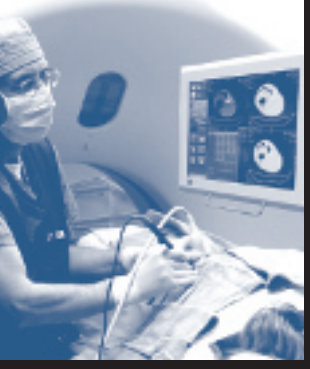


MAYO CLINIC

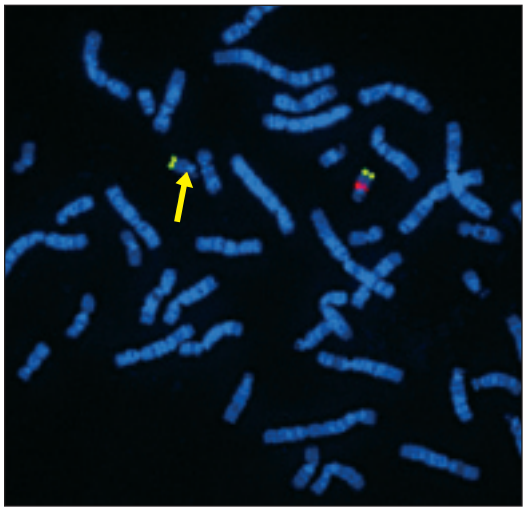
CLINICAL UPDATE

CURRENT TRENDS IN THE PRACTICE OF MEDICINE

SUPPLEMENT
FOCUS ON PEDIATRICS

Mayo Clinic Pediatric Immunodeficiency Center Provides Early, Accurate Diagnoses and Management Advice

Primary immunodeficiency affects an estimated 50,000 Americans, and most cases are diagnosed in childhood. The presentation varies and is characterized by recurrent infections and a range of heterogeneous symptoms, depending on the specific immune defect. Because of this variability and because the symptoms include common infec-tions—otitis media, sinusitis, pneumonia—the disorder frequently eludes early diagnosis.



This image indicates DNA fluorescent in situ hybridization probes used to detect microdeletion of chromosome 22q11.2 region. This deletion is commonly found in DiGeorge and velocardiofacial syndrome, conditions often presenting with immunodeficiency. An abnormal chromosome 22 is indicated here by the arrow. This deletion would be consistent with a microdeletion that is not visible by conventional chromosome analysis.

To provide early, accurate diagnoses and management advice for children with immune disorders, in February 2005 Mayo Clinic opened its Pediatric Immunodeficiency Center, one of only a few in the United States. Staffed by Mayo Clinic pediatricians who specialize in immunology, allergy, rheum-atology, and infectious diseases, it receives technical support from a new cellular and molecular diagnostic immunology laboratory. This multidisciplinary approach can address the whole spectrum of diseases and organ systems involved.

Indications for Referral

A child should be evaluated for primary immunodeficiency if any of the following conditions is present:

- Frequent infections—for example, 2 occurrences of lobar pneumonia during childhood or 6 to 8 ear infections in a 6-month period.
- Infections with unusual organisms, such as *Aspergillus* or *Pseudomonas*.
- Particularly severe infections.
- Infections at unusual sites such as liver or spleen abscesses.

Genetic Causes

Several genetic syndromes are characterized by immunodeficiency, which makes taking a detailed family history important. For example, decreased T-lymphocyte count along with certain cardiac defects and characteristic facial features may suggest a diagnosis of DiGeorge syndrome (also known as 22q11.2 deletion syndrome).

Mayo Clinic Designated Phase 1 Study Center for New Treatments of Recurrent Pediatric Cancers

Cancer is the second leading cause of death among children between the ages of 1 and 14 years in the United States—accidents being the most frequent cause of death in this age group. The most commonly occurring childhood cancers are acute lymphocytic leukemia, brain and other nervous system cancers, soft tissue sarcoma, lymphoma, and renal (Wilms) tumor.

The Division of Pediatric Oncology at Mayo Clinic is a member of the Children's Oncology Group Phase 1 Consortium, a group of 21 institutions in the United States funded by the

National Cancer Institute to investigate new agents for therapy of cancer. Chemotherapeutic or biologic agents offered in phase 1 trials are those that have shown anticancer activity in preclinical studies. Phase 1 study agents should not be interpreted as "likely cures." That determination is yet to be made—and will rest, in part, on the data generated from the phase 1 studies.

Phase 1 studies are intended to determine 3 critical features of promising chemotherapeutic or biologic agents:

- the maximum tolerated dose;
- preliminary information about the adverse effects profile; and
- a preliminary definition of the drug's antitumor activity.

Eligibility for a given agent at a given dose level is determined individually. If accepted into a phase 1 study, the child and his or her parents must travel to Mayo Clinic in Rochester, Minnesota. The method of drug delivery (intravenous, oral, or other route) depends on the particular drug being studied, and patients may or may not require hospitalization, again depending on the agent being administered.

Specific chemotherapeutic agents under study are subject to change, so referring physicians should contact Mayo Clinic to discuss each patient before referral. For more information about phase 1 trials at Mayo Clinic or to discuss referring a patient, please contact Carola Arndt, MD, at 507-284-3442.

Expanded Focus of Mayo Clinic's Pediatric Asthma Service

Nationwide, approximately 4 million children younger than 18 years have at least 1 asthma attack a year. The dramatic rise in the incidence in asthma, as well as the increasing complexity of both social and biological factors at work in asthma, has led Mayo Clinic pediatric asthma clinicians and researchers to expand their focus in treating pediatric asthma patients.

Mayo Clinic specialists offer patients and their families a clinical approach that synthesizes biological factors with social factors to determine how the interplay of variables affects asthma outcomes. Included in this expanded view is a multidisciplinary approach that takes into consideration the child's environment; biological factors such as defects in the immune system and the role of airborne allergens in contributing to asthma; genetic predisposition; comorbid conditions such as sinusitis and acid reflux; and clinical symptoms. The aim is to achieve the best possible asthma control, achieve full patient participation in childhood physical activities, with the lowest possible doses of medications to limit the risk of adverse effects.

Monitoring asthma symptoms alone as a guide to therapy is insufficient; National Institutes of Health guidelines also call for achievement of the patient's best possible lung function, and control of airway inflammation is essential to achieving this. Because asthma is a chronic disease, follow-up includes not only periodic maintenance visits but also monitoring lung function and indices of airway inflammation. This long-term, comprehensive approach is the key to ensuring the best outcome for the child.

Defining the relationship of asthma to infectious disease is another area that Mayo childhood asthma specialists are investigating. Research is under way to examine the role of pneumococcal infections in asthma development. Still other research is concentrating on the possibility that commonly found airborne fungi may contribute to the development of asthma.

Goals of Specialized Pediatric Asthma Care

Using a systematic approach to diagnosis and management, a pediatric asthma specialist can help children with difficult asthma achieve

- **the best possible lung function on the lowest dose of inhaled corticosteroids**
- **controlled asthma, defined as**
  - **absence of nocturnal symptoms**
  - **use of a rescue bronchodilator <4 times a week**
  - **normal exercise and activity tolerance**
  - **≤2 exacerbations per year requiring systemic corticosteroids**
  - **no hospitalizations due to asthma**
- **minimal adverse effects of medication**

MAYO CLINIC

200 First Street SW
Rochester, Minnesota 55905
www.mayoclinic.org

MC2024-07