

SHORT OF BREATH:
OUR LACK OF RESPONSE TO THE GROWING ASTHMA EPIDEMIC
AND THE NEED FOR NATIONWIDE TRACKING

TRUST FOR AMERICA'S HEALTH

JULY 2001

The Trust for America's Health is a new, non-profit public health advocacy organization that is taking action to prevent disease and protect the health and safety of our communities.

The Priorities of the Trust are to:

- Advocate for fair policies that ensure vigorous prevention and intervention of diseases for all communities;
- Develop tools to reduce today's health threats, especially for those most at risk; and
- Ensure that every person has access to the information needed to understand and fight threats to our nation's health.

Acknowledgements

Trust for America's Health gratefully acknowledges the following donors for their support of our work: Bauman Foundation, Benjamin Spencer Fund, Jenifer Altman Foundation, Joyce Foundation, The Pew Charitable Trusts, Rockefeller Family Fund, and Tortuga Foundation.

Trust for America's Health is supported by grants from the above foundations. The opinions expressed in this report are those of the authors and do not necessarily reflect the views of these foundations.

The Trust's long-term commitment to a healthier nation—especially for our most disadvantaged populations—is made possible by the generous founding support and spirit of the Benjamin Spencer Fund.

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Executive Summary

Asthma, a disease which can make breathing so difficult that even simple tasks are impossible and can even lead to death, is America's fastest growing chronic affliction. So far, more than 17 million Americans—nearly five million of whom are children—have been hit by this epidemic. And we don't know why. But we do know asthma attacks are triggered by local environmental factors, from indoor irritants such as mold and tobacco smoke to outdoor air pollutants such as ozone.

Given the strong link between asthma and environmental factors, health officials and medical experts agree that tracking asthma's prevalence in communities across America—at least to the county level—is critical to fighting its wildfire spread.

Yet a study by Trust for America's Health, which utilized previously unreleased data from the Centers for Disease Control and Prevention (CDC), shows that 27 states don't track the disease at all. And among the 23 that do, none appear to produce the comprehensive, localized data that would tell us what we need to know. Communities and public health officials must be able to:

- ascertain disease prevalence and mortality rates at the community level;
- identify clusters or "hot spots" and activate rapid response teams to investigate them;
- point to potential causes of the disease for further investigation; and
- plan, carry out trials and evaluate long-term interventions and policies.

Further, the Trust found that 12 of the 20 states with the highest exceedences of federal standards or levels of air pollution known to affect the respiratory system do not track the disease at the state and community levels. The Trust analyzed three pollutant categories that public health officials believe are linked to asthma attacks and other respiratory problems: particulate matter, ozone and suspected respiratory toxicants. The 12 high pollution states failing to track asthma are: Alabama, Georgia, Idaho, Indiana, Nevada, New Jersey, Ohio, Pennsylvania, Tennessee, Texas, Virginia, and West Virginia. Three states—Ohio, Pennsylvania and Texas—were in the top ten for all three categories and none track asthma.

The Trust found that, in general, state health officials know and are willing to do what it takes to step up the fight against asthma. They simply lack the resources. For years the national, state and local public health agencies have been poorly funded relative to the challenges they face. Leadership at the national level to address this gap has not come forward.

But while the asthma epidemic is the problem, it is also an opportunity to take action. The Pew Environmental Health Commission at the Johns Hopkins School of Public Health conducted an 18-month comprehensive review of the nation's lack of public health capacity to track and respond to chronic disease and links to environmental factors. The Pew Commission's final recommendation was the creation of a Nationwide Health Tracking Network.

Trust for America's Health is now proposing a three-year action plan for the federal government to make the Nationwide Health Tracking Network a reality:

- **In year one**, provide a \$60 million down payment for the CDC to fund a 10-state demonstration project, develop regional laboratories and support agency efforts aimed at creating a Nationwide Health Tracking Network that would monitor the prevalence of asthma and other chronic diseases at the community level.
- **In year two**, place in every state a chronic disease investigator who would look for asthma and other chronic disease hot spots and pursue potential environmental relationships.
- **In year three**, fund in all states tracking networks that, while tailored to each state's needs, would follow baseline standards for collecting consistent, comparable data tied to a common definition of asthma, other targeted chronic diseases and relevant environmental factors.

Without tracking and prevention efforts, scientists project that asthma rates will double in 20 years. As the country battles rising health care costs and escalating rates of chronic disease, investing in basic prevention tools is our smartest tactic. A Nationwide Health Tracking Network is the first key step for a healthier, safer nation.

Why Is This Happening In Our Neighborhood?

In Northeast Washington, D.C., Sandy Donelson wonders why she and an ever-increasing number of people in this predominantly African-American neighborhood have asthma. There are plumes of black smoke billowing from a local power plant and the omnipresent diesel fumes wafting over from a nearby trash transfer station. Sandy and her neighbors are starting to ask if there is a connection (1).

Indeed, there might be a link. But high incidence of asthma also could be related to substandard housing or poor indoor air quality, which often are associated with a wide range of health problems. Yet, right now, nobody can say for sure. For Sandy and for the millions of others like her across America caught up in a national asthma epidemic—asthma rates spiked an alarming 75 percent between 1980 and 1994—basic questions about their disease are going unanswered.

Most likely, public health officials can't even tell Sandy whether asthma rates in her neighborhood are any higher than areas that don't have transfer stations or fossil fuel burning power plants. The data we do have, pieced together from national surveys and statistics from emergency room visits, is of use only for documenting asthma's growing prevalence nationwide. Rarely does one find documentation of asthma rates in towns, cities or counties. Data on bird populations in local areas are usually easier to obtain than is information on asthma or other chronic diseases.

That's because we lack a national system for tracking disease rates at the community level. And without standardized, detailed data that allows health officials to compare, say, the trajectory of the asthma epidemic among inner city residents of Southside Chicago with the way it's affecting people who live in the Mississippi Delta, we stand little chance of resolving the confounding mysteries of asthma; namely, what is causing this disease to run rampant and what can be done to stop it.

No End in Sight to an Epidemic

Asthma is a chronic disease characterized by inflammation of the airway and lungs. It causes attacks of wheezing, shortness of breath and in extreme cases, death.

America is in the midst of an asthma epidemic that continues to escalate at astonishing rates. According to the CDC, more than 17 million Americans suffered from asthma in 1998 and more than 5,000 per year die from it.

Mounting rates affected people in all race, sex and age categories and in every region of the U.S., although the poor, minorities and children have been hit the hardest. Among children under four, asthma rates increased a stunning 160% between 1980 and 1994. Asthma causes 9 million lost workdays, and 10 million missed schooldays.

Scientists know little about what causes asthma. We do know many environmental factors can trigger and worsen attacks. These include animal dander, mold, pollen, tobacco smoke, infectious diseases and many types of air pollutants, such as ozone and particulates (dust, dirt and soot).

It's true that biomedical research is making great strides in treating people who suffer with asthma. But the root causes of the disease and the reasons behind its wildfire spread are poorly understood. The first step toward closing this knowledge gap—and in this sense asthma serves as a clarion call for addressing all chronic diseases—is to pinpoint precisely where asthma is occurring, how frequently it crops up, what are the levels of related environmental factors, and who (i.e., by ethnicity, age and geographic location) is afflicted with it.

With this simple but critical information, scientists and health officials can identify disease epidemics and match them with the presence of known environmental triggers in ways that could lead to breakthroughs in prevention *and* treatment. Conversely, without national tracking of asthma down to the community level, prevention is likely to remain a pipe dream and treatments will continue to be developed without a clear understanding of underlying causes. In this scenario, asthma rates will continue to climb and the sight of steroid inhalers tucked into a child's school backpack will become so common as to seem deceptively normal. Health care costs will skyrocket. (See Appendix B for a basic overview of asthma.)

America's Asthma Story: A Tale of Mystery or Missed Opportunities?

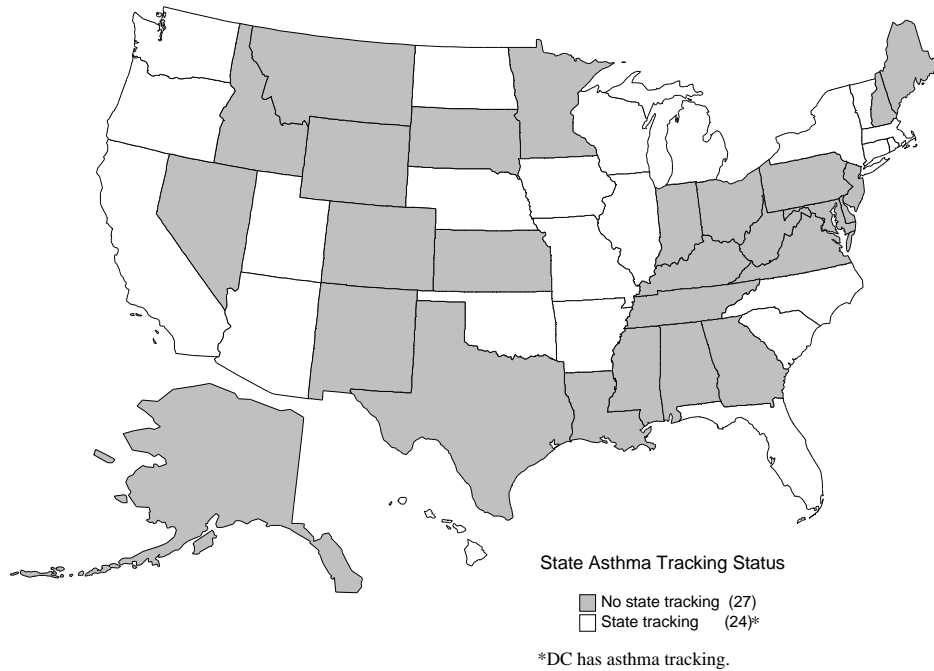
Much of the national attention devoted to asthma tends to focus on largely anecdotal accounts of asthma patients filling emergency rooms and doctors' offices. But while such information can provide compelling snapshots of asthma's escalation as a national health problem, it's far short of what policy makers need to take action. In order to paint a more complete picture, one that will compel the development of a nationwide tracking network, it's important to sketch out what the situation is today, in terms of existing efforts to track the disease, particularly in areas where the presence of environmental triggers of asthma attacks is well documented.

To this end, Trust for America's Health looked at the existence or absence of asthma tracking in all 50 states and the District of Columbia. It then ranked the states by level of the outdoor air pollutants known to trigger asthma attacks and assessed whether the states with the highest rankings are tracking the disease.

“Tracking”
Synonymous with the CDC's concept of public health surveillance, it is “the ongoing, systematic collection, analysis and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know (2).”

Using previously unreleased data from the Centers for Disease Control and Prevention (CDC), the Trust found the majority of states in this country—twenty-seven—fail to track asthma or other related respiratory conditions (3). (These states have been identified in Figure 1.) Among the states that do track asthma, the detail and quality of tracking data is highly variable, making it impossible to determine whether variations in asthma rates among the states are significant from an epidemiological standpoint or simply are the result of differing reporting practices.

Figure 1: States With and Without Tracking Based on CDC Data



Most poignantly, the Trust found that in almost all cases, states with the highest levels of outdoor or “ambient” air pollutants that may cause breathing problems did not track respiratory diseases at all. For example:

- Over half of the top ten states with the highest number of exceedences of federal standards for particulate matter in the air—Alabama, Idaho, Nevada, Ohio, Pennsylvania, Texas—do not track asthma.
- In the top five states with the largest total air releases of suspected respiratory toxicants (“air toxics”), four—Indiana, Ohio, Pennsylvania, and Texas—do not track asthma.
- Over half of the top ten states with the highest number of exceedences of federal standards for ozone, seven—Georgia, New Jersey, Ohio, Pennsylvania, Tennessee, Texas, and Virginia—fail to track asthma.
- The three states that made every top pollution category—Ohio, Pennsylvania and Texas—do not track asthma.

Table 1 lists the top states with the highest levels of three different categories of ambient air pollutants known to aggravate asthma conditions and whether or not they track asthma. (For detailed methodology and analysis of each state’s ranking for air pollution associated with respiratory problems and its asthma tracking status, see Appendix A.)

Table 1: ASTHMA TRACKING STATUS IN TOP AIR POLLUTING STATES*				
Top Air Polluting States	Particulate Matter	Ozone	Suspected Respiratory Toxicants	Asthma Tracking Status
Alabama	X			NO
Arizona	X			YES
California	X	X		YES
Florida			X	YES
Georgia		X	X	NO
Idaho	X			NO
Illinois			X	YES
Indiana			X	NO
Missouri	X			YES
Nevada	X			NO
New Jersey		X		NO
New York		X		YES
North Carolina		X	X	YES
Ohio	X	X	X	NO
Pennsylvania	X	X	X	NO
Tennessee		X	X	NO
Texas	X	X	X	NO
Virginia		X		NO
Washington	X			YES
West Virginia			X	NO

*Note: These are the states ranked in the Top 10 for highest number of exceedences of PM10, Ozone, and/or the highest levels of Suspected Respiratory Toxicants Releases to Air. Actual values and methodology are listed in Appendix A.

The Trust focused its analysis on three ambient air pollutants where there is strong evidence linking them to respiratory distress:

- **Ozone**, a primary ingredient in “smog” caused by sunlight acting on emissions from such varying sources as cars, diesel trucks, off-road equipment, power plants and factories, is associated with inflammatory responses in the upper airways of asthmatics and reduced lung function;
- **Particulate matter**, very small particles such as soot and dust that can be inhaled and are known to aggravate existing respiratory diseases, with recent studies concluding that asthma sufferers are among those most susceptible to disease from elevated exposures to this pollutant; and
- **Suspected Respiratory Toxicants**, a subset of the wide range of toxic industrial emissions, the state specific quantities of which were calculated based on emissions levels reported in the EPA’s Toxics Release Inventory.

To be sure, ambient air pollutants are not the only suspects in asthma attacks. Indoor air contamination from allergens derived from dust mites, cockroaches, mold, pet dander, tobacco smoke and other pollutants also are known to trigger asthma attacks. Unfortunately, there are no national data on the levels of these indoor triggers.

Linking high levels of ambient air pollution, which come from industrial and transportation sources, with a lack of tracking is not intended to single out industry or vehicular emissions as being of more concern than other asthma triggers. Rather, the near absence of disease tracking in states with high levels of ambient air pollutants is a prime example of the problem at hand.

How can researchers understand the role of various asthma triggers, regardless of their source, in this public health crisis if they can't compare asthma rates in communities with relatively high levels of ambient air pollution to those where pollution levels are relatively low? For example, indoor air pollutants could be the most significant factor in certain disease clusters but without tracking data that allow for comparisons, such a conclusion cannot be drawn. In this sense, the asthma epidemic is not so much a mystery as much as it is a series of missed opportunities to gather the data that would allow us to get at the root of the problem. Investigators simply lack the information they need to target interventions and set priorities for research and action.

State Tracking Efforts: Serious Gaps Between Words and Deeds

Unfortunately, addressing the problems with national asthma tracking capabilities is not simply a matter of getting those who say that they don't track to develop a program. When the Trust began to look more closely at those 23 states and the District of Columbia that report keeping tabs on the disease, serious deficiencies in data quality, reporting methodology and level of detail became readily apparent.

States were identified as conducting some level of tracking based on their voluntary responses to a CDC survey. (It should be noted that their status might have changed based on activities initiated since the survey was completed in January 2000.) But that doesn't mean that all the states that say they are tracking are in fact doing so, or conversely, that those who say they don't, fail to collect any data on the disease. The CDC survey did not specifically define surveillance criteria; therefore, state responses are highly variable.

For example, one state might consider a cursory look at asthma mortality data to be asthma tracking while another might undertake a detailed baseline assessment of asthma in the state and not consider it tracking because the work had not been continuous. In addition, there was no systematic attempt by CDC to verify the responses (3). Therefore, it is doubtful that existing data is comprehensive enough to guide prevention strategies, measure the effectiveness of intervention or to allow researchers to pierce the veil shrouding the origins of asthma's escalation.

Most states that report asthma tracking activities track only a few elements of the disease epidemic, such as hospital admissions or emergency room visits. They often fail to routinely track trends over time or cover the entire population. Even the states that carry out a significant

amount of tracking activities don't undertake the effort in a comprehensive, comparable or consistent manner. Additionally, there is no national record of how many states monitor possible links between asthma prevalence and known environmental hazards. While many states are interested in this critical connection, Wisconsin is the only state currently known to have conducted such monitoring. Researchers in the state found that hospital admissions increased when sulfur dioxide levels in ambient air increased (4).

The CDC does work with the states to gather information on asthma as part of its Behavioral Risk Factor Surveillance System (BRFSS). However, BRFSS is of limited value in terms of establishing a national tracking system. It's a random sample telephone survey that doesn't delve down to the local level and thus fails to provide the comprehensive detail required of an effective tracking system.

Tracking in the Trouble Spots: Case Studies of Asthma Tracking in States with High Levels of Ambient Air Pollution

The Trust investigated more closely four of the states—California, Florida, Illinois and North Carolina—whose levels of asthma-related ambient air pollutants rank in the top ten nationally but who also reported to the CDC survey that they carry out some activities to track the disease. (More detailed information on these state programs can be found in Appendix C.) The Trust learned, among other things, that:

- California reports that it is monitoring trends in asthma morbidity and mortality. It has been collecting prevalence data (the number of existing cases) statewide via BRFSS since 1983 on lifetime asthma prevalence and, beginning in 1998, on active prevalence. Local prevalence data has been collected in two areas: the Oakland school district and along the California-Mexico border in Imperial County. State officials plan to seek more information on asthma prevalence through survey methods (i.e. California has added a question on childhood asthma) that, while expected to improve on the status quo, rely on self-reporting that is subject to bias (27,28).
- Florida reports that it has explored strategies for conducting asthma surveillance but has not established a formal asthma surveillance system. It has included asthma-related questions in its Florida Youth Tobacco Survey (FYTS), but the validity of adolescent self-reported asthma information has not been demonstrated at this time (29).
- While Illinois' response to the CDC survey indicated that it conducts tracking, a top state health official said its efforts to monitor asthma do not, in fact, constitute tracking. The state currently collects only hospitalization and mortality data but appears to be making efforts to improve its system. At this time, comprehensive prevalence data is not being collected. Working with CDC funding, Illinois is trying to build a statewide tracking infrastructure and improve the collection and comparability of local data (30, 31).
- North Carolina has made extensive efforts to track asthma. It collects local hospitalization and individual county-level data for children and adults. North Carolina recently began a statewide effort to gather comprehensive data from all seventh and

eighth grade students through an innovative survey that seeks to minimize error by asking questions via a descriptive video presentation (32).

On the whole, what one sees in these state efforts are commendable initiatives that nonetheless fall far short of providing health officials and communities with what they need to effectively address the asthma epidemic. For example, hospitalization and mortality data is chiefly evidence for extreme asthma-related outcomes. But this information alone does not provide anything close to a complete picture of how the epidemic is behaving in total state populations. What's most needed is a reporting of prevalence data that goes down to the local, community level. But the Trust found that this is precisely the data states are the *least likely* to collect.

It's not that states lack the willingness to initiate tracking programs. When states were asked in a survey to name diseases that required better tracking, asthma topped the list (5). CDC reports that states that don't track asthma blame this deficiency on a lack of funds, personnel and data (6). Funding and staffing are relatively straightforward, if politically difficult, problems to address. Data access issues, however, present a trickier situation.

Access to raw data can make a great deal of difference in how quickly agencies can launch tracking programs. The CDC survey found that all but 11 of the states have ready access to mortality data while about half—twenty-four—of them reported that they lacked ready access to hospitalization statistics. Only seven are able to gather asthma emergency care statistics in their jurisdictions. Thirty-four reported lacking ready access to data on costs of asthma (3).

Health tracking systems must be designed to ensure that policymakers, health professionals and communities have the tools to:

- ascertain disease prevalence and mortality rates at the community level;
- identify clusters or "hot spots" and activate rapid response teams to investigate them;
- point to potential causes of the diseases for further investigation; and
- plan, carry out trials and evaluate long-term interventions.

Table 2 provides a detailed overview of the types of critical questions, data and actions needed for effective asthma tracking at the community level.

In addition, there must be a baseline level of consistency and comparability of data collected at the state level and a common schedule for gathering information. In other words, all states, at some level, must be collecting the same information at the same regular intervals. For example, if New York's report on asthma prevalence is based on an annual examination of hospitalization statistics while Arizona's is based on monthly physician reports from the state's largest HMOs, the information is simply not comparable.

Table 2: Overview of Approach to Asthma Tracking

What Do You Want to Know?	Why Do You Want to Know It?	What Data Are Needed to Learn It?	How Will the Information Be Used to Affect Program Activity?
<p>How much asthma is there? What are the trends in asthma occurrence over time?</p>	<p>This information would provide an indication of the burden of disease on the population and health systems and help to identify causes and precipitating factors.</p>	<ul style="list-style-type: none"> Prevalence of asthma cases in the general population: age, sex, race; lifetime and/or current prevalence 	<p>To educate the public; to aid policymakers; to evaluate trends over time; to identify research needs; to understand the impact of asthma on the community; to define and direct resources; to link specific education and training to improvement in health status.</p>
		<ul style="list-style-type: none"> Prevalence of asthma in selected schools 	<p>To educate school administrators, faculty, and staff; to aid the development and evaluation of interventions in schools; to educate the public; to help support research needs; to aid in the understanding of the impact of asthma on learning.</p>
		<ul style="list-style-type: none"> Incidence of asthma episodes 	<p>To provide an additional measure of impact of asthma on the community; to provide a better indicator of impact on the health care system; to be used in assessing fluctuations in the incidence of asthma episodes.</p>
		<ul style="list-style-type: none"> Prevalence of exposure of cases to known allergens and irritants (indoor and outdoor); identification of additional potential allergens/irritants 	<p>To educate; build advocacy to change; to direct intervention programs; define additional research needs; to identify significant causes of asthma morbidity; to aid management of asthma through recognizing additional allergens/irritants.</p>
		<ul style="list-style-type: none"> Percent of people with allergy who report having asthma 	<p>To help define a research agenda.</p>
<p>How severe is the asthma? What are the trends in asthma severity over time?</p>	<p>Although it is not possible now to prevent asthma or impact prevalence, it is possible to decrease the severity of asthma. Monitoring changes in severity over time is an essential part of outcome evaluation. Doing so also provides an indication of the burden of disease on the health system.</p>	<ul style="list-style-type: none"> Number of asthma deaths by age, sex, race 	<p>To investigate individual deaths for increased understanding; to use deaths of children as examples of preventable deaths; to understand trends in deaths over time; to modify asthma education and improve management to prevent deaths.</p>
		<ul style="list-style-type: none"> Frequency and duration of hospitalization; measures of health status on admission 	<p>To provide key indicators of severity of disease; to target new initiatives and providers for education; to support program evaluation; to serve as indicators of impact on the health care system; to evaluate trends; to identify research needs.</p>
		<ul style="list-style-type: none"> Frequency of unscheduled visits (including emergency department); particularly, multiple unscheduled visits 	<p>To target the poorly managed; to support other program planning; to aid program evaluation; to identify epidemics; to aid education; to serve as indicators of impact on the health care system; to recognize trends; to identify treatment practices.</p>
		<ul style="list-style-type: none"> Information on quality of life; people with asthma, parents of children with asthma 	<p>To evaluate; to provide information for policymakers.</p>
<p>Adapted from Boss LP, et al. The Public Health Surveillance of Asthma. Journal of Asthma 38(1), 83-89 (2001).</p>			

The good news is that a consortium of New England states is in the process of constructing a regional network that could provide a national model for coordinating data collection efforts to produce comparable—and thus, insightful—information.

In response to calls from asthma leaders and experts, including providers, health officials, and members of community-based and other non-governmental organizations in all six New England states, a work group of public and private sector representatives began a process this past summer to become familiar with one another's data, agree on health, environmental and economic data elements needed to answer critical questions about asthma, and make recommendations about how to move toward region-wide collection of comparable information. In the last few months, the Asthma Regional Coordinating Council—made up of state-level commissioners of housing, education, environment and health as well as non-governmental asthma leaders and experts from around New England—has responded to the workgroup's recommendations by committing to: 1) support the development of strong state surveillance programs; 2) seek agreement among the six New England states to develop and collect comparable asthma data on at least several key indicators; and 3) establish a New England asthma tracking pilot project which will attempt to integrate health and environmental data in schools (7). This initiative is deserving of strong support since its potential benefits extend beyond New England. It could end up serving as an organizational model for national coordination of state-led tracking efforts. (For more details on the New England Tracking Initiative, see Appendix D.)

Listening to Asthma: Epidemic is a Call for National Chronic Disease Tracking Network

Until there is concerted action of the sort we are seeing in New England, state asthma tracking efforts will continue to be a patchwork of quality and coverage. This is largely because there are no minimum national standards, requirements or definitions for tracking. But this is not just the case with asthma. The same can be said of tracking initiatives for most chronic diseases.

The poor state of affairs in asthma tracking--and the way such shortcomings have become impediments to effective prevention and treatment—speak to a broader problem. Asthma is a disease in which severity, and perhaps even root cause, may be closely associated with local environmental factors. Similarly, with many other chronic ailments, local environmental factors often are suspect, either as aggravating factors or as the cause itself.¹

That's why barriers to understanding the asthma epidemic can be so instructive. As we begin to see the clear benefits of tracking asthma at the community level (i.e., a better understanding of the relationship of environment to disease) we begin to understand why America needs a national system that tracks not just asthma, but the community-level presence of chronic diseases in general. The link between environment and disease is a hotly debated topic and all parties would be well served by a substantial infusion of objective data. A functional, well-coordinated national tracking system would provide just that.

¹ According to a September 2000 report by the Pew Environmental Health Commission, environmental factors identified by researchers as contributing to the development and severity of chronic disease include environmental tobacco smoke, toxic chemicals, dietary habits and viral infections (5).

In this sense, asthma provides the impetus for establishing such a network, one that would track asthma along with other chronic afflictions, such as Alzheimer's disease, Parkinson's disease, multiple sclerosis, diabetes and an array of cancers. Indeed, a single tracking network can accrue data on all of these diseases. For example, the infrastructure for tracking asthma already being established through such initiatives as New England's Asthma Regional Coordinating Council can serve as a foundation for a tracking system that monitors other chronic diseases as well.

Creating a nationwide data collection infrastructure to track the prevalence of chronic diseases such as asthma would provide everyone from health care providers and biomedical researchers to officials in industry and government with a wealth of insightful information. This was the conclusion of the Pew Environmental Health Commission, an independent blue-ribbon panel charged with seeking ways to improve the nation's health defenses against environmental health threats.

Last year, following extensive investigations into current health challenges and the nation's ability to respond, the Commission, which was based at the Johns Hopkins School of Public Health, proposed a formal Nationwide Health Tracking Network. The Commission viewed the Network as providing public health officials with what they need to address the underlying environmental factors in chronic disease, information that will fuel strategies for targeting and responding to existing crises while limiting further outbreaks.

The Commission stated that a comprehensive tracking network would advance our ability to:

- Identify populations at risk;
- Respond to outbreaks, clusters and emerging threats;
- Establish the relationship between environmental hazards and disease;
- Guide intervention and prevention strategies, including lifestyle improvements;
- Identify, reduce and prevent harmful environmental risks;
- Improve the public health basis for policy making; and
- Enable the public's right to know about health and the environment

Federal leadership is needed to launch a Nationwide Health Tracking Network that gives health professionals, the public and policymakers the tools to take preventive action to fight chronic diseases (8).

PEW COMMISSION RECOMMENDS NATIONWIDE HEALTH TRACKING NETWORK

The Nationwide Health Tracking Network consists of five components:

1. **Coordinating essential data collection systems:** The first component builds on existing health and environmental data collection systems and establishes data collection systems where they do not exist. The Network would coordinate with the local, state and federal health agencies to collect this critical data.

In all fifty states, the Network would track:

- Asthma and other respiratory diseases;
- Developmental disorders such as autism, cerebral palsy, and mental retardation;
- Neurological diseases such as Alzheimer's, multiple sclerosis, and Parkinson's;
- Birth defects; and
- Cancers, especially in children.

The Network would also track exposures to:

- Heavy metals such as mercury and lead;
- Pesticides such as organophosphates and carbamates;
- Air contaminants such as toluene and carbamates;
- Organic compounds such as PCBs and dioxins; and
- Drinking water contaminants, including pathogens.

2. **Developing an Early Warning System:** The second component is an Early Warning System that would immediately alert communities to health emergencies such as lead, pesticide and mercury poisonings. The existing system of local health officials, hospitals and poison centers that alert our communities to outbreaks such as food illness and the West Nile virus would also warn our communities about these health emergencies.
3. **Creating Rapid Response Teams:** The third component consists of improving our response time to the identified disease clusters and other health emergencies. The Network would coordinate federal, state and local health officials into Rapid Response Teams to quickly investigate these health emergencies, providing the teams with the trained personnel and necessary equipment.
4. **Addressing unique local health problems:** The fourth component is a pilot program consisting of 20 regional programs that would investigate local disease clusters and emergencies outside of the Network. These programs would alert the public and health officials to new developing disease clusters. These pilot programs also would serve as possible tracking models to be included in the Network.
5. **Creating community and academic partnerships:** The fifth component creates relationships with our communities and with regional academic centers. Community relationships would ensure that the tracking data is accessible and useful on a local level. The academic partners would assist with training the workforce, analyzing data, and developing links between the tracking results and preventive measures.

ASTHMA TRACKING: WHAT THE FUTURE HOLDS

From Congress and the White House, Mixed Signals

The Pew Environmental Health Commission's report increased awareness in the U.S. Congress about the need for significant improvements in our ability to respond to environmental threats to human health. Many members were particularly concerned by the Commission's conclusion that without a national tracking network that maps disease prevalence at the local level, the U.S. will remain unable to mount effective prevention efforts against chronic illnesses. At the moment, this dearth of information is almost certainly resulting in more cases of asthma and more acute suffering by those who already have the disease. The absence of tracking also is hindering the fight against such scourges as birth defects, developmental disabilities, cancers and neurological disorders such as Alzheimer's and Parkinson's, and other chronic diseases as well.

Congress took a vital step toward making this critical public health tool a reality by instructing the CDC to deliver an implementation report for a Nationwide Health Tracking Network to both the House and Senate Labor, Health and Human Services, Education and Related Agencies Appropriations Subcommittees during the FY2002 appropriations cycle. This shows that Congress is beginning to view a health tracking network as a critical component of an effective public health infrastructure.

As for efforts that specifically target asthma, in FY2001 Congress appropriated \$27.9 million—a \$17.4 million increase over the previous year—for CDC's asthma-related activities, approximately \$7 million of which was set aside for surveillance efforts. However this was less than the \$55 million some members had sought for the program.

Meanwhile, separate legislation authorized \$99 million for core public health infrastructure improvements, money that would benefit a wide range of initiatives, including chronic disease tracking. However, in his FY2002 budget request, President Bush sought only \$2 million for this program.

The chief concern at the moment is that the Bush administration, and some in Congress as well, are focused almost solely on research activities that address new drug treatment while giving scant attention to prevention. While it's commendable that the administration is seeking close to \$3 billion in additional spending for the National Institutes of Health, it's lamentable that the President wants to cut \$165 million from CDC. If Congress were to follow this blueprint, it would be creating a precarious imbalance in our nation's health portfolio. We should question whether almost all bets should be placed on medically treating chronic diseases while disease tracking and other prevention research, efforts that have great potential to prevent suffering, receive relatively paltry investments.

The Federal Health Agency Response

The CDC is seeking better information on the asthma epidemic and has launched efforts related to establishing a national chronic disease-tracking network. However, the efforts on asthma, while they represent progress, fall well short of what's needed. In addition, while the Agency appears committed to building a Nationwide Health Tracking Network for chronic diseases, CDC has still not released a plan in response to this Congressional mandate.

Piecemeal Progress on Asthma

In 2000, the U.S. Department of Health and Human Services, CDC's parent agency, outlined its asthma strategy in a major report, Action Against Asthma. That report specifically proposes a new tracking initiative to be implemented by CDC in at least 15 states. These tracking programs would be required to:

- Conduct surveys to determine the prevalence of asthma, the quality of asthma management and the quality of life for people with asthma;
- Examine mortality and hospitalization data at the local level to allow for immediate investigation of deaths from asthma, and for rapid assessment of reasons behind changing rates of morbidity;
- Develop supplementary data systems to gather additional information in locations with particularly elevated rates of asthma prevalence or other measures of the burden of the disease; and
- Develop model emergency department surveillance systems to identify characteristics of persons without access to quality care or with exceptionally severe disease.

Recently, CDC has taken notable steps toward establishing asthma tracking in the states. In 1999 and 2000, CDC awarded grants to a total of 12 states, establishing cooperative agreements to develop asthma tracking and intervention initiatives.

While this represents a step in the right direction, the CDC cooperative agreements are not without problems. For example, CDC does not require states to create plans with elements that are consistent and comparable with one another, weakening efforts to compare and contrast asthma conditions in various communities across the country.

Meanwhile, CDC has developed data on asthma's prevalence by including asthma-related questions on two of its major health surveys, the Nationwide Health Interview Survey (NHIS) and the Behavioral Risk Factor Survey (BRFS). These efforts can be viewed as useful building blocks for the Nationwide Health Tracking Network. However, they do not, by themselves, constitute comprehensive health tracking.

1999	2000
Illinois	California
Minnesota	Colorado
Oregon	Iowa
Rhode Island	Maine
	Michigan
	New Jersey
	New Mexico
	Vermont

For example, the NHIS survey provides good information at the national level but fails to gather that all-important community level data. Further, the National Center for Health Statistics in 1997 modified the NHIS; it no longer asks about prevalence of asthma but rather asks whether an asthma attack was experienced in the past year. In consequence, people with asthma that is well controlled with avoidance of environmental triggers and/or medication will no longer be counted. Meanwhile, the BRFSS has been important for establishing a national definition for asthma—a critical factor for meaningful comparative studies—and it does allow data collection at the state level, and among a number of demographic variables. But its flaws include the fact that it has not tracked asthma in children, a fairly significant omission given the sharp rise in pediatric cases. Also, while the BRFSS requires states to ask at least two questions on asthma, most of the survey's asthma-related inquiries are optional. CDC has taken the step of including two pediatric asthma items among the BRFSS optional questions for 2001. A number of states have added these to their surveys. (For more details on these surveys, see Page 18.)

Remembering the Bigger Picture

As for creating the blueprint for a broader, Nationwide Health Tracking Network, CDC has established three working groups with representatives from each of the relevant CDC entities, including the National Center for Environmental Health, National Center for Chronic Disease Prevention and Health Promotion, Agency for Toxic Substances and Disease Registry, Public Health Practice and Program Office, National Center for Infectious Diseases, Epidemiology Program Office and National Center for Health Statistics. Based on their recommendations, CDC will present a plan to Congress this year.

These working groups are considering what is needed to create a Nationwide Health Tracking Network at both the policy and practical levels. On the policy front, they are pursuing a strategy that builds on existing programs. On a more practical level, they are focused on basic infrastructure needs.

As with nearly all modern-day public health initiatives, building a Nationwide Health Tracking Network requires addressing the fact that many local and some state public health agencies lack rudimentary equipment, such as computers and Internet connections. Unless provisioned with this technology, state and local agencies will be hard pressed to participate in a national tracking network. It is vital that we take steps now to strengthen this infrastructure so that we are equipped to embrace the data collection efforts essential to disease prevention and surveillance.

NHIS AND BRFS

The CDC's two major data collection surveys for obtaining information on chronic diseases are the National Health Interview Survey (NHIS) and the Behavioral Risk Factor Survey (BRFS).

NHIS is an ongoing household survey of a representative sample of the non-institutionalized civilian U.S. population. This survey has been asking asthma questions since 1980. It was redesigned in 1997, eliminating data continuity and essentially crippling the ability to continue tracking national and regional asthma trends. It will take a number of years of collection before trends can be tracked through this new version of the survey and it will not count everyone with asthma since it now only counts people who had an attack in the last year (and not people whose asthma is under control).

Although the NHIS data has been helpful in estimating asthma prevalence at the national level, it lacks many of the characteristics required of a comprehensive tracking system.

- First, because it does not sample them in sufficient numbers, the survey data does not allow examination of subgroups (i.e., Hispanic subgroups, Asians and Pacific Islanders, American Indians).
- Second, while the sampling design is sufficient for estimating disease rates for the country as a whole, and even for large regions, it's not well suited for making accurate estimates at the state and local levels or in small populations.
- Third, it does not produce actual data on asthma prevalence but rather on the prevalence of asthma attacks.
- Fourth, there is no mechanism to link asthma tracking and environmental tracking information. Such linking is critical for identifying asthma triggers and developing and evaluating prevention strategies.
- Finally, NHIS asthma datasets are publicly available but difficult to access and not user-friendly.

The BRFS, carried out by CDC in collaboration with all states, the District of Columbia and three territories, is an annual telephone survey which involves randomly calling about 120,000 adults in households across the country. This ongoing data collection program requires each state to ask a specified set of core questions, while allowing the states the option of making additional, related inquiries.

In 2000, CDC required states to include in the BRFS two questions to identify the presence of asthma. In 2001, states have the option of asking an additional eleven asthma related questions, two of which are designed to identify cases of pediatric asthma.

The BRFS has made an important contribution by establishing the first national uniform definition of asthma, making comparisons of the state-specific data it produces more meaningful. The questions are based on a definition recommended by the Council of State and Territorial Epidemiologists (CSTE). The Trust believes that the use of one single nationwide definition of asthma is an important step toward the goal of compiling comparable data across the country.

The BRFS can provide valuable comparative information because it includes all states and a number of demographic variables. Nonetheless, because it does not cover the entire population the BRFS cannot be viewed as comprehensive national tracking. Its most notable omission is children, one of the population subgroups most vulnerable to asthma.

Comprehensive tracking also should provide a mechanism for identifying problems at the local level in order to find links between asthma and exposure to environmental hazards. The broad survey data produced by the BRFS cannot give location specific information that is critical for identifying clusters and for providing specific environmental clues to prevention.

Support for a Nationwide Health Tracking Network

There is tremendous support from the public and many organizations for a Nationwide Health Tracking Network. Recent polling figures show that 89% of registered voters support the concept (9). The Network is also on the agenda of a coalition that includes Aetna US Healthcare, the American Public Health Association, and the March of Dimes Birth Defects Foundation, groups that understand the need for a stronger health defense.

Toward a Nationwide Health Tracking Network: A Three-Year Plan that Starts with Asthma

Creating a Nationwide Health Tracking Network will take time and the support of Congress as well as the state and federal health agencies. Trust for America's Health is proposing a three-year action plan that focuses on the annual achievement of meaningful yet reasonable goals:

- **Year One:**
 - Create a Nationwide Health Tracking Network funded through CDC to track chronic diseases and related environmental factors. Include asthma as one of the initial chronic diseases to be tracked. As a first step, to allow a 10-state demonstration project including development of regional laboratories and support for CDC coordination efforts, year one requires a \$60 million investment. The increased funding would be a down payment on the \$275 million needed annually to fully fund the Network and aid CDC in its role as the nation's disease prevention agency.
 - Allocate more of the growing NIH budget to support chronic disease prevention and related research on the underlying cause of chronic disease.
 - Incorporate into the CDC's core questionnaire for the BRFSS questions on pediatric asthma that are currently optional.
 - Fund the New England Asthma Tracking Initiative as a pilot study that could provide the framework for a national asthma tracking system structured to work as part of a broader chronic disease network.
- **Year Two:**
 - Place in every state chronic and environmental disease investigators who will study asthma and other chronic disease clusters along with potential environmental relationships. These chronic disease investigators will also coordinate response teams composed of state and federal health officials to rapidly investigate identified disease clusters.
 - Congress and experts from the federal, state and local health departments should create a grant system that would support community efforts to obtain the

information on chronic diseases and environmental factors they need to protect the public's health.

- CDC, in consultation with other state and federal partners, should create minimum national standards and procedures that include a common national definition of asthma and other priority chronic diseases, along with national standards for local data collection procedures and investigative responses.
- **Year Three:**

As an interim measure, within three years, mandate and fund in all 50 states tracking systems that have adopted, in a demonstrable way, minimum standards for collecting consistent, comparable data based on a common definition of asthma. States would be allowed to tailor the system to fit their specific needs.

Conclusion

These recommendations for addressing the asthma epidemic, and for dealing with all other chronic diseases as well, are based on a simple premise: that the first step in preventing diseases with potential environmental components is to get the facts about where and when they occur and then compare this information with what's in the air, water, households and diets of its victims. It is precisely information of this sort that has led to such dramatic reductions in the number of people dying of heart disease.

Without similar data on asthma and other chronic diseases, we will be resigned to fighting an enemy that is identifiable only as a fuzzy target, at best. Today, our strategy, instead of "ready, aim, fire," is more akin to "ready, fire, aim."

Disease tracking at the community level is something state and local health officials are eager to implement and something people across the country say they want. As we contemplate how best to allocate limited federal dollars, surely a strong case can be made for establishing a nationwide program that simply informs citizens about the prevalence of chronic diseases in their community and uses sound scientific data to determine whether something in their immediate surroundings may be to blame.

The sudden spread of asthma, particularly among children, should be sufficient to compel action. But the benefits of such a program would extend to those who suffer from so many other debilitating chronic diseases, while helping keep those of us who are currently healthy from joining the list of victims.

APPENDIX A: Tables on States Tracking Status and Specific Air Pollutants

Particulate Matter

Particulate matter is a general term used for a mixture of solid particles and liquid droplets found in the air. Particulate matter includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, vehicles, construction activity, mining, fires and natural windblown dust. Some particles are large and dark enough to be seen; those of health concern are very small.

Particulate matter is usually divided into different classes based on size. Health concerns are for particles called PM10; among these, the smallest are called PM2.5. For this report, The Trust chose PM10 as the index of particulate matter because the greatest amount of particulate matter research has focused on PM10 (and PM2.5 is a subset of PM10).

Exposure to particulate matter can adversely affect human health by aggravating existing respiratory and cardiovascular diseases, altering the body's defense systems against foreign materials, reducing lung function, and contributing to cancer and premature death. Recent studies have confirmed that asthma sufferers are among those most susceptible to serious morbidity from elevated exposures to particulate matter (10, 23, 24).

Results of our analysis showed that of the five states that had the highest number of exceedences of federal standards for PM10 emissions, three—60 percent—do not track asthma. Likewise, of the top ten states, 60 percent do not.

STATES RANKED BY NUMBER OF EXCEEDENCES OF EPA AIR QUALITY STANDARDS FOR PARTICULATE MATTER (PM10), 1997-1999													
(Based on EPA AIRData - Monitor Trends Report for Particulate Matter)													
Rank	State	1997	1998	1999	TOTAL	Tracking	Rank	State	1997	1998	1999	TOTAL	Tracking
1	CA	154	216	320	690	YES	16	WY	1	0	0	1	NO
2	AZ	179	63	81	323	YES	16	SD	1	0	0	1	NO
3	ID	77	13	15	105	NO	17	AR	0	0	0	0	YES
4	PA	85	7	0	92	NO	17	CT	0	0	0	0	YES
5	TX	14	20	19	53	NO	17	DC	0	0	0	0	YES
6	NV	5	7	35	47	NO	17	DE	0	0	0	0	NO
6	MO	47	0	0	47	YES	17	GA	0	0	0	0	NO
7	AL	6	16	0	22	NO	17	HI	0	0	0	0	YES
8	WA	12	6	3	21	YES	17	KS	0	0	0	0	NO
9	OH	0	1	19	20	NO	17	KY	0	0	0	0	NO
10	WI	0	0	12	12	YES	17	LA	0	0	0	0	NO
10	NE	0	6	6	12	YES	17	MA	0	0	0	0	YES
10	NJ	0	12	0	12	NO	17	MD	0	0	0	0	NO
11	TN	1	9	1	11	NO	17	ME	0	0	0	0	NO
11	CO	9	2	0	11	NO	17	MN	0	0	0	0	NO
12	SC	1	6	2	9	YES	17	MS	0	0	0	0	NO
12	MT	2	6	1	9	NO	17	NC	0	0	0	0	YES
13	IL	5	3	0	8	YES	17	ND	0	0	0	0	YES
14	AK	0	0	6	6	NO	17	NH	0	0	0	0	NO
14	FL	0	0	6	6	YES	17	NY	0	0	0	0	YES
14	OR	0	0	6	6	YES	17	OK	0	0	0	0	YES
15	NM	0	0	4	4	NO	17	RI	0	0	0	0	YES
15	IA	1	0	3	4	YES	17	UT	0	0	0	0	YES
16	MI	0	0	1	1	YES	17	VA	0	0	0	0	NO
16	IN	1	0	0	1	NO	17	VT	0	0	0	0	YES
							17	WV	0	0	0	0	NO

Background

The chart above displays the number of times per year that levels of PM10 exceeded the EPA air quality standard (150 $\mu\text{g}/\text{m}^3$) established in the National Ambient Air Quality Standards. Based upon a 24-hour average, the exceedence is the number of days per year estimated by EPA when values are expected to exceed the air quality standard for PM10.

Methodology

This data comes from the *AIRData* Monitor Trends Report (website located at <http://www.epa.gov/air/data/montrnd.html>) of EPA's Office of Air Quality Planning and Standards. A report was generated by selecting Geographic Location: United States; Pollutant Measured: PM10 - Particulate (<10 μm); and Report Columns to Include: State Abbreviations. The total number of exceedences in states for PM10 was calculated by adding the number of exceedences for the years 1997, 1998 and 1999. The data used in this report was last accessed 4 June 2001 and is based upon data extracted from EPA's air pollution database, AIRS, on 25 March 2001.

Ozone

Ozone is an odorless, colorless gas that forms naturally in the atmosphere. There are actually two layers of ozone surrounding the earth; the stratosphere, about 10 miles up, is where the "good" ozone layer exists, which acts as the earth's sun-glasses, shielding us from the damaging ultraviolet rays of the sun. The atmosphere closest to the earth's surface is called the troposphere, which is where the ground level or "bad" ozone exists. This "bad" ozone is the primary ingredient in "smog," which can cause health problems by damaging lung tissue, reducing lung function and sensitizing the lungs to other irritants. Ambient ozone has been linked with inflammatory responses in the upper airways of asthmatics (11) and in their reduced lung functions (12). Days with elevated "bad" ozone levels are associated with increased asthma emergency room visits and hospitalizations. There is scientific evidence that this "bad" ozone not only affects people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well.

There are many examples of the association between various levels of ozone and occurrences of asthma and other respiratory diseases. During the 1996 Olympic Games, the city of Atlanta went to great lengths to decrease traffic congestion, including the closure of the downtown area to cars, increased public transportation and the promotion of carpooling and telecommuting. Thanks to these aggressive efforts, levels of ozone declined by 27.9%. During that same time period there was a dramatic drop in childhood emergency room visits and hospitalization for asthma attacks (13).

Four—80 percent—of the five states with the highest number of exceedences of federal standards for ozone emissions do not track asthma and seven—70 percent—of the top ten do not.

STATES RANKED BY DAYS WITH AQI>100 (OZONE ONLY), 1997-1999
(Based on 1999 EPA Data)

RANK	STATE	1997	1998	1999	TOTAL	Tracking	RANK	STATE	1997	1998	1999	TOTAL	Tracking
1	CA	353	393	364	1110	YES	18	SC	13	31	24	68	YES
2	PA	85	123	104	312	NO	19	DE	21	24	21	66	NO
2	TN	73	111	128	312	NO	20	AL	8	23	27	58	NO
3	TX	85	100	110	295	NO	21	MA	18	14	15	47	YES
4	OH	59	112	104	275	NO	21	OK	11	16	20	47	YES
5	NJ	66	82	88	236	NO	22	AZ	11	17	13	41	YES
6	NC	52	94	80	226	YES	23	IL	9	7	12	28	YES
7	NY	47	50	69	166	YES	24	WI	4	10	12	26	YES
8	GA	31	50	61	142	NO	25	RI	10	4	7	21	YES
9	VA	38	43	41	122	NO	26	UT	1	12	2	15	YES
10	MD	30	51	40	121	NO	27	AR	1	2	6	9	YES
11	DC	29	47	39	115	YES	27	WA	1	7	1	9	YES
12	MO	32	38	34	104	YES	28	CO	0	5	0	5	NO
13	CT	35	20	34	89	YES	29	OR	0	3	0	3	YES
14	MI	20	30	34	84	YES	30	NE	0	0	2	2	YES
15	IN	23	28	31	82	NO	31	NM	0	0	1	1	NO
16	FL	15	43	23	81	YES	31	MN	0	1	0	1	NO
16	KY	14	27	40	81	NO	32	HI	0	0	0	0	YES
17	LA	15	21	35	71	NO	32	NV	0	0	0	0	NO

Background

The chart displays total number of days with Air Quality Index (AQI) greater than 100 measured for ozone only. AQI is an index for reporting daily air quality. Ranging from 0 (good air quality conditions) to 500 (bad air quality conditions), AQI allows the public to relate air quality conditions to level of health concern. An AQI of 100 represents the level at which EPA has established a standard to protect public health. An AQI greater than 100 equals an exceedence, which is an 8-hour average greater than or equal to 0.085 ppm. To obtain the AQI for ozone only, ground-level ozone concentrations are collected at trend sites in Metropolitan Statistical Areas (>350,000 people) and converted by EPA into AQI values.

Methodology

This data is based upon "Number of Unhealthy Days by City, Ozone Only" found on EPA's Office of Air and Radiation AIR*Trends* website located at <http://www.epa.gov/oar/aqtrnd99/aqioz.pdf>. This document displays the number of days with AQI exceeding 100 at trend sites. The Trust combined trend site data within each state and calculated the total. The number of days with AQI greater than 100 may exceed 365 days per year due to multiple trend sites reporting an exceedence on the same day.

The Toxics Release Inventory and Suspected Respiratory Toxicants

The Environmental Protection Agency conducts the Toxics Release Inventory (TRI), a database of annual releases of over 644 toxic chemicals in the air and water by the nation's major industries. Each year, every covered facility reports the total amount of each chemical released. These data are publicly available and posted on the Internet, providing communities with information about the nature and magnitude of industrial pollution in their neighborhoods. In its analysis, The Trust focused on a subset of TRI air releases: suspected respiratory toxicants.

The TRI is an effective and publicly accessible hazard-tracking program, but it does have its limits. Most importantly, the volume released does not indicate the level of actual community exposure since these exposures are not tracked at the community level. In addition, the approach oversimplifies the complex nature of chemical toxicants, since multiple health effects can be associated with an individual toxicant, and complex interactions between toxicants can further impact human health. Also, the TRI is limited to major industrial facilities and does not include all potential sources of these pollutants. Finally, the 644 substances included capture only a fraction of total chemicals in common use.

Given the large amount of toxic pollutants released into our environment, there is a clear need to improve the tracking of population exposures and to be watchful for any evidence of adverse health impacts.

Four of the top five states ranking highest on releases of suspected respiratory toxicants do not track asthma. Nor do seven of the top ten. Of the top 25, over half do not track the disease.

Suspected Respiratory Toxicants

STATES RANKED BY REPORTED RELEASES OF SUSPECTED RESPIRATORY TOXICANTS EMISSIONS TO AIR AND ASTHMA TRACKING STATUS (Based on 1998 EPA Data as Presented by Environmental Defense Scorecard)							
Rank	State	Resp. Tox.(in lbs.)	Tracking	Rank	State	Resp. Tox.(in lbs.)	Tracking
1	OH	148,189,240	NO	26	OK	22,300,331	YES
2	PA	95,484,437	NO	27	KS	22,203,522	NO
3	TX	94,683,320	NO	28	WA	20,529,068	YES
4	IN	92,979,798	NO	29	MN	16,505,857	NO
5	NC	92,474,071	YES	30	NJ	16,250,220	NO
6	GA	92,408,886	NO	31	OR	15,890,044	YES
7	FL	88,016,967	YES	32	DE	10,608,254	NO
8	IL	81,740,132	YES	33	MA	10,434,430	YES
9	TN	81,071,609	NO	34	NE	9,900,991	YES
10	WV	74,317,699	NO	35	AZ	9,780,090	YES
11	KY	73,391,300	NO	36	ME	6,529,947	NO
12	MI	72,490,093	YES	37	NH	6,313,835	NO
13	LA	71,897,665	NO	38	ID	6,277,046	NO
14	AL	69,843,266	NO	39	CT	5,475,164	YES
15	UT	64,045,848	YES	40	MT	5,008,929	NO
16	VA	61,010,484	NO	41	CO	4,803,161	NO
17	SC	55,467,931	YES	42	NV	4,189,307	NO
18	MS	42,748,878	NO	43	WY	3,804,222	NO
19	MO	41,313,083	YES	44	HI	3,528,347	YES
20	WI	38,094,411	YES	45	ND	3,512,631	YES
21	NY	36,104,578	YES	46	SD	2,526,633	NO
22	IA	31,533,077	YES	47	AK	2,422,468	NO
23	MD	30,959,974	NO	48	NM	2,418,999	NO
24	CA	26,153,392	YES	49	RI	1,885,648	YES
25	AR	24,260,681	YES	50	VT	184,599	YES
				51	DC	68,950	YES

Methodology

Data and ranking are taken from Environmental Defense Scorecard (which based its presentation on 1998 TRI figures from EPA). This data was accessed at http://www.scorecard.org/env-releases/cap/rank-states-emissions.tcl?how_many=100&drop_down_name=suspected+respiratory+toxicants+tp+air on 4/3/01.

APPENDIX B: Asthma Basics

What is Asthma? Asthma is a chronic disease characterized by inflammation of the airways and lungs. It causes attacks of wheezing and shortness of breath.

Prevalence and increase. Asthma is a problem that affects not only a large number of people but people in every demographic group. More than 17 million Americans suffered from the disease in 1998 and 5,000 people per year die from it according to the CDC. It is increasing at a rate faster than any other chronic disease. The number of people with asthma rose 75% between 1980 and 1994. Mounting rates affected people in all race, sex and age categories and in every region of the U.S., although the poor, minorities and children have been hit the hardest.

By every health measure, the rate of increase is truly alarming. Between 1974 and 1995, the estimated annual number of office visits for asthma nearly doubled. Between 1979 and 1994 the number of hospitalizations for asthma increased from 386,000 to 466,000.

In 1995, there were 1.8 million emergency room visits for asthma. Asthma is the most common chronic illness among children, rising even faster among young children (160% between 1980 and 1994 among children aged 0-4) than for the population as a whole. Because this epidemic is getting worse instead of better, projections for asthma prevalence in the future show a grim picture. Based on the current rate of increase, 29 million Americans could have asthma by 2020. The number of deaths attributable to asthma could double by 2020 to reach 10,000 annually unless public health action is taken (15).

Causes and Triggers. We have not discovered the causes of most asthma development, that is, initiation in people that do not have asthma, and consequently we cannot know what is causing the recent escalation of its prevalence. However, we do know that asthma is a multifactorial disease, caused by some combination of genetic and environmental factors. We are better informed concerning some of its exacerbating factors, that is, the factors that trigger and worsen attacks in persons already having asthma.

Development of asthma. The dramatic rise in asthma has taken place in a far shorter period than one in which a genome change could occur. Therefore, it is reasonable to search for potential causes among relevant environmental factors (whose interaction with genetic factors can be investigated). A recent meticulous study of indoor environmental factors by the Institute of Medicine (IOM) concluded that there is sufficient evidence to characterize some of these as causal agents. They include allergens derived from cats, cockroaches and house dust mites as well as environmental tobacco smoke (in pre-school age children) (14).

Exacerbation of asthma. Last year's IOM study concluded that there was sufficient evidence to identify an association between asthma exacerbation and allergens from dogs, fungi/molds, rhinovirus and high indoor NO_x and NO₂ levels. IOM researchers found limited/suggestive evidence of an association between asthma exacerbation and the following: infections with chlamydia pneumoniae, mycoplasma pneumoniae and RSV (a virus); environmental tobacco smoke (in school age and older children and adults); and exposures to formaldehyde and fragrances.

It has been difficult to definitively link outdoor air pollution with asthma because of problems in estimating exposure and controlling for other factors. However, the weight of evidence linking air pollution to morbidity and mortality related to the respiratory system has significantly increased in the last decade, especially in the past five years. Many studies linking air pollutants to morbidity and mortality from respiratory diseases as well as to impaired lung development have confirmed the decade's earlier research (16, 17, 18, 19, 20, 21, 22).

Several recent studies have confirmed the association of certain outdoor air pollutants with asthma exacerbation in particular. For example, the reduction of ozone and particulate matter during the 1996 Olympic Games in Atlanta was associated with a dramatic drop in emergency room visits for asthma attacks (13). Recent work has confirmed that asthma sufferers are among those most susceptible to mortality and serious morbidity from elevated exposures to fine particulate matter (10). Elevated PM10 levels were associated with a rise in the occurrence of asthma symptoms in Seattle area children (23). Particulate matter has also been associated with the onset of respiratory symptoms in asthmatic children in southern California (24). Ambient ozone has been linked with inflammatory responses in the upper airways of asthmatics (11) and in their reduced lung function (12). New evidence has just been published revealing that school absences due to respiratory diseases, including asthma, escalate as ozone levels rise (25). Increased concentrations of nitrogen dioxide have been shown to significantly increase the prevalence of asthma among children in Japan (26).

APPENDIX C: Details on State Programs for Asthma Tracking

As stated previously, according to the CDC, tracking (surveillance) is defined as "the ongoing, systematic collection, analysis and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know." In that regard, we have highlighted four states, which are among the leading air polluters in the country but also reported to CDC that their state health department carries out ongoing asthma surveillance activities.

California

The Environmental Health Investigations Branch (EHIB) of the California Department of Health Services (DHS) is leading the state's asthma tracking initiatives. Currently, it reports asthma hospitalization and mortality for the whole state of California. It has utilized vital statistics, mortality records and hospital inpatient admissions in Geographic Information Systems (GIS) to map patterns of asthma mortality and hospitalization at the county level. This data is then used to characterize geographic trends and patterns over time.

As part of an international effort to study asthma (the International Study of Asthma and Allergies in Childhood or ISAAC), DHS currently conducts two isolated prevalence studies: 1) in Imperial County along the California-Mexico border and 2) in the Oakland school district. At this time, however, asthma incidence and prevalence estimates are not available at the state and local levels.

To analyze asthma prevalence, EHIB plans to use the Behavioral Risk Factor Survey (BRFS) and the National Health Interview Survey (NHIS). NHIS and BRFS are both federally mandated. NHIS is a national interview survey of random households, including both adults and children while BRFS is limited to adults only. The utility of these surveys are subject to self-reported bias but are currently both more available and more reliable than privately collected data such as that collected by managed care organizations. EHIB would also like to obtain emergency room visit data to observe rates of ER use for asthma attacks (27, 28).

Florida

The Florida Department of Health does not conduct formal asthma tracking. It did include six asthma-related questions from ISAAC on its 2000 Youth Tobacco Survey (FYTS). This survey was administered to students in grades 6-12 (about 65,000 Florida children completed the survey in 2000); however, the use of the data is limited at this time, while data are reviewed and validated, and the value of the adolescent self-reported asthma information is assessed. Self-reported asthma prevalence in adults is tracked through the BRFSS, which includes two CDC-supported asthma questions. Additional questions have not been developed and added by the state. The validity of self-reported asthma information in adults has not been well demonstrated either (29).

Illinois

Illinois is in its second year of CDC funding for asthma tracking efforts. It has begun a statewide asthma coalition for building an asthma-tracking infrastructure. At the state level, counties are combined to form health service areas that allow for aggregating data from smaller counties in order to improve data analyses and allow for comparisons statewide. Illinois' version of the BRFSS is designed to obtain estimates for sub-regions of the state, which can then be used to find the asthma prevalence in adults. Currently, Illinois collects hospitalization and mortality data. In the future, it plans to look at asthma prevalence.

In 1999, the Chicago Department of Health conducted the Chicago Respiratory Health Survey. This was a telephone survey that included about 3,000 children and adults in the city of Chicago. It found that asthma prevalence in Chicago did not differ much from that of the U.S. overall. In the future, the Chicago Department of Health would like to conduct an environmental health survey as part of its plan to develop an advocacy agenda (30, 31).

North Carolina

North Carolina's asthma tracking program uses a population-based approach to address the asthma problem. It collects local hospitalization and individual county-level data. At the state level, the North Carolina Division of Public Health conducted the NC School Asthma Survey (NCSAS) with seventh and eighth grade children in the 1999-2000 school year. NCSAS is a combination of the International Study of Asthma and Allergies in Childhood (ISAAC) prevalence survey and questions on risk factors (i.e., environmental triggers), consequences, and healthcare use. The ISAAC components include video scenes of children experiencing five asthma symptoms; this visual aid allows children to recognize these symptoms in themselves, whether or not they have been diagnosed, and increases the validity of their answers. Roughly 129,000 children from 499 (88%) public middle schools participated in the survey. These data have been reported back to individual schools as well as to other local educators, school nurses, the medical community and asthma coalitions. This first-of-a-kind survey confirmed that asthma is a leading chronic disease among school-age children. Before the NCSAS, only hospitalization records, school nurse reports and Medicaid claims data were available to determine the prevalence of asthma.

County-level data – emergency room use, school and childcare absences, repeat acute episodes, quality of life indicators, and healthcare provider's diagnostic and treatment practices -- are also available. However, this information is collected on a county-specific basis and by various entities, such as local asthma coalitions or health departments, with unique data collection methods. Thus, with the exception of NCSAS, county-level data may not be consistent across the state and may be difficult to use for comparison.

As for asthma prevalence in adults, the NC DHHS reports that it recently received results from the BRFSS and plans to analyze and disseminate the data as soon as possible (32).

APPENDIX D: New England Asthma Tracking Initiative

In May 2000, the regional administrators of the U.S. Department of Health and Human Services, the U.S. Environmental Protection Agency and the U.S. Department of Housing and Urban Development hosted a summit of New England commissioners of public health, environment, housing and education to address the challenge of combating pediatric asthma caused or worsened by environmental exposures in homes, schools and communities. Guided by recommendations from asthma leaders and experts around the region, the Summit participants called for three priority actions to address asthma: the establishment of a multi-sectoral, interdisciplinary Council to provide coordination of policy and programmatic priorities for multi-sectoral work on asthma in the region; the creation of guidance for the design, renovation and maintenance of asthma patient friendly schools and homes; and the launching of a regional asthma tracking initiative. The Summit's charge for a regional tracking initiative was to "support statewide surveillance efforts, while creating a core set of measures across health and environment including schools, homes, and outdoor exposures that are tracked across the region."

A workgroup made up of asthma leaders and experts in data, surveillance and asthma from within and outside the government—including representatives of managed care and health care delivery organizations—took the lead on the Summit's asthma tracking recommendation. Over the course of the summer and fall, the workgroup began exchanging information and experience, agreed on the importance of generating comparable data, developed a list of core data elements which the workgroup endorsed as important ingredients in any asthma tracking system, and facilitated agreement by all six New England states to ask the same two questions on pediatric asthma in the Behavioral Risk Factor Survey (BRFS) beginning in 2001.

Also in response to the Summit, the New England commissioners of health, housing and environment pioneered the nation's first Asthma Regional Coordinating Council (ARCC), which is composed of representatives from state and federal health, housing, environmental, education and Medicaid agencies, as well as non-governmental advocacy organizations in some of these same sectors. The Council has set for itself the task of creating an action plan to address the environmental aspects of asthma by targeting four areas that are within the control or influence of the Council's members. The four areas of action are: Surveillance, Education and Outreach, Exposure Reduction in Homes and Schools, and Exposure Reduction in the Community.

The Council's recommendations on surveillance build on the tracking workgroup's activities. They focus on (1) supporting the development of strong state surveillance programs that can contribute to development of a regional asthma prevalence estimate; (2) achieving agreement among the six New England states for developing and collecting comparable asthma data on at least several key indicators; and (3) establishing a New England asthma tracking pilot project focusing on the integration of health and environmental data in schools.

ARCC's commitment to advancing asthma tracking in New England has the potential to generate a regional profile of asthma far superior to any available in the nation, and to set in motion a process for ongoing collection and dissemination of comparable data relevant to asthma. Continuing collaboration between the public and private sectors through the regional tracking

workgroup will likely generate additional innovative ideas that could be piloted. New England asthma tracking activities can provide a model for the efforts CDC should be taking nationally to track chronic diseases so that clinicians, public health officials, environmental regulators, community-based groups and other leaders have the information they need to implement effective policies and programs.

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