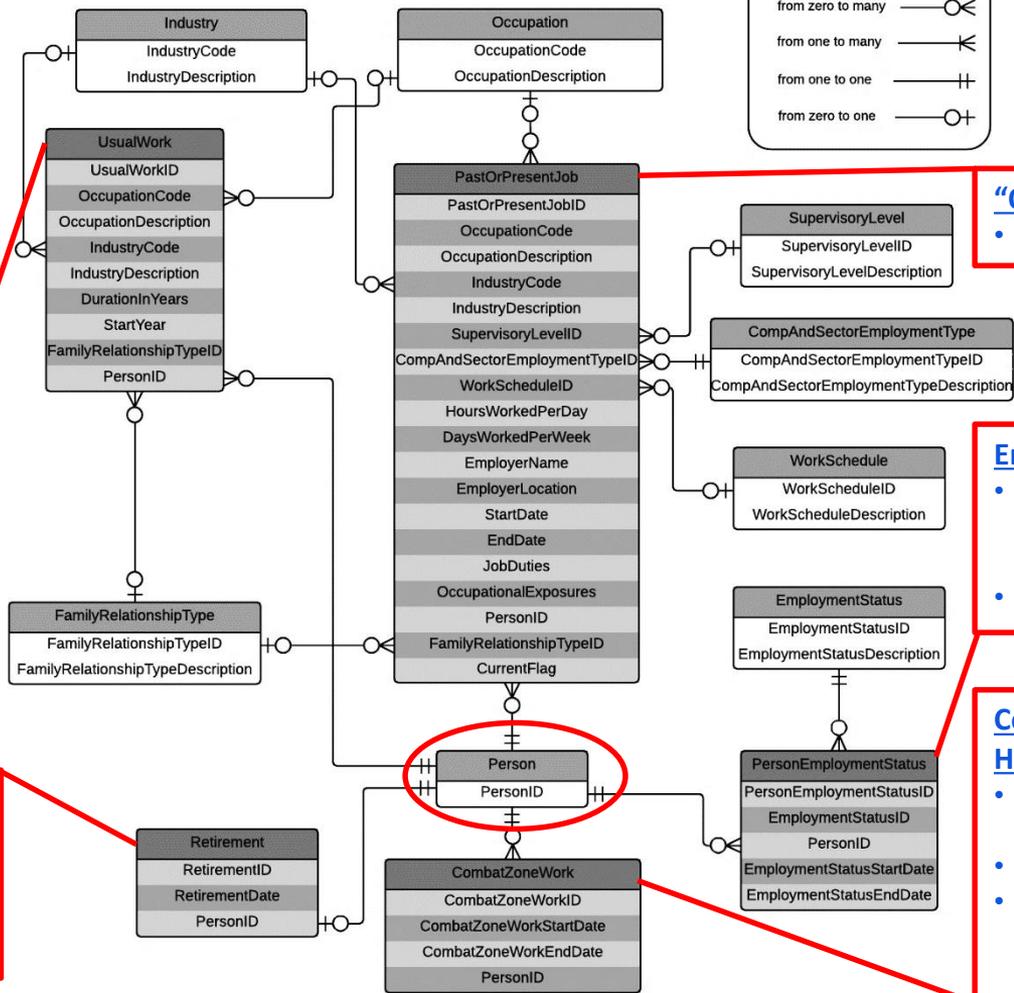
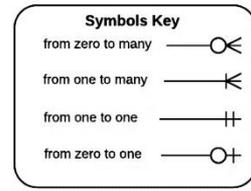
- Manage Occupational Data for Health (ODH).

- “The system SHALL provide the ability to render and exchange ODH as a part of clinical documentation.”
 - *To be used for future enhancements to EHR-System Functional Model*

Occupational Data for Health Information Model

- Provides the information needed for a common understanding of the meaning and organization of specified data elements
- Does not provide information on what to do with the data

ODH Information Model Diagram (Draft)



“Occupational History”

- Current and past jobs

Longest Held Occupation

- Could be aggregate of many jobs
- Longest-held industry in relation to longest-held occupation
- No history retained

Employment Status

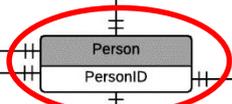
- Employed, Unemployed, or Not-in-Labor-Force
- History retained

Retirement

- Defined as “self-identified”
- Only start date
- Not linked to a job entry or usual occupation entry

Combat Zone or Hazardous Duty Work

- Not limited to military (e.g., DOD contractors)
- Only date ranges
- Not linked to a job entry or usual occupation entry



Past or Present Job Data Elements (Draft)



Occupation



Supervisory Level,
Military Pay Grade



Schedule



Employer
Employer Location



Industry

- Employment Type**
- Self-employed
 - Unpaid worker (e.g., family farm/business)

Compensation/Sector
Employment Type



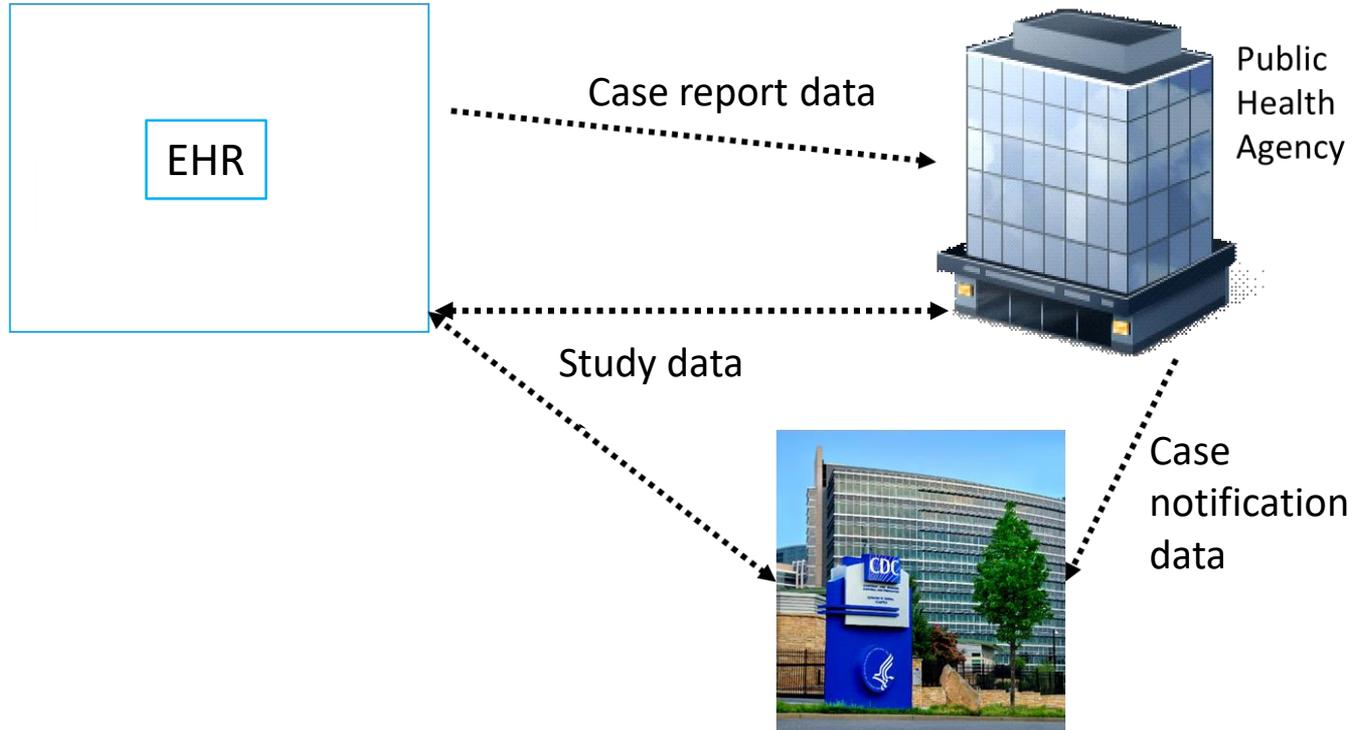
Hours per day
Days per week

Job Duties

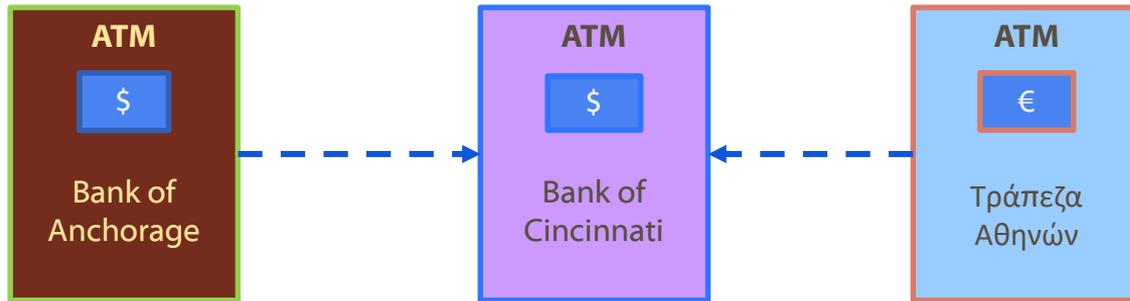
Potential
Occupational
Exposures

PastOrPresentJob
PastOrPresentJobID
OccupationCode
OccupationDescription
IndustryCode
IndustryDescription
SupervisoryLevelID
CompAndSectorEmploymentTypeID
WorkScheduleID
HoursWorkedPerDay
DaysWorkedPerWeek
EmployerName
EmployerLocation
StartDate
EndDate
JobDuties
OccupationalExposures
PersonID
FamilyRelationshipTypeID
CurrentFlag

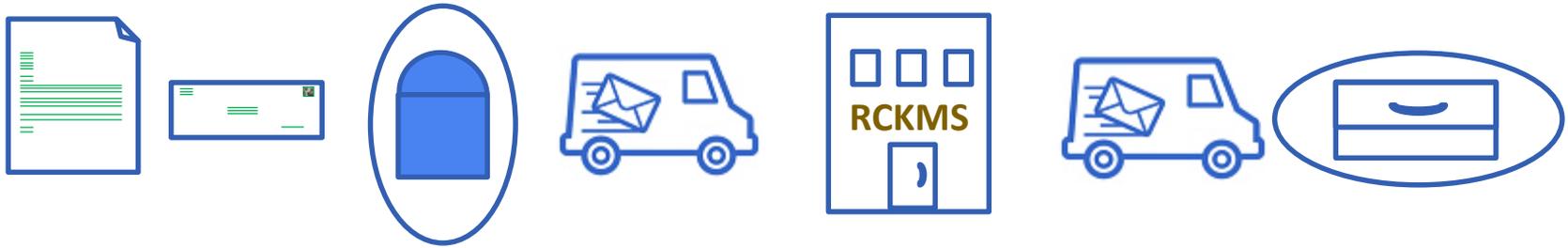
Public Health and Interoperability



Interoperability

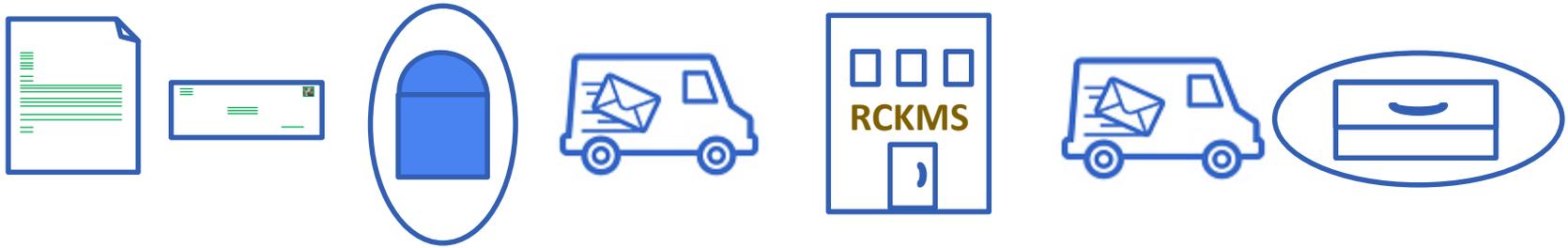


Interoperability Standards



- **Interoperability standards** are frameworks for
 - Formatting data
 - Packaging data
 - Transporting data
 - Security of data
- **Systems** are needed that can send and receive the data
- **RCKMS:** Reportable Condition Knowledge Management System for case reporting

Interoperability Standards



- Interoperability standards are frameworks for

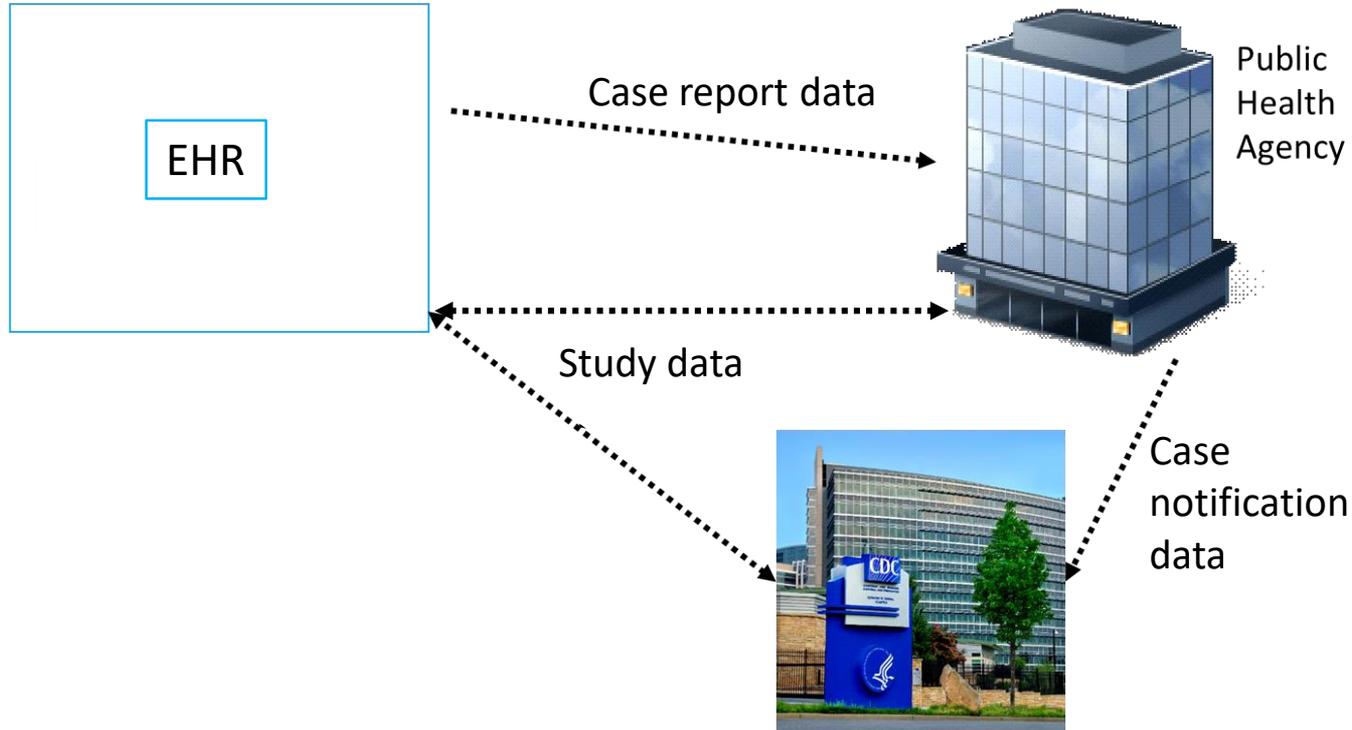
- Formatting data
- Packaging data
- Transporting data
- Security of data

- Implementation specifications, aka **Implementation Guides** or **Profiles**, are the requirements and instructions constraining a standard for a specific purpose, such as formatting and packaging data for cancer registry reporting or case reporting.

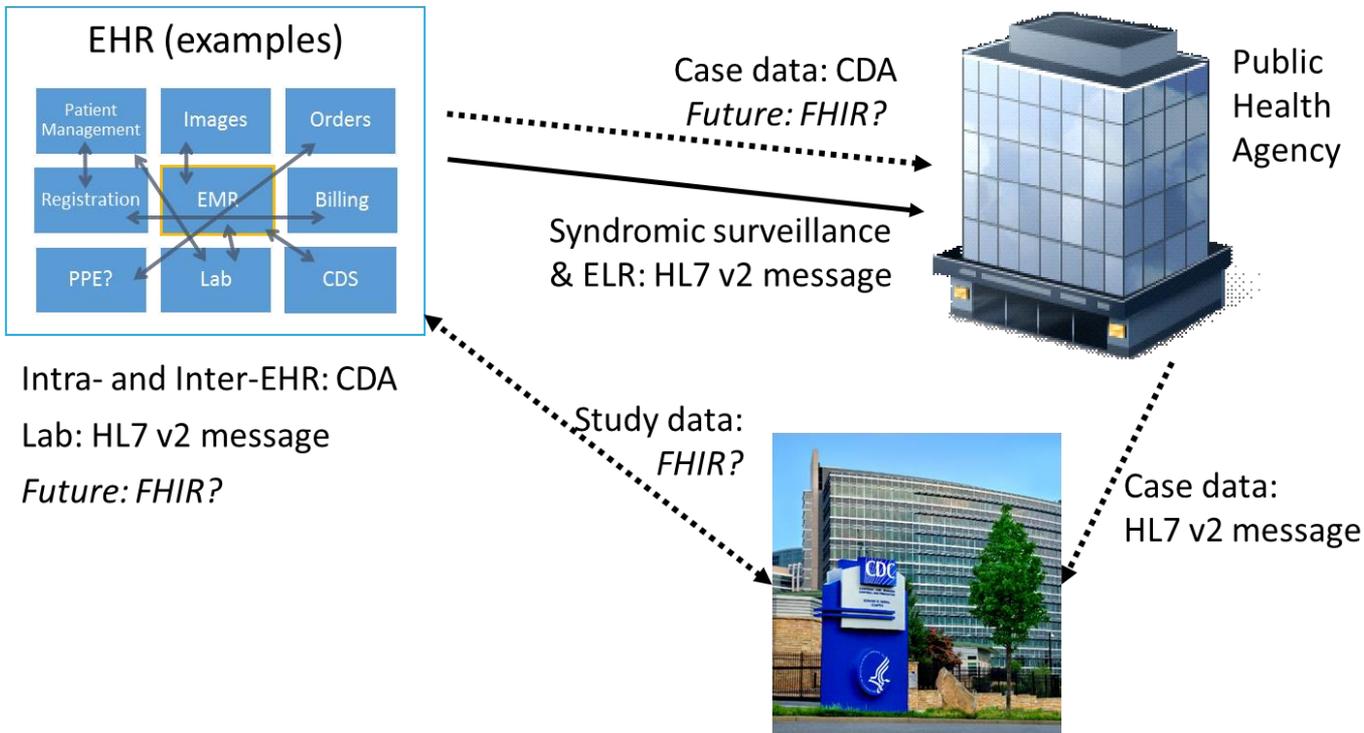
Sample lines example 3:

```
MSH|^~&|XXXX|C|PRIORITYHEALTH|PRIORITYHEALTH|20080511103530||ORU^R01|Q335939501T337311002|P|2,3||  
PID|1||940000000000^^^Priority Health||LASTNAME^FIRSTNAME^INIT||19460101|M||||  
PD1|1||1234567890^PCPLAST^PCFIRST^M^NPI  
OBR|1||185L29839X64489JLPF~X64489^ACC_NUM|JLPF^Lipid Panel -  
C|||||1694^DOCLAST^DOCFIRST^MD|||||20080511103529||  
OBX|1|NM|JHDL^HDL Cholesterol (CAD)|1|62|CD:289^mg/dL|>40^>40|||F|||20080511103500|||^  
OBX|2|NM|JTRIG^Triglyceride (CAD)|1|72|CD:289^mg/dL|35-150^35^150|||F|||20080511103500|||^  
OBX|3|NM|JLDL^LDL-C (calc - CAD)|1|14|CD:289^mg/dL|||F|||20080511103500|||^  
OBX|4|NM|JLDL^LDL-C (calc - CAD)|1|134|CD:289^mg/dL|0-100^0^100|H|||F|||20080511103500|||^  
OBX|5|NM|JCHO^Cholesterol (CAD)|1|210|CD:289^mg/dL|90-200^90^200|H|||F|||20080511103500|||^
```

Public Health and Interoperability



Public Health and Interoperability



Primary Healthcare Interoperability Standards

	Version 2.x Messaging ("using HL7")	Clinical Document Architecture (CDA)	Fast Healthcare Interoperability Resources (FHIR)
Status	Regularly updated, backwards-compatible. Most recent version is V2.9, public health uses V2.5.1.	Not being updated. C-CDA is required by regulation, so used as the <i>de facto</i> template for other specifications, e.g., electronic initial case report (eCR).	Draft, close to 1 st version being 'finalized' per 80/20 rule.
Level of Effort	Moderately difficult	Very difficult	Very easy to use: modular, web services
Readability	Machine only	Human and machine components	Aims for human- and machine-processing
Data Sharing	Transient message: data can be lost	Can be kept as an electronic 'document' but not searchable (similar to a pdf)	Can be either transient or kept
Examples of uses/available implementation specifications	<ul style="list-style-type: none"> • Electronic Laboratory Reporting (ELR) • Intra-hospital • Case notification 	<ul style="list-style-type: none"> • C-CDA="Consolidated CDA", suite for basic purposes, e.g., transitioning care • Cancer reporting, ambulatory care • Vital records death reporting 	<ul style="list-style-type: none"> • Apps for EHRs and other health information systems • Misc. for testing

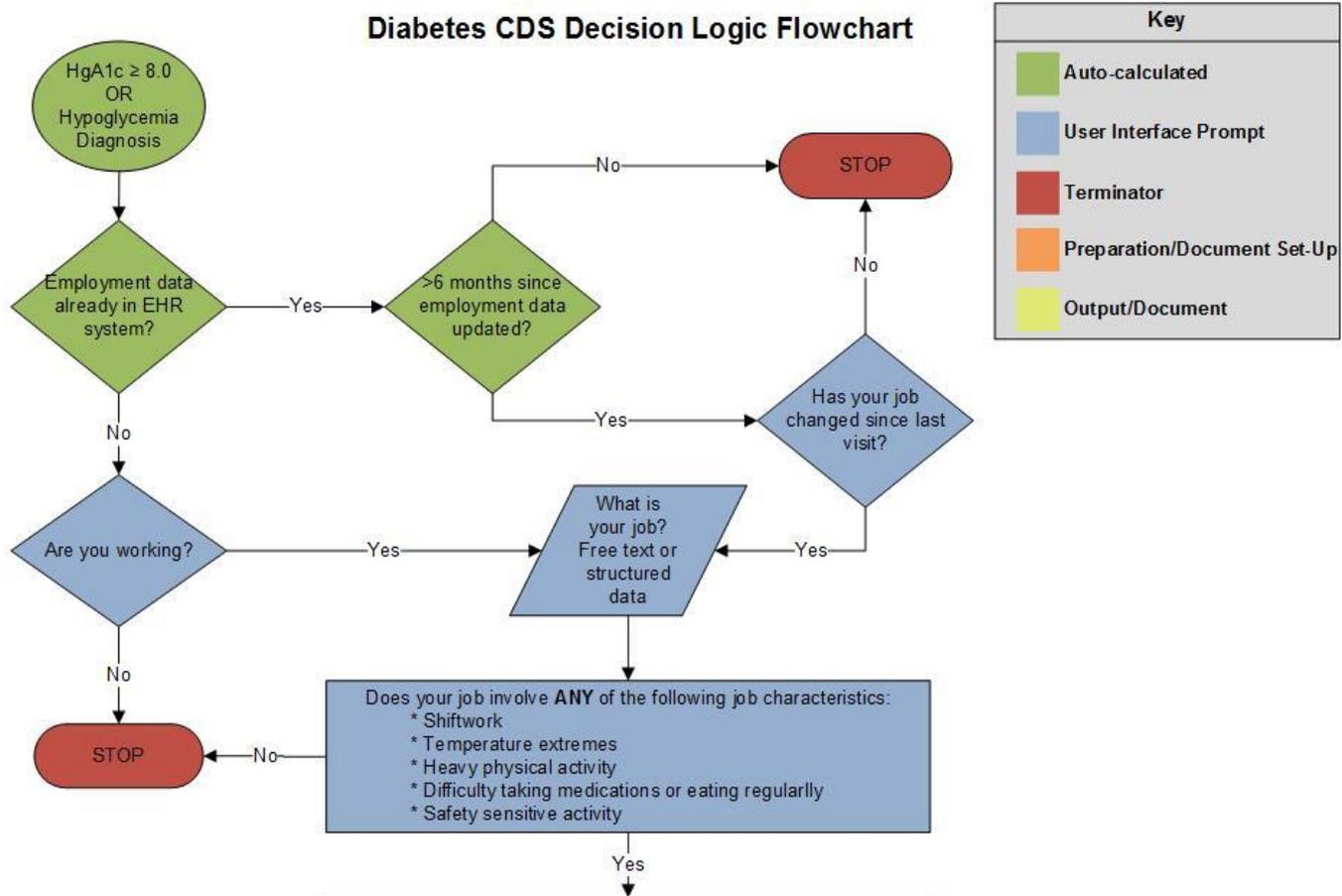
Providing Clinical Decision Support Knowledge

- Narrative: e.g., guidelines
- Semi-Structured: Recommendation = clinical scenario + clinical action
- Structured: Expressed in codes, triggers *Has to be made available!*
 - Executable = System-specific (local implementation)

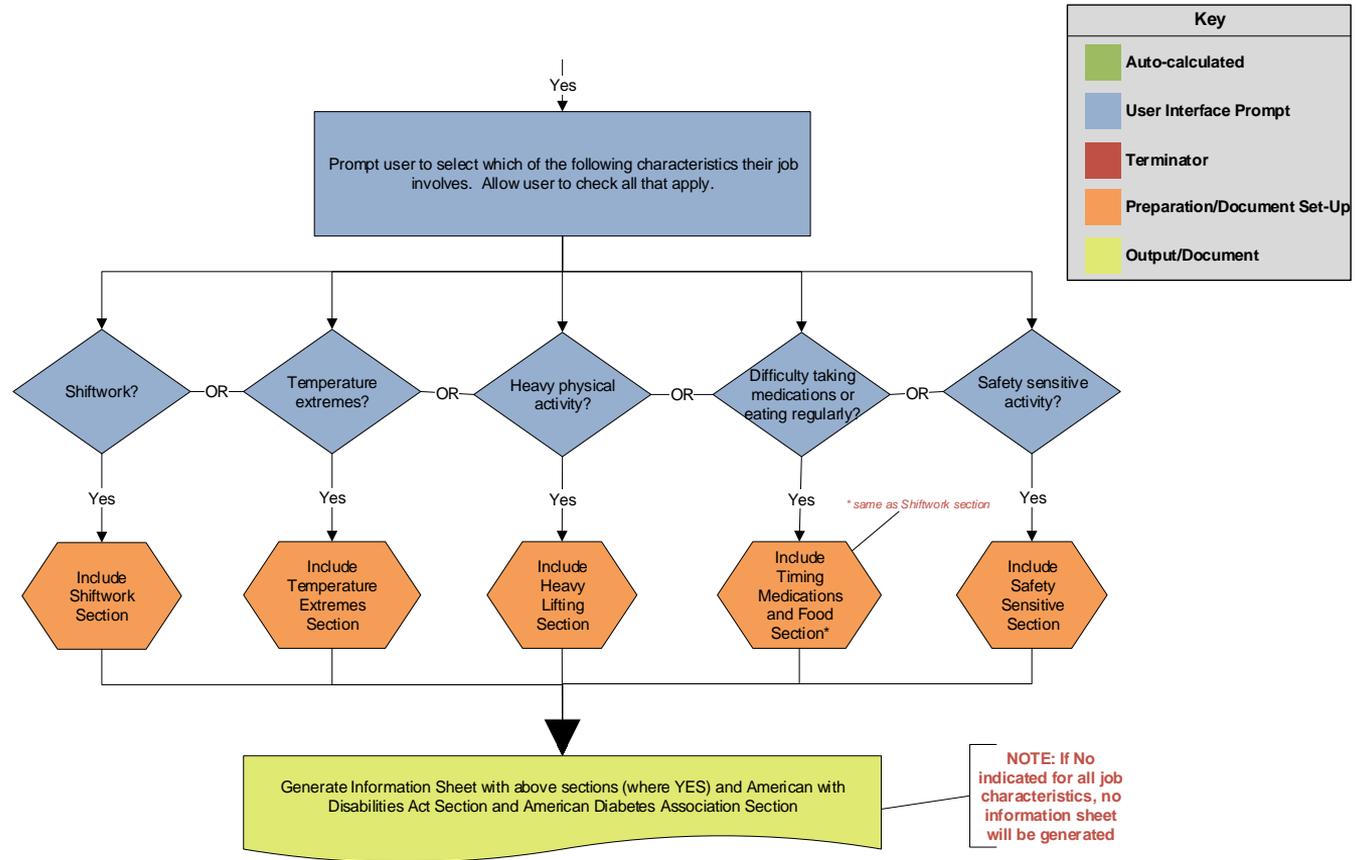
Providing Clinical Decision Support Knowledge

- Narrative: e.g., guidelines
 - What topics to start with?
- Semi-Structured: Recommendation = clinical scenario + clinical action
 - IF/THEN statements
- Structured: Expressed in codes, triggers *Has to be made available!*
 - Executable = System-specific (local implementation)

Providing Clinical Decision Support Knowledge



Providing Clinical Decision Support Knowledge



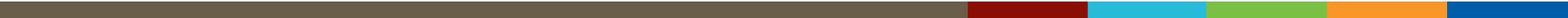
Providing Clinical Decision Support Knowledge

- Narrative: e.g., guidelines
- Semi-Structured: Recommendation = clinical scenario + clinical action
- **Structured: Expressed in codes, triggers**
 - Has to be made available!
 - Consider how it fits in the care delivery workflow
- Executable = System-specific (local implementation)

Providing Clinical Decision Support Knowledge

- Narrative: e.g., guidelines
- Semi-Structured: Recommendation = clinical scenario + clinical action
- Structured: Expressed in codes, triggers
 - **Executable = System-specific (local implementation)**

Summary: Meeting the Needs for Public Health Population Health, and Patient Care

- Two objectives: collect data, improve patient care
 - Proposed data elements and values for occupational data for health (ODH)
 - Preparing a tool for collecting standardized I/O in EHRs
 - Describing useful health IT system features for managing ODH
 - Preparing for interoperability
 - Exploring ways to improve patient care by sharing knowledge, aka clinical decision support
- 

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

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



Survey Data Coding

Survey or Data System	Sponsoring Agency	Text-to-Code System	
		Occupation	Industry
Health-Related Data Collection Systems/Registries/Surveys			
Adult Blood Lead Epidemiology & Surveillance (ABLES)	CDC	Census	NAICS
Behavioral Risk Factor Surveillance System (BRFSS)	CDC	Census	Census
Central Cancer Registries	CDC	Census	Census
Census of Fatal Occupational Injuries (CFOI)	Bureau of Labor Statistics (BLS)	SOC	NAICS
Expanded Work-Related Asthma (WRA) Surveillance	CDC	Census & SOC	NAICS
Expanded Silicosis Surveillance	CDC	Census & SOC	NAICS
Fatality Assessment & Control Evaluation (FACE)	CDC	Not coded	NAICS
General Social Survey	National Science Foundation (NSF)	Census	Census
Health and Retirement Study (HRS)	Social Security Administration	Census	Census
National Electronic Injury Surveillance System (NEISS)—Work	CDC	Census	Census & NAICS
National Health Interview Survey (NHIS)	CDC	Census	Census
National Health & Nutrition Examination Survey (NHANES)	CDC	Census	Census
National Occupational Mortality Surveillance (NOMS)	CDC	Census	Census
National Occupational Respiratory Mortality System (NORMS)	CDC	Census	Census
Sentinel Event Notification System for Occupational Risk (SENSOR) Pesticides	CDC	Census	NAICS
Survey of Occupational Injuries & Illnesses (SOII)	BLS	SOC	NAICS
Vital Statistics-Deaths	CDC	Census	Census
Population Surveys (baseline/denominator data for health surveillance data analyses)			
American Community Survey (ACS)	US Census Bureau	Census	Census
Census of Agriculture	National Agricultural Statistics Service (NASS)	Not coded	NAICS
County Business Patterns	US Census Bureau	Not collected	NAICS
Current Employment Statistics (CES)	BLS	Not collected	NAICS
Current Population Survey (CPS)	BLS and US Census Bureau	Census	Census
Occupational Employment Statistics (OES)	BLS	SOC	NAICS