Medication & Drug Overdose in NC DETECT

This user guide provides an introduction to accessing reports on medication and drug overdose in NC DETECT. If you have any questions about this guide or are interested in a free, Web-based training customized to your jurisdiction, please contact Amy Ising at ising@ad.unc.edu.

The guide will describe the different indicators available in NC DETECT to track poisoning and overdose in NC, where to find them in NC DETECT and how to use NC DETECT reports to get the information you want.

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Case Definitions

There are several reports or "indicators" in NC DETECT that can be used to track poisoning and overdose in NC based on data from emergency departments (ED) and emergency medical services (EMS). **Local health departments can decide which indicators are most useful for their respective jurisdictions.**

Case definitions describe the search terms that are used to identify ED visits or EMS encounters related to overdose. Most ED case definitions are based on ICD-9-CM or ICD-10-CM final diagnosis codes, which are typically assigned by coders for billing purposes. Please note that the ICD-10-CM version became effective on October 1, 2015 so any case definitions that include ICD-10-CM codes only (and no ICD-9-CM codes) should be used for ED visits AFTER September 30, 2015.

Keywords are included in some case definitions for ED visits and EMS encounters. Keywords are useful if diagnosis codes are missing, late to be added to an ED visit record, or the codes are non-specific and not included in the case definition for a particular indicator.

The most commonly used overdose indicators are included in the table below. Additional overdose-related definitions are available at https://ncdetect.org/case-definitions/.

Table 1: Emergency Department (ED) Case Definitions

ED Report / Indicator	Search Criteria / Case Definition	Description
Benzodiazepine Overdose (ICD-10-CM)	ICD-10-CM Codes: T42.4 - T42.4X4D (ending in A or D only) Excludes sequela	Acute unintentional and intentional benzodiazepine overdoses.
Cocaine Overdose (ICD-10-CM)	ICD-10-CM Codes: Between T40.5 and T40.5X4D Excludes sequela	Acute unintentional and intentional cocaine overdoses.
Heroin Overdose (ICD-9/10-CM)	ICD-9-CM Codes: 965.01 OR E850.0 ICD-10-CM Codes: T40.1% (ending in A or D only) Excludes sequela	Acute unintentional and intentional heroin overdoses.

ED Report / Indicator	Search Criteria / Case Definition	Description
Heroin-related ED Visits (ICD-9/10-CM or keyword)	Free text: heroin* OR herion* ICD-9-CM Codes: 965.01 OR E850.0 ICD-10-CM Codes: T40.1% (ending in A or D only)	Heroin-related ED visits. This definition includes ED visits for emergency (e.g. poisoning/overdose) and non-emergency (e.g. detoxification and rehabilitation). This definition intends to capture ED visits by individuals who have experienced a heroin overdose and/or are at risk for a heroin overdose. This definition also includes keywords, which may be more timely than ICD-9/10-CM final diagnosis codes for some hospitals.
Medication or Drug Overdose (ICD-9/10-CM)	ICD-9-CM Codes: 960-979.9 OR E850-E858.9 OR E950-E950.5 OR E962.0 OR E980-E980.5 ICD-10-CM Codes: T36-T50.996D (ending in A or D only and EXCLUDING all codes in which the second to last character (7th position) is a 5 (adverse effect) or 6 (underdosing)).	Medication or drug overdose. This definition includes ED visits in which the individual consumed the drugs inadvertently, for recreational purposes, to inflict self-harm, or due to assault. This definition consists only of ED visits in which an acute injury resulted from a medication or drug overdose and does not include visits due to medical misadventures and/or the adverse effects of medications or drugs properly administered in therapeutic or prophylactic dosages.

ED Report / Indicator	Search Criteria / Case Definition	Description
Medication or Drug Overdose (ICD-9/10-CM or Keyword)	Free text: overdose OR OD OR O/D ICD-9-CM Codes: 960-979.9 OR E850-E858.9 OR E950-E950.5 OR E962.0 OR E980-E980.5 ICD-10-CM Codes: T36-T50.996D (ending in A or D only and EXCLUDING all codes in which the second to last character (7th position) is a 5 (adverse effect) or 6 (underdosing)).	Acute medication or drug overdose. This definition includes ED visits in which the individual consumed the medications or drugs inadvertently, for recreational purposes, to inflict self-harm, or due to assault. This definition consists only of ED visits in which an acute injury resulted from an overdose and does not include visits due to medical misadventures and/or the adverse effects of medications or drugs properly administered in therapeutic or prophylactic dosages. This definition also includes keywords, which are received in a more timely fashion than ICD-9/10-CM final diagnosis codes; a good definition to use for near-real-time surveillance.
Methadone Overdose (ICD-9/10-CM)	ICD-9-CM Codes: 965.02 OR E850.1 ICD-10-CM Codes: T40.3% (ending in A or D only and EXCLUDING all codes in which the second to last character (7th position) is a 5 (adverse effect) or 6 (underdosing)).	This definition captures ED visits for acute methadone overdoses. Includes unintentional and intentional methadone overdoses.
Opioid Overdose (ICD-9/10-CM)	ICD-9-CM Codes: 965.0% OR E850.0-E850.2 ICD-10-CM Codes: T40.0-T40.4X6D (ending in A or D only and EXCLUDING all codes in which the second to last character (7th position) is a 5 (adverse effect) or 6 (underdosing)).	Acute opioid overdoses. Opioids include illicit drugs such as heroin and prescription medications such as methadone, oxycodone, and hydrocodone taken for licit or illicit purposes. This definition includes unintentional and intentional opioid overdoses.
Other and Unspecified Narcotics Overdose (ICD-10-CM)	ICD-10-CM Codes: T40.6 - T40.604D (ending in A or D only) Excludes sequela	Acute unintentional and intentional overdoses for other and unspecified narcotics.

ED Report / Indicator	Search Criteria / Case Definition	Description
Other Opioid Overdose (ICD-10-CM)	ICD-10-CM Codes: T40.2 - T40.2X4D (ending in A or D only) Excludes sequela	Acute unintentional and intentional overdoses for other opioids.
Other Synthetic Narcotic Overdose (ICD-10-CM)	ICD-10-CM Codes: T40.4 - T40.4X4D (ending in A or D only) Excludes sequela	Acute unintentional and intentional overdoses for other synthetic narcotics.
Other Synthetic Narcotic (keyword)	Free text: fent* AND (overdose or OD)	Intended to capture ED visits that mention fentanyl overdose in the chief complaint or triage note fields.
Unintentional Medication or Drug Overdose (ICD-9/10-CM)	ICD-9-CM Codes: E850-E858.9 ICD-10-CM Codes: T36.0X1 - T50.991D (only includes codes in this range where the character in the second to last position (7th with decimal) is a 1 (accidental/unintentional)); EXCLUDES sequela	Unintentional medication or drug overdose. An unintentional medication or drug overdose is defined as an injury in which a person is exposed to a medication or drug without the attempt for self-harm or assault. This definition includes overdoses due to drugs taken for recreational purposes. Excludes visits due to medical misadventures and/or the adverse effects of medications or drugs properly administered in therapeutic or prophylactic dosages.

Table 2: PreMIS / EMS Indicators

PreMIS Report / Indicator	Case Definition	Description
Naloxone	Narcan or naloxone included as a medication administered by the EMS agency during the patient encounter	Tracks EMS encounters that have documented administration of Narcan or naloxone, drugs used for overdose reversals

Overdose/Poisoning/Ingestion	Mention of overdose, poisoning or ingestion in chief complaint OR a dispatch complaint of Ingestion/Poisoning OR a provider impression = 977.90-Poisoning/Drug Ingestion	Tracks EMS encounters for suspected overdoses

Please note that some of the indicators are subsets of overall overdose indicators as displayed in the graphics on the following pages. ED visit counts from 2016 for NC residents are included to provide context. ED visits that have diagnosis codes for more than one type of medication or drug can be counted in more than one indicator. For example, if an ED visits gets a diagnosis code for cocaine overdose and a diagnosis code for heroin overdose, that visit will be included in the counts for both of those indicators.

In addition, case definitions that include keywords and ICD-9/10-CM codes typically provide more results than case definitions that include only the ICD-9/10-CM codes. Keywords can identify visits that have missing diagnosis codes; they can also identify visits that do not get a code that is required for the case definition. For example, the case definition Medication or Drug Overdose (ICD-9/10-CM or keyword) will include an ED visit with a chief complaint of "overdose" that has a diagnosis code of "F19.10 - OTHER PSYCHOACTIVE SUBSTANCE ABUSE, UNCOMPLICATED" while the case definition for Medication or Drug Overdose (ICD-9/10-CM) will not include this ED visit.

Keywords can sometimes result in false positives, e.g., visits that are included in the results that are NOT related to an overdose. When reviewing line listing results, false positives are usually easy to identify. For example, "OD" is a common medical abbreviation for right eye; we are working to reduce these types of false positives but please contact us if you notice a recurring pattern that we can attempt to address.

Figure 1: Medication and Drug Overdose Indicators and Hierarchy

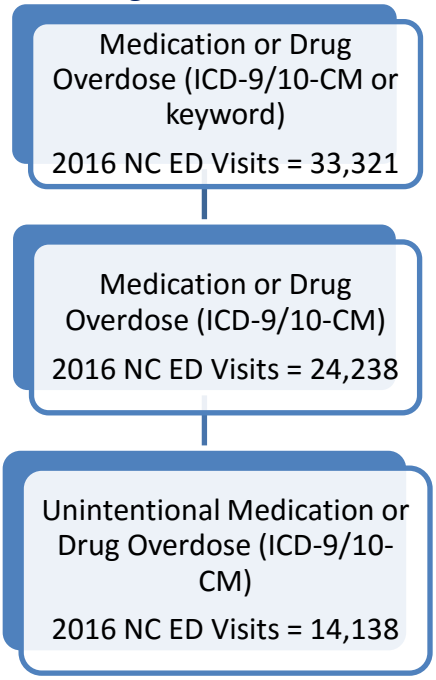
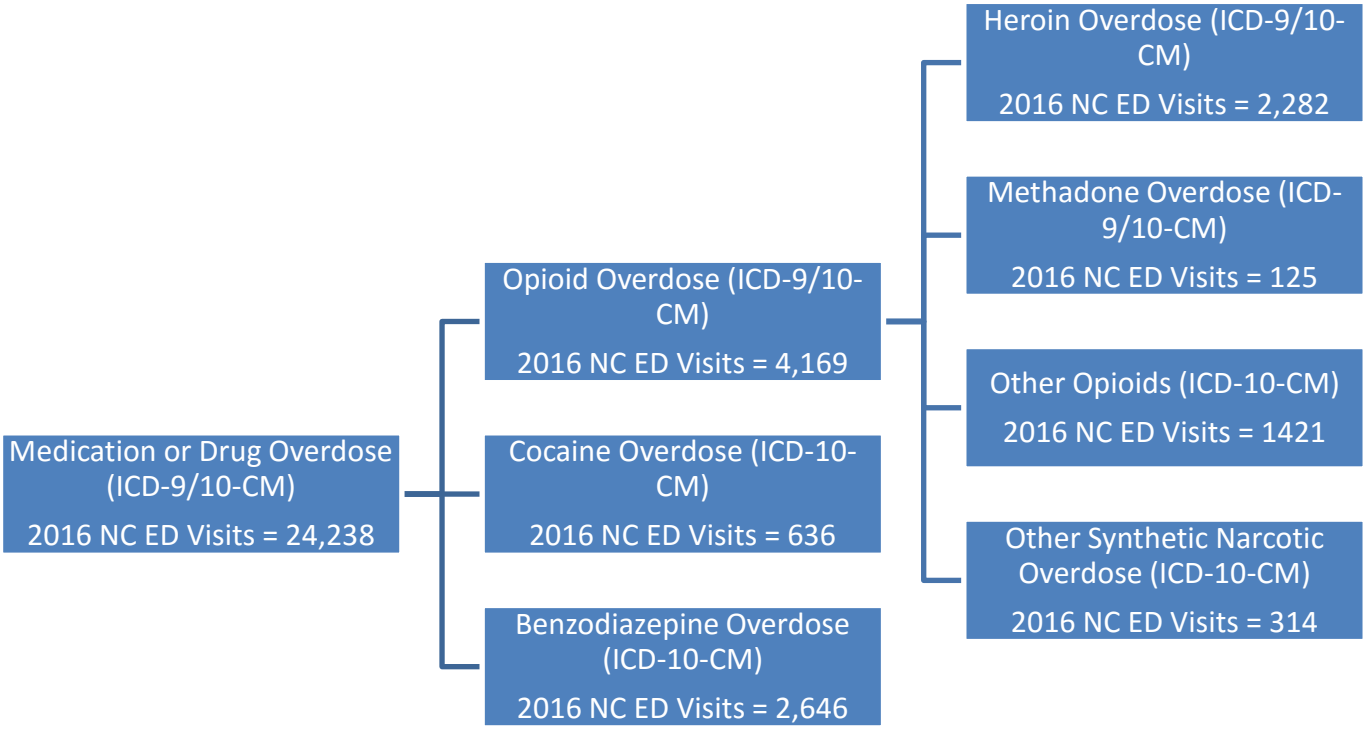


Figure 2: Relationship between Medication and Drug Overdose and Opioid Overdose and Opioid Overdose Subsets



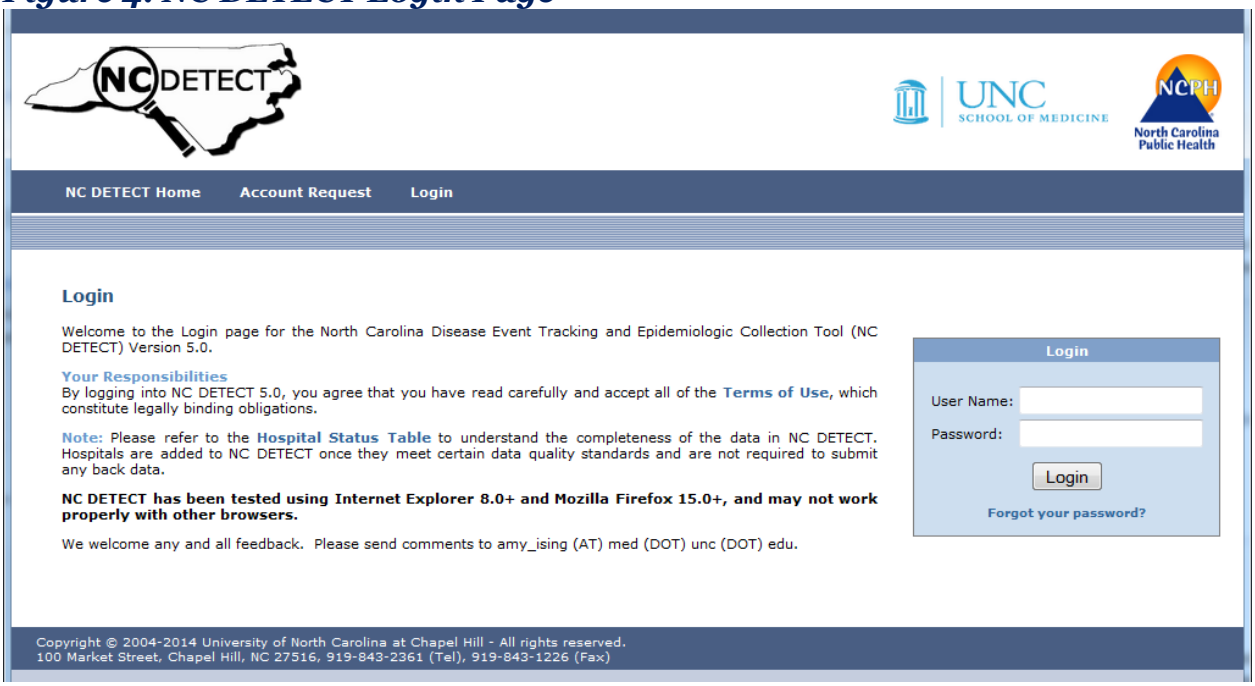
NC DETECT Account Requests

To request an NC DETECT account, please go to http://ncdetect.org and click on Account Request.

Figure 3: NC DETECT home page (http://ncdetect.org)

NC DETECT account requests are reviewed by the North Carolina Division of Public Health (NC DPH) Communicable Disease Branch. Users will be notified by email once their account has been approved and activated. Users with approved account requests can click on the Login link to access the login page.

Figure 4: NC DETECT Login Page



Once you have been notified by email that your account has been activated, go to the login page and enter your user name and password. If you do not remember your password, please use the *Forgot Password?* link on the login page. It will ask for your user name and email address and will send you a link to reset your password. If you do not remember your user name or the email address used to create your account, please email us at ncdetect@listserv.med.unc.edu

Reporting Summary & Key Points

Below are some reminders about using NC DETECT and what is available.

- The data available in NC DETECT describe emergency department visits for overdoses and EMS encounters for overdoses.
- Mortality data are not available in NC DETECT. To access mortality data for your county, please go the NC Division of Public Health Injury and Violence Prevention Branch Poisoning Data Page at http://www.injuryfreenc.ncdhhs.gov/DataSurveillance/Poisoning.htm.
- Overdose indicators are not mutually exclusive. ED visits that have diagnosis codes for more than one type of medication or drug can be counted in more than one indicator. For example, if an ED visits gets a diagnosis code for cocaine overdose and a diagnosis code for heroin overdose, that visit will be included in the counts for both of those reports.
- Case definitions are available in this document and are also available at https://ncdetect.org/case-definitions/
- Please contact us at ncdetect@listserv.med.unc.edu for assistance, to request new indicators and/or to request training!

Reports

Reports for surveillance of medication and drug overdose are found in the following NC DETECT Reports:

- General Dashboards: Overdose / Substance Abuse Tab
- Custom Event Line Listing
- County-level Custom Event Aggregate Report
- Syndrome Line Listing

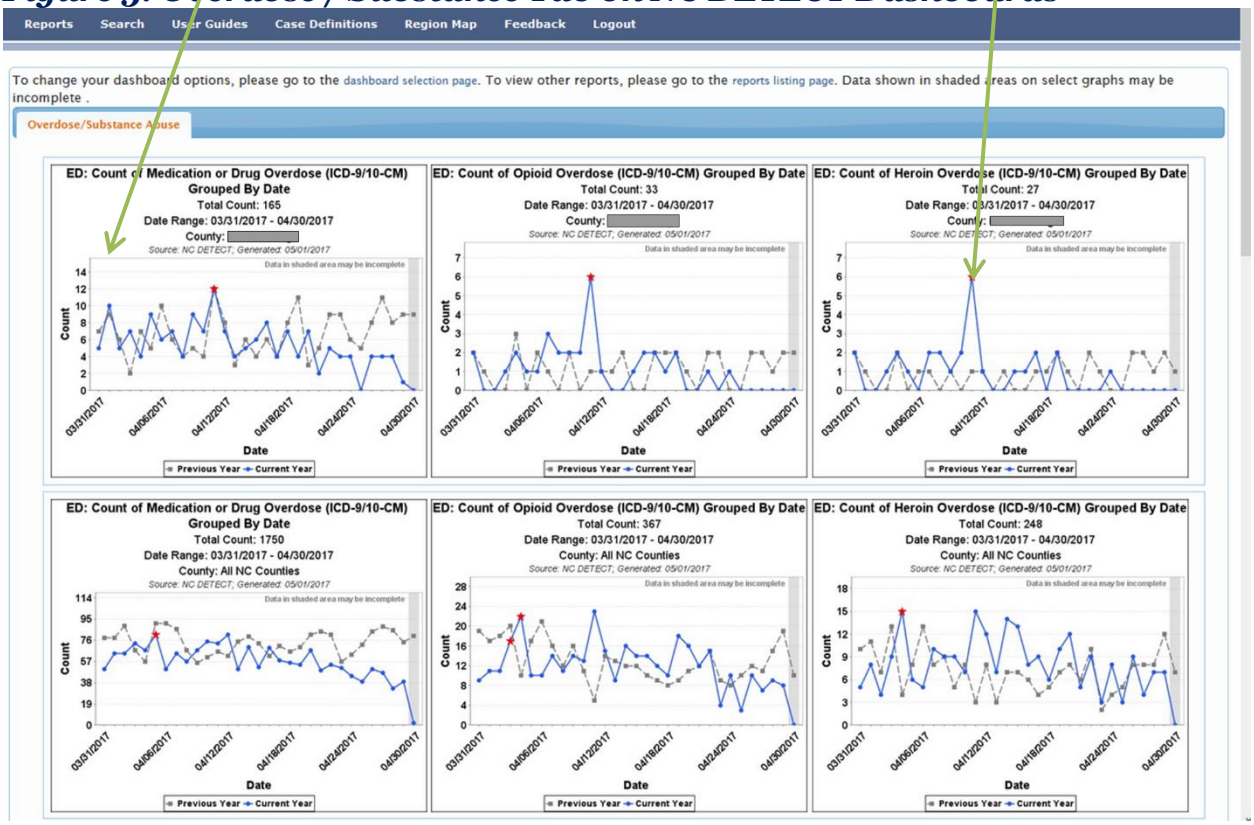
Overdose / Substance Abuse Dashboard

NC DETECT supports a variety of user roles that receive different data access and report permissions. After a successful login, local health department users are shown a "dashboard" of information for their county(ies). A sample screenshot is shown below. By selecting the "Overdose / Substance Abuse" tab, users can view several graphs for medication and drug overdose. The graphs show a one-month trend and compare the current year to the previous year. Users can click on a point on the graph to be taken to the line listing detail for the selected date and indicator. Users can also right click on a graph to copy and/or save the graph for use in another document (Word, email, PowerPoint, etc.)

Right click on any graph to save it as an image for use in other programs (Word, PowerPoint, etc.)

Click on a point in the graph to access line listing information.

Figure 5: Overdose / Substance Tab on NC DETECT Dashboards



Custom Event Line Listing Report

The Custom Event Line Listing Report can be accessed two ways: by clicking on a point on a graph in the overdose/substance abuse dashboard or by clicking on the Reports link at the top of NC DETECT and selecting the Custom Event Line Listing report. This report houses NC DETECT's newest indicators and syndromes.

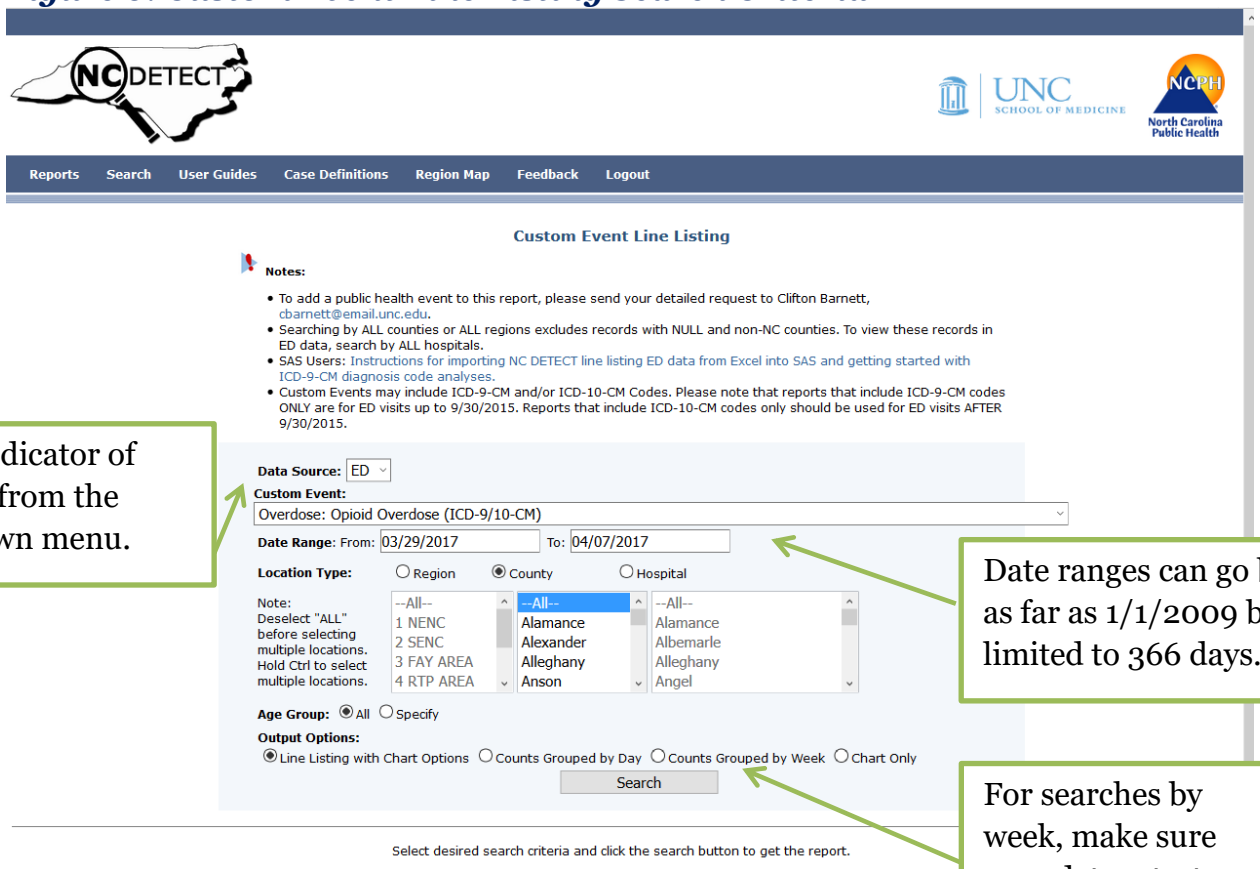
On the Custom Event Line Listing Report, users can select the indicator, date range, location and output option of interest. Users can search as far back as January 1, 2009 but searches are limited to 366 days at a time. Key features on this report include the following:

Output Options (see figure for examples): Select how to display the data. Options include line listing with/without a chart, counts grouped by day, counts grouped by week, chart only. When grouping counts by week ensure accuracy by selecting a date range that has complete weeks (starting on a Sunday and ending on a Saturday). Selecting chart only helps the report load faster when only a graph is needed and an extended date range is used.

Sorting: In the tabular results, click on a column name to sort the results by that column. Click again to toggle between ascending / descending. The default sort is currently Arrival Date – ascending.

Download to Excel: For any tabular output, users can click on the Excel link to download the data to Excel.

Figure 6: Custom Event Line Listing Search Criteria



Select indicator of interest from the drop down menu.

Date ranges can go back as far as 1/1/2009 but are limited to 366 days.

For searches by week, make sure your dates start on a Sunday and end on a Saturday.

The table below displays sample line listing output from the overdose reports. Not all hospitals send triage notes, but that data element, along with the chief complaint, can provide context to the overdose- or poisoning-related ED visit.

Table 3: Sample Line Listing Output

Chief Complaint	Triage Notes	Diagnosis Code(s)	Injury Code(s)
overdose	EMS was called by pt friend when they found him on the couch not breathing , pt has been drinking earlier unable to determine if pt took something else aside from alcohol.	965.09 - POISONING BY OTHER OPIATES AND RELATED NARCOTICS	E850.2 - ACCIDENTAL POISONING BY OTHER OPIATES AND RELATED NARCOTICS
Overdose	Chief Complaint Subjective: "took 40 allergy pills. I took them to kill myself" Does not know name of medicine that she took. Parents do not know either	977.9 - POISONING BY UNSPECIFIED DRUG OR MEDICINAL SUBSTANCE *-* V62.84 - SUICIDAL IDEATION *-* 311 - DEPRESSIVE DISORDER NOT ELSEWHERE CLASSIFIED *-* 965.4 - POISONING BY AROMATIC ANALGESICS NOT ELSEWHERE CLASSIFIED *-* 977.0 - POISONING BY DIETETICS *-* 971.2 - POISONING BY SYMPATHOMIMETICS (ADRENERGICS)	E950.0 - SUICIDE AND SELF-INFLICTED POISONING BY ANALGESICS ANTIPYRETICS AND ANTIRHEUMATICS *-* E950.4 - SUICIDE AND SELF-INFLICTED POISONING BY OTHER SPECIFIED DRUGS AND MEDICINAL SUBSTANCES

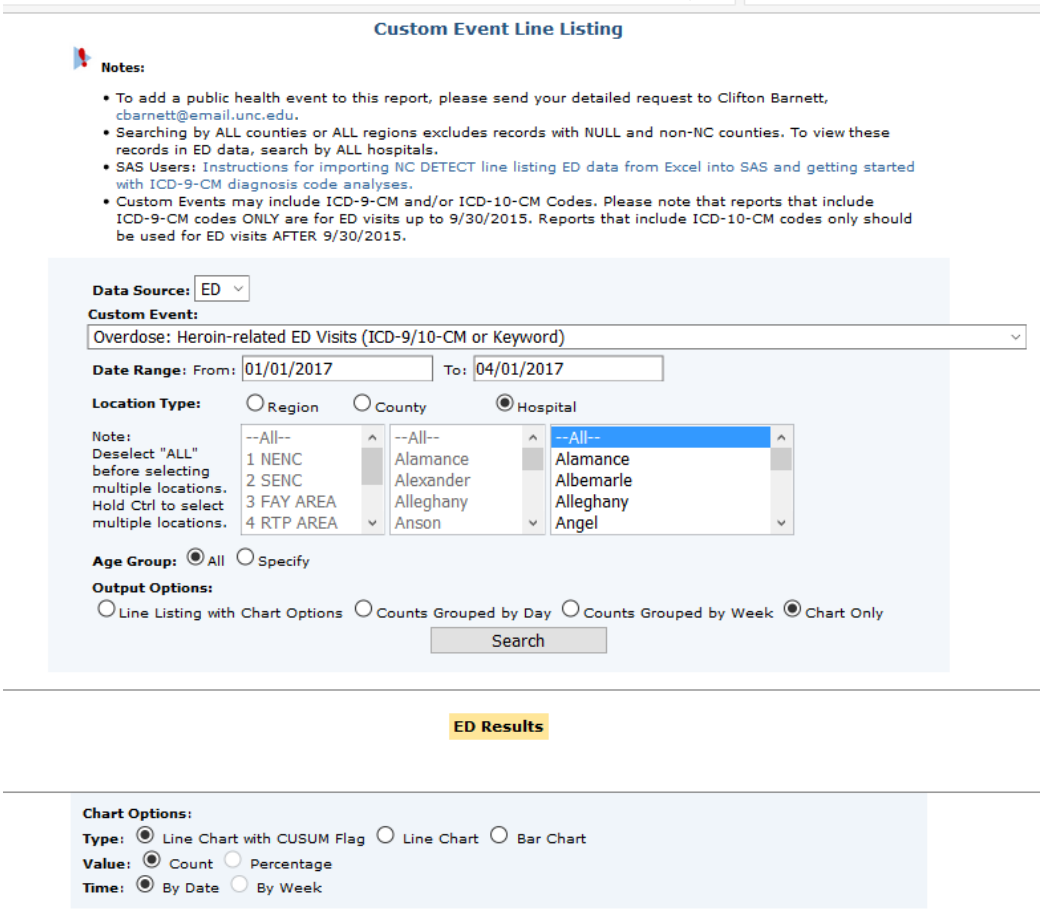
Chief Complaint	Triage Notes	Diagnosis Code(s)	Injury Code(s)
Drug OD	Patient coming in from home following an overdose of heroin, patient received 2mg Narcan in route and is slightly more responsive at this time.	965.09 - POISONING BY OTHER OPIATES AND RELATED NARCOTICS *-* 305.20 - NONDEPENDENT CANNABIS ABUSE UNSPECIFIED USE *-* 458.9 - HYPOTENSION UNSPECIFIED *-* 780.97 - ALTERED MENTAL STATUS *-* 309.81 - POSTTRAUMATIC STRESS DISORDER *-* 965.01 - POISONING BY HEROIN *-* 785.50 - SHOCK UNSPECIFIED *-* 305.50 - NONDEPENDENT OPIOID ABUSE UNSPECIFIED USE *-* 584.9 - ACUTE KIDNEY FAILURE, UNSPECIFIED	E850.2 - ACCIDENTAL POISONING BY OTHER OPIATES AND RELATED NARCOTICS *-* E950.0 - SUICIDE AND SELF-INFLICTED POISONING BY ANALGESICS ANTIPYRETICS AND ANTIRHEUMATICS
Ingestion	Chief Complaint Subjective: Possible Childrens Tylenol ingestion tonight approximately 1 hour ago. Unknown how much pt might have taken.	965.4 - POISONING BY AROMATIC ANALGESICS NOT ELSEWHERE CLASSIFIED *-* V58.69 - LONG-TERM (CURRENT) USE OF OTHER MEDICATIONS *-* 493.90 - ASTHMA UNSPECIFIED	E980.0 - POISONING BY ANALGESICS ANTIPYRETICS AND ANTIRHEUMATICS UNDETERMINED WHETHER ACCIDENTALLY OR PURPOSELY INFLICTED *-* E850.4 - ACCIDENTAL POISONING BY AROMATIC ANALGESICS NOT ELSEWHERE CLASSIFIED *-* E849.0 - HOME ACCIDENTS

Charting Options

NC DETECT reports include a chart feature. To save a chart, simply right click on the chart with your mouse and choose copy or save. In addition to the title, the chart includes the total count, the date range, location(s) and the date generated. Most charts can also be stratified by age groups. Additional features (and limitations) are outlined below.

1. Type: Line Chart with CUSUM flag. Displays a line graph for user's selected date range and includes any signals in that time period for the selected syndrome. This chart is available only by date (not by week). CUSUM flags are indicating by red starts. These indicate higher than expected counts for the selected location and date. For more information on the CUSUM algorithm, please view page 19 of the NC DETECT User Guide, which is available after logging into NC DETECT.
2. Type: Line chart. Displays a line graph of syndrome counts for the user's selected date range and syndrome, by date or by week
3. Type: Bar chart. Syndrome counts for the user's selected date range are represented by bars.

Figure 7: Sample daily graph for heroin-related ED visits. The red stars indicate dates with higher than expected counts using a CUSUM algorithm.



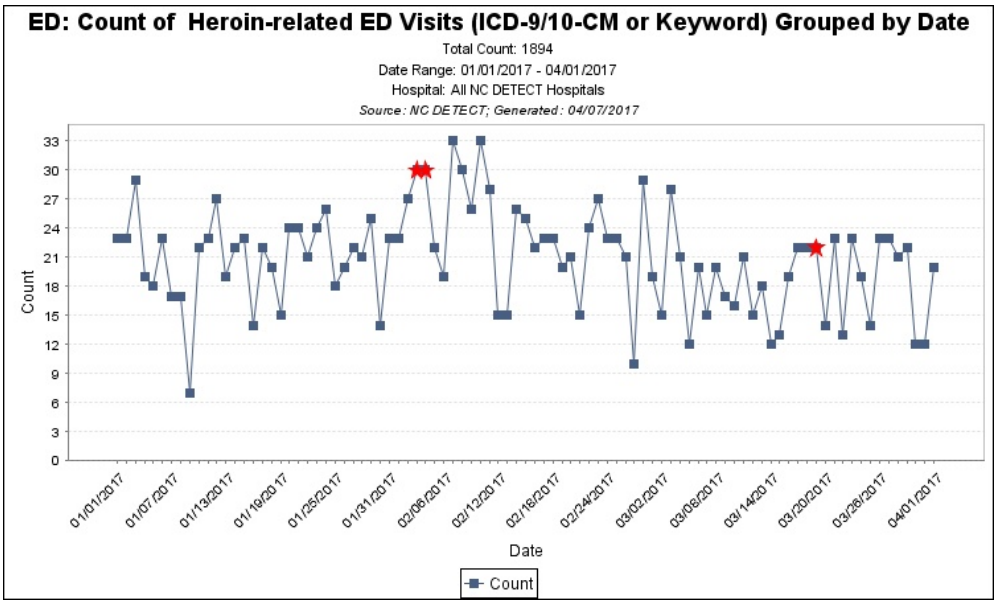
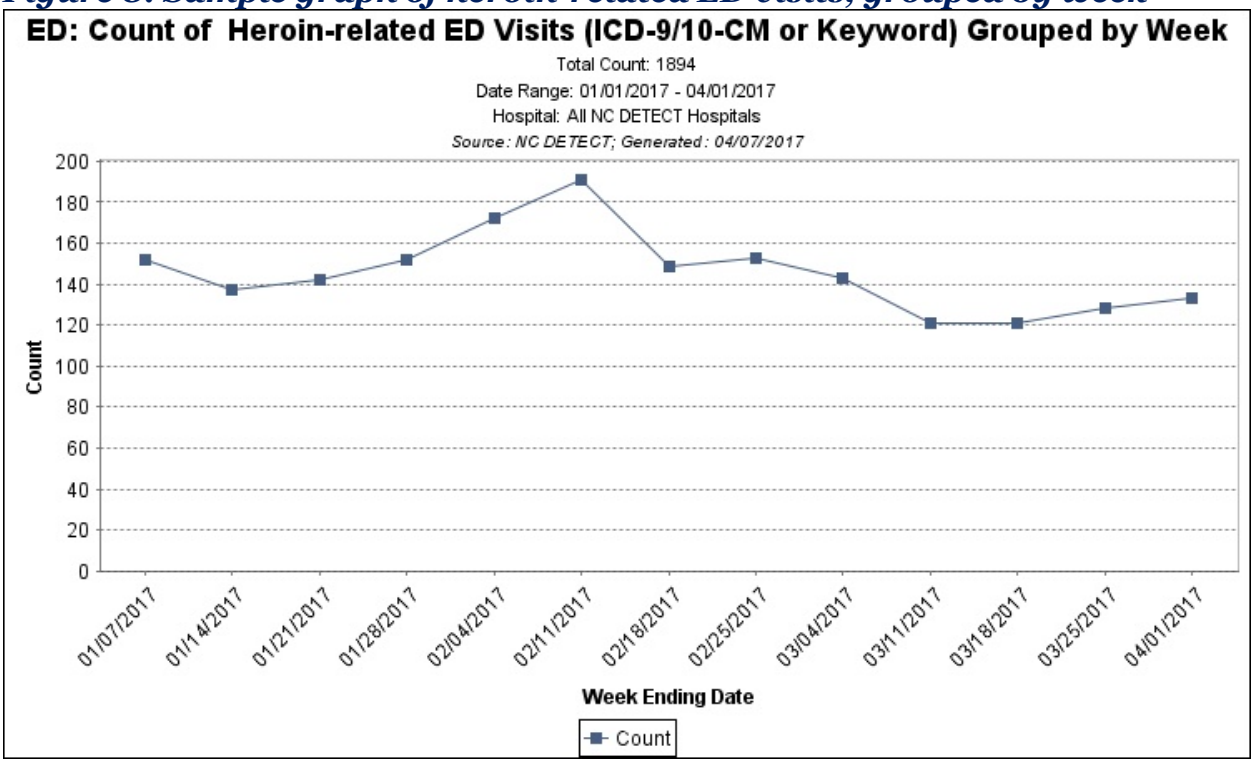


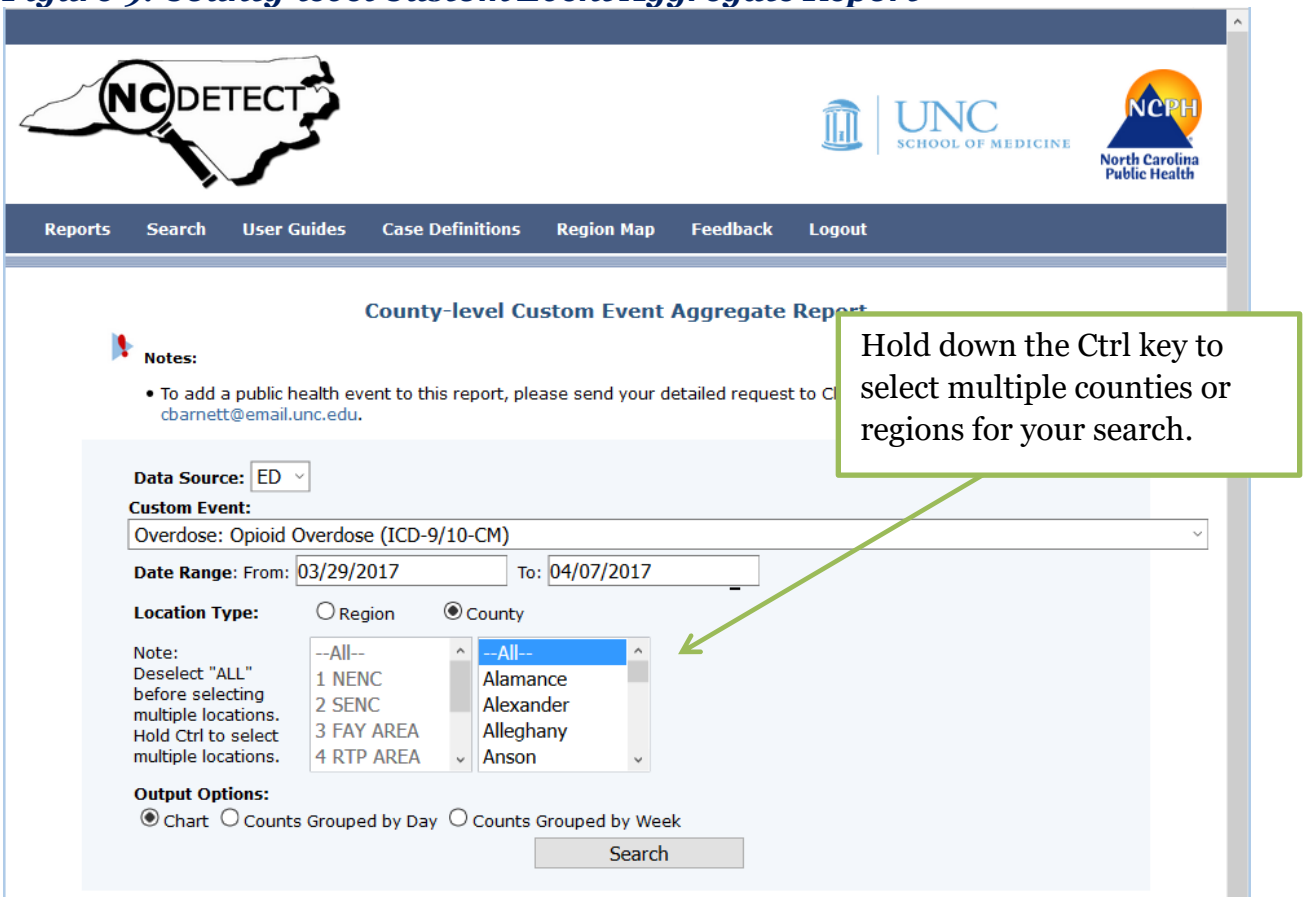
Figure 8: Sample graph of heroin-related ED visits, grouped by week



County-level Custom Aggregate Report

The County-level Custom Aggregate Report allows users to view aggregate counts or charts for any county or group of counties. Users can search as far back as January 1, 2009 but searches are limited to 366 days at a time. This report is helpful to compare trends to peer counties.

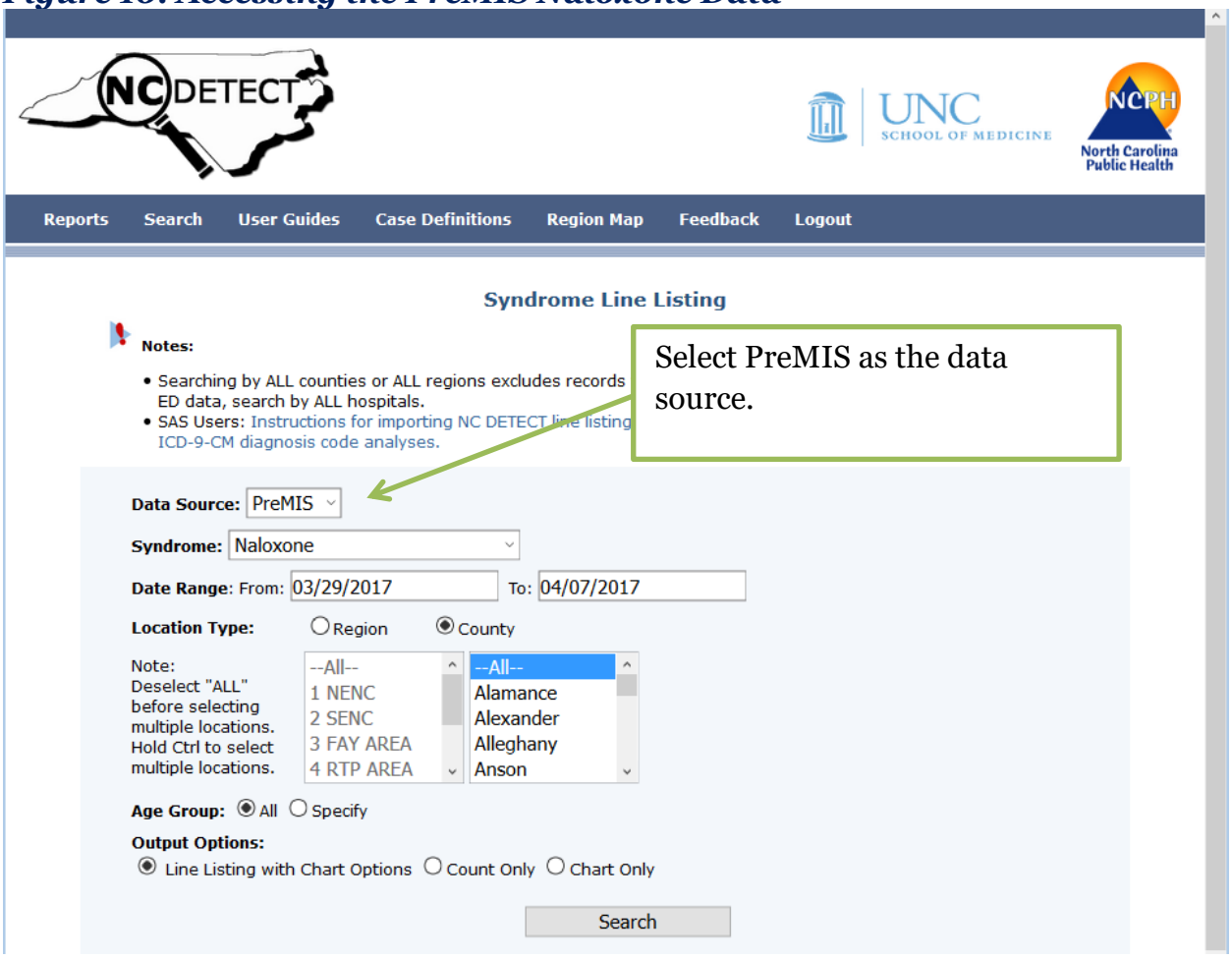
Figure 9: County-level Custom Event Aggregate Report



Syndrome Line Listing

The PreMIS data source provides information on EMS encounters in NC. NC DETECT users can track EMS encounters where naloxone is administered during an encounter or encounters that have documentation related to Overdose/Poisoning/Ingestion. To access this report, go to the Syndrome Line Listing report. Select PreMIS as the data source and Naloxone or Overdose/Poisoning/Ingestion as the syndrome. Medication data are available from November 2014 to present.

Figure 10: Accessing the PreMIS Naloxone Data



Grouping Counts

The Syndrome Line Listing Report has additional features that may be helpful. When users select an output option of *Count Only*, they can group counts by one or two categories.

Table 4: Count Grouping Options for ED and PreMIS Data

Grouping Option	ED	PreMIS (EMS)
Date	X	X
Week	X	X
Month	X	X
County	X	X
Hospital	X	
Age Group	X	X
Disposition	X	
Gender	X	X
Insurance Coverage	X	
Transport Mode	X	

Figure 11: PreMIS Options for Grouping Counts

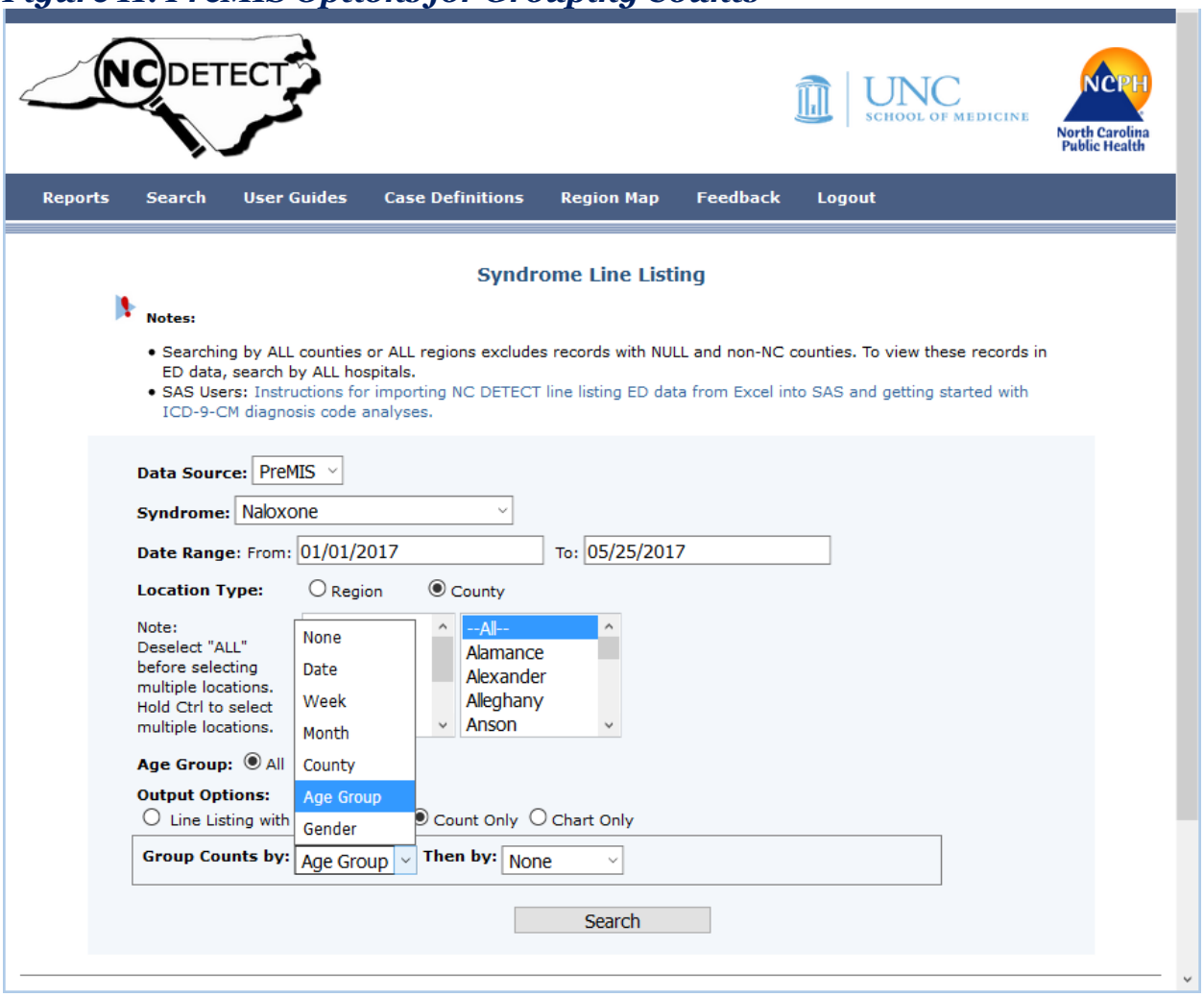


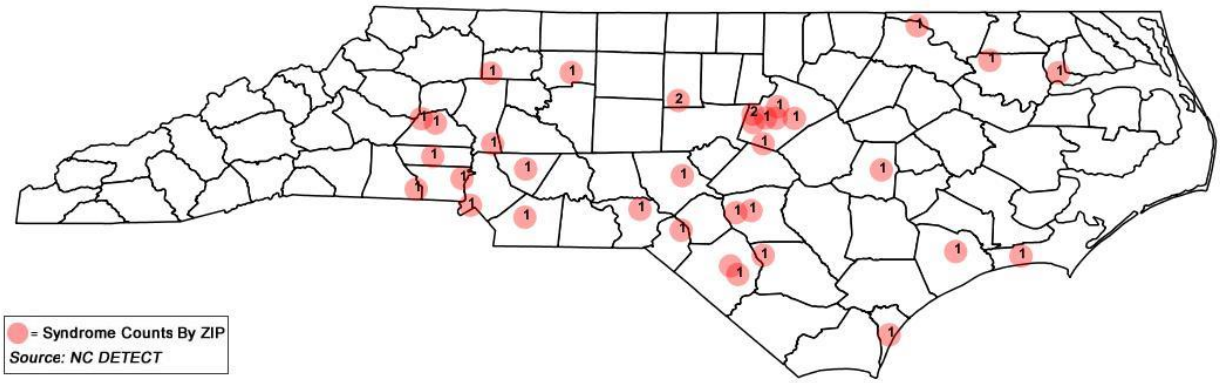
Figure 12: Sample Output of EMS Naloxone Administrations by Age Group

Age Group	Syndrome Count
Young Adult (25 - 44)	2308
Middle Aged (45 - 64)	1799
Senior (65+)	1062
College (19 - 24)	558
High School (15 - 18)	75

Maps

On the Syndrome Line Listing report, the line listing output option includes a ZIP-code map at the bottom of the page after the tabular data. This map shows raw counts of the selected indicator by the patient's 5-digit ZIP code. The can be resized using the tools at the top left of the map. The map is an image; right click on the image and select save or copy to paste into another program.

Figure 13: Sample ZIP Code Map



Sharing NC DETECT data with non-NC DETECT users

The emergency department data in NC DETECT are collected by the NC Division of Public Health Communicable Disease Branch under NC State Statute. When sharing NC DETECT information with partners outside of the health department, please keep confidentiality in mind. Line listing information should not be shared. Graphs that show counts under 10 can be presented but not in publicly available documents or handouts that are given to meeting participants. County-level data that show counts above 10 can be shared. At all times, please attribute the data to NC DETECT using the following disclaimer:

NC DETECT is a statewide public health syndromic surveillance system, funded by the NC Division of Public Health (NC DPH) Federal Public Health Emergency Preparedness Grant and managed through collaboration between NC DPH and the UNC-CH Department of Emergency Medicine's Carolina Center for Health Informatics. The NC DETECT Data Oversight Committee is not responsible for the scientific validity or accuracy of methodology, results, statistical analyses, or conclusions presented.