



Electronic medical record
Support for
Public Health

Denominators matter: Understanding medical encounter frequency and its impact on surveillance estimates using EMR data

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CSTE 2018, West Palm Beach, FL

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Background

- ❑ Electronic medical record (EMR) data are an increasingly common source for public health surveillance
- ❑ EMR systems do not include definitive lists of all patients associated with the practice at any given time
 - Patients may leave a practice without notifying the practice, they might die, or years may elapse between encounters
 - Only those who seek and receive care on a regular basis can be identified with confidence
- ❑ **Challenge:** selecting an appropriate denominator for incidence and prevalence estimates

Background continued

- ❑ Our practice has been to estimate prevalences using “ ≥ 1 encounter of any kind in the last 2 years” as our default denominator
- ❑ Canadian Primary Care Sentinel Surveillance network:
 - Estimated diabetes among patients with ≥ 1 primary care encounter in 2 years (Greiver et al., 2014)
- ❑ NYC Macroscopic:
 - Estimated prevalence of chronic conditions among patients with ≥ 1 visit in 1 year (Thorpe et al., 2016)

Objectives

- ❑ Evaluate the distribution of intervals between encounters for populations of patients to inform the selection of an ideal denominator for population-level disease rates
- ❑ Explore the impact of different denominator definitions on chronic condition prevalence estimates

ESP – EMR Support for Public Health

Software and architecture to extract, analyze, and transmit electronic health information from providers to public health

- Surveys codified EMR data for patients with conditions of public health interest
- Generates secure electronic reports for the state health department
- Designed to be compatible with any EMR system – Requires ability to export data
- Open source software, PopMedNet (available via esphealth.org)

JAMIA 2009;16:18-24

MMWR 2008;57:372-375

Am J Pub Health 2012;102:S325–S332

PRACTICE EMR's



ESP SERVER INFRASTRUCTURE (updated nightly)



AGGREGATED DATA*



HEALTH DEPARTMENT



diagnoses



vital signs



lab results



demographics



medications



immunizations

*Also reports
individual cases of
notifiable diseases



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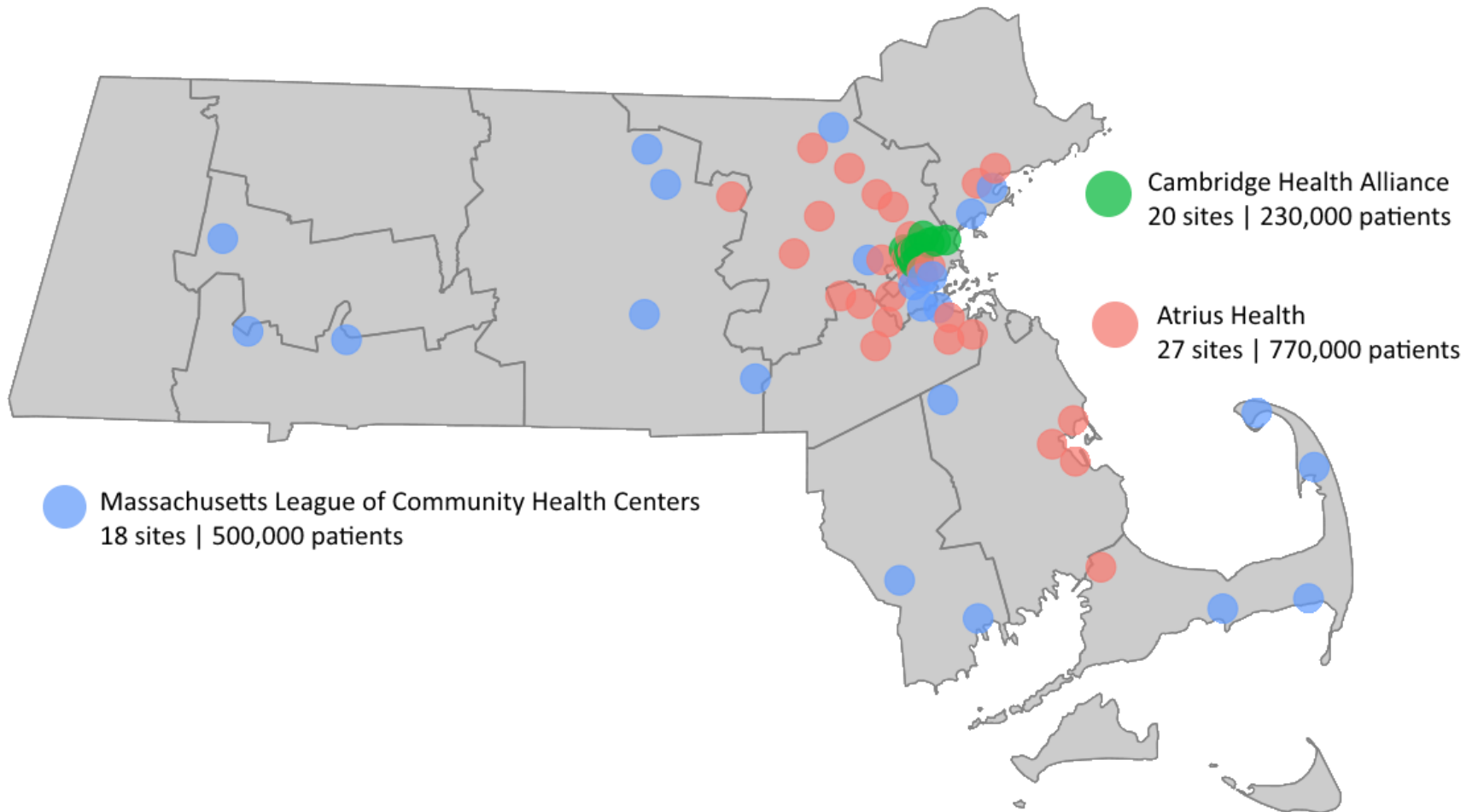
 **Atrius Health**

 **Commonwealth
Informatics**

 **CHA**
Cambridge
Health Alliance




Massachusetts League
of Community Health Centers



Methods

- ❑ Identified date of adult patients' first clinical encounter for each year (2011-2016)
- ❑ Plotted distribution of days until each patient's next encounter

Methods continued

- We defined “clinical encounters” as encounters where at least 1 of the following was recorded:
 - Vital sign (blood pressure, height, weight, temperature)
 - Diagnosis code
 - Immunization
 - Prescription
 - Laboratory test

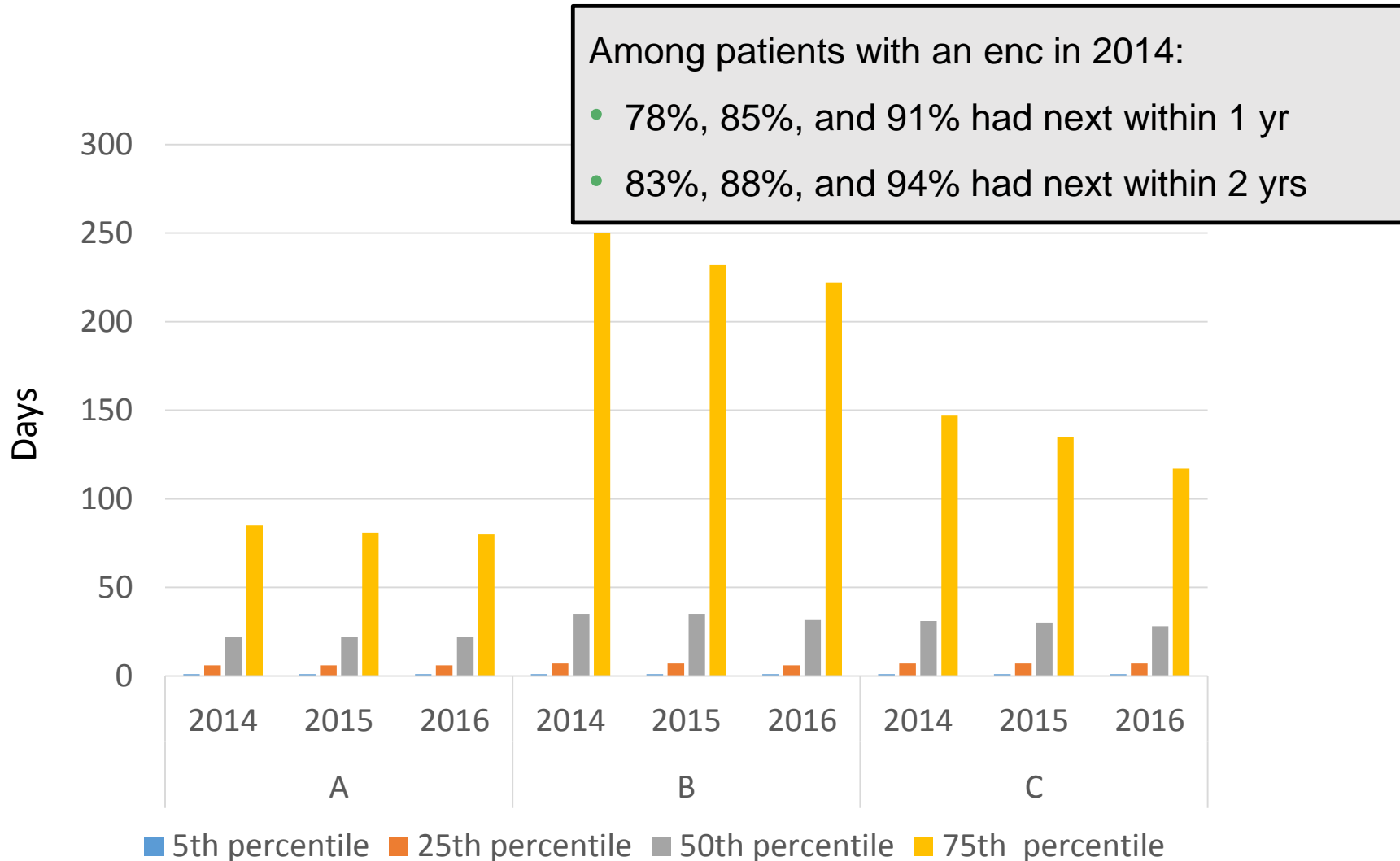
Methods continued

- ❑ Estimated prevalence of asthma, hypertension, obesity, tobacco use in 2016 using different denominators
 - ≥ 1 clinical encounter in the past 2 yr
 - ≥ 1 clinical encounter in the past 1 yr
 - ≥ 2 clinical encounters in the past 1 yr
 - ≥ 2 clinical encounters in the past 2 yr

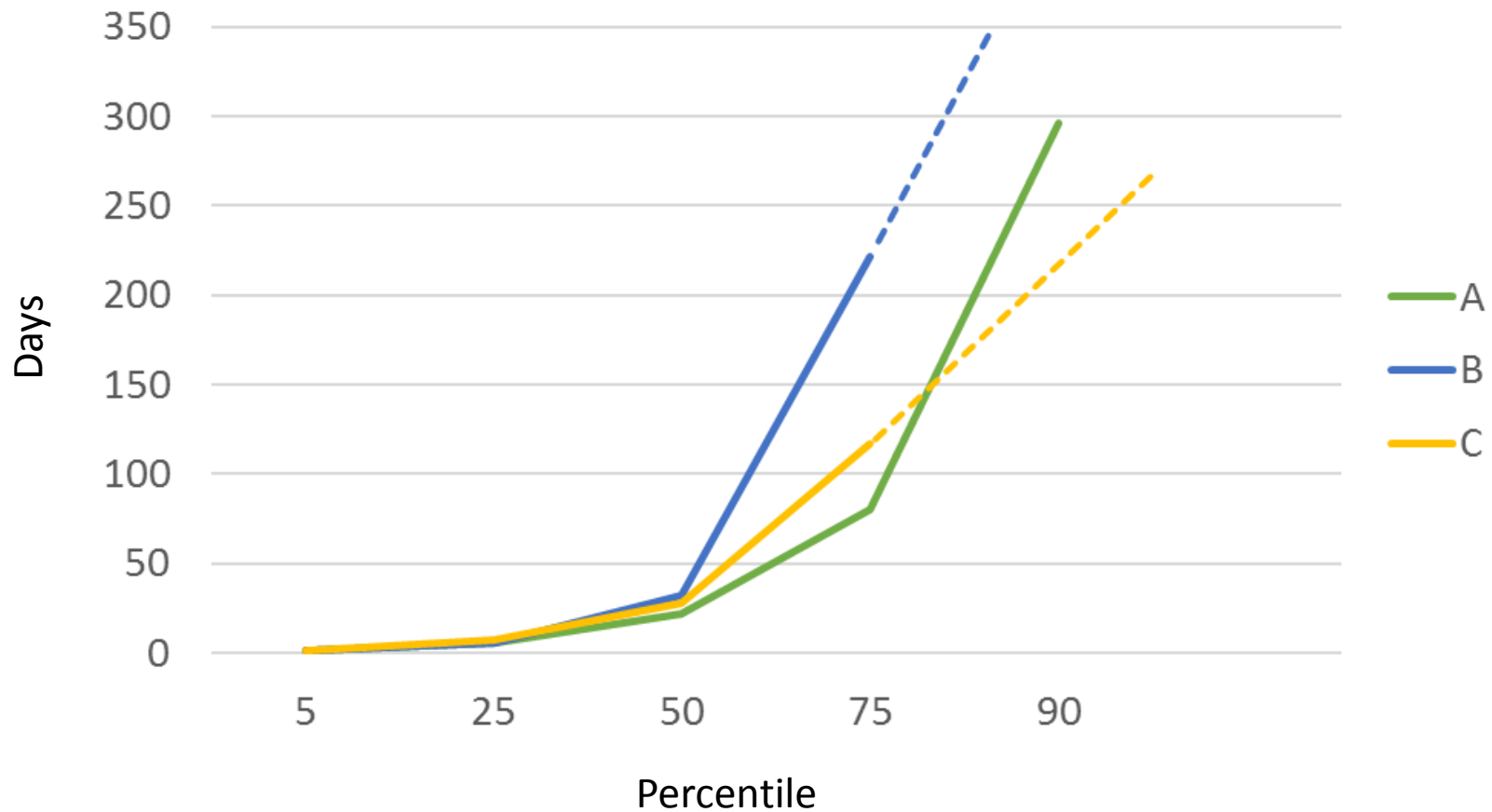
Results

- ❑ 2011-2016: 1,995,529 patients had 90,308,287 clinical encounters across all practices

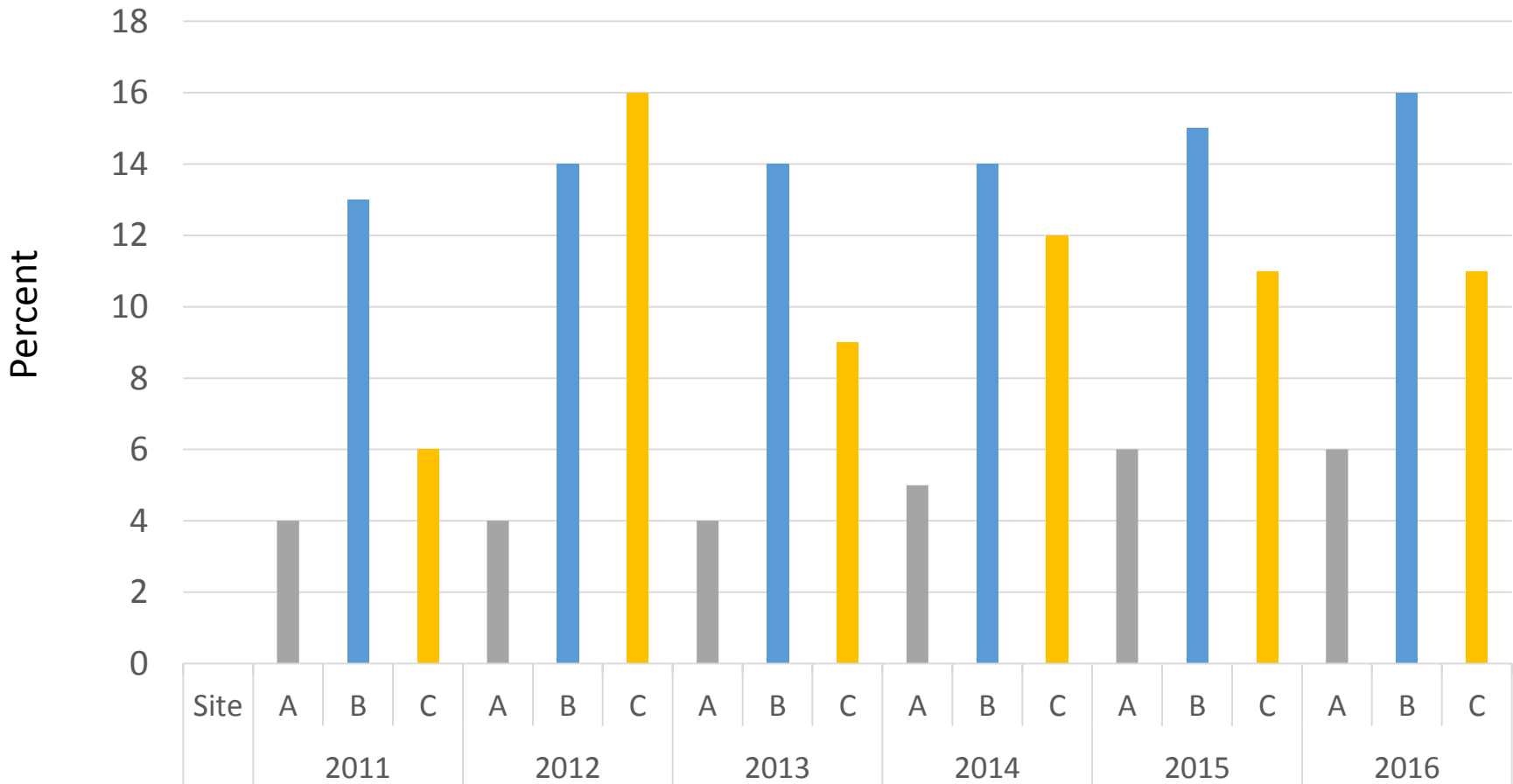
No. of days from 1st annual clinical encounter to the next, adults ≥ 20 yrs



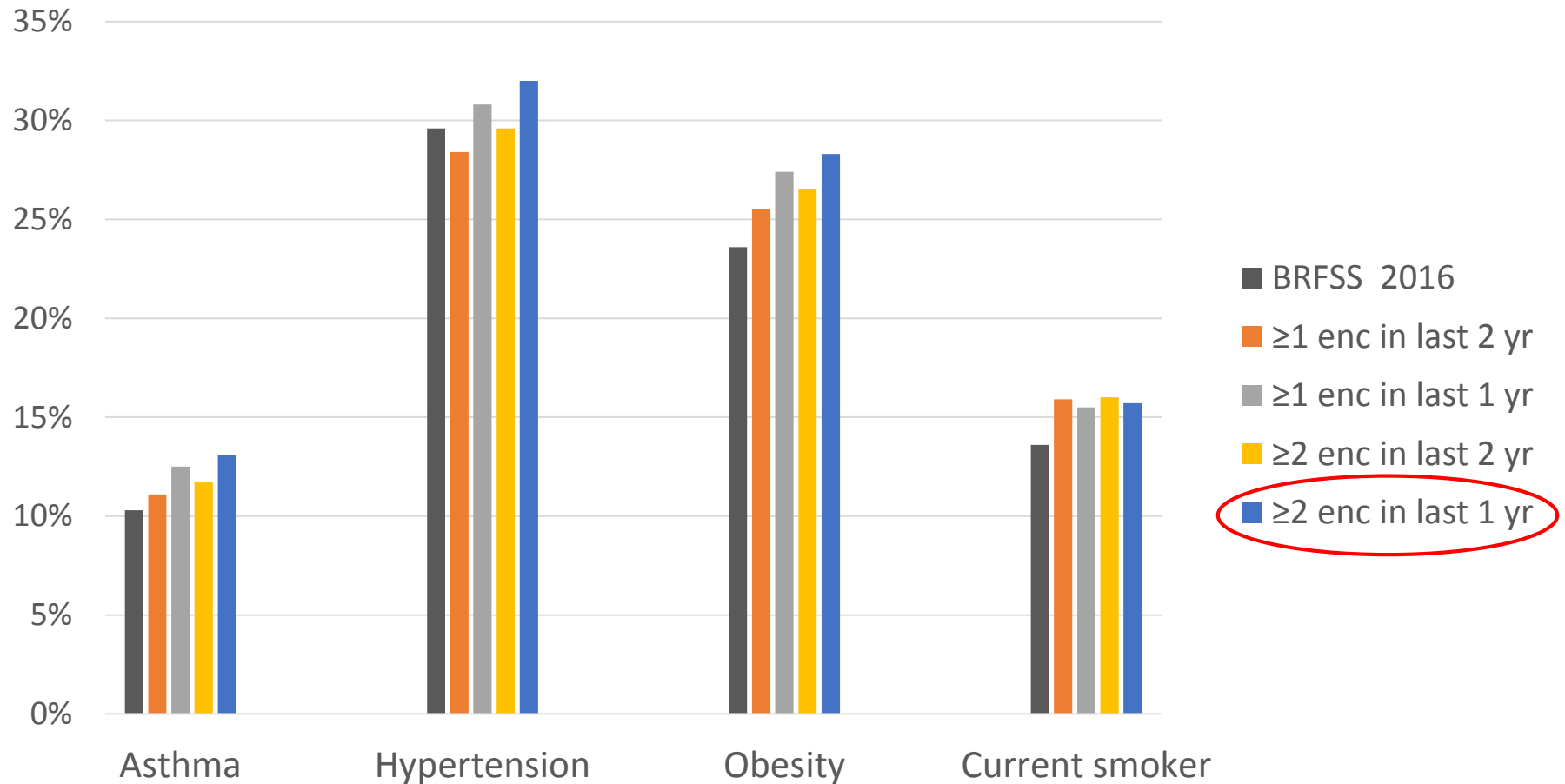
Days to next encounter by percentile, 2016



Of those with an annual clinical encounter, % with no subsequent encounter, adults ≥ 20 yrs



Prevalence of conditions by denominator, MA adults ≥20 yrs, July 2016



ESP prevalence are adjusted for age, sex, race, ethnicity based on 2010 MA census

Conclusions

- ❑ Most ambulatory patients have >1 encounter per year
- ❑ More frequent engagement in care is associated with higher prevalence estimates of some chronic conditions
- ❑ The most appropriate denominator for surveillance estimates from EMR data will vary by condition of interest – and algorithm definition
 - e.g., a less stringent denominator likely best option for “general population” of patients

Acknowledgements

Department of Population Medicine

- **Michael Klompas**
- **Micaela Coady**
- **Aileen Ochoa**

Commonwealth Informatics, Inc.

- **Bob Zambarano**
- **Catherine Rocchio**
- **Karen Eberhardt**
- **Chaim Kirby**

MA Dept. of Public Health

- **Sanouri Ursprung**
- **Natalie Nguyen**

Participating sites

- **Massachusetts League of Community Health Centers**
- **Cambridge Health Alliance**
- **Atrius Health**



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Questions?

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esphealth.org