Specialized technique shows asthma prevalence, distribution at neighborhood level

**Description:** The project Clinical and Public Health Data Exchange estimated the pattern of asthma prevalence at the neighborhood level (census block group of 600 to 3,000 people) across Wisconsin. These estimates were produced using data from the Behavioral Risk Factor Surveillance System (BRFSS) and the University of Wisconsin Electronic Health Record (EHR) Public Health Information Exchange (PHINEX).

**Relevance:** Asthma is a chronic disease affecting more than 500,000 children and adults in Wisconsin. BRFSS data are used to provide annual statewide asthma prevalence estimates; however, the data consist of small samples and self-reported health outcomes. Although data are provided at the county level, 14 counties are excluded due to insufficient observations. EHR data allows estimation to the neighborhood level, where many policies and interventions are designed and implemented.

**Results:** This study enhances knowledge about asthma prevalence and its distribution across Wisconsin. The focus on individual neighborhoods will allow state and local public health agencies, health care providers, advocacy groups and insurance companies to highlight areas of asthma disparity, allow discovery of novel risk factors and improve targeting of education and health care interventions.

The BRFSS sample of Wisconsin residents with asthma included 3,882 children (younger than 18) and 19,063 adults (age 18 and older). The PHINEX sample included 12,667 adults and children with asthma. At the county level, the BRFSS and PHINEX samples had similar estimates.

Using individual records from the BRFSS, Dr. Guilbert produced an asthma prevalence estimate for all 72 counties in Wisconsin. Simultaneously, she produced an estimate for the 72 counties using EHR data and associated demographic characteristics. EHR data also was used to produce an estimate for the asthmatic population at the census block group level.

Dr. Guilbert used small area estimation (SAE), a specialized analysis technique, to provide asthma prevalence estimates in the 14 counties with insufficient BRFSS observations (SAE was comparable to direct estimates in counties with sufficiently large sample sizes). Using census covariates, SAE was able to define areas of higher asthma prevalence at the neighborhood level.

Results showed that asthma prevalence was higher in children and around metropolitan areas. In Milwaukee, asthma prevalence among children exceeded 17.9 percent in several census block groups – the highest in the state.

This project helped establish the UW e-Health PHINEX project as a campus-wide collaborator through the Institute for Clinical and Translational Research. Research groups interested in other chronic diseases, such as diabetes and obesity, plan to use these methods and results for future grant submissions.