

Supplemental Material: “Environmental Public Health Tracking of Childhood Asthma Using California Health Interview Survey, Traffic and Outdoor Air Pollution Data”, Wilhelm et al., 2008.

Table 1 provides a list of other potential health data sources for tracking of childhood asthma and its relation to air pollution. One potential source is administrative data, such as hospital discharge records. For example, Babin et al. (2007) examined associations between short-term variations in air pollution (O_3 and $PM_{2.5}$) and daily pediatric ED visits and asthma related admissions in Washington D.C. as part of an EPHT pilot project. In California, statewide data on asthma hospitalizations and emergency room visits are available through the Office of Statewide Health Planning and Development (OSHPD). The benefits of administrative data (e.g., hospital discharge data) for building an EPHT system are that they can include large populations and dates of diagnoses or admissions allow for examination of air pollution levels immediately prior to the event (i.e., acute effects). However, hospitalization data do not provide an accurate estimate of asthma prevalence, as they miss those who are diagnosed with this illness and are not hospitalized, i.e., they generally comprise severe asthma incidents and/or asthma exacerbations in the medically underserved or underinsured that lack proper medications and management plans. Such data sources also currently do not include potentially important information such as school locations, residential histories, and exposure to secondhand smoke and indoor allergens. Furthermore, hospital discharge databases typically do not include patient addresses (for example, in California, only residential zip codes are currently recorded) which can lead to increased exposure misclassification, especially for traffic-related pollutants whose concentrations vary substantially over short distances.

The California Healthy Kids Survey is a self-reported, biennial survey of youth health risks and behaviors. Subjects in all participating schools answer a question about lifetime asthma

diagnosis, while a sub-sample also complete questions on current asthma-like symptoms. Although schools may provide a framework for routine data collection on asthma in support of EPHT, this survey in particular only covers fifth through twelfth graders, does not include all schools in the state (and only a subset answer asthma symptom as well as doctor-diagnosis questions), and no residential information is available since the survey is completed anonymously (only school location is known). The survey includes data collection on some covariates such as age, gender, race/ethnicity (for grades 7 and above), tobacco use, physical activity, and school safety. More detailed data is collected in a physical health module such as asthma-like symptoms, ED visits, asthma medication use, exercise habits, and diet; however, this module is currently optional.

Other potential asthma data sources are public (e.g., Medi-Cal) and private (e.g., Kaiser Permanente) health insurance patient databases. Strengths of these databases are that they include detailed patient-level information (e.g., residential addresses, dates of diagnoses, medication use) and could potentially be modified to include data collection for key covariates of interest. However, they focus on specific populations (in the case of Medi-Cal, low income individuals only) and thus are not representative of the state as a whole. Finally, obstacles for using nation-wide survey data such as the NHIS include the relatively small sample sizes for local areas and sub-populations of interest (racial and ethnic minorities) where interactions between environmental and other exposures (e.g., low social support or limited health care access) may be important and the fact that public-use versions of these survey data only include residential location information at relatively broad geographic (e.g., county) levels. Thus, although hospital discharge or health insurance databases might provide more detailed information on disease status and medication use, they are limited to certain segments of the

population and currently lack detailed information on potentially important confounders, residential mobility, and time-activity patterns (and it is not clear how easily these systems could be expanded to include this data collection and whether the collecting agencies would be amenable to such changes). Although surveys such as CHIS rely on self-reports of disease status, there are data supporting the accuracy of self-reported asthma diagnoses and symptoms based on the ISAAC questionnaire (Jenkins et al. 1996), and thus use of these standardized questions in surveys may provide a more feasible approach for EPHT considering data collection on a wide array of covariates and time-activity information is already included, or may be more easily added since these efforts are focused on research applications.

Supplemental Material: Table 1. Examples of health databases with information on childhood asthma morbidity^a

Database	Type	Frequency	Health Endpoints	Geographic Locator and Coverage
OSHPD (California)	Administrative, hospital discharge data	Continuous	Hospital discharges and emergency room visits for asthma (based on ICD codes)	State-wide; residential zip codes
Population-Based Survey (e.g., NHIS)	Survey (in-person)	Annual	Lifetime asthma diagnosis, current asthma, asthma attacks in previous year	Nation-wide; residential county
School-Based Survey (e.g., California Healthy Kids)	Survey (at the school)	Biennial	Lifetime asthma diagnosis – all participating schools; Current asthma-like symptoms optional for sub-set of schools	State-wide; All public schools eligible, certain schools required to participate; includes 5-12 th graders; anonymous survey so no information on residential location
Public Health Insurance (e.g., Medi-Cal)	Administrative, health insurance	Continuous	Asthma outpatient visits, hospitalizations, emergency room visits, medication use	Covers individuals enrolled in the program (low income); residential addresses
Private Health Insurance (e.g., Kaiser Permanente)	Administrative, health insurance	Continuous	Asthma outpatient visits, hospitalizations, emergency room visits, medication use	Covers individuals enrolled in the program; residential addresses

^a See also “Strategies for Establishing an Environmental Health Surveillance System in California. A Report of the SB 702 Expert Working Group”. California Policy Research Center, University of California, 2004.

References

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