Case Management: the Pediatric Patient with Lung Disease

What We Know

› Lung disease in the pediatric patient can be acute and episodic, or chronic. Common lung diseases in the pediatric population include pneumonia, bronchiolitis, asthma, and pertussis (also known as whooping cough). Less common lung diseases in children include acute respiratory distress syndrome (ARDS), acute lung injury, and cystic fibrosis (CF). This Evidence-Based Care Sheet focuses on case management (CM) of more common lung diseases that occur in the pediatric population.

› Pneumonia is the leading infectious cause of death in children worldwide.
  - Worldwide, over 920,000 children < 5 years of age died in 2015 from pneumonia; pneumonia causes more deaths than malaria, AIDS, and tuberculosis combined and can be viral, bacterial, or fungal in origin.
  - Severe malnutrition is a risk factor for lower respiratory infections (e.g., pneumonia). Researchers report that the prevalence of tuberculosis is more common in severely malnourished Zambian children with lower respiratory infections; these children are at a higher risk for mortality.
  - *Streptococcus pneumonia* is the most common cause of bacterial pneumonia in children.
  - *H* *aemophilus* *i* *nfluenza* *type b* (Hib) is the second most common cause of bacterial pneumonia in children.

› Bronchiolitis is an acute disorder that occurs in most children by 3 years of age; it is the most common cause of hospitalization in children < 1 year of age. Infection occurs through direct contact with secretions and is most prevalent during the winter and spring seasons.
  - *Respiratory syncytial virus* (RSV) is the most common cause of bronchiolitis and viral pneumonia in children < 1 year of age in the United States.
  - Most healthy infants diagnosed with RSV recover at home within 1–2 weeks. Nonetheless, children < 6 months of age can require hospitalization secondary to severe respiratory distress and dehydration.

› Asthma is a chronic inflammatory condition characterized by acute exacerbations. The manifestations of asthma vary from rare, infrequent attacks to severe, status asthmaticus.
  - 80-90% of children with asthma become symptomatic before age 4 or 5.

› Pertussis is a highly contagious, acute respiratory infection that is caused by the bacterium *Bordetella pertussis*. Incidence is on the rise in the US, and pertussis is commonly diagnosed in unvaccinated children < 4 years of age. Pertussis can be life-threatening, particularly in infants, and approximately 50% of infants < 1 year of age with an
Children with chronic illnesses face academic challenges and experience decreased QOL. School nurses can be paramount.

Authors conducted a comprehensive review of documents (e.g., books, reports, peer reviewed articles) from 1950 onwards.

In a systematic review of randomized controlled trials, Hall, Petsky, Chang, and O’Grady (2018) found that an individual effective pediatric CM consists of education, symptoms management, prevention strategies (e.g., immunization, education about adequate nutrition and good hygiene (e.g., proper hand hygiene) should be included in the education).

Frequent hand hygiene, avoidance of close contact (e.g., shaking hands, kissing) and sharing eating utensils, and disinfecting hard surfaces help to prevent the transmission of RSV. Palivizumab is a medication that is available to prevent severe RSV in cases of infants and children who are at high risk.

Immunization is the most effective way to prevent pertussis. It is especially important for family members and caregivers to be vaccinated with Tdap (i.e., a "3-in-1" vaccine that protects against tetanus [lockjaw], diphtheria, and pertussis [whooping cough]) at least 2 weeks before close contact with an infant.

Successful asthma management requires extensive patient/parent education, allergen control, pharmacologic treatment, and objective measures to monitor the severity of disease.

Effective pediatric CM consists of education, symptoms management, prevention strategies (e.g., immunization, education about exposure to secondhand smoke), follow-up appointments, and referrals, and an easily accessible and multidisciplinary approach. These factors facilitate a trusting relationship between the case managers and the patient/family members.

In a systematic review of randomized controlled trials, Hall, Petsky, Chang, and O’Grady (2018) found that an individual caseworker-assigned discharge plan may prevent hospital readmissions for asthma exacerbations in children.

The World Health Organization (WHO) in partnership with the United Nations Children’s Fund (UNICEF) formed the Global Action Plan for the prevention and control of Pneumonia (GAPP) through a combination of pneumonia-specific interventions. Primary goals and interventions of GAPP are as follows:

- Protect children from pneumonia by promoting exclusive breastfeeding, improved hand hygiene, and reduction of indoor pollution
- Prevent pneumonia through vaccinations
- Treat pneumonia with antibiotics and/or oxygen, as appropriate, and by verifying that children have access to care
- The Child Lung Health Programme (CLHP), a government health service in Malawi, is based on the Union model, adopted by the WHO in 1993, to prevent and manage tuberculosis. Researchers found that the CLHP improves health outcomes and decreases case fatality rates in hospitalized children with severe and very severe pneumonia (i.e., based on clinical indicators). The CLHP successfully plans and supervises treatment programs to avoid shortages of antibiotics and implement oxygen therapy that are both necessary for treatment. Funding for the CLHP began in 2000 in Malawi hospitals; the program is being expanded to 16 nongovernment hospitals with the goal to improve child survival. By 2012, 22 of 23 district hospitals, 3 of 4 central hospitals, and 16 of 37 Christian hospitals in Malawi were participating in the CLHP program.

Authors conducted a comprehensive review of documents (e.g., books, reports, peer reviewed articles) from 1950 onwards that addressed community-based primary health care (CBPHC) interventions for children in South Asia and sub-Saharan African countries. They found that children < 5 years of age had higher mortality rates with a slower decline in numbers than global trends, most likely because of malnutrition and pneumonia. Global Essential Interventions (e.g., immunization, promotion of breastfeeding, vitamin A and zinc supplementation, control of illness [diarrhea, pneumonia, malaria], trimoxazole therapy for HIV-positive children) coupled with CBPHC interventions were cost-effective and can improve the health status of children < 5 years of age.

Community health workers were primarily responsible for providing prevention education and treatment; diagnosing; and treating children in the community-based model.

Expansion of the CBPHC interventions to include preventive strategies (e.g., immunizations) was the most efficacious intervention in reducing mortality rates; it is believed that adding these interventions to an ongoing systematic approach with close collaboration with community services would increase the efficiency of the healthcare system as a whole.

Children with chronic illnesses face academic challenges and experience decreased QOL. School nurses can be paramount in the management of pediatric patients with asthma. Investigators tracked children and adolescents 8–18 years of age who
had chronic illnesses, including asthma, and found that an improvement in QOL, school attendance, and participation in extracurricular activities in students is directly correlated with the parents’ perception of the child’s health status ([6-8])

• identification of children whose health was not optimal and whose academic performance suffered as a result of impaired health
• surveillance and assessment of children for screening of chronic illness and establishing goal-oriented, individualized plans of care (e.g., for education, counseling, direct care, checking physiologic status, making referrals, teaching self-administration of medications); and an Emergency Action Plan (i.e., a written plan for strategies to be initiated at varying levels of signs and symptoms) created for each child
• activities to facilitate coordination of care (e.g., collaborating with community healthcare services, serving as a link between parents and pediatricians) and improve coping in children that were specific to their illness and that would prevent and/or reduce the occurrence of illness
• coordination of patient care and regular communication with the child, parents, teachers, and other healthcare providers; this entails establishing a long-term relationship
• evaluation of interventions and activities performed

Researchers conducted a quality improvement (QI) project during the period 2015–2016 with the goal of improving inpatient assessment of asthma control questions and the accuracy of pediatric asthma controller medications (e.g., inhaled albuterol) at discharge. Data was obtained from 240 pre-QI intervention and 252 post-QI intervention charts and improvements in follow-up participation were demonstrated by ([11])

• the median proportion of patients discharged with appropriate medication therapy increased from approximately 60% in the pre-QI intervention period to 80% in post-QI intervention
• the increased improved inpatient assessment of asthma control questions from 43% to 98%

What We Can Do

• Become knowledgeable about CM in pediatric patients with lung diseases so you can accurately assess your patients’ personal characteristics and health education needs; share this information with your colleagues
• Collaborate with the facility’s multidisciplinary care teams in accordance with facility protocols to identify, diagnose, and treat pediatric patients with lung disease
• Identify successful strategies in the facility to improve follow-up care in pediatric patients with lung diseases
• Collaborate with the facility’s education and/or marketing department to coordinate outreach to the public regarding pediatric immunizations and education for prevention and treatment of common lung diseases
• Contact the Centers for Disease Control and Prevention (CDC) and the WHO for updated guidelines on management and immunizations for lung diseases
• Research available resources in your community for CM for children with lung diseases; collaborate with administration in the facility to establish a trusting relationship that includes the treating clinician and the affected child’s school nurse in CM plans

Coding Matrix

References


