NHSN Antimicrobial Use and Resistance Module – Group Function

Laura Blum, MPH
Lantana Consulting Group | Contractor for the Division of Healthcare Quality Promotion, CDC

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2022 Virtual NHSN Training
Objectives

- Identify differences between NHSN Group Function and Data Use Agreement (DUA)
- Define steps to create an NHSN group
- Set up Confer Rights Template for AUR
- Run group-specific analysis reports
- Run SAAR report at the group level and aggregate SAARs across multiple facilities
- Run facility-wide antibiogram report at the group level
- Monitor the quality of AUR data at the group level
NHSN Groups
Sharing NHSN Data

- Groups allow NHSN facilities to share some or all their data at a single (Group) level for a mutual purpose
- Facilities can share NHSN data with other entities via Groups but only users at the Group level can see facility-level data – Group members cannot see each other’s data
- Facilities can join as many Groups as they want
- Two vehicles to create a Group: NHSN Group Function and Data Use Agreement (DUA)
Group Function vs. Data Use Agreement (DUA)

**Group Function**
- Anyone can create a Group and invite facilities
- Facilities join voluntarily and manually accept the Confer Rights Template
- Group administrators cannot access data for facilities that don’t confer rights

**DUA**
- State, local, and territorial health departments can gain access to data from facilities in their jurisdiction solely for the purposes of surveillance and prevention
- Facilities in jurisdiction automatically added to group and do not have to accept Confer Rights Template
- No state, local, or territorial reporting mandate required
Group Set Up via DUA
Steps to Creating a DUA

1. Health department submits DUA inquiry to NHSNDUA@cdc.gov and arranges initial call with CDC’s Division of Healthcare Quality Promotion (DHQP)
2. DHQP and health department work together to develop DUA
3. Health department and DHQP sign DUA once they agree on the terms
5. DHQP works with the health department to host a webinar to inform all local and state associations about DUA and 90-day opt-out period
Group Set Up via Group Function
Steps to Creating a Group

1. Identify a Group Administrator
2. Group Administrator asks NHSN facility for nomination
3. Group Administrator completes Secure Access management services (SAMS) user registration (if needed)
4. Group Administrator adds additional users to the Group and assigns rights
5. Group Administrator sets joining password
6. Group Administrator creates Confer Rights Template
7. Group Administrator invites potential members
8. Member facilities join Group and accept Confer Rights Template
1. Identify a Group Administrator

- First step is identifying a Group Administrator
  - Can be anyone!
  - Only one person can be the Group Administrator, but other Group users can be given administrative rights and role can be reassigned as needed
    - Only current Group Administrator can reassign
    - Group > Edit Group Info to reassign
2. Ask a Facility to Nominate the Group

- A facility currently participating in NHSN must nominate the Group
  - Group Administrator provides facility with the Group name, type, Group Administrator’s contact information, and whether Group Administrator is new or existing NHSN user
  - Email address must match email address used for Group Administrator’s SAMS account
2. Ask a Facility to Nominate the Group (cont.)

- Facility navigates to Group > Nominate to access the Nominate Group screen
  - Only one facility should nominate the Group
  - Facility that nominates the Group does not automatically become a Group member
2. Ask a Facility to Nominate the Group – screenshot
3. Complete SAMS user registration (if needed)

- After the nomination, Group Administrator will receive an email containing the Group’s 5-digit NHSN ID and link to register with SAMS
  - SAMS is a federal information technology system that gives authorized personnel secure access to non-public CDC applications like NHSN
  - If Group Administrator is not existing NHSN user, must complete SAMS user registration – existing NHSN users do not need to register again
4. Add Group Users and assign rights

- Group Administrator should now have access to Group in NHSN
- Group Administrator can add Group users and assign rights like Facility Administrator at facility
  - Users > Add
  - Recommended user rights for AUR: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-au-user-rights.pdf
4. Add Group Users and assign rights – screenshot
5. Set Joining Password (cont.)

- NHSN Groups protected with a joining password, which Group Administrator shares with member facilities
  - Group Administrator sets the joining password by selecting Group > Joining Password
  - Enter joining password, then click Set Password to complete Group setup
  - Group Administrator can change or reset the password at any time
5. Set Joining Password – screenshot

**Note:** Data are fictitious and for demonstration purposes only.
6. Confer Rights Template

- Group Administrator creates template of data elements (Confer Rights Template) that member facilities will share with the Group
  - Group > Define Rights
- For Group Function, Group users will be unable to view data of member facilities that have not accepted Confer Rights Template
- For DUA, facilities in jurisdiction automatically added to group and do not have to accept Confer Rights Template
6. Confer Rights Template – screenshot
Defining Rights for AUR – General & Surveys Sections

- **General section**
  - Select monthly reporting plan, data analysis and facility information
  - Patient information required for AR Option

- **Surveys section**
  - Required for SAARs
Defining Rights for AUR – AUR Section

- Antimicrobial Use and Resistance section
  - Select Location Type = (ALL), Location = (ALL)
    - Includes all individual inpatient and outpatient locations

### Antimicrobial Use and Resistance

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<tr>
<th>Plan</th>
<th>Month</th>
<th>Year</th>
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<th>Year</th>
<th>Location Type</th>
<th>Location</th>
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- **Antimicrobial Use**
- **Antimicrobial Resistance**
Select Location Type = FACWIDE, Location = FacWIDEIn

- Includes FacWideIn
- Must be included to receive FacWideIn data from facilities
7. Invite Member Facilities

- Group Administrator invites facilities to join Group
  - Invitation must include Group’s NHSN ID and Joining Password
  - May want to include Group’s purpose, summary and reasoning for data elements in confer rights template, and information regarding data use and security
8. Member Facilities Join Group

- Any administrative-level user in the invited facility can join Group
  - Group > Join
  - Enter Group ID and Joining Password
- After member facility joins Group, they will be taken directly to confer rights template
8. Member Facilities Join Group – screenshot

**Note:** Data are fictitious and for demonstration purposes only.
Accepting the Confer Rights Template for AUR

- Facilities can elect not to share some or all AUR data requested in the Confer Rights Template by checking "N/A" box

- Facilities can view and edit rights conferred on Action Items/Alerts screen or by navigating to Group > Confer Rights
Congratulations – you created a Group!

Can now receive data from member facilities and access special group features in NHSN
Group View and Reports
NHSN Group Users’ View
Rights Acceptance Report

- Track Group membership
- Shows which member facilities accepted Confer Rights Template and when

**Note:** Data are fictitious and for demonstration purposes only.
Group Analysis Reports

- Group view has same reports as available for facilities plus additional options for analysis
  - Advanced > Group-level
  - Data folder exclusive to Group users
- Facilities do not have to generate datasets for Group users to analyze data

Note: Data are fictitious and for demonstration purposes only.
Line Listing – Membership Rights

- Exclusive to Group users
- More detailed membership report that describes the rights each facility has conferred
Line Listing – Registered Vendor Information for AUR Data

- Available to facilities and Group users
- Provides information about vendor(s) and software each member facility uses to submit AUR data
- Vendors must have passed Synthetic Data Set (SDS) validation
  - Required for AU; AR requirement forthcoming
Group-level AUR Data

- Group view has same reports as available for facilities, but Groups will see all facilities in single output by facility orgID
- Facilities do not have to generate datasets for Group users to analyze data
- All AUR reports can be run at the facility or group level, including SAAR reports and facility-wide antibiogram
Examples

Let’s imagine ourselves as Group Administrator for a group of hospitals (a main hospital and two satellite campuses) that report to NHSN separately.
Analyzing Group-level AU Data
Example: SAAR Report

### National Healthcare Safety Network

**SAARs Table - All Adult and Pediatric Standardized Antimicrobial Administration Ratios (SAARs)**

**High-Level Indicators and High-Value Targets (2017 Baseline)**

As of: February 10, 2022 at 5:22 PM  
Date Range: AU_SAAR_2017 summaryYM 2021M08 to 2021M08

All Antibacterial Agents used in adult SAAR ICUs, wards, step down units and oncology units

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>SAARRtype_2017</th>
<th>antimicrobialDays</th>
<th>numAUDaysPredicted</th>
<th>numDaysPresent</th>
<th>SAAR</th>
<th>SAAR_pval</th>
<th>SAAR95CI</th>
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<td>Adult_All-Antibacterial_2017</td>
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<td>4368</td>
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<td>0.0000</td>
<td>0.636, 0.690</td>
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<td>0.0000</td>
<td>0.632, 0.686</td>
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<td>4502</td>
<td>6215.340</td>
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<td>0.724</td>
<td>0.0000</td>
<td>0.703, 0.746</td>
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</tbody>
</table>

**Note:** Data are fictitious and for demonstration purposes only.
SAAR Aggregation Across Group Members

- NHSN does not have a built-in option to generate one SAAR for multiple facilities
- Can export and manually pool data to calculate SAARs at different levels of aggregation
Example: SAAR Aggregation

Our healthcare system’s C-Suite asked for an aggregate Adult All Antibacterial SAAR for our main hospital and satellite campuses for August 2021

<table>
<thead>
<tr>
<th>orgID</th>
<th>summaryYM</th>
<th>SAARType_2017</th>
<th>antimicrobialDays</th>
<th>numAUDaysPredicted</th>
<th>numDaysPresent</th>
<th>SAAR</th>
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<td>8609</td>
<td>0.724</td>
<td>0.0000</td>
<td>0.703, 0.746</td>
</tr>
</tbody>
</table>

Note: Data are fictitious and for demonstration purposes only.
Example: SAAR Aggregation – Pooling Data

- Calculate pooled SAAR for aggregation levels not available in NHSN:
  - Sum observed antimicrobial days across desired levels of aggregation
  - Sum predicted antimicrobial days across same levels
  - Divide pooled observed antimicrobial days by pooled predicted antimicrobial days

Note: Data are fictitious and for demonstration purposes only.
Example: SAAR Aggregation – Calculation

Note: Data are fictitious and for demonstration purposes only.

\[
SAAR = \frac{2279 + 2301 + 4502}{3439.626 + 3494.261 + 6215.340} = \frac{9082}{13149.227} = 0.691
\]

We can tell C-Suite that the aggregate Adult All Antibacterial SAAR for our main hospital and satellite campuses for August 2021 was 0.691.
Summary Statistics for Aggregate SAARs

- NHSN Statistics Calculator, a tool within the NHSN application, conducts statistical tests and determines statistical differences
- Can be used to compare SAARs to nominal value or compare two SAAR values to each other
  - NHSN does not recommend comparing aggregate SAARs over time
Example: Statistics Calculator – Compare to 1

- Compare Two Proportions
- Compare Two Incidence Density Rates
- Compare Single Proportion to a Benchmark

The options below can be applied to the following standardized ratios: standardized infection ratios (SIRs), standardized utilization ratios (SURs), and standardized antimicrobial administration ratios (SAARs).

- Compare Single Standardized Ratio (for example, SIR) to Nominal Value
  - Compare Single Standardized Ratio (for example, SIR) to 1
- Compare Two Standardized Ratios (for example, SIRs)
Example: Statistics Calculator – SAAR

Compare Single Standardized Ratio (for example, SIR) to 1

When comparing a standardized ratio to 1, the hypothesis is that the ratio is not different from 1 (specifically, the number observed is not different than the number predicted). To perform a hypothesis test and calculate a p-value and 95% confidence interval, first select the type of ratio you wish to analyze. Then, enter the values for the appropriate number observed and number predicted. The standardized ratio will be displayed automatically. Click Calculate.

Type of ratio: SAAR - standardized antimicrobial administration ratio

Data Source #1

Number Observed Antimicrobial Days of Therapy: 
Number Predicted Antimicrobial Days of Therapy: 
Standardized Antimicrobial Administration Ratio: 
Title: 

Calculate  Back
Example: Statistics Calculator – Enter Data

Compare Single Standardized Ratio (for example, SIR) to 1

When comparing a standardized ratio to 1, the hypothesis is that the number observed is not different than the number predicted. To perform the test and 95% confidence interval, first select the type of ratio you wish to analyze. Enter the appropriate number observed and number predicted. The standardized ratio is calculated.

Type of ratio: SAAR - standardized antimicrobial administration ratio

Data Source #1

Number Observed Antimicrobial Days of Therapy: 9082
Number Predicted Antimicrobial Days of Therapy: 13149.227
Standardized Antimicrobial Administration Ratio: 0.691

SAAR = \frac{9082}{13149.227} = 0.691
Example: Statistics Calculator – Title

Compare Single Standardized Ratio (for example, SIR) to 1

When comparing a standardized ratio to 1, the hypothesis is that the ratio is not different from 1 (specifically, the number observed is not different than the number predicted). To perform a hypothesis test and calculate a p-value and 95% confidence interval, first select the type of ratio you wish to analyze. Then, enter the values for the appropriate number observed and number predicted. The standardized ratio will be displayed automatically. Click Calculate.

Type of ratio: SAAR - standardized antimicrobial administration ratio

Data Source #1

Number Observed Antimicrobial Days of Therapy: 9082
Number Predicted Antimicrobial Days of Therapy: 13149.227
Standardized Antimicrobial Administration Ratio: 0.691

Title: Compare Aggregate SAAR to 1

Calculate  Back
Example: Statistics Calculator - Results

National Healthcare Safety Network
Compare Aggregate SAAR to 1
As of: March 2, 2022 at 9:08 PM

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<th>Number Observed Antimicrobial Days of Therapy</th>
<th>Number Predicted Antimicrobial Days of Therapy</th>
<th>SAAR</th>
<th>p-value</th>
<th>SAAR 95% CI</th>
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<tbody>
<tr>
<td>9082</td>
<td>13149 227</td>
<td>0.691</td>
<td>0.0000</td>
<td>0.677, 0.705</td>
</tr>
</tbody>
</table>

- $p$-value is 0.000, which is < 0.05
- True SAAR likely lies between 0.677 and 0.705 (0.691 is most likely value)
- We can tell C-Suite that our aggregate SAAR value of 0.691 is significantly different from 1
Analyzing Group-level AR Data
Facility-wide Antibiogram Report

- Facility-wide antibiogram displays calculated percent susceptible (%S) for each pathogen-antimicrobial combination reported to the AR Option

\[
%S = \frac{Number \ of \ isolates \ that \ tested \ susceptible}{Number \ of \ isolates \ tested}
\]

- %S only calculated if at least 30 isolates tested for specific antimicrobial
AR Facility-wide Antibiogram – Default Settings

- Tables by month
- Isolates from:
  - All specimen types (blood, cerebrospinal fluid, urine, and lower respiratory)
  - All patient ages
  - All locations
- All isolates regardless of organism category (gram negative, gram positive, and fungal)
- Both healthcare facility and community onset
Example: Group Antibiogram

Our local health department is concerned about *Acinetobacter* and asked us what percent of *Acinetobacter* isolates tested at our hospital and satellite campuses are susceptible to cephalosporins.
Example: Group Antibioticgram – Modify Screen
Example: Group Antibiogram – Table Details

- At group level, first table displays combined antibiogram for all member facilities that report AR data and subsequent tables display antibiograms by orgID.

Note: Data are fictitious and for demonstration purposes only.
Example: Group Antibiogram – Organism Category

- Organisms are grouped by category:
  - Gram-negative
  - Gram-positive
  - Fungal

Note: Data are fictitious and for demonstration purposes only.
Example: Group Antibiogram – Drug Class & Drug

- Drugs are sorted into drug classes organized alphabetically
- Full drug names can be found in Eligible Antimicrobial Agents document: https://www.cdc.gov/nhsn/xls/aur/aur-eligible-antimicrobial-agents.xlsx

Note: Data are fictitious and for demonstration purposes only.
Example: Group Antibiogram – Invalid Combinations

- Though not present in our example, cells shaded in grey represent invalid pathogen/drug combinations.
- Susceptibility tests for those drugs are not reported for those pathogens.
- Refer to the AUR Module protocol for all valid pathogen/drug combinations: https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf

Note: Data are fictitious and for demonstration purposes only.
Example: Group Antibiogram – Interpretation

- We can show the health department our group-level antibiogram, specifically the cephalosporins
  - Only 36% of *Acinetobacter* isolates tested were susceptible to cefepime (CEFEP)
  - Tested less than 30 *Acinetobacter* isolates for cefiderocol (CEFID) susceptibility
  - Remaining cephalosporins had fairly high susceptibility

Note: Data are fictitious and for demonstration purposes only.
Monitoring AUR Data Quality at the Group Level
Participation Alerts

Note: Data are fictitious and for demonstration purposes only.
Line Listing – Participation Alerts

- Groups do not have access to facilities’ Alert screens
- Groups can access alerts created for each facility through the Line Listing – Participation Alerts and frequency table

Note: Data are fictitious and for demonstration purposes only.
Generating Participation Alerts

Note: Data are fictitious and for demonstration purposes only.
Example: Participation Alerts Line List – Modification Screen

View participation alerts for the AUR Module by modifying the Line Listing – Participation Alerts and filtering by module.
### Example: Participation Alerts Line List – Output

#### National Healthcare Safety Network
**Line Listing - Participation Alerts**

As of: February 11, 2022 at 1:35 PM

Data Range: PARTICIPATIONALERT planYM 2021M08 to 2021M08

If (((module = "AUR" )))

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Sorted by orgID module planYM location locCDC eventTypePath summaryDataType procCode setting surveyYr surveyType groupID

Data contained in this report were last generated on February 10, 2022 at 5:29 PM: for the following alerts beginning January 2021: All Alerts

If you are a group user or a facility user with limited rights, alerts may indicate limited rights as opposed to missing data.

**Note:** Data are fictitious and for demonstration purposes only.
AU Option Data Quality Line List

- Line Listing – Antimicrobial Use Data to Review provides opportunity to review data containing four potential data quality issues
- Group users can monitor AU data quality at group level and conduct outreach to member facilities with potential data quality issues
AU Option Data Quality Line List: Table 1

- Facility reported antimicrobial days for every drug as zero or missing (".")
- Not always an error but unlikely to have zero antimicrobial administrations if patients were present during a calendar month

Note: Data are fictitious and for demonstration purposes only.
AU Option Data Quality Line List: Table 2

- Facility reported antimicrobial days for any drug, but also reported zero days present
- Zero days present indicates no patients present in that location for the entire calendar month so no antimicrobials should be administered.

Note: Data are fictitious and for demonstration purposes only.
Total antimicrobial days reported for individual drug were greater than days present

Patient can only attribute one antimicrobial day per drug per day

Note: Data are fictitious and for demonstration purposes only.
AU Option Data Quality Line List: Table 4

- Sum of routes of administration < total antimicrobial day count for an individual drug; sum of routes should always be ≥ total antimicrobial days

<table>
<thead>
<tr>
<th>orgID</th>
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<th>antimicrobialDays</th>
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<tr>
<td>33817</td>
<td>2020M01</td>
<td>AD_STP_DN</td>
<td>AMAN - Amantadine</td>
<td>33</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: Data are fictitious and for demonstration purposes only.
Example: Data Quality Outreach

OrgID 33617 had quite a few potential data quality issues – healthcare system wants us to ask them to validate their AU data.
Example: Data Quality Outreach – Email All Users

- **Group > Send Email**
- This option emails **ALL** users at the selected facilities
- Preferable to send outreach only to relevant users

**Note:** Data are fictitious and for demonstration purposes only.
Line Listing – Facility Users

- Exclusive to Group users
- Provides name, date last logged in, and contact info for users at every member facility
- Identifies special contacts such as Facility Administrator and Patient Safety Primary Contact
Example: Data Quality Outreach – Modifications

- Facility-level Data
  - Line Listing - Facility Enrollment Data
  - [Additional data items]
- Frequency about Participation Aarts La.
- Line Listing - Custom Field Variable Names
- Line Listing - Facility Users
  - Run Report
  - Modify Report
  - Export Data Set
Example: Data Quality Outreach – Filters
Example: Data Quality Outreach – Display Variables

```
<table>
<thead>
<tr>
<th>Available Variables</th>
<th>Selected Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address 1</td>
<td>Facility Org ID</td>
</tr>
<tr>
<td>Address 2</td>
<td>Facility Name</td>
</tr>
<tr>
<td>Address 3</td>
<td>Salutation</td>
</tr>
<tr>
<td>City</td>
<td>First Name</td>
</tr>
<tr>
<td>CMS Certification Number</td>
<td>Middle Name</td>
</tr>
<tr>
<td>county</td>
<td>Last Name</td>
</tr>
<tr>
<td>County Name</td>
<td>Title</td>
</tr>
<tr>
<td>Fax</td>
<td>contactType</td>
</tr>
<tr>
<td>Last Modified</td>
<td>userType</td>
</tr>
<tr>
<td>lastLoggedlnBV</td>
<td>Active?</td>
</tr>
<tr>
<td>lastLoggedlnDIAL</td>
<td>email</td>
</tr>
<tr>
<td>lastLoggedlnHPS</td>
<td></td>
</tr>
<tr>
<td>lastLoggedlnLTCF</td>
<td></td>
</tr>
<tr>
<td>lastLoggedlnPS</td>
<td></td>
</tr>
<tr>
<td>lastLoggedlnSAMS</td>
<td></td>
</tr>
</tbody>
</table>
```
Example: Data Quality Outreach – Output

National Healthcare Safety Network
Line Listing - Facility Users
As of: March 2, 2022 at 9:51 PM
Date Range: All PSFACILITY_USERS
If (((orgID = "33617") AND (contactType = "FADMIN")))

<table>
<thead>
<tr>
<th>Facility Org ID</th>
<th>Facility Name</th>
<th>Salutation</th>
<th>First Name</th>
<th>Middle Name</th>
<th>Last Name</th>
<th>Title</th>
<th>contactType</th>
<th>userType</th>
<th>Active?</th>
<th>email</th>
</tr>
</thead>
<tbody>
<tr>
<td>33617</td>
<td>CDA-XYZ TEST FACILITY (PROD)</td>
<td>AMY</td>
<td>WEBB</td>
<td></td>
<td></td>
<td>FADMIN</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data contained in this report were last generated on February 15, 2022 at 12:44 PM to include data beginning January 2017.

We can email Amy and ask her to validate her facility’s AU data using data validation resources on the AUR Module webpage: [https://www.cdc.gov/nhsn/psc/aur/index.html](https://www.cdc.gov/nhsn/psc/aur/index.html)
Resources
Group Resources

- NHSN Group Users: https://www.cdc.gov/nhsn/group-users/index.html
- NHSN DUA Announcement: https://www.cdc.gov/hai/state-based/dua-announcement.html
- NHSN DUA FAQ: https://www.cdc.gov/hai/state-based/dua-faq.html
Thank you!

Q&A Session: 11:15-11:30am ET on March 24, 2022
NHSN Help Desk: NHSN@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.