Lessons Learned for the Study of Childhood Asthma for the National Children's Study

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Introduction

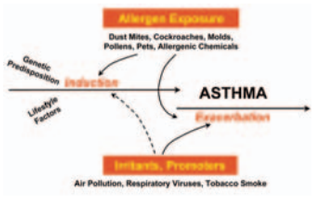
Asthma is one of five priority outcome areas selected for focused evaluation in the National Children's Study. The environmental causes of both incident asthma and exacerbations of asthma in children are of concern.

Projects Conducted to Support Study of Childhood Asthma in the National Children's Study

- *Lessons Learned for the Study of Childhood Asthma from the Centers for Children's Environmental Health and Disease Prevention Research* – published as part of a Mini-Monograph in *Environmental Health Perspectives*, October, 2005: http://ehp.niehs.nih.gov/docs/2005/7671/7671.pdf
- Workshop: Methods for the Assessment of Asthma-Related Health Outcomes – May 27–28, 2004, Orlando, Florida

  Report available at www.nationalchildrensstudy.gov

Factors Related to Asthma



Childhood Asthma: Lessons Learned from the NIEHS/EPA Children's Centers

Seven of the NIEHS/EPA Centers for Children's Environmental Health and Disease Prevention Research (Children's Centers) have conducted studies related to asthma in both urban and rural populations. These studies provide important lessons regarding the successful conduct of community research addressing asthma and demonstrate that it is necessary and feasible to conduct repeated evaluations of environmental exposures in the home to address environmental factors relevant to asthma.

NIEHS/EPA Children's Centers Locations

Definition of asthma and assessment of disease severity is complex and requires a combination of questionnaires, pulmonary function tests, and biologic samples for markers of immune response and disease activity. Definition of asthma is particularly problematic in young children, who may exhibit typical asthma symptoms sporadically with respiratory infections without developing chronic asthma.

Environmental exposures included demographic, social, medical, and environmental exposure data. Most studies included inspection, air and dust sampling, and biologic sampling for ETS, pesticides, and IgE sensitization that could be compared to allergen exposures.

Reference

Eggleston PA, et al. 2005. **Lessons Learned for the Study of Childhood Asthma from the Centers for Children's Environmental Health and Disease Prevention Research.** *Environmental Health Perspectives* 113:1430–1436. doi:10.1289/ehp.7671 [Online 24 June 2005]

Summary of Lessons Learned

- **Asthma identification requires a combination of questionnaire and physiologic measures.** To allow comparisons with previously reported data and for comparisons of National Children's Study data with other countries, it is advisable to include questions from the ISAAC, the ATS, and the CHSA in Study questionnaires. In addition to historical information, objective measures such as spirometry, eosinophil counts in peripheral blood, secretions, or measures of specific IgE antibody are usually included in definitions of asthma.
- **Identification of asthma in preschool-age children is problematic.** Many children wheeze or cough with respiratory infections and never wheeze when they are older. For this reason, it is appropriate to classify these episodes as recurrent wheezing illness rather than asthma and to reserve this definition for other children with more persistent symptoms.

- **Medication confounds the assessment of asthma symptoms and classification of disease severity.** Short-acting, beta-adrenergic agonists (SABAs) will predictably improve acute asthma symptoms, and their use may be equated with asthma episodes. However, they are also used to prevent symptoms, thus introducing uncertainty about their reliability as an indicator of asthma.
- **Recruitment and data collection in health care settings requires dedicated study staff.** The Children's Centers found that health care personnel in clinical settings could not be relied on to either recruit children into the studies or to collect outcome data, adding to the cost and complexity of recruiting in a clinical setting.
- **There are important longitudinal data to be gained from cohorts of older children.** Longitudinal studies provide essential data on sequence of exposures, incidence cases of asthma, and sequence of asthma episodes. Asthma is characteristically variable, so repeated measures are important.

Workshop – Summary of Recommendations

Data Gaps in Questionnaires

- Three parental-specific questionnaires were recommended: Maternal history questionnaire, with questions sensitive enough to identify undiagnosed women, paternal history questionnaire (same as maternal history questions), and a postpartum questionnaire, as soon as possible after birth.
- Child data should be collected at 4–6 weeks, 3–4 months, 6 months, 1 year, and annually thereafter: questionnaires should include symptoms and diagnoses, reduced physical activity due to respiratory symptoms, prescribed and OTC medicines, urgent care.

Calendars and Diaries

- Baby calendars may be a useful tool to assist memory.
- Because few subjects are motivated to maintain diaries in any form, subject diaries should not be considered for use in the National Children's Study.

Minimally Invasive Clinical Outcome Measures

- High-priority clinical outcome measures should include health care utilization, quality of life, growth and development, allergy, physical examination, sleep/respiratory studies, oscillometry (start age 3 then annually to age 7), spirometry (start annually at age 5).

Minimally Invasive Clinical Outcome Biomarkers

- High-priority clinical biomarkers should include exhaled breath condensate (annually from age 5 when spirometry is done), nasal swab (highest priority at 6 months, 1 year, and 2 years), cord blood, meconium, blood (6 months, 12 months, and years 2, 5, 8, and 16).

Implications for the National Children's Study

Identification of asthma and the environmental factors important in induction and exacerbation will require a multi-faceted repeated measures approach in the National Children's Study.

Implementing the National Children's Study:
Scientific Progress, Challenges, and Opportunities

Study Assembly Meeting

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