Missouri ESSENCE Guide

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Public Health
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Missouri ESSENCE Project Guide

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Missouri Electronic Surveillance System for Early Notification of Community-based Epidemics (ESSENCE)

Introduction

Welcome to the Missouri ESSENCE Project. The Missouri Department of Health and Senior Services (DHSS) hopes that ESSENCE will be useful to your organization for a variety of applications. This document is intended as a self-study guide to help you navigate through some basic functions in ESSENCE. We encourage you to explore the system to determine the ways in which it can help you in your job duties. Please contact the Missouri ESSENCE Project staff (**ESSENCE@dhss.mo.gov**) with specific or general questions concerning the applications and capabilities of ESSENCE.

Our mission is to help state and local partners respond to adverse public health events by providing information and tools for early event detection and situational awareness.

It should be noted that access to some features displayed in this training guide might not be available to all individuals. For example, hospital personnel may only view data for their hospital or hospital group. Hospitals may not "drill down" further in some data views if another facility's data are identifiable in that same view.

Overview

ESSENCE software takes electronic emergency department (ED) data and groups chief complaints into syndrome categories. This information is used to determine if the number of visits is greater than expected for that facility, county, or other geographic area based on statistical analyses. The syndrome groups used are: Botulism-like, Fever, Gastrointestinal, Hemorrhagic, Neurological, Rash, Respiratory, and Shock/Coma.

Some hospitals send data in near real-time while others send batches daily. Every weekday, the DHSS Information Technology Services Division (ITSD) loads hospital records into ESSENCE, which analyzes and displays the findings for use at the state, local, and hospital level. For this reason, today's data are not available in ESSENCE. The previous day's data are available in the afternoon of the current day, after the processing and loading are complete. The Public Health Event Detection and Assessment (PHEDA) program, which is responsible for overseeing Missouri ESSENCE, will send out e-mail to the user list if a significant delay is expected or if another technical issue affecting ESSENCE availability has occurred. For this reason, it is important to keep contact information current with the PHEDA staff.

It is important to note that the data sent in near real-time form from hospitals are loaded automatically on weekends and holidays on about the same schedule as noted above.

Applications

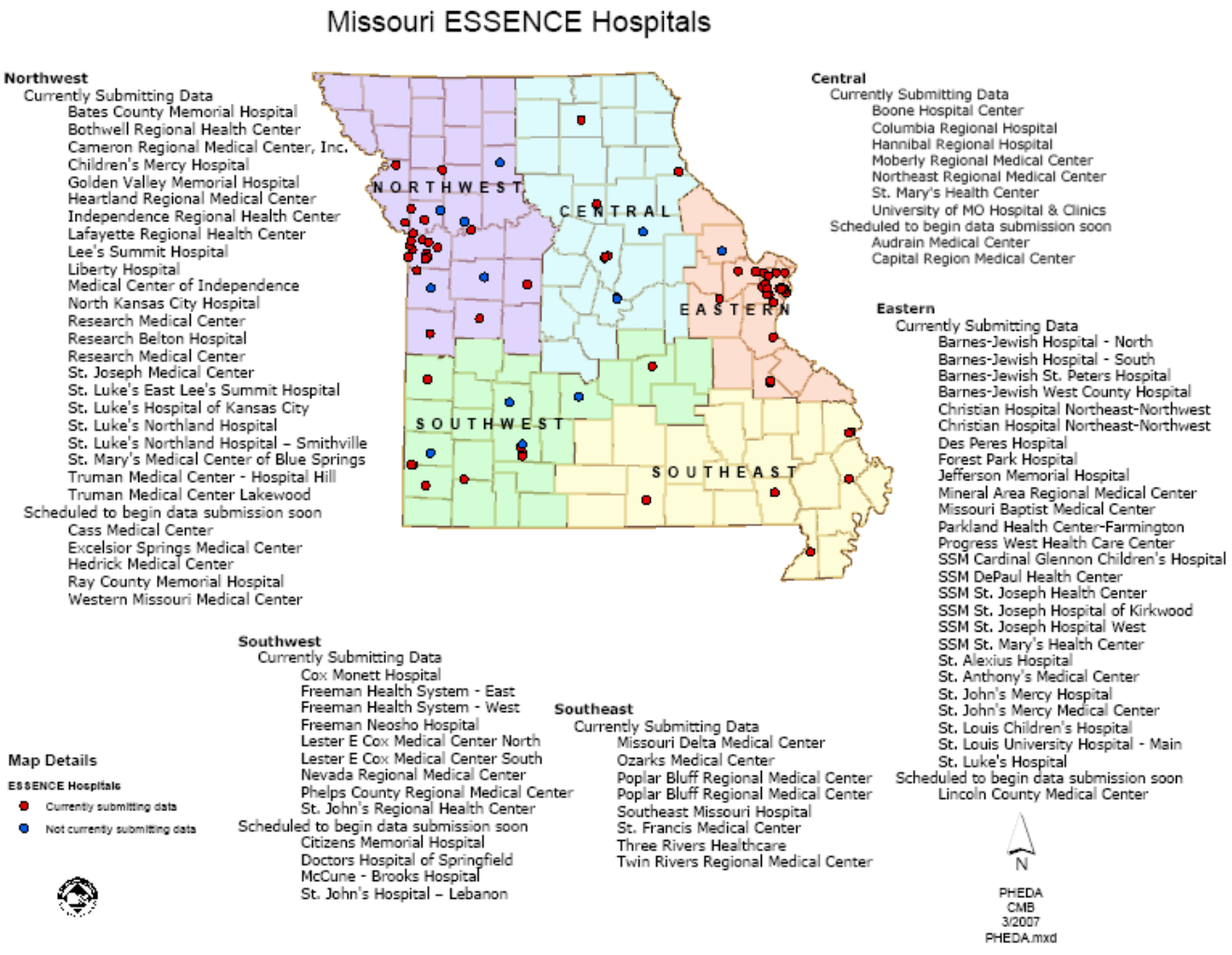
In general, ESSENCE is used for early event detection through the use of the Alert List feature. ESSENCE displays the number of ED visits in each syndrome category that occurred in a given day in either the hospital/syndrome or patient/syndrome view (detailed below). The system will "flag" a syndrome group whose number of visits was significantly higher than the expected number based on short-term and long-term data trends as well as day of week and holidays. The overall goal is to detect anomalies as early as possible to identify and contain health events such as naturally occurring outbreaks or acts of bioterrorism.

ESSENCE can be used for situational awareness to augment existing information during an ongoing public health event. In general, the Query feature is used to track impact in terms of time, geography, and demography.

However, it should be noted that each ESSENCE feature is useful for a variety of applications. For example, during cold weather, epidemiologists can conduct routine surveillance using the ESSENCE Query feature to identify cases of hypothermia or carbon monoxide poisoning. If a rumored or known foodborne illness outbreak has been linked to a particular county, the Alert List feature can be used to see if a greater than expected number of cases among that counties residents have occurred at ESSENCE hospitals.

Limitations

Users must understand the limitations of ESSENCE and its data sources to assure appropriate interpretation, decision-making, and communication with colleagues and the general public. The Missouri ESSENCE coverage map shows the locations of participating hospitals along with their reporting status. The ESSENCE Reporting Rule determines which hospitals are required to send their data to DHSS for syndromic surveillance; some rural hospitals are exempt from the Reporting Rule. Therefore, cases related to a particular chief complaint may not be found among residents of a particular county or zip code in ESSENCE, but this does not mean that no cases occurred in that area.



Similarly, when utilizing the Query feature to search by keyword, misspellings and variant terminology may prevent the user from finding all of the cases related to that chief complaint included in ESSENCE.

ESSENCE data are a snapshot of the main complaints listed by the patient upon admission to the emergency department. *ESSENCE is capable of reporting discharge diagnosis for patients; however, this information is usually not available at the time of the data transfer to DHSS, especially within the eight syndrome groups. Outcomes like hospital or intensive care unit admission, death, or transfer to another facility are not available in the dataset.*

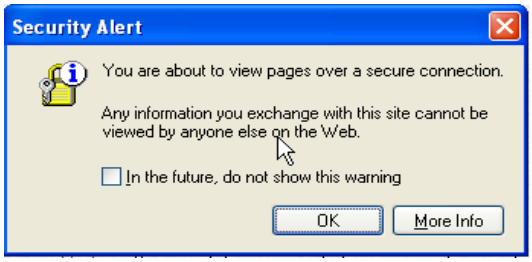
Getting Started

The secure website is hosted by Johns Hopkins University and can be accessed at the following site:

http://eedweb.dhss.mo.gov/

Logging on:

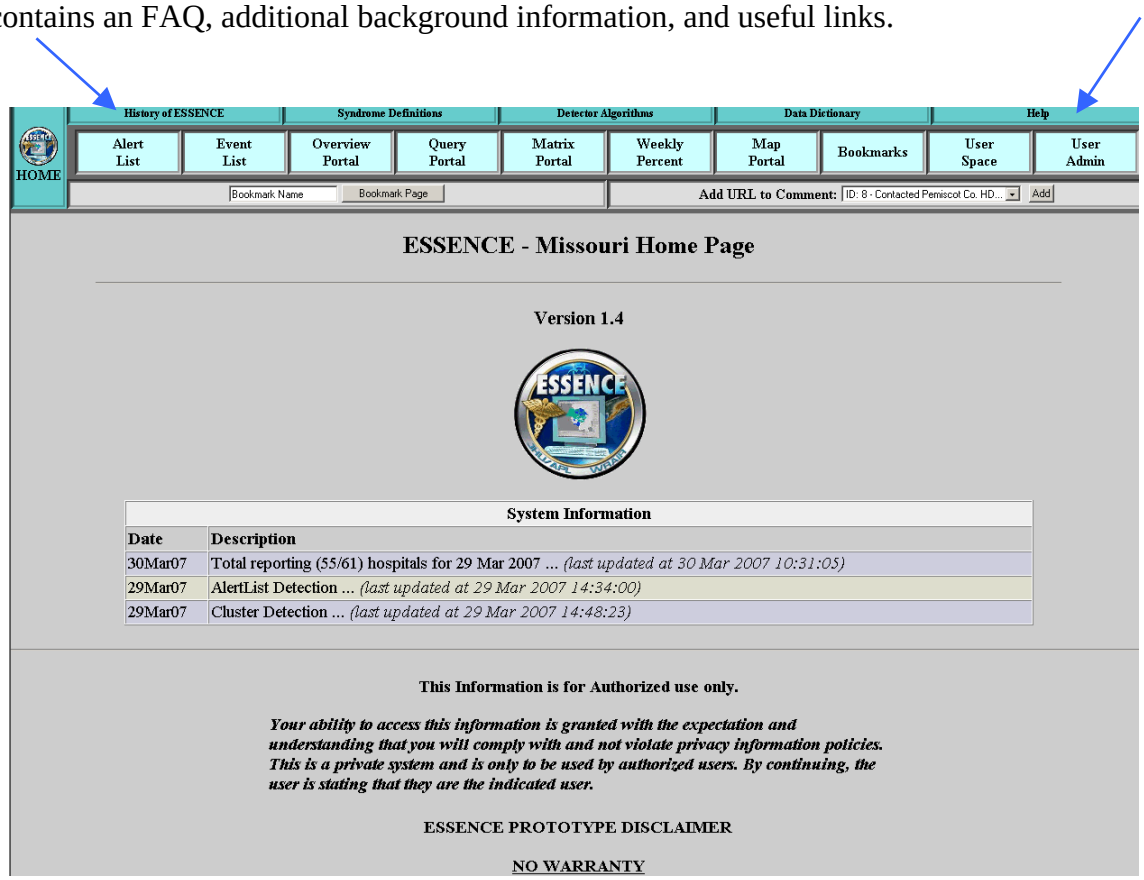
1. A security certificate dialog box may appear – click yes
2. You will likely see a Security Alert dialog box – click yes.



3. The Enter Network Password dialog box should appear – enter your user name and password as granted by ITSD (for instructions on obtaining this access, visit our website at http://www.dhss.mo.gov/ESSENCE).

4. The ESSENCE homepage will appear. All of the major functions of the software are accessible using the main toolbar. We will describe each of the application tabs (e.g., Alert List, Event List, etc.) in various depths depending upon the foreseen usefulness to the user.

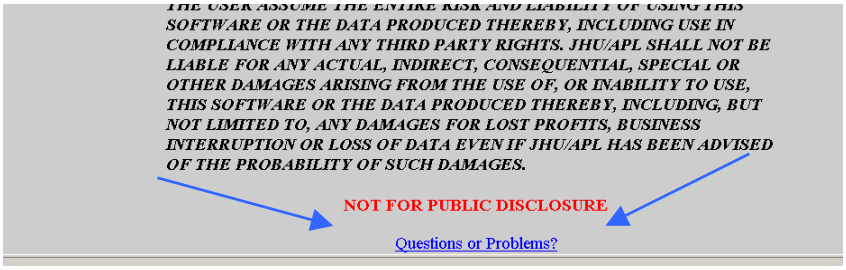
   Prior to examining specific data outputs, we also suggest looking at the items on the very top of the tool bar which describes: 1) history and background of ESSENCE and its relationship to syndromic surveillance, 2) syndrome and subsyndrome definitions, 3) statistical methodology, 4) the data dictionary, a glossary of common ESSENCE terms and 5) the Help section, which contains an FAQ, additional background information, and useful links.



The Total Reporting Hospitals for 29 Mar 2007 shows that the previous day's data have been loaded for nearly all of the hospitals (at times, this will not reach 100 percent of hospitals due to batching). The "last updated" shows at what time this load was completed. At this time, data are only loaded once per day by ITSD.

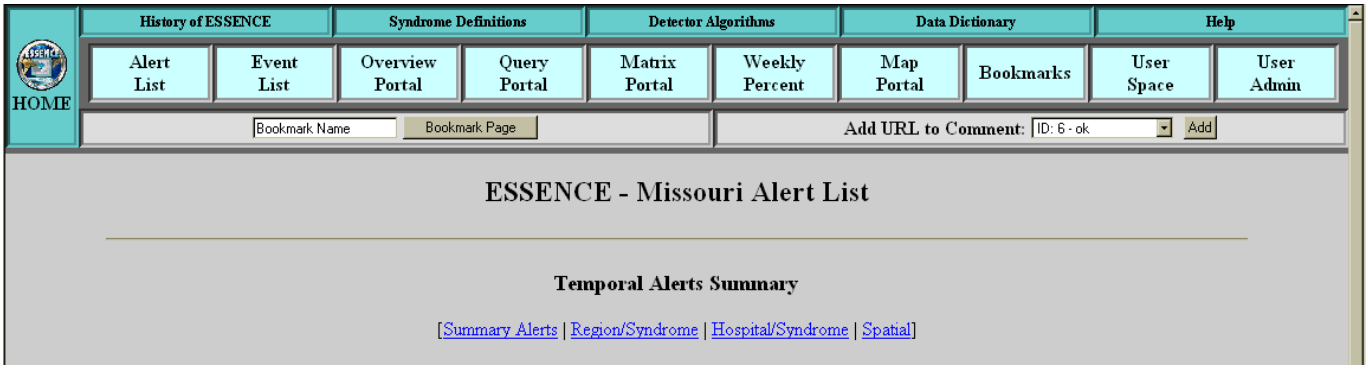
The second row shows that the alert list was completely finished updating at 2:34 pm. The third line shows that cluster detection was complete at 2:48 pm; cluster detection is used in for Spatial Alerts and in a mapping feature. Data may be displayed in the system before these dates and times, but they are not considered final until the system information table states it has been updated. ***In summary, if the current date is the 30th of the month, to see all flagged alerts from the previous day, the system must analyze all of the data and report the "cluster detection" as the previous day or in this example, the 29th.***

System Information is monitored daily and e-mail alerts will go out if an unusually long delay is expected. If you observe a problem with this or any other aspect of the Missouri ESSENCE System, please hit the "Questions or Problems?" button, which will automatically prompt you to send an e-mail to ESSENCE@dhss.mo.gov.

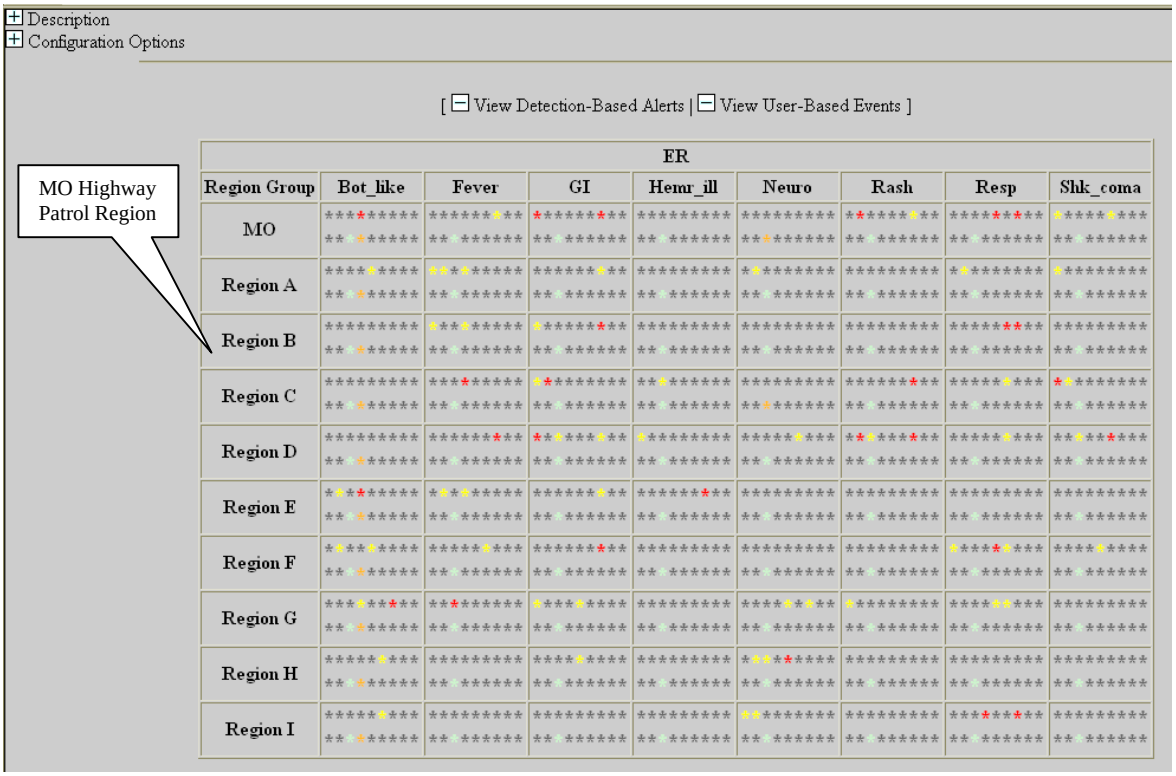


ALERT LISTS

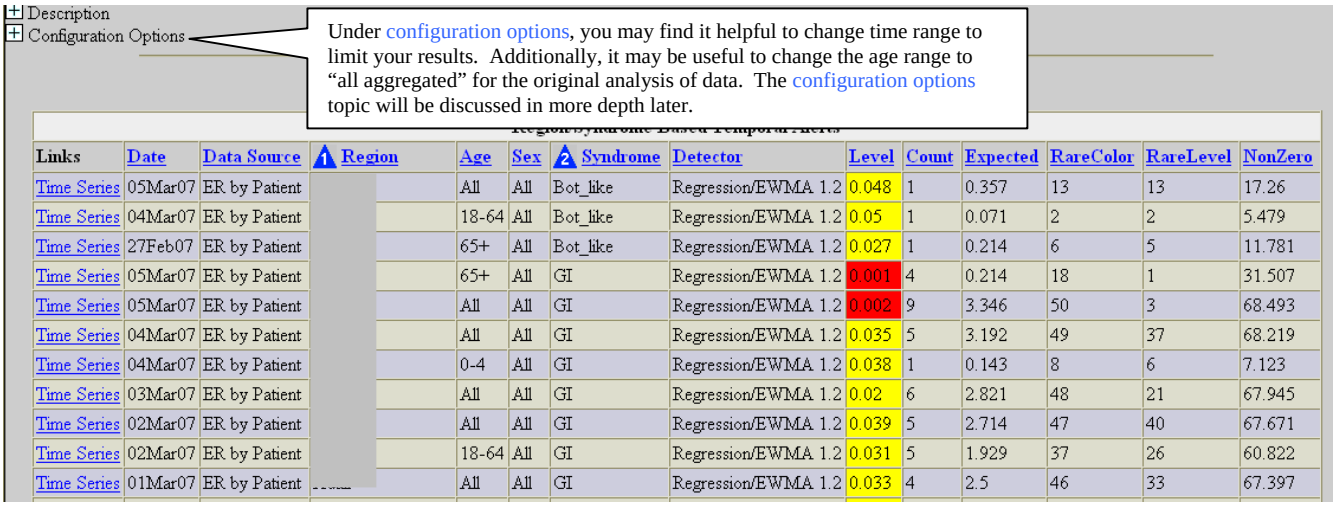
1. Click on the "Alert List" icon. This feature will allow you to choose from four different alert views.



2. Click on Summary Alerts**:** You can now see a graphical summary of syndromic alerts for the state of Missouri as a whole or by individual reporting regions ***(in this instance, region = MO Highway Patrol Region).*** Each asterisk (*) represents the past nine days for a given syndrome listed chronologically with the current day being on the far right. Asterisks will appear as grey, yellow or red (see ***data dictionary*** for explanation of the color schemes). The top tier of asterisks provides a sense of syndromic alert activity over time and by clicking on individual asterisks, you can further investigate the data used to generate this data point. The second tier of asterisks shows whether any Event List entries have been posted in that region. The color schemes used in this tier are described in the Event List section (pages 16 and 17).



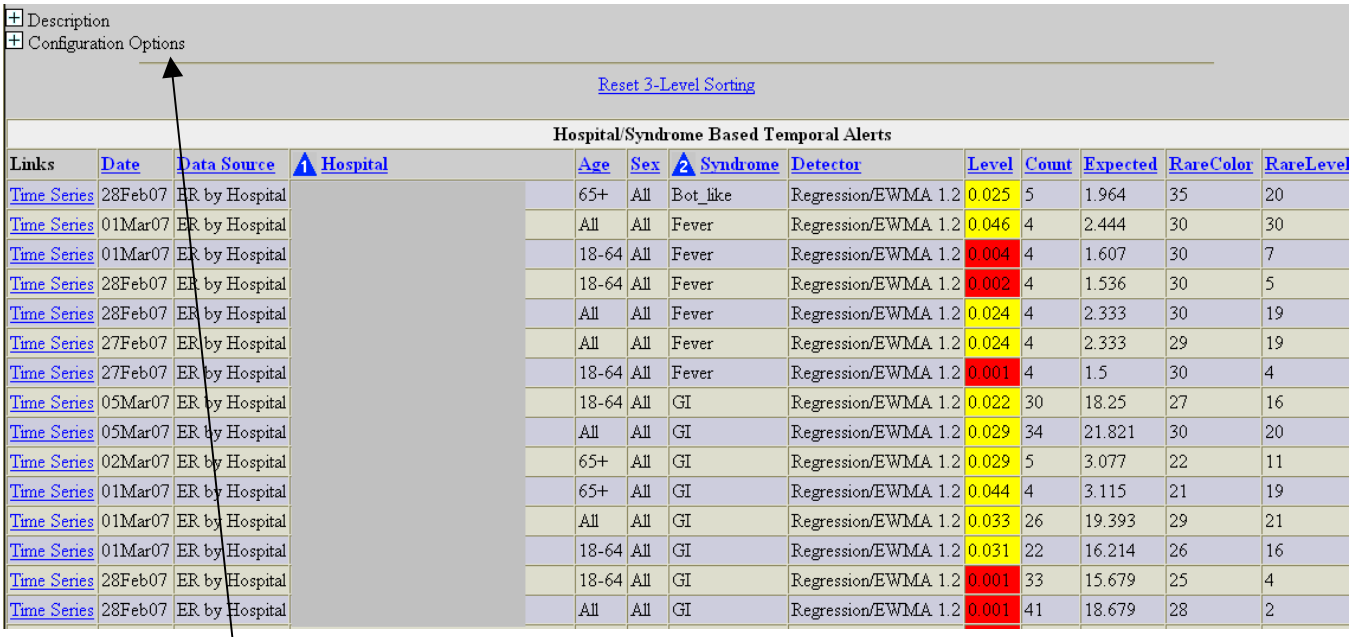
3. Click on Region / Syndrome**:** This view allows you to view alerts ***by county (in this instance, region = county)***. You can use the sort function to strategically sort the last seven days of alerts. To do this, click on the Region icon (this will place a 1 icon by this selection). This is good for getting a sense of total syndromic activity in a geographic area. To further sort by a syndrome, click on the syndrome icon (a 2 will be placed by this selection). All alerts in that region for each syndrome will be listed for the past seven days in this graph (unless start and end dates have been changed in the options). The region section here has been blocked for confidentiality reasons.



Links	Date	Data Source	1 Region	Age	Sex	2 Syndrome	Detector	Level	Count	Expected	RareColor	RareLevel	NonZero
Time Series	05Mar07	ER by Patient		All	All	Bot_like	Regression/EWMA 1.2	0.048	1	0.357	13	13	17.26
Time Series	04Mar07	ER by Patient		18-64	All	Bot_like	Regression/EWMA 1.2	0.05	1	0.071	2	2	5.479
Time Series	27Feb07	ER by Patient		65+	All	Bot_like	Regression/EWMA 1.2	0.027	1	0.214	6	5	11.781
Time Series	05Mar07	ER by Patient		65+	All	GI	Regression/EWMA 1.2	0.001	4	0.214	18	1	31.507
Time Series	05Mar07	ER by Patient		All	All	GI	Regression/EWMA 1.2	0.002	9	3.346	50	3	68.493
Time Series	04Mar07	ER by Patient		All	All	GI	Regression/EWMA 1.2	0.035	5	3.192	49	37	68.219
Time Series	04Mar07	ER by Patient		0-4	All	GI	Regression/EWMA 1.2	0.038	1	0.143	8	6	7.123
Time Series	03Mar07	ER by Patient		All	All	GI	Regression/EWMA 1.2	0.02	6	2.821	48	21	67.945
Time Series	02Mar07	ER by Patient		All	All	GI	Regression/EWMA 1.2	0.039	5	2.714	47	40	67.671
Time Series	02Mar07	ER by Patient		18-64	All	GI	Regression/EWMA 1.2	0.031	5	1.929	37	26	60.822
Time Series	01Mar07	ER by Patient		All	All	GI	Regression/EWMA 1.2	0.033	4	2.5	46	33	67.397

4. Click on Hospital / Syndrome**:** This view allows you to view the past 7 days of alerts ***by reporting hospital***. Offering additional focus (vs. Region), this method further individualizes the data. If an

elevated number of cases in a particular syndrome are reported by a hospital, a yellow or red alert will appear and can be further investigated by selecting the time series icon.



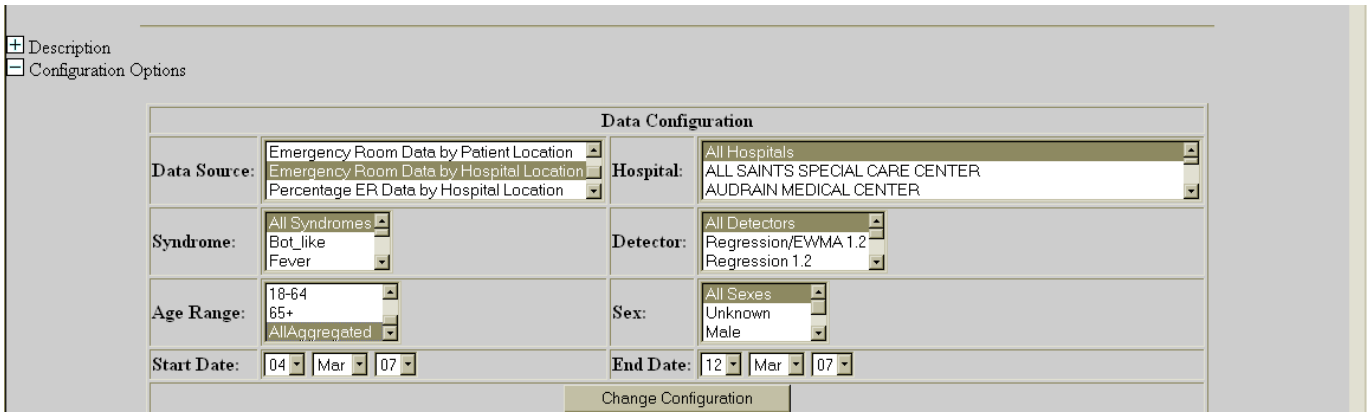
Description
Configuration Options

Reset 3-Level Sorting

Hospital/Syndrome Based Temporal Alerts

Links	Date	Data Source	1 Hospital	Age	Sex	2 Syndrome	Detector	Level	Count	Expected	RareColor	RareLevel
Time Series	28Feb07	ER by Hospital		65+	All	Bot_like	Regression/EWMA 1.2	0.025	5	1.964	35	20
Time Series	01Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.046	4	2.444	30	30
Time Series	01Mar07	ER by Hospital		18-64	All	Fever	Regression/EWMA 1.2	0.004	4	1.607	30	7
Time Series	28Feb07	ER by Hospital		18-64	All	Fever	Regression/EWMA 1.2	0.002	4	1.536	30	5
Time Series	28Feb07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.024	4	2.333	30	19
Time Series	27Feb07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.024	4	2.333	29	19
Time Series	27Feb07	ER by Hospital		18-64	All	Fever	Regression/EWMA 1.2	0.001	4	1.5	30	4
Time Series	05Mar07	ER by Hospital		18-64	All	GI	Regression/EWMA 1.2	0.022	30	18.25	27	16
Time Series	05Mar07	ER by Hospital		All	All	GI	Regression/EWMA 1.2	0.029	34	21.821	30	20
Time Series	02Mar07	ER by Hospital		65+	All	GI	Regression/EWMA 1.2	0.029	5	3.077	22	11
Time Series	01Mar07	ER by Hospital		65+	All	GI	Regression/EWMA 1.2	0.044	4	3.115	21	19
Time Series	01Mar07	ER by Hospital		All	All	GI	Regression/EWMA 1.2	0.033	26	19.393	29	21
Time Series	01Mar07	ER by Hospital		18-64	All	GI	Regression/EWMA 1.2	0.031	22	16.214	26	16
Time Series	28Feb07	ER by Hospital		18-64	All	GI	Regression/EWMA 1.2	0.001	33	15.679	25	4
Time Series	28Feb07	ER by Hospital		All	All	GI	Regression/EWMA 1.2	0.001	41	18.679	28	2

****Using configuration options, the user is able to manipulate the time series used for generating output, limit the hospital, which is being examined, sex, age etc. Often times syndromes are examined in an aggregated view for age as when the data are listed in the output, age delineation into subgroups is easily achieved.



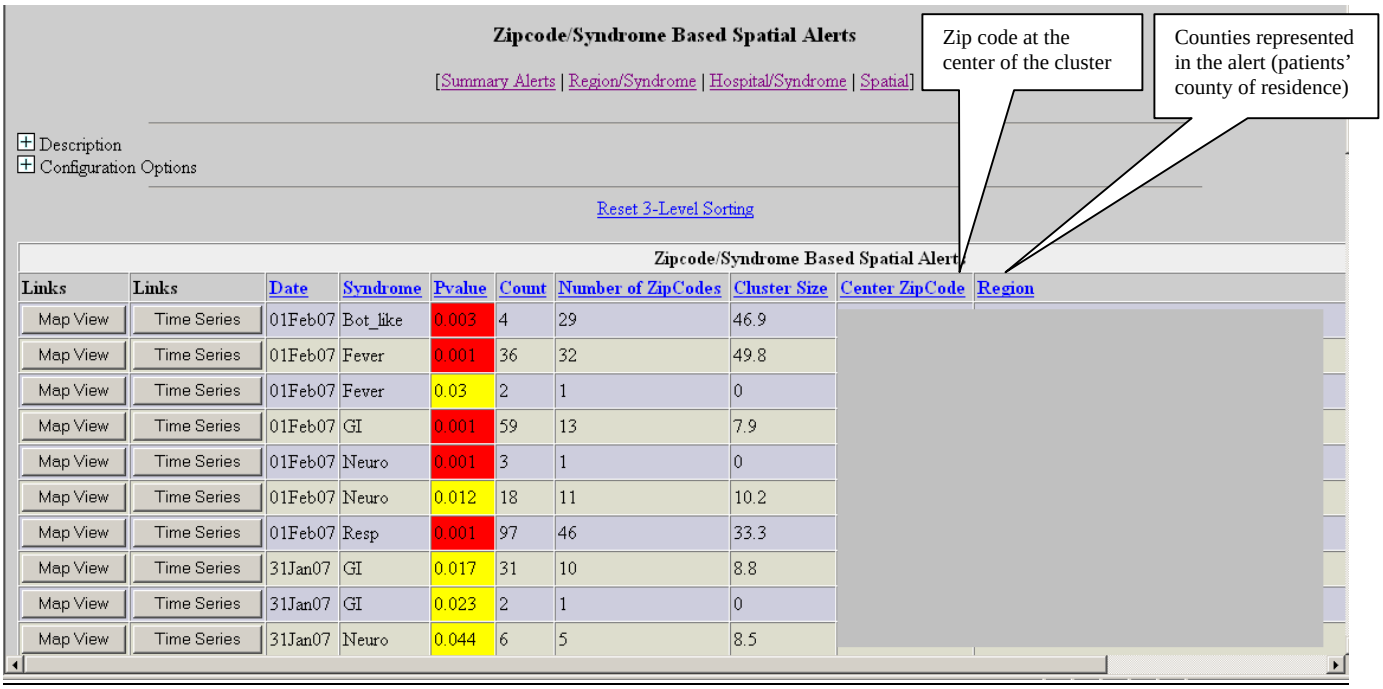
Description
Configuration Options

Data Configuration

Data Source:	Emergency Room Data by Patient Location Emergency Room Data by Hospital Location Percentage ER Data by Hospital Location	Hospital:	All Hospitals ALL SAINTS SPECIAL CARE CENTER AUDRAIN MEDICAL CENTER
Syndrome:	All Syndromes Bot_like Fever	Detector:	All Detectors Regression/EWMA 1.2 Regression 1.2
Age Range:	18-64 65+ AllAggregated	Sex:	All Sexes Unknown Male
Start Date:	04 Mar 07	End Date:	12 Mar 07

Change Configuration

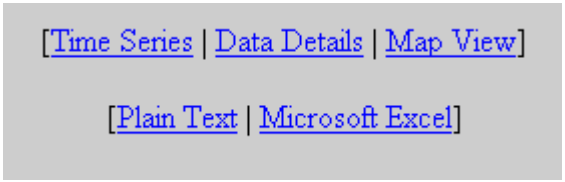
5. Click on Spatial**:** The Spatial Alert List is different from the Temporal Alert Lists in that it not only looks at a specific stratification over time, but also looks at how certain geographic areas compare to the rest of the regions. If a cluster of zipcodes act abnormal compared to the surrounding areas, it will be noted as a red or yellow alert. The alert list will present information like the number of zip codes in the cluster and the total count of cases seen that day by the zip codes in the cluster.



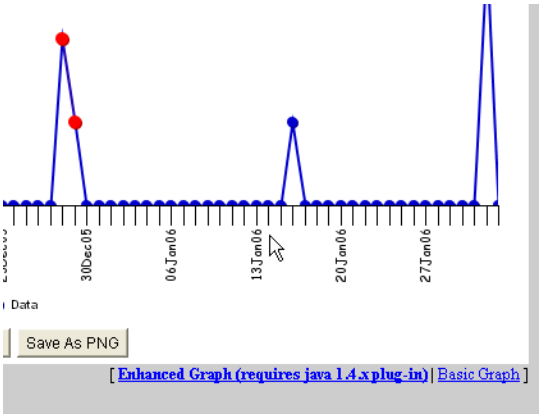
Links	Links	Date	Syndrome	Pvalue	Count	Number of ZipCodes	Cluster Size	Center ZipCode	Region
Map View	Time Series	01Feb07	Bot_like	0.003	4	29	46.9		
Map View	Time Series	01Feb07	Fever	0.001	36	32	49.8		
Map View	Time Series	01Feb07	Fever	0.03	2	1	0		
Map View	Time Series	01Feb07	GI	0.001	59	13	7.9		
Map View	Time Series	01Feb07	Neuro	0.001	3	1	0		
Map View	Time Series	01Feb07	Neuro	0.012	18	11	10.2		
Map View	Time Series	01Feb07	Resp	0.001	97	46	33.3		
Map View	Time Series	31Jan07	GI	0.017	31	10	8.8		
Map View	Time Series	31Jan07	GI	0.023	2	1	0		
Map View	Time Series	31Jan07	Neuro	0.044	6	5	8.5		

Functions within Each View

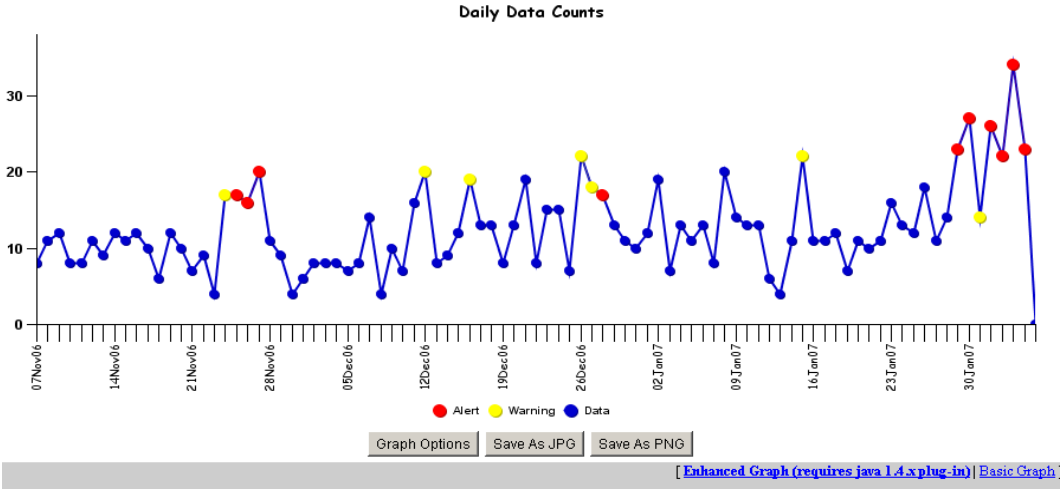
After choosing one of the above ESSENCE views, you can "drill down" and display syndromic data in very helpful ways.



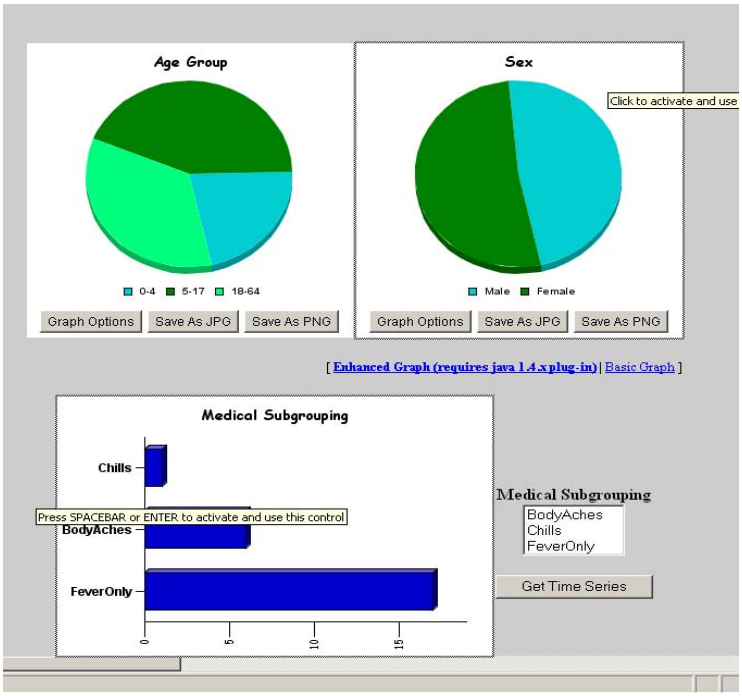
Note: *After opening a time series graph for the first time on a given computer, CLICK ON the "enhanced graph (requires java 1.4.xplug-in)" link in the bottom right corner of the time series graph. This means that a version of Java greater than 1.4 will be needed (www.java.com/en/download/windows_ief.jsp?name=F). You will be given the choice to click "always" – click it. This step will cover all graphics, and you will not need to complete it again.*



1. **Time Series:** Clicking on Time Series for an alert displays a graph of the number of cases over time for the particular view and syndrome you selected. This is a good way to see how an alert compares to baseline data and previous alerts.



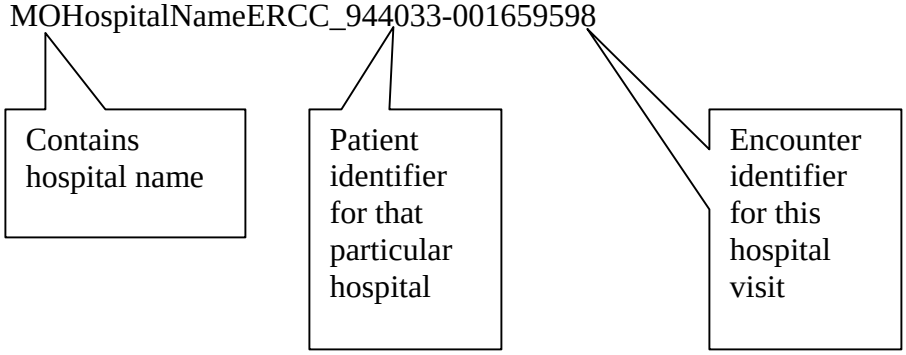
2. **Data Details:** Clicking on the Data Details icon or the data point in a time series graph will display the individual days details. These data can be sorted using the 3-sort function. Each case record has fields for date, admit time, zip code, age, chief complaint, medical record number, and patient ID. All of these data are essential to evaluating alerts.



Date	Time	HospitalName	Zipcode	Orig_Zipcode	Region	AgeGroup	Age	Sex	ChiefComplaintOrig
04Feb07	10:49 PM					18-64	30	Female	FEVER, FLU LIKE SYMPTOMS
04Feb07	08:48 PM					5-17	17	Female	FEVER
04Feb07	04:23 PM					18-64	39	Female	BODY ACHES,CONGESTION
04Feb07	02:15 PM					5-17	8	Male	CONGESTION,COUGH,FEVER,ACHEY
04Feb07	02:12 PM					5-17	11	Male	CONGESTION,COUGH,FEVER,ACHEY
04Feb07	02:09 PM					18-64	32	Female	FEVER,ACHEY,DIZZY,CONGESTION
04Feb07	12:38 PM					0-4	2	Male	FEVER
04Feb07	10:18 AM					18-64	36	Male	BODYACHES/CONGESTION
04Feb07	09:10 AM					0-4	2	Female	FEVER
04Feb07	08:41 AM					18-64	18	Female	FEVER
04Feb07	09:05 AM					5-17	11	Female	FEVER
04Feb07	12:51 PM					5-17	7	Male	FEVER
04Feb07	02:38 PM					0-4	2	Male	FEVER,NECK PAIN
04Feb07	01:00 PM					0-4	2	Male	FEVER,NECK PAIN
04Feb07	10:21 AM					0-4	2	Male	FEVER,FUSSY,NECK HURTS,SISTER
04Feb07	03:13 PM					5-17	7	Female	FEVER
04Feb07	10:52 AM					5-17	5	Male	FEVER X 3 DAYS
04Feb07	10:13 AM					5-17	6	Female	FEVER X 2 DAYS
04Feb07	10:09 AM					5-17	7	Male	BLOOD SHOT EYES/FEVER
04Feb07	03:15 PM					5-17	8	Male	FEVER
04Feb07	10:12 PM					18-64	26	Female	FEVER
04Feb07	10:00 AM					18-64	33	Female	BODYACHES/CHILLS/EARACHE/HA/P
04Feb07	08:39 PM					18-64	24	Female	FEBRILE ILLNESS, PERGNANCY

Helpful Hint:
The Medical Record Number is a unique identifier assigned by DHSS and is made up of three parts:

MOHospitalNameERCC_944033-001659598

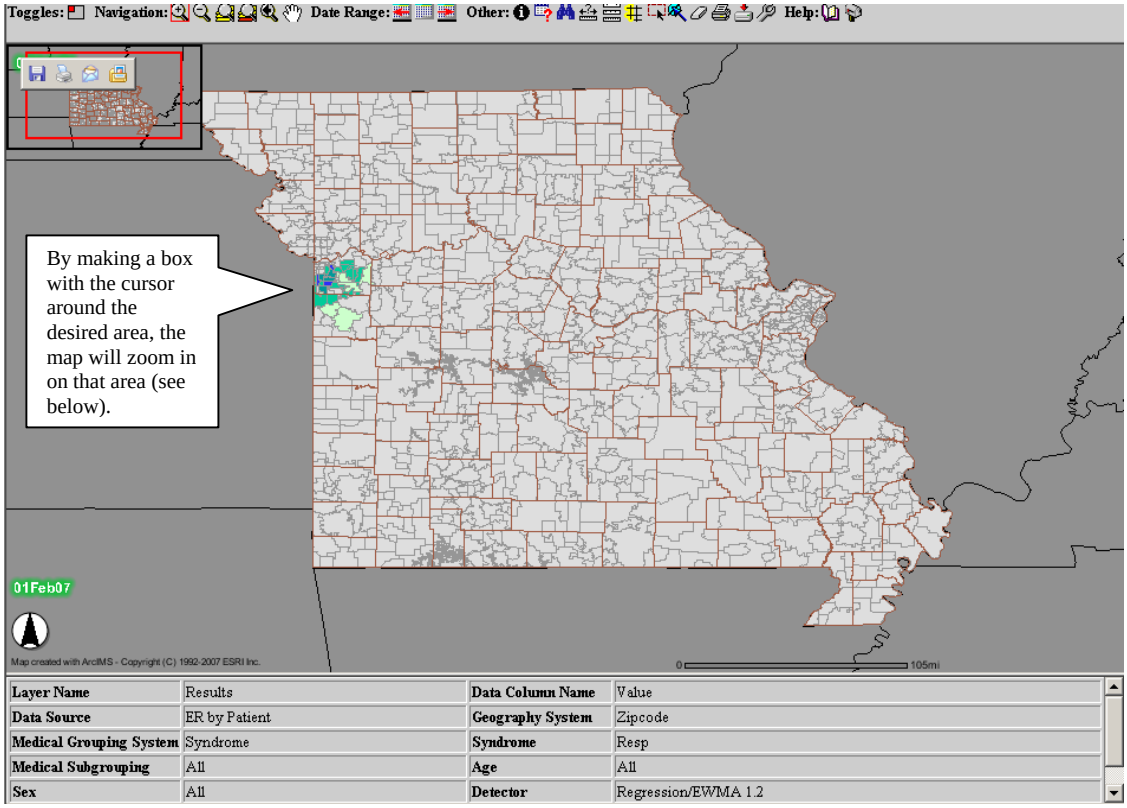


The Medical Record Number can be used:

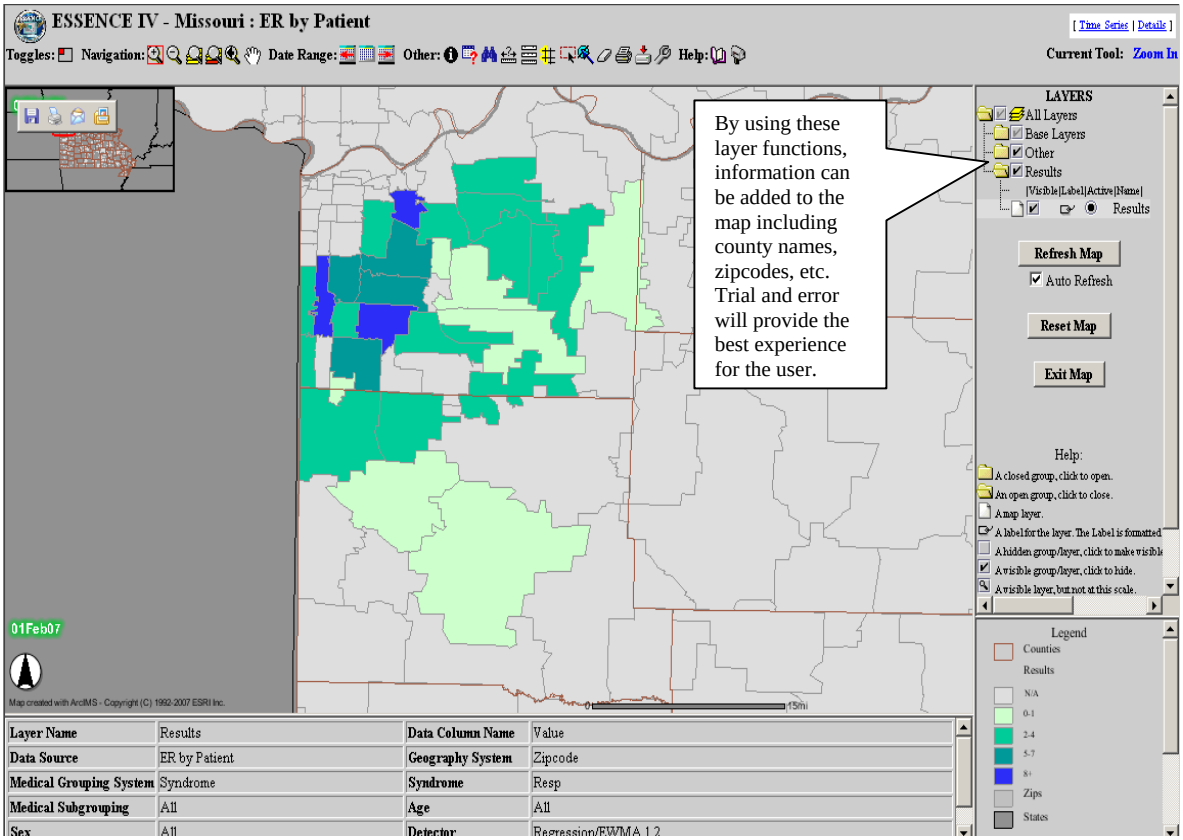
- To determine if duplicate records occur in the dataset
- To determine if the same patient has visited a particular hospital during a period of time
- To facilitate communications among public health partners and with hospital staff during follow up or investigations

Note: The PIN is the same as the Medical Record Number

3. **Map View:** Clicking on Map View for a given set of data details displays a new window with a map with the color-coded syndrome cases present. You may be prompted to log-in again if it is the first time during your ESSENCE session you have used Map View; go ahead and sign in again. This is an easy way to generate a map for the first time using ESSENCE. Using the Map Portal, discussed later, also provides this function with more powerful capabilities. Labeling and other functions are user-friendlier in the Map Portal.



Layer Name	Results	**Data Column Name**	Value
Data Source	ER by Patient	**Geography System**	Zipcode
Medical Grouping System	Syndrome	**Syndrome**	Resp
Medical Subgrouping	All	**Age**	All
Sex	All	**Detector**	Regression/EWMA 1.2



4. **Plain Text:** Clicking on *Plain Text* yields comma delimited data detail – probably not a function you will use much.

5. **Microsoft Excel:** Clicking on *Microsoft Excel* will convert the data details chart into an Excel spreadsheet that can be copied and pasted into an Excel file and saved to the ISDH network drives as needed. This is helpful when you need to perform a complex sort, or to delete unwanted data fields.

> Note: Please refer to Missouri ESSENCE Policies and Procedures regarding the confidentiality of patient-level data. If data are downloaded using this feature, please assure that they are stored, viewed, and transmitted in a safe manner. For example, do not e-mail the data outside of the DHSS information systems network.

6. **Graphs:** Each of the different graphs (i.e., time series, age groups, gender, and medical groupings) can be saved as a .jpg or .png file. These can be helpful for investigation reports, and communicating ESSENCE data with partners. Again note you will need to load the enhanced graphics at least once.

Event List

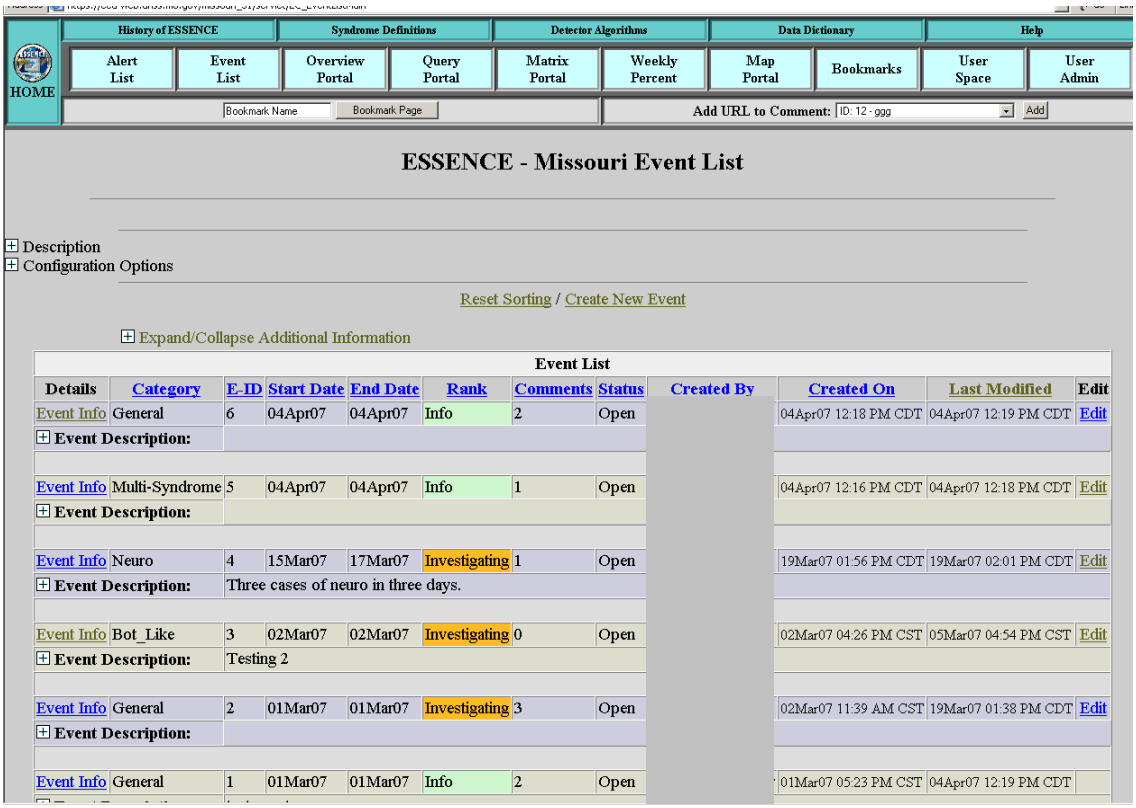
We ask that all Missouri ESSENCE users who find an alert or other information in the system that they feel warrants further attention complete an Event List entry describing their recommendations or activities. (See Missouri ESSENCE Policies and Procedures)

Benefits of the Event List

- The best way to organize communications regarding Missouri ESSENCE findings among users
- As stated earlier, most flags do not require public health investigation or intervention. However, the second tier of asterisks on the Summary Alerts page shows those flags that other Missouri ESSENCE users have determined warrant further attention
    - This provides a more accurate view of "actual" health events occurring at the state and regional level
    - Individuals can monitor this to determine if they should be on heightened alert in their jurisdiction as well
- Provides a forum for discussing potential health events
- Provides the only way DHSS has to track how Missouri ESSENCE is used and can be improved
- Hospitals cannot view the Event List so public health officials can communicate freely without the possibility of hospitals reading notes about each other's patients

Creating an Original Event

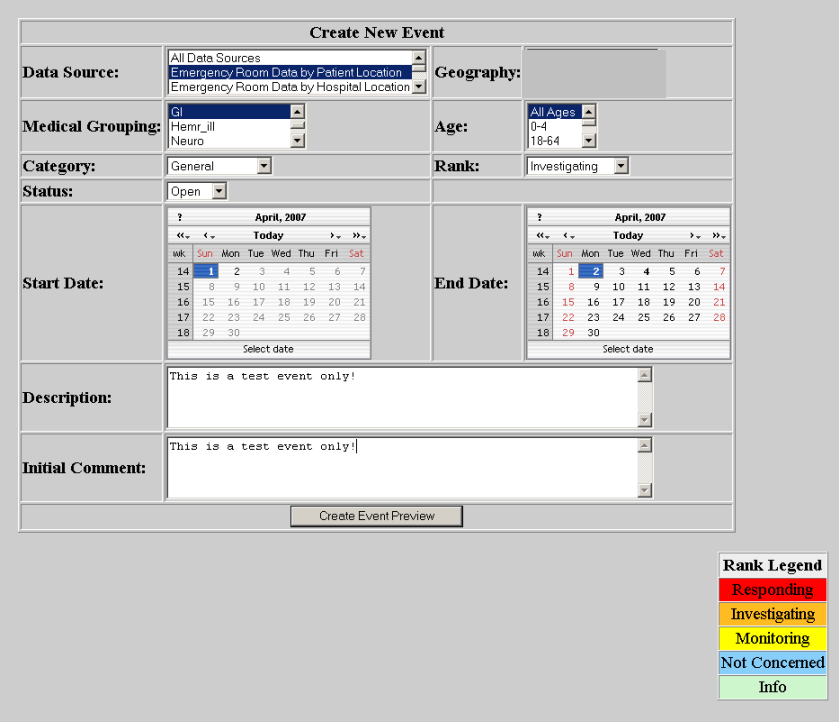
1. First, click on Event List icon in the menu bar. This will take you to the Missouri Event List. Here, you can view all of the events that other Missouri ESSENCE users have commented on. To create an original event, click Create New Event.



2. Next, fill out all fields on the Create New Event page. In this case, we created an event based on Emergency Room Data by Patient Location in St. Louis County for the GI syndrome and All Ages. Under Category, we entered General, although the drop-down box shows other options if those apply. To determine which Rank to use, refer to the Rank Legend and see which term and

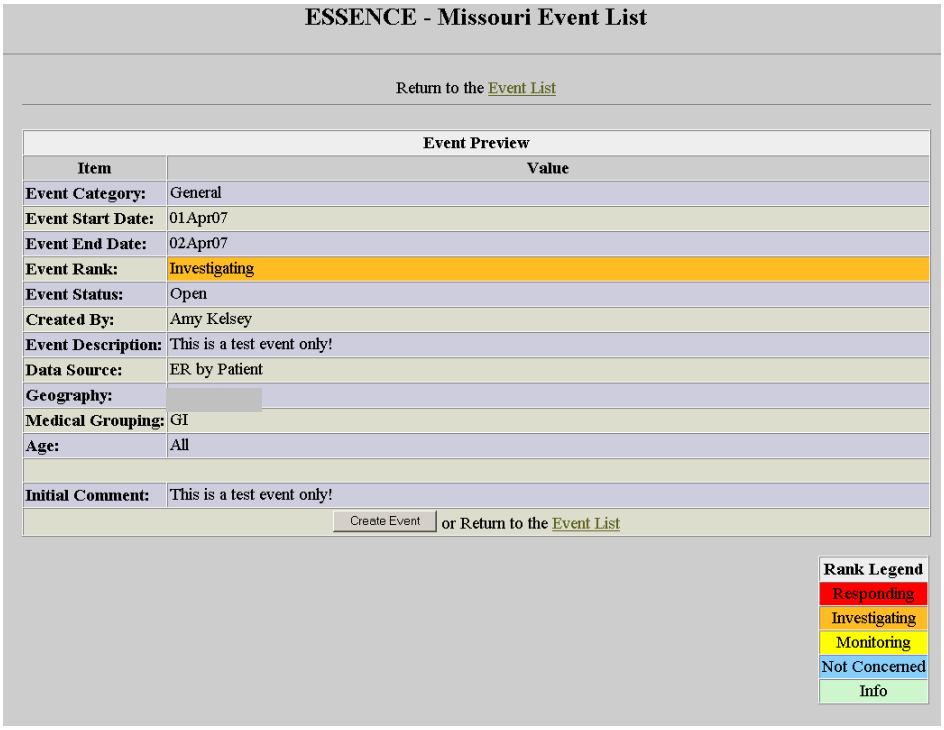
relative rank (i.e., red, orange, etc.) best applies to your situation. Status is open in this example. The date range here was only a two-day period.

Description: Input what you observed and/or additional information that caused you to consider this an "event".
Initial Comment: Input the initial recommendation or action you are taking; for example, contacted X Health Department regarding a cluster at Hospital Y for follow-up.



3. Click Create Event Preview and view your entry. To accept your entry, click Create Event.

Important! Once you create an event, it cannot be deleted. You will, however, have an opportunity to edit the entry.



4. Next, you will see Event Added Successfully, and you can click Return to the Event List to assure the event has been added to the top of the list.

5. You have three options to add new information to the event.
    a. First, you can click on Edit to make changes to a screen identical to the Create New Event screen (above).

    b. The second option is to click Event Info. Here, you can add an additional comment by clicking Add Additional Comment. The options are to add more information in the Comments Window or to add a URL to direct users to information you feel is important. *If you have posted a URL it will show up in the view that pops up when you click Event Info.*

    c. The third option is to reply with new comment; here you have the opportunity to update the event ranking.

Reset Sorting / Create New Event

Expand/Collapse Additional Information

Event List

Details	Category	E-ID	Start Date	End Date	Rank	Comments	Status	Created By	Created On	Last Modified	Edit
Event Info	General	7	01Apr07	02Apr07	Investigating	1	Open		04Apr07 12:59 PM CDT	04Apr07 12:59 PM CDT	Edit
Event Description:	This is a test event only!										
Event Info	General	6	04Apr07	04Apr07	Info	2	Open		04Apr07 12:18 PM CDT	04Apr07 12:19 PM CDT	Edit
Event Description:											
Event Info	Multi-Syndrome	5	04Apr07	04Apr07	Info	1	Open		04Apr07 12:16 PM CDT	04Apr07 12:18 PM CDT	Edit
Event Description:											
Event Info	Neuro	4	15Mar07	17Mar07	Investigating	1	Open		19Mar07 01:56 PM CDT	19Mar07 02:01 PM CDT	Edit
Event Description:	Three cases of neuro in three days.										
Event Info	Bot_Like	3	02Mar07	02Mar07	Investigating	0	Open		02Mar07 04:26 PM CST	05Mar07 04:54 PM CST	Edit
Event Description:	Testing 2										

ESSENCE - Missouri Event List

Return to the Event List

Reset Sorting / Create New Comment

Event 7: This is a test event only!

Data Source:	ER by Patient
Geography:	
Medical Grouping:	GI
Age:	All

Comments

User / Rank	C-ID	Comment	Created On	Last Modified	Edit	Delete
Amy Kelsey **Responding**	16	Test event only! Add Additional Comment	04Apr07 01:05 PM CDT	04Apr07 01:05 PM CDT	Edit	Delete

Reply with New Comment

Rank Legend
Responding
Investigating
Monitoring
Not Concerned
Info

ESSENCE - Missouri Event List

Return to the Event List

Return to the Event Info for Event 7

Add Additional Comment

Comment:

Add Comment

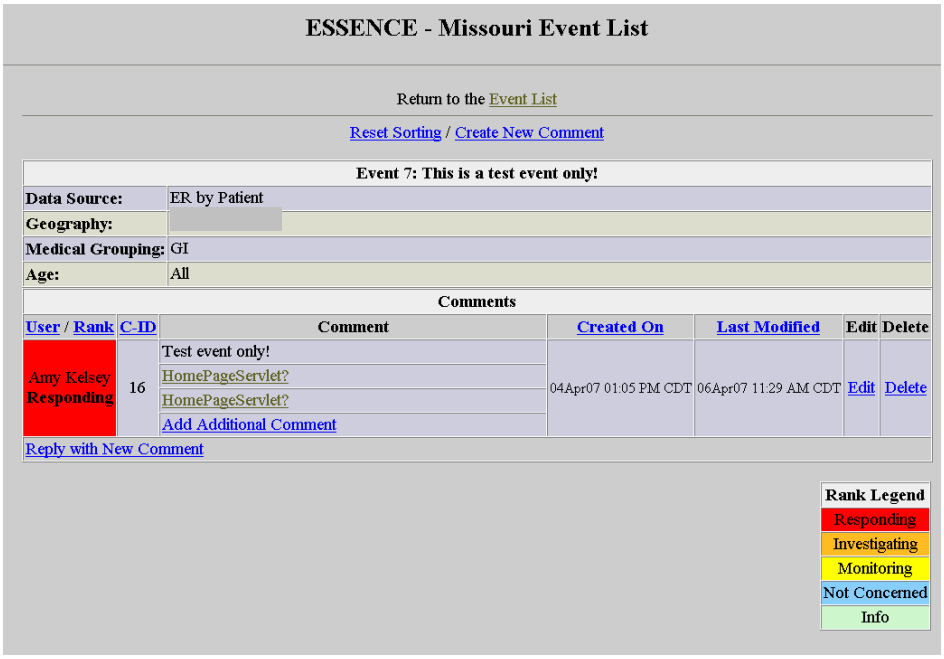
Add Additional URL

URL Label:

URL:

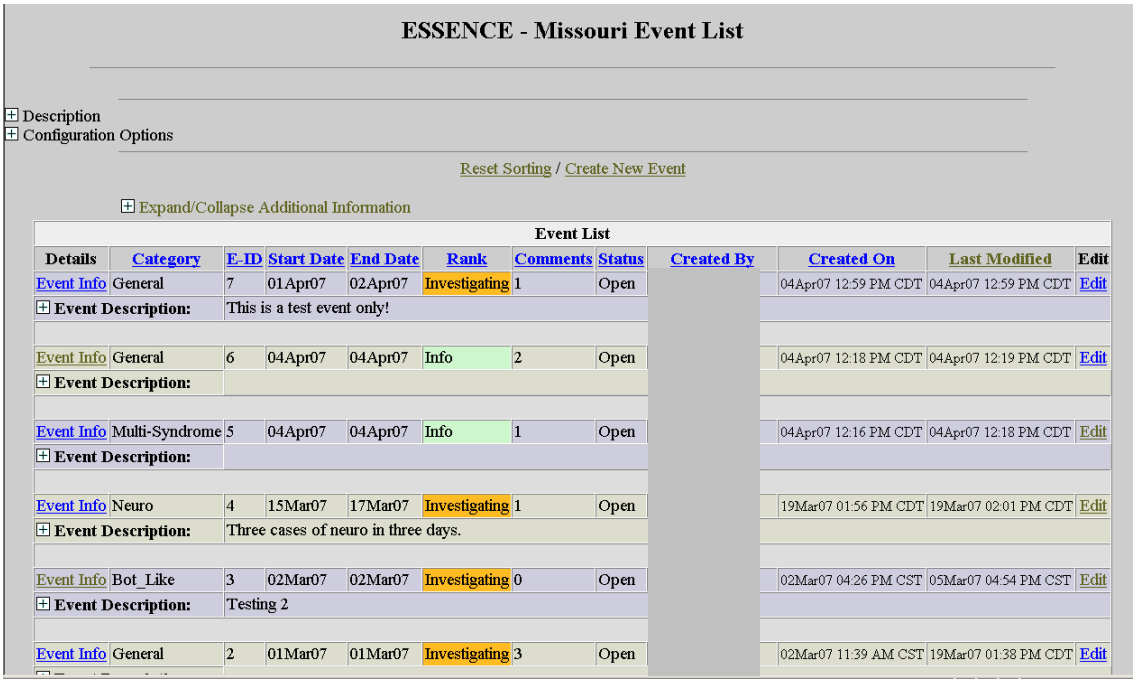
Add URL

Rank Legend
Responding
Investigating
Monitoring
Not Concerned
Info



Responding to an Existing Event

1. Click on Event Info next to the Event you would like to comment on.



ESSENCE - Missouri Event List

⊞ Description
⊞ Configuration Options

Reset Sorting / Create New Event

⊞ Expand/Collapse Additional Information

Event List

Details	Category	E-ID	Start Date	End Date	Rank	Comments	Status	Created By	Created On	Last Modified	Edit
Event Info	General	7	01Apr07	02Apr07	Investigating	1	Open		04Apr07 12:59 PM CDT	04Apr07 12:59 PM CDT	Edit
⊞ **Event Description:**	This is a test event only!										
Event Info	General	6	04Apr07	04Apr07	Info	2	Open		04Apr07 12:18 PM CDT	04Apr07 12:19 PM CDT	Edit
⊞ **Event Description:**											
Event Info	Multi-Syndrome	5	04Apr07	04Apr07	Info	1	Open		04Apr07 12:16 PM CDT	04Apr07 12:18 PM CDT	Edit
⊞ **Event Description:**											
Event Info	Neuro	4	15Mar07	17Mar07	Investigating	1	Open		19Mar07 01:56 PM CDT	19Mar07 02:01 PM CDT	Edit
⊞ **Event Description:**	Three cases of neuro in three days.										
Event Info	Bot_Like	3	02Mar07	02Mar07	Investigating	0	Open		02Mar07 04:26 PM CST	05Mar07 04:54 PM CST	Edit
⊞ **Event Description:**	Testing 2										
Event Info	General	2	01Mar07	01Mar07	Investigating	3	Open		02Mar07 11:39 AM CST	19Mar07 01:38 PM CDT	Edit

2. Click on Reply with New Comment to post your information, suggestions, or actions taken in response to the event.

ESSENCE - Missouri Event List

Return to the Event List

Reset Sorting / Create New Comment

Event 7: This is a test event only!

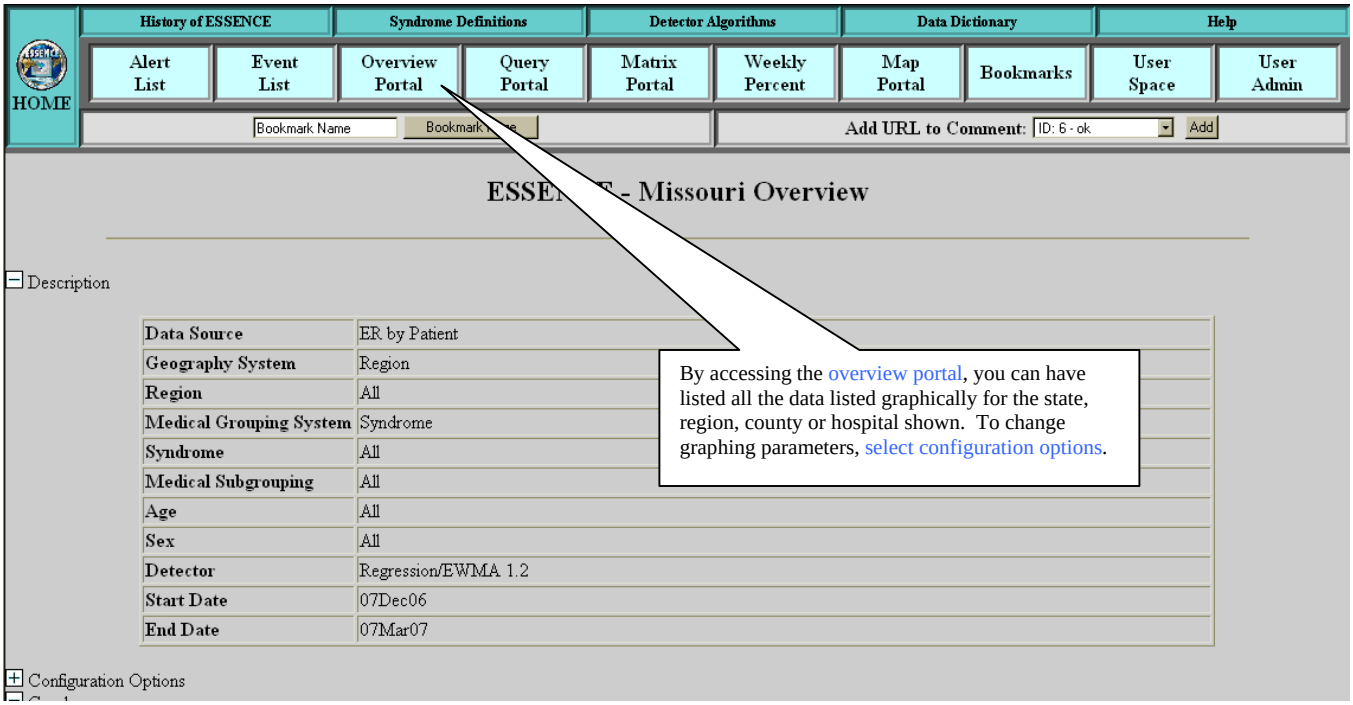
Data Source:	ER by Patient
Geography:	
Medical Grouping:	GI
Age:	All

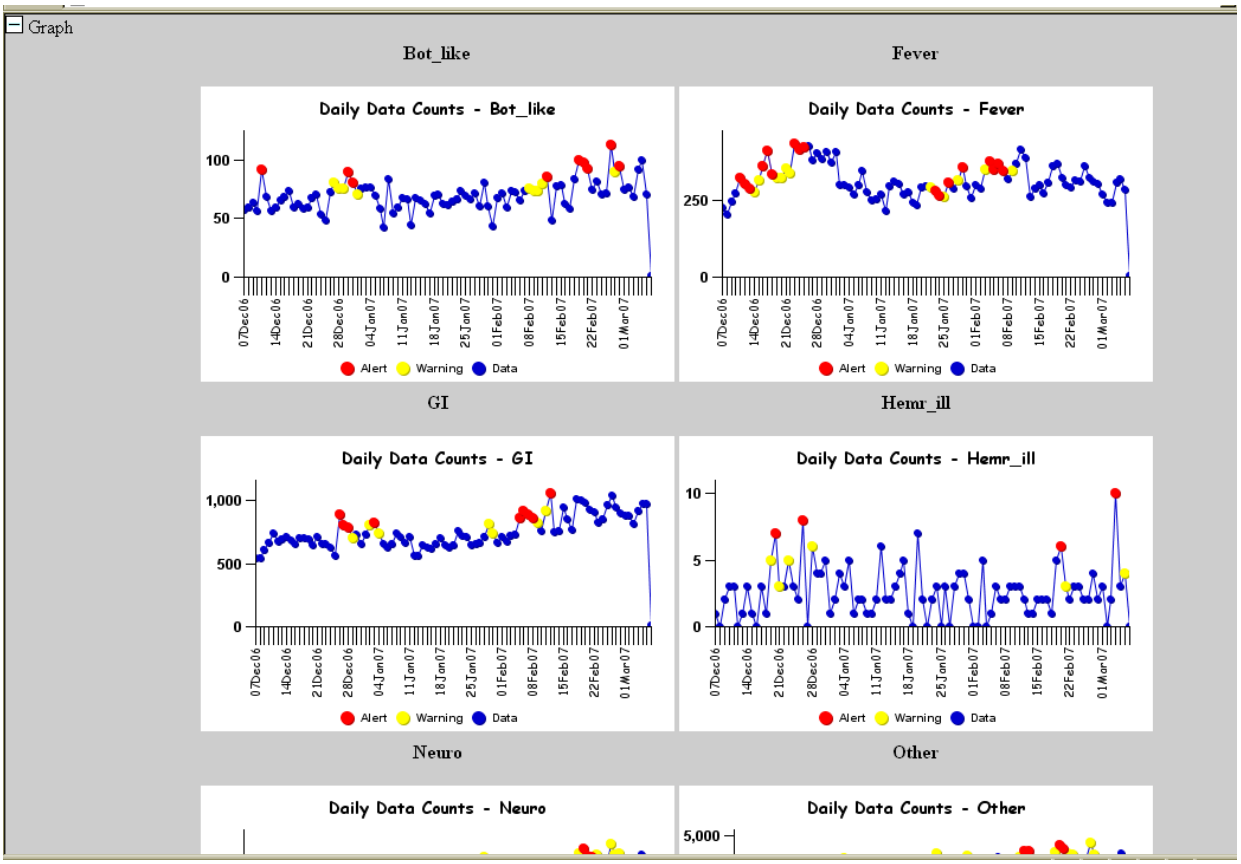
Comments

User / Rank	C-ID	Comment	Created On	Last Modified	Edit	Delete
Amy Kelsey **Responding**	16	Test event only! HomePageServlet? HomePageServlet? Add Additional Comment	04Apr07 01:05 PM CDT	06Apr07 11:29 AM CDT	Edit	Delete

Reply with New Comment

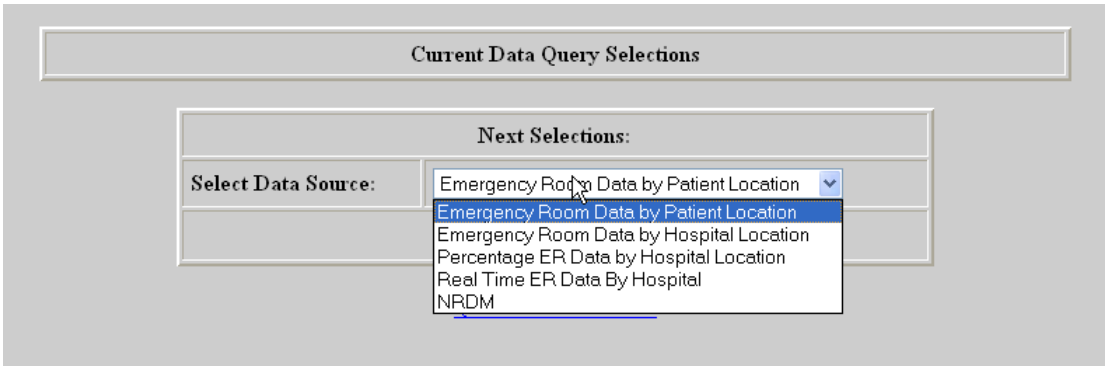
Rank Legend
Responding
Investigating
Monitoring
Not Concerned
Info

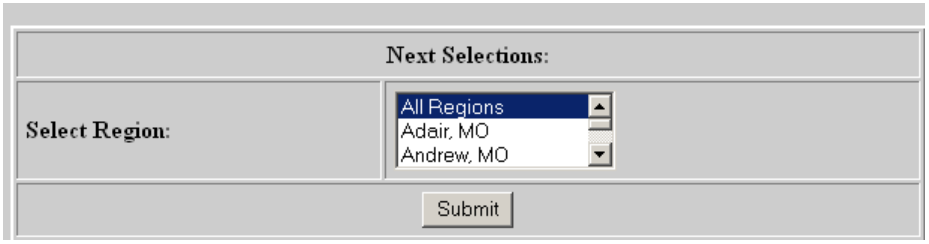




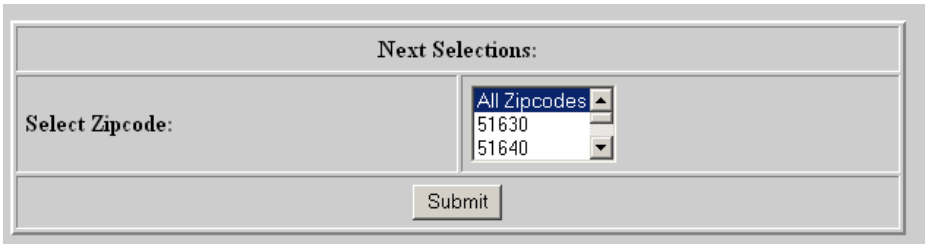
Query Portal

Clicking the Query Portal icon allows you to perform various searches of Missouri data in ESSENCE. Your search parameters are chosen in a logical order (data source, geography, medical grouping, and finally chief complaint, age group, gender, and date range). ***Real-time data is currently not available for your use in this or other areas of ESSENCE.***

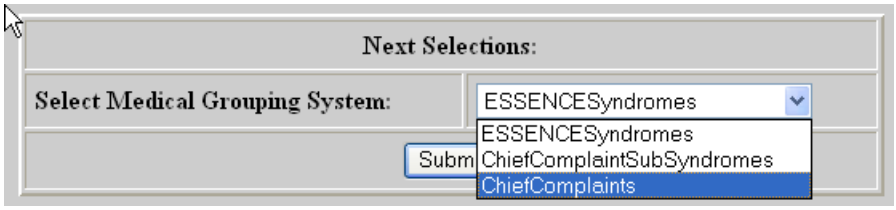


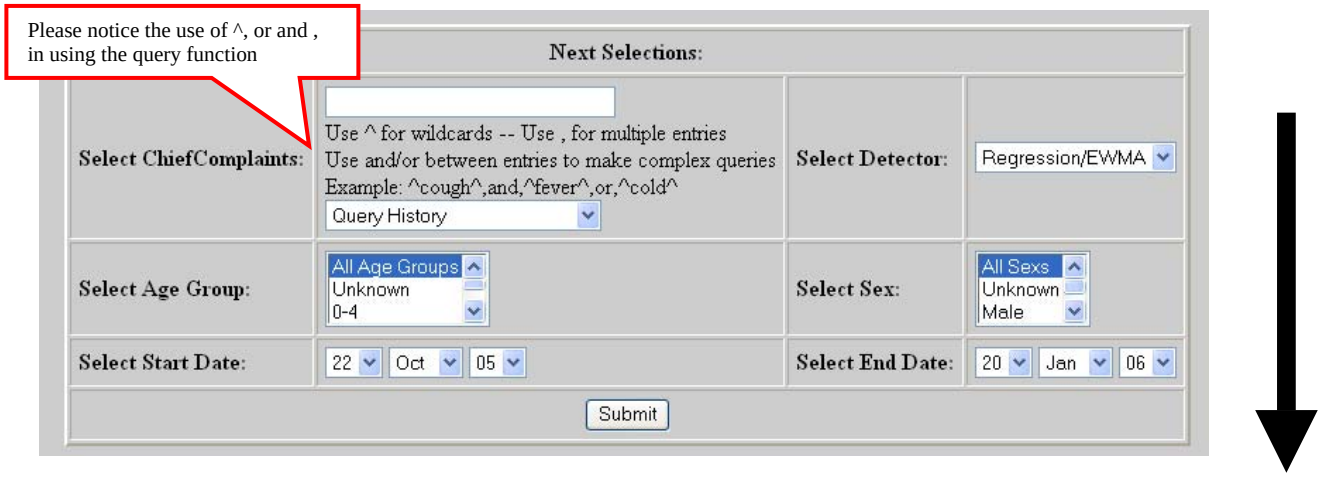


or



Note: to choose multiple counties or zip codes, hold the control key down and click on choices.

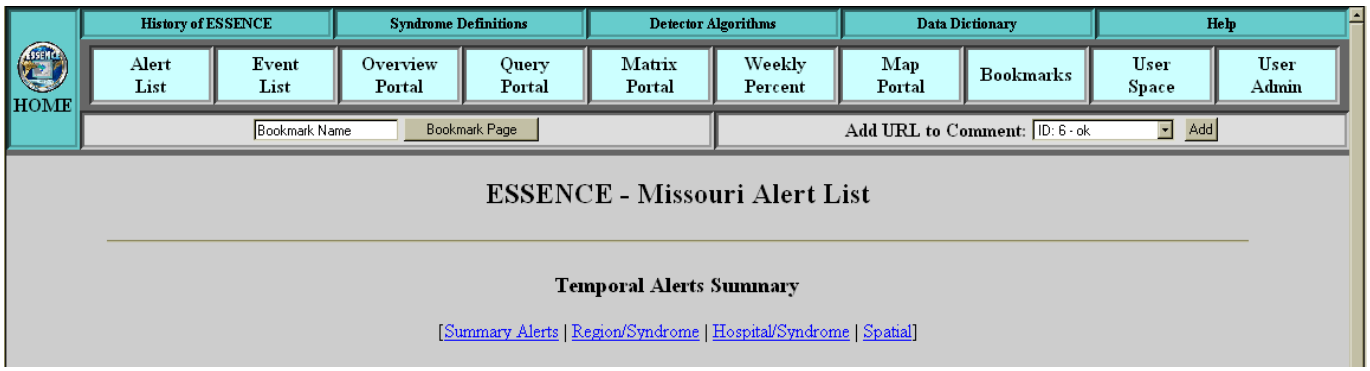




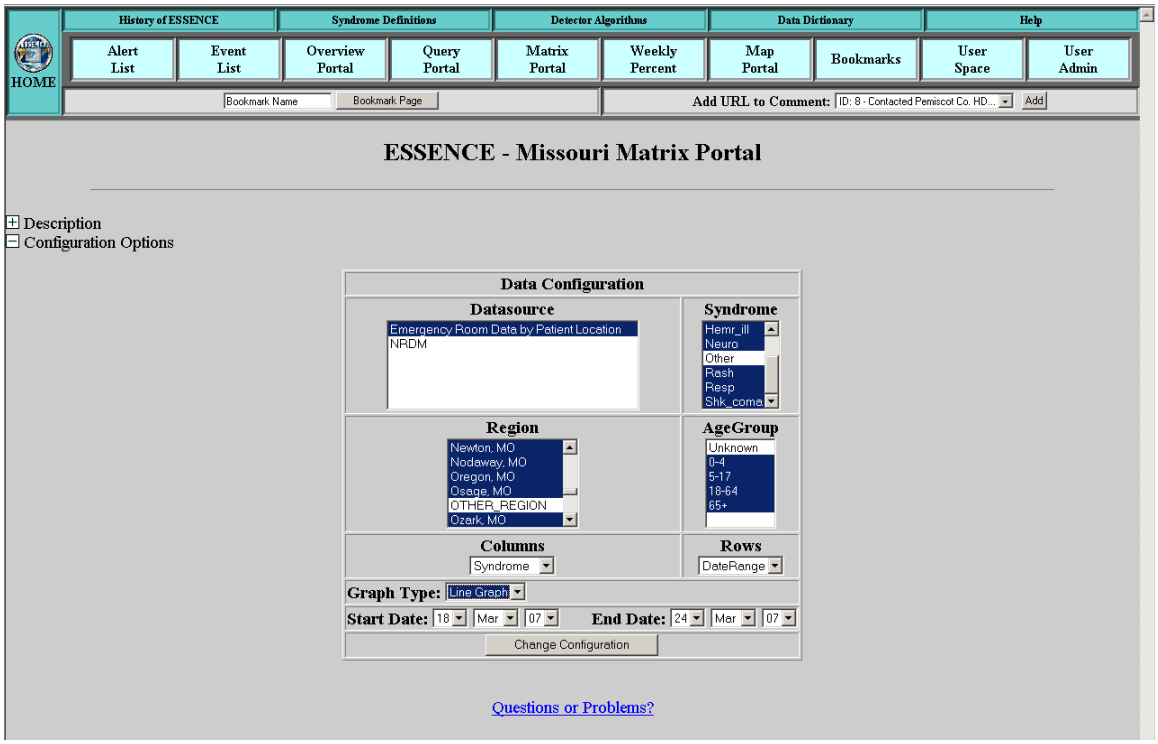
Matrix Portal

1. Click on the Matrix Portal icon, this will allow you to create a custom report for ER data by patient location along with a bar chart or line graph. Below is one example of a line graph, but many different line graphs and bar charts can be created using this feature.

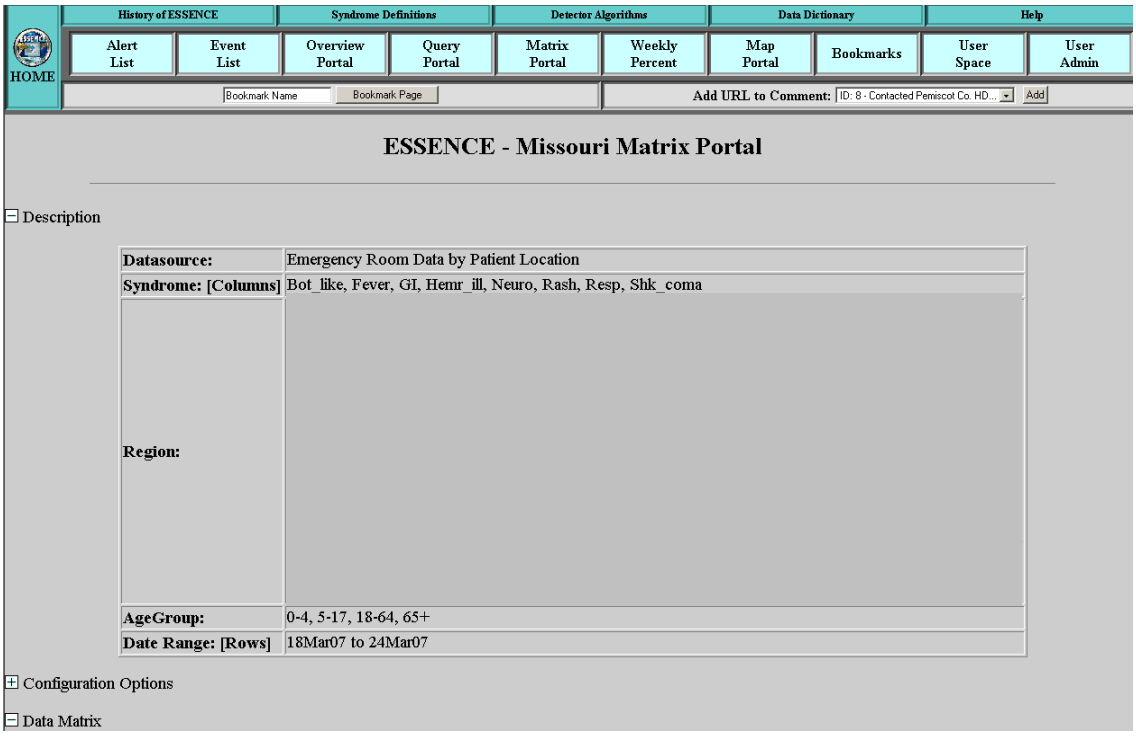
Note: This feature is currently not available for ER by Hospital Location and is therefore not available for hospital staff to use.



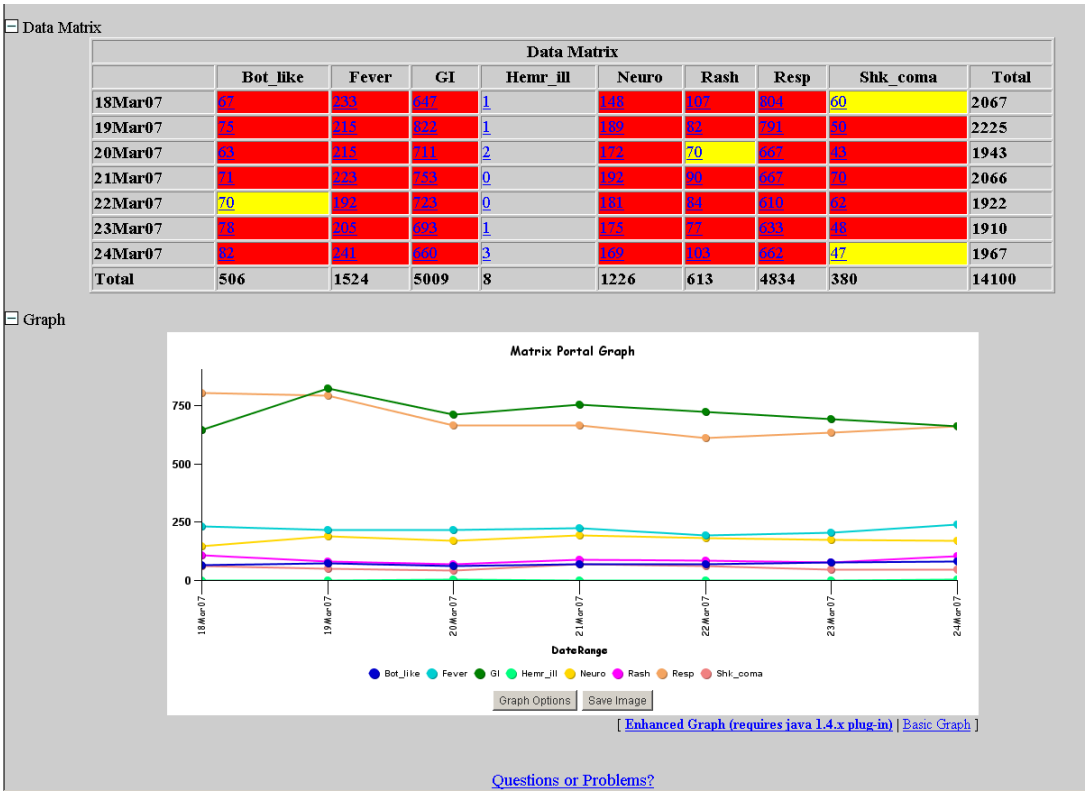
2. To create a line graph that shows all ER visits for Missouri by syndrome and date in a particular week, first select “Emergency Room Data by Patient Location” in Datasource. Then, use your mouse to select all syndromes and the control button to de-select “Other”, and then select all age groups, and all regions. You can de-select “Other Region” to eliminate non-Missouri residents if you wish. In the columns category, select Syndrome and in the rows category, select Date Range. Under graph type, select line graph. In the start date and end date section enter the time period of interest, here it is one full week of data. Click Change Configuration to see the product.



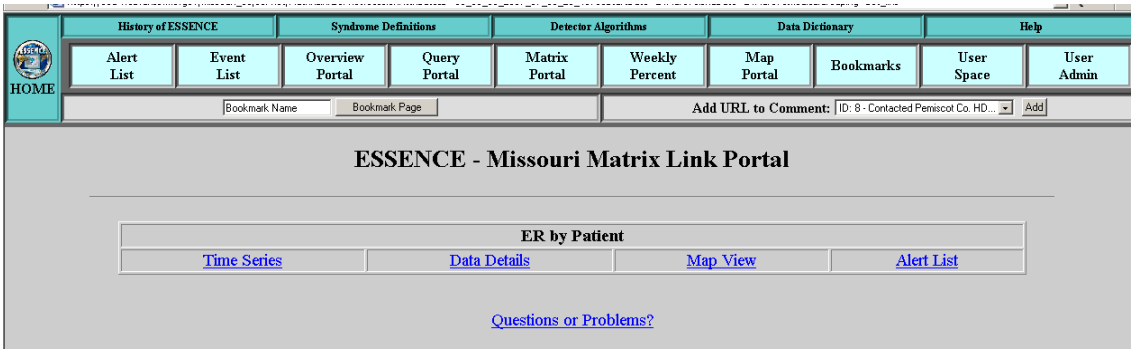
3. At the top of the Matrix Portal page, you will see the description of everything included in the data table below.



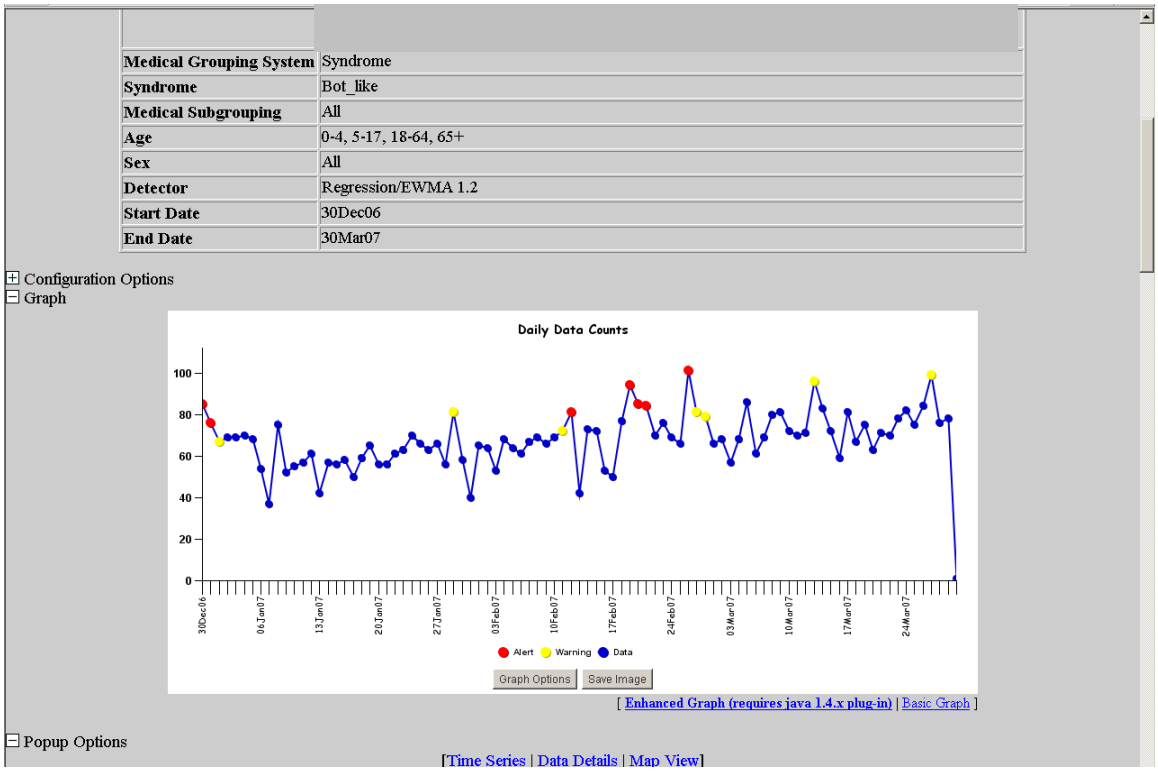
4. Scroll down to see the Data Matrix and Line Graph. The Data Matrix shows all of the cells in which a red or yellow alert has occurred for at least one age group. The Matrix Portal Graph is a line graph that shows the trend in each syndrome during the week among all ages, all counties for the state of Missouri.



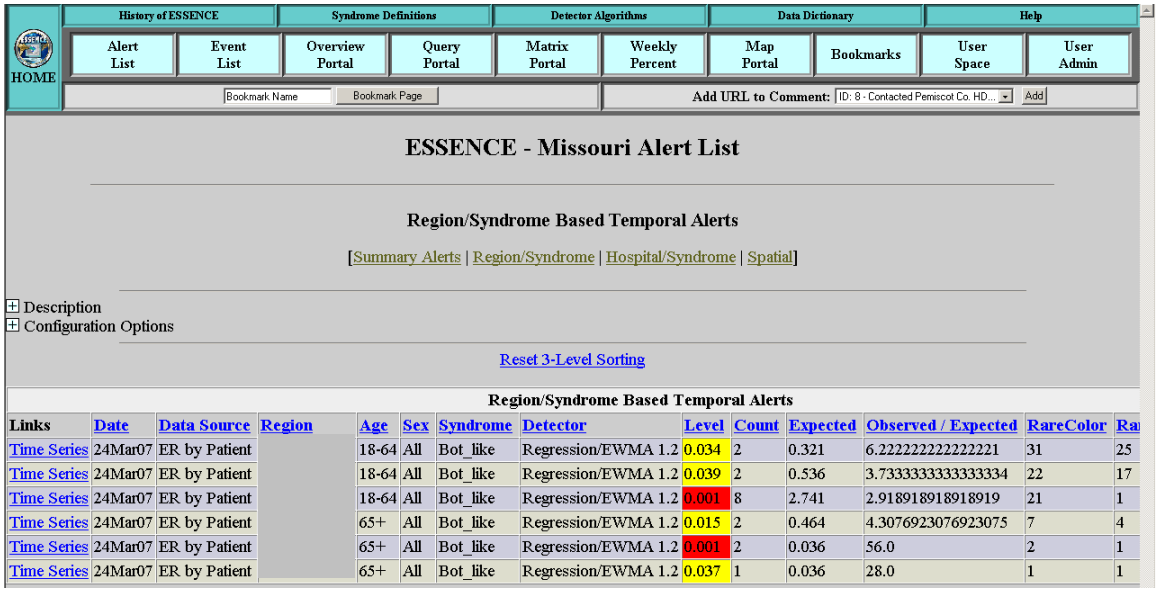
By clicking on a cell within the Data Matrix, you can see details on each syndrome and date. In this example, click on Bot-Like from March 24, 2007. The Missouri Matrix Link Portal appears and you can select among several options including: Time Series, Data Details, Map View, and Alert List.



5. By selecting the Time Series option, you can see the time series for the last three months of available data, including the time period selected within the Matrix Portal options. By selecting Data Details (not shown) you will get pie charts, bar charts, and the chief complaints list for the last date entered in the Matrix Portal options, similar to any data details page. By selecting the Map View (not shown) you will get a map for the specified syndrome and time period.

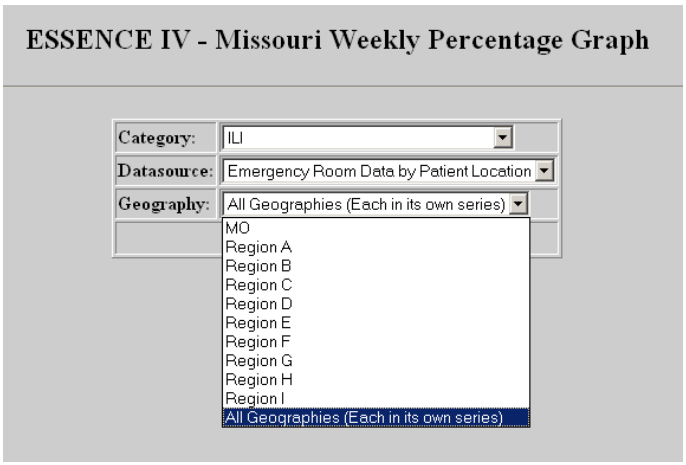


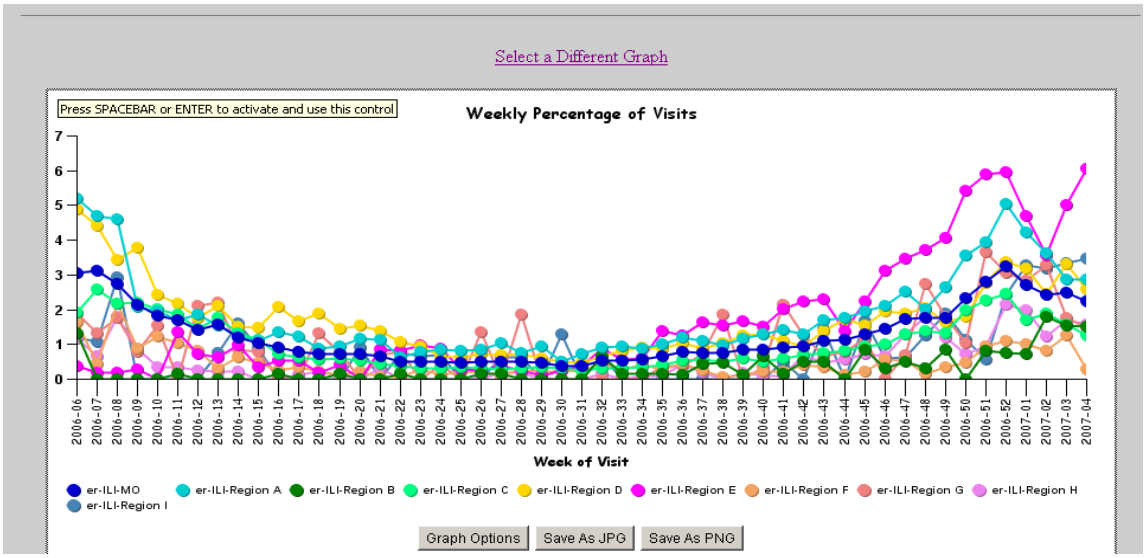
By selecting the Alert List option, you can view which age groups flagged for Bot-Like Syndrome on March 24, 2007. The highest alert level for any age group is red, which is why the call for this syndrome on this date was red in the Data Matrix.



Weekly Percent

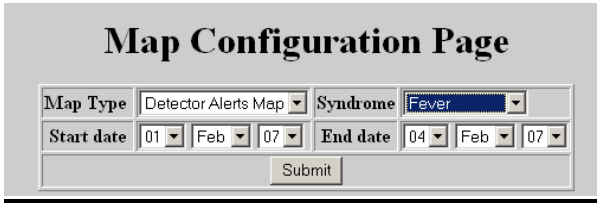
Clicking on the Weekly % icon allows you to view the percentage of syndromic cases that fall into the Influenza-Like Illness category during a given week as a percent of total emergency department visits. You can choose ILI from the drop-down, then choose Missouri, a single district, or “all”.

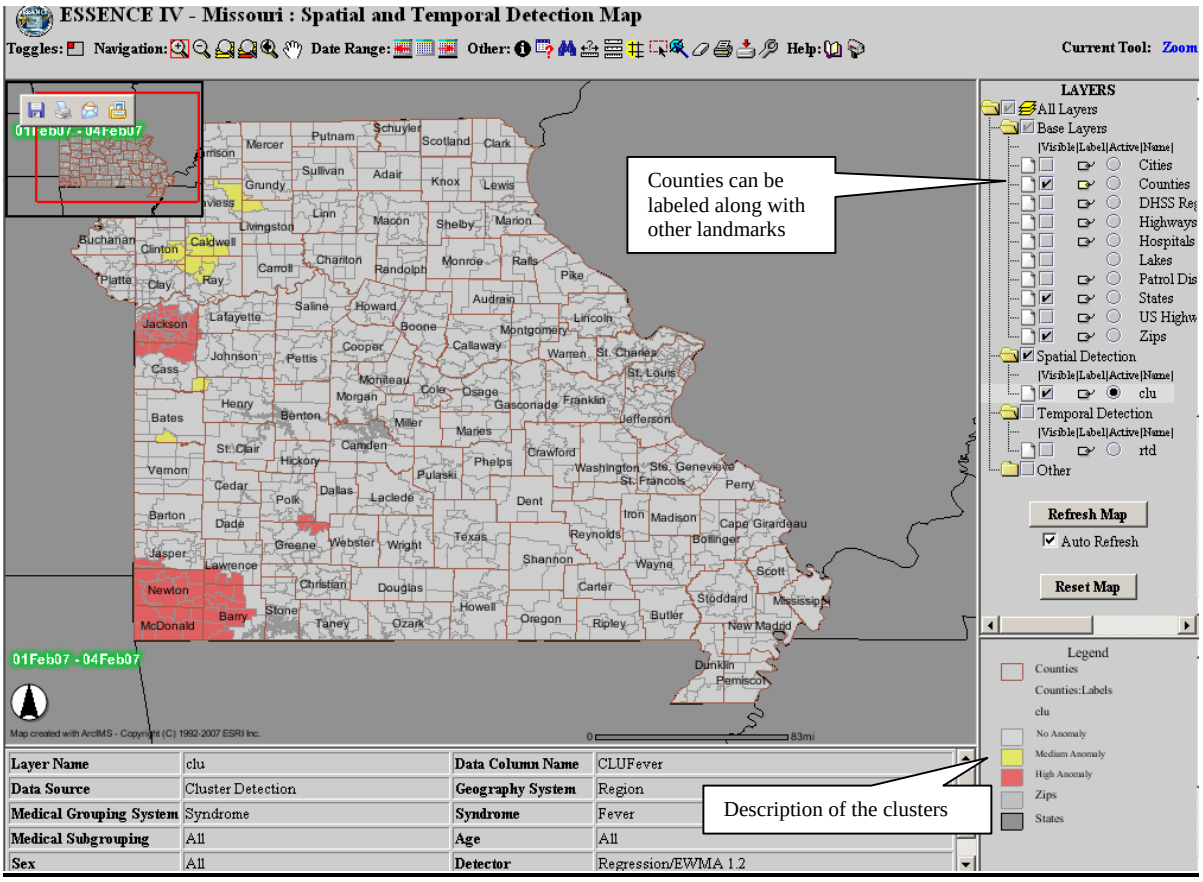


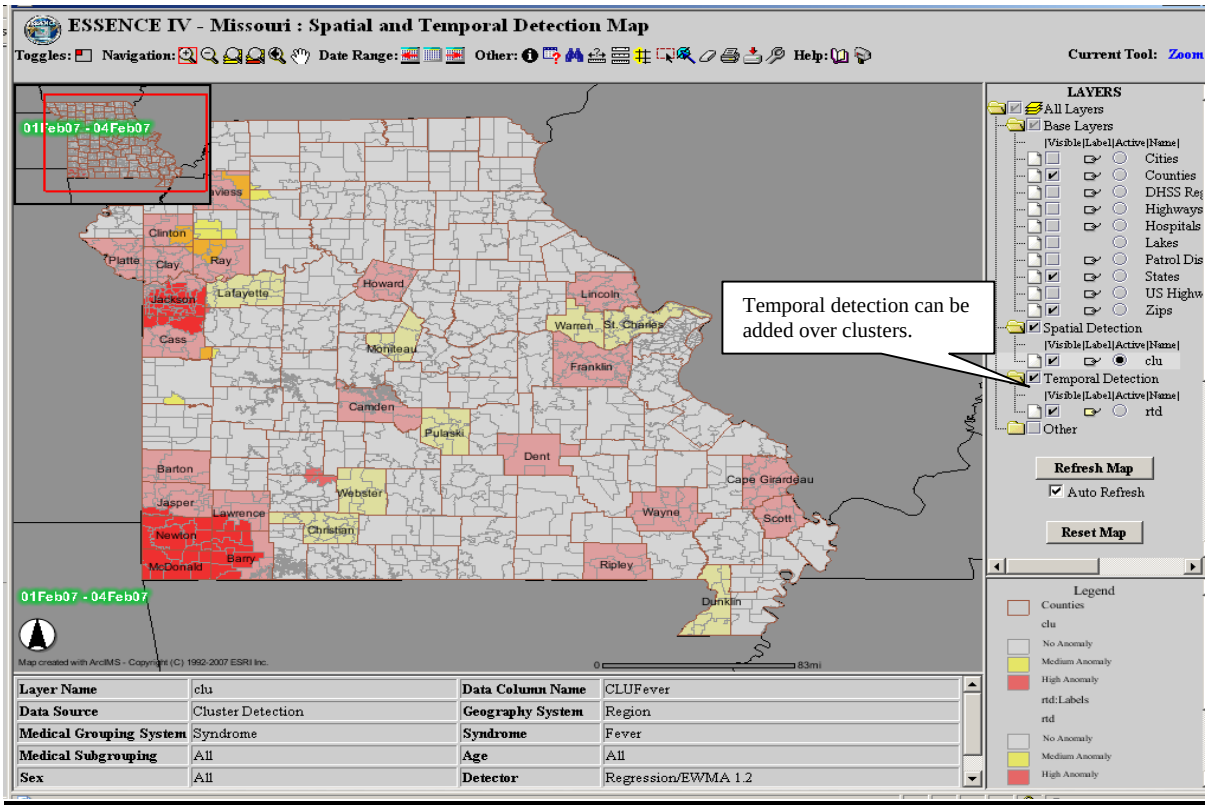


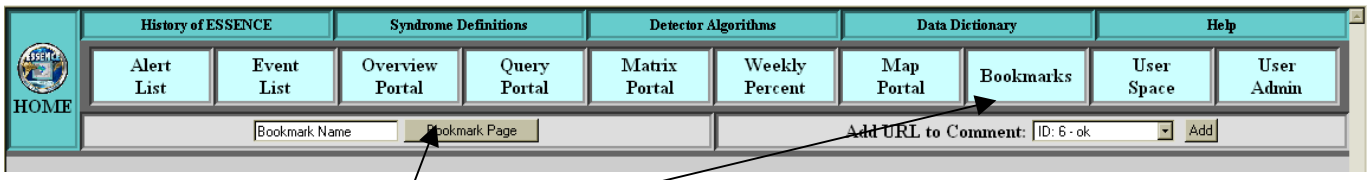
Map Portal

Clicking on Map Portal allows you create, in two steps, a statewide map depicting all data or just alert data for all syndromes or single syndromes. The map can then be manipulated (zoom, zip codes, etc) as necessary. This is the most powerful tool for creating maps.




ESSENCE IV - Missouri : Spatial and Temporal Detection Map
Toggles: Navigation: Date Range: Other: Help: Current Tool: Zoom
01Feb07 - 04Feb07
Counties can be labeled along with other landmarks
LAYERS
All Layers
Base Layers
Cities
Counties
DHSS Re
Highways
Hospitals
Lakes
Patrol Dis
States
US Highw
Zips
Spatial Detection
clu
Temporal Detection
rtd
Other
Refresh Map
Auto Refresh
Reset Map
Legend
Counties
Counties:Labels
clu
No Anomaly
Medium Anomaly
High Anomaly
Zips
States
Layer Name | clu | Data Column Name | CLUFever
Data Source | Cluster Detection | Geography System | Region
Medical Grouping System | Syndrome | Syndrome | Fever
Medical Subgrouping | All | Age | All
Sex | All | Detector | Regression/EWMA 1.2
Description of the clusters


ESSENCE IV - Missouri : Spatial and Temporal Detection Map
Toggles: Navigation: Date Range: Other: Help: Current Tool: Zoom
01Feb07 - 04Feb07
Temporal detection can be added over clusters.
LAYERS
All Layers
Base Layers
Cities
Counties
DHSS Re
Highways
Hospitals
Lakes
Patrol Dis
States
US Highw
Zips
Spatial Detection
clu
Temporal Detection
rtd
Other
Refresh Map
Auto Refresh
Reset Map
Legend
Counties
clu
No Anomaly
Medium Anomaly
High Anomaly
rtd:Labels
rtd
Layer Name | clu | Data Column Name | CLUFever
Data Source | Cluster Detection | Geography System | Region
Medical Grouping System | Syndrome | Syndrome | Fever
Medical Subgrouping | All | Age | All
Sex | All | Detector | Regression/EWMA 1.2



The Bookmark Page feature allows the user to save searches and use the same criteria to recover data on a daily, weekly or as-needed basis without doing the stepwise work. When saving a search, name the search and select the Bookmark Page icon. When accessing these criteria at a future time, use the Bookmarks icon to recall the saved search.

Missouri ESSENCE Alert Investigation Process

Interpretation

As you have seen so far, ESSENCE software identified clusters within various syndromic and age groups for hospitals or geographic areas and flags them red or yellow. ***However, the majority of these flags do not constitute an event of public health importance.*** For this reason, it is up to the user to distinguish between statistical anomalies and potential public health threats when determining whether a follow-up, investigation, or response is warranted. The goal is to respond in a timely manner to actual health threats and to avoid false alarms. *Appendix A provides a flow chart for the proposed alert investigation process.*

View the potential event using all Missouri Alert List features:

1. View the hospital(s) that most or all patients involved in the region/syndrome alert visited to see if the increase in cases is due to the addition of a new hospital to Missouri ESSENCE (this occurs often) or a suspected error in the data feed coming from the hospital (rare, but can occur). Please report any suspected data errors to us: ESSENCE@dhss.mo.gov.
2. Similarly, a significant cluster in a particular county may not show up the cases among the view available at the Hospital/Syndrome level.
3. Summary alerts including the Event Communication tier of asterisks may show whether your colleagues have been commenting, following up, or responding to events.
4. Spatial alerts can be viewed to determine whether the system has found spatial patterns across jurisdictions.

Factors to Consider When Interpreting Flags:

1. Time period: The internal DHSS ESSENCE alert investigation process requires that (in the absence of other factors or information) a region/syndrome or hospital/syndrome must flag (red) for two days in a row for the same syndrome and hospital or region/group of regions plus additional examination (see below) to trigger the **Hospital Communications Procedure**. Users at the local and regional level may determine that an alert on one day is worthy of follow up based on knowledge about what is "normal" for their jurisdiction.
2. Number of cases: In some situations one or two cases will flag, but do not necessarily justify a public health response.
3. Magnitude: Consider the p-value and/or the difference between observed and expected values.
4. Demography: Look for a pattern by age, age group, sex, or geographic area.
5. Subsyndromes or chief complaint text: Look for a pattern within the syndrome group (e.g., most of the cases involve vomiting) or keywords that suggest an event (e.g., food poisoning).

6. Chief complaints or subsyndromes most typically associated with non-outbreak illness such as headache, seizure, weakness, and dizziness.
7. Knowledge of what is normal for your community or local information.
8. Increased level of awareness due to national or state events: food recall, nationwide outbreak, increased terror alert level.

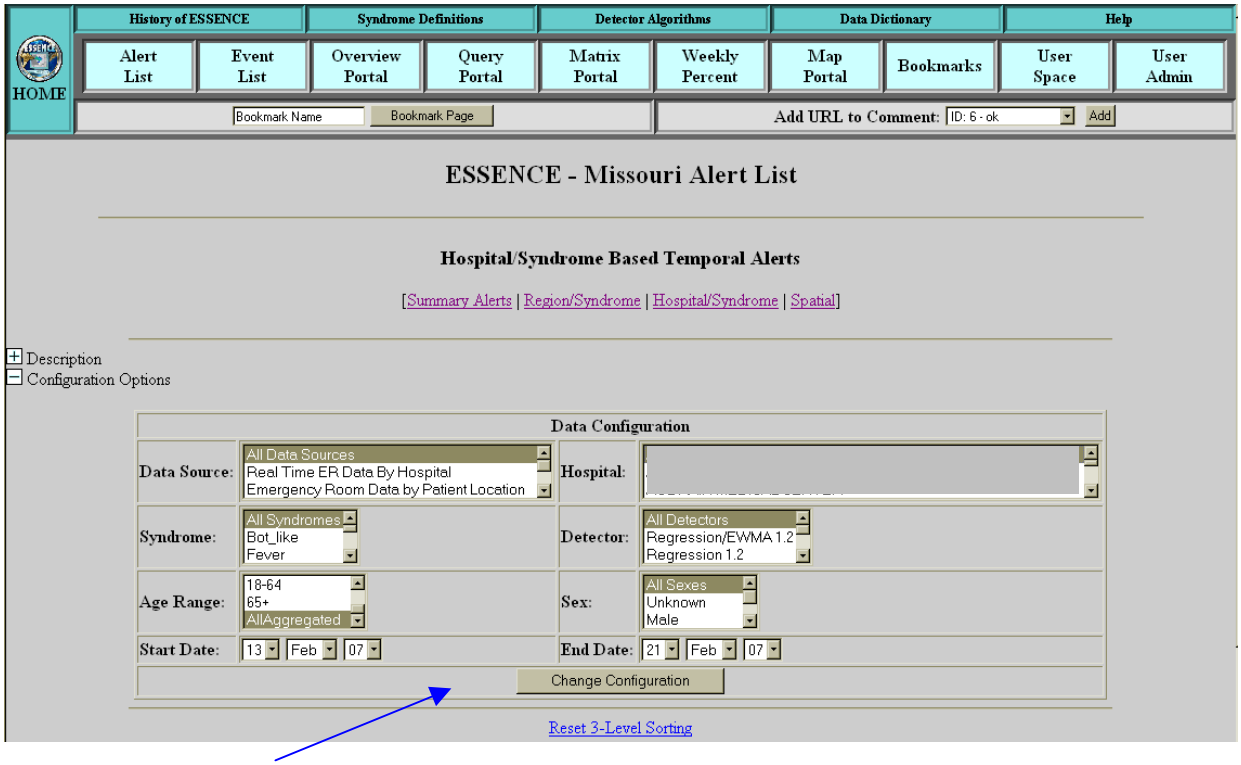
Help with Interpretation:

Please contact the Senior Epidemiologist for your region if you have questions about how to interpret Missouri ESSENCE findings (Appendix B). If the Senior Epidemiologist or their staff are not available, please feel free to contact us at ESSENCE@dhss.mo.gov or (573) 751-6161 to discuss your concerns.

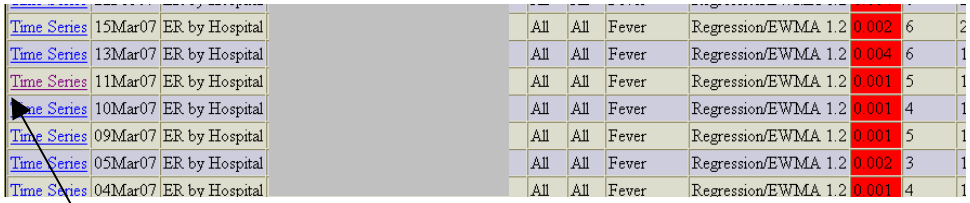
Practical Uses for ESSENCE

Example 1: ***Investigating a flag for a reporting hospital***

Beginning at the main ESSENCE screen, select the Alert List icon. For investigating individual hospitals, select the Hospital/Syndrome icon under the Temporal Alerts. Depending upon the access granted, this will list all statewide providers or an individual hospital or hospital network. By selecting the Configuration Options icon in the left margin, the user is able to change the parameters to an individual's needs.

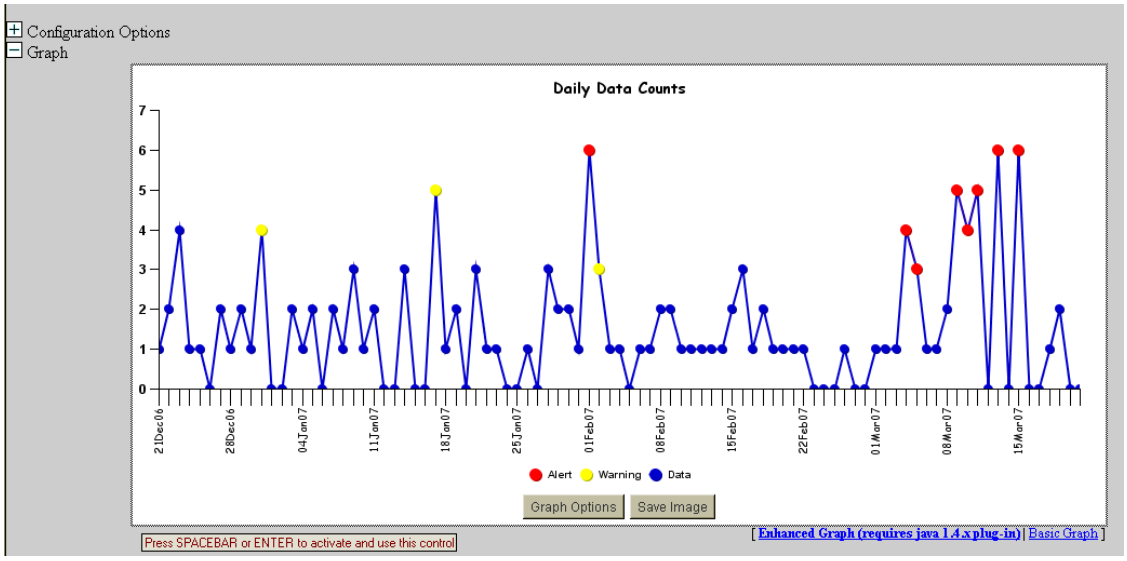


By selecting the Change Configuration button, the individual flagging reports will be listed as seen below. To organize these, select the Syndrome icon to list each of the reporting categories chronologically. ***A red flag that persists for two consecutive days is generally investigated further, at least within ESSENCE itself.***



Time Series	15Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.002	6	2
Time Series	13Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.004	6	1
Time Series	11Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.001	5	1
Time Series	10Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.001	4	1
Time Series	09Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.001	5	1
Time Series	05Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.002	3	1
Time Series	04Mar07	ER by Hospital		All	All	Fever	Regression/EWMA 1.2	0.001	4	1

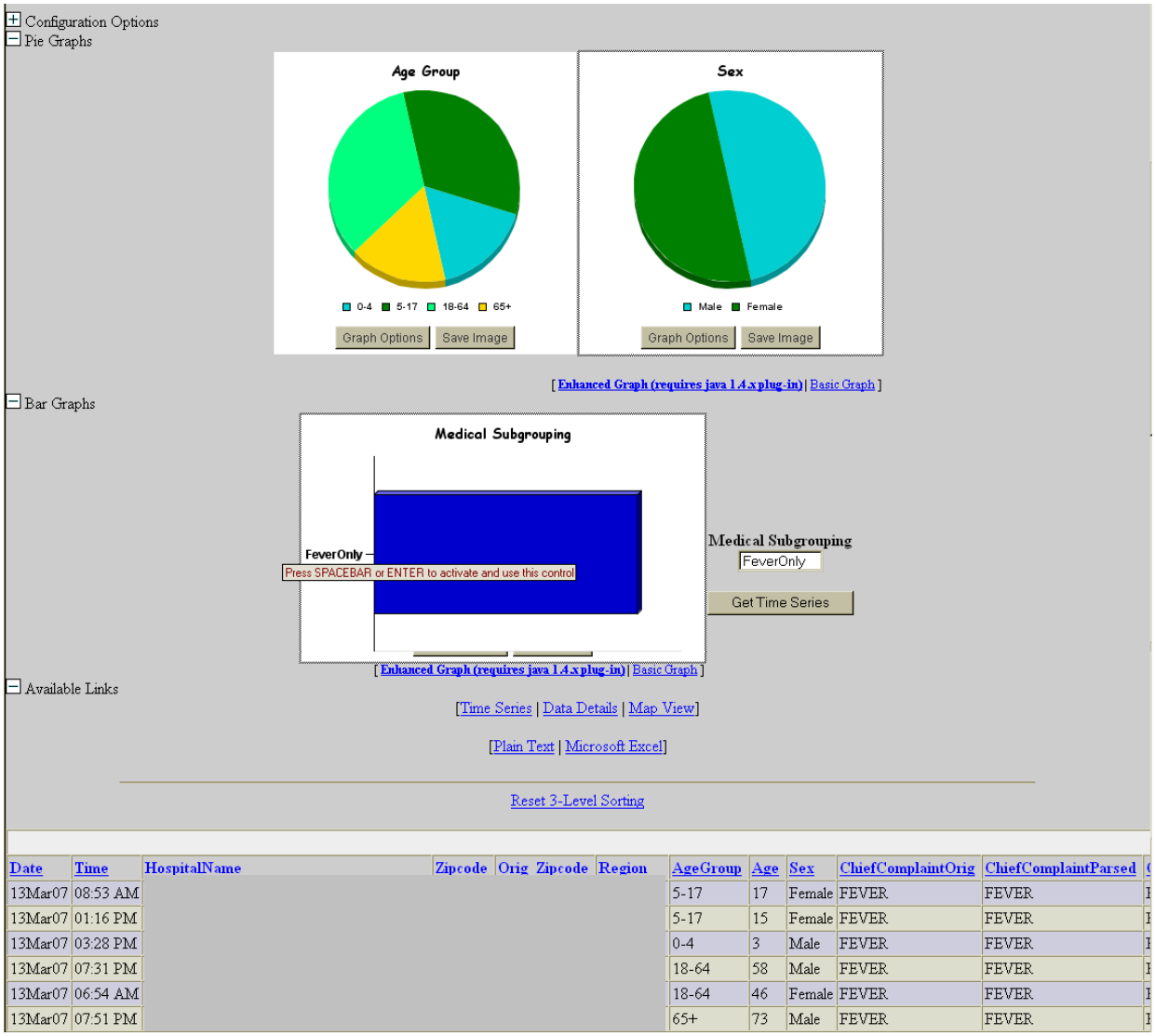
By selecting the time series for a given day, a graph of the syndrome will be given for the period selected previously. The data for each of the time points can be observed by clicking on the individual point on the graph or selecting the individual day (Data Details) listed below the figure.



Data Link	Map Link	Date	Data	Expected	Detection
Data Details	Map View	21Mar07	0	2.421	0.5
Data Details	Map View	20Mar07	0	4.127	0.5
Data Details	Map View	19Mar07	2	2.087	0.54
Data Details	Map View	18Mar07	1	4.21	0.98
Data Details	Map View	17Mar07	0	2.238	0.5
Data Details	Map View	16Mar07	0	3.596	0.5
Data Details	Map View	15Mar07	6	2.224	0.002
Data Details	Map View	14Mar07	0	1.75	0.5
Data Details	Map View	13Mar07	6	1.739	0.004
Data Details	Map View	12Mar07	0	1.609	0.5
Data Details	Map View	11Mar07	5	1.478	0
Data Details	Map View	10Mar07	4	1.478	0.001
Data Details	Map View	09Mar07	5	1.478	0.001
Data Details	Map View	08Mar07	2	1.478	0.328
Data Details	Map View	07Mar07	1	1.409	0.492
Data Details	Map View	06Mar07	1	1.273	0.121
Data Details	Map View	05Mar07	3	1.273	0.002
Data Details	Map View	04Mar07	4	1.038	0

Press SPACEBAR or ENTER to activate and use this control

Data details provides an individualized report for the data that contributed to the flag. Additionally, data on the age and sex of the cumulative data are provided. Descriptive data are also included for each patient in this flag. *For various reasons, data can be imported in duplicate and contribute to abnormally high numbers for a syndrome and result in a flag.* When observing the individualized data, please notice that the sex, ages and age groups are different.

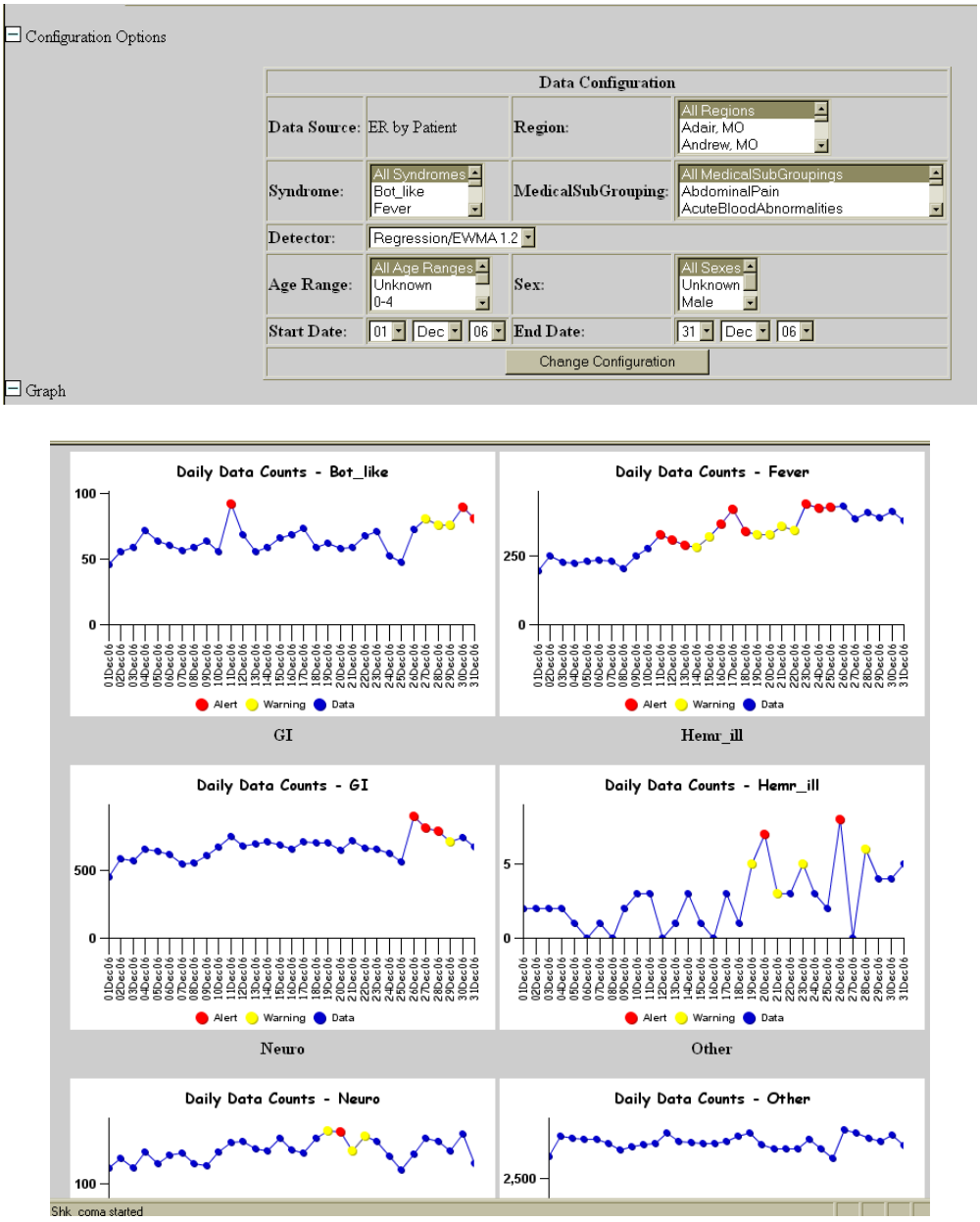


Date	Time	HospitalName	Zipcode	Orig_Zipcode	Region	AgeGroup	Age	Sex	ChiefComplaintOrig	ChiefComplaintParsed
13Mar07	08:53 AM					5-17	17	Female	FEVER	FEVER
13Mar07	01:16 PM					5-17	15	Female	FEVER	FEVER
13Mar07	03:28 PM					0-4	3	Male	FEVER	FEVER
13Mar07	07:31 PM					18-64	58	Male	FEVER	FEVER
13Mar07	06:54 AM					18-64	46	Female	FEVER	FEVER
13Mar07	07:51 PM					65+	73	Male	FEVER	FEVER

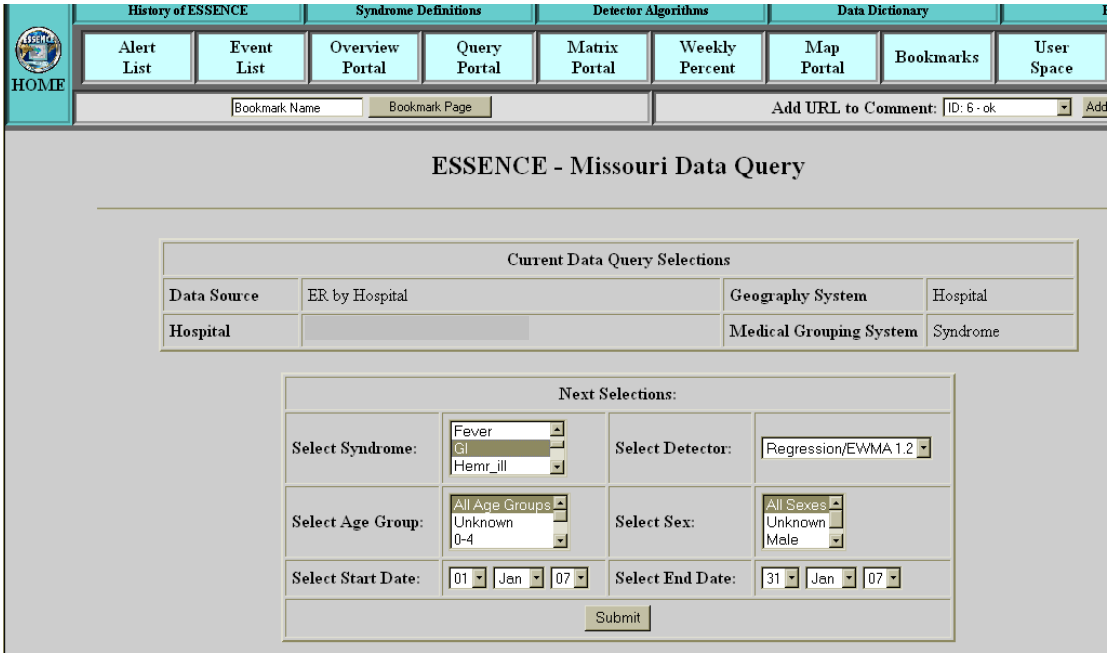
Example 2: ***Using ESSENCE data for creating reports***

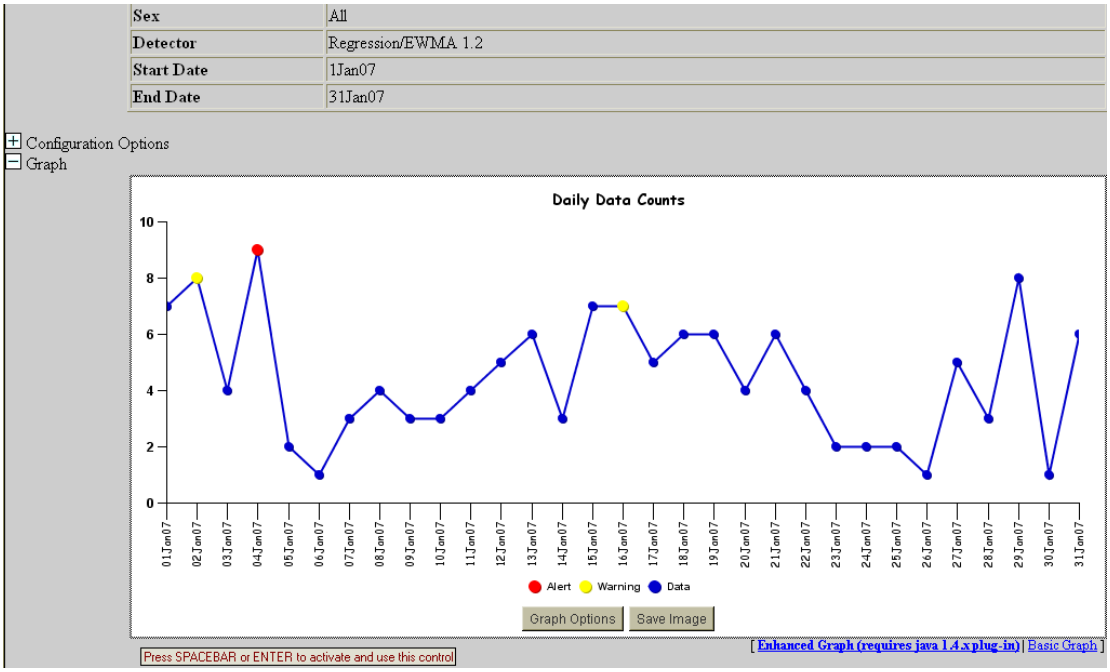
There are many ways you may want to present the data your facility has provided for your internal evaluations. We will illustrate just some of the more common ways this may be done.

State/County/Region Report: The simplest way is to use the Overview Portal on the main ESSENCE page. If you are a hospital user, it appears that this method is not available to you, but this feature will work because your hospital comprises the entire dataset available under your restricted settings. Just select all regions and it will pull the overview report for your hospital. If you have statewide access, you can select all regions to view the entire state, one region only, or you can select one more counties by holding down the "control" button and selecting regions with your mouse.



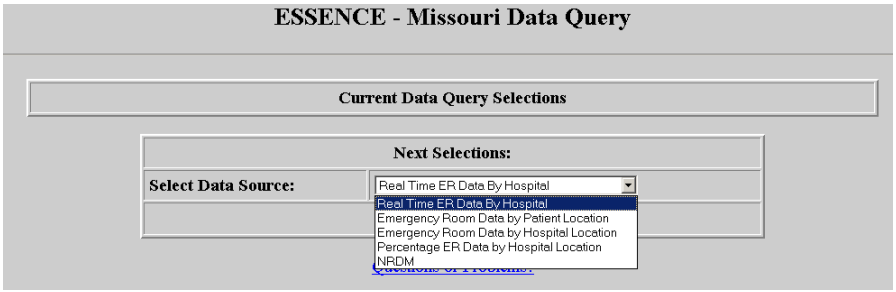
Hospital Reports: Individuals may also elect to use the Query Portal (main page) to create figures representing data for a given facility or region. In a step-wise fashion, you are prompted for data source, geography system, hospital or region/county and the grouping system. Finally, select the syndrome, age, sex and time frame to be examined. The graph will be created, including the individual data points, and may be saved in various formats for inclusion in reports.



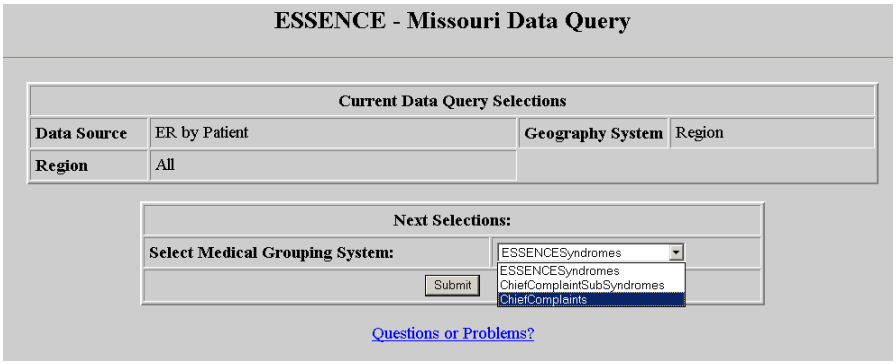


Example 3: Querying Database for Situational Awareness

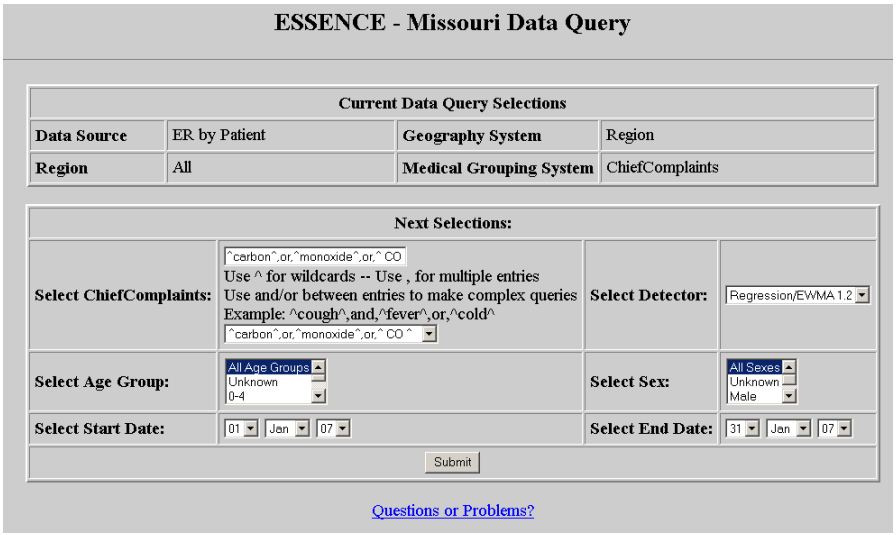
1. Click on the Query Portal icon. You will see five selections in the drop-down box. The first option, Real Time ER Data by Hospital should be avoided because Missouri ESSENCE does not currently have real time capabilities. The next two options, by patient and hospital location are used most commonly. Percentage ER by hospital does function, and you may wish to view it. Missouri does not currently have NRDM (which is National Retail Data Monitor, or over-the-counter drug sales) data.



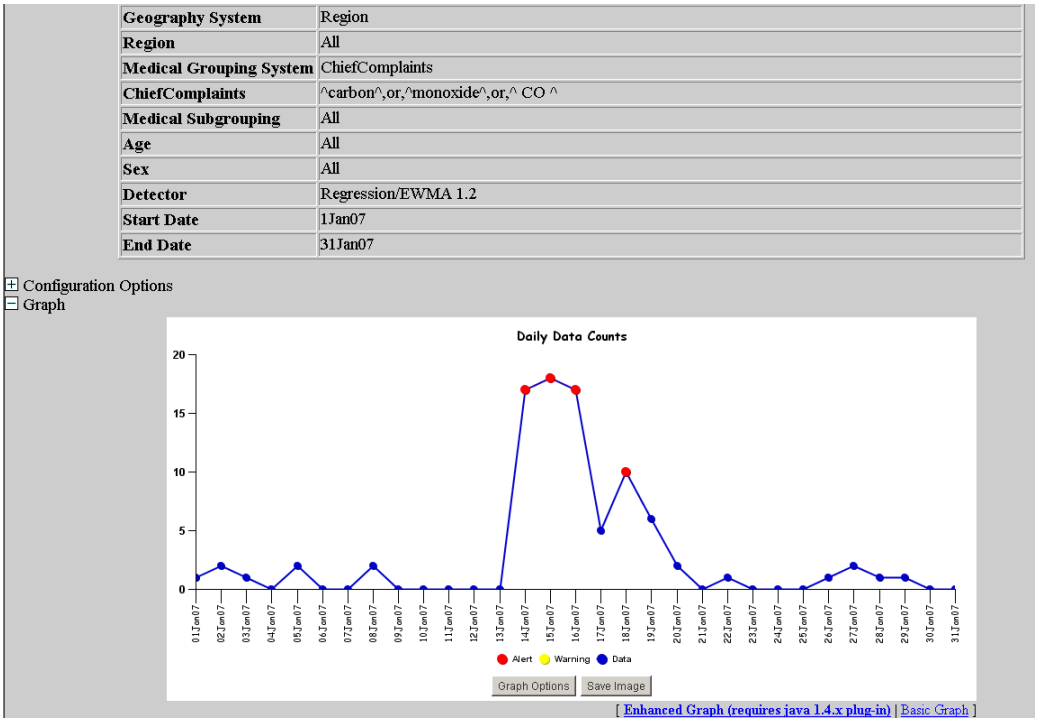
2. In this example, we have heard that power outages across the state are associated with carbon monoxide poisonings due to unsafe attempts at home heating. Select Emergency Room by Patient Location as the Data Source.



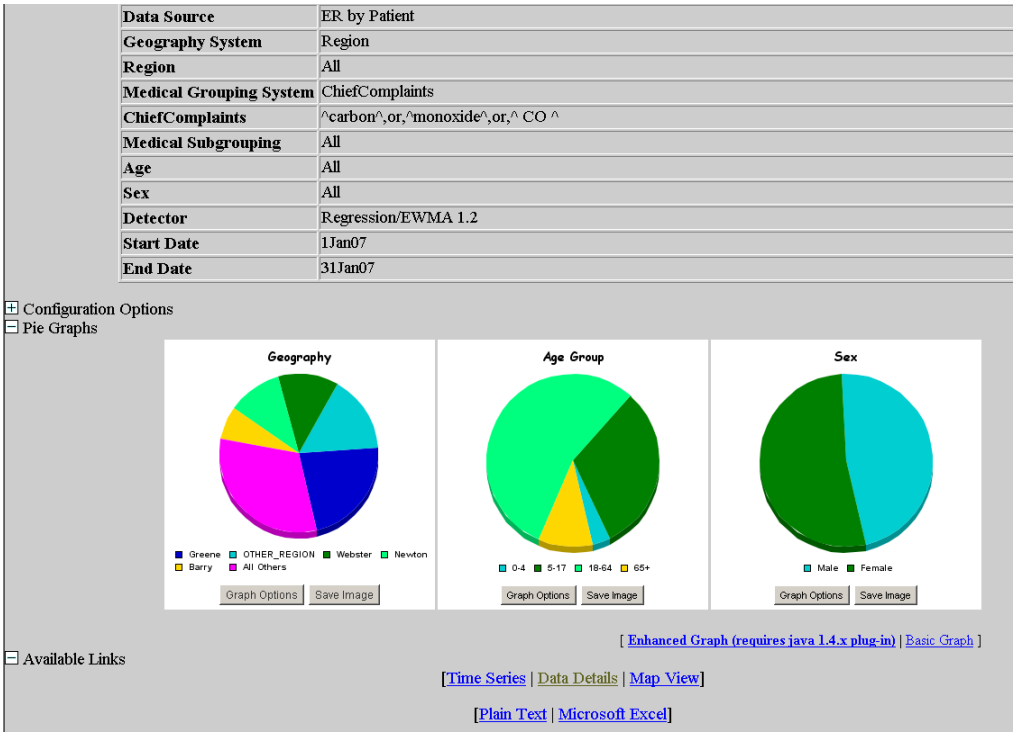
3. Next, use the drop down box next to Medical Grouping System to select Chief Complaints. This allows you to do a free text query.



4. The query tool provides instructions on use of wildcards, commas, etc., and these should be followed for best results. We used "^carbon^,or,^monoxide^,or,^ CO ^" to find cases related to carbon monoxide. Please note that there is a space on either side of CO in order to avoid capturing all words that contain those letters (like cold, colon, etc.). We found that this combination of terms provided the best results through trial and error. This will probably be necessary for any free text query. Also, remember that if the ED record contains a misspelled word, you may not find the case. We selected the month of January and all age groups and sexes.

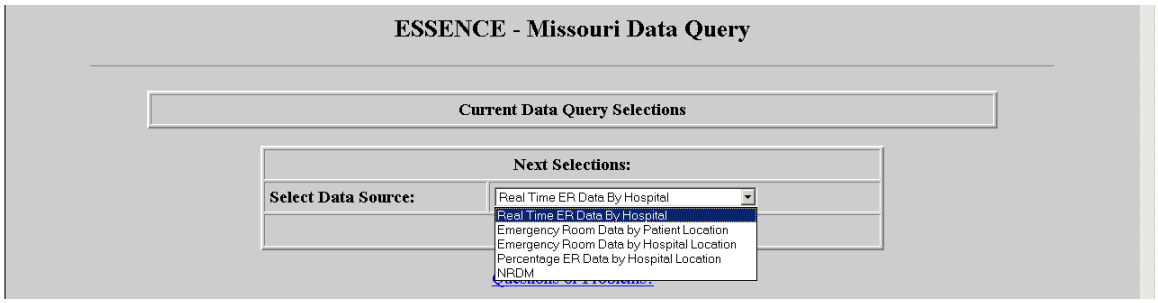


5. The time series shows that there were significantly higher numbers of cases during mid-January than expected. Click on Data Details to see descriptive statistics on these ED visits. This information can be used along with supporting information from other sources to determine whether interventions should be aimed at a particular geographic area and/or demographic group. A map view might also be helpful in this case (not shown).

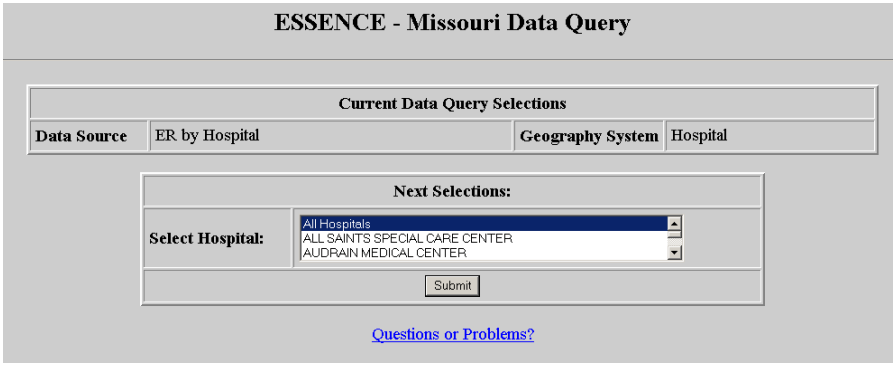


Example 4: Querying Database for Hospital Surveillance

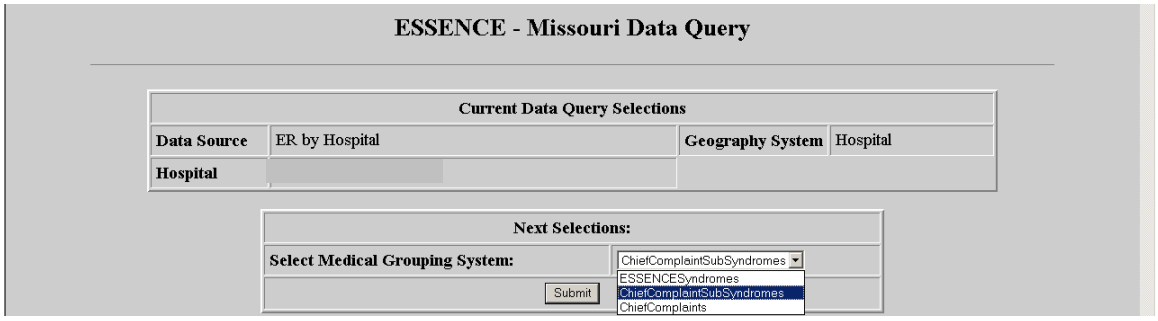
1. Click on Emergency Room data by Hospital Location.



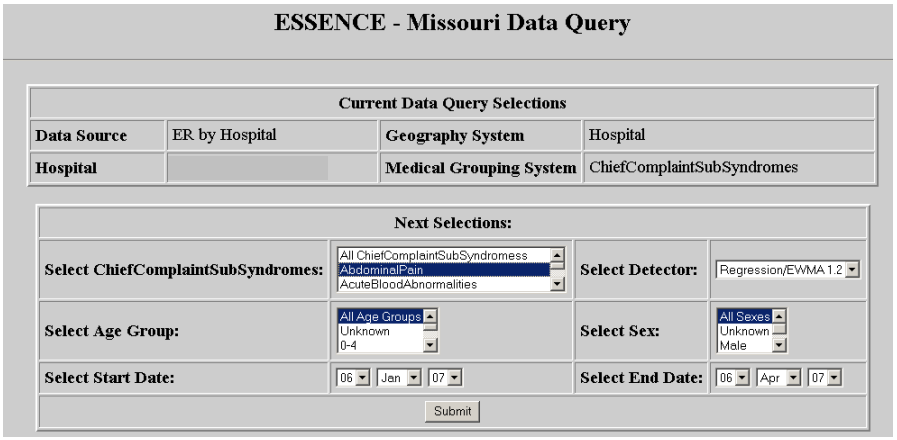
2. Select the hospital of interest from the selection menu.



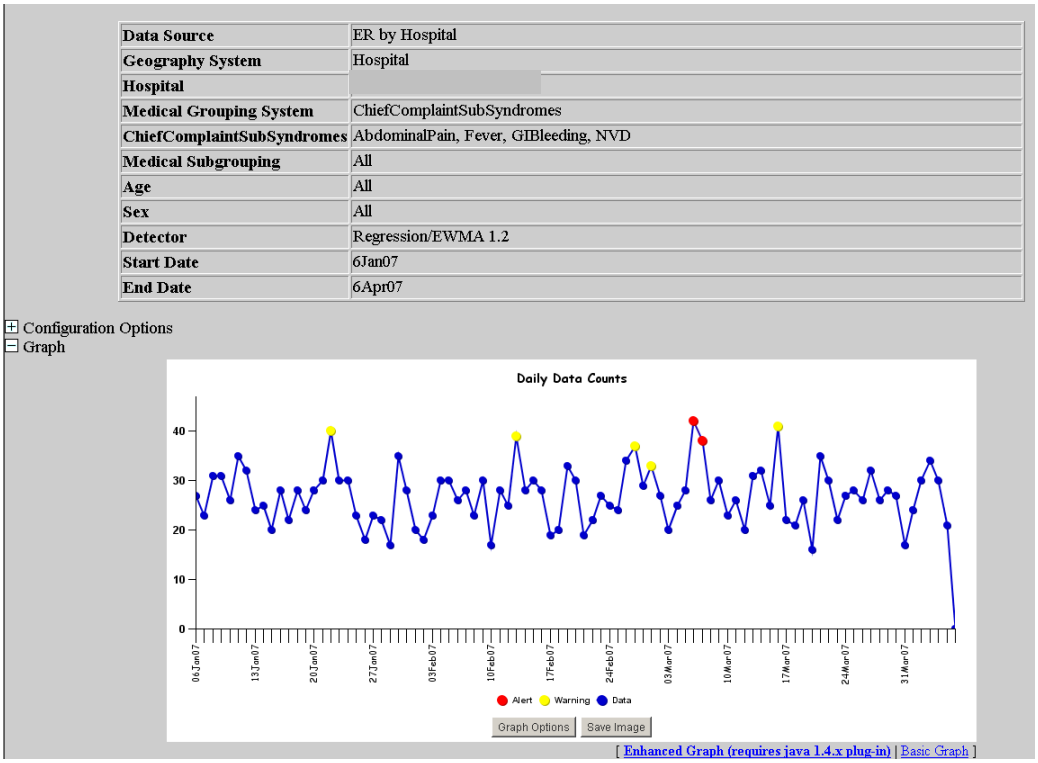
3. In this case, you suspect that cases related to Shigella infection have been occurring at a particular hospital, so you select ESSENCE subsyndromes so that you can select symptoms from more than one syndrome group.



4. Use the Control Button to select the following subsyndromes: abdominal pain, fever, GI bleeding, and NVD. Select all ages and sexes.



5. Here is the time series for cases that fit with one or more of the subsyndromes entered. Additional descriptive analysis and/or a search using Medical Record Numbers can help investigate whether potential cases of shigellosis have occurred at this hospital.



Glossary

Term	Definition	Example
Chief complaint original	Primary reason for seeking healthcare, as documented by caregiver	ha, abd pain
Chief complaint parsed	Primary reason for seeking healthcare, after the text parsing algorithm has expanded abbreviations or corrected punctuation errors	Original: ha; Parsed: headache Original: abd pain; Parsed: Abdominal Pain
Cluster Size	Number of zip codes included in cluster analysis	
Count	Actual number of visits or over-the-counter products per day	
Emergency Room Data by Hospital Location	Patient encounters at Emergency Rooms reported by location of hospital	
Emergency Room Data by Patient Location	Patient encounters at Emergency Rooms reported by zip code in which the patient resides	
ESSENCE Syndrome	Clinically relevant groups into which diagnoses, chief complaints or drug classifications are categorized by ESSENCE	Gastrointestinal, Neurological, Other, Rash, Respiratory, Fever, Shock-coma
Expected	Statistically modeled expected count	
Influenza-like-illness	ICD9 code(s) representing provider diagnoses of influenza-like-illness	
Level	Intensity of alarm generated by detectors	<2, no alert; 2-3, yellow alert; >3, red alert
Number of Zip Codes	Indicates the number of zip codes that were involved in any spatial cluster detection	
Percent Emergency Room Data by Hospital Location	Percentage of selected medical encounters as compared to all medical encounters by location of Emergency Rooms	
PID	Unique patient identifier	
Promotion Indicator	Indicates whether there are promotional sales on over-the-counter health products	
Pvalue	Statistical P-value output from spatial detector algorithm that indicates level of alert	>0.05, no alert; 0.01-0.05, yellow alert; <0.01, red alert
Rare Color	The number of times the set of attributes have had any red or	

	yellow alerts in the past year	
Rare Level	The number of times the set of attributes have alerted in the past year at that particular level or above	
Region	County or geographic area	Note that since zip codes can cross county lines, a zip code is included in a region based on where the centroid of the zip code is located
Syndrome	Infectious disease syndrome that ESSENCE classifies the ICD9 or pharmaceutical for syndromic surveillance	Examples: Bot-like, Fever, Hemorrhagic illness, Gastrointestinal, Neurological, Rash, Respiratory, Shock/coma