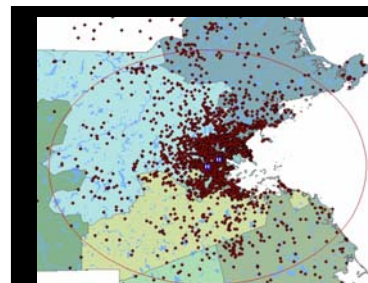
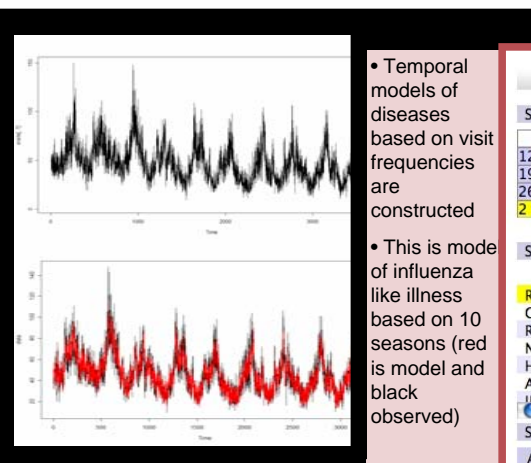


AEGIS (Automated Epidemiologic Geotemporal Integrated Surveillance) is a leading edge system to detect abnormal patterns of disease in the region. The system operates fully in real time and in a completely automated fashion.

- Data are automatically and securely sent from emergency departments and clinics, as soon as patients are registered
- Cases are instantly appended to time series and plotted on maps, as shown
- Advanced geotemporal clustering algorithms are applied to the data streams, comparing prevailing conditions with a normal baseline
- When patterns of disease are abnormal, an electronic message is sent to staff at, participating emergency departments, and local and state departments of public health



- Classical GIS for epi**
- Point Source
 - Case definition solid
 - Huge temporal windows
- GIS for Biosurveillance**
- Could be anywhere
 - "Inverted" case definition
 - Small temporal windows



- Temporal models of diseases based on visit frequencies are constructed
- This is mode of influenza like illness based on 10 seasons (red is model and black observed)

A E G I S

HARVARD MEDICAL SCHOOL Children's Hospital Boston

Logout Help Show Visits

Map Satellite Hybrid

POWERED BY Google

SELECT DATE

12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

SELECT HOSPITAL/SYNDROME

	BIDMC	CAMB	CHB	MGH	SOMER	WH
RESP	***					
GI						
RASH						
NEURO						
HEMOR						
ALL						
ALL						

SELECT ABBERRATION

Aberrations For Current Selection

*** BIDMC RESP 5/4/2 [details](#) [export](#)

Other Aberrations

*** MGH RESP 5/4/5 [details](#) [export](#)

*** BIDMC RESP 5/4/2 [details](#) [export](#)

*** CHB GI 5/3/11 [details](#) [export](#)

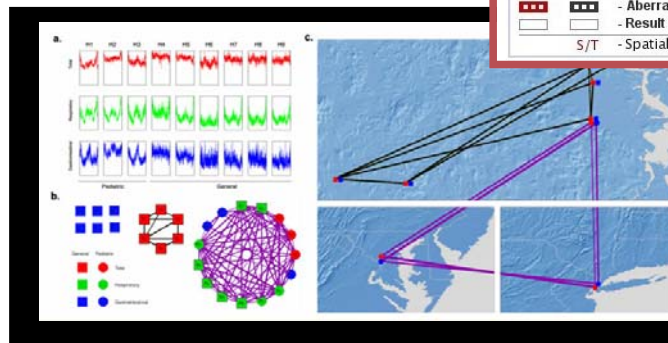
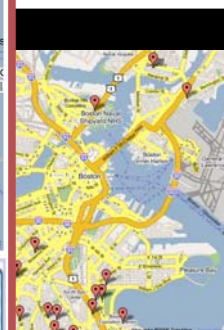
*** CAMB RESP 5/3/23 [details](#) [export](#)

LEGEND

Active	Inactive	Normal
Blue	Grey	- Normal
Yellow	Grey	- Aberration (99% Certainty)
Red	Grey	- Aberration (99.9% Certainty)
White	Grey	- Result not yet available
S/T		- Spatial/Temporal Aberration

TEMPORAL

■ Aberration (99.9% Certainty) ■ Aberration (99% Certainty) ■ Normal - - Predicted Visits
 ■ Observed Visits



In a multivariate relevance network, a geographical view shows a stronger effect of age over geography in determining epidemiological similarity. Visits at a pediatric hospital are significantly more correlated to visits at other pediatric hospitals hundreds of miles away than to visits at neighboring general hospitals

- Using an anonymizer sensitive to the underlying population distribution, we are able to move points from their original locations and anonymize them.
- This allows us to protect privacy while preserving our ability to detect localized clusters.