TEMPO Data Products: Health Applications

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Clinical Interests

• Vulnerable populations
• Morbidity/mortality
• Costs
  • Financial (resource utilization, facility risk, HCP P4P)
  • Social
  • Emotional
PM2.5
2015-5th
mortality risk factor
Particulate matter—health impact

- \( \leq 2.5 \) microns
- Rapid inhalation
- Pro-inflammatory
- CV effects (AHA statement)
  - [http://circ.ahajournals.org/content/121/21/2331](http://circ.ahajournals.org/content/121/21/2331)
Exposure and Causal Relationships:

- **Long-term**
  - Cause-specific mortality
  - Cardiopulmonary morbidity

- **Short-term**
  - Cardiopulmonary diseases
    - Single & multi-city
      - Mortality (nonaccidental, CV)
    - Single City
      - Hospital admissions, ER visits

- Sources
Global satellite-derived map of PM2.5 averaged over 2001-2006. Credit: Dalhousie University, Aaron van Donkelaar.
Ozone—health impact

- Additive
- Lung function
- Respiratory disorders
- Morbidity
- Mortality

Counties Where Measured Ozone is Above Proposed Range of Standards (65 – 70 parts per billion)

- 310 counties would violate 70 parts per billion (ppb)
- 200 additional counties would violate 65 ppb for a total of 516

Based on 2011 – 2013 monitoring data
Utility of TEMPO data in Health Applications
Exposure Risk

- Fixed site
- Remote satellite
- Models
Improved spatial resolution
Reduction in exposure misclassification
Epidemiological research
Exposure response curve
Multiple contaminants
Characterize health impact

• PM$_{2.5}$ and O$_3$
• Mortality
• Morbidity
• CV and pulmonary disease burden
• Healthcare resource utilization
• ‘Plug and play’ model
One example:
Alabama has the 2nd highest death rate from cardiovascular disease in the country.**

- Heart disease is the no. 1 killer in Alabama*
- 12,981 people in Alabama died of heart disease in 2015*
- Stroke is the no. 4 killer in Alabama*
- 2,937 in Alabama died of stroke in 2015*
The following code(s) above Z77.110 contain annotation back-references that may be applicable to Z77.110:

- Z80-Z99 Factors influencing health status and contact with health services
- Z77-Z79 Persons with potential health hazards related to family and personal history and certain conditions influencing health status
- Z77 Other contact with and (suspected) exposures hazardous to health

Approximate Synonyms
- Exposure to air pollution
- Exposure to polluted air

Present On Admission
- Z77.110 is considered exempt from POA reporting.

ICD-10-CM Z77.110 is grouped within Diagnostic Related Group(s) (MS-DRG v35.0):
- 951 Other factors influencing health status

Convert Z77.110 to ICD-9-CM

Code History
- 2016 (effective 10/1/2015): New code (first year of non-draft ICD-10-CM)
- 2017 (effective 10/1/2016): No change
- 2018 (effective 10/1/2017): No change

Diagnosis Index entries containing back-references to Z77.110:
- **Contact (with)** - see also Exposure (to)
  - pollution
  - air Z77.110
  - air pollution Z77.110
- **Exposure (to)** T75.89 - see also Contact, with
  - pollution
  - air Z77.110
  - air pollution Z77.110

Reimbursement claims with a date of service on or after October 1, 2015 require the use of ICD-10-CM codes.
Priorities

• Better research/science
  • Limitations:
    • Environmental
      • Fixed site
      • Remote satellite
    • Health
      • Data acquisition
      • Structure/sources

• Framing the connection
  • Health
  • Air quality changes
    Speciation, combinations, sources