Population Health Modeling: Day 7

Yale SCHOOL OF PUBLIC HEALTH
Data Science and Data Equity

Check-In

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Data Science and Data Equity

Brief Review

- Basic philosophical and ethical principles for public health research and public health modeling
- Outbreak Investigations- lots of moving parts in any data collection/analysis process
- Everything you need to know about *Streptococcus pneumoniae*
- First run, time series analysis
- Adapting your data, time series analysis

Brief Overview

- Hierarchical modeling

Brief Overview

Multi-level structure:
Hierarchical models handle data that have natural groupings or layers — for example, patients nested within hospitals, or serotypes nested within years.

- **Borrowing strength:**
Instead of modeling each group completely separately, hierarchical models share information across groups. This helps improve estimates, especially for groups with less data.

- **Random effects:**
These models include "random effects" — parameters that vary by group but come from a common distribution. For example, each serotype might have its own baseline risk, but those risks come from an overall population distribution.

- **Partial pooling:**
Hierarchical models strike a balance between *complete pooling* (treating all groups the same) and *no pooling* (treating each group completely independently), improving accuracy and interpretability.

Paper Review

- Warren
- Weinberger