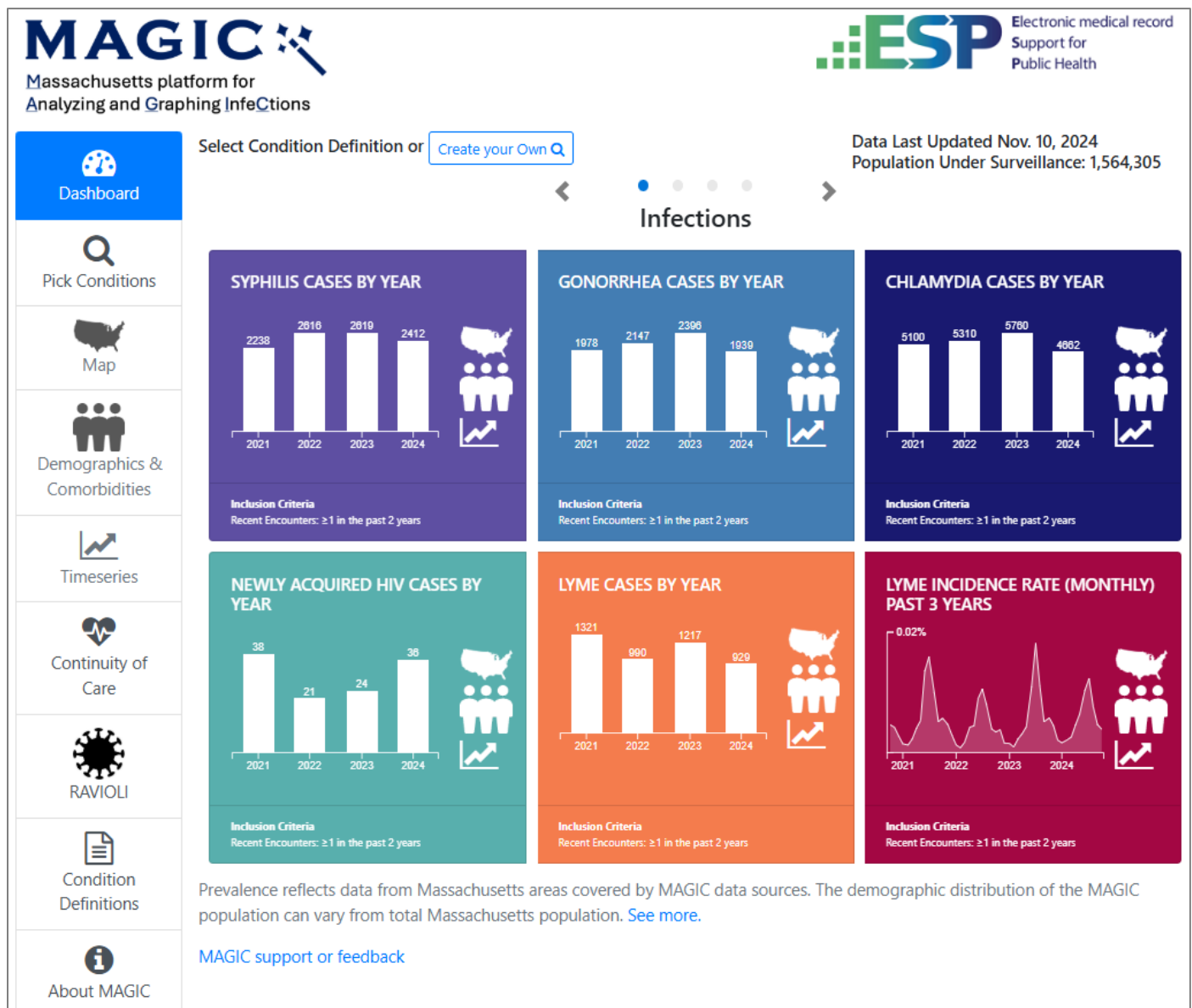


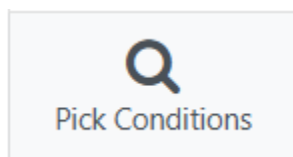
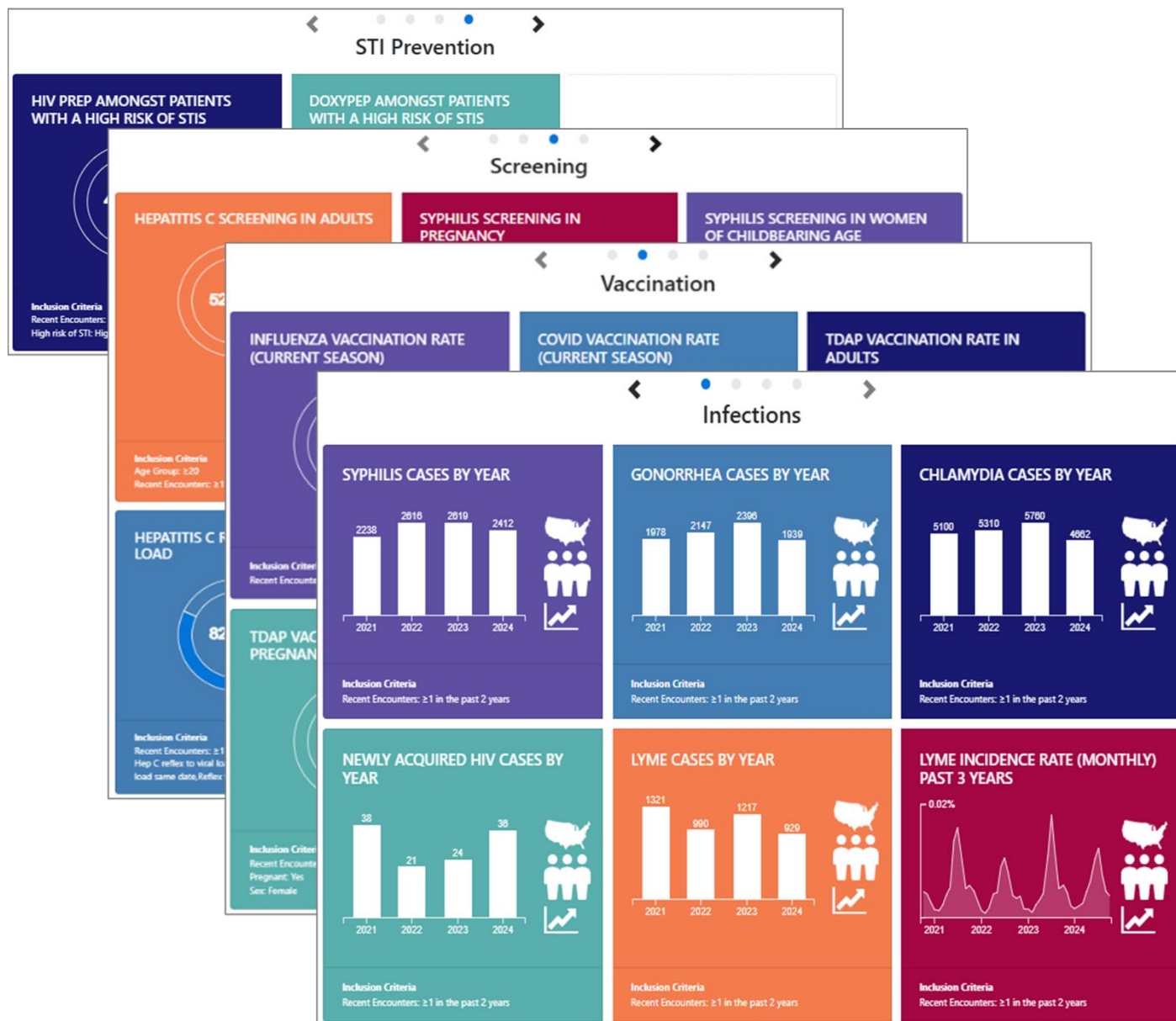
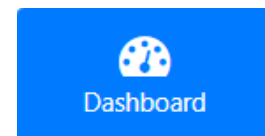
## About ESP and MAGIC

Electronic Medical Record Support for Public Health (ESP) is an EHR-based distributed surveillance network that enables the Massachusetts Department of Public Health (DPH), Bureau of Infectious Disease and Laboratory Sciences (BIDLS) to receive automated electronic reports of select infections and syndromes. It also provides authorized BIDLS staff access to deidentified, population-level summary health information from participating clinical practices in a secure, transparent, and controlled fashion. ESP was developed and implemented by the DPH in collaboration with the Harvard Medical School Department of Population Medicine (DPM) at Harvard Pilgrim Health Care Institute, Commonwealth Informatics Inc (CII), and clinical partners. ESP software is open source and is compatible with different electronic health record systems. [Information about ESP, including code and technical specifications](#) is available and information about [DPH's use of ESP for infectious disease reporting](#) is also available.

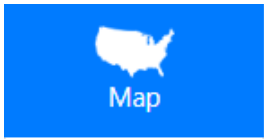
The Massachusetts Platform for Analyzing and Graphing Infections (MAGIC) is the web-based, interactive tool for visualization of aggregate, de-identified ESP data. MAGIC provides timely, high-level summaries and analyses of specific health measures of interest to public health practitioners and others charged with population health management in BIDLS and participating clinical sites.



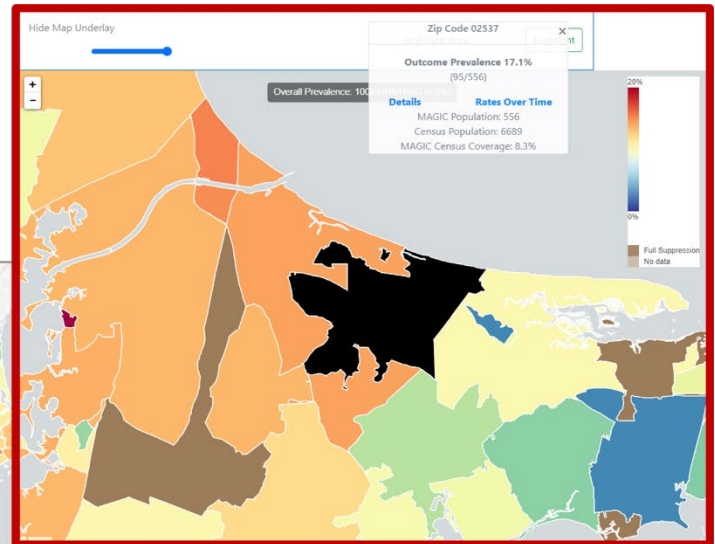
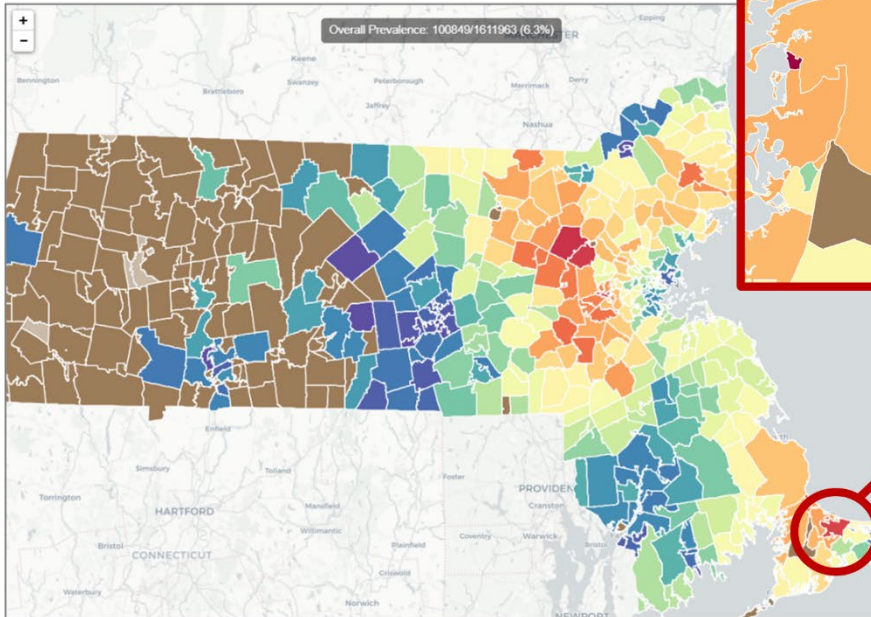
**Dashboards** offer quick, at-a-glance views of a subset of the infection, vaccination, screening, and STI prevention outcomes included in MAGIC. From each tile, users can click on the map, people, and graph icons to navigate to the Heat Map, Demographics & Comorbidities, and Timeseries modules, respectively. There, time periods can be changed, and data can be filtered and/or stratified by any number of population characteristics and outcomes.



While a limited number of outcomes of particular interest are displayed in dashboards, users can select the **Pick Conditions** menu to view maps, demographics, and timeseries graphs for any outcome available in MAGIC. (See page 6 for a complete list of outcomes.)



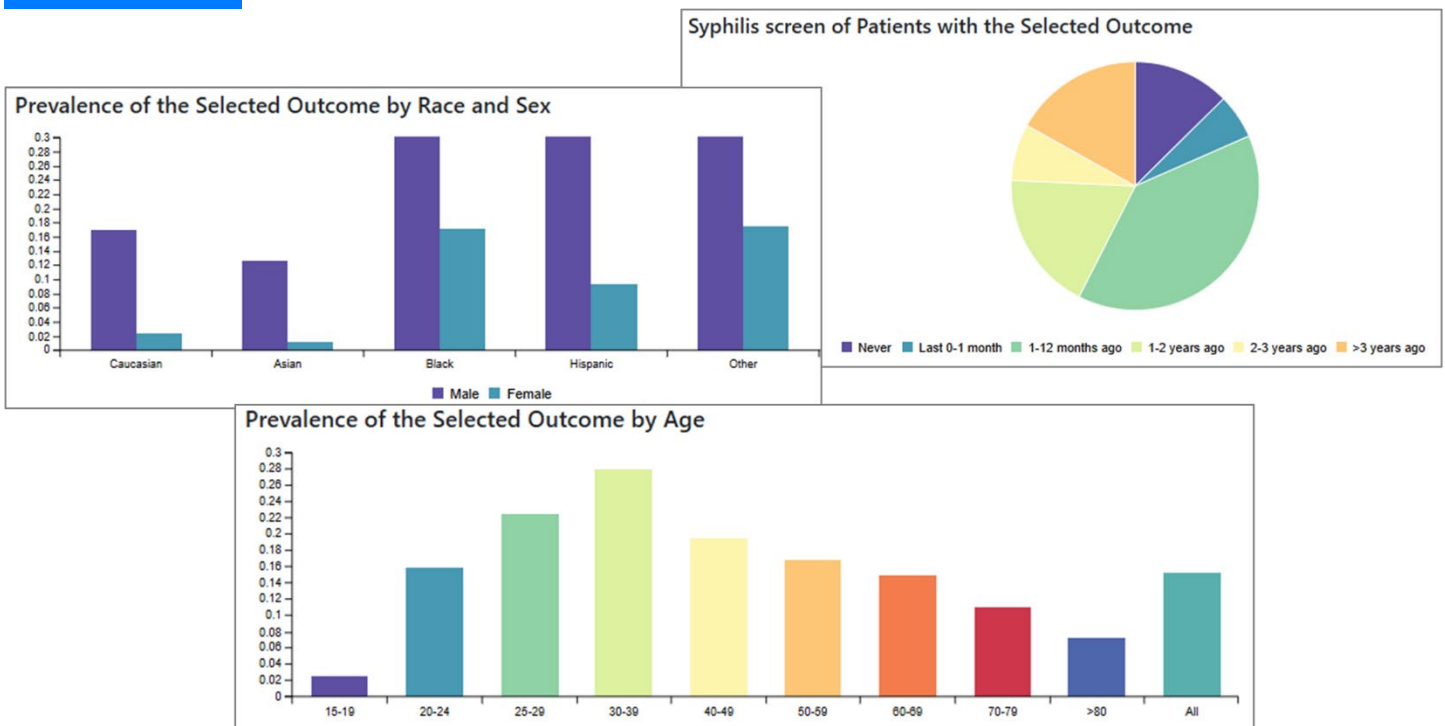
**Heat maps** can be used to view outcome rates geographically. Data can also be filtered for specific population characteristics and viewed for different time periods.



Zoom in and click on specific zip codes to view prevalence for the selected outcome.



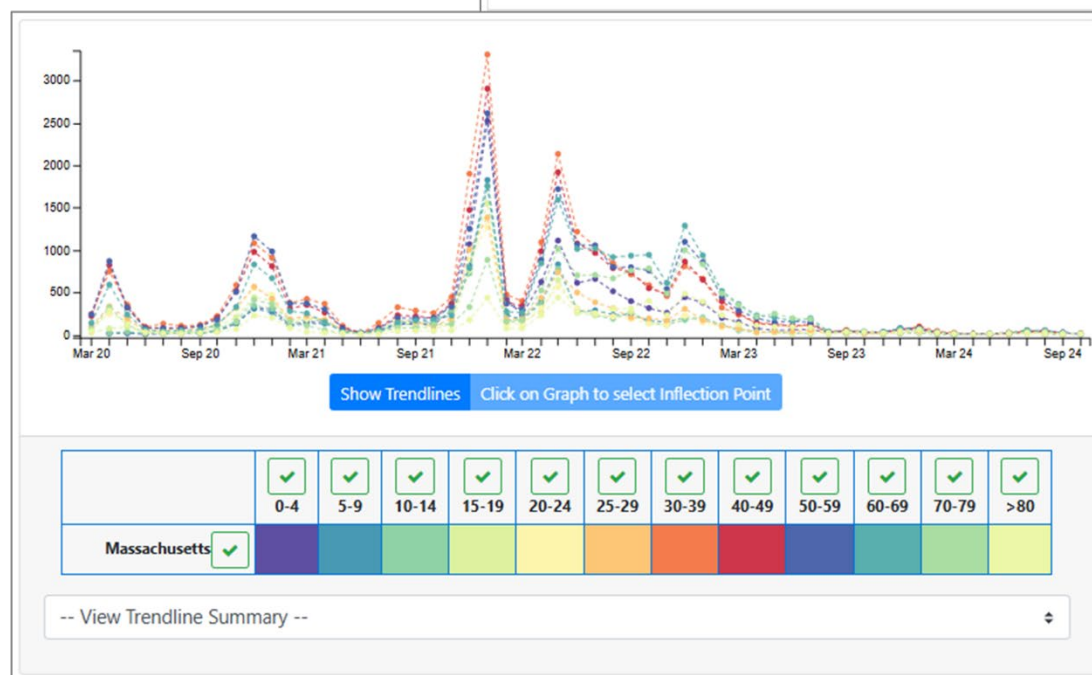
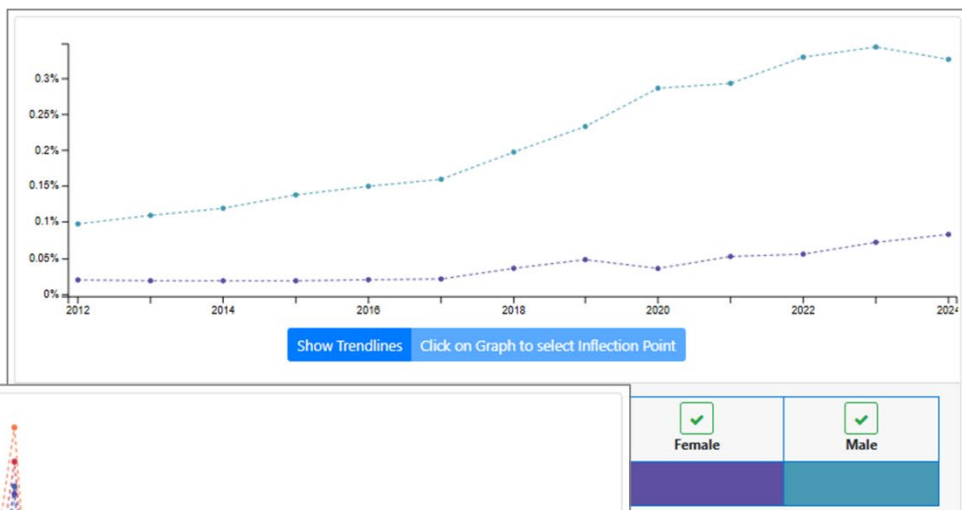
The **Demographics and Comorbidities** module allows users to stratify outcomes by population characteristics such as age, race and ethnicity, gender, and other outcomes. Data can also be filtered by these characteristics and viewed for different time periods.





## Timeseries

Users can create **Timeseries** graphs for any outcome, which can be further stratified and filtered.



Data can be aggregated and viewed by month or by year, and can be viewed as patient counts or as incidence rates.



## Continuity of Care

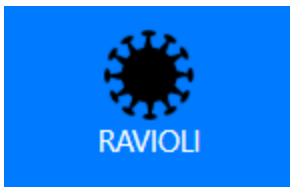
**Continuity of Care** displays summarize patient engagement and

retention in care indicators and enable generation of patient level information for select conditions to support clinical management.

“Line lists” containing patient-level information will only be accessible to users at the practice level through their facility-specific ESP server and only to those individuals granted specific access by their agency’s designated account approver.

Hepatitis C <a href="#">Show inline Graph</a>	Count	Percent	Line list
<b>Total Population Under Surveillance</b> ⓘ	<b>4386273</b>	<b>100%</b>	
Patients tested for hepatitis C in selected year(s) ⓘ	1048749	23.9%	
Patients with a positive result (RNA or ELISA) in selected year(s) ⓘ	41383	3.9%	
Viral load measured during selected year or subsequent years ⓘ	36154	87.4%	
Detectable viral load during selected year or subsequent years ⓘ	22077	61.1%	
Most recent viral load positive ⓘ	12977	35.9%	
Most recent viral load negative ⓘ	23177	64.1%	
Acute hepatitis C ⓘ	3366	8.1%	
Resolved, no treatment ⓘ	943	28.0%	
Persistently infected ⓘ	566	16.8%	<a href="#">List</a>
Unknown status ⓘ	1857	55.2%	<a href="#">List</a>
Chronic hepatitis C ⓘ	40422	97.6%	
Never on treatment ⓘ	33729	83.4%	<a href="#">List</a>
Resolved ⓘ	16765	49.7%	
Persistently infected ⓘ	11773	34.9%	<a href="#">List</a>
Unknown status ⓘ	5191	15.4%	<a href="#">List</a>
Received treatment ⓘ	6693	16.6%	
Viral load not measured ⓘ	773	11.5%	<a href="#">List</a>
Viral load measured ⓘ	5920	88.5%	
Virologic suppression ⓘ	5422	91.6%	
Sustained virological response ⓘ	3060	51.7%	

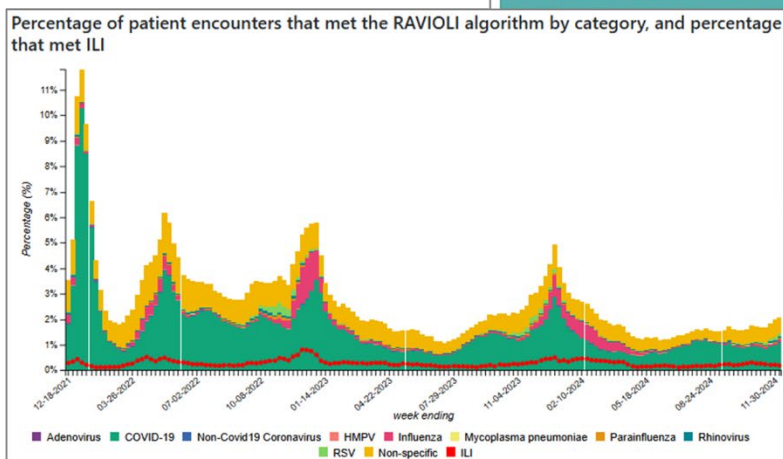
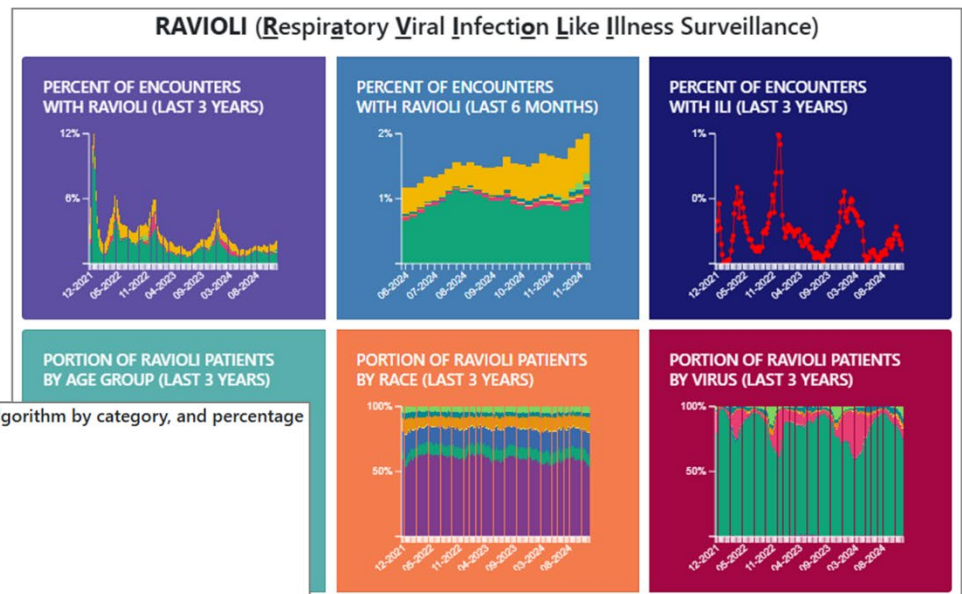




The **RAVIOLI**, or Respiratory Viral Infection Like Illness, surveillance module combines common respiratory conditions and syndromes into a single view allowing users to assess respiratory illness more holistically.

The RAVIOLI dashboard offers quick access to some common queries, and users can also filter and stratify data in any one of these displays.

Data are updated weekly offering near real-time monitoring.



## Accessing MAGIC

Access to MAGIC is restricted to individuals with a username, password, and an authentication app to generate one-time second passcodes. Access by staff within participating practices is approved by a designated account approver at each practice. Only aggregate level information is viewable through MAGIC. All users can view combined summary data from all participating practices. Practice-specific data, however, are only viewable to staff at the specific practice. Authorized DPH users are able to view practice-specific data for all participating facilities. This allows DPH to examine trends by site, an important feature for understanding patterns in care, patient characteristics, etc. Note that project staff at CII and DPM can also see data stratified by site, as authorized by DPH, consistent with their role in the development and implementation of the system.

Prospective users from participating practices should email [DPH-BIDLS-ESPMAGIC-Communication@mass.gov](mailto:DPH-BIDLS-ESPMAGIC-Communication@mass.gov) to request an account. DPH staff will approve requests for new accounts with that practice's designated approver, and then reach out to new users to get them on-boarded.

## Limitations and Additional Notes

Population coverage in ESP and MAGIC reflects patients receiving care through participating clinical practices. As such, it should not be considered a perfect representation of Massachusetts' population at a statewide, community, or zip code level. Data in MAGIC are unadjusted.

Condition detection is based upon custom algorithms. These use a combination of vital signs, diagnosis codes, lab test orders, lab results, immunizations, and/or prescriptions in order to detect conditions. The specific logic for each condition is available [here](#).

The "encounters" used to construct denominators for analyses are those which had any one of the following items documented in the EMR: vital sign (blood pressure, height, weight, temperature), diagnosis code, prescription, laboratory test, or immunization (i.e., "clinical encounters").

The COVID-19 pandemic substantially impacted healthcare utilization in general and the data underlying MAGIC and ESP specifically. During the pandemic period patient interactions with a participating practice may have been exclusively COVID-19-related (e.g., testing or vaccine) and such patients have no other clinical information or history. Therefore, time series data that includes the COVID-19 pandemic period should be interpreted with this in mind.

Data may be incomplete for individuals who seek care with multiple participating clinical practices and/or from healthcare institutions outside of the ESP/MAGIC network. Patients who seek care at multiple clinical partners in the network are not de-duplicated.

Geographic data are based on patients' current zip code as documented in their EMR data. Heat maps only highlight zip codes in which MAGIC covers at least 100 patients (i.e., if your denominator is specified as patients with  $\geq 1$  encounter in the last 2 years and there were less than 100 such patients per the specified locale, the data will not be reported in the map view). In addition, data in the heat maps, bar graphs, and time series are suppressed if less than 5 patients meet the criteria for the numerator.

Please note that the screenshots and data included in this document are intended to be illustrative of the various features available in MAGIC and should not be used or interpreted otherwise.

## List of outcomes currently available in MAGIC

### Infections

Anaplasmosis  
Babesiosis  
Chlamydia  
COVID  
HIV  
Hepatitis A  
Hepatitis B, acute and chronic  
Hepatitis C, acute and chronic  
Gonorrhea  
Lyme  
Syphilis  
Tuberculosis, latent and active

### Screening

Chlamydia  
HIV  
Hepatitis B  
Hepatitis C  
Hepatitis C reflex to viral load  
Gonorrhea  
Syphilis  
Syphilis in pregnancy  
Tuberculosis

### Vaccination

COVID  
Hepatitis A  
Hepatitis B  
Influenza  
TDaP  
TDaP in pregnancy

### STI Prevention

High risk for STI  
DoxyPEP  
PrEP