Outline

• Specimen selection
• Influenza Virologic Surveillance Right Size goals
• Specimen collection and shipping
• Influenza testing
Influenza Laboratory Surveillance Goals

• Determine when and where influenza viruses are circulating
  ▪ Situational awareness

• Detect changes in the influenza viruses
  ▪ Seasonal drift, novel viruses, antiviral resistance

• Determine if circulating influenza viruses match the vaccine strains
  ▪ Informs vaccine virus selection
Specimen Selection
Selection of Patient Specimens

- Target patients with:
  - Symptoms of ILI/flu and no other illness explanation
    - Typical symptoms of flu: fever (typically > 100 ºF), malaise, muscle aches, cough, runny nose, sore throat, chills, and/or headache
    - Recent illness onset (≤ 3-4 days of presenting to the clinic/healthcare facility)
- Try for overall representativeness
- However, providers should submit influenza “specimens of interest”:
  - Unsubtypeable influenza A
  - Travel-related
  - Severe or unusual illness
  - Not responding to antiviral treatment
  - Outbreak/cluster
  - Recent avian/swine contact
  - Vaccinated
  - Early and late season
Influenza Virologic Surveillance Right Size Goals
APHL Influenza Virologic Surveillance Right Size Laboratory Guidance

- Influenza Virologic Surveillance Right Size Roadmap (aka Right Size)
  - Released July 2013
  - Consolidates all virological components into one document (i.e. sampling, testing, etc.)
  - Provides tools to assess and improve the precision of the system
  - Supports disease surveillance, response and control efforts and policy decisions

- Answers the questions:
  a. “How much virologic surveillance is needed?”
  b. “What is the most efficient way to achieve needed surveillance objectives?”
• Objectives
  ▪ Situational awareness
  ▪ Novel event detection
  ▪ Antiviral resistance monitoring and investigation
  ▪ Vaccine strain selection and vaccine candidate development
Right Size Goals for Texas:

**SITUATIONAL AWARENESS**
(state level, 95% confidence level, 5% error)

<table>
<thead>
<tr>
<th>Goal number of ILI specimens tested in the state each week</th>
<th>When does this sample size apply?</th>
</tr>
</thead>
<tbody>
<tr>
<td>138</td>
<td>Start of the flu season</td>
</tr>
<tr>
<td>322</td>
<td>Peak of flu season</td>
</tr>
</tbody>
</table>

- Contributors: All providers, commercial labs, hospital labs, and public health labs in Texas that test for flu and report numerator and denominator for tests

- Only during official flu season (Oct--May)
Right Size Goals for Texas:

<table>
<thead>
<tr>
<th>NOVEL EVENT DETECTION</th>
<th>(national level, prevalence level varies with timing, 95% confidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal number of flu POSITIVES tested by TX PHLs each week</td>
<td>When does this sample size apply?</td>
</tr>
<tr>
<td>1</td>
<td>Summer/off-season</td>
</tr>
<tr>
<td>50</td>
<td>“Shoulders” of flu season</td>
</tr>
<tr>
<td>172</td>
<td>Peak season</td>
</tr>
</tbody>
</table>

- Contributors: Public health laboratories in Texas (DSHS Austin and the Laboratory Response Network [LRN] laboratories)
- Novel event detection needed year-round
# Right Size Situational Awareness (Numeric) Goals for Texas DSHS Regions

Note: Population-based goals by DSHS Region; all submissions to a Texas laboratory (that reports flu test results and flu test denominator to public health) count toward goals.

<table>
<thead>
<tr>
<th>Situational Awareness</th>
<th>Weekly number of ILI specimens to be tested cumulatively by any Texas laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Service Region (HSR)</td>
<td>Start of season/shoulder weeks (~20 weeks)</td>
</tr>
<tr>
<td>HSR 1</td>
<td>4</td>
</tr>
<tr>
<td>HSR 2/3</td>
<td>40</td>
</tr>
<tr>
<td>HSR 4/5N</td>
<td>8</td>
</tr>
<tr>
<td>HSR 6/5S</td>
<td>36</td>
</tr>
<tr>
<td>HSR 7</td>
<td>17</td>
</tr>
<tr>
<td>HSR 8</td>
<td>14</td>
</tr>
<tr>
<td>HSR 9/10</td>
<td>7</td>
</tr>
<tr>
<td>HSR 11</td>
<td>12</td>
</tr>
<tr>
<td>Texas</td>
<td>138*</td>
</tr>
</tbody>
</table>

*Provides situational awareness for influenza at the state level with a 95% confidence level and 5% margin of error.
# Right Size Novel Event Detection (Numeric) Goals for Texas LRN Service Areas

**Note:** Population-based goals by LRN service area; all submissions to a Texas public health laboratory count toward goals.

<table>
<thead>
<tr>
<th>Novel Event Detection</th>
<th>Weekly number of flu positives to be tested cumulatively by PHLs in Texas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off-season (~19 weeks)</td>
</tr>
<tr>
<td>Laboratory Response Network (LRN) Lab</td>
<td></td>
</tr>
<tr>
<td>Lubbock</td>
<td>1</td>
</tr>
<tr>
<td>Tarrant</td>
<td>1</td>
</tr>
<tr>
<td>Dallas</td>
<td>1</td>
</tr>
<tr>
<td>Tyler</td>
<td>1</td>
</tr>
<tr>
<td>Houston</td>
<td>1</td>
</tr>
<tr>
<td>Austin</td>
<td>1</td>
</tr>
<tr>
<td>San Antonio</td>
<td>1</td>
</tr>
<tr>
<td>Corpus Christi</td>
<td>1</td>
</tr>
<tr>
<td>Harlingen</td>
<td>1</td>
</tr>
<tr>
<td>El Paso</td>
<td>1</td>
</tr>
<tr>
<td><strong>Texas</strong></td>
<td>1*</td>
</tr>
</tbody>
</table>

*Detect novel viruses at the national level among influenza positive specimens at the specified threshold and 95% confidence (Peak: 1/700, Shoulder: 1/200, off-season: 1/4)
Specimen Collection & Shipping
Supplies Needed to Collect, Package and Ship Specimens

**Specimen Collection Supplies:**
- Viral transport media (VTM) tube
- Nasopharyngeal (NP) swab
- **Instructions:**
  - DSHS Influenza Laboratory Surveillance Protocol for 2018-2019 Season
- Lab Specimen submission form: G-2V form if shipping to DSHS Lab in Austin or Specific-LRN form if shipping to a specific LRN Lab
- Refrigerator or freezer to store collected samples

**Packaging supplies:**
- Secondary container
- Absorbent material to put in secondary containers
- Shipping boxes (“Cold Box”)
- Shipping labels
- Air Bill

**Coolant Supplies:**
- Cold packs (ETA @ Lab<72 hours from time of collection)
- or
- Dry ice (ETA @ Lab>72 hours from time of collection). DSHS does not provide dry ice
Commercially Prepared Viral Transport Media (VTM)

- Commercially prepared VTM purchased for 2018-19 season: Remel M4RT
  - Plastic tube; media is light pink with beads

- Store unused VTM according to manufacturers instructions
  - At room temp.
    - Temp. is 2-30°C (35.6-86.0°F)
Nasopharyngeal (NP) Swabs

- Use synthetic/plastic swabs
  - (NP) specimens are preferred for flu testing at DSHS Lab
  - Calcium alginate swabs or wooden are not acceptable for specimen collection
- NP swabs are sent with VTM order
  - Standard: One swab per VTM tube ordered
  - Always check expiration date on NP swabs

Expiration date

Catalog Number (Peel Pouch): 501CS01
Catalog Number (Dry Tube): 551C
Product Description: Minitip flocked swab, plastic applicator, sterile, individually packaged
Breakpoint Distance (From Swab Tip): 80mm
Secondary Containers

- DSHS uses plastic cylinders labeled with an orange biohazard sticker
  - These liners should be used with the commercially prepared media
  - Contact FluTexas@dshs.texas.gov to return liners back to DSHS Lab
Shipping Boxes, Coolant, Waybills

- DSHS supplies appropriately labeled shipping boxes
  - 2 cold packs included for each box ordered
  - 1 FedEx waybill per box ordered (shipping to DSHS Lab)
  - Providers should order 2-3 boxes pre-season
- DSHS Austin sends empty flu boxes and ice packs back to submitters
- Encourage submitter to place a label with their Submitter ID and address on the inside Cold Box lid
- DSHS does not provide dry ice
DSHS Influenza Laboratory Surveillance Protocol

- Full protocol (Multiple pages)
  - Detailed instructions for specimen collection, labeling, storing, and shipping flu/ILI specimens to the DSHS Lab

- Quick Reminders page (1 page)
  - Highlights important flu/ILI specimen activities

- Both versions of the protocol are sent with all orders
Ordering Supplies

• Types of orders
  ▪ Initial “pre-season” orders
    ❖ Place through the Regional Coordinator in August
    ❖ Supplies sent to “receiver” of order in September
  
  ▪ Replenishment orders
    ❖ Sites can order throughout the season as needed
    ❖ Send VTM Order Form/requests to FluTexas@dshs.texas.gov
Ordering and Shipping Initial Supplies for the 2018-19 season

- Order Initial Supplies

  1. Local Health Depts., Regional Public Health Clinics/Field Offices, and other facilities should place initial orders through their respective Regional Flu Surveillance Coordinator by **August 14, 2018** using the current season’s VTM Order Form (see pic below)

  2. Regional Flu Surveillance Coordinator’s should review and forward VTM Order Forms/requests to **FluTexas@dshs.texas.gov** by **August 17, 2018**

<table>
<thead>
<tr>
<th>Information for site that will receive the VTM</th>
<th>Information on person ordering VTM (if different from person receiving VTM)</th>
<th>VTM Order—Initial Shipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility/Culture Surveillance Site Name</td>
<td>Shipping Address</td>
<td>City</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Simple data entry area for each row</td>
<td>Simple data entry area for each row</td>
<td>Simple data entry area for each row</td>
</tr>
</tbody>
</table>

- Shipping of initial supplies will begin on **September 4, 2018**

- If you need VTM before September for an investigation or outbreak, please send an email to **FluTexas@dshs.texas.gov**
Receiving Your Supplies

- Initial supplies come in a box with an “X” on the outside
  - You don’t need to send anything back to DSHS Austin
  - Supplies may arrive in multiple boxes
  - Inform staff when supplies including VTM should be received and how the VTM should be stored

- Unpack supplies promptly and locate the VTM and store appropriately

- Good time to check expiration dates on any VTM still in the office and discard expired media
  - Unused expired VTM should be discarded according to your health department’s policies and procedures
Lab Submission Form

- Check with LRNs for their forms
- For submission to DSHS Austin Lab:
  - Lab Reporting (LR) distributes submission forms: LabInfo@dshs.texas.gov
    - **New submitters**: Complete and submit the “Submitter Identification (ID) Number Request Form”.
      - Fax the completed form to Tiffunee Odoms at (512) 776-7533.
      - The Lab uses the Submitter ID to account set up and to get copies of the form
    - **Returning submitters**:
      - If only a form is needed, email LR to request a G-2V form
      - If a change of address is requested, complete the “Submitter Identification (ID) Number Request Form” and submit the form via email to LR
  - Submission form information: http://www.dshs.texas.gov/lab/MRS_forms.shtm
Lab Submission Form

• Returning Submitters
  ▪ Requested info needed by Laboratory Reporting (LR) to obtain a copy of submission forms
    ❖ Submitter Number
    ❖ Submitter National Provider Identification Number (NPI)
    ❖ Provider Name
    ❖ Mailing Address
    ❖ City, State, Zip
    ❖ Phone Number
    ❖ Fax Number
    ❖ Contact person name
    ❖ Email address
Completing the DSHS Austin G-2V Submission Form

- **Section 1: Submitter Information**
- **Section 2: Patient Information**
  - Date and time of collection
  - Name and DOB (or other secondary identifier)
- **Section 3: Specimen Source:**
  - Note: If nasopharyngeal swab, Please check both “Nasopharyngeal” and “swab”.
- **Section 4: Virology**
  - Influenza Surveillance
  - Travel history and/or animal contact
  - Vaccine information
- **Section 5: Ordering physician**
- **Section 6: Payor source (Only mark one)**

Fill out everything & ensure info on form matches the info on specimen tube.
DSHS Specimen Labeling Requirements: Patient Identifiers

• All specimens must be labeled with at least two patient specific identifiers
  ▪ Primary identifier: Must be the patient’s name (first and last)
  ▪ Secondary identifier should be one of these:
    ❖ Date of birth (preferred)
    ❖ Medical record number
    ❖ Social security number
    ❖ Medicaid number
    ❖ CDC number
  ▪ Both identifiers must appear on the submission form and specimen tube
  ▪ Specimens not meeting this requirements will be rejected
Acceptable Specimens for Flu Surveillance

- **Upper Respiratory**
  - Nasopharyngeal swab - preferred
  - Nasal swab
  - Throat swab
  - Nasal aspirate
  - Nasal wash
  - Dual NP/throat swabs

- **Lower Respiratory**
  - Bronchoalveolar lavage (BAL)
  - Bronchial wash
  - Tracheal aspirate
  - Sputum
  - Lung tissue

Specimen Collection Tips

• Check media expiration dates before collection
• Leave swab in the media; do not need to remove it
• Complete a specimen submission form for each specimen
• Required identifiers on tube must match the identifiers on the G-2V form
After Collection

• Storing collected specimens
  ▪ Specimens should be refrigerated at 2-8°C or frozen at -70 °C based on the time it will take for the specimen(s) to arrive at the Lab

  ❖ If the specimen will be received at testing laboratory within 72 hours of collection, option to ship cold on ice packs OR ship frozen on dry ice.

  ❖ If the specimen will be received at testing laboratory after 72 hours from collection, ship frozen on dry ice.
Double-check before packaging/shipping

• Are there two patient identifiers (including patient name) on the form and the specimen tube?
  ▪ Do the identifiers match between the tube and the form?

• Are specimen collection date and time on the form?

• When will the specimen arrive at the lab?
  ▪ Should I ship frozen on dry ice?

• Have I listed the correct address on the package (no PO boxes)?
  ▪ Is “Laboratory Services or Lab” included in the address?
Packaging

- Close caps tightly
- If specimen is frozen, do not allow to thaw
- Pack enough coolant to arrive at the lab at the same temperature you sent it
Shipping Reminders

• Ship specimens soon after collection (72 hour window)

• Ship overnight service
  ▪ Contact the courier for pick-up where regular pick-up not scheduled

• Any expected delays → store frozen and ship on dry ice

• Do not ship on Fridays or for weekend/holiday delivery!!
Influenza & Respiratory Virus Testing
CDC FDA Approved Real Time RT-PCR Assay

- Performed by Texas LRNs and DSHS Austin
- Tests for
  - Influenza A/B
    - Flu A Subtype: Pdm A/H1, Seasonal H3, Seasonal H1
    - Flu B lineage: Victoria, Yamagata
  - Novel/Variants: H5/H7/H3v, Flu A unsubtypeable
    - Preliminary: Send to CDC for confirmation
    - Testing must be approved by epidemiologist or similar
  - Can detect all influenza A
- 4-6 hours required for testing, report TAT is 48 hours
- DSHS reports individual patient results reported to submitter
Respiratory Virus Panel (RVP)

- Several RVPs available
- DSHS Austin uses GenMark which detects:
  - Influenza A/H1, A/H3, & B
  - Respiratory syncytial virus (RSV) A & B
  - Human metapneumovirus (hMPV)
  - Rhinovirus
  - Adenovirus B/E
  - Adenovirus C
  - Parainfluenza viruses 1, 2, & 3

- GenMark info:
  - NP swabs only
  - LHDs encouraged to send outbreak specimens for RVP testing
  - Submitters cannot order this test, must request epi approval (512-776-7676)
  - Results are reported to EAIDB
  - TAT varies
Pyrosequencing & Virus Characterization

- **Pyrosequencing (aka antiviral resistance testing)**
  - Looks for influenza viruses that have a marker for antiviral resistance
  - Performed at DSHS Austin, looks for oseltamivir resistance
    - Only done on specific A/H1 viruses (Ct value <30)
    - Results are reported to EAIDB
      - EAIDB alerts HSR/LHD if there is a positive
  - CDC/contract labs do all other pyrosequencing
    - We only hear (quickly) about positives

- **Virus characterization**
  - How we monitor changes in circulating influenza viruses and compare current circulating strains to the reference viruses used for developing influenza vaccines
  - Testing done at CDC/contract labs
    - Genomic sequencing and genetic characterization
    - Hemagglutination inhibition (HI) (i.e. antigenic characterization)
DSHS Austin Lab Contact Information

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