OREGON ESSENCE

Using ESSENCE for Mass Gathering Surveillance

Oregon Health Authority

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Syndromic Surveillance for Mass Gatherings

Syndromic surveillance is the near real-time monitoring of key health indicators in emergency department (ED) and urgent care visits. Oregon ESSENCE tracks the number of visits for specific patient symptoms using chief complaints (what the patient says is the reason for their visit) and discharge diagnosis codes. Visit information is collected from EDs and urgent care centers across the state. Currently, all 60 eligible hospitals are sending ED data every day for syndromic surveillance. Some urgent care centers are currently reporting. See Figure 1 for more details about data availability and facility participation by county.
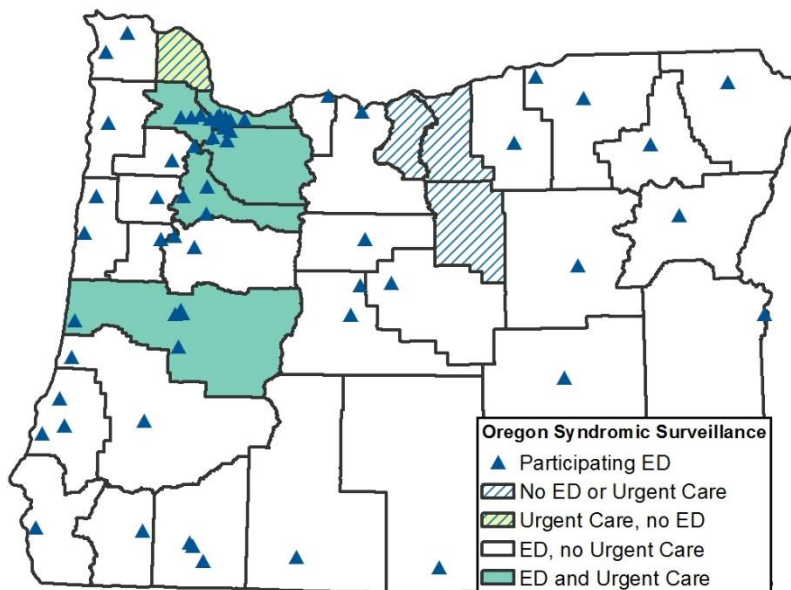

Figure 1. Current Oregon ESSENCE participation.

This guidance document is intended to provide instructions for local ESSENCE users who are using syndromic surveillance as part of mass gathering surveillance efforts. Mass gatherings are sometimes defined as "preplanned public events that are held for a limited time period and attended by more than 25,000 people" (Lombardo, 2008); however, per Oregon Statue (ORS §433.735-433.770), for the purposing of permitting, an outdoor mass gathering is an "actual or reasonably anticipated assembly or more than 3,000 persons" (OHA Regulations 333-039-0005). In Oregon, ESSENCE has been used to support several sports-related mass gatherings, most recently the 2016 U.S. Olympic Team Track and Field Trials in Lane County (Jagger et al., 2017). In addition to sporting events, syndromic surveillance is now a common public health tool for monitoring health outcomes at political conventions, festivals, and religious gatherings (Al-Tawfiq & Memish, 2014; Hoy et al., 2016; Polkinghorne, Massey, Durrheim, Byrnes, & MacIntyre, 2013; Todkill et al., 2016; Zumla et al., 2016).

Oregon ESSENCE staff can be contacted via email (Oregon.Essence@state.or.us) or phone (971-673-1111, ext. 5).

2017 Total Solar Eclipse Mass Gatherings

The 2017 eclipse-related mass gatherings present new challenges for Oregon public health authorities and healthcare systems.

- All Oregon counties will likely be affected in some way, as travelers pass through the state into the "Path of Totality" (See Figure 2). For this event, many agencies and counties will be coordinating efforts.
- In Eastern Oregon, most counties have only one healthcare facility submitting data to Oregon ESSENCE. Per data use agreements, counts from a single healthcare facility or system are proprietary and cannot be disseminated publicly. It will be important to monitor visits by facility, but local users must describe trends verbally without providing counts or visualize time series as percent queries when sharing information. For more details see the Project Proposal Guidelines for the Eclipse Event section of this document.
- Visitors are expected to particularly stress resources in rural and remote parts of the state.

There is limited information in the literature about wilderness mass gatherings. While "urban mass gatherings have similar rates of injuries as most wilderness activities," the types of injuries are different and transportation out of the area can complicate outcomes (Burdick, 2005). Additionally, there can be differences in types of injuries and illnesses seen among visitors and employees at such events (Chang, Koval, Freer, & Kraus, 2000).

> **2017 Total Solar Eclipse**
>
> **Who:** 1 million estimated visitors
>
> **When:** August 21, 2017
>
> The influx of visitors is expected several days before and after the event.
>
> **Where:** The path of totality will stretch from Lincoln City to Salem, Madras, and Ontario. However, the entire state is expected to be affected by travel related to the eclipse.
>
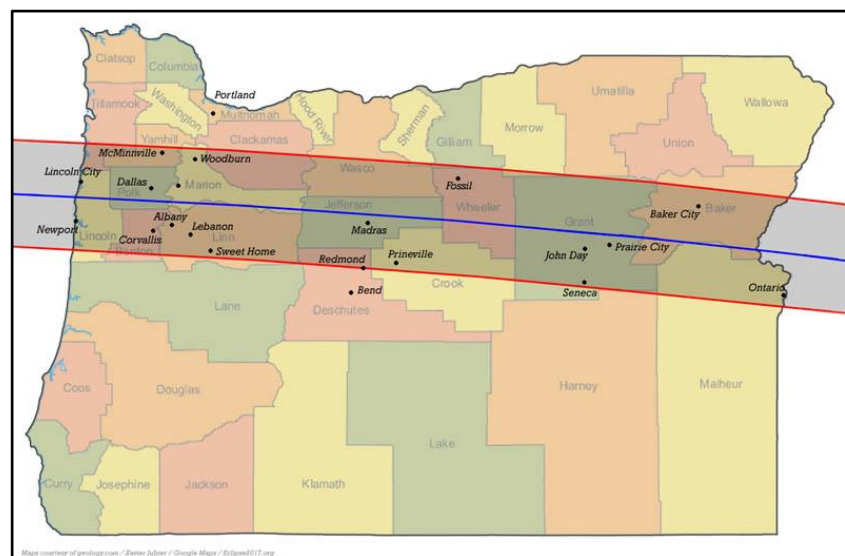> For more details, visit the Oregon Office of Emergency Management.

Figure 2. Map of eclipse path of totality from 1859 Magazine.

Priority Query Rationale

ESSENCE is a powerful and flexible tool for syndromic surveillance. Users are encouraged to incorporate local considerations as they plan for and monitor mass gathering events. The Oregon ESSENCE team is recommending local users start with the following 11 priority queries, grouped into four categories. These queries target conditions or events with the potential to overwhelm the healthcare system. They can be resource intensive and/or affect numerous individuals. Additionally, these recommendations are based on prior Oregon mass gathering experience, known hazards for the season, and the scientific literature.

Health System Capacity
- **Total Visit Counts:** Monitor baseline healthcare system visit totals; this is the denominator for percent queries.
- **Percent of Visits by Age Group:** Monitor proportion of visits by vulnerable age groups (young children or older adults) and by those most likely to attend mass gathering events (working-aged adults).
- **Medication Refills:** Monitor whether visitors or others are unable to obtain medications through routine methods and are thus seeking medication at EDs or urgent care centers.

Outdoor Exposure
- **Asthma-like:** Monitor to see if wildfire smoke, heat, or other environmental conditions exacerbate respiratory conditions.
- **Heat-related Illness:** Monitor to see if extreme temperatures impact health.
- **Mammal Bites:** Monitor because mammal bites may require rabies prophylaxis, which is resource intensive.
- **Snake Bites:** Monitor because venomous snake bites require antivenin, which is resource intensive.

Event-Specific
- **Alcohol Use:** Monitor substance abuse increases in conjunction with festivals and other celebrations.
- **Motor Vehicle-related Injuries:** Monitor to see if road congestion increases visits for these types of injuries.

Communicable Disease
- **Fever:** Monitor as a proxy for febrile and viral illness.
- **Nausea/Vomiting/Diarrhea:** Monitor as a proxy for foodborne or waterborne disease.

Priority Query Definitions

Table 1. Priority query definitions.

Query	Type	Definition
Total Visit Counts	Total counts	Total visits: Stratify (using Data Series Options) by Facility and/or Facility Type, as applicable for your jurisdiction.
Percent of Visits by Age Group	Total counts	Total visits: Stratify (using Data Series Options) by Age Group (0-4, 5-17, 18-44, 45-64, 65+).
Medication Refill	CC/DD	(, ^;V681^ ,or, ^;Z760^ ,or, ^refil^ ,or, ^re-fil^ ,or, ^re fil^ ,or, ^script^ ,or, ^medication^ ,or, ^rx^ ,) ,andnot, ^reaction^
Asthma-like	CC/DD	^;493^ ,or, ^;J45^ ,or, ^;R06^ ,or, ^wheeze^ ,or, ^shortness of breath^ ,or, ^difficulty breathing^ ,or, ^chest tightness^ ,or, ^breathing problem^ ,or, ^asthma^ ,or, ^dyspnea^
Heat-related Illness	CC/DD	^;992^ ,or, ^;T67^ ,or, ^;E900^ ,or, ^;X30 ,or, ^heat ^ ,or, ^heatcramp^ ,or, ^heatex^ ,or, ^heatst^ ,or, ^heat-exhaust^ ,or, ^heat-related^ ,or, ^heat-stroke^ ,or, ^hypertherm^ ,or, ^overheat^ ,or, ^over heat^ ,or, ^sun stroke^ ,or, ^sunstr^ ,or, ^sun-str^ ,or, ^to hot^ ,or, ^too hot^ ,or, (,(, ^hot^ ,or, ^ heat ^ ,) ,and, (, ^excessive^ ,or, ^exhaust^ ,or, ^expos^ ,or, ^fatigue^ ,or, ^cramp^ ,or, ^stress^ ,or, ^in car^ ,or, ^outside^ or ^prostration^ ,),) ,andnot, (, ^heater^ ,or, ^heatrate^ ,or, ^cheat^ ,or, ^wheat^ ,)
Mammal Bites	CC/DD	(, ^;W5501^ ,or, ^;W540^ ,or, ^;E9063^ ,or, ^;E9060^ ,or, ^;Z203^ ,or, ^;V015^ ,or, ^animal^ ,or, ^ferret^ ,or, ^dog^ ,or, ^cat^ ,or, ^rabi[de]^ ,or, ^bat^ ,or, ^raccoon^ ,or, ^ra[co][co]on^ ,) ,andnot, (, ^scratch^ ,or, ^cat[aihe]^ ,or, ^[mreu]bat^ ,or, ^bat[ithe]^ ,or, ^ hit^ ,or, ^ baseball^ ,or, ^frost^ ,or, ^bee^ ,or, ^insect^ ,or, ^spider^ ,or, ^tick^ ,or, ^mosquito^ ,or, ^bug^ ,)
Snake Bites	CC/DD	^;T630^ ,or, ^;W591^,or, ^;E9050^ ,or, ^;E9062^ ,or, ^snake bit^
Alcohol Use	Subsyndrome	ALCOHOLUSE
Motor Vehicle-related Injuries	Subsyndrome	MOTORVEHICLE
Fever	Syndrome	FEVER
Nausea/Vomiting/Diarrhea	Subsyndrome	NVD

Supplementary Event-Specific Query Definitions

The Oregon ESSENCE team has also developed a suite of queries related to the 2017 total solar eclipse and associated mass gatherings. Unlike the priority queries above, visits for these complaints are not as likely to overwhelm the healthcare system. However, information gleaned from them may be useful for situational awareness, for developing messaging, and planning interventions.

Table 2. Supplementary event-specific query definitions.

Query	Type	Definition
Eye injury	CC/DD	(, ^;H53^ ,or, ^;368^ ,or, ^;H31023^ ,or, ^;E11219^ ,or, ^;36210^ ,) ,and, (, ^blind^ ,or, ^blur^ ,or, ^vision^ ,or, ^ retinopath^ ,or, ^conjunctivitis^ ,or, (, ^eye^ ,and, (, ^pain^ ,or, ^problem^ ,or, ^irritation^ ,or, ^injury^ ,) ,) ,) ,andnot, (, ^foreignbody^ , ^abdominal^ , ^fall^ , ^cut^ , ^assault^ ,)
"Eclipse"	Triage	^eclipse ^ ,andnot, ^mitsub[ui]shi^
Beach/Water Recreation	Triage	(, (, ^ lake^ ,andnot, (, ^road^ ,or, ^rd^ ,or, ^sky^ ,or, ^oswego^ ,or, ^view^ ,or, ^high^ ,or, ^city^ ,) ,) ,or, ^swim^ ,or, (, ^ river ^ ,andnot, (, ^driver^, or, ^hood^ ,or, ^rd^ ,or, ^road^ ,or, ^three^ ,or ^ 3 ^ ,) ,),or, (, ^ocean^ ,andnot, (, ^ayr^ , or, ^ocean spray^ ,or, ^ave^ ,or ^avenue^ ,or, ^park^ ,or, ^ridge^ ,or, ^view^ ,) ,) ,or, (, ^ coast ^ ,andnot, (, ^sutter^ ,or, ^guard^ ,or, ^east^ ,or, ^lives at^ ,) ,) ,or, (, ^beach ^ ,andnot, (, ^gold^ ,or, ^long^ ,) ,) ,) ,andnot, (, ^feels like^ ,or, ^ocean beach hospital^ ,or, ^assisted living^ ,)
Camping	Triage	(, ^camp^ ,or, ^campground^ ,or, ^camper^ ,or, ^ tent ^ ,or, ^campsite^ ,or, ^ RV ^ ,or, ^recreational vehicle^,) ,andnot, (, ^camphor^ ,or, ^campion^ ,or, ^campos^ ,or, ^homeless^ ,or, ^campus^ ,or, ^camphophnique^ ,or, ^Campbell^ ,or, ^trailer^ ,or, ^boot camp^ ,or, ^happy camp^ ,)

| Query	Type	Definition
Evacuation	Triage	^evacua^ ,andnot, (, ^stool^ ,or, ^bow[el]^ ,or, ^hem[oa]toma^ ,or, ^clot^ ,or, ^rectal^ ,or, ^anus^ ,or, ^stomach^ ,or, ^abortion^ ,or, ^bladder^ ,or, ^blood^ ,or, ^abscess^ ,or, ^pus^ ,or, ^bleed^ , ^bm^ ,or, ^miscarriage^ ,or, ^hemorrhage^ ,or, ^inflam^ ,or, ^ear^ ,or, ^uterus^ ,or, ^gastric^ ,or, ^pleural effusion^ ,or, ^foreign body^ ,or, ^fb^ ,or, ^diarrhea^ ,or, ^phlem^ ,or, ^subdural^ ,or, ^bottle^ ,or, ^container^ ,or, ^alcohol^ ,or, ^liquid^ ,)
Festival	Triage	^festival^ ,or, ^celebration^ ,or, ^fundraiser^ ,or, ^concert ^ ,or, ^jamboree^ ,or, ^pioneer days^ ,or, ^extravaganza^ ,or, (, ^party^ ,andnot, (, ^3rd^ ,or, ^third^ ,) ,) ,or, ^ fest ^

Query Considerations

Types of Queries

- **Total:** Counts or percent of total visits. These queries can be stratified by variables such as Facility Type (ED or urgent care) or Age Group.
- **CC/DD:** These queries search a combined field that includes the chief complaint (what the patient says is the reason for their visit) and discharge diagnosis codes. This is the most common free-text search option. Queries in Tables 1 and 2 are copy/paste ready; make sure to include all characters, including beginning and end parenthesis.
- **Syndrome:** Very large pre-built category in ESSENCE. These queries only search chief complaints.
- **Subsyndrome:** Smaller pre-built category in ESSENCE. These queries only search chief complaints.
- **Triage Note:** Free-text search of the longer field that may include verbatim patient's explanation of reason for visit, context for visit, and doctor's or nurse's observations. It also includes a lot of other information, which may be noise. Some smaller facilities do not send this optional data field. Queries in Tables 1 and 2 are copy/paste ready; make sure to include all characters, including beginning and end parenthesis.

Data Source Considerations

The ESSENCE system allows users to view ED (and urgent care) visits by either Patient Location (based on address) or Hospital Location. For mass gatherings, it will be important to look at data by Hospital Location to capture the number of visits in your jurisdiction. **In counties with only one participating healthcare facility or where all facilities are part of the same healthcare system, visit counts by Hospital Location may not be shared by entities other than the hospital.** Per data use agreements, counts from a single healthcare facility or system are proprietary and cannot be disseminated publicly. It will be important to monitor visits by facility, but local users must describe trends verbally without providing counts or visualize time

series as percent queries when sharing information. Another consideration would be to work with the facility to make a plan for releasing count data (in a joint press release or by the hospital alone).
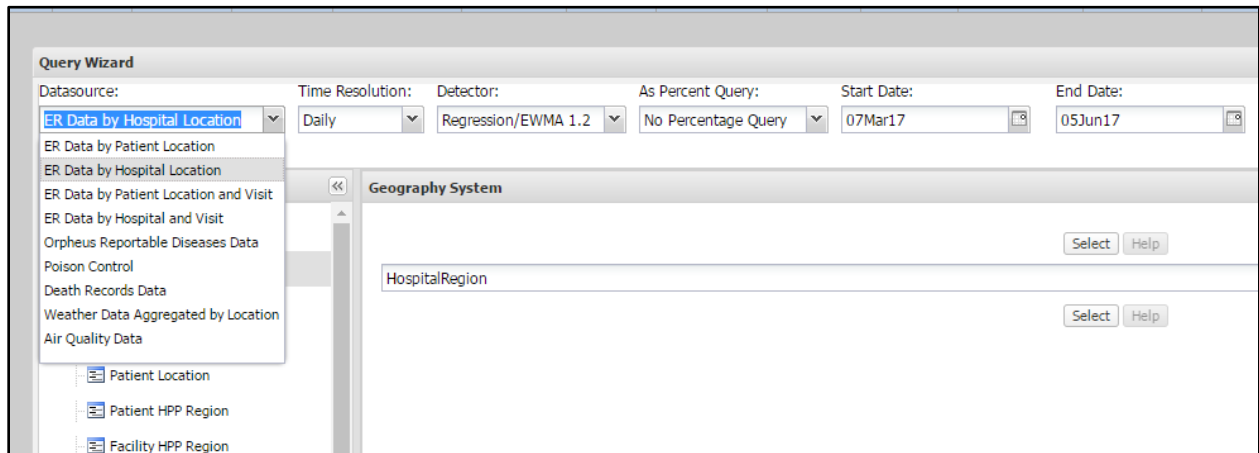
ESSENCE Functionality Reminders

The unit of measurement in ESSENCE is visits and not patients. A patient who visits a hospital twice in the same day is counted twice in ESSENCE.

Queries are not mutually exclusive. For example, a visit can be classified as meeting both the Fever Syndrome and the NVD Subsyndrome if the patient's chief complaint is "high fever and upset stomach." Full syndrome and subsyndrome definitions are available within ESSENCE under the More tab.
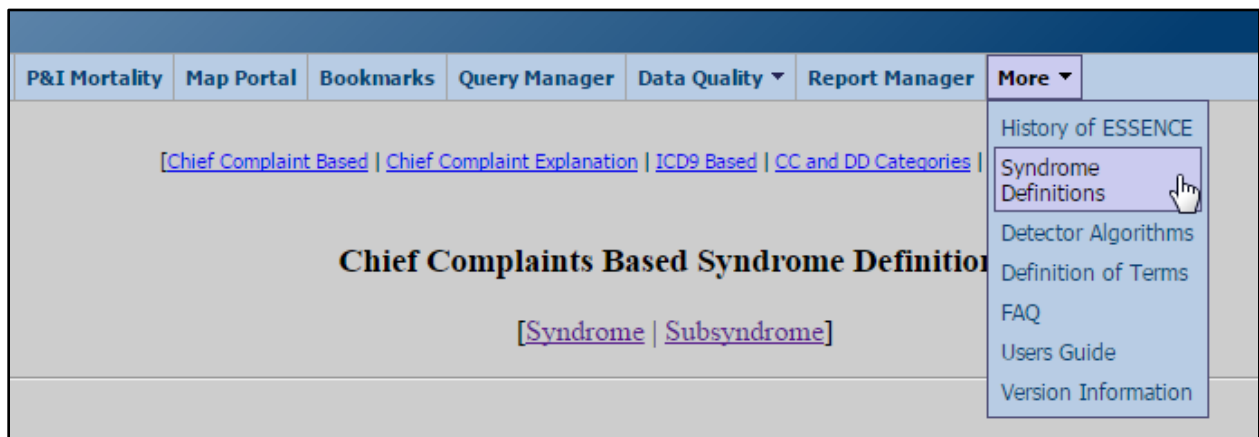
Similarly if a patient's chief complaint is "shortness of breath, possible sunstroke," the visit will be captured by both the asthma-like and heat-related illness CC/DD queries.

Communicable Disease Data

If you have access to Orpheus, Oregon's reportable disease database, you can request access to Orpheus data through ESSENCE (on your annual confidentially policy agreement). This can allow users to visualize trends of confirmed or presumptive reportable disease cases. For mass gatherings, these data can complement information available from EDs and urgent care visits. However, many reportable diseases require lab testing before they are given a confirmed or presumptive status, which often takes at least a few days. Additionally, some diseases of interest, such as sexually transmitted infections (STIs), have incubation periods of weeks or months. Surveillance should be planned accordingly, and prevention efforts should be planned well in advance of any increases in notifiable diseases or conditions.
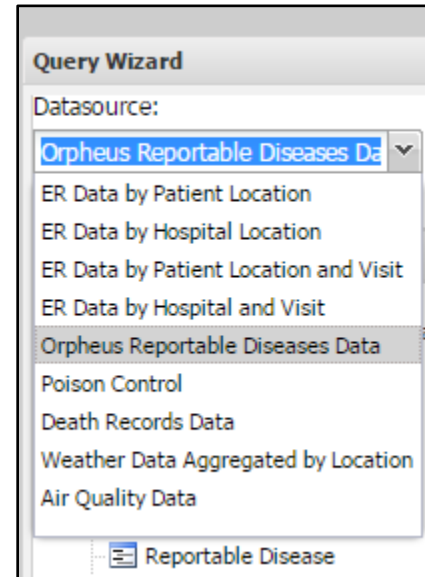
Instructions for MyESSENCE Tab Creation

MyESSENCE allows users to set up tabs (i.e., dashboards) with data widgets that update every time you log into ESSENCE. While they take a bit of time to create, they save users from recreating common queries and allow users to set up queries ahead of time for daily monitoring. MyESSENCE tabs can be modified, copied, and shared, which makes MyESSENCE ideal for mass gathering surveillance.
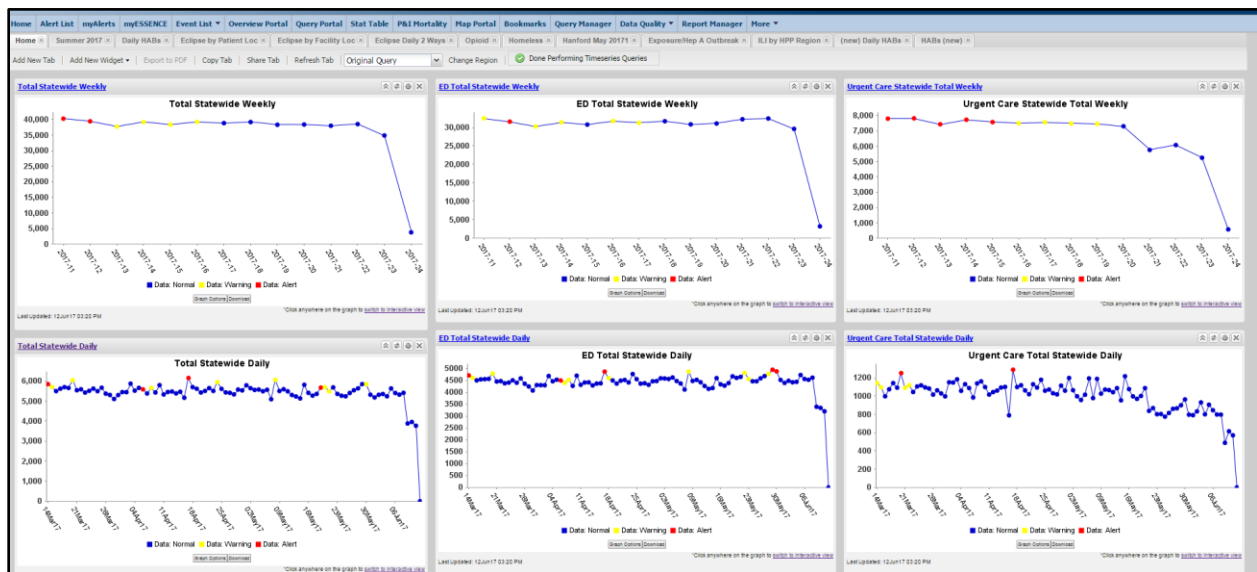
MyESSENCE Benefits

- Create your own custom dashboard(s)
- Include different types of widgets (time series, overlays, data details) which can be opened to further explore data
- See current data for all widgets (view refreshes automatically)
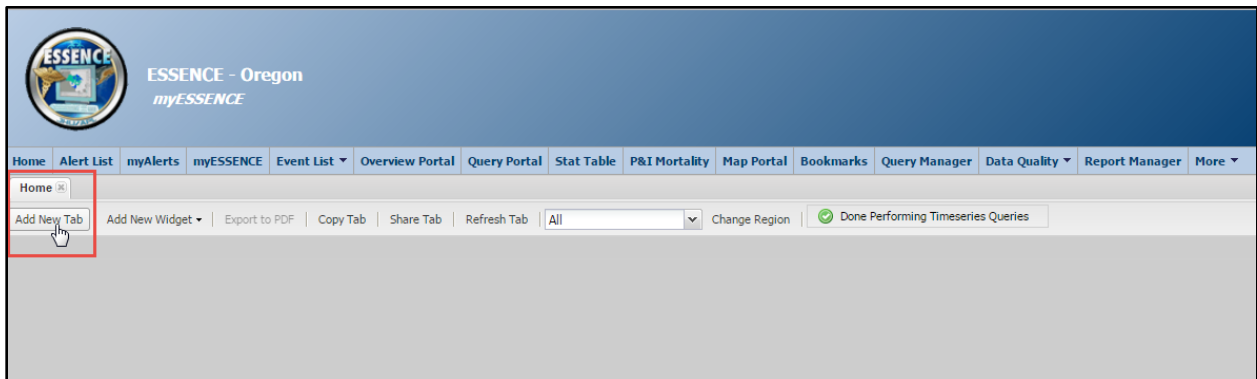- Share your dashboard(s) with other users

MyESSENCE Creation Summary
1. Add a new tab (myESSENCE)
2. Create queries (Query Portal)
3. Save queries to Query Manager-optional
4. Add saved queries to myESSENCE
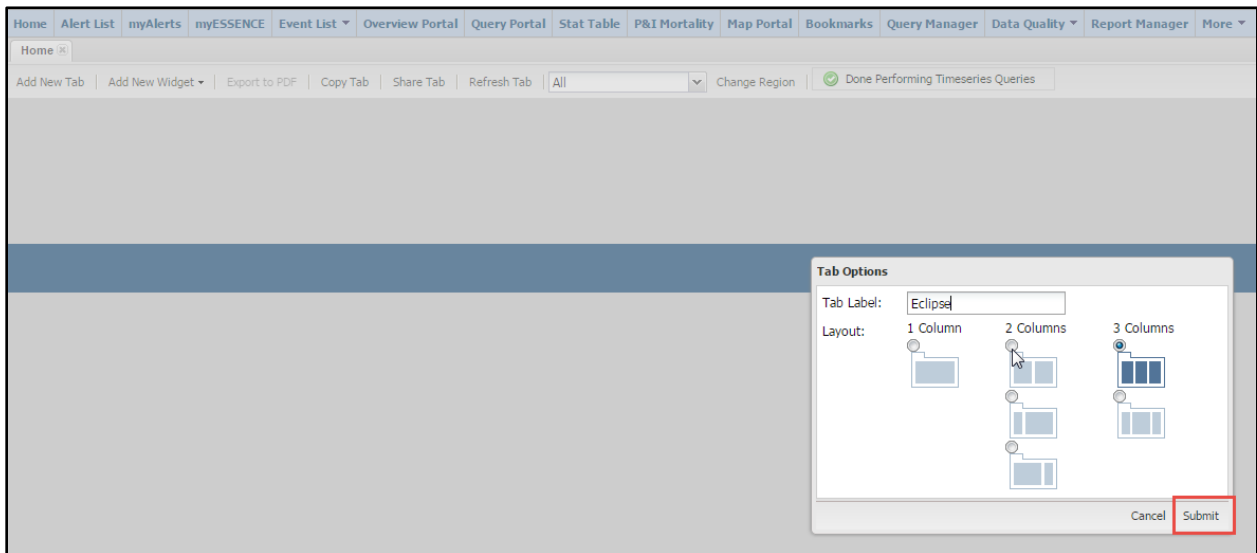5. Arrange and add widgets
6. Review and use!

MyESSENCE Creation Step Details
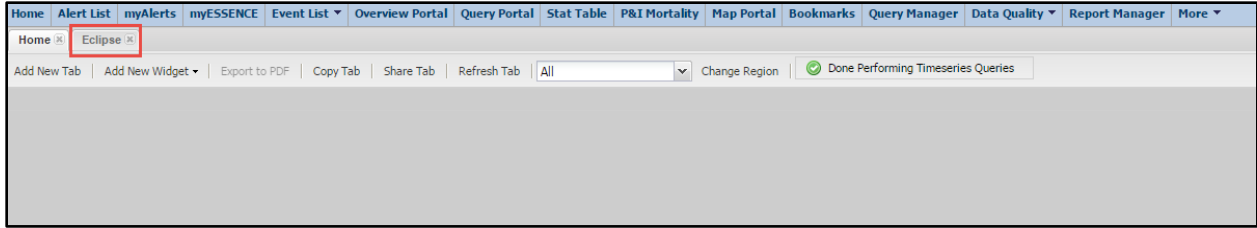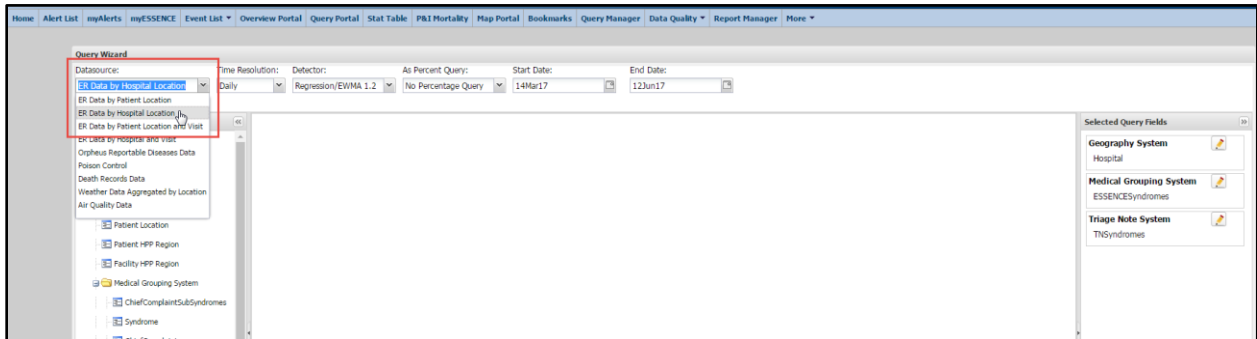**1. Add a new tab (myESSENCE)**

- Add a New Tab

- Label Tab
- Select format (one, two, or three columns). **This cannot be changed later!**
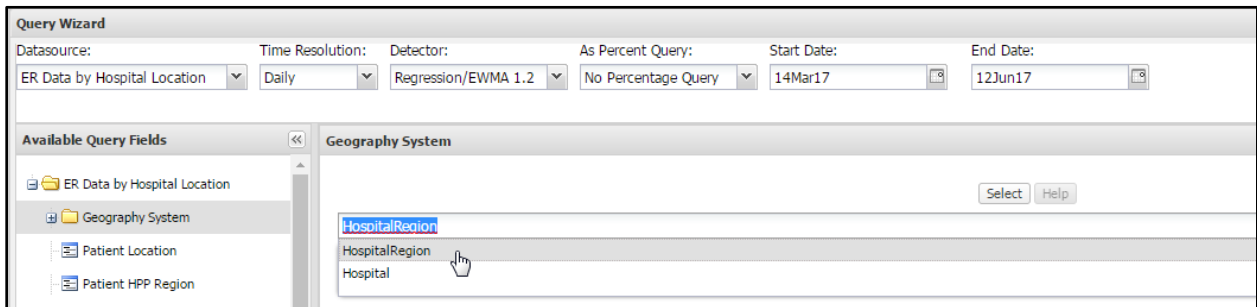- Submit

- Now you have a new tab

2. Create queries (Query Portal)

- Select Datasource – likely ER Data by Hospital Location
- Select Time Resolution – likely Daily or Weekly
- If a percent query select based on query type. **Match your numerator (Query Field) and denominator (As Percent Query) types (e.g., CC and DD).**
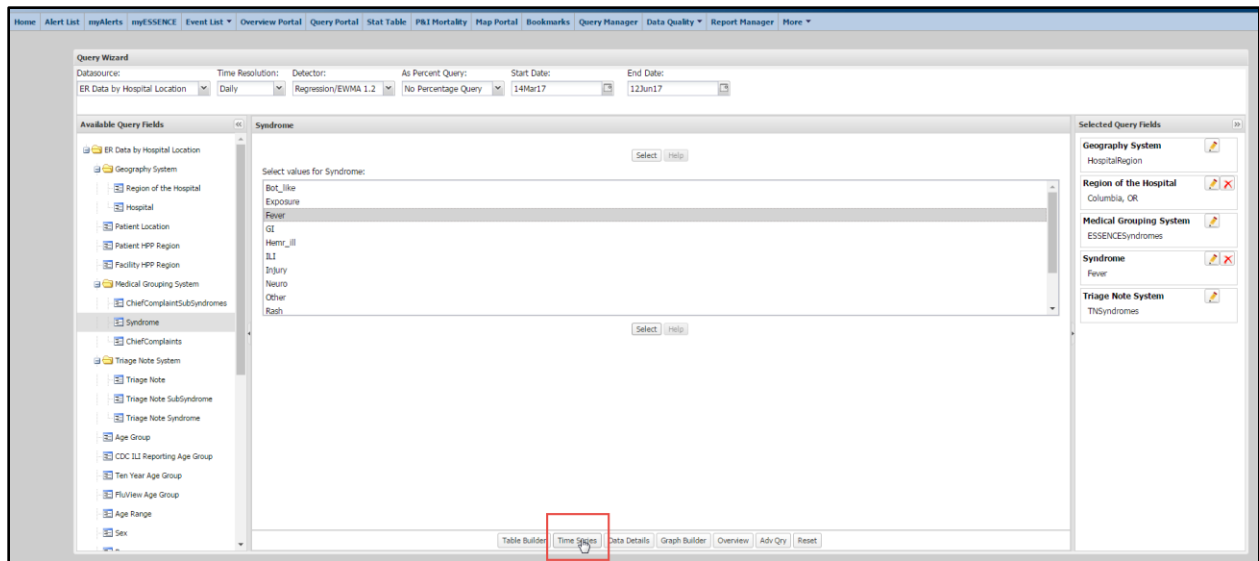

- Update Geography System – Select Hospital Region if using ER Data by Hospital Location
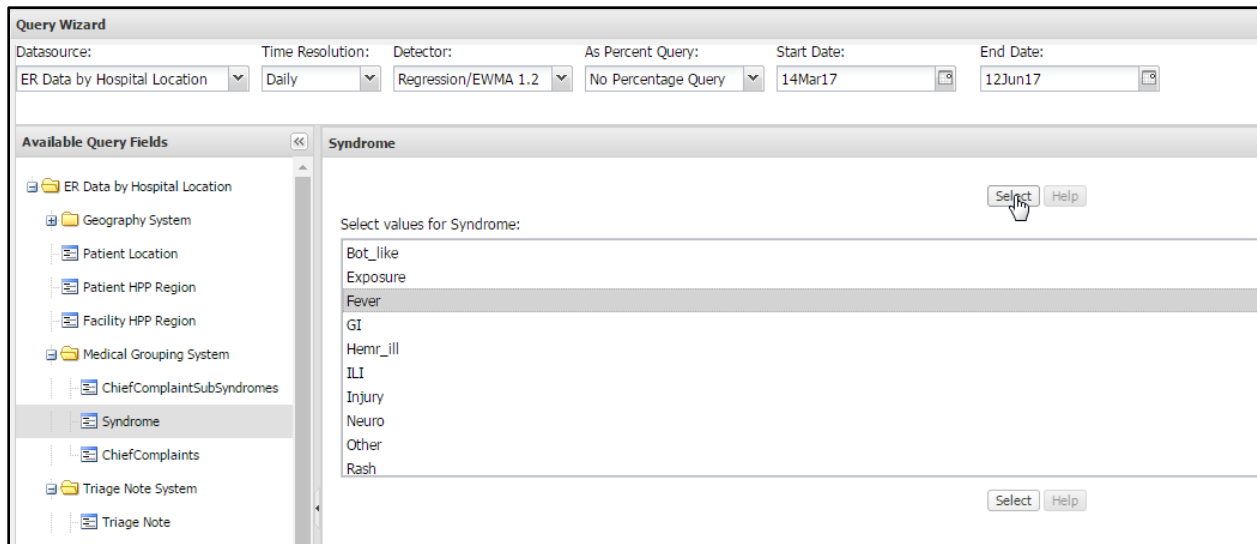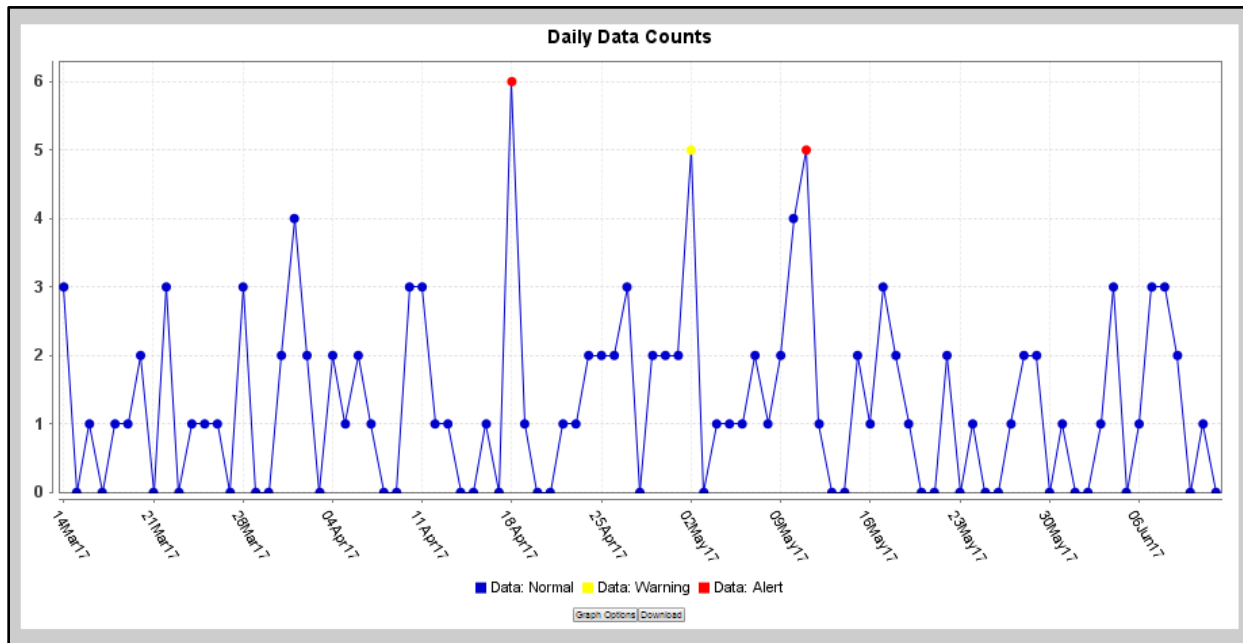
- Select Region (i.e., county)
- Select Syndrome, ChiefComplaintSubSyndrome (i.e., Subsyndrome), or CC and DD (i.e., chief complaint and discharge diagnosis or CC/DD) query
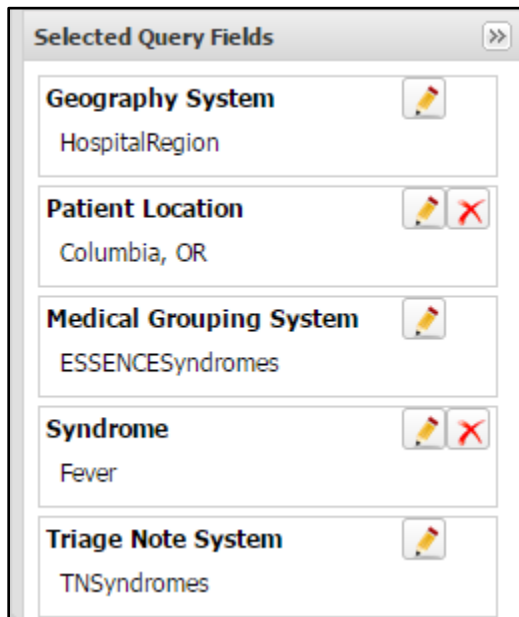
- Make sure all your selections are in the right side panel.
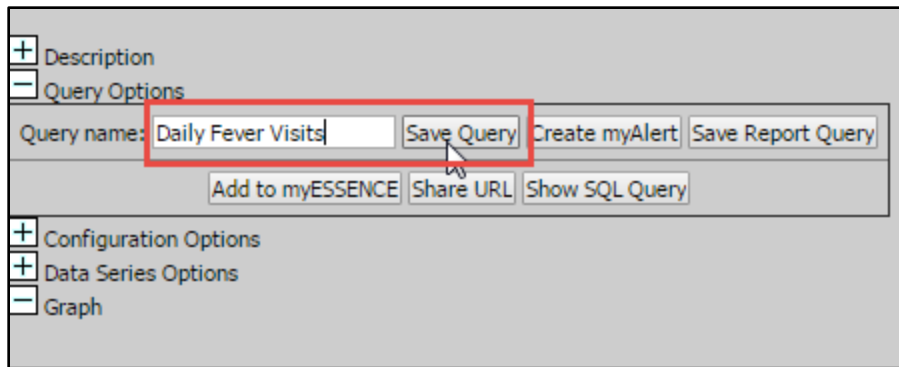
- Graph a Time Series

3. **Save queries to Query Manager**
   - Name the query
   - Add to a grouping
   - Add notes, if needed

Naming Convention Best Practices

- Be consistent
- Include description, time frame, geography, count or percent

For example: Asthma-like daily statewide percent

4. **Add saved queries to myESSENCE**
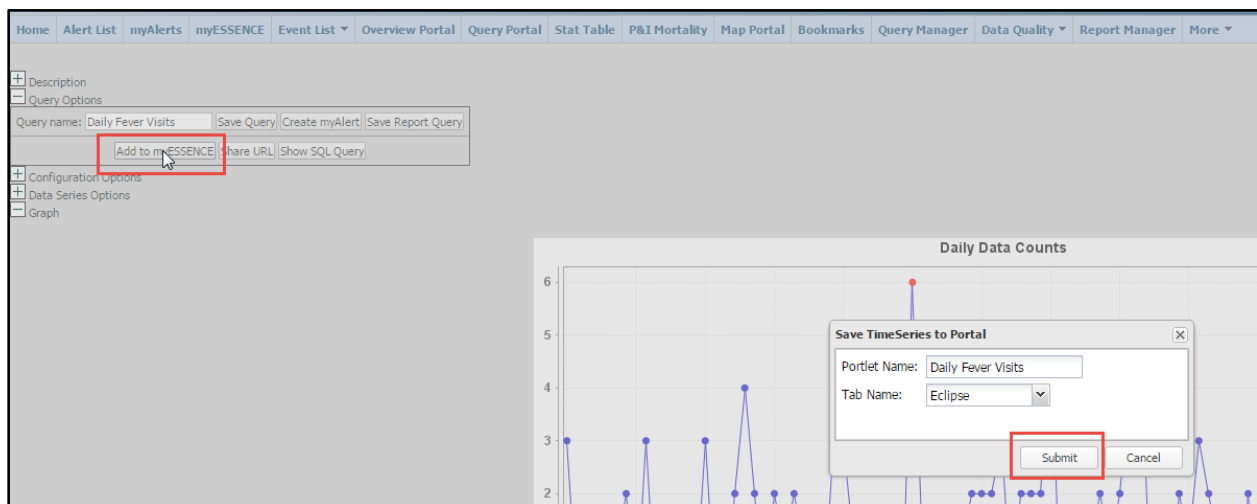
- Save the name
- Select the desired tab
- Submit

5. **Arrange and add widgets (repeat Steps 2-4)**

- Widgets can be dragged and dropped within a single tab. They cannot be moved between tabs.

6. **Review and use!**

- From MyESSENCE, you can click the hyperlinked name to open the widget up so you can get a closer look.
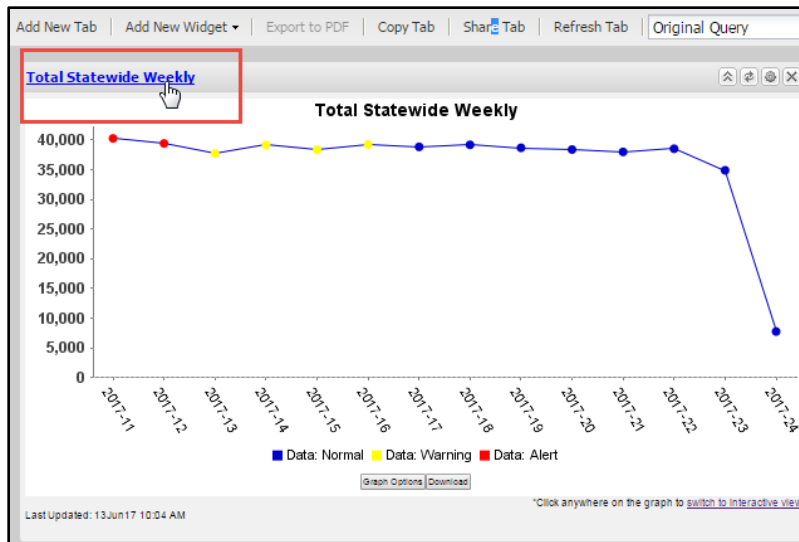
MyESSENCE Tab Sharing
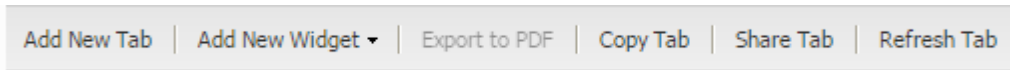
- **Copy:** You can duplicate the tab within your MyESSENCE and rename it
- **Share Tab:** By default you can share a tab with other users. The receiver can make changes. The sender will NOT see these changes. The tabs are separate after sharing.
- **Share Tab-Managed:** After sharing a tab with a receiver, the sender can modify or delete the tab. The receiver can only view. They can make no changes.

Data Interpretation Suggestions

Business as usual (blue or a few yellow dots): "During the last [time period], X-related visits at Y county facilities were within expected levels."
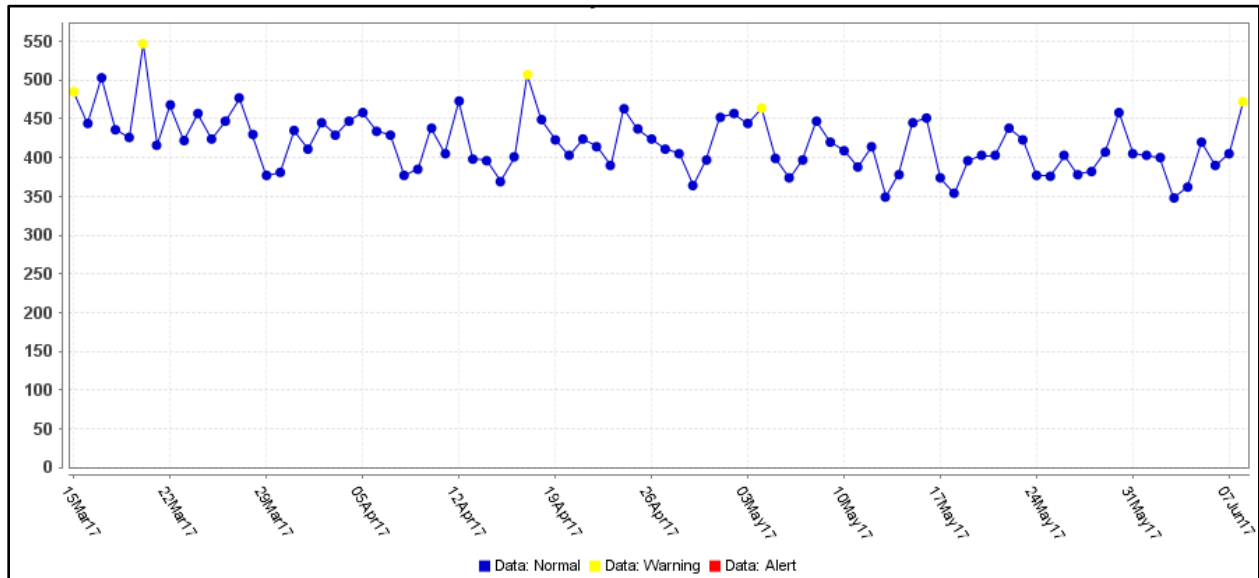
Elevated levels attributable to time of year: "During the last [time period], X-related visits at Y county facilities were higher than expected [specify dates/weeks if needed]. This increase may be due to [seasonal variations, extreme temperatures, the holiday weekend, etc.] and [is/is not] of public health significance."
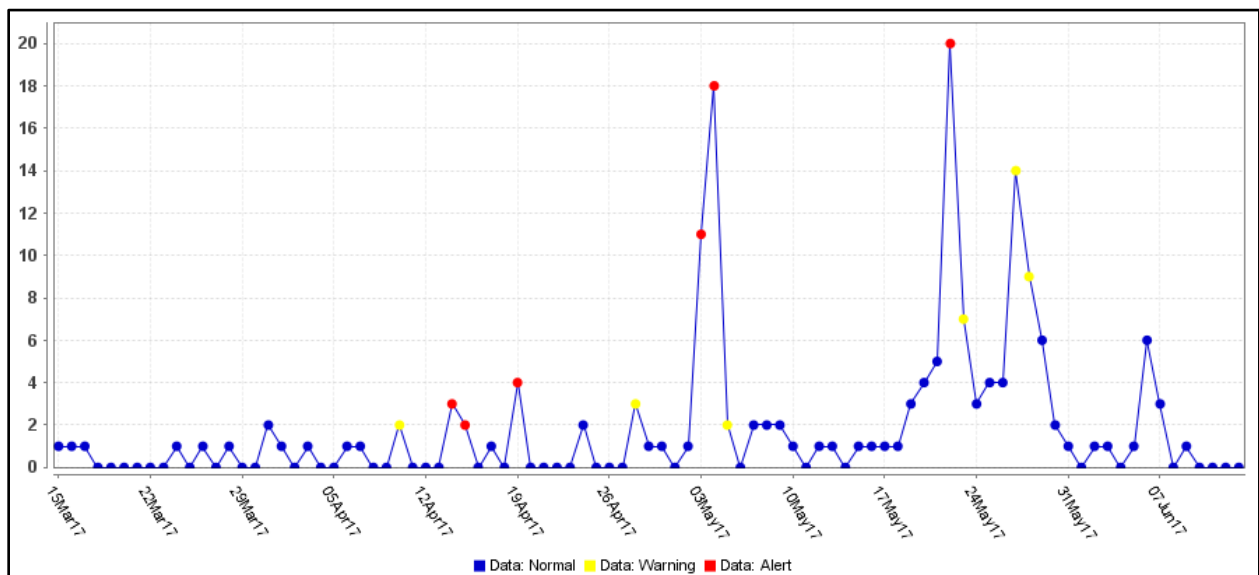
Explanation of elevated level subtypes or demographics:

- "Most of these visits were among patients aged X-Y."
- "More visits than expected were made by males."
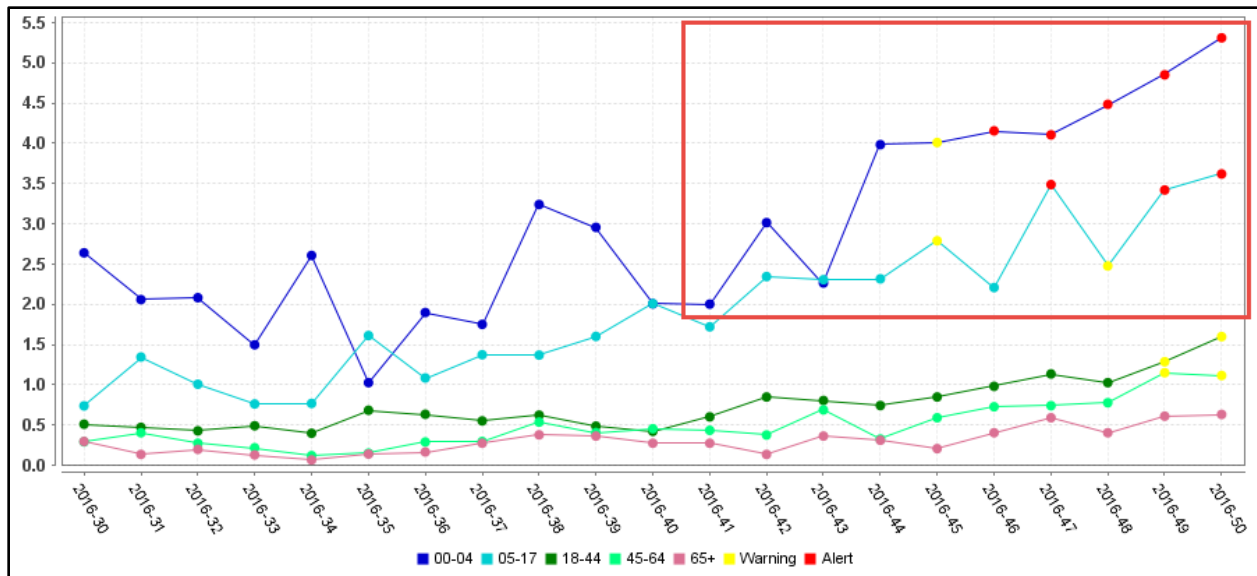
Return to normal levels: "After [time] of higher than expected levels, X-related visits at Y county facilities have been within expected levels since [time]."

Data quality: "On Sundays we do not receive a complete data set. Some local hospital data will not be reported until Monday, but no issues have been directly reported to [agency]."

Project Proposal Guidelines for the Eclipse Event

It is every ESSENCE user's responsibility to ensure that Oregon ESSENCE data are used appropriately.

Per the Oregon ESSENCE Confidentially Policy, the categories of users who must submit a proposal request to Oregon ESSENCE include:

1. Any user who wishes to report, present or publish ESSENCE data

2. Any user who wishes to re-release or share ESSENCE data outside of a Public Health Authority, hospital or health system

For the purposes of the 2017 total solar eclipse mass gatherings, any LPHA may disseminate information within the scope of this project proposal. Uses beyond the scope of this project proposal require consultation with the Oregon ESSENCE team (Oregon.Essence@state.or.us).

Objectives
- To monitor public health outcomes related to 2017 total solar eclipse mass gatherings in Oregon
- To enhance local situational awareness of events or conditions that could overwhelm healthcare capacity during the event monitoring period (July 31 – September 11, 2017)

Methods

Surveillance

- ESSENCE trends of priority, supplemental, and locally developed queries may be monitored daily, weekly, and monthly **by Hospital Location** (for more details see Data Source Considerations).
- The event monitoring period covered by this project proposal extends three weeks before and three weeks after the event: July 31 – September 11, 2017.

Assistance

- Additional Oregon ESSENCE team support will be available during Oregon Public Health Division (OPHD) Incident Management Team (IMT) activation period scheduled for Friday August 18, 2017 – Thursday August 24, 2017.
- ESSENCE users can consult with the Oregon ESSENCE team as needed.

Information Sharing

During the event monitoring period, summary information from ESSENCE related to mass gatherings or emergent incidents of public health concern may be shared.

Table 3. Summary of permitted information sharing.

Number of healthcare facilities or systems	Information	Partners
Any	Identify a specific visit(s) or trends seen in the data, in order to follow-up	Hospital ICP
	General written or verbal descriptions of increases or decreases in visits, by type, demographic, etc.	Public, external, internal
	Statements that more or fewer visits than expected were seen	
	Comparisons of the percent increase or decrease to a reference period (i.e., last year, last month)	
Only 1	Percent queries displayed as time series graphs or tabular	Internal
2 or more	Visit count queries displayed as time series graphs or tabular data	

- As always, ESSENCE users outside the hospital setting may directly contact a healthcare facility's infection control preventionist (ICP) to follow-up on a specific visit(s) or trends seen in the data. Note that you may not link ESSENCE data to any other data sources without an approved project proposal.

- Local public health ESSENCE users may provide summary information to public health administrators, health officers, communicable disease staff, public health emergency preparedness staff, and environmental health staff, following local protocols for information dissemination in either a routine or incident management context.

Examples of summary information that can be shared internally:

- o **Visit count queries** displayed as time series graphs or tabular data as long as data are collected from **more than one** healthcare facility or system
- o **Percent queries** displayed as time series graphs or tabular data if there is **only one** or more healthcare facility or system in the jurisdiction
- o General written or verbal descriptions of increases or decreases in visits, by type, demographic, etc.
- o Statements that more or fewer visits than expected were seen
- o Comparisons of the percent increase or decrease to a reference period (i.e., last year, last month)

- If deemed appropriate by the LPHA leadership, generalized information may be shared with external partners or the public.

  Examples of generalized information that can be shared externally:
  - o General written or verbal descriptions of increases or decreases in visits, by type, demographic, etc.
  - o Statements that more or fewer visits than expected were seen
  - o Comparisons of the percent increase or decrease to a reference period (i.e., last year, last month)

Protecting Confidentially
- No potentially identifiable information or counts from one healthcare facility or system in a jurisdiction may be shared by ESSENCE users outside the hospital setting.
- LPHAs will collaborate with local healthcare facilities to coordinate information releases when needed.
- Hospital ESSENCE users may release count data from their health system in accordance with their local practices.

Data Security Plan
If any data are downloaded from ESSENCE, they will be stored on an encrypted network at the LPHA that can only be accessed by staff who have a current signed ESSENCE confidentiality policy. Remember to delete downloaded files from the appropriate "Downloads" folder by pressing "Shift" + "Delete" to permanently delete the file rather than move it to the Recycle Bin.

Roles of Individuals
- Active ESSENCE users will have access to line level ESSENCE data (i.e., data details) to monitor public health outcomes.
- LPHA public health administrators, health officers, communicable disease staff, public health emergency preparedness staff, environmental health staff, and administrators and hospital data system managers may review aggregate data to enhance local situational awareness.

<u>List of Data Elements</u>
The following data elements may be used in query development: age, sex, race, ethnicity, zip code (resident), facility name, chief complaint, discharge diagnosis, and triage note. **Data details will not be shared with non-ESSENCE users.**

<u>Confidentiality Oaths</u>
ESSENCE confidentiality oaths for active users must be signed within the past 12 months and be on file with the Oregon ESSENCE program.

<u>Plan for Dissemination of Results</u>
ESSENCE users may alert LPHA staff, partners, or the public of events or conditions that could overwhelm healthcare capacity during the event monitoring period (July 31 – September 11, 2017) as described in the methods section above.

ESSENCE Technical Assistance

Oregon ESSENCE staff can be contacted via email (Oregon.Essence@state.or.us) or phone (971-673-1111, ext. 5).

During the OPHD IMT activation period scheduled for **Friday August 18, 2017 – Thursday August 24, 2017**, ESSENCE staff will be available from **8 AM – 5 PM** to provide technical and epidemiological support (i.e., assistance interpreting local surveillance findings) via the ESSENCE email and phone number.

Please expect at least three (3) business hour turnaround for requests.

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Revision History

Revision History Ver/Rel #	Issue Date	Summary of Changes
V1.0	July 2017	First version based upon ESSENCE version 1.20