A Framework for Validating Modeled Air Quality Data for use in Biomedical Research
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Background
- There are only three permanent air quality (AQ) monitoring stations in Salt Lake (SL) County causing spatial and temporal gaps.
- Biomedical research requires a high resolution spatio-temporal AQ grid.¹
- Modeled AQ data has higher spatial and temporal resolution, but needs experimental validation.¹
- Comparison of measured AQ data at the same location and time as modeled AQ data can provide this validation.

Methods
- Modeled data from the Environmental Protection Agency (EPA) modeled AQ data for the CDC national environmental public health tracking network² using a Hierarchical Bayesian Space Time Modeling approach.³
- Modeled PM$_{2.5}$ data in a 12 x12 kilometer continuous grid resolution for the years 2007 and 2008.²
- Measured data was obtained from EPA’s Air Quality System (AQS) Datamart.⁴
- Statistical comparisons of measured vs. modeled data were done using daily and monthly PM$_{2.5}$ averages for the years 2007-08 with MySQL, MATLAB and R.

Conclusion & Future Work
- We developed a prototype for comparing and validating modeled against measured AQ data.
- We will expand on the validating measures, and include a library of data modeling algorithms such as, the Complex Terrain Dispersion Model Plus Algorithms for Unstable Situations (CTDMPPLUS)⁵ and Yanosky⁶ for user selection.
- Using OpenFurther⁷, different air quality sources, including modeled could be selected, validated and then integrated with biomedical data.

References
2. EPA’s “Air Quality Data for the CDC National Environmental Public Health Tracking Network.” Available from: http://www.epa.gov/health/tracking/cdc.html
4. EPA’s Air Quality System (AQS) Datamart. Available from:
7. Federating Air Quality Data with Clinical Data, Gouripeddi, et. al, Fall AMIA Annual Symposium 2014.

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