Temporal effects on data fragmentation

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Green et al, The Ecology of Medical Care Revisited. NEJM 2001

- 1,000 persons
- 800 report symptoms
- 327 consider seeking medical care
- 217 visit a physician's office (113 visit a primary care physician's office)
- 65 visit a complementary or alternative medical care provider
- 21 visit a hospital outpatient clinic
- 14 receive home health care
- 13 visit an emergency department
- 8 are hospitalized
- <1 is hospitalized in an academic medical center
Summary

• Patient data fragmentation across systems increases over time
• Missing data due to fragmentation or time censoring impacts the ability to accurately identify conditions of interest
• “Edge” conditions are particularly prone to data loss
Quantifying “Cross-over” patients

• Finnell et al, Indianapolis, Emergency Department visits:
  ▪ 7.6% over one year
  ▪ 15% over four years

• Bourgeois et al, Massachusetts, Emergency department, inpatient, and observation visits:
  ▪ 31% over five years
Chicago: Percent of Fragmented Care by Number of Years
Effect of data fragmentation

**Diabetes (eMERGE)**
- Wei WQ et al, JAMIA 2012, Olmstead County, two care systems
- Adding in other site data reduced single site cases by 5% and controls by 7%
- Single site data missed 33% of true cases and 37% of true controls

**Asthma (eMERGE)**
- Spring AMIA 2015, Chicago, six care systems
- Adding other institutions data to single site data reduced cases by 1.5% and controls by 16%
Wei WQ et al. The absence of longitudinal data limits the accuracy of high-throughput clinical phenotyping for identifying type 2 diabetes mellitus subjects. IJMI 2012.
Data loss at the edges

• Transition from paper records to EHR

• Transition from pediatric to adult care

• Death