

BioSense Platform Quick Start Guide to Using **ESSENCE**

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Technical Assistance: support.syndromicsurveillance.org

The National Syndromic Surveillance Program (NSSP) promotes and advances development of the cloud-based BioSense Platform, a secure integrated electronic health information system that hosts standardized analytic tools and facilitates collaborative processes. The BioSense Platform is a product of the Centers for Disease Control and Prevention (CDC).

Quick Start Guide to Using ESSENCE

1. Overview

NSSP's BioSense Platform hosts the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE)—a system that will let you analyze events of public health interest, monitor healthcare data for events that could affect public health, and share data and analyses.

This quick start guide supports NSSP ESSENCE v.1.21 and will help you access and navigate the system's main features. This guide is NOT intended to be a comprehensive user's manual.

Version 1.21 updates include:

- New access control system
- Improved graph overlay functionality (examples on pages 11 and 12)
- Ability to query multiple user-defined text fields when building free-text queries (not just chief compliant, CC/DD or triage notes) (examples on page 9)
- Ability to view data details (line list) of more than 5,000 records (examples on pages 16 and 17)
- Overlay graphs can be saved in myESSENCE and the Report Manager (examples on pages 12 and 18)

A few reminders before getting started:

- **Browser:** Use Chrome or Edge to access full ESSENCE functionality. Some functionality in other browsers is limited.
- **Data:** ESSENCE provides insight into the data sent to the BioSense Platform. Emergency department data are a primary source. Currently, the system can include data from many patient classes (e.g., emergency, inpatient, and outpatient data). In time, other types of data will become available, such as LabCorp and prescription drug data.
- **Terminology:** Within ESSENCE, the different data sources provide different levels of detail. For example, note the distinction between column header "REGION" and the term "HHS REGION." "REGION" refers to COUNTY-level data (approximated by ESSENCE) for detailed data sources below the state level. "HHS REGION" denotes the U.S. Department of Health and Human Services' ten regional offices that directly serve state and local organizations.

- **Data Sources:** Several sources feed data to ESSENCE. These data sources allow you to view data by either patient location or hospital location. Below are the names of the data sources and the views associated with them.
 - **Patient Location (Full Details):** Use is typically limited to users associated with sites. Enables a query of data based on where the patient lives. Will return complete list of available patient details. All binned patient syndromes are returned in a query (e.g., fever, GI).
 - **Patient Location and Visit (Full Details):** Use is typically limited to users associated with sites. Enables a query of data based on where the patient lives. Will return complete list of available patient details. A single patient syndrome is returned for a query (e.g., fever).
 - **Patient Location (Limited Details–HHS Region):** All users will have access to data source. Enables a query based on the region where a patient lives. Will return a limited set of available patient details. All binned patient syndromes are returned in a query.
 - **Facility Location (Full Details):** Use is typically limited to users associated with sites. Enables a query of data based on the hospital location where a patient sought treatment. Will return a complete list of available patient details. Patient’s chief complaint can be binned into multiple categories.
 - **Facility Location and Visit (Full Details):** Use is typically limited to users associated with sites. Enables a query of data based on hospital location where a patient sought treatment. Will return complete list of available patient details. A single patient syndrome is returned for a query (e.g., fever).
 - **Facility Location (Limited Details–HHS Region):** All users will have access to this data source. Enables a query based on the region in which the hospital is located (where the patient sought treatment). Will return a limited set of available patient details. All binned patient syndromes are returned in a query.
 - **Chief Complaint Query Validation Tool:** All users will have access to this data source. Limited view of Chief Complaint (CC) and Diagnosis Discharge (DD) information. Allows users to train a new definition against the largest possible universe of keyword occurrences. After fine-tuning the definition (e.g., figuring out what keywords to include or exclude), a user may copy this definition to an advanced query of site facilities or patients (data for which the user has access to view).
 - **Department of Defense (DOD) Data:** These data are not in ESSENCE. Will eventually provide snapshot of DoD beneficiary encounters throughout the United States.
 - **Veterans Affairs Data:** These data are not in ESSENCE. Will eventually provide snapshot of Veterans Affairs beneficiary encounters throughout the United States.
 - **ASPR Electronic Medical Record (EMR) Data:** U.S. Department of Health and Human Services (HHS) Office of the Assistant Secretary for Preparedness and Response (ASPR) group collects EMR data from disaster medical assistance team (DMAT) operation sites deployed to provide medical care during a disaster or other event. Regions in which DMATs are deployed will have access to the facilities included in this dataset.

- **Air Quality Data:** All users will have access to this data source. Data are provided via a web service that compiles various air quality metrics (e.g., ozone, particulate matter, air quality index) across the United States. More information is available at this link: www.airnow.gov.
- **Weather Data:** All users will have access to this data source. Various weather variables (e.g., total precipitation, snowfall, wind speed) collected from the National Weather Service Form 6 are provided in this dataset across all weather stations throughout the United States. More information is available at this link: <http://w2.weather.gov/climate/f6.php?wfo=gld>.

How do the statistical algorithms work?

A 30-day baseline of data is used to calculate alerts. The Poisson/Regression/Exponentially Weighted Moving Average switch algorithm is the default temporal alerting algorithm developed by Johns Hopkins University–Applied Physics Laboratory (JHU–APL) for ESSENCE.

For more information on the detector algorithms, please click the “More” tab and select Detector Algorithms. Additional information describing these algorithms will be provided in future user guides.

2. Access

Log In to ESSENCE

1. Go to <https://essence.syndromicsurveillance.org/>.
2. Click on “ESSENCE – NSSP (1.21)” in the middle of the screen.
3. Log in by using your NSSP-provided user ID and password (figure 1). These are the same credentials used for all Access & Management Center tools and applications hosted on the BioSense Platform.



Figure 1. ESSENCE Log-in Screen

Get Oriented to Home Page

The ESSENCE home page has multiple tabs (figure 2). Each tab and a brief description of its function(s) are provided for quick reference.

Date	Description
15Jul21	Notice to users: Data loaded to the Staging BioSense platform should not be considered permanently retained. Data older than 90 days may be deleted from the system to free up system resources.
15Jul21	Data files transmitted to the Staging system for Onboarding purposes are not retained. Site Administrators will be notified in advance of any planned data storage maintenance which results in data being deleted earlier than 90 days.
14Jul21	Note to Users: You are logged into the Staging ESSENCE Application
14Jul20	Staging system maintenance occurs the third Tuesday of every month from 6:00 AM to 10:00 AM

Figure 2. ESSENCE Home Page

Tabs

1. **Home:** Returns user to the home page; contains authorization/disclaimer information.
2. **Alert List:** Provides a tabular view of alerts for the 12 syndromes in ESSENCE.
3. **myAlerts:** Includes two primary functions:
 - Enables creation of custom alerts for syndromes, subsyndromes, or free-text queries by various stratifications or threshold criteria.
 - Enables creation of Records of Interest. The purpose of Records of Interest is to return encounter details that match your query criteria (e.g., the word of code for anthrax).
4. **myESSENCE:** Allows dashboard customization of frequently used graphs, maps, myAlerts results, rich text boxes, and data details pages.
5. **Event List:** Serves as an interactive communication portal to share monitoring activities.
6. **Overview Portal:** Allows stratification of data to produce time series graphs for a variable of interest. For example, users can view time series graphs for syndromes in their sites. This functionality may be accessed via the Query Portal once you've defined a query.
7. **Query Portal:** Allows users to perform various searches of their data.
8. **Stat Table:** Produces weekly and monthly epidemiology reports in tabular form.
9. **Map Portal:** Allows geographic representation of data by alert type.
10. **Bookmarks:** Allows user to save a page for quick access.
11. **Query Manager:** Allows time series queries to be saved to prevent user from rerunning a query each time ESSENCE is accessed.
12. **Data Quality:** Allows assessment of multiple data quality metrics, including completeness of data (by variable, by location, etc.), whether data are mapped to known values, and status of data processing by facility.
13. **Report Manager:** Produces reports including time series graphs and maps in MS Word; allows the user to add text for interpretation of data and visualizations.
14. **More:** Provides useful information such as the history of ESSENCE, definition of syndromic surveillance, detector algorithms, FAQs, user's guide, etc.

3. Data Completeness

Check your data for completeness (at a minimum) before running a query. This can be done at the file level or variable level. By running this check, you'll ensure essential data are in ESSENCE.

How to Check Data Completeness

1. Click the “Data Quality” tab (figure 3).
2. Select Data Source— “Facility Location (Full Details).”
3. Select Quality Factor—here, “Percent Completeness.”
4. Select Time Resolution—the default is “Daily.”
5. Select the hospitals you would like to see.
6. Select “All Parameters.”
7. Select start date of interest: Previous week/month (here, date range of your choice).
8. Select end date: typically, the current date (here, date range of your choice).
9. Click “Submit.”

A color-coded legend indicates the percent complete:

Gray/green indicates positive results,

Yellow indicates caution, and

Orange/red indicates significant problems with completeness of the data.

You can display this information by facility, by variable, and by date of percent complete. You can also download as an MS Excel table.

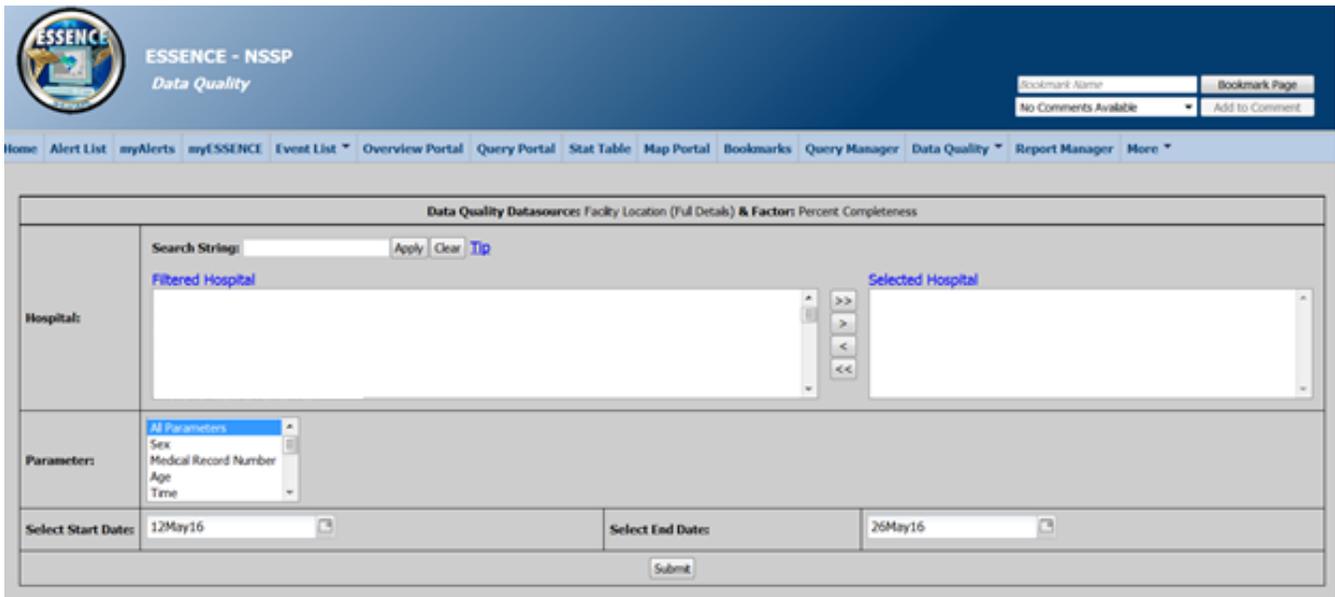


Figure 3. ESSENCE Data Quality Tab

4. Basic Monitoring

Check Alert List

To monitor for public health events, users can review the alert list on the main screen and assess syndromes of interest by Temporal Alerts Summary (figure 4), Region/Syndrome, Hospital/Syndrome, Spatial, and Hospital/SubSyndrome Time of Arrival. Each table will summarize the analysis of alerts either by region, hospital, geography or by time of arrival.

1. Click on “Alert List” tab to view Summary Alerts. The default alerts show an indicator for the past 9 days (each asterisk is a day) for 11 syndromes. The legend at the bottom of the page explains the color-coding for an asterisk (*) (i.e., action being taken, or not, for results that may have reached an alert threshold). The top row of asterisks corresponds to statistical anomalies for each region and syndrome, whereas the lower row of asterisks corresponds to user-entered actions taken as entered within the Event List.

Temporal Alerts Summary								
Last Updated: April 25, 2016 1:42 AM								
[Summary Alerts Region/Syndrome Hospital/Syndrome Spatial Hospital/SubSyndrome Time of Arrival]								
<input type="checkbox"/> Description <input type="checkbox"/> Configuration Options								
<input type="checkbox"/> View Detection-Based Alerts <input type="checkbox"/> View User-Based Events								
ER								
Region Group	Bot_Like	Exposure	Fever	GI	Hemr_III	ILI	Injury	Neuro
Region I	***** *****							
Region II	***** *****							
Region III	***** *****							
Region IV	***** *****							
Region V	***** *****							
Region VI	***** *****							
Region VII	***** *****							
Region VIII	***** *****							

Figure 4. Temporal Alerts Summary Page

2. Click on the “Alert List” tab, then click on the Region/Syndrome tab to display the Region/Syndrome-Based Temporal Alerts page.
3. Site users with access to data associated with a Region/Syndrome alert can further explore the underlying contributing cases by clicking on the time series link and data details for specific visits (figure 5).



Figure 5. Example of “Digging Deeper” into Data

Create, Visualize, and Save a Query

Your next step is to create queries to monitor specific events within your site. You can save queries in myESSENCE or in Query Manager for future analysis.

1. CREATE A QUERY:

- a. Click on the “Query Portal” tab to display page.
- b. Select the data source(s) for your analysis.
- c. Note that Time Resolution, Detector (algorithm), and As Percent Query may remain in their default modes.
- d. Select start and end dates.
- e. Select query fields from the left-hand column.
- f. Options are available to query multiple user-defined text fields when building free-text queries. In figure 6, you can select several categories simultaneously of the CC and DD query field. Press and hold the Ctrl key to select multiple query fields for analysis; those selected will appear in the right-hand column.

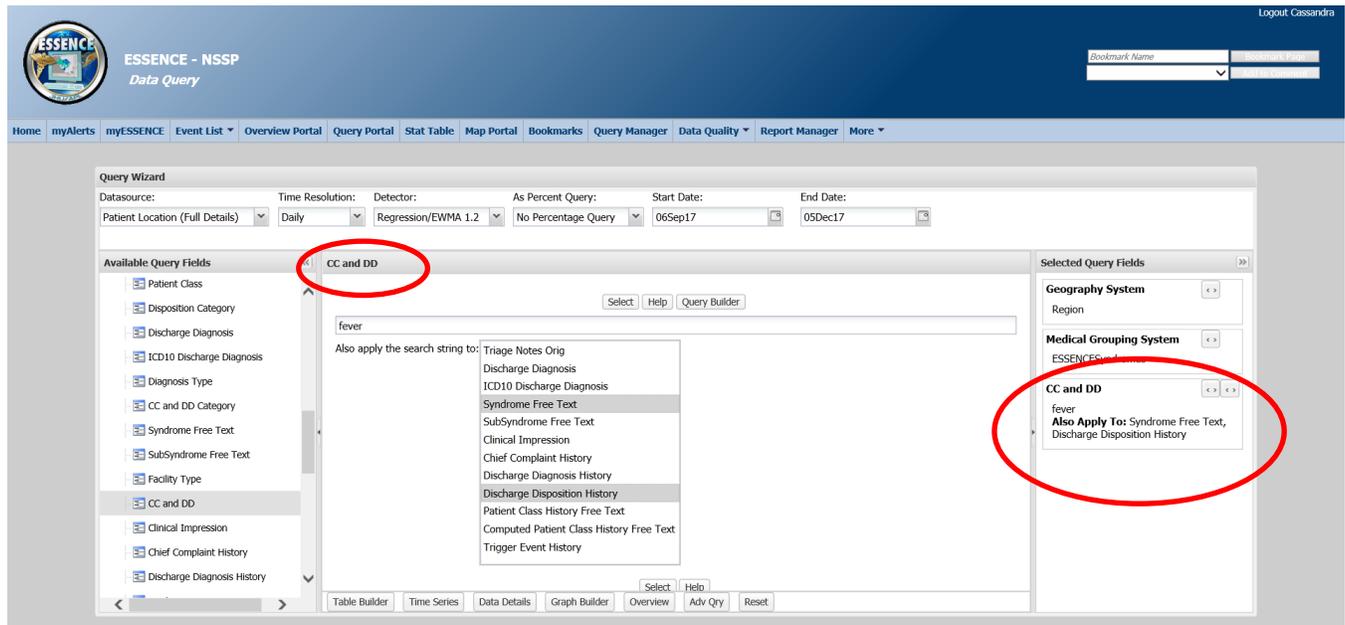


Figure 6. System Users May Query Multiple Text Fields (CC and DD)

2. VISUALIZE THE ANALYSIS:

Next, select the type of visualization from the buttons at the bottom of the screen (e.g., Table Builder, Time Series, Data Details, Overview). Clicking on “Overview” provides you with time series graphs that may be stratified by various parameters including Region (i.e., County), Syndrome, Age, and Sex (figure 7).

Overlays can be added on the graph to compare data across two parameters. From the times series graph (figure 7), select “Add Overlay.” The query portal window will open and you can select the second parameters of interest. After you select all fields, press the “Add Overlay” button again.

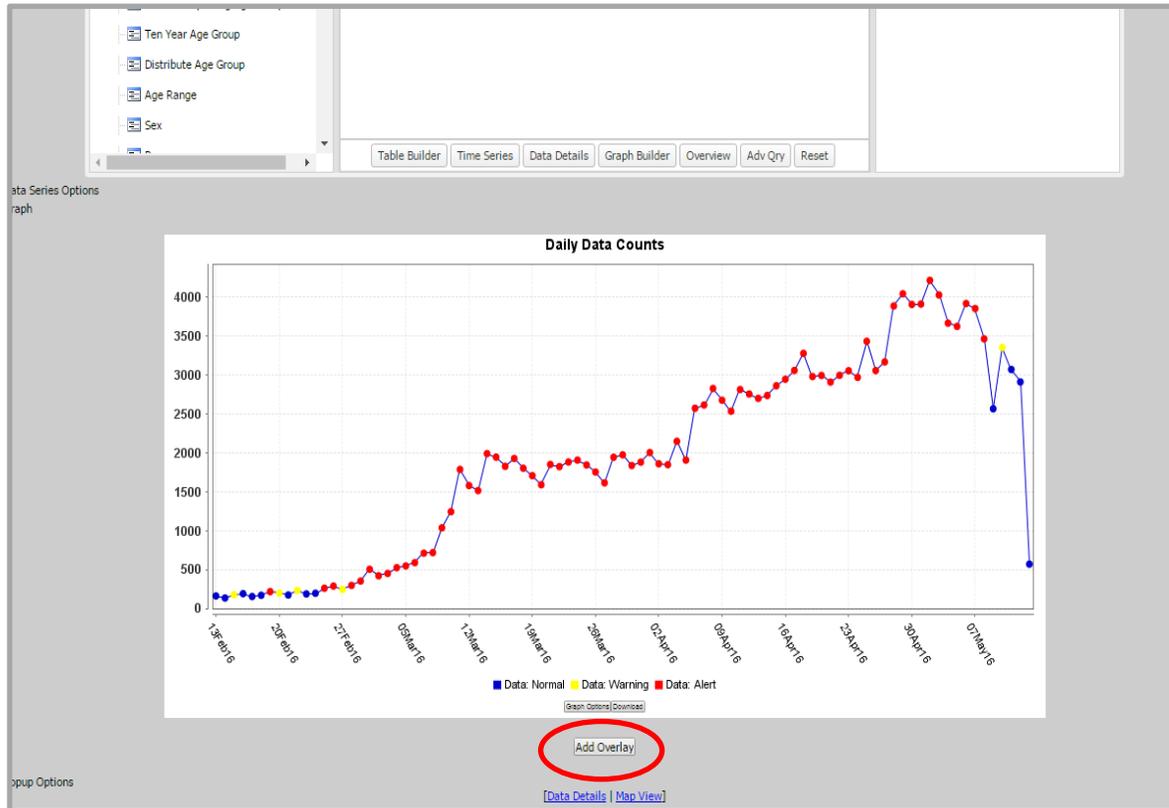


Figure 7. Sample Time Series Graph

Another window will open asking you to configure the overlay (figure 8).

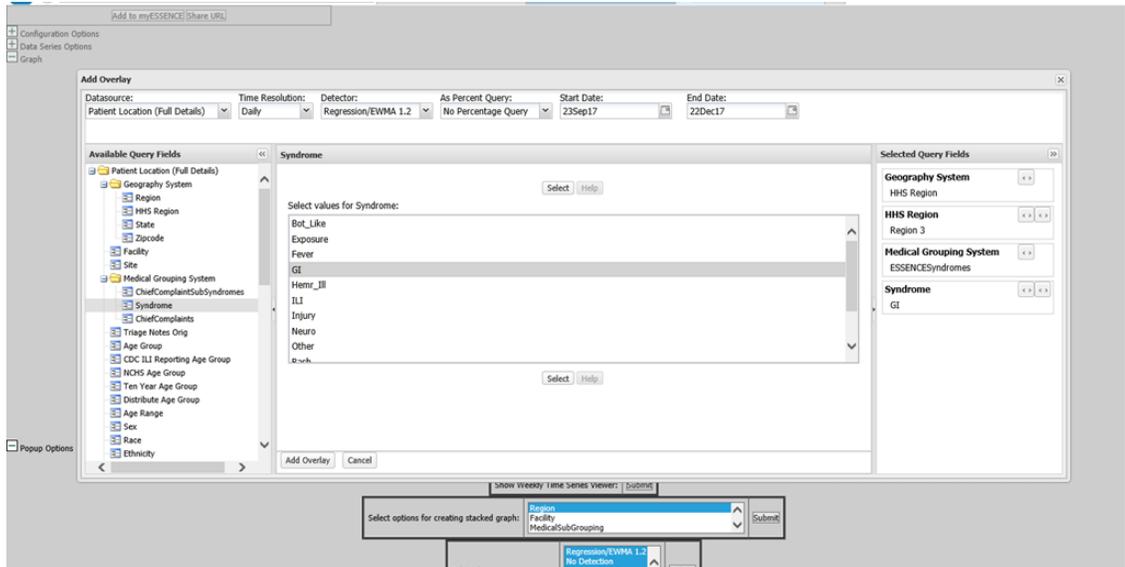


Figure 8. Query Portal Window for Overlay

Title the graph, label the left and right axis, and select “Display Overlay” (figure 9).

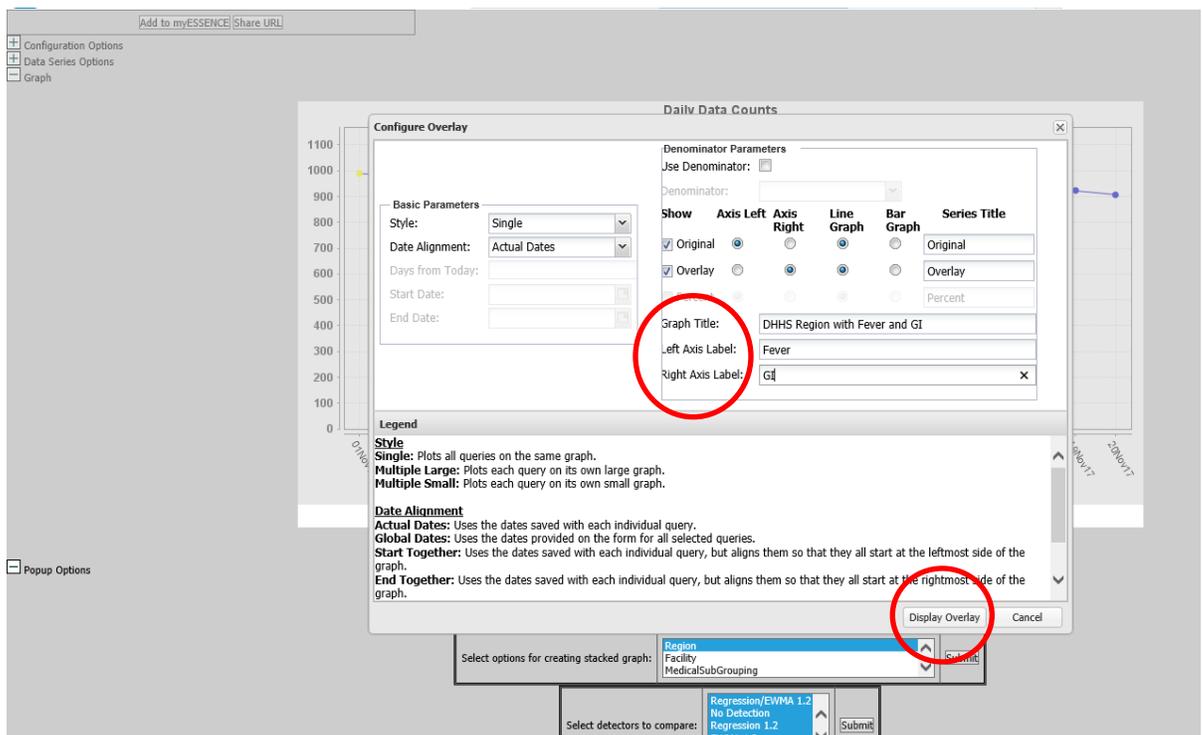


Figure 9. Configure Overlay

The new parameters will be displayed on the right-hand side of the graph (figure 10).

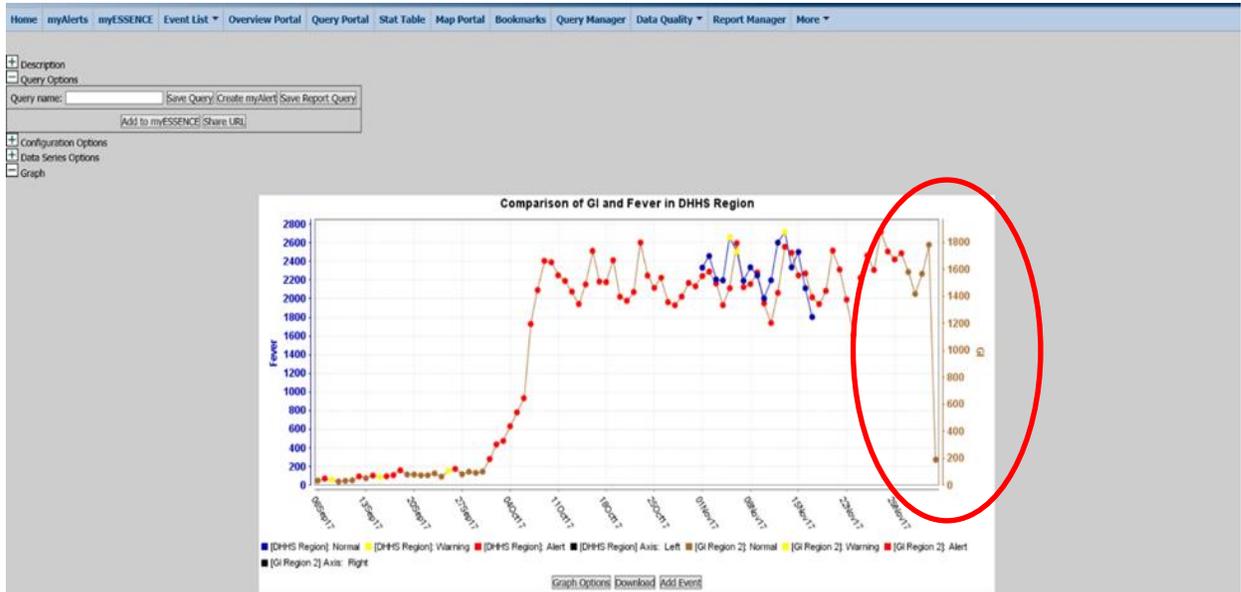


Figure 10. New Parameters are Displayed

3. SAVE YOUR QUERY:

Name the query (figure 11), and click on “Add to myESSENCE” or “Save Query.” If you choose “Add to myESSENCE,” be sure you’ve already created a new tab within myESSENCE to which the query will be saved. All graphs, including overlay graphs, can be saved to myESSENCE. Now you’ll be able to use (or share) this query whenever you want to check the same parameters. If you click “Save,” the query will only save in the query manager. You can also create a myAlert for the query by typing the query name and selecting “Create myAlert.” You can choose to create Records of Interest or a Detection query. The next time the detection algorithm runs, it will include any new myAlerts you created.

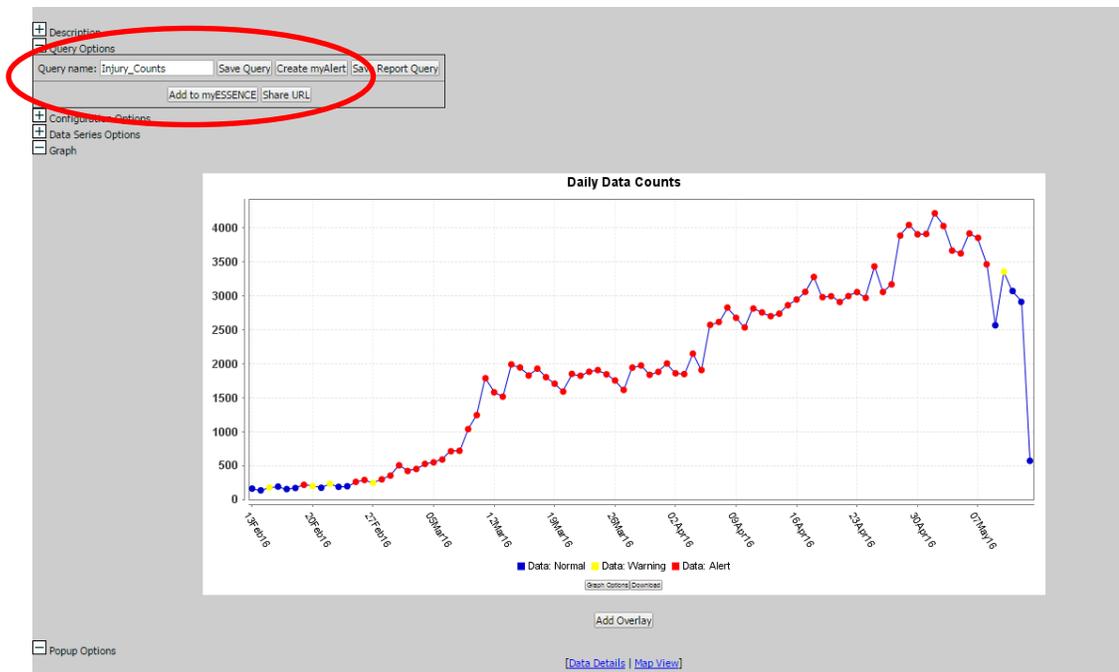


Figure 11. Name Query and Create myAlert

If you select the Detection alert (figure 12), also select the parameters for your alert (figure 13).

The 'Create myAlert' dialog box is shown with the following settings:

- Name of myAlert: AK Fever
- Query: AK Fever
- Enabled:
- myAlert being created for: Records of Interest Detection
- Stratifications: Use Original (selected), Facility, Site, MedicalSubGrouping, Age Group
- Detector: Regression/EWMA 1.2
- Threshold: 0.05
- Minimum Count:
- alerts in the past days
- consecutive alerts
- Save For:

<input type="checkbox"/>	First Name	Last Name	Organization
<input type="checkbox"/>	demoSti	aaaademoHi	OrgCat
<input type="checkbox"/>	admin	aaadmindemo	siteAdminsAssoci
<input type="checkbox"/>	tester	aatester	org
<input type="checkbox"/>	test	access	CDC
<input type="checkbox"/>	Demo	Account	CDC

Buttons: Cancel, Save myAlert

Figure 12. Create myAlert

The 'Create myAlert' dialog box is shown with the following settings:

- Name of myAlert: AK Fever
- Query: AK Fever
- Enabled:
- myAlert being created for: Records of Interest Detection
- Save For:

<input type="checkbox"/>	First Name	Last Name	Organization
<input type="checkbox"/>	demoSti	aaaademoHi	OrgCat
<input type="checkbox"/>	admin	aaadmindemo	siteAdminsAssoci
<input type="checkbox"/>	tester	aatester	org
<input type="checkbox"/>	test	access	CDC
<input type="checkbox"/>	Demo	Account	CDC

Buttons: Cancel, Save myAlert

Figure 13. Select Parameters for Alert

4. **MODIFY QUERIES:**

Queries may be modified or enhanced by clicking on the plus sign (+) next to Configuration Options. This will show the fields available in the Query Portal.

5. **MANAGE QUERIES:**

The Query Manager lets you view saved queries in one tab and modify by clicking on a link (figure 14). Clicking on the link will run the saved query. Once the query has run, you can use the Configuration Options to make modifications.

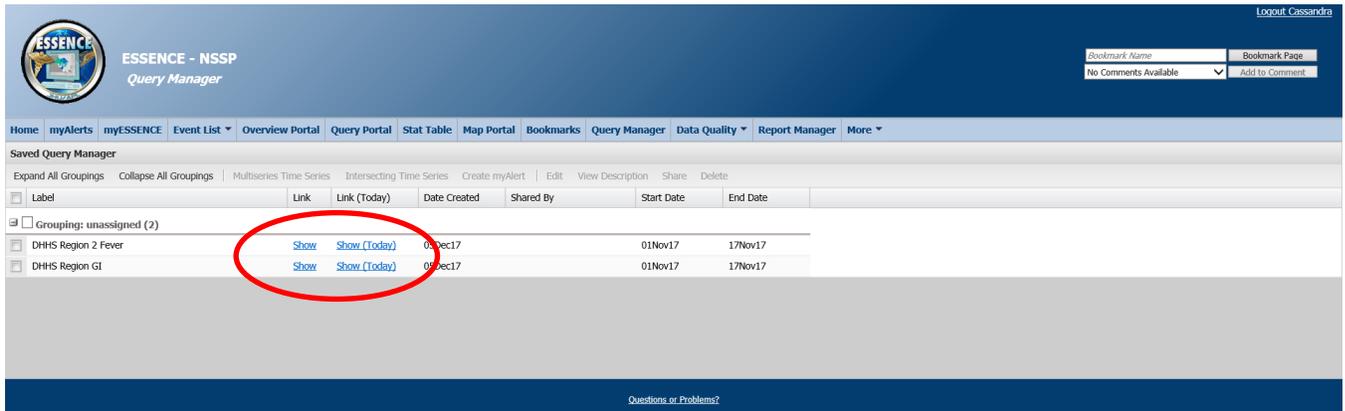


Figure 14. ESSENCE Query Manager Page

View Your Dashboard (myESSENCE)

The myESSENCE tab lets you save customized views of any query you run that results in a time series graph, map, data details page, myAlert (detection or records of interest), or rich text box. Once you create a myESSENCE tab, you can view all queries in one place. In addition, myESSENCE updates automatically as data are received so that you can quickly identify what is happening (or not) at your site.

1. Click on “myESSENCE” tab. Saved queries will appear in graph form. Click on “Add New Tab” if you want to organize query results in new tabs.
2. Roll up, refresh, modify, or delete a graph by using the icons for each function located at the top left-hand corner of each graph (figure 15).

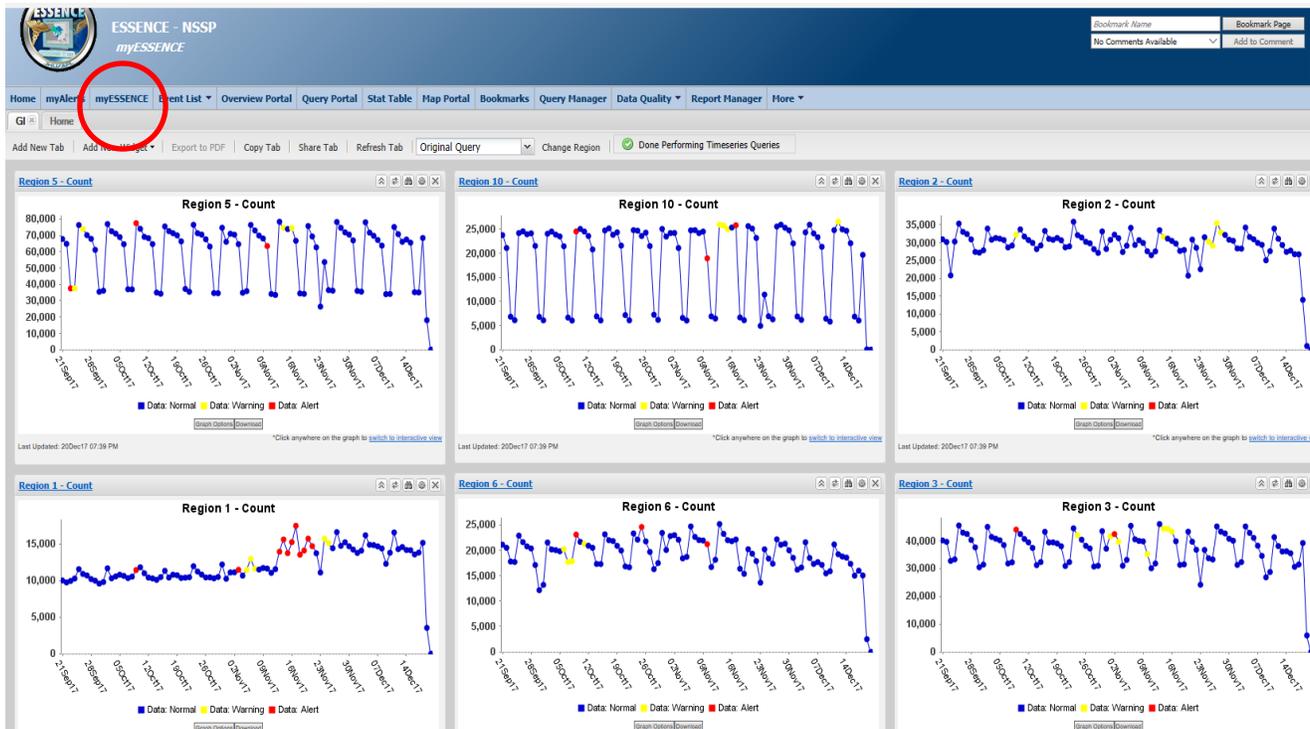


Figure 15. myESSENCE Dashboard (Modify Graphs)

- View the data details table below the chart (figure 16) for each date in the range, or click on points of interest within the time series graphs to get data details for that specific date. The data details option enables views of more than 5,000 records but less than 30,000 records.

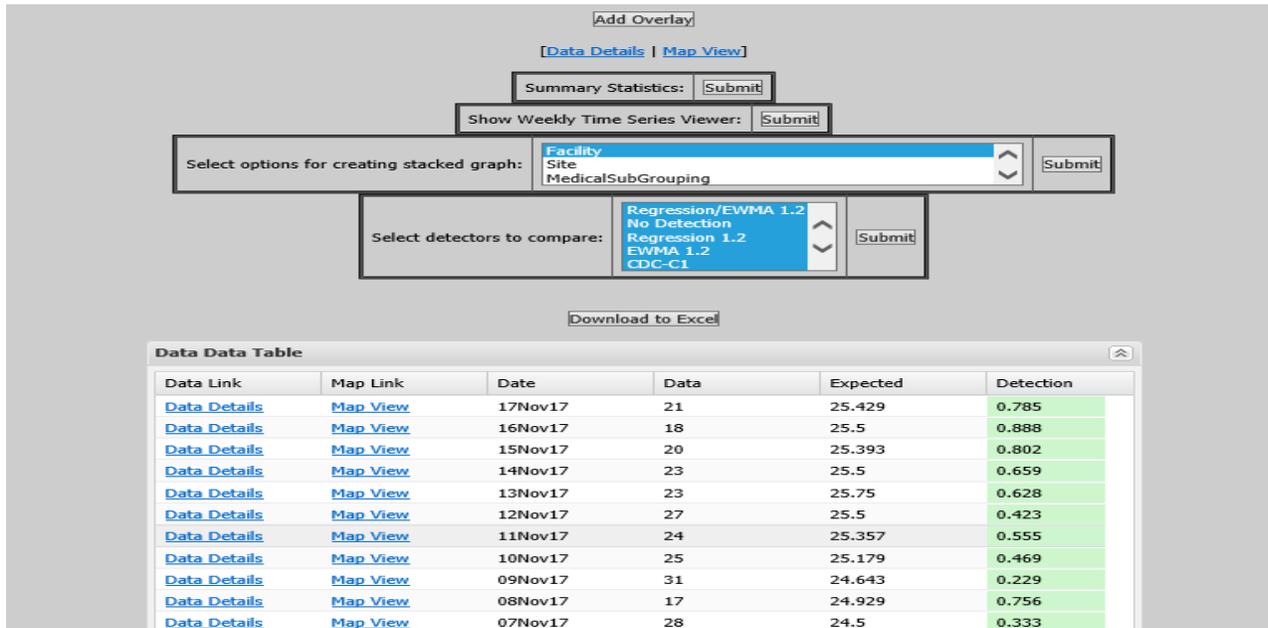


Figure 16. View Data Details

- Use the scroll feature at the bottom of the page to view other data elements (figure 17). To summarize data in your data details page, select the variables to summarize within “Select Pie Chart(s)” or “Select Bar Chart(s).” The “Map View” link will let you map your data by geographic unit, depending on how you built your query.

PIN	Date	Time	Facility Name	Zipcode	Region	C_Patient_County	
3789_622345	09Nov17	08:00 AM		66061		20091	FEVER,DIARRHEA,VOMITING
3800_M098793	09Nov17	12:22 AM		67337		20125	MOTHER STATES CHILD HAS A FEVER OF 100.9 AXILLARY AND IS HAVING TROUBLE ;BREATHING.
3801_031456	09Nov17	01:35 PM		66736		20205	fever

Figure 17. Data Details Page

Visualize Statistical Alerts: The “Map Portal” Tab

To visualize statistical alerts by region, syndrome, and time frame, use the map portal option:

- Click on the “Map Portal” tab. Select the parameters of interest (Alert List, Syndrome, Timeframe). Click “submit.”
- A map of your site will appear with alerts color coded in YELLOW or RED (figure 18). Areas shaded YELLOW indicate a temporal alert in that region with a p-value between 0.05 and 0.01. Areas shaded RED indicate a temporal alert in that region with a p-value less than or equal to 0.01.

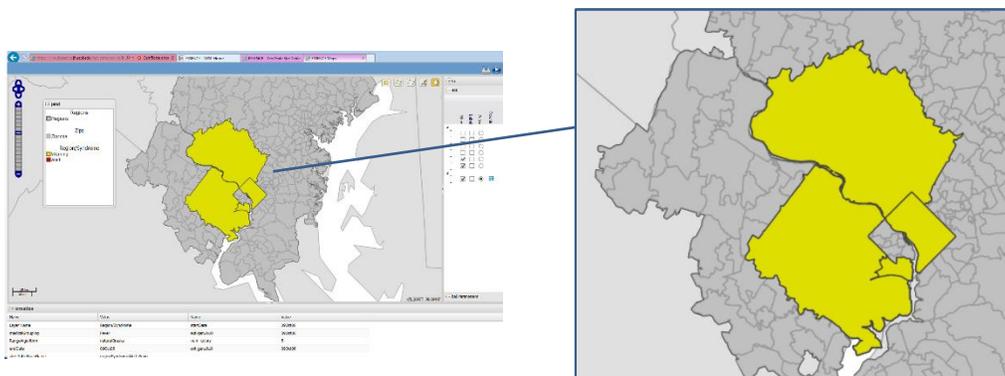


Figure 18. Yellow Shading Indicates a Temporal Alert

Share Queries and Visualization

Use myESSENCE and the Query Manager to share data. Once your site administrator has set your data-access privileges, you may begin sharing data to broaden your view of health trends. (CDC encourages you to re-read the Code of Conduct before releasing or distributing data to ensure confidentiality and data integrity. Another good practice is to consult others on how they interpreted their data.)

1. In myESSENCE, click on the “Share Tab” feature (circled in red, figure 19, below).

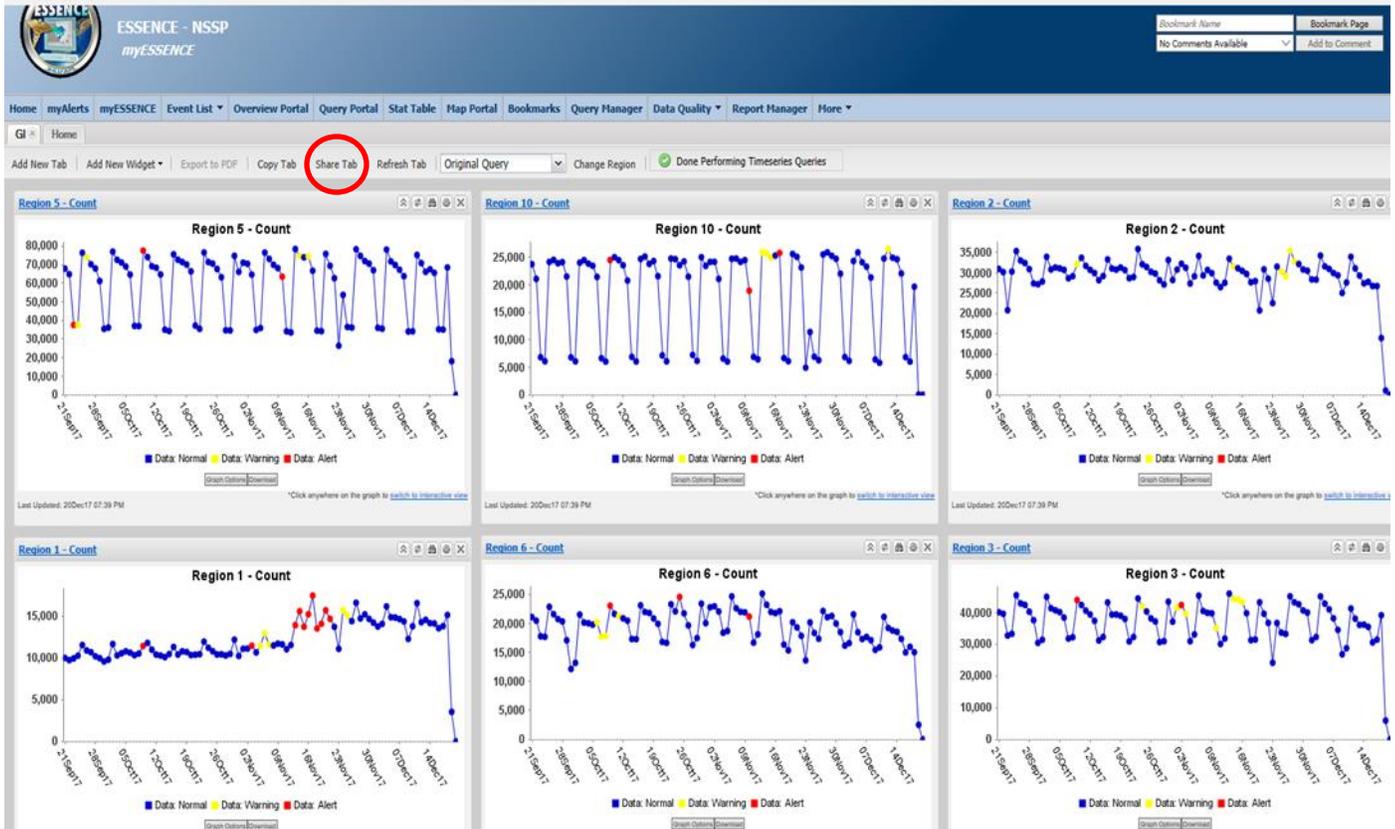


Figure 19. myESSENCE Share Tab for Queries and Visualization

- A window will open to let you name the tab and identify with whom these data may be shared. You can adjust the time series graphs to a specific region; here, “no change” has been selected (figure 20).

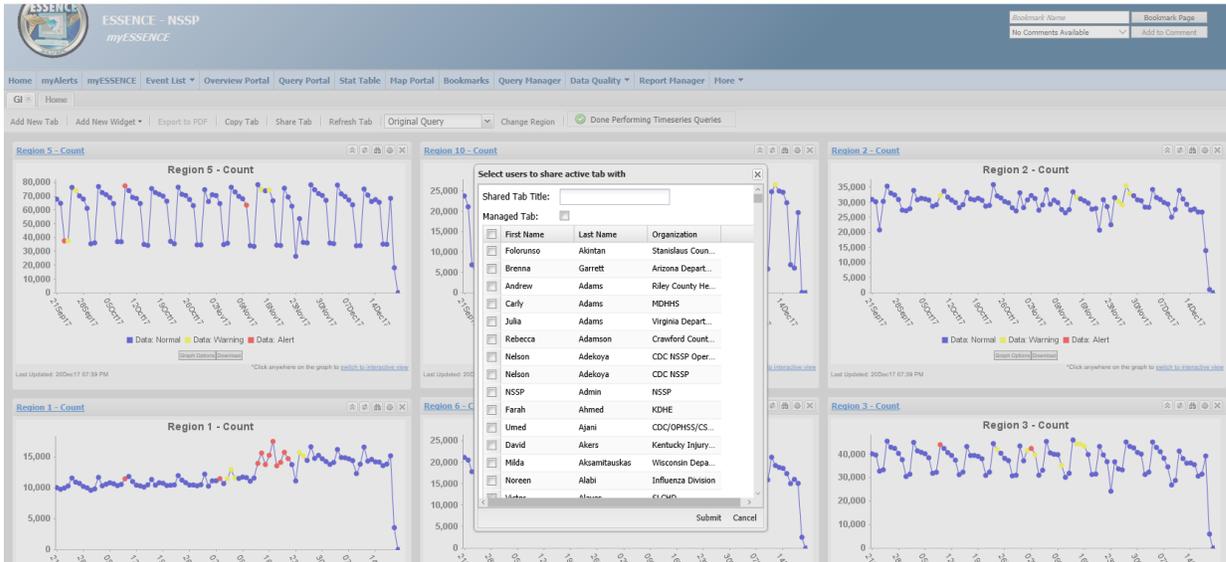


Figure 20. Select Users for Data Sharing (Query Manager)

- For the Query Manager, select a query by clicking on the appropriate check box, then click “Share” (figure 21). A similar window will pop up to let you add a title and select with whom the query may be shared.

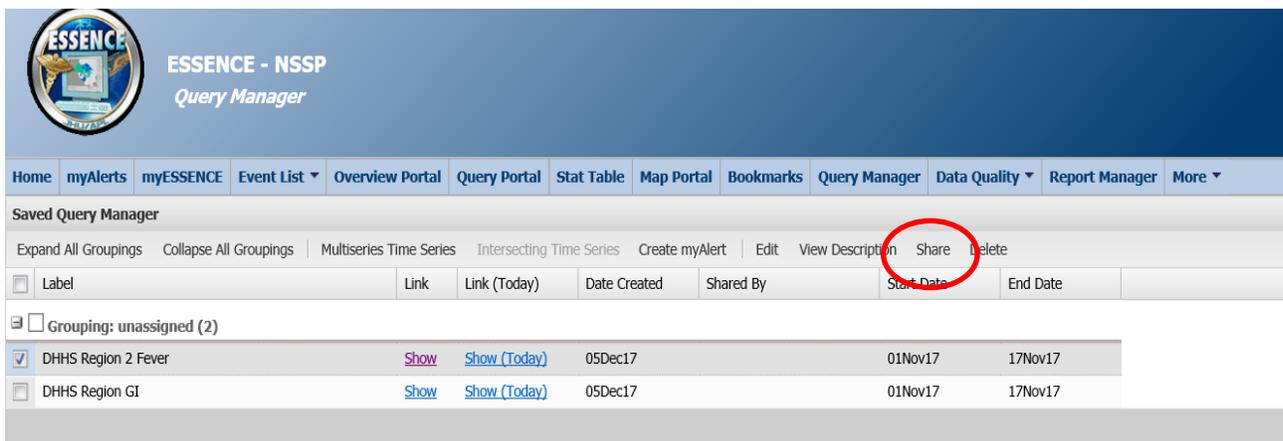


Figure 21. Query Manager Page (Share Data)

Generate Reports

All users can generate reports using the Report Manager function in ESSENCE.

1. Click on the “Report Manager” tab; select a report by clicking the check boxes on the far left (figure 22).
2. Click “Run” under the “Run Report” column.

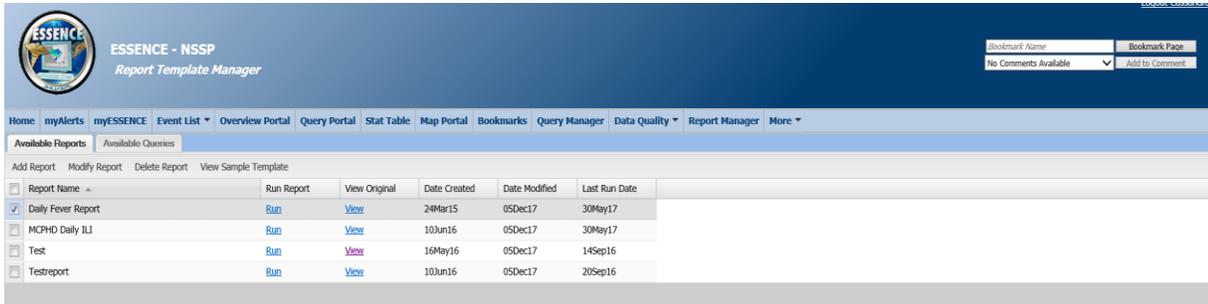


Figure 22. Report Template Manager Page

3. When prompted at the bottom of the screen, click “Open.” The result will be a newsletter template (figure 23) that can be saved and shared. Inside the template are instructions for creating reports in ESSENCE.

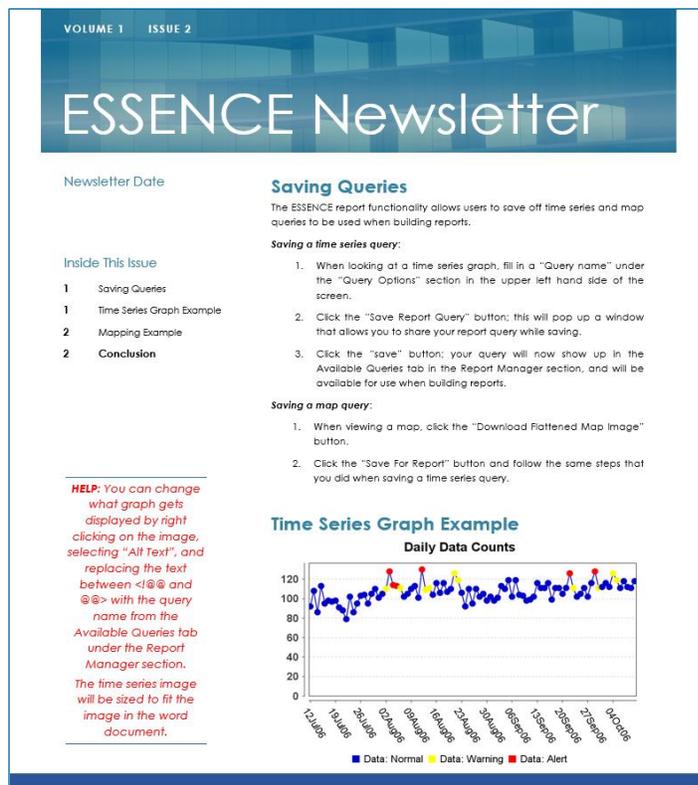


Figure 23. Template for Creating a Newsletter in ESSENCE

Request Technical Assistance

Within NSSP ESSENCE—If you need assistance beyond what’s covered in this quick start guide, please refer to the FAQs and Users Guide under the “More” tab (figure 24). If you still cannot find the information you need, please contact the NSSP Service Desk.

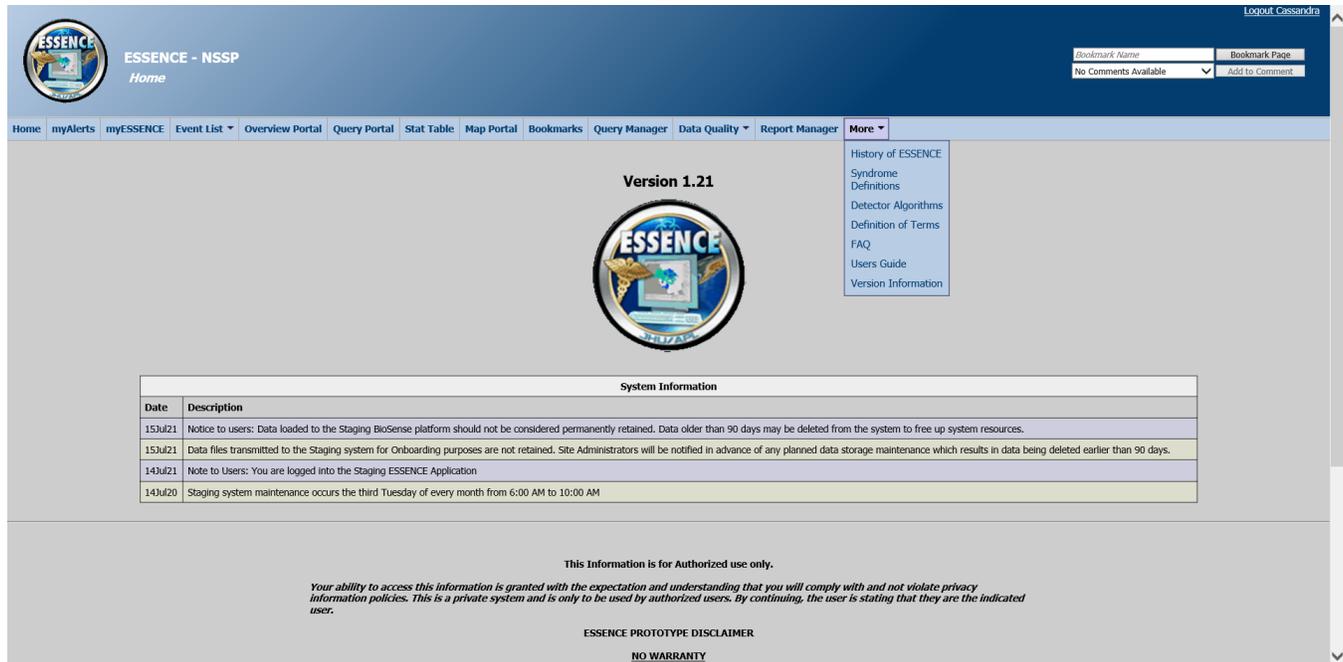


Figure 24. Access Resources on ESSENCE Home Page

NSSP Service Desk—If you’ve exhausted the resources already mentioned and still have questions about NSSP ESSENCE v1.21, please contact the [NSSP Service Desk](#). If you do not have an account, visit support.syndromicsurveillance.org and register to receive technical assistance. Once registered, please sign in and enter your request for technical assistance (TA request) into the system. A ticket will be created automatically, and further communications will be sent to your registered email.

5. Activities Common to Users and Site Administrators

1. Log in to ESSENCE.
2. Check data access rules created by the site administrator for your site. Create a query on the data source or data sources (i.e., Patient Location [Full Details], or Patient Location and Visit [Full Details], or Facility Location [Full Details], or Facility Location and Visit [Full Details] at aggregate or data-details level) that your site administrator has set up for you. Create a time series graph.
3. Check data access rules created by a site administrator **NOT** affiliated with your site (if applicable). Create a query on the data source(s) included in that rule (i.e., Patient Location [Full Details], or Patient Location and Visit [Full Details], or Facility Location [Full Details], or Facility Location and Visit [Full Details] at aggregate or data-details level) that the site administrator has set up for you. Create a time series graph.
4. Check the national picture. Create a query on the data source Patient Location (Limited Details by HHS Region). Select HHS Region(s) and create a time series graph.
5. Check your data quality. Run a daily, weekly, and monthly data quality report for percent completeness on ER Data by Facility and by selecting a particular facility in your site for a date range of your choice.
6. Run a daily, weekly, and monthly data quality report for percent mapped to known values on ER Data by Facility and by selecting a particular facility in your site for a date range of your choice.
7. Download the data quality report to an MS Excel spreadsheet.
8. Run data quality frequencies on age.
9. View data quality alerts for a time period of your choice.
10. Click Alert list and view the summary alerts for the HHS region. Investigate an alert of interest.
11. Click “Region/Syndrome” tab, and investigate an alert of interest.
12. View the alerts by hospital/syndrome, and investigate the alerts that are level RED for your site.
13. View the spatial alert list, and investigate the alerts that are level RED for zip codes in your site.
14. View the alert list by time of arrival for each syndrome with RED alerts for hospitals in certain zip codes.
15. Select the data source Patient Location (Full Details), and create a query to investigate ED visits of patients aged 18–44 years in a site with fever from a date range of your choice, and create a table showing syndrome by sex and patient class or other variables of your choice.
16. Download the table to MS Excel.
17. Create a time series graph using the same data source and parameters as item 15.

18. Save the query with a name of your choice.
19. Add this time series graph to myESSENCE.
20. Select an alert or warning data point on the graph, and examine the line-level details.
21. Generate different charts (pie chart, bar charts, and pop-up charts) to determine patient breakdown by sex and race.
22. Download the tables to MS Excel.
23. Download the zip file for the graphs.
24. Select Facility Location (Full Details), and create a graph of your choice investigating ED visits of patients aged 18–44 years in hospitals in your site or in a particular region of your site for a period of your choice, and label the graph with title, axis labels, etc.
25. Return to the query portal; select Patient Location (Limited Details by HHS Region) from the list of data sources; and generate a time series graph of ED visits by patients aged 5–17 years in the fever syndrome, your HHS Region, and from a date range of your choice.
26. Select add overlay; select Patient Location (Limited Details by HHS Region) from the list of data sources; and generate an overlay onto the time series graph in line 25 by patients aged 5–17 years in the fever syndrome, a different HHS region, and from the same date range used in line 25.
27. Click “Configuration Options” to modify the variables in your query. Modify the variables of interest in the overview to generate a time series graph investigating ED visits by patients aged 5–17 years with fever by sex or another parameter of your choice.
28. Go to the “Query manager” to find the query you saved in item 18.
29. Share the saved query with another user.
30. Create and save a myAlert query to detect counts of fever in children younger than 5 years of age that occurred in the past 30 days.
31. Create a records of interest myAlert for patients in your site with GI syndrome.
32. Go to the “myAlerts” tab, and click Manage Alert Definitions to view all alerts created and to share the alert query with another user.
33. Delete an alert.
34. Add a tab in myESSENCE with a name of your choice.
35. Find the query saved in item 18 in myESSENCE, and add it to the tab you created.
36. Share the new tab in myESSENCE with a user of your choice.
37. Click the query name on the graph to generate a map of the time series graph in the myESSENCE tab.

38. Change the layers of the map to show the location of hospitals in your site and the distribution of ED visits by HHS region.
39. Add labels to the map.
40. Click the picture of disk to save the shapefile of the map on the bottom right under result.
41. Return to the query portal; create a time series graph to investigate ED visits of patients aged 5–17 years in a site with fever from a date range of your choice; and save it as a report query.
42. Generate an external report for publishing.
43. Bookmark the query created in item 24.
44. Explore using the segregated Chief Complaint Query Tool to develop a new definition. In the Query Portal, select the data source Chief Complaint Query Validation.
45. Query Chief Complaint Free Text, Discharge Diagnosis, and CC and DD for keywords relevant to developing an outcome definition for anything related to a drug overdose.
46. Select the CC and DD query field, and select three free-text strings to query simultaneously.
47. Subsequent to identification of relevant keywords, apply a query definition in the Query Portal to identify details of relevant cases.
48. After completing these tasks, log out from ESSENCE.