Medical News

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Early Diagnosis of HIV Infection Achieved With Polymerase Chain Reaction

The human immunodeficiency virus (HIV) infection may be diagnosed earlier with polymerase chain reaction technology than with other available tests.

Currently available laboratory methods, such as enzyme-linked immunosorbent assay (ELISA) and western blot, detect HIV antibodies that may take three weeks to six months after initial infection to reach measurable levels in the blood. Using polymerase chain reaction, scientists can produce millions of copies of DNA from a single DNA segment within two hours, making it possible to detect a single HIV-infected cell among 100,000 uninfected cells prior to seroconversion.

Polymerase chain reaction may be important in resolving the HIV status of persons with indeterminate serological results-such as newly infected individuals and babies born to HIV-positive mothers. Serological tests are not useful in neonatal HIV screening because newborns carry their mothers' antibodies and will test positive with serological methods. HIV infection is transmitted to an estimated 30% of newborns from their HIV-positive mothers.

Progress is being made in developing a polymerase chain reaction-based HIV kit for use in the clinical laboratory The kit will be a qualitative assay that can detect the presence of HIV at any stage of infection. One of the test kit's most important uses is expected to be for neonatal screening, where it may replace the need for viral culture, that can delay critical treatment for weeks.

An estimated one million Americans are thought to be infected with HIV, reports the National Institute of Allergy and Infectious Diseases. And more than 80% of U.S. physicians have now treated an HIV-positive patient, according to the American Medical Association.

Portable Tuberculosis Air Purifier

A new, portable high-efficiency filtration device filters tuberculosis-carrying airborne particulates. The MICROCON (Biological Controls, Tinton Falls, New Jersey) unit combines a high-volume (up to 725 cfm delivered) air impeller with a submicron high efficiency particulate air (HEPA) filter, both contained in a caster-mounted ducting unit. The unit also has a shielded UV-lamp option.

Tuberculosis bacteria present a serious threat to healthcare workers and patients wherever tuberculosis patients are being treated. The micron-size bacillus attaches to droplet nuclei and can migrate with air currents, distributing the bacteria throughout a facility. MICROCON's 360° intake and exhaust creates a recirculation pattern that filters the air within a room up to 55 times per hour.

MICROCON's HEPA filter is a self-sealed replaceable module. A patent application has been made for the MICROCON design.

From the Centers for Disease Control

PUBLIC-SECTORVACCINATION EFFORTS IN RESPONSE TO THE RESURGENCE OF MEASLES AMONG PRESCHOOL-AGED CHILDREN— UNITED STATES, 1989-1991

From 1989 through 1991 in the United States, the incidence of reported measles increased six-fold to nine-fold over the median annual incidence (1.3 per 100,000 population) reported from 1981 through 1988.

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In 1990, the peak of the resurgence, the incidence of measles among children aged <5 years was 15-fold higher than the median incidence from 1981 through 1988 (4.8 per 1,000,000).[1] During 1991, approximately 9,500 cases were reported, including 4,662 cases among children aged <5 years (Centers for Disease Control [CDC], unpublished data). The measles epidemic is a consequence primarily of the failure to vaccinate preschool-aged children at appropriate ages;[2] among children aged 16 months to 59 months who developed measles during this resurgence, only 15% had received measles vaccine as recommended (CDC, unpublished data). This report compares the number of public clinic vaccinations (i.e., all measles-containing vaccines, diphtheria-tetanus-pertussis vaccine, and oral polio vaccine) for 1988 with that for 1989 through 1991 in response to the measles resurgence.

During 1989 through 1991, state health departments reported a provisional total of 55,467 measles cases that resulted in a minimum of 11,251 known hospitalizations, 44,127 hospital days, and 166 suspected measles-related deaths. The resurgence of measles prompted collaborative efforts among federal, state, and local government agencies and private physicians and other private sector groups to improve overall vaccination coverage among preschool-aged children. Records of vaccine doses (measles-containing vaccines, diphtheria-tetanus-pertussis vaccine, and oral polio vaccine) administered to preschool-aged children in public clinics are reported to the CDC by age group by the 63 immunization projects in the United States and its territories for all publicly purchased vaccines. For this report, assessment of the response to the resurgence of measles was limited to vaccinations administered through the public sector (i.e., federally, state-, and locally funded clinics).

Doses of measles-containing vaccines, diphtheria-tetanus-pertussis vaccine, and oral polio vaccine provided in public clinics in 1988 were compared with doses provided annually from 1989 through 1991. Among children aged 12 months through 23 months, the number of doses of measles-containing vaccines administered each year increase substantially after 1988. In 1991, the number of doses administered to children aged 1 year was 42% higher than in 1988. The estimated proportion of all children aged 12 months through 23 months who received measles-containing vaccines through public health clinics also increased, from 25% during 1988 to 33% during 1991. During 1989 through 1991, doses of measles-containing vaccines administered in public clinics increased (mean = 59%) in the ten immunization projects with the largest measles outbreaks during these years; however, vaccination also increased (mean = 38%) in immunization project sites that did not have large measles outbreaks. In addition to increases in measles-containing vaccines vaccination, doses of diphtheria-tetanus-pertussis vaccine and oral polio vaccine administered to children aged <12 months increased (diphtheria-tetanus-pertussis vaccine increased 26% and oral polio vaccine increased 22%). Overall, from 1989 through 1991, doses of measles-containingvaccines, diphtheria-tetanus-pertussis vaccine, and oral polio vaccine administered to all preschool-aged children increased at a similar level.

Although the incidence of measles began to decrease during 1991, intense publicity efforts about the need for preschool vaccination continued, and the greatest number of doses of all three vaccines were administered that year. The reasons for the improved vaccination performance of the public- and private sector efforts to educate and motivate parents to ensure their children are vaccinated at recommended ages and assure that providers both reduce barriers to vaccination and take advantage of all opportunities to vaccinate.

Some of the increase in vaccinations since the resurgence of measles also might reflect a shift in vaccine delivery from private to public sector. A recent survey of physicians in Dallas, Texas, suggested they were referring substantially more. patients to public clinics where vaccines were available free or at a nominal charge because these patients could not afford vaccination in the private sector.[4] In particular, from 1982 through 1992, the price of vaccines to fully vaccinate a child increased approximately ten-fold in the private sector-in part, because the Advisory Committee on Immunization Practices and the Committee on Infectious Diseases of the American Academy of Pediatrics now recommend 17 to 18 doses of different vaccines, compared with ten doses in 1982.[5] Much of this increased cost must be borne by the parent because, as of 1990, only half of the traditional employer-based indemnity plans provided reimbursement for childhood vaccination.[6]

During 1991, although approximately 400,000 more children were vaccinated against measles at the appropriate age than in 1988, only 33% of these 1-year-olds may have been vaccinated against measles at the recommended age in public clinics-a percentage sub stantially lower than the estimated 50% of children traditionally served by the public sector. Major sustainable improvements in vaccination programs are still needed to meet the national health objective for the year 2000 to completely vaccinate 90% of children by their second birthday (objective 20.11).[7]

During the next several years, as children vaccinated between 1989 and 1991 enter school, vaccination records will become available for public health agencies to assess whether the increases in vaccine

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administered in the public sector were associated with overall increases in vaccination levels of preschool-aged children.

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