ABSTRACT. The Hospital Infection Control Practices Advisory Committee of the US Centers for Disease Control and Prevention and the National Center for Infectious Diseases have issued new isolation guidelines that replace earlier recommendations. Modifications of these guidelines for the care of hospitalized infants and children should be considered specifically as they relate to glove use for routine diaper changing, private room isolation, and common use areas such as playrooms and schoolrooms. These new guidelines replace those provided in the 1994 Red Book and have been incorporated into the 1997 Red Book.

STANDARD PRECAUTIONS
Standard precautions now apply to nonintact skin, mucous membranes, blood, all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood. These general methods of infection prevention are indicated for all patients and are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

TRANSMISSION-BASED PRECAUTIONS
Transmission-based precautions are designed for patients documented or suspected to be infected or colonized with pathogens that require additional precautions beyond the standard precautions necessary to interrupt transmission. These precautions apply to airborne, droplet, and contact transmissions. The precautions may be combined for diseases that have multiple routes of transmission. Whether singly or in combination, they are always to be used in addition to standard precautions.

Contact Transmission
Contact transmission, the most important and frequent mode of transmission of nosocomial infections, is divided into two subgroups: direct-contact transmission and indirect-contact transmission.

Direct-contact transmission involves a direct body surface-to-body surface contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as occurs when a person turns a patient, gives a patient a bath, or performs other patient-care activities that require direct personal contact. Direct-contact transmission also can occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host.

Indirect-contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles, dressings, or contaminated
Droplet Transmission

Droplet transmission, theoretically, is a form of contact transmission. However, the mechanism of transfer of the pathogen to the host is quite distinct from either direct- or indirect-contact transmission. Therefore, droplet transmission is considered a separate route of transmission in this guideline. Droplets are generated from the source person primarily during coughing, sneezing, and talking, and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from the infected person are propelled a short distance through the air and deposited on the host's conjunctiva, nasal mucosa, or mouth. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission must not be confused with airborne transmission.

Airborne Transmission

Airborne transmission occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 μm or smaller] of evaporated droplets containing microorganisms that remain suspended in the air for long periods) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents, and may be inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Microorganisms transmitted by airborne transmission include *Mycobacterium tuberculosis* and the measles and varicella viruses.

These new guidelines provide summary tables for
different settings. A synopsis of the precautions and patients requiring these precautions is presented in Table 1. Table 2 describes empiric precautions for clinical syndromes pending confirmation of diagnosis. Table 3 outlines the specific procedures indicated for each type of precaution. Footnotes document the acceptable changes for children. Appendix A in the guidelines, which is not reproduced here, is the specific recommendation on type and duration of precautions needed when the specific infection or condition is known.

**PEDiATRIC CONsiderATIONS**

These guidelines are intended to be not only epidemiologically sound but also simple and readily implemented for the care of both adults and children. Practically, however, unique requirements of pediatric care necessitate modifications of these guidelines, par-

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**TABLE 2.** Clinical Syndromes or Conditions Warranting Additional Empiric Precautions to Prevent Transmission of Epidemiologically Important Pathogens Pending Confirmation of Diagnosis*

<table>
<thead>
<tr>
<th>Clinical Syndrome or Condition†</th>
<th>Potential Pathogens‡</th>
<th>Empiric Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute diarrhea with a likely infectious cause in an incontinent or diapered patient</td>
<td>Enteric pathogens§</td>
<td>Contact</td>
</tr>
<tr>
<td>Diarrhea in an adult with a history of recent antibiotic use</td>
<td><em>Clostridium difficile</em></td>
<td>Contact</td>
</tr>
<tr>
<td>Meningitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neisseria meningitidis</td>
<td></td>
<td>Droplet</td>
</tr>
<tr>
<td>Rash or exanthems, generalized, etiology unknown</td>
<td>Neisseria meningitidis</td>
<td>Droplet</td>
</tr>
<tr>
<td>Petechial/echymotic with fever</td>
<td>Varicella</td>
<td>Airborne and contact</td>
</tr>
<tr>
<td>Vesicular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maculopapular with coryza and fever</td>
<td>Rubeola (measles)</td>
<td>Airborne</td>
</tr>
<tr>
<td>Respiratory infections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough/fever/pulmonary infiltrate in an HIV-negative patient or a patient at low risk for HIV infection</td>
<td><em>Mycobacterium tuberculosis</em></td>
<td>Airborne</td>
</tr>
<tr>
<td>Cough/fever/pulmonary infiltrate in any lung location in an HIV-infected patient or a patient at high risk for HIV infection</td>
<td><em>Mycobacterium tuberculosis</em></td>
<td>Airborne</td>
</tr>
<tr>
<td>Paroxysmal or severe persistent cough during periods of pertussis activity</td>
<td><em>Bordetella pertussis</em></td>
<td>Droplet</td>
</tr>
<tr>
<td>Respiratory infections, particularly bronchiolitis and croup, in infants and young children</td>
<td>Respiratory syncytial or parainfluenza virus</td>
<td>Contact</td>
</tr>
<tr>
<td>Risk of multidrug-resistant microorganisms</td>
<td>Resistant bacteria</td>
<td>Contact</td>
</tr>
<tr>
<td>History of infection or colonization with multidrug-resistant organisms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin, wound, or urinary tract infection in a patient with a recent hospital or nursing home stay in a facility where multidrug-resistant organisms are prevalent</td>
<td>Resistant bacteria</td>
<td>Contact</td>
</tr>
</tbody>
</table>

| Skin or wound infection | Staphylococcus aureus, group A streptococcus | Contact |

* Infection control professionals are encouraged to modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care. (Reprinted with permission from Garner JS and the Hospital Infection Control Practices Advisory Committee.†)

† Patients with the syndromes or conditions listed herein may present with atypical signs or symptoms (eg, neonates and adults with pertussis may not have paroxysmal or severe cough). The clinician’s index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.

‡ The organisms listed are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond standard precautions until they can be ruled out.

§ These pathogens include enterohemorrhagic Escherichia coli O157:H7, Shigella, hepatitis A, and rotavirus.

¶ Resistant bacteria judged by the infection control program, based on current state, regional, or national recommendations, to be of special clinical or epidemiological significance.

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**TABLE 3.** Recommendations for Transmission-Based Precautions for Hospitalized Patients

<table>
<thead>
<tr>
<th>Category of Precautions</th>
<th>Hand Washing for Patient Contact</th>
<th>Single Room</th>
<th>Masks</th>
<th>Gowns</th>
<th>Gloves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airborne</td>
<td>Yes</td>
<td>Yes, with negative-pressure ventilation</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Droplet</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes, for those close to patient</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Contact</td>
<td>Yes</td>
<td>Yes*</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Preferred but not required for crib-confined patients. Cohorting of children infected with the same pathogen is acceptable.
particularly concerning 1) use of gloves for routine diaper changing, 2) private rooms and cohorting, and 3) common-use areas such as playrooms and schoolrooms.

Diaper Changing
When dealing with infants and preschool-age children who require routine diaper changing, the use of gloves is not mandatory. The routine use of gloves, however, for diaper changing in hospitalized children could minimize the potential transmission of colonizing microbes (eg, cytomegalovirus, Clostridium difficile, and Citrobacter freundii) to another patient who might become infected. While exceptions to routine glove use in units such as the normal newborn nursery or outpatient surgical suites are acceptable, the lack of a uniform policy for glove use may be confusing and actually impede implementation of recommended and consistent infection control practices.

Private Rooms and Cohorting
The CDC guidelines recommend private rooms for all patients requiring isolation precautions (airborne, droplet, or contact). For any patient with an infection requiring airborne precautions, a single room with negative pressure ventilation is indicated. The guidelines also recommend that patients who do not control body excretions should be in single rooms. However, because the majority of young pediatric patients are incontinent, by definition, this recommendation is inappropriate for routine care of uninfected children. Even with infection in settings such as nurseries, intensive care units, and infant wards, single room isolation for droplet and contact precautions, although preferred, is not mandatory because these infants are confined to cribs or incubators. However, for young children who are not confined to their cribs or incubators who require droplet or contact precautions, single rooms are indicated because young children are unable to limit the spread of their secretions and excretions. The exception to the need for a single room is for children infected with the same pathogen (such as respiratory syncytial virus) who can be separated by cohorts.

Common Use Areas (Hospital Schoolrooms, Playrooms, Etc)
Hospital playrooms and schoolrooms are unique to the field of pediatrics. Any child being treated with isolation precautions should be excluded from these general use areas.

RECOMMENDATIONS
In general, the revised CDC guidelines are endorsed for the care of hospitalized infants and children.
Modification of these guidelines for the care of hospitalized infants and children should be considered specifically as they relate to glove use for routine diaper changing, private room isolation, and common use areas such as playrooms and schoolrooms.
These new guidelines replace those provided in the 1994 Red Book and have been incorporated into the 1997 Red Book.
The Revised CDC Guidelines for Isolation Precautions in Hospitals: Implications for Pediatrics

Committee on Infectious Diseases and Committee on Hospital Care

*Pediatrics* 1998;101;e13

DOI: 10.1542/peds.101.3.e13

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e1 ABSTRACT. Control of Hyperbilirubinemia in Glucose-6-Phosphate Dehydrogenase-deficient Newborns Using an Inhibitor of Bilirubin Production, Sn-Mesoporphyrin. Timos Valaes, MD; George S. Drummond, PhD; and Attallah Kappas, MD. Background. Hyperbilirubinemia in newborns with glucose-6-phosphate dehydrogenase (G6PD) deficiency is a serious clinical problem because of the severity and unpredictability of its course. An innovative approach to this problem is suggested by previous experience with Sn-mesoporphyrin (SnMP), a potent inhibitor of bilirubin production, in moderating neonatal hyperbilirubinemia caused by ABO incompatibility, immaturity, and unspecified mechanisms.

Objective. To compare the effectiveness of the preventive and therapeutic uses of SnMP in ameliorating the course of bilirubinemia of G6PD-deficient neonates.

Methods. Neonates born at the Materna Maternity Hospital, Athens, Greece, and found to be G6PD-deficient by cord blood testing were stratified by sex and gestational age (210–265 days and ≥265 days) and randomized in pairs to receive SnMP (6 μmol/kg birth weight, intramuscularly) either on the first day of life (preventive use) or if and when the plasma bilirubin concentration (PBC) level reached an age-specific threshold level for intervention (therapeutic use). In the case of failure of SnMP to control the rise of PBC levels, the protocol defined precisely the threshold PBC levels for switchover to phototherapy (PT) and, if necessary, exchange transfusion. PBC was measured daily until a declining value was obtained and the case was closed.

Results. A total of 86 G6PD-deficient neonates were randomized: 42 in the preventive arm and 44 in the therapeutic arm. Of the latter, 20 (45%) reached PBC levels requiring therapeutic intervention and thus received SnMP. Regardless of the trial arm, none of the 86 neonates required PT, whereas in a previous study in the same population, 33% of G6PD-deficient neonates required PT. In the intrapair sequential analysis, the favored arm was decided on the criterion of the age at closure of the case being shorter by at least 1 day. After plotting 30 untied pairs in the sequential analysis graph, the preventive use of SnMP proved to be the favored arm, and the trial was stopped. At this point, there were 2 unpaired neonates, 12 tied pairs, 22 pairs in which the preventive use of SnMP was favored and 8 pairs in which the therapeutic use of SnMP was favored. In the group analysis, infants in the preventive group, compared with those in the therapeutic group, had a lower maximum PBC level (8.2 ± 1.1 and 10.9 ± 2.8 mg/dL, respectively), which was reached at an earlier age (63.5 ± 34.8 and 82.2 ± 24.7 hours, respectively) as well as a lower closing PBC level (7.2 ± 2.9 and 9.6 ± 2.5 mg/dL, respectively) and an earlier age at closing (89.1 ± 35.6 and 110.8 ± 23.6 hours, respectively). Moreover, a PBC level of 8.0 mg/dL, a level at which jaundice is clearly visible, was not reached by 52% of the neonates in the preventive arm and 16% of the neonates in the therapeutic arm.

Conclusions. In G6PD-deficient neonates, a single dose of SnMP administered preventively or therapeutically entirely supplanted the need for PT to control hyperbilirubinemia. The preventive use of SnMP offers practical advantages in populations with a high enough prevalence of G6PD deficiency to justify cord blood screening.

e2 ABSTRACT. Effects of Exposure to Alcohol in Mother’s Milk on Infant Sleep. Julie A. Mennella, PhD, and Carolyn J. Gerrish, PhD. Objective. To test the hypothesis that exposure to alcohol in breast milk affects infants’ sleep and activity levels in the short term.

Methods. Thirteen lactating women and their infants were tested on 2 days, separated by an interval of 1 week. On each testing day, the mother expressed 100 mL of milk, while a small, computerized movement detector called an actigraph was placed on the infant’s left leg to monitor sleep and activity patterning. After the actigraph had been in place for ~15 minutes, the infants ingested their mother’s breast milk flavored with alcohol (32 mg) on one testing day and breast milk alone on the other. The infants’ behaviors were monitored for the next 3.5 hours.

Results. The infants spent significantly less time sleeping during the 3.5 hours after consuming the alcohol-flavored milk (78.2 minutes compared with 56.8 minutes after feeding alcohol in breast milk). This reduction was apparently attributable to a shortening in the longest sleeping bout (34.5 compared with 56.7 minutes for sleeping after breast milk alone) and the amount of time spent in active sleep (25.8 minutes compared with 44.2 minutes after breast milk alone); the decrease in active sleep was observed in all but 2 of the 13 infants tested.

Conclusions. Although the mechanisms underlying the reduction in sleep remain to be elucidated, this study shows that short-term exposure to small amounts of alcohol in breast milk produces distinctive changes in the infant’s sleep–wake patterning.

Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e2; alcohol, lactation, sleep, activity, development, infant behavior.

e3 ABSTRACT. Adverse Effects of High-dose Vitamin A Supplements in Children Hospitalized With Pneumonia. Charles B. Stephensen, PhD; Luis Miguel Franchi, MD; Herminio Hernandez, MD; Miguel Campos, MD, PhD; Robert H. Gilman, MD, DTMH; and Jose O. Alvarez, PhD. Objective. To test the hypothesis that high-dose vitamin A supplements will enhance recovery of children hospitalized for the treatment of community-acquired pneumonia.

Design. We conducted a randomized, double-blind, placebo-controlled clinical trial of high-dose vitamin A supplements among children 3 months to 10 years of age (N = 95) admitted to hospital with community-acquired pneumonia in Lima, Peru. Children ≤1 year of age received 100 000 IU of water-miscible vitamin A on admission to the hospital and an additional 50 000 IU the next day. Children >1 year of age received 200 000 IU on admission and 100 000 IU the next day.

Results. Children receiving vitamin A (n = 48) had lower blood oxygen saturation (the mean difference on day 3 in hospital was 1.1%), higher prevalence rates of retraction (37% in the vitamin A group vs 15% in the placebo group on day 3), auscultatory evidence of consolidation (28% in the vitamin A group vs 17% in the placebo group on day 3), and were more likely to require supplemental oxygen (21% in the vitamin A group vs 8% in the placebo group on day 3) than children in the placebo group (n = 47). Adjustment for baseline severity of disease and nutritional status did not alter the association of vitamin A with increased clinical severity, although the difference in blood oxygen saturation was no longer statistically significant. No differences were seen in duration of hospitalization.
tion or in chest x-ray changes 14 days after admission. No deaths occurred, and toxicity of vitamin A was not seen.

Conclusions. This study indicates that high-dose vitamin A supplements cause modest adverse effects in children recovering from pneumonia and should not be used therapeutically in such patients unless there is clinical evidence of vitamin A deficiency or concurrent measles infection. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e3; vitamin A, pneumonia, children, Peru, respiratory, lung, retinol.

e4 ABSTRACT. Attitudes of the Physician Membership of the Society for Adolescent Medicine Toward Medical Abortions for Adolescents. Nancy H. Miller, MD; David J. Miller, PhD; and Laura M. Pinkston Koenigs, MD. Objective. To document the practices and attitudes of the US physician members of the Society for Adolescent Medicine (SAM) regarding adolescent abortion and contraception, as well as physician willingness to prescribe medical abortion if approved by the Food and Drug Administration (FDA).

Design. Cross-sectional questionnaire survey.

Participants. The entire physician membership of SAM (N = 1001) was surveyed. A total of 713 physicians responded, with 668 usable surveys yielding an adjusted response rate of 70%.

Results. Of the respondents, 81% were trained as pediatricians; 58% had additional adolescent medicine training. Ninety-six percent prescribed contraception for their patients. Sixty-one percent of respondents identified abortion as an option for pregnant adolescents in all circumstances, whereas 4% believed abortion should never be an option. Eighty-nine percent referred their patients for abortions; 90% were aware of medications to induce abortions medically. If these medications (mifepristone and misoprostol, RU-486) were FDA-approved, 42% would prescribe them for their patients; 34% were unsure. Fifty-four percent believed if medical abortions were routinely available, they should be available from primary care physicians.

Physicians were significantly more likely to consider prescribing medical abortions if the physician were female, offered postcoital contraception, performed Norplant insertions, referred adolescents for abortions, or performed postabortion medical checkups. Physicians were no more likely to consider prescribing medical abortions according to physician age, specialty training, or date of residency training. Religious affiliation per se was not associated with likelihood of prescribing medical abortions, but Catholic physicians were significantly less likely to consider prescribing medical abortions.

Conclusions. Virtually all SAM physician respondents (96%) reported that abortion for pregnant adolescents should be available under some circumstances. Forty-two percent would prescribe medical abortion if the medications were FDA-approved, suggesting that medical abortion would potentially be available to adolescents from a larger group of physicians than is currently available. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e4; adolescence, abortion, Society for Adolescent Medicine.

e5 ABSTRACT. Do Missed Opportunities Stay Missed? A 6-Month Follow-up of Missed Vaccine Opportunities in Inner City Milwaukee Children. Svapna S. Sabnis, MD; Albert J. Pomeranz, MD; Patricia S. Lye, MD, MS; and Margaret M. Amateau, MD. Objectives. To determine 1) the frequency of missed vaccine opportunities (VOs) in inner city children <3 years of age; 2) whether the recommended vaccine(s) were given within 6 months of the missed opportunity (MO); 3) whether these vaccinations were age-appropriate according to the guidelines of the Advisory Committee on Immunization Practices; and 4) variables associated with MOs.

Design. Retrospective chart review with a nested retrospective cohort of children with MOs.

Setting. Two inner city practice settings in Milwaukee: a community health center and an academic continuity care practice.

Patients/Selection Procedure. A consequtive sample of 710 visits of inner city children <3 years of age with VOs, seen between January 1 and March 31, 1995. A VO was defined as any encounter when the child was vaccine-eligible according to Advisory Committee on Immunization Practices guidelines.

Results. MOs occurred in 47% (330/710) of the VOs. Only 40% of the children with MOs received age-appropriate immunizations within 6 months; 30% received the vaccinations beyond the age-appropriate time. The remaining 30% either did not return or were not vaccinated on return. The variables significantly associated with MOs were 1) age: children with MOs were older than those without, with a mean age of 15.5 months vs 10.9 months; 2) minor febrile illness; 3) moderate/severe illness; 4) acute illness encounters; and 5) patient’s being seen at the community health center. Only 15.5% of all MOs were justified by the presence of moderate/severe illness.

Conclusions. VOs are frequently missed in inner city children. Most of the MOs were not justified by the valid contraindication of moderate/severe illness. Sixty percent of the children with MOs did not receive age-appropriate immunizations within 6 months. These children are vulnerable to vaccine-preventable diseases such as measles and pertussis. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e5; immunization, vaccination, missed opportunities, children, pre-school.

e6 ABSTRACT. Anabolic Steroid Use by Male and Female Middle School Students. Avery D. Faigenbaum, EdD; Leonard D. Zaichkowsky, PhD; Douglas E. Gardner, MA; and Lyle J. Micheli, MD. Background. The prevalence of anabolic steroid use by high school and college students has been reported in the literature. However, rumors persist regarding the use of steroids by younger populations.

Objective. To assess the extent of steroid use by male and female middle school students and to explore their attitudes and perceptions about these drugs.

Methods. A confidential self-report questionnaire was administered to 466 male and 499 female students between 9 and 13 years of age (mean ± SD, 11.4 ± 0.9 years) in 5th, 6th, and 7th grades from four public middle schools in Massachusetts. The number of students reporting steroid use and differences between users’ and nonusers’ underlying attitudes and perceptions about these drugs were evaluated.
ABSTRACT. Early Dexamethasone Therapy in Preterm Infants: A Follow-up Study.

Tsu F. Yeh, MD; Yuh J. Lin, MD; Chao C. Huang, MD; Yung J. Chen, MD; Chyi H. Lin, MD; Hong C. Lin, MD; Wu S. Hsieh, MD; Deanna Kruszon-Moran, MS; Elizabeth C. Wright, PhD; and Richard Evans III, MD, MPH. Objectives. To study the outcome at 2-year corrected age of infants who participated in a double-blind controlled trial of early (<12 hours) dexamethasone therapy for the prevention of chronic lung disease (CLD).

Methods and Materials. A total of 133 children (70 in the control group, 63 in the dexamethasone-treated group) who survived the initial study period and lived to 2 years of age were studied. All infants had birth weights of 500 to 1999 g and had severe respiratory distress syndrome requiring mechanical ventilation within 6 hours after birth. For infants in the treatment group, dexamethasone was started at a mean age of 8.1 hours and given 0.25 mg/kg every 12 hours for 1 week and then tapered off gradually over a 3-week period. The following variables were evaluated: interim medical history, socioeconomic background, physical growth, neurologic examinations, mental and psychomotor development index score (MDI and PDI), pulmonary function, electroencephalogram, and auditory and visual evoked potential.

Results. Infants in the control group tended to have a higher incidence of upper respiratory infection and rehospitalization than did the dexamethasone-treated group because of respiratory problems. Although there was no difference between the groups in somatic growth in girls, the dexamethasone-treated boys had significantly lower body weight and shorter height than the control boys (10.7 ± 3.0 vs 11.9 ± 2.0 kg; 84.9 ± 5.7 vs 87.5 ± 4.8 cm). The dexamethasone-treated group had a significantly higher incidence of neuro-motor dysfunction (25/63 vs 12/70) than did the control group. The dexamethasone-treated infants also had a lower PDI score (79 ± 26) than did the control group (87 ± 23), but the difference was not statistically significant. Both groups were comparable in MDI, incidence of vision impairment, and auditory and visual evoked potential. Significant handicap, defined as severe neurologic defect and/or intellectual defect (MDI and/or PDI ≤ 69), was seen in 22 children (31.4%) in the control group and 26 (41.2%) in the dexamethasone-treated group.

Conclusions. Although early postnatal dexamethasone therapy for 4 weeks significantly reduces the incidence of CLD, this therapeutic regimen cannot be recommended at present because of its adverse effects on neuromotor function and somatic growth in male infants, detected at 2 years of age. A longer follow-up is needed. If early dexamethasone therapy is to be used for the prevention of CLD, the therapeutic regimen should be modified. The proper route of administration, the critical time to initiate the therapy, and the dosage and duration of therapy remain to be defined further. Pediatrics 1998; 101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/67; preterm infant, early dexamethasone therapy, follow-up study.

The inability to adhere to a prescribed therapeutic program for the treatment of a chronic disease may be responsible in part for continued disease activity. This problem may be more of an issue in the treatment of asthma, a common, potentially lethal chronic condition in which the lack of symptoms may be interpreted as remission. Adherence was one of the key areas of interest for the National Cooperative Inner-City Asthma Study. The focus of this study was to identify those issues reported by families that could adversely affect their adherence to an asthma care program. The identification of barriers to adherence could then form the basis of a successful intervention program. This study describes barriers to adherence, asthma management behavior, and self-reported adherence.

Methods. Patients presenting during an acute attack of asthma at an emergency department (ED) were recruited for this study. The medical record of the ED encounter was abstracted and compared with information that was obtained during a baseline interview 3 to 5 weeks later. During the baseline interview, parents were asked about health care behaviors related to adherence.

Results. There were 344 children 4 to 9 years of age living in inner city census tracts in the study. Four areas of adherence (medicine use, appointment-keeping, emergency actions, and asthma attack prevention) were investigated. The parental report of medications prescribed at the ED and the information on the abstracted ED report agreed 94.9% of the time for the β-agonists, 86.8% for steroids, and 69.4% for cromolyn. Among respondents, 85.4% of parents reported that they are able to follow the ED recommendations almost all of the time; side effects of medicines were a concern for 81.1% of caretakers who were adherent and for 89.5% of caretakers who were nonadherent. Doubts regarding the usefulness of medications occurred in 34.4% of those considered adherent and 54.2% who admitted nonadherence. Medications
were forgotten some of the time by 45.2% of the children, and 52.8% tried to get out of taking medicine. Appointment for follow-up care were kept by 69% of those given an appointment in the ED, by an estimated 60.0% of those who were told specifically to call for an appointment, and by an estimated 25.2% of those who were neither given an appointment nor told specifically to make one. Only one third of parents report that they were able to keep the child away from known asthma triggers nearly all of the time. Approximately half avoided allergens; however, only 37.5% reported avoidance of cigarette smoke. The use of preventive medicines occurred in 23.5%. Using a medicine and taking the child to a physician were reported as the first or second action during an acute attack of asthma by 72.1% of respondents.

Conclusions. Adherence to an asthma-management program involves a number of areas: medication, appointment-keeping, prevention, and applying an emergency plan of action. Barriers to adherence may exist in one or all four of these areas, leading to ineffective control of asthma. Recommendations are made for improving the patient-physician partnership to improve adherence. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e9; carnitine, valproate, valproic acid, epilepsy, liver dysfunction, hyperammonemia, lipid metabolism, Reye's syndrome, handicap, malnutrition.

e9 ABSTRACT. Valproate Therapy Does Not Deplete Carnitine Levels in Otherwise Healthy Children. Shinnichi Hirose, MD; Akihisa Mitsudome, MD; Sawa Yasumoto, MD; Atsushi Ogawa, MD; Yukiko Muta, BS; and Yasuko Tomoda, MD. Objective. To determine whether children with epilepsy undergoing valproate (VPA) antiepileptic therapy and who are otherwise healthy have a lower serum level of carnitine (CAR) and a higher plasma level of plasma ammonia than do normal children.

Methodology. A total of 45 children with epilepsy, 6.3 to 21.7 years of age, who were treated solely with VPA and were free of abnormal neurologic findings or nutritional problems were randomly selected (VPA-treated group). An age-matched control group (n = 45) was selected from subjects without epilepsy (control group). Total (T) and free (F) serum CAR, serum VPA concentration, and the plasma ammonia level were measured and analyzed.

Results. Serum VPA concentration exhibited a weak negative correlation with both T- (r = −0.34) and F-CAR (r = −0.41). The T-CAR levels were 55.7 ± 12.4 and 57.6 ± 12.1 mM, and the F-CAR levels 42.7 ± 9.9 and 44.4 ± 9.9 mM in the VPA-treated and control groups, respectively. Thus, there was no significant difference in T- or F-CAR levels between the VPA-treated and control groups. Plasma ammonia levels were the same in the two groups: 9.9 ± 6.2 and 9.9 ± 11.8 mM in the VPA-treated and control groups, respectively. There was no significant correlation between blood ammonia and either T- (r = +0.024) or F-CAR (r = −0.026).

Conclusion. Children on a regular diet ingest a sufficient amount of CAR that more than meets their daily CAR requirement. The level of neither T- nor F-CAR in patients with epilepsy and without severe neurologic or nutritional problems being treated with VPA appeared to be affected by VPA therapy. Because the blood CAR level depends on nutritional condition rather than on blood VPA concentration, CAR deficiency caused by VPA is not likely to occur in this population. The usefulness of supplementation of CAR for this type of patient with epilepsy, therefore, must be reevaluated carefully. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e9; carnitine, valproate, valproic acid, epilepsy, liver dysfunction, hyperammonemia, lipid metabolism, Reye’s syndrome, handicap, malnutrition.

e10 ABSTRACT. Symptomatic Splenic Hamartoma: Case Report and Literature Review. Teresa C. Hayes, MD; Howard A. Britton, MD; E. Bruce Mewborn, MD; Dean A. Troyer, MD; Victor A. Saldivar, MD; and Irving A. Ratner, MD. An 11-year-old girl with low-grade fever, night sweats, thrombocytopenia, and an 8-year history of progressive splenomegaly underwent an elective splenectomy. Pathologic diagnosis was multiple splenic hamartoma. The patient’s symptoms resolved after the splenectomy. Since first described by Rokitansky in 1861, ~140 cases of splenic hamartoma have been described in the literature. Most of the splenic hamartomas were discovered incidentally. A minority of these lesions were associated with hematologic symptoms such as pancytopenia, anemia, and thrombocytopenia. Only 20 of the reported cases of splenic hamartoma occurred in pediatric patients. However, compared with the adult patients, nearly half of these cases in pediatric patients was associated with symptoms. Splenectomy and partial splenectomy have relieved these symptoms. With advances in imaging, splenic hamartomas are being discovered with increasing frequency. A multimodal radiologic work-up has enabled some cases of splenic hamartoma to be diagnosed preoperatively. Inclusion of this benign entity in the differential diagnoses of symptomatic splenomegaly in a pediatric patient is important in the preoperative management and counseling of the patient and family. In patients who have discrete lesions, consideration of this entity preoperatively may avoid total splenectomy. Pediatrics 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e10; splenic hamartoma, pancytopenia, hypersplenism, splenomegaly, hemangiomas.

e11 ABSTRACT. School-age Follow-up of Prophylactic Versus Rescue Surfactant Trial: Pulmonary, Neurodevelopmental, and Educational Outcomes. Robert A. Sinkin, MD; Bonnie M. Kramer, PhD; Joan L. Mertzbach, MSW; Gary J. Myers, MD; John G. Brooks, MD; Donna R. Palumbo, PhD; Christopher Cox, PhD; James W. Kendig, MD; Charles E. Mercier, MD; and Dale L. Phelps, MD. Background. Exogenous surfactant replacement has improved survival and reduced pulmonary complications of prematurity. Improved early outcomes for infants of <30 weeks’ gestation treated with a strategy of prophylactic versus rescue surfactant, if needed, were demonstrated in a multicenter, randomized trial conducted between 1985 and 1988. We reevaluated a subset of survivors from this trial to determine the pulmonary and neurodevelopmental outcomes at school age.

Methods. At 4.5 to 8 years of age, all survivors from one of the three centers were located, and 96% were evaluated. The original randomization included stratification by center and followed an intention-to-treat methodology in assessing the efficacy of prophylactic versus rescue treatment with surfactant. The follow-up test battery included a health-assessment questionnaire, spirometry, 88% saturation test, neurologic examination, and the McCarthy Scales of Children’s Abilities (MSCA) and the
Conners’ Parent Rating Scale–48. Educational achievement was determined by school class placement and teachers’ reports of achievement.

**Results.** Of the 192 children originally enrolled, 154 survived. Evaluations were performed on 148 of these infants. An abnormal pulmonary history was found in 45 (30%) of the children: 16 (22%) in the prophylactic group and 29 (39%) in the rescue group. Formal pulmonary function was evaluated in 81 children; 29 (78%) in the prophylactic group and 33 (75%) in the rescue group were considered abnormal. No significant differences were found between the two groups on either cognitive or motor subscales of the MSCA, the Conners’ Parent Rating Scale–48, the neurologic examination, the education services received in school, or the teacher ratings of below-average academic performance. Intelligence scores measured on the MSCA were low-normal for both groups. Some level of educational assistance was being provided to 72 (49%) of the cohort studied, and both groups had below average educational performance and increased needs for educational assistance.

**Conclusions.** Prophylactic surfactant administration to infants of <30 weeks’ gestation was associated with fewer long-term clinical pulmonary complications than assignment to rescue administration. Formal pulmonary testing at school age did not reveal significant differences between treatment groups in those infants who could be tested. There also were no group differences found on neurologic, cognitive, behavioral, or educational assessments at school age. *Pediatrics* 1998; 101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e12; follow-up, newborn, premature, surfactant.

e12 ABSTRACT. Predictors of Mortality From Fires in Young Children. Seth J. Scholer, MD, MPH; Gerald B. Hickson, MD; Edward F. Mitchel, Jr, MS; and Wayne A. Ray, PhD. **Background.** In the United States in 1994, fires claimed 3.75 lives per 100 000 child years and accounted for 17.3% of all injury deaths in children <5 years of age.

**Objectives.** To conduct a historical cohort study that uses maternal demographic characteristics to identify young children at high risk of fire-related deaths, thus defining appropriate targets for prevention programs.

**Methods.** The cohort consisted of children born to mothers who resided in the state of Tennessee between 1980 and 1995. Information was obtained by linking birth certificates, 1990 census data, and death certificates. Children were eligible for the study if they were <5 years of age at any time within the study period and if key study variables were present (99.2% of births).

Birth certificates provided information on maternal characteristics including age, race, education, previous live births, use of prenatal care, and residence (in standard metropolitan statistical area). Child characteristics included gender, gestational age, and birth type (singleton/multiple gestation). Neighborhood income was estimated by linking the mother’s address at the time of birth to the 1990 census (block group mean per capita income).

The study outcome was a fire resulting in at least one fatality (fatal fire event) during the study period, identified from death certificates (coded E880 through E889 in the **International Classification of Diseases**, 9th rev.). We calculated the fatal fire event rate corresponding to each stratum of maternal/child characteristics. We assessed the independent association between each characteristic and the risk of a fatal fire event from a Poisson regression multivariate analysis.

**Results.** During the study period, 1 428 694 children contributed 5 415 213 child years to the cohort: there were 270 deaths from fire (4.99 deaths per 100 000 child years) and 231 fatal fire events. In the multivariate analysis, factors associated with greater than a threefold increase in fatal fire events included maternal education, age, and number of other children. Compared with children whose mothers had a college education, children whose mothers had less than a high school education had 19.4 times (95% confidence interval [CI], 2.6–142.4) an increased risk of a fatal fire event. Children whose mothers had more than two other children had 6.1 times (95% CI, 3.8–9.8) an increased risk of a fatal fire event compared with children whose mothers had no other children. Children of mothers <20 years of age had 3.9 times (95% CI, 2.2–7.1) an increased risk of a fatal fire event compared with children whose mothers were ≥30 years old. Although both maternal neighborhood income and race were associated strongly with increased rates of fatal fire events in the univariate analysis, this association did not persist in the multivariate analysis. Other factors that were associated with increased risk of fatal fire events in the multivariate analysis were male gender and having a mother who was unmarried or who had delayed prenatal care.

The three factors associated most strongly with fire mortality were combined to create a risk score based on maternal education (≥16 years, 0 points; 13 to 15 years, 1 point; 12 years, 2 points; <12 years, 3 points); age (≥30 years, 0 points; 25 to 29 years, 1 point; 20 to 24 years, 2 points; <20 years, 3 points); and number of other children (none, 0 points; one, 1 point; two, 2 points; three or more, 3 points). The lowest-risk group (score <3) included 19% of the population and had 0.19 fatal fire events per 100 000 child years. In contrast, highest-risk children (score >7) comprised 1.5% of the population and had 28.6 fatal fire events per 100 000 child years, 150 times higher than low-risk children. Children with risk scores >5 contributed 26% of child years but experienced 68% of all fatal fire events. If the fatal fire event rate for all children had been equal to that of the low-risk group (risk score <3), then 95% of deaths from fires would not have occurred.

**Discussion.** Maternal education, age, and number of other children had strong and independent associations with fire-related deaths among young children. Taken together, these factors defined a steep risk gradient, where children in the highest-risk group had a fire-related mortality rate that was 150 times that of the lowest-risk group. From a public health perspective, maternal factors clearly define children who would be good candidates for prevention programs. There is an urgent need to develop prevention programs that can be shown to reduce fire-related injury in high-risk children. *Pediatrics* 1998;101(5). URL: http://www.pediatrics.org/cgi/content/full/101/5/e13; wounds and injuries, fires, socioeconomic factors, risk factors.

e13 ABSTRACT. Cat Scratch Disease Presenting With Peripheral Facial Nerve Paralysis. Robert S. Walter, MD, and Stephen C. Eppes, MD. Acquired peripheral facial nerve paralysis is a relatively common disorder that af-
fects both children and adults. The most frequent non-
trauma-related etiologies in otherwise neurologically in-
tact patients are idiopathic (Bell’s palsy) and infectious,
which includes otitis media, herpes zoster, Lyme disease,
herpes simplex virus, Epstein–Barr virus, and Myco-
plasma pneumoniae.1–5

Cat scratch disease (CSD) is typically a subacute, re-
gional lymphadenitis caused by Bartonella henselae that
is seen in children and young adults. CSD most often has
a benign, self-limited course. However, 11% of CSD
patients may present atypically, most commonly with
Perinaud’s oculoglandular syndrome or acute encepha-
lopathy.6–11

We present a child with the first reported case of acute
facial nerve paralysis in serologically proven CSD with
typical lymphadenitis.

**ADDITION**

A sentence has been added to the American Academy of Pediatrics statement from the Committee on Drugs, “Drugs for Pediatric Emergencies,” published in the January 1998 edition of Pediatrics electronic pages, as article e13. The following should be added under the heading, “Propranolol,” after the dosage but before the note that was initially published:

*Note: Some practitioners have used up to 0.15 to 0.25 mg/kg for the treatment of refractory infundibular spasm.*

The electronic version of this article will include links indicating this addition.
The Revised CDC Guidelines for Isolation Precautions in Hospitals: Implications for Pediatrics
Committee on Infectious Diseases and Committee on Hospital Care

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DOI: 10.1542/peds.101.3.e13

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/101/3/e13

An erratum has been published regarding this article. Please see the attached page for:
http://pediatrics.aappublications.org/content/101/5/914.full.pdf