# Infectious Disease Surveillance for Case Investigation Massachusetts 2020

Board of Registration in Medicine
781-876-8200

# Commissioner

Public Health Council

## BUREAUS

- Bureau of Community Health and Prevention
- Bureau of Environmental Health
- Bureau of Family Health and Nutrition
- Bureau of Health Care Safety and Quality
- Bureau of Health Professions Licensure
- Bureau of Infectious Disease and Laboratory Sciences
- Bureau of Substance Abuse Services

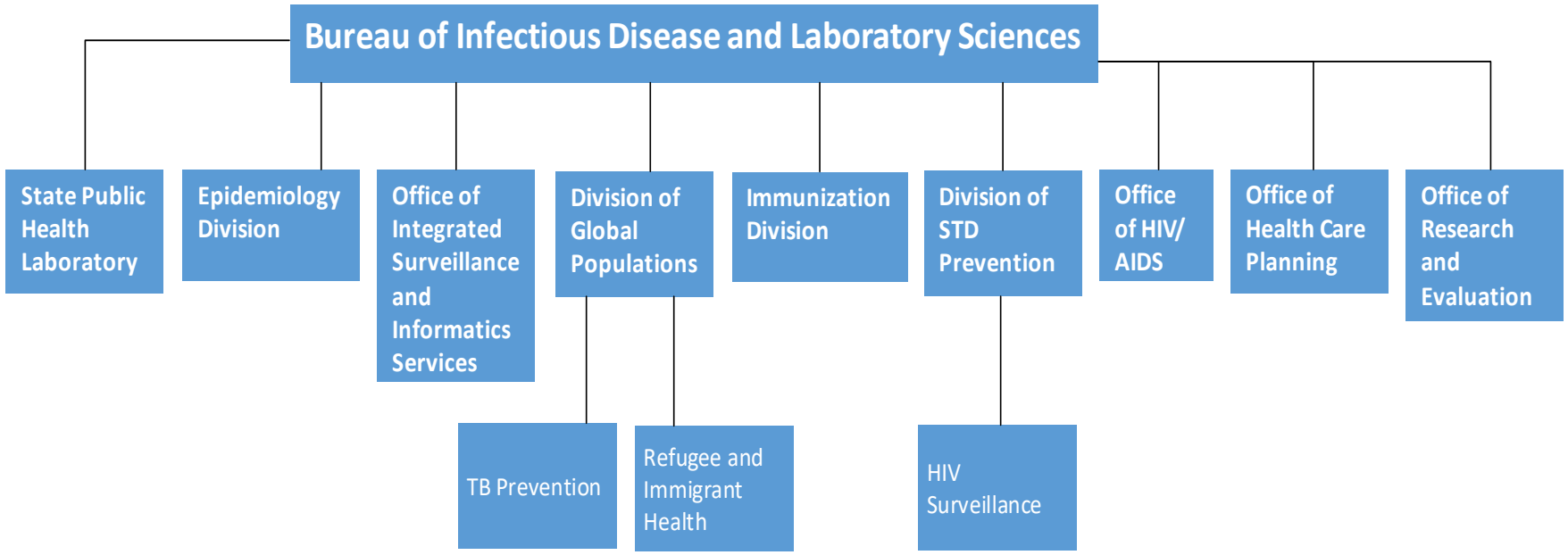
## PUBLIC HEALTH HOSPITAL SYSTEM

- Lemuel Shattuck Hospital
- Pappas Rehabilitation Hospital for Children
- Tewksbury Hospital
- Western Massachusetts Hospital
- State Office of Pharmacy Services

## OFFICES

- Office of Data Management and Outcomes Assessments
- Office of Health Equity
- Office of Local and Regional Health
- Office of Population Health (under development)
- Office of Preparedness and Emergency Management
- Registry of Vital Records and Statistics

# Bureau of Infectious Disease and Laboratory Sciences



# Mandated Response to Infectious Disease Reports

- 24/7 response
- coordination with 351 local boards of health
- approximately 90 notifiable diseases
  - measles, meningitis, hepatitis A, Lyme disease, STDs, diarrhea in a food handler, BT agents, unusual clusters, emerging infections (e.g. COVID-19)

Effective July 2008

**COMMUNICABLE AND OTHER INFECTIOUS DISEASES REPORTABLE IN MASSACHUSETTS TO LOCAL BOARDS OF HEALTH**

**Note:** If these diseases are initially reported to MDPH, local boards of health will be notified.

**☎INITIATE INVESTIGATION IMMEDIATELY FOR BOTH SUSPECT AND CONFIRMED CASES AND NOTIFY MDPH!**
**Telephone: (617) 983-6800**

**• INITIATE INVESTIGATION AND COMPLETE CASE REPORT AS SOON AS POSSIBLE.**
(This may include both suspect and confirmed cases.)
**Confidential Fax: (617) 983-6813**

- Amebiasis (*Entamoeba histolytica*)
- Anaplasmosis (*Anaplasma phagocytophilum*)
- ☎ Any case of an unusual illness
- ☎ Any cluster/outbreak of illness, including but not limited to foodborne illness
- ☎ Anthrax (*Bacillus anthracis*)
- Babesiosis (*Babesia* sp.)
- ☎ Botulism (*Clostridium botulinum*)
- ☎ Brucellosis (*Brucella* sp.)
- Campylobacteriosis (*Campylobacter* sp.)
- Chagas disease (*Trypanosoma cruzi*)
- Cholera (*Vibrio cholerae*)
- Creutzfeldt-Jakob disease (CJD) and variant CJD
- Cryptococcosis (*Cryptococcus neoformans*)
- Cryptosporidiosis (*Cryptosporidium* sp.)
- Cyclosporiasis (*Cyclospora cayetanensis*)
- Dengue
- ☎ Diphtheria (*Corynebacterium diphtheriae*)
- ☎ Eastern equine encephalitis
- Ehrlichiosis (*Ehrlichia* sp.)
- Encephalitis, any cause
- *Escherichia coli* O157:H7, and other shiga-toxin producing *E. coli*
- Food poisoning and toxicity (includes poisoning by ciguatera, scombrotoxin, mushroom toxin, tetrodotoxin, paralytic shellfish and amnesic shellfish)
- Giardiasis (*Giardia* sp.)
- Glanders (*Burkholderia mallei*)
- ☎ Group A streptococcus, invasive
- Group B streptococcus, invasive
- ☎ *Haemophilus influenzae*, invasive
- Hansen's disease (leprosy)
- ☎ Hantavirus
- ☎ Hemolytic uremic syndrome
- ☎ Hepatitis A (IgM+ only)
- Hepatitis B
- Hepatitis C
- Hepatitis – infectious, not otherwise specified
- Influenza
- ☎ Influenza A virus, novel
- ☎ Influenza, pediatric deaths (<18 years)
- Legionellosis (*Legionella* sp.)
- Leptospirosis (*Leptospira* sp.)
- Listeriosis (*Listeria* sp.)
- Lyme disease (*Borrelia burgdorferi*)
- Lymphocytic choriomeningitis
- Malaria (*Plasmodium falciparum, P. malariae, P. vivax, P. ovale*)
- ☎ Measles
- Melioidosis (*Burkholderia pseudomallei*)
- ☎ Meningitis, bacterial, community acquired
- Meningitis, viral (aseptic), and other infectious (non-bacterial)
- ☎ Meningococcal disease, invasive (*Neisseria meningitidis*)
- ☎ Monkeypox or other orthopox virus
- Mumps
- Norovirus
- Pertussis (*Bordetella pertussis*)
- ☎ Plague (*Yersinia pestis*)
- Pneumococcal disease, invasive (*Streptococcus pneumoniae*)
- ☎ Polio
- Psittacosis (*Chlamydophila psittaci*)
- Q fever (*Coxiella burnetii*)
- ☎ Rabies in humans
- Reye syndrome
- ☎ Rheumatic fever
- Rickettsialpox (*Rickettsia akari*)
- Rocky Mountain spotted fever (*Rickettsia rickettsii*)
- ☎ Rubella
- Salmonellosis (*Salmonella* sp., non *typhi*)
- ☎ Severe acute respiratory syndrome (SARS)
- Shiga-toxin producing organisms
- Shigellosis (*Shigella* sp.)
- ☎ Smallpox
- ☎ Tetanus (*Clostridium tetani*)
- Toxic shock syndrome
- Toxoplasmosis (*Toxoplasma* sp.)
- Trichinosis (*Trichinella* sp.)
- ☎ Tularemia (*Francisella tularensis*)
- ☎ Typhoid fever (*Salmonella typhi*)
- Typhus (*Rickettsia prowazekii*)
- Varicella (chickenpox)
- Vibriosis (*Vibrio* sp.)
- ☎ Viral hemorrhagic fevers
- ☎ West Nile
- Yellow fever
- Yersiniosis (*Yersinia* sp.)

**Important Note:** During outbreaks, MDPH and local boards of health may request that other diseases be reportable immediately.

105 CMR 300.000 Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements, July 2008

# Local Boards of Health

- 351 towns/cities
  - range in size from 75 residents (Gosnold) to 685,000 (Boston)
  - cities and towns are autonomous from DPH  operating independently as a function of their individual town/city (decentralized public health system)
  - no direct state funding for local board of health operations

# About Local Boards of Health

- public health responsibilities are primarily led by employees and/or elected/appointed officials of municipal governments
- municipal governments retain authority over most fiscal and policy decisions
- every community in Massachusetts must meet the public health mandates and duties established by statute and regulation – regardless of size

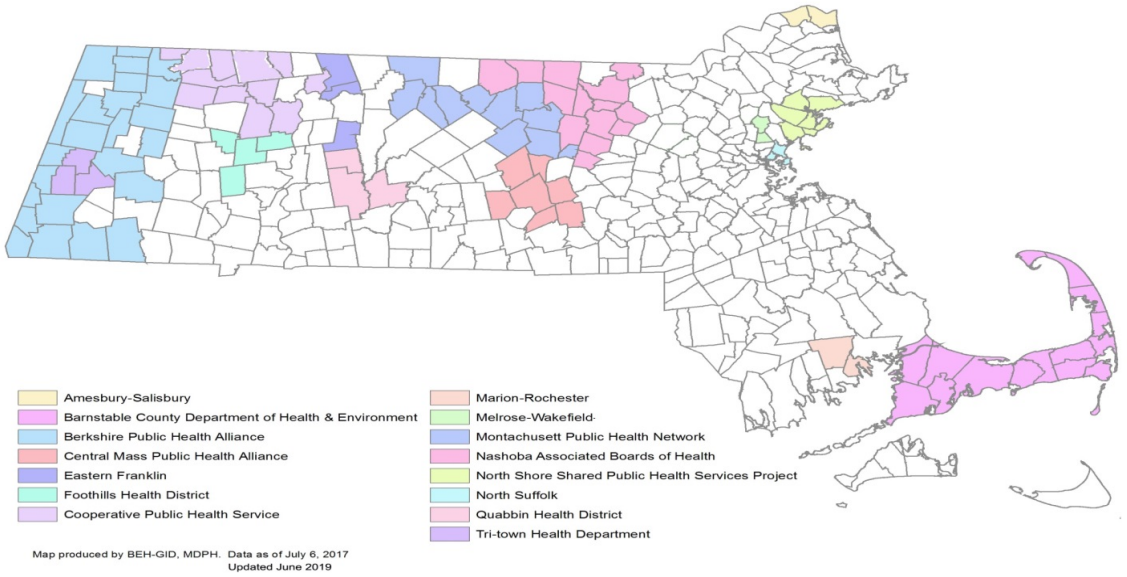
# What services do Local Public Health Provide?

- Local Public Health Departments provide a wide range of public health services:
  - infectious disease surveillance
  - emergency preparedness
  - community sanitation enforcement (housing, pools)
  - enforcing food regulations/permitting food establishments
  - chronic disease education
  - mitigation of health disparities
  - tobacco control and education
  - teen pregnancy prevention
  - injuries and violence prevention
  - community health assessment
  - policy development

# Public Health Districts / Shared Services

**Definition:**

- districts and shared service agreements are when two or more Local Boards of Health collaborate to share the costs and benefits of running a state-of-the-art local public health department.



# Public Health Districts / Shared Services

- 16 regional public health districts or formal shared service agreements in MA.
- 1/3 of Massachusetts communities representing about 20% of the population are served by a public health district or shared service agreement.
- pooling resources, functions, and expertise allows a consortium of cities and towns, especially those that are smaller or less affluent, to improve compliance with their statutory and regulatory mandates and expand safeguards and opportunities for inhabitants.

# Acronyms

- BIDLS - Bureau of Infectious Disease and Laboratory Sciences
- CRF - Case Reporting Form
- ELR - Electronic Lab Reporting
  - LOINC - Logical Observation Identifiers Names & Codes
    - Lab Test
  - SNOMED - Systematized Nomenclature of Medicine
    - Lab Test result
- ISIS - Integrated Surveillance Informatics Services
- LBOH - Local Board Of Health
- MAVEN - Massachusetts Virtual Epidemiologist Network
- MDPH - Massachusetts Department of Public Health

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# The Division of Epidemiology

A staff of 30 epidemiologists and research analysts

- Prevents infectious, communicable diseases statewide, 24/7, to include
  - Enteric diseases, zoonotic diseases, bioterrorist agents, bloodborne infections, vaccine-preventable diseases, respiratory diseases, healthcare associated infections, antibiotic resistant organisms, emerging infections
- Controls outbreaks and morbidity caused by these diseases
- Monitors the occurrence and patterns of these disease, including emerging infections in Massachusetts
- Are a resource to the citizens of Massachusetts
  - Responds to calls from healthcare providers, local health jurisdictions, the general public
  - Develops educational materials
  - Provides technical assistance to local health partners
- Monitors disease statistics, community by community and statewide
- Reviews every disease reported to the Office of Integrated Surveillance and Informatics Services

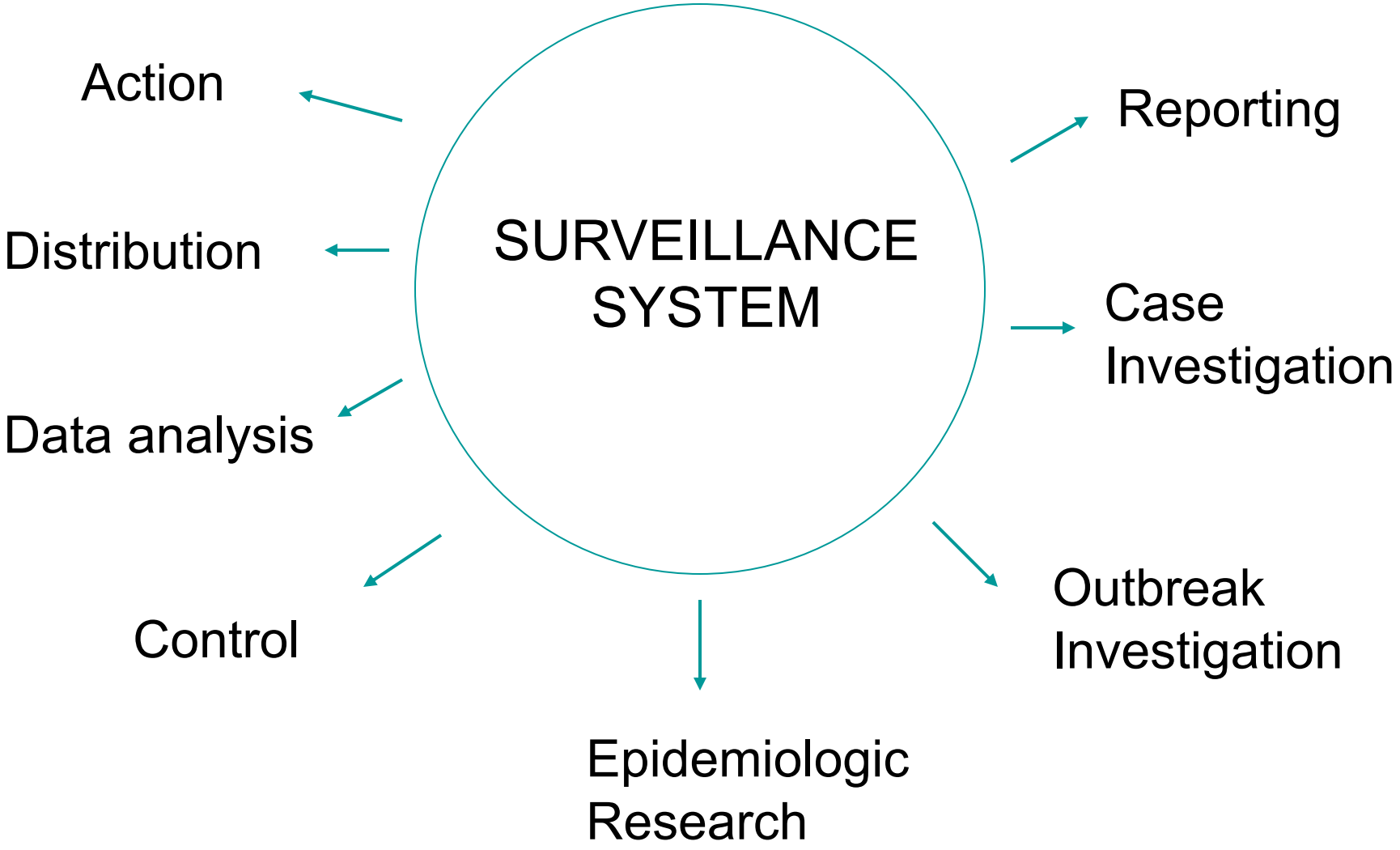
# Office of Integrated Surveillance and Informatics Services

- Staff of 35 epidemiologists/informaticians, biostatisticians, research analysts
  - epidemiology and surveillance SME
  - informatics SME
    - core understanding of MAVEN model and HL7
- Oversee MAVEN, ELR, eCR and syndromic surveillance
- Implement national standards for epidemiologic, surveillance and laboratory data
  - CSTE case definitions
  - ELR: LOINC / SNOMED
  - eCR: eICR (Digital Bridge) and ESP
  - ensure CDC reporting (NEDSS Modernization Initiative)
- Centralized triage of surveillance data
- Standardized quality assurance/control measures; conduct quality assurance of surveillance data
- Provide analysis and epidemiological assistance; monitor disease trends to guide public health practice
- Data, public records, and legal requests

# What Is Infectious Disease Surveillance?

- Definition
  - The routine collection, analysis, interpretation and distribution of data
- Goal
  - Reduce morbidity and mortality through the control and/or prevention of disease
- Systematic and ongoing

# Surveillance System Components



# Using Surveillance Data

- To follow up on cases and identify contacts
- To implement control measures
  - isolation and quarantine
  - post exposure prophylaxis
  - vaccination
- To identify high-risk groups
  - e.g. health care workers, nursing homes
- To rapidly detect increases in disease occurrence
- To monitor disease trends over time
- To allocate resources & guide public health policy and action

# Case Definitions

- Uniform criteria used to define a disease for public health surveillance
  - may consist of laboratory, clinical and/or epidemiologic information
  - defined as suspect, probable, confirmed as defined by criteria
- Allows public health officials to classify and count cases consistently across reporting jurisdictions for ultimate reporting to CDC
- Established by the Council of State and Territorial Epidemiologists

# National Disease Reporting System

Healthcare Providers

Hospitals

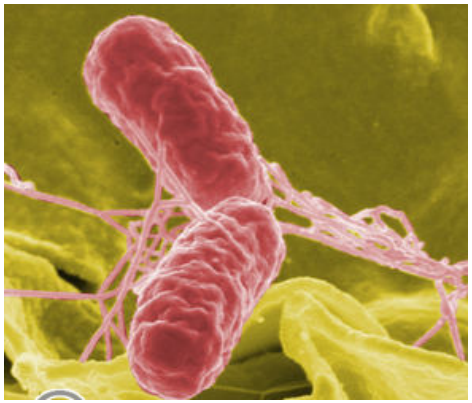
Laboratories

Others

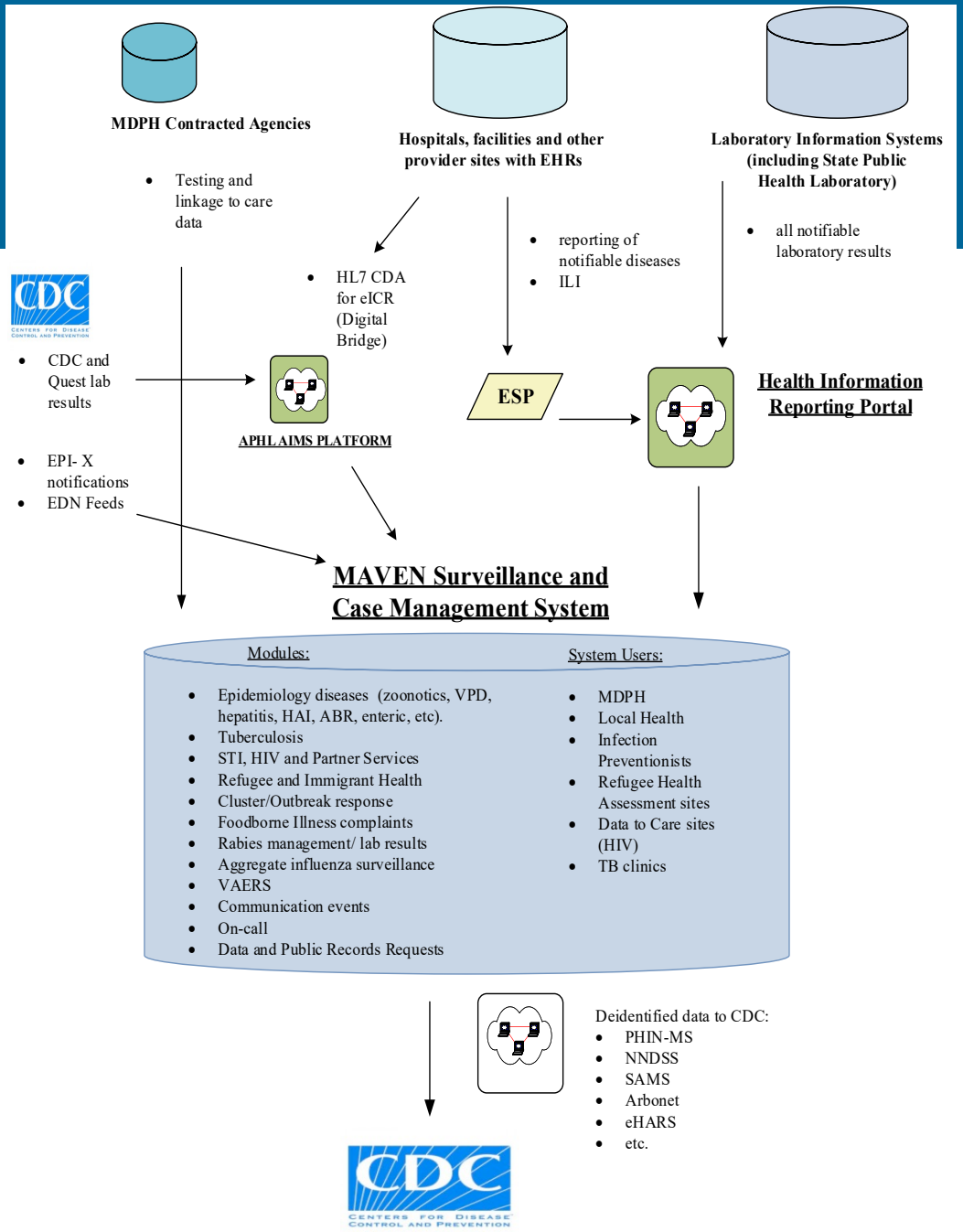
Local Boards of Health

State Health Department

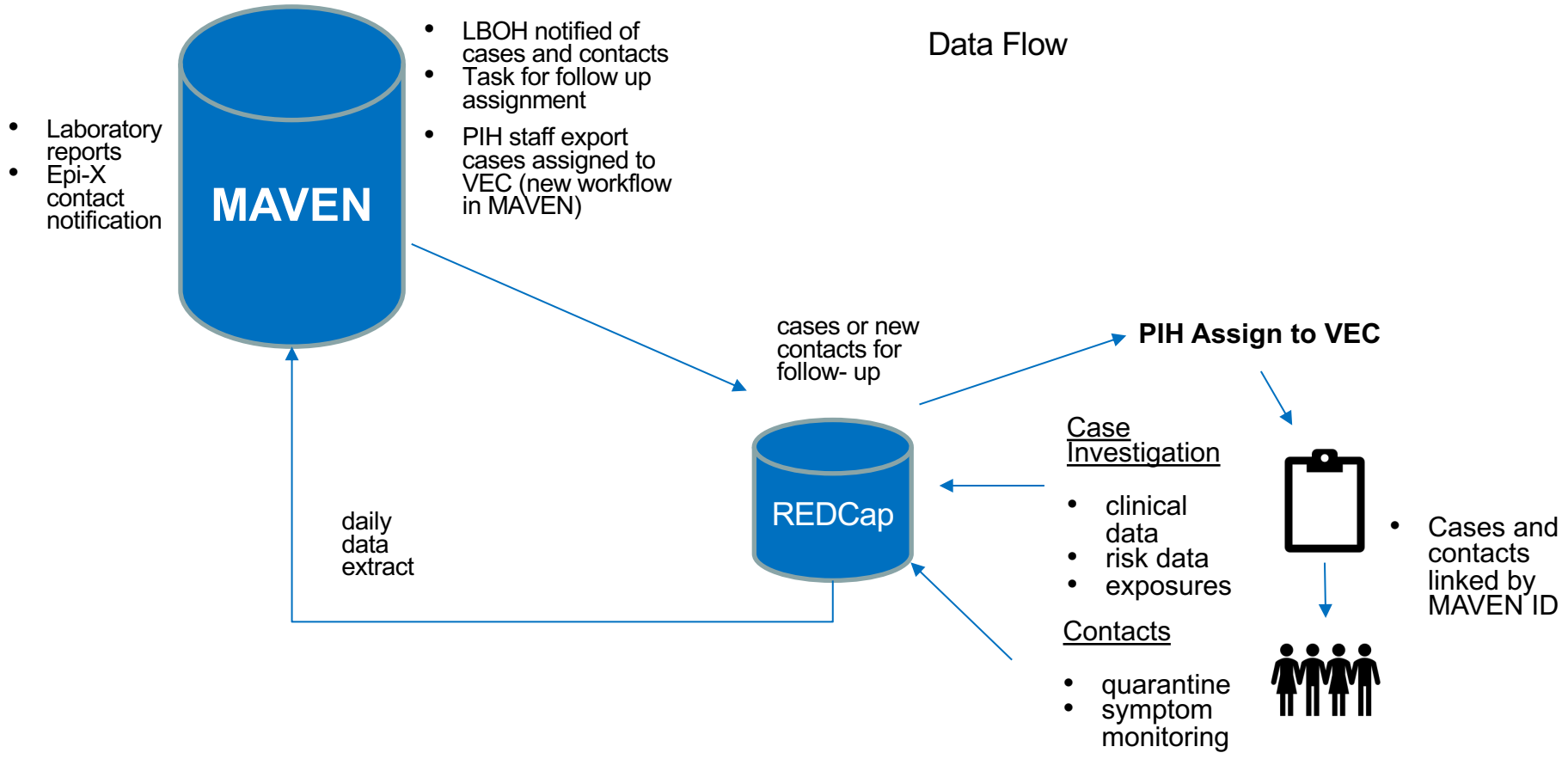
CDC



CDC MMWR™ MORBIDITY AND MORTALITY WEEKLY REPORT

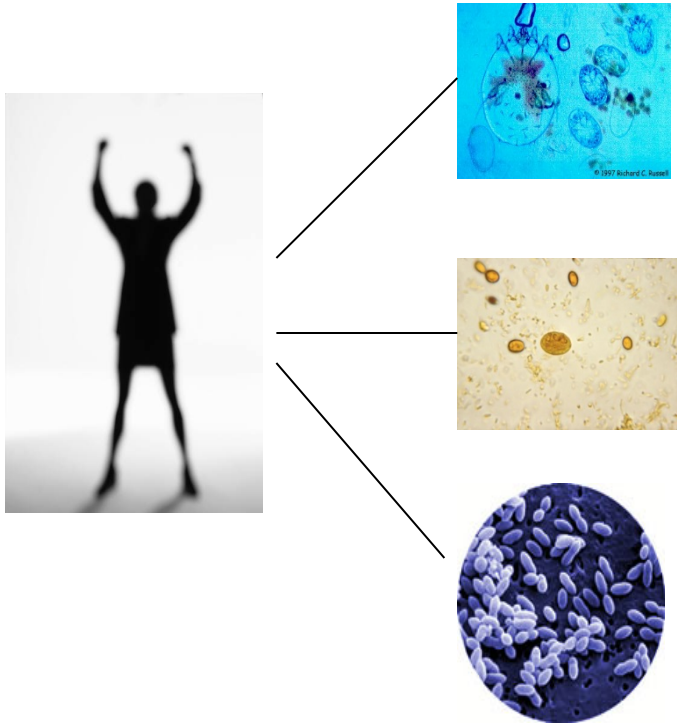

MDPH Contracted Agencies
Hospitals, facilities and other provider sites with EHRs
Laboratory Information Systems (including State Public Health Laboratory)
Testing and linkage to care data
HL7 CDA for eICR (Digital Bridge)
reporting of notifiable diseases
ILI
all notifiable laboratory results
CDC
CDC and Quest lab results
APHL AIMS PLATFORM
ESP
Health Information Reporting Portal
EPI- X notifications
EDN Feeds
MAVEN Surveillance and Case Management System
Modules:
Epidemiology diseases (zoonotics, VPD, hepatitis, HAI, ABR, enteric, etc).
Tuberculosis
STI, HIV and Partner Services
Refugee and Immigrant Health
Cluster/Outbreak response
Foodborne Illness complaints
Rabies management/ lab results
Aggregate influenza surveillance
VAERS
Communication events
On-call
Data and Public Records Requests
System Users:
MDPH
Local Health
Infection Preventionists
Refugee Health Assessment sites
Data to Care sites (HIV)
TB clinics
Deidentified data to CDC:
PHIN-MS
NNDSS
SAMS
Arbonet
eHARS
etc.
CDC

# Volunteer Epi Corps to support local health capacity



# MAVEN: General Features

- Complete data capture in single integrated system across BID
- Disease specific question packages
- Workflow management
- Contact investigations
- Real-time information sharing
- Outbreak response
- Reports and data extracts
- ELR/ eCR interface



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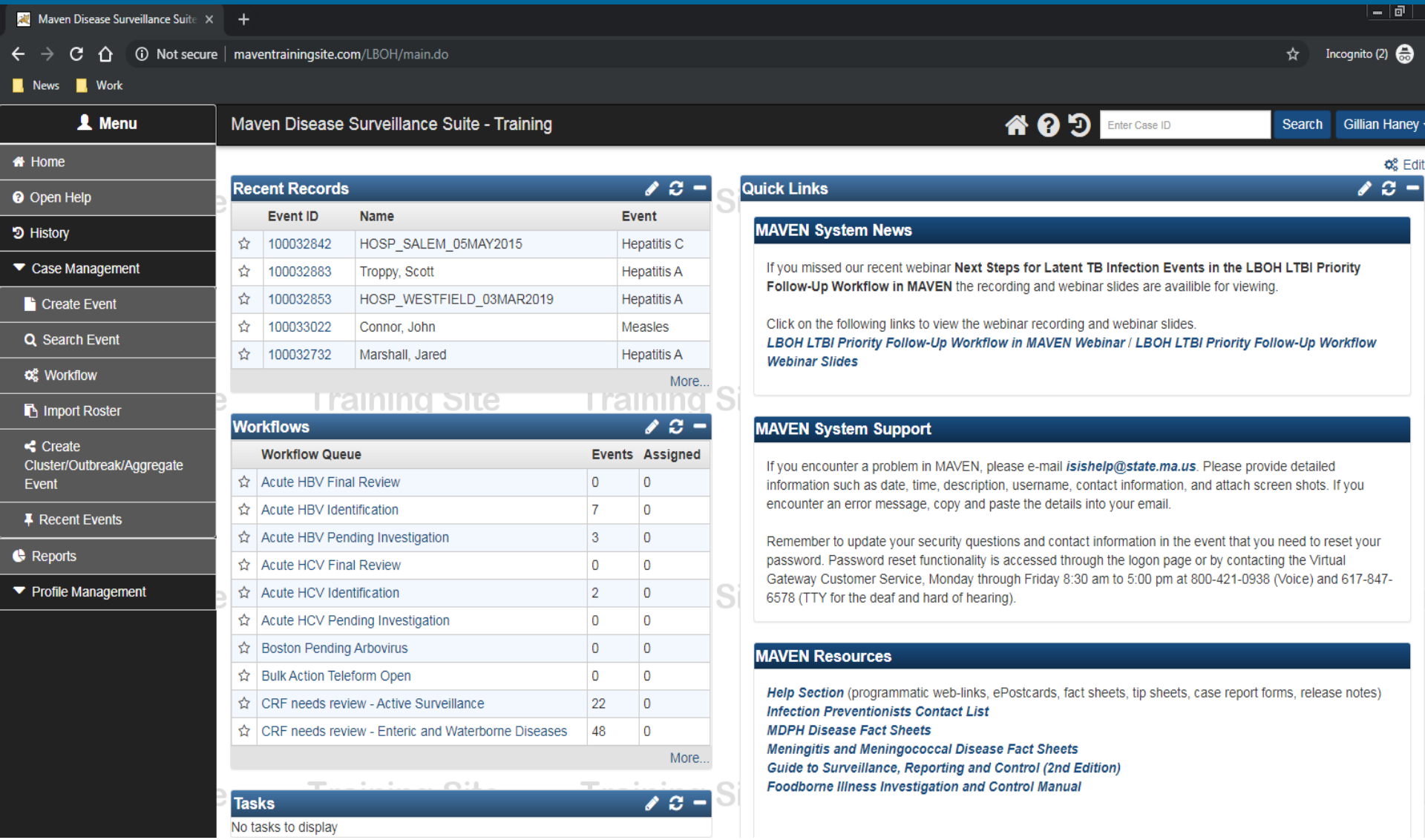
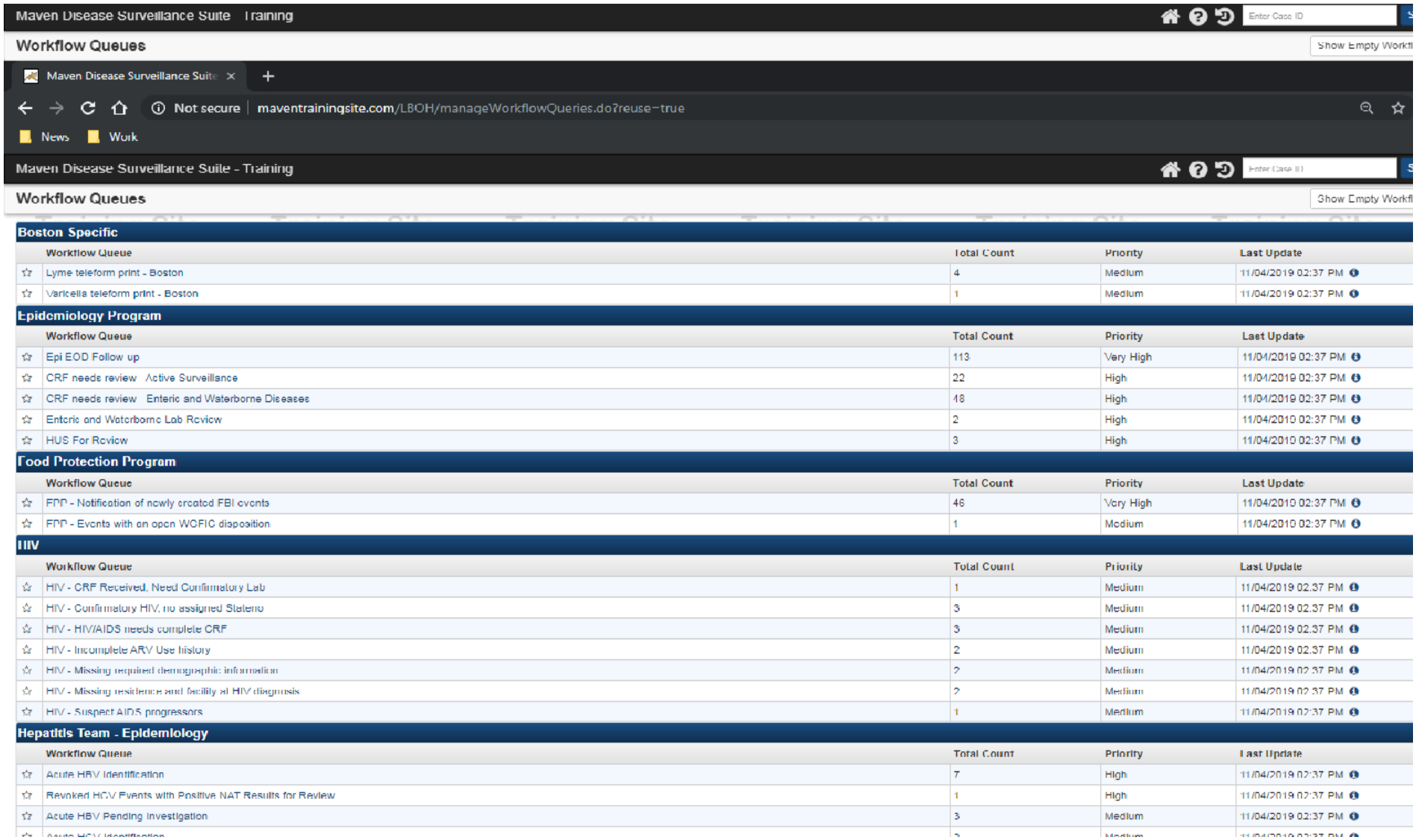
# Main Dashboard



# Workflows


Maven Disease Surveillance Suite Training
Workflow Queues
Maven Disease Surveillance Suite
Not secure | maventrainingsite.com/LBOH/manageWorkflowQueries.do?reuse=true
News
Work
Maven Disease Surveillance Suite - Training
Workflow Queues
Boston Specific
Workflow Queue | Total Count | Priority | Last Update
Lyme teleform print - Boston | 4 | Medium | 11/04/2019 02:37 PM
Varicella teleform print - Boston | 1 | Medium | 11/04/2019 02:37 PM
Epidemiology Program
Workflow Queue | Total Count | Priority | Last Update
Epi EOD Follow up | 113 | Very High | 11/04/2019 02:37 PM
CRF needs review Active Surveillance | 22 | High | 11/04/2019 02:37 PM
CRF needs review Enteric and Waterborne Diseases | 18 | High | 11/04/2019 02:37 PM
Enteric and Waterborne Lab Review | 2 | High | 11/04/2019 02:37 PM
HUS For Review | 3 | High | 11/04/2019 02:37 PM
Food Protection Program
Workflow Queue | Total Count | Priority | Last Update
FPP - Notification of newly created FBI events | 46 | Very High | 11/04/2019 02:37 PM
FPP - Events with an open WOFIC disposition | 1 | Medium | 11/04/2019 02:37 PM
HIV
Workflow Queue | Total Count | Priority | Last Update
HIV - CRF Received, Need Confirmatory Lab | 1 | Medium | 11/04/2019 02:37 PM
HIV - Confirmatory HIV, no assigned Statelo | 3 | Medium | 11/04/2019 02:37 PM
HIV - HIV/AIDS needs complete CRF | 3 | Medium | 11/04/2019 02:37 PM
HIV - Incomplete ARV Use history | 2 | Medium | 11/04/2019 02:37 PM
HIV - Missing required demographic information | 2 | Medium | 11/04/2019 02:37 PM
HIV - Missing residence and facility at HIV diagnosis | 2 | Medium | 11/04/2019 02:37 PM
HIV - Suspect AIDS progressors | 1 | Medium | 11/04/2019 02:37 PM
Hepatitis Team - Epidemiology
Workflow Queue | Total Count | Priority | Last Update
Acute HBV Identification | 7 | High | 11/04/2019 02:37 PM
Revoked HCV Events with Positive NAT Results for Review | 1 | High | 11/04/2019 02:37 PM
Acute HBV Pending Investigation | 3 | Medium | 11/04/2019 02:37 PM

# Disease Event/ Question Packages

## Event Summary

### Basic Information

| | |
|---|---|
| Case ID: | 100033778 |
| Event: | Novel Coronavirus (SARS, MERS, etc) |
| Name: | TEST CASE COVID #3 |
| Birth Date: | 03/25/1975 |
| Gender: | Female |
| Home Phone: | (617) 555-1369 |
| Investigation Status: | Open |
| Linked Events/Contacts: | 0 (View) |
| Attachments: | 0 (Add) |

### Notes

**Scott Troppy [stroppy] - (Generic)** 03/29/2020 05:37 PM
Notes go here

### Notifications

**Event/Status/Date/Type Notifier** 3
Event Status: Confirmed
Event Date: 03/19/2020
Event Type: Symptom Onset Date

**Workflow Status** 1
Event ID is in workflows [View List]

**Case Classification** 2
Age at time of event: 44.98
Age unit: Years

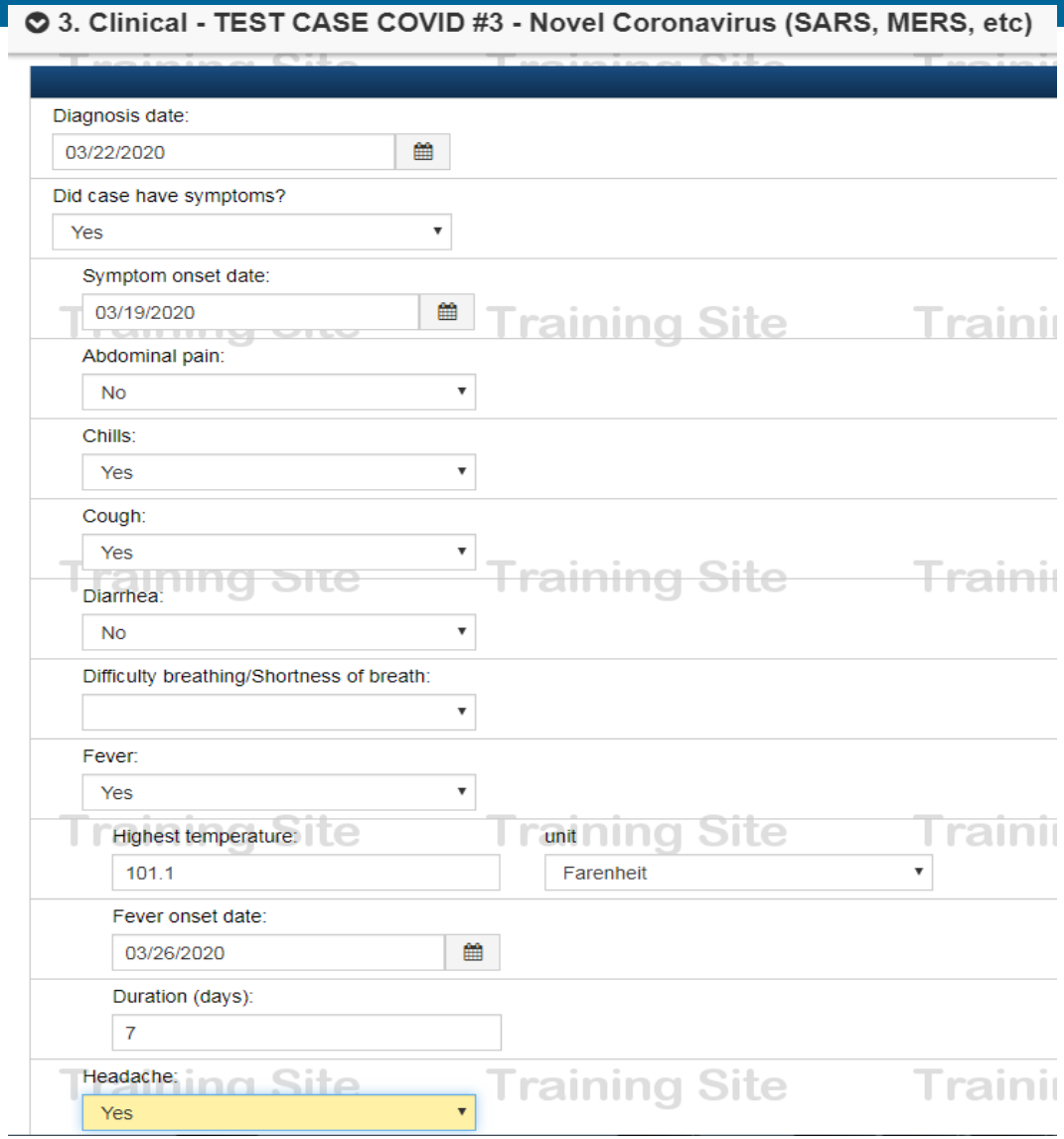
Edit Event Properties | Copy Event

Event Data | Labs | Concerns | Participants | Tasks | Event Properties | Event History Trail

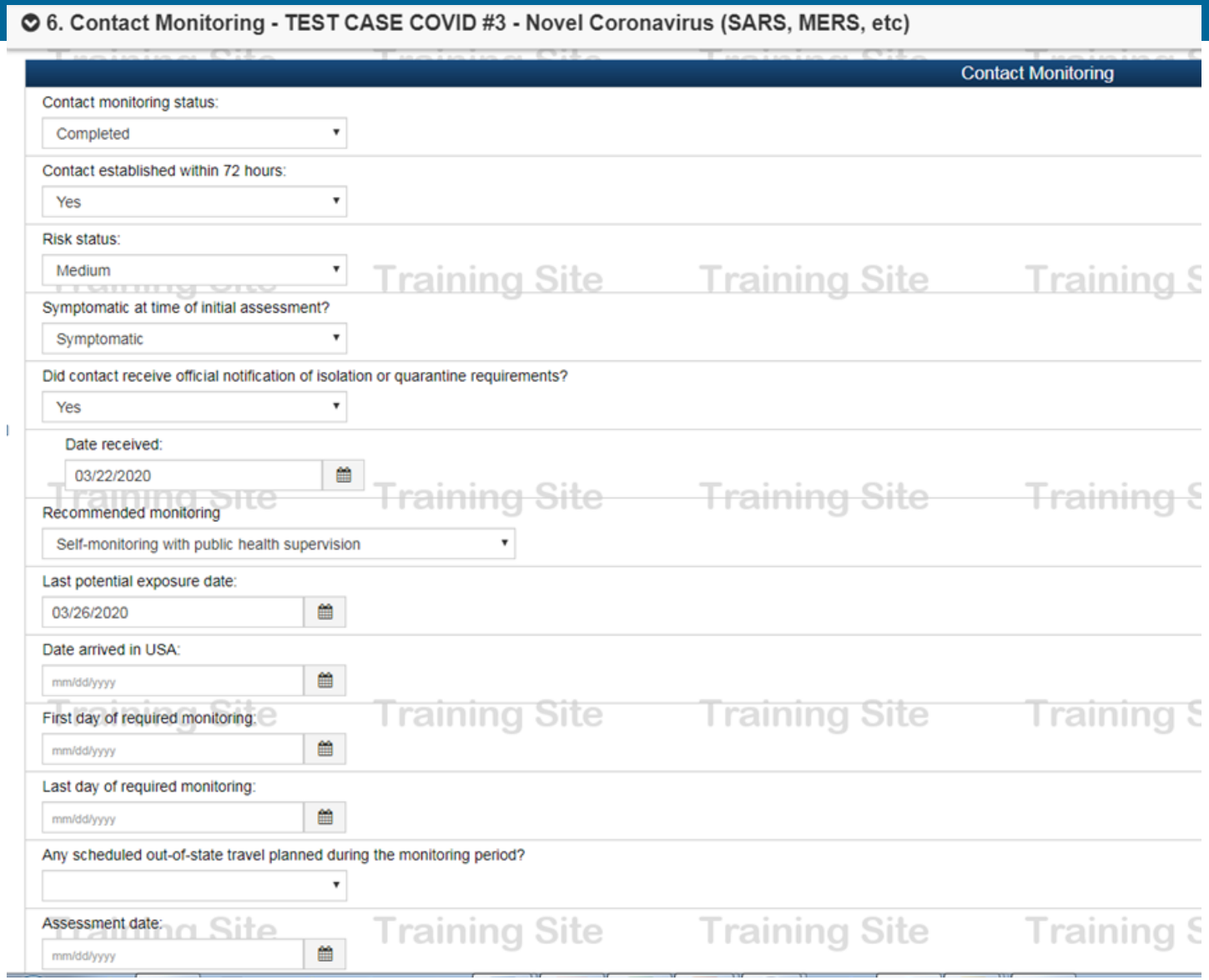
### Question Packages

| Question Package | Person | Last Update |
|---|---|---|
| 1. Administrative | Event ID | 03/29/2020 |
| 2. Demographic | TEST CASE COVID #3 | 03/24/2020 |
| 3. Clinical | TEST CASE COVID #3 | 03/29/2020 |
| 5. Risk/Exposure/Control & Prevention | TEST CASE COVID #3 | 03/26/2020 |
| 6. Contact Monitoring | TEST CASE COVID #3 | 03/29/2020 |
| 6. Epi-linked and Outbreak Information | TEST CASE COVID #3 | 03/24/2020 |
| 8. ECR Information | TEST CASE COVID #3 | 03/24/2020 |

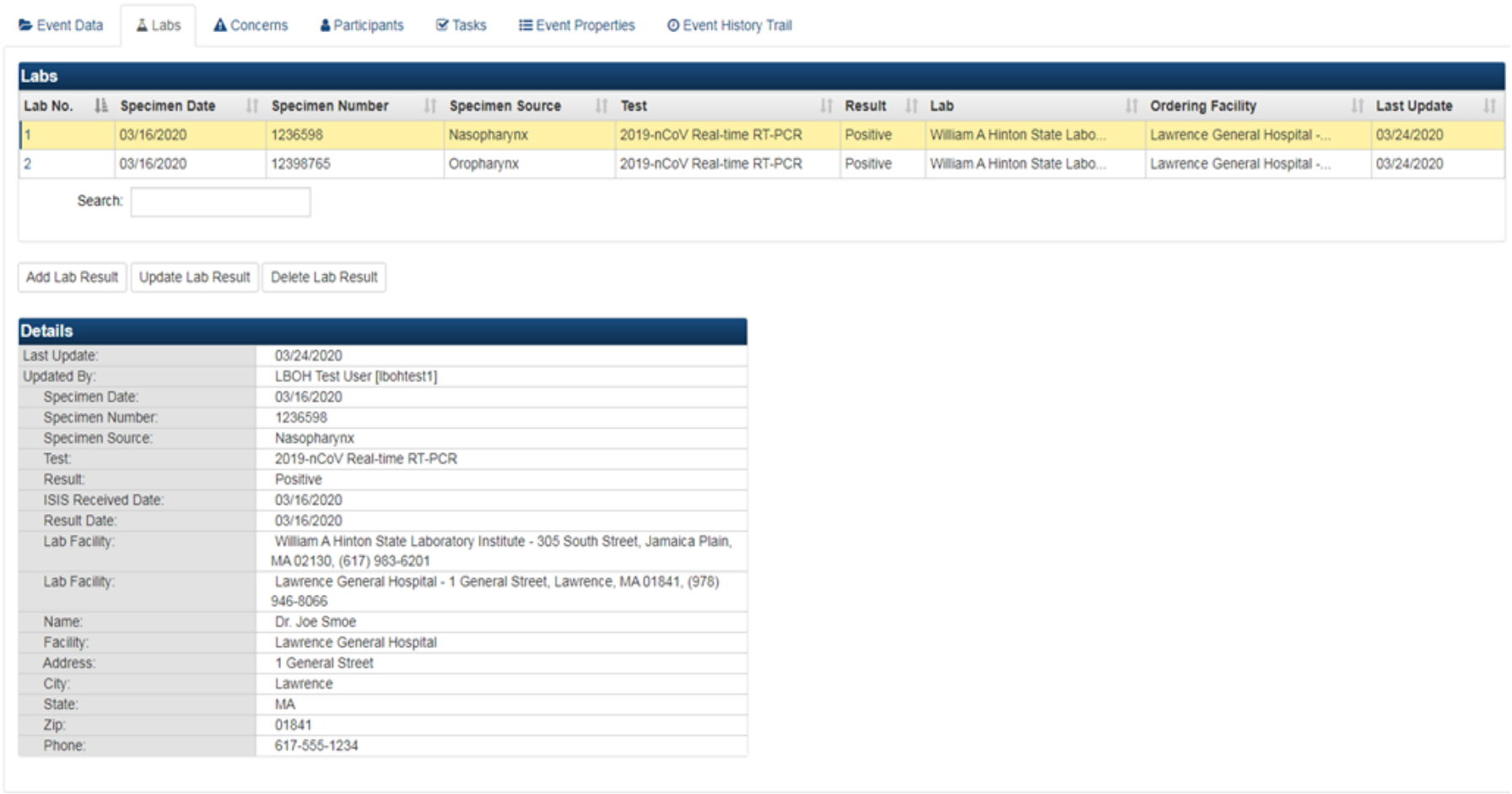
# Investigation



# Contact Monitoring



# Laboratory Data



Event Data | Labs | Concerns | Participants | Tasks | Event Properties | Event History Trail

**Labs**

| Lab No. | Specimen Date | Specimen Number | Specimen Source | Test | Result | Lab | Ordering Facility | Last Update |
|---|---|---|---|---|---|---|---|---|
| 1 | 03/16/2020 | 1236598 | Nasopharynx | 2019-nCoV Real-time RT-PCR | Positive | William A Hinton State Labo... | Lawrence General Hospital -... | 03/24/2020 |
| 2 | 03/16/2020 | 12398765 | Oropharynx | 2019-nCoV Real-time RT-PCR | Positive | William A Hinton State Labo... | Lawrence General Hospital -... | 03/24/2020 |

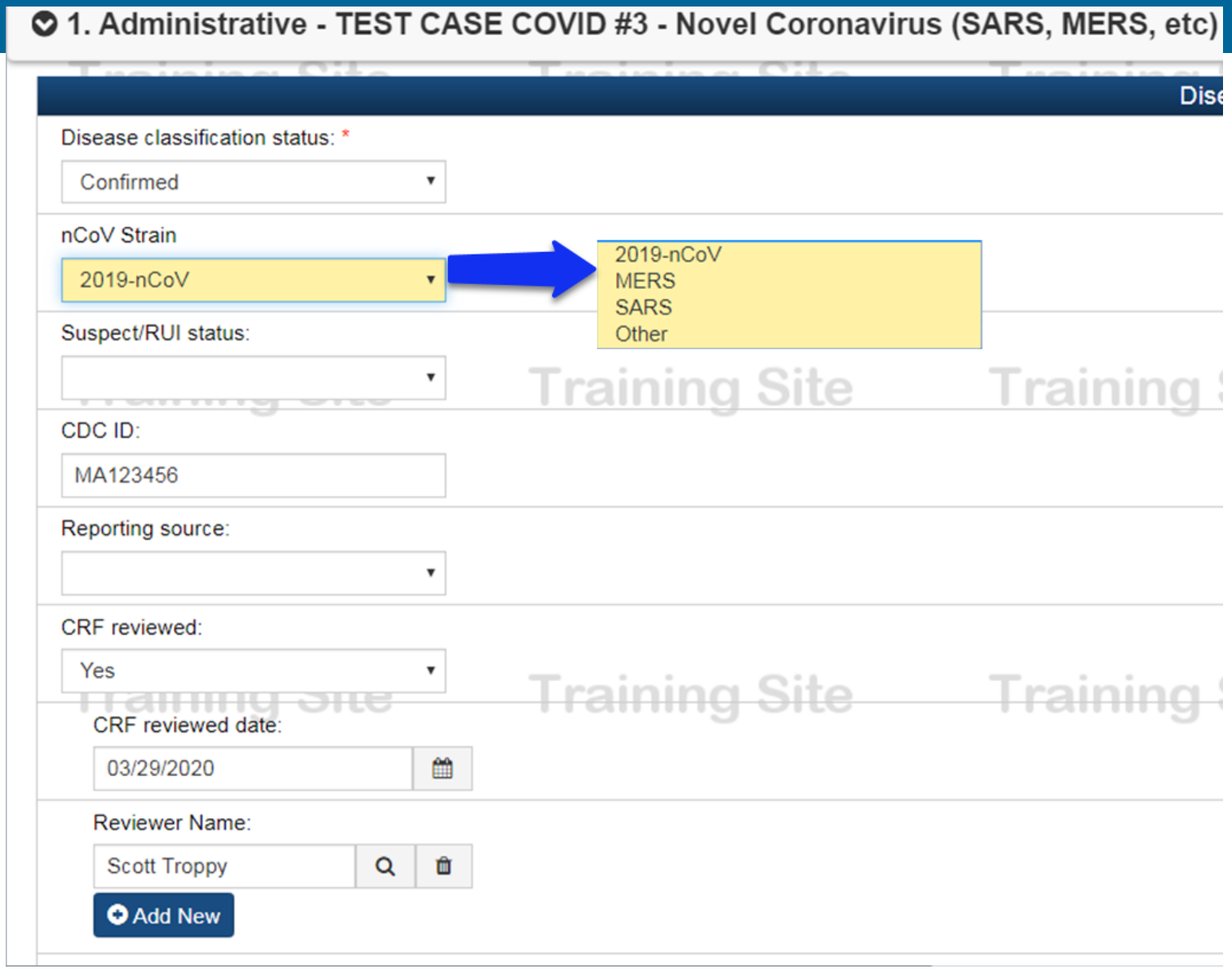
Search:

Add Lab Result | Update Lab Result | Delete Lab Result

**Details**

| | |
|---|---|
| Last Update: | 03/24/2020 |
| Updated By: | LBOH Test User [lbohtest1] |
| Specimen Date: | 03/16/2020 |
| Specimen Number: | 1236598 |
| Specimen Source: | Nasopharynx |
| Test: | 2019-nCoV Real-time RT-PCR |
| Result: | Positive |
| ISIS Received Date: | 03/16/2020 |
| Result Date: | 03/16/2020 |
| Lab Facility: | William A Hinton State Laboratory Institute - 305 South Street, Jamaica Plain, MA 02130, (617) 983-6201 |
| Lab Facility: | Lawrence General Hospital - 1 General Street, Lawrence, MA 01841, (978) 946-8066 |
| Name: | Dr. Joe Smoe |
| Facility: | Lawrence General Hospital |
| Address: | 1 General Street |
| City: | Lawrence |
| State: | MA |
| Zip: | 01841 |
| Phone: | 617-555-1234 |

# Case Review


1. Administrative - TEST CASE COVID #3 - Novel Coronavirus (SARS, MERS, etc)
Disease classification status: *
Confirmed
nCoV Strain
2019-nCoV
2019-nCoV
MERS
SARS
Other
Suspect/RUI status:
CDC ID:
MA123456
Reporting source:
CRF reviewed:
Yes
CRF reviewed date:
03/29/2020
Reviewer Name:
Scott Troppy
Add New
Training Site

# MAVEN

- **Fully integrated across all reportable diseases**
- **Electronic laboratory reporting**
  - State Public Health Laboratory
  - Hospital and reference laboratories, CDC
  - Electronic health records (ESP, Digital Bridge)
  - City of Boston surveillance system
- **On-call system**
- **Data and public records requests tracking**
- **Over 800 Users:**
  - BIDLS
  - BEH
  - Division of Marine Fisheries
  - >95% of local boards of health
  - Hospital infection preventionists
  - data to care providers

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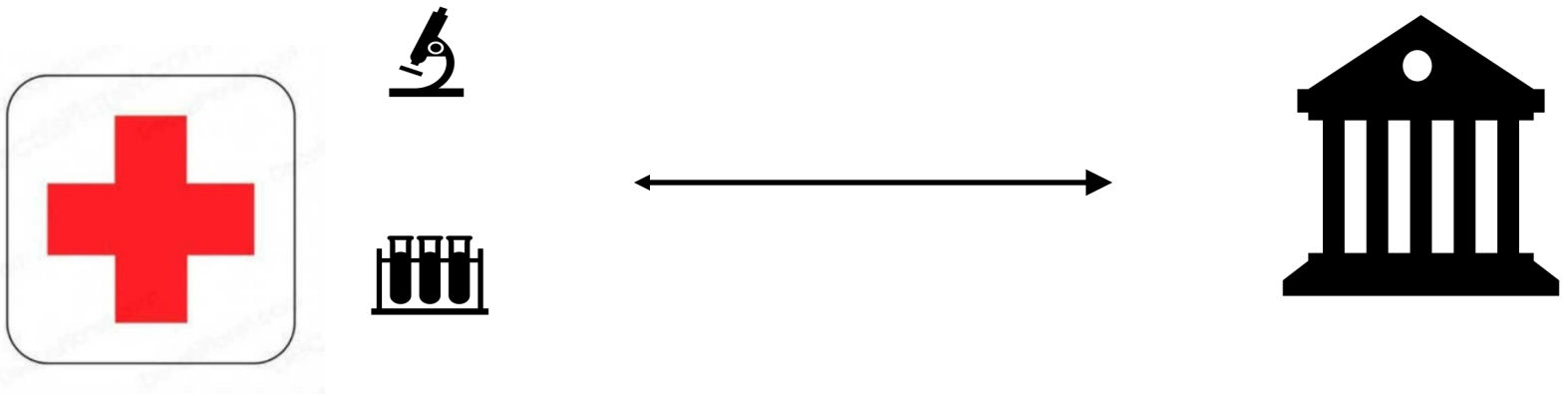
# Electronic Lab Reporting (ELR)

Automated electronic reporting - ELR - replaces fax, email, and ad hoc electronic data. ELR Message Gateway translates the reported information from local coding systems into standardized LOINC, SNOMED, and HL7 equivalents. The LOINC and SNOMED codes are used for test names and results.



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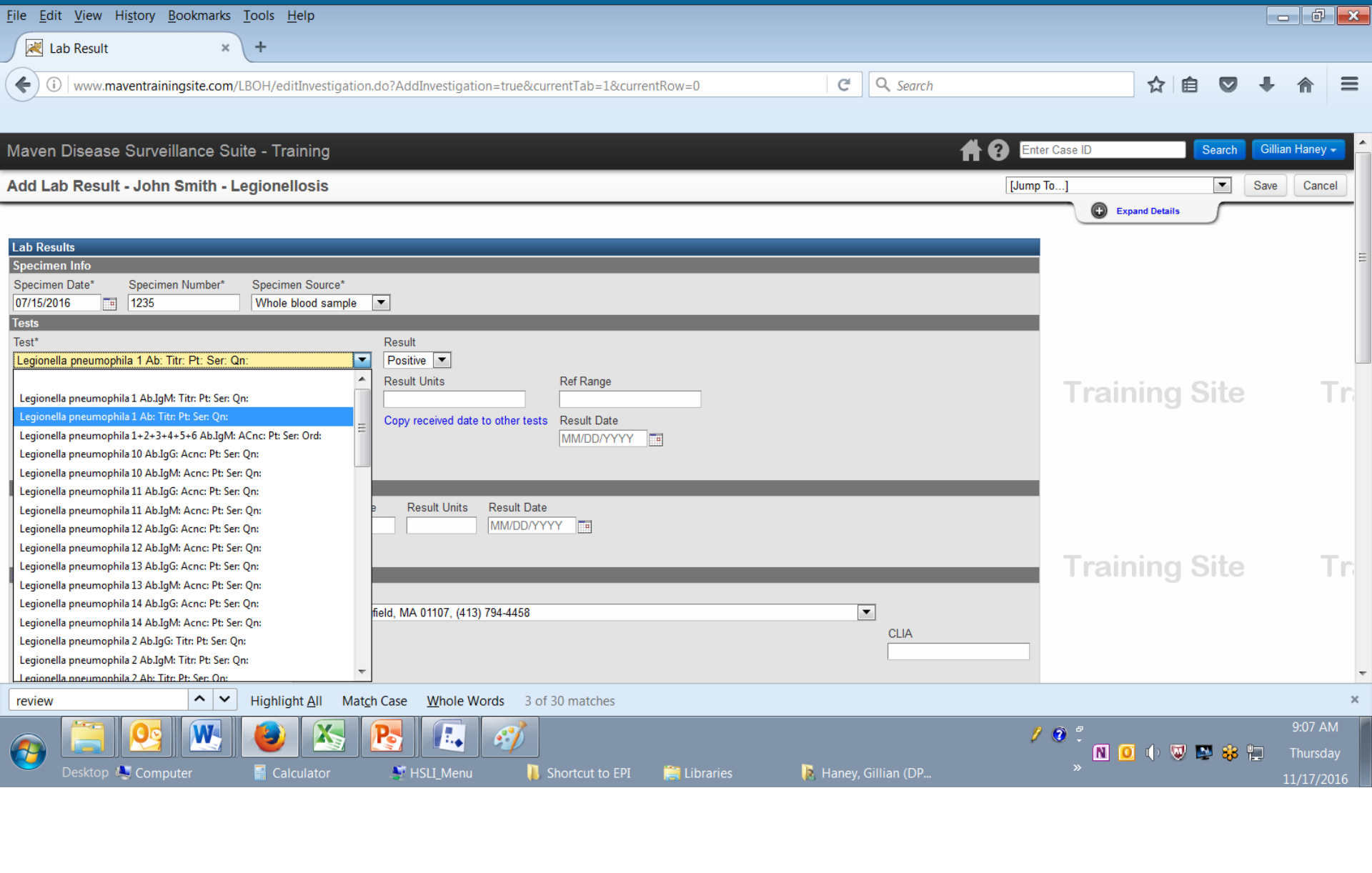
# ELR


File Edit View History Bookmarks Tools Help
Lab Result
www.maventrainingsite.com/LBOH/editInvestigation.do?AddInvestigation=true&currentTab=1&currentRow=0
Search
Maven Disease Surveillance Suite - Training
Enter Case ID
Search
Gillian Haney
Add Lab Result - John Smith - Legionellosis
[Jump To...]
Save
Cancel
Expand Details
Lab Results
Specimen Info
Specimen Date*
07/15/2016
Specimen Number*
1235
Specimen Source*
Whole blood sample
Tests
Test*
Legionella pneumophila 1 Ab: Titr: Pt: Ser: Qn:
Result
Positive
Result Units
Ref Range
Copy received date to other tests
Result Date
MM/DD/YYYY
Legionella pneumophila 1 Ab.IgM: Titr: Pt: Ser: Qn:
Legionella pneumophila 1 Ab: Titr: Pt: Ser: Qn:
Legionella pneumophila 1+2+3+4+5+6 Ab.IgM: ACnc: Pt: Ser: Ord:
Legionella pneumophila 10 Ab.IgG: Acnc: Pt: Ser: Qn:
Legionella pneumophila 10 Ab.IgM: Acnc: Pt: Ser: Qn:
Legionella pneumophila 11 Ab.IgG: Acnc: Pt: Ser: Qn:
Legionella pneumophila 11 Ab.IgM: Acnc: Pt: Ser: Qn:
Legionella pneumophila 12 Ab.IgG: Acnc: Pt: Ser: Qn:
Legionella pneumophila 12 Ab.IgM: Acnc: Pt: Ser: Qn:
Legionella pneumophila 13 Ab.IgG: Acnc: Pt: Ser: Qn:
Legionella pneumophila 13 Ab.IgM: Acnc: Pt: Ser: Qn:
Legionella pneumophila 14 Ab.IgG: Acnc: Pt: Ser: Qn:
Legionella pneumophila 14 Ab.IgM: Acnc: Pt: Ser: Qn:
Legionella pneumophila 2 Ab.IgG: Titr: Pt: Ser: Qn:
Legionella pneumophila 2 Ab.IgM: Titr: Pt: Ser: Qn:
Result Units
Result Date
MM/DD/YYYY
Training Site
Training Site
field, MA 01107, (413) 794-4458
CLIA
review
Highlight All
Match Case
Whole Words
3 of 30 matches
Desktop
Computer
Calculator
HSLI_Menu
Shortcut to EPI
Libraries
Haney, Gillian (DP...
9:07 AM
Thursday
11/17/2016

# Laboratory Data – 2018

| Mechanism | Enteric | General Comm. | Hepatitis | HIV | Influenza | Lead/ Toxic | STD | TB/Myco | VPD | Zoonotic | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Reports - Paper only | 607 | 1,403 | 16,487 | 4,026 | 663 | 67 | 1,764 | 2,558 | 523 | 4,242 | 32,340 |
| Lab Reports - ELR only | 17,498 | 10,789 | 202,464 | 125,987 | 43,488 | 211,147 | 89,153 | 9,516 | 3,341 | 54,107 | 767,490 |
| ELR and paper lab reports | 18,105 | 12,192 | 218,951 | 130,013 | 44,151 | 211,214 | 90,917 | 12,074 | 3,864 | 58,349 | **799,830** |
| % Paper | 3% | 4% | 2% | 2% | 0% | 0% | 2% | 14% | 14% | 6% | 2% |
| Estimated Throughput - Paper only | | | | | | | | | | | 872,831 |
| Estimated throughput - ELR only | | | | | | | | | | | **9,362,870** |

# Electronic Data Processing 2018

| | |
|---|---|
| Number of clinical laboratories transmitting ELR | 74/74 |
| Commercial laboratories transmitting ELR | 6/8 |
| Percent of laboratory reports sent via ELR | 98% |
| Electronic laboratory and case reporting throughput | ~ 9,300,000* |

*2018 estimate