

The US Respiratory Arena—In Brief A Round-up of Trends, Statistics, and Clinical Research

Dutch Scientists Sniff Out Asthma

Researchers at a Dutch university have developed a new and effective way of diagnosing and assessing the severity of asthma in patients—an artificial nose. This biosensor is already used for detecting bombs and optimising the coffee-roasting process, as well as for detecting tuberculosis bacteria and lung cancer from the volatile gas patterns in expired breath from patients.

The pilot study was reported at the American Thoracic Society (ATS) meeting. The researchers tested the breath of 10 patients with mild asthma, 10 with severe asthma, 10 young healthy controls, and 10 older controls. They had 100% success in differentiating patients with mild asthma from young controls, 90% success in distinguishing patients with severe asthma from older controls, and 90–95% reproducibility in distinguishing patients with severe asthma from controls.

This finding is more important than it might at first seem. The diagnosis of asthma is not always easy, as there are different types and causes of the disease and the physical signs are not always constant. A simple test would be a great step forward, according to the moderator of the press conference reporting the findings. ■

Prevalence of Lung Disease Varies Across Diverse Populations

Variations in the prevalence of specific lung diseases such as asthma, tuberculosis (TB), lung cancer, and chronic obstructive pulmonary disease (COPD) are seen across diverse communities, according to the 2007 American Lung Association (ALA) report 'State of Lung Disease in Diverse Communities'. This could be due to members of some communities having more risk factors for these diseases, such as genetic predisposition, poor living conditions, and unequal access to healthcare and medications.

The report presents analyses of data from various surveys and reports across many

ethnic and racial groups, illustrating the particular vulnerability of African-Americans to lung cancer, COPD, sleep disorders, TB, and HIV/AIDS.

While the spikes in some disease rates may be linked to cigarette smoking and occupational exposures, other findings shed light on genetic and socioeconomic factors. African-Americans are less likely to develop or die from COPD, yet they have more emergency room visits and similar disease severity compared with white patients who have smoked cigarettes over a longer period of time and who are heavier smokers.

"The American Lung Association prides itself on being the most powerful enemy of lung disease that we can be, particularly for vulnerable individuals," says Dr Leroy Graham, Partner with the Georgia Pediatric Pulmonology Associates. "Part of that fight involves taking a hard look at who is most affected by lung diseases, and creating stronger connections with diverse populations so that our education, advocacy and research are as effective as possible." ■

New Viruses Implicated in Respiratory Infections and Asthma Attacks

A new study using a DNA microarray developed by researchers at the University of California, San Francisco has helped to identify an unexpected number of viruses and viral subtypes in patients with respiratory tract infections (RTIs). RTIs such as the common cold are associated with some of the most common viral infections, and increase the risk of an asthma attack in those with the condition. Fifty to 80% of asthma exacerbations are precipitated by viral upper RTIs, yet these viruses are still poorly understood.

This Virochip technique uses the most conserved sequences of all known viruses of humans, animals, plants, and microbes for its detection system. The new study is the first to employ this strategy to investigate the

viruses associated with RTIs in people with and without asthma.

The study, conducted by Dr Amy Kistler and colleagues in California, Illinois, and Missouri, used various methods to test 53 asthmatic and 30 non-asthmatic adults for viruses at various stages of health.¹ Compared with the conventional methods of viral culture and the highly sensitive polymerase chain reaction (PCR) method, the Virochip had excellent agreement in terms of identifying viral pathogens, and proved to be both highly sensitive and highly specific.

The method "detected remarkable and unanticipated diversity" of viruses linked with RTIs and identified "a wholly new branch of the phylogenetic tree" for the human rhinovirus, one of the causative agents of the common cold virus, Dr Kistler notes. Thus, even with a small test group, the Virochip enabled the detection of new viruses that it was not previously possible to culture.

The researchers also detected 30 distinct known species of rhinoviruses and found that only one of the two coronaviruses thought to be responsible for up to 15% of all colds in the US was detectable in this study population. Instead, two newly described strains of coronaviruses dominated.

Generally speaking, our understanding of the role of viral diversity in RTIs and asthma is poor; therefore, Kistler's findings are particularly important and could be expanded on by future groups, leading to a comprehensive understanding of viral pathogen diversity associated with asthma exacerbations; this may enable the development of specific strategies for treating or preventing these respiratory problems. ■

Parental Attitude Influences Abhorrence to Pediatric Asthma Medications

A new study suggests that parental negative opinion of their children's asthma

medications—thinking they are not essential, or believing they pose health risks that outweigh the benefits—could explain why so many of the 10 million US children with the disease do not take their prescriptions regularly. Only about half of all prescribed preventive asthma medications are actually taken daily as directed.

To see whether parents’ beliefs about their children’s medicines might influence how dependably children actually take them, researchers at the University of Rochester analyzed data from the parents of 622 children in south-east Michigan who had been prescribed at least one preventive asthma medication.

First, parents were asked to complete a Beliefs About Medications Questionnaire (BMQ), a survey that measures two often conflicting parental perceptions of their children’s medications: necessity, or the extent to which parents believed a child’s sickness necessitated taking it; versus concern, or the extent to which a parent worried about possible risks associated with the drugs, such as side effects and potential for dependency.

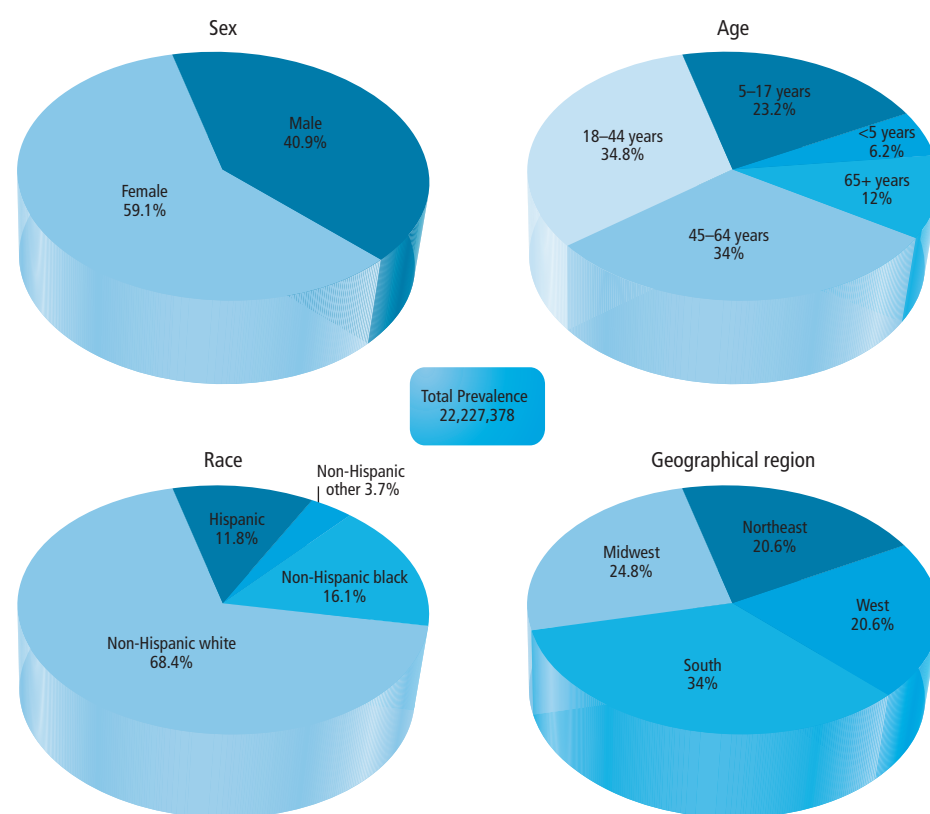
The survey showed that in 77% of cases, parents’ perceived need for their child’s medication outweighed concerns about any possible risks. However, 17%—one in six parents—were in the opposite camp, being more concerned about the potential of the drugs to cause harm than they were convinced of their child’s need for them.

The study confirmed that parental beliefs did indeed play a part in their children receiving medicines consistently; a stronger belief in necessity over concern was significantly linked with better adherence scores, even after controlling for all other potentially confounding variables. ■

Rising Number of Chronic Obstructive Pulmonary Disease Patients

The number of chronic obstructive pulmonary disease (COPD) patients is rising worldwide—the World Health Organization (WHO) predicts that by 2030 it will be the fourth-leading cause of death in the world. Estimates put the number currently affected with moderate to severe COPD at 80 million, with 5 million deaths in 2005.

Figure 1: Percentage Distribution of Current Asthma Prevalence by Sex, Age, Ethnicity, and Geographical Region, 2005



‘Current prevalence’ is defined as answering yes to ‘Have you ever been told by a doctor or other health professional that you had asthma?’ and ‘Do you still have asthma?’

Source: National Center for Health Statistics, National Health Interview Survey, 2005.

A recent study assessed 9,425 people aged 40 years and over from 12 different countries, and included results from spirometry tests, which measure breathing ability. The results of the study were as follows:

- The overall prevalence of COPD was 10.1%. This compares with previous estimates from another study that put the prevalence at 4.3%.
- Among men, the prevalence of COPD was 11.8%; among women it was 8.5%. Differences in smoking behavior probably explain the difference in COPD rates between men and women.
- The figures varied widely across countries:
 - South Africa had the highest proportion of people with COPD: 22.2% of men and 16.7% of women;

- Hanover in Germany had the lowest prevalence: 8.6% of men and 3.7% of women; and
- in the US, the overall prevalence of serious COPD is 10.1%.
- The risk of COPD is nearly doubled for every 10 years of age above 40.
- Smoking has a similarly large effect on risk.

An aging population may have something to do with this increase. “COPD is a cumulative response of the lungs to the burden of all that’s breathed in over a lifetime” said Sonia Buist, one of the lead authors of the recent study.

Whatever its cause, COPD looks set to be a major problem for the world’s physicians. ■

1. Kistler A, et al., Pan-viral screening of respiratory tract infections in adults with and without asthma reveals unexpected human coronavirus and human rhinovirus diversity, *J Infect Dis*, 2007;196(6):817–25.