



Invited Commentary: Asthma Surveillance in US Children

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Abbreviations: NHANES, National Health and Nutrition Examination Survey; NHIS, National Health Interview Survey.

Asthma is a highly prevalent and disabling disease of childhood. Data from national surveys indicate that 5–11 percent of children and adolescents in the United States—totaling over 4 million persons—have physician-diagnosed asthma (1–4). It is the most prevalent cause of childhood disability, with 1.4 percent of US children having disabling asthma (5). These data leave little room to doubt that asthma is one of the leading public health problems in the United States. Much of our knowledge about the burden of asthma in the US population comes from the data systems of the National Center for Health Statistics.

The National Health Interview Survey (NHIS) has been used to track diagnosed asthma for over 30 years. Prior to 1997, the emphasis of the NHIS was to report the diagnosis of asthma. In 1997, the National Center for Health Statistics redesigned the NHIS. In this issue of the *Journal*, Akinbami et al. (6) try to make sense of the decline in the prevalence of asthma introduced by this redesign. The authors' analyses are a credible attempt to correct the artifactual decrease in asthma prevalence due to the NHIS redesign. Still, one cannot help but question why the NHIS—a survey that is so central to our understanding of asthma trends and the allocation of resources to control asthma—was altered in the midst of what appears to be an epidemic.

Updating the structure of surveys is important. Otherwise, our monitoring systems would quickly become obsolete. The redesign of the NHIS appears to be intended to measure asthma control rather than prevalence, as indicated by the change to a question about asthma "attacks" (6). However, without additional information about medication use, data on asthma control can be very misleading (7). For example, an asthmatic person who has not suffered from a recent attack because he or she uses inhaled steroids may not be counted in a survey that focuses on recent wheezing episodes or "attacks." Thus, any observed decline may largely be a result

of redefining asthma prevalence as the prevalence of uncontrolled asthma.

Altering the design of the NHIS uncovered a largely unrecognized problem with our asthma surveillance system: It is a fragmented collection of data sets with no clearly stated roles and little coordination. Data collected in the various surveys conducted by the National Center for Health Statistics form the backbone of our asthma surveillance system. The National Death Index is used to measure rates and trends in asthma deaths (1, 4). The National Hospital Discharge Summary is used to monitor hospitalizations (1, 4, 8–10). The National Hospital and Ambulatory Medical Care Survey is used to monitor emergency room visits and ambulatory care (8, 9). The NHIS and the National Health and Nutrition Examination Survey (NHANES) are used to measure disease prevalence and disability (1–5, 11). These national surveys were not specifically designed for asthma, and they do not collect all the information we need to track asthma.

CHALLENGES TO ASTHMA SURVEILLANCE

There are a number of impediments to conducting asthma surveillance. The lack of a "gold standard" for asthma makes it difficult to measure asthma trends (12). Increasing rates of asthma prevalence have been reported worldwide over the past three decades, particularly for younger children (1, 2, 4, 13). Still, because of the limitations of existing surveys, some scientists doubt whether the reported increase in asthma prevalence represents a "true" increase in disease (14).

The reported prevalence of asthma is subject to influences that are unrelated to the true level of disease (14). Undiagnosed asthma is common at all ages; thus, the well-reported increase could simply reflect previously undiagnosed asthma

that now receives a diagnosis (15, 16). Diagnostic shift—the shift of diagnostic labels over time—may also contribute to the rise in asthma prevalence. In the past, a child with “wheezing attacks” who was labeled by a physician as having bronchitis may now be labeled as having asthma. Finally, as awareness of asthma increases with expanded media coverage, parents may be more likely to report a previously forgotten diagnosis.

Surveys often lack objective measures of asthma that are critical to understand asthma burden and trends. In the past, the NHANES examined objective measures that were either correlated with asthma or measured asthma severity, including skin test sensitization and pulmonary function tests. Unfortunately, information on these measures is not currently being collected in the ongoing NHANES. Although there were probably reasons for this omission (such as limited funds), it is still difficult to understand why information on these biologic measures was not collected for what is arguably the leading chronic and disabling disease of childhood.

IMPROVEMENT OF ASTHMA SURVEILLANCE

Surveillance for asthma can and must be improved. To understand changes in the prevalence of asthma, additional but easily collected data are necessary. Data on wheeze, the chief symptom of asthma, should be collected in addition to physician-diagnosed asthma, so that the ratio of diagnosed to undiagnosed asthma can be monitored. The NHANES collects this type of data, but the periodic nature of the survey (before 1999 when NHANES became continuous) and the lack of compatibility of the asthma data collected in the NHIS and in the NHANES limit the usefulness of the data. The prevalence of diseases or conditions that mimic asthma should be collected to measure diagnostic shift. When the NHIS reports on asthma trends, the trends in other diseases that contribute to diagnostic shift, such as bronchitis, should be reported (13). Medication use must be collected so that the level of asthma control can be understood.

An asthma surveillance system must be designed with specified goals. The role of each part of a surveillance system should be clearly defined, and ancillary data should be collected to maximize the value and interpretation of the data collected. Ongoing efforts to identify and counter any threats to these goals should be instituted. Questions should be included in the NHIS to better ascertain the contribution of diagnostic shift to trends in asthma prevalence. Moreover, as new risk factors emerge, surveys and surveillance should be updated. We could, for example, augment the NHANES by collecting environmental measures of settled allergens or hair cotinine to improve our understanding of asthma epidemiology. Unnecessary redundancies between the surveys should be eliminated but without losing comparability. Data across surveys, such as the NHIS and the NHANES, should be compatible, so that the self-reported data in the NHIS can be augmented by objective data collected in the NHANES. Not all data relevant to asthma, such as allergen skin testing and pulmonary function tests, need to be collected every year, but we must periodically monitor these and other objective measures of asthma with a predetermined periodicity.

National surveys will always be an essential component of public health surveillance, but we should also use emerging information technology to expand and enhance our asthma surveillance system. An electronic medical record is no longer a distant goal. Advances in technology allow for instantaneous availability of data on health-care encounters, such as hospitalizations, emergency room visits, and drug purchases. In the near future, individual state-based surveillance systems could form the basis of a national surveillance system (17).

Surveillance is a fundamental component of the public health system. Yet, our national surveillance system for asthma and other chronic diseases inexplicably lags behind the systems of many other countries. In the absence of a more comprehensive surveillance system, we have relied largely on national surveys. Although these surveys have been and will continue to be essential to our understanding of chronic disease epidemiology, they can be improved. Surveys by the National Center for Health Statistics now routinely monitor numerous diseases, including asthma, cardiovascular disease, obesity, and diabetes. Increasingly, data from different national surveys are used to better understand the trends and burden of individual diseases. It is time for a reassessment of national surveillance for major diseases and injuries that confront our nation; it is fundamental to protecting the public's health.

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