

Motivation and Objectives

Motivation

- Studying health effects of aircraft noise is important in policy models, but few U.S. studies exist.

Objectives

Long Term:

- Evaluate associations between aircraft noise and cardiovascular outcomes, cross-sectionally and over time.
- Estimate population attributable risk.

Short Term:

- Assign aircraft noise exposures over time to geocoded participant addresses.
- Develop models to investigate associations of noise with cardiovascular outcome(s).

Methods and Materials

Leverage data from the Nurses' Health Studies (NHS) and Health Professionals' Follow-up Study (HPFS) – longitudinal cohorts. Key attributes:

- Large sample size and geographic distribution.
- Individual data on traditional cardiovascular disease (CVD) risk factors (e.g., age, smoking).
- Geocoded addresses over time.
- Systematically ascertained, physician-reviewed and adjudicated outcomes.

Assign noise exposure to geocoded address over time.

- Develop noise levels in multiple metrics, out to DNL 45 dB.
- Calculate noise exposures at participant addresses over time.

Develop survey questions on housing characteristics, noise perception and stress.

Summary

- Collaborating with Volpe to model noise for 1995-2015.
 - Operational data source: Enhanced Traffic Management System (ETMS) run through Aviation Environmental Design Tool (AEDT).
 - Noise estimates out to DNL 45 dB.
 - Noise estimates in multiple metrics.
- Ongoing analyses of spatiotemporal exposure patterns for quality assurance.
- Assigning longitudinal aircraft noise exposure to geocoded addresses.

Results and Discussion

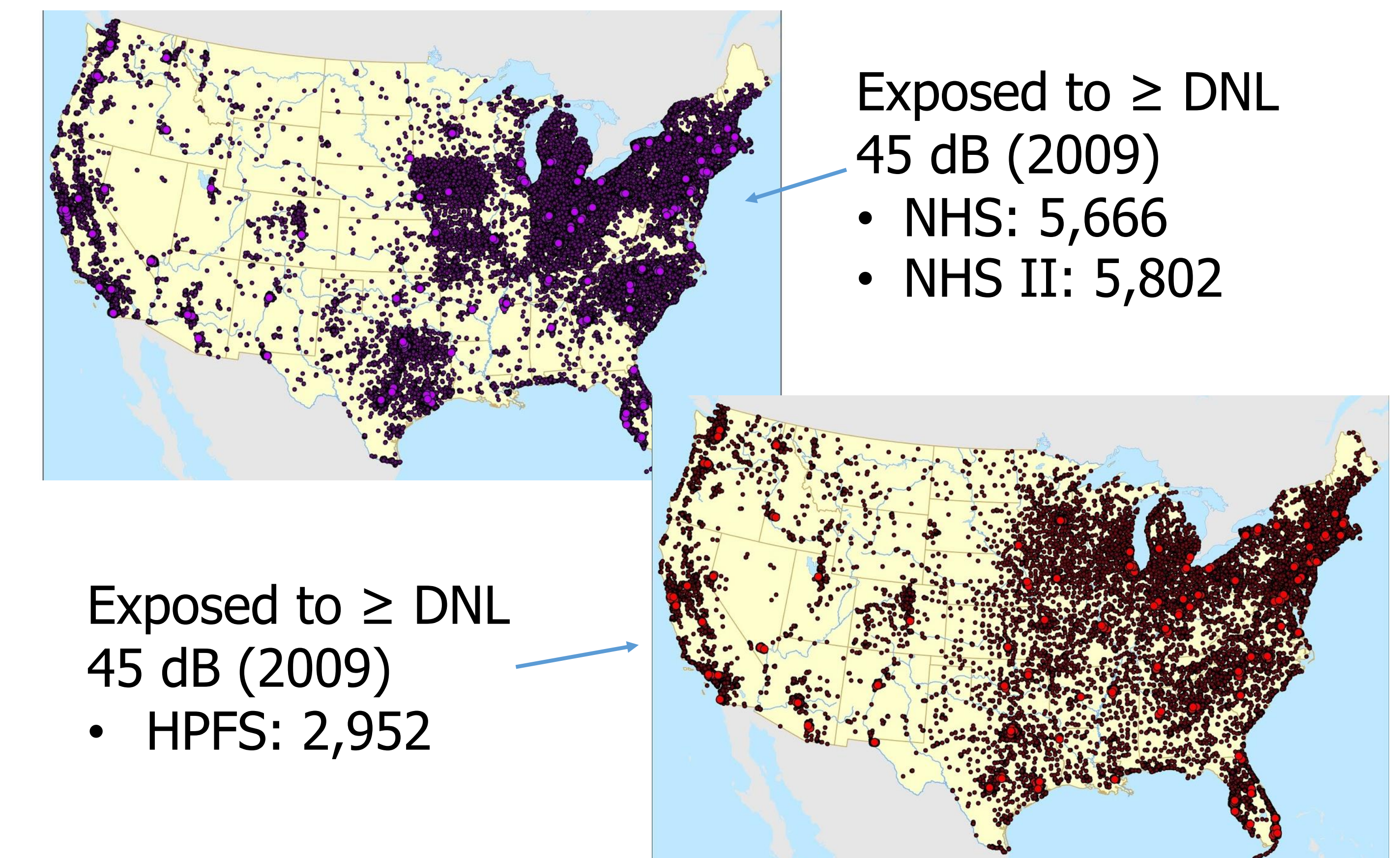
Completed procedural steps related to accessing NHS/HPFS data for linkage with noise data:

- Obtained approval from BU and Harvard University/Brigham & Women's Hospital Human Subjects Review Boards.
- Obtained Manuscript Analysis Plans for two papers:
 - Aircraft Noise and Hypertension
 - Aircraft Noise and CVD

Coordinated with FAA regarding noise data:

- Entered into Data Use Agreement.
- Received noise data for:
 - Years: 1995, 2000, 2005, 2010, 2015.
 - Metrics: DNL, Leq Day, Leq Night, TALA65.
- Performed extensive analyses of noise contours and exposure estimates.
 - Found systematic differences between Volpe and Wyle noise estimates.
 - Determined subset of airports for rerun to ensure internal consistency in exposure values.

Results and Discussion (cont.)



Key Barriers

- Resolving differences in noise estimates generated by Volpe and Wyle.
- Converting noise data into useable formats.

Conclusions

Outcomes

- Improved understanding of how populations are exposed to aircraft noise over time.
- Estimate of risks of cardiovascular outcomes associated with noise-related exposures among adults.
- Evidence regarding pathways by which aircraft noise can influence cardiovascular disease.

Practical applications

- Could improve ability to quantify (and monetize) health outcomes rather than just focusing on property value as the only approach for valuation.