A seven month old with rash and irritability: Kwashiorkor

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Featured Stories

• Policy Making in DC: A Hospitalist’s Insight and Influence
• Dr. Wachter on Jessica Alba vs. Stephen Colbert: An Interview
• One Hospital’s ALTE Guideline
You are the Hospitalist: A Seven-Month-Old with Rash and Irritability
Our Vision

The Section on Hospital Medicine of the American Academy of Pediatrics is dedicated to the health of all children in the hospital setting through advocacy, education and service—incorporating the core principles of safety, effectiveness, timeliness, efficiency and equitability in family-centered health care.

Our Mission

Advocacy

The Section is dedicated to being a leader in inpatient Pediatric Hospital Medicine in the Pediatric community—advocating for the health and safety of hospitalized children.

Education

The Section is dedicated to being a leader in educating health care providers, patients and families.

Service

The Section is dedicated to being a leader in identifying the professional needs of Pediatric Hospitalists.

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LETTER FROM THE CHAIR OF SOHM

Making the Rounds

Laura Mirkinson, MD, FAAP
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This is an unusual time to be writing to the membership of the Section on Hospital Medicine. Since many of us last saw each other in Denver, much has changed in our economy and our country, and more change is coming. As I write, tomorrow is Election Day, the country is in a recession, and more than ever it is especially important to be fiscally responsible and austere in the day-to-day work we do as physicians, administrators, and members of a health care team. This is an ideal time for hospitalists to bring to their institutions an understanding of the value of their work and their programs beyond their clinical productivity and expertise. Hospitalists bring leadership experience in a wide variety of areas including quality improvement, safety, performance improvement and risk management. They are able to see firsthand where processes can be streamlined and which medications are rarely utilized, and they are available onsite to form effective collaborative teams with representatives of a wide variety of ancillary services in the hospital. Pediatric hospitalists are ideally suited to champion the health of children by promoting effective transitions of care, encouraging family-centered rounds, enhancing patient satisfaction, and improving effective means of communication with community and subspecialty providers. Now is the time of all times to show our value in caring for hospitalized children.

At the Pediatric Hospital Medicine Conference in Denver in July and the National Conference & Exhibition in Boston in October, I had the opportunity to speak with many hospitalists and review the activities of the Section over the past year. As always, CME is a major focus and responsibility of the Section, and we continue to send members of the Section to a variety of CME activities through our grant programs. The SOHM Executive Committee worked with the AAP to develop the new Self Evaluation Program PREP Hospital Medicine Module for maintenance of certification with focus on inpatient pediatrics. I’m pleased to report that it has been available since the July PIM conference. And next on the hit parade – the inpatient asthma eQipp module – which will likely be available winter 2009. This year the Executive Committee is revising the “Guiding Principles for Pediatric Hospitalist Programs” originally published in 2005. In addition, by the time the next news journal is published, I expect to report on the results of the Section’s Benefits and Salary Survey, a Coding and Billing Resource and a Visiting Professorship Program. These are three projects that I anticipate will be completed in this my final year as Chair of the Section.

As always, the subcommittees of the Section are extremely busy. Their reports are included in the journal. I consider it an important role of the Section to provide a place for members with similar interests to come together and communicate, solve problems and potentially develop projects. This year for the first time the Section is going to provide each subcommittee with a yearly budget to assist them. I continue to be hugely impressed by the activities of these subcommittees and the professional level of the news journal itself. Kudos to all of you!

Finally, my best wishes to all of you and your families for a happy and healthy New Year!
LETTER FROM THE EDITOR

I don’t know about you, but 2008 has left my head spinning …

Jennifer Daru, MD, FAAP
jadaru@gmail.com

… from increasing the pace of quality measure implementation to changing a number of our CPT codes, let alone making sure I have kept up with isolation policies, treatment of MRSA or other organisms, we have had plenty to fill our time (and heads) as hospitalists.

This edition of Hospital Pediatrics has a number of pieces that should help you keep your practice up to date (though your head may still spin)—from the update in the Billing and Coding Corner by Dr James O’Callaghan that should help you set your charge sheets straight, to the update on how medical policy is being formed and thoughts on how to get involved based on Dr Patrick Conway’s personal experience, to Dr Mark Shen’s interesting and a bit humorous interview with Bob Wachter. We have also published a piece that may create some clinical controversy: see On the Ward and send a letter to the editor with your thoughts.

So this time of year is a time to say thanks and prepare for the year to come. I personally want to thank the Section on Hospital Medicine Executive Committee and our current fearless leader Dr Laura Mirkinson for their support and input into not only the news journal but also my career and life. Hospital Pediatrics also has two goodbyes. Our last edition was our final with Dr Sheldon Berkowitz as General Editor. I think I speak for the Editorial Board in saying what a pleasure it was to work with Sheldon as we embarked together on changing what Hospital Pediatrics was all about. Luckily, Dr Ruben Nazario has joined us as Guest General Editor for this edition. Welcome Ruben! I also want to say a special thanks to Ursula Kneissl for her work in building the Neonatal Medicine Update. She is stepping down as Editor, and so we look to all of you for a new expert in neonatal medicine (with good writing and editing skills!) to apply.

Just shoot me an email (jadaru@gmail.com)…. There’s plenty more to say!
I spent the last year as a White House Fellow in the Department of Health and Human Services. The White House Fellowship was founded in 1965 by Lyndon Johnson and has included a diverse array of alumni such as Generals Colin Powell and Wesley Clark, Senator Sam Brownback, author Doris Kearns Goodwin, and CNN Chief Medical Correspondent Sanjay Gupta. There are 12-18 fellows each year and often 1-2 are from health care. The purpose of the non-partisan program is to train the fellows through exposure to government at the Cabinet Secretary level or in the White House. There are three components to the program: work placement, educational, and policy trips. For the work placement, I worked at the Department of Health and Human Services (HHS) and split my time between the Office of the Secretary with Secretary Mike Leavitt and the Agency for Healthcare Research and Quality (AHRQ) with Dr Carolyn Clancy.

I worked on a range of projects, such as personal health record pilots for Medicare, quality measurement strategy for AHRQ, value driven health care, health information technology, coverage and payment policy, and a strategy for health care associated infections. In many of these projects, I was given the opportunity to lead initiatives with significant budgets and implications for health care delivered to Americans. I was also asked to help shape and write content for Secretary speeches and strategy documents on specific programs and initiatives. I learned an immense amount about how federal policy is formulated, how HHS attempts to influence and improve health care delivery, and the intersection of health services research and health care policy. On a given day, I would attend the Senior Staff meeting with the Chief of Staff for the Department, Assistant Secretaries, and leaders of operating divisions such as NIH, FDA, AHRQ, and CMS. I was often asked to give my opinion as a physician and researcher to non-medical leaders of the Department. One needs to try to summarize the issue if possible in several short sentences, which can be difficult given the complexity of health care. Unfortunately, given the number of decisions and the speed with which they need to be made, there is often not time for an in-depth analysis and searching of the available evidence for every issue. The work experience has changed the way I will think about research and health care delivery in the future.

The program also has an educational program which consists of 2-3 meetings each week with leaders from government, the private sector, and non-profit organizations. As examples, we met with President Bush in the Oval Office and Roosevelt Room, almost all of the Cabinet Secretaries, Senators, CEOs of companies from defense to banking, non-profits such as the Komen Foundation and Red Cross, and media personalities such as Bob Costas, Tim Russert, and Sanjay Gupta. The leadership lessons were immense. In addition, we took domestic policy trips to Michigan, Texas, Louisiana, and New York City in which we met with state and local government officials and leaders. This gave us the perspective of how federal policy translates to the state and local level. Finally, a highlight was our international trip to Turkey and Russia. We met with foreign leaders including the equivalent to the Secretary of State of both countries and learned about how U.S. policy is interpreted by our international colleagues and its effect on the world.

I often took the opportunity to educate people about the work of pediatricians and hospitalists. I am still not sure some people completely understood my explanation of a pediatric hospitalist. Whenever possible, I tried to ensure that children were not forgotten in the policy debates and program implementations. This year has truly been a transformational year for me and I am incredibly thankful for the opportunity. I was asked to stay on at HHS as Chief Medical Officer in the Office of the Secretary, primarily focused in his Planning and Evaluation Division. This allows me to complete a number of projects and continue to shape policy and programs across the Department. I deferred my return to my faculty position at Cincinnati Children’s until the spring. I work on the weekends as a hospitalist attending at Cincinnati Children’s but I miss doing clinical care, research, and teaching on a regular basis. Overall, this experience has been amazing, and I would highly recommend applying to the fellowship or other leadership and policy opportunities to anyone. We need more physicians willing to get directly involved in health care policy at the federal, state, and local level so we can lead the transformation of our health care system to provide high quality care to all.
Case: A Seven-Month-Old with Rash and Irritability

John Ragsdale, MD, Resident in Medicine and Pediatrics
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You are the pediatric hospitalist on duty when you receive a call from a community provider to discuss admission of “a difficult case.” He relates a history of a 7 month-old boy who has been following for the last 2 months who has had a puzzling rash, problems gaining weight, and, for the last month, irritability. You question about his use of the word “irritable” and he describes a child who cries “25 hours in a 24 hour day.” He worries the stressful family situation, failure to thrive (FTT) and long duration of irritability may place the patient at risk for abuse, and he asks if you can admit him for evaluation. You accept the patient and await his arrival.

You know when the patient arrives because you hear the incessant crying and screaming from your office down the hall. You go to evaluate the patient and are first struck by the boy’s mental status: he truly is irritable and looks edematous with an awful rash on his face. First impressions aside, you begin to talk to mom, dad, and paternal grandmother. Everything began about 2 months ago when the rash developed on the back of his head and on flexor creases of his legs. His primary care provider (PCP) gave him 1% hydrocortisone cream applied three times a day for two weeks. At the follow up visit, the rash was worse and pimecrolimus cream started for 2 weeks, but the rash continued to worsen. A 7-day course of oral prednisone was given without improvement. It was around this time (either just before or slightly after starting prednisone) that the family felt the baby began to be very fussy and at times inconsolable. At the end of oral steroid therapy, the PCP was concerned that the rash was infected since it was still progressing and worsening, so a skin swab was performed and sent for culture; this grew methicillin-sensitive Staphylococcus aureus. He was placed on cephalexin 3 times a day for ten days. On day 6 of the antibiotic course, the family returned to the PCP’s office because they “were done caring for this kid who has been screaming for a month!” The PCP also mentioned that the infant had lost 0.68 kg in the last month, and recommended an inpatient FTT evaluation.

The boy’s past medical history was significant for a term spontaneous vaginal delivery, birth weight of 3.35 kg (25-50th percentile). No surgeries or previous hospitalizations, no allergies or chronic medications, and his immunizations were up to date through 4 months. He is an only child living at home with his mother and father. Mom stays at home, and dad works in a family-owned lumber mill; they reside in a rural area of the state. The family denies any psychological, social or financial stressors. A brief diet history reveals that he eats well “just like other kids his age; he eats his milk and applesauce, mashed potatoes and gravy.” His family history and review of systems are negative, including no vomiting, diarrhea, or cough.

You review his vital signs: temperature 37°C; pulse 155 beats per minute; respirations 50 breaths per minute; blood pressure 108/75 mm Hg; weight 6.78 kg (3-5th percentile). He appears edematous and is crying inconsolably. You note a scaly, flaky rash on his face, arms, legs, trunk, genital area and buttocks. It is sharply demarcated, blanching, with a slightly raised edge; it gives the appearance of flaking paint. The rash spares his palms and soles. He has multiple ulcerative lesions on his palate. No glossitis or vesicular lesions are noted.

No lymphadenopathy is appreciated. His cardiovascular and pulmonary examinations are unremarkable. His abdomen’s bowel sounds are present, there is no tenderness to palpation, and no hepatosplenomegaly or masses are present. His genitourinary examination reveals a circumcised male with scrotal edema and the rash described above. Other than his irritability, his neurological and musculoskeletal examinations are normal.

You decide to order a few laboratory tests. The complete blood count has a white blood count of 26,500/mm³ (51% segs, 34% lymphs, 7% monos, 2% basos), a hemoglobin level of 8.8g/dL, a hematocrit of 26.5%, and a platelet count of 500,000/mm³. The complete metabolic panel is shown in table 1.

**TABLE 1: COMPLETE METABOLIC PANEL RESULTS AT ADMISSION**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Result</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>129 mEq/L</td>
<td>135-145 mEq/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.4 mEq/L</td>
<td>3.2-4.5 mEq/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>94 mEq/L</td>
<td>102-112 mEq/L</td>
</tr>
<tr>
<td>CO2</td>
<td>18 mEq/L</td>
<td>20-31 mEq/L</td>
</tr>
<tr>
<td>BUN</td>
<td>2 mg/dL</td>
<td>5-18 mg/dL</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.6 mg/dL</td>
<td>0.2-0.5 mg/dL</td>
</tr>
<tr>
<td>Glucose</td>
<td>130 mg/dL</td>
<td>60-100 mg/dL</td>
</tr>
<tr>
<td>Calcium</td>
<td>8.2 mg/dL</td>
<td>9-11 mg/dL</td>
</tr>
<tr>
<td>Aspartate Aminotransferase</td>
<td>44 U/L</td>
<td>15-60 U/L</td>
</tr>
<tr>
<td>Alkaline Aminotransferase</td>
<td>69 U/L</td>
<td>13-45 U/L</td>
</tr>
<tr>
<td>Total Protein</td>
<td>3.3 g/L</td>
<td>5.1-7.5 g/L</td>
</tr>
<tr>
<td>Albumin</td>
<td>1.2 g/L</td>
<td>3.2-5.7 g/L</td>
</tr>
</tbody>
</table>

You review his vital signs: temperature 37°C; pulse 155 beats per minute; respirations 50 breaths per minute; blood pressure 108/75 mm Hg; weight 6.78 kg (3-5th percentile). He appears edematous and is crying inconsolably. You note a scaly, flaky rash on his face, arms, legs, trunk, genital area and buttocks. It is sharply demarcated, blanching, with a slightly raised edge; it gives the appearance of flaking paint. The rash spares his palms and soles. He has multiple ulcerative lesions on his palate. No glossitis or vesicular lesions are noted.

You decide to order a few laboratory tests. The complete blood count has a white blood count of 26,500/mm³ (51% segs, 34% lymphs, 7% monos, 2% basos), a hemoglobin level of 8.8g/dL, a hematocrit of 26.5%, and a platelet count of 500,000/mm³. The complete metabolic panel is shown in table 1.

After reviewing the initial studies, you ask yourself “what next?” You choose one of the following:

A. Consult nephrology and dermatology for renal and skin biopsies, respectively
B. Obtain serum pre-albumin, magnesium, phosphorous, zinc levels, stool alpha-1 antitrypsin levels, a sweat chloride test, and a more detailed dietary history.
C. Begin full feeds via nasogastric tube until he begins to gain weight.
D. Arrange for outpatient gastroenterology evaluation for protein-losing enteropathy

Continued on page 8
Each year, typically in the fall, changes to CPT codes are announced. This year brings significant changes to many areas of pediatric hospital CPT codes, including normal newborn care, pediatric critical care transport, neonatal and pediatric critical care, and neonatal intensive care. These changes were made to bring neonatal and pediatric hospital codes together numerically, since previously they had been scattered throughout the CPT manual.

The majority of the changes are simple numerical changes to the CPT code. However, several of the codes did, in addition, have some changes to the wording description of the code. For example, the old CPT code 99440 had the wording ‘newborn resuscitation’. The new replacement CPT code 99465 has changed the wording to ‘delivery/birthing room resuscitation.’

Given the sheer number of changes to CPT codes that impact pediatric hospital medicine, I would strongly advise each group to consider purchasing or at least ensuring access to the 2009 CPT manual. These new CPT codes will go into effect on January 1, 2009. (Seems like January would be a good time to take a vacation!)

### Neonatal and Pediatric Critical Care

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>99295</td>
<td>Initial inpatient neonatal critical care, per day, for the evaluation and management of a critically ill neonate, 28 days of age or less</td>
</tr>
<tr>
<td>99296</td>
<td>Subsequent inpatient neonatal critical care, per day, for the evaluation and management of a critically ill neonate, 28 days of age or less</td>
</tr>
<tr>
<td>99293</td>
<td>Initial inpatient pediatric critical care, per day, for the evaluation and management of a critically ill infant or young child, 29 days through 24 months of age</td>
</tr>
<tr>
<td>99294</td>
<td>Subsequent inpatient pediatric critical care, per day, for the evaluation and management of a critically ill infant or young child, 29 days through 24 months of age</td>
</tr>
<tr>
<td>NA</td>
<td>Initial inpatient pediatric critical care, per day, for the evaluation and management of a critically ill infant or young child, 2-5 years of age</td>
</tr>
<tr>
<td>NA</td>
<td>Subsequent inpatient pediatric critical care, per day, for the evaluation and management of a critically ill infant or young child, 2-5 years of age</td>
</tr>
</tbody>
</table>

### Neonatal Intensive Care

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>99477</td>
<td>Initial hospital care, per day, for the evaluation and management of the neonate, 28 days of age or less, who requires intensive observation, frequent interventions, and other intensive care services</td>
</tr>
<tr>
<td>99298</td>
<td>Subsequent intensive care, per day, for the evaluation and management of the recovering very low birth weight infant (present body weight less than 1500 grams)</td>
</tr>
<tr>
<td>99299</td>
<td>Subsequent intensive care, per day, for the evaluation and management of the recovering low birth weight infant (present body weight of 1500-2500 grams)</td>
</tr>
<tr>
<td>99300</td>
<td>Subsequent intensive care, per day, for the evaluation and management of the recovering infant (present body weight of 2501-5000 grams)</td>
</tr>
</tbody>
</table>

Have a coding conundrum? Contact James O’Callaghan, MD, at jjocallaghan@aap.net with your question.
Case: A Seven-Month Old with Rash and Irritability, continued from page 6

Answer: B

Discussion

The constellation of findings of failure to thrive (FTT), irritability, edema, and rash raise the concern for kwashiorkor. While awaiting the results of the additional laboratory studies you ask the parents again about the diet. This time, you get more specific with the questions and determine the child eats mashed potatoes and gravy; drinks thickened, cold apple juice or orange juice; apple sauce; and occasionally some whole milk. He takes no infant formula because “he does not like it.” When you express your concern about his nutrition, the patient’s father gets belligerent and states: “Plenty of kids go off their milk at 3 months and eat mashed potatoes and gravy…right off the table. Look at how fat he is, he’s just fine!” His additional laboratory studies reveal a phosphorous of 2.7 mg/dL (normal 3.5-6.6 mg/dL) with a pre-albumin of 13 mg/dL, (normal 2.36 mg/dL) and magnesium of 2.2 mEq/L, (normal 1.3-2 mEq/L). The history of low protein content of his diet, the clinical findings, and laboratory results strongly support your diagnosis of kwashiorkor.

Background

Protein-energy malabsorption (PEM) is a term that encompasses two related disorders which exist on a spectrum: marasmus, a generalized nutritional deficiency (including protein and calories); and kwashiorkor, a deficiency of protein without a deficiency of calories. The term Kwashiorkor was coined by Cicely Williams in the 1930s in Ghana and is best translated as “the disease of the first son when the second one is born.” The term describes the shift to carbohydrate-based diet for children upon the birth of a younger sibling thus displacing the older sibling from the mother’s breast. The remainder of this discussion will focus primarily on kwashiorkor.

PEM continues to be a major problem in much of the world. It is estimated that 30% of children in developing countries are underweight. While affecting a much lower proportion of the population in developed countries, PEM is still a very real entity, even in countries like the United States. Since PEM is not a reportable disease, estimates of its prevalence in this country are difficult. However, a CDC chart review of admissions in the state of Georgia from 1997-1999 found 2 patients per one million children aged 6-60 months were hospitalized for PEM. Because of the morbidity and mortality associated with PEM, it is important that clinicians recognize the signs and symptoms of this disorder in order to intervene in a timely manner.

The etiology of the protein deficiency may result from poor dietary intake, impaired absorption, or increased losses. Thus, children with chronic diseases such as cystic fibrosis, celiac disease, inflammatory bowel disease, and malignancy can develop kwashiorkor even without a concerning dietary history. Diarrheal illnesses can be both a cause of malnutrition and an effect of it. In severe protein deficiency, the intestinal epithelium is so damaged that absorption is ineffective, complicating re-feeding efforts.

Clinical Features

When evaluating a child for any type of malnutrition, a careful dietary history is crucial. In this country, many cases of kwashiorkor are due to poor nutritional choices rather than lack of availability of food. It is important to question caregivers about alternatives to cow’s milk or infant formula and about dilution of formulas. Protein sources are often replaced by carbohydrate-rich foods out of convenience, perceived palatability preferences of the child and concerns about food allergies.

The assessment should include comparing a patient’s growth pattern to established growth curves and to their previous growth velocity. In general, malnutrition can be characterized by three separate growth parameters: underweight (low weight-for-age), stunting (low height-for-age), and wasting (low weight-for-height). Stunting is the best indicator of long-term nutritional deficiency, whereas wasting best represents acute changes. Extensive data from developing countries has shown the natural course of growth retardation, revealing the behavior of the different parameters. Wasting and underweight both begin to occur at about 3 months of age and continue to worsen until 12 to 15 months of age; after which they may recover. Stunting, on the other hand, begins at birth, rapidly worsens for the first two years, and never recovers. Head circumference is the last growth parameter to change in chronic malnutrition.

Edema is a prominent feature of kwashiorkor and is in fact one of the main signs which differentiates it from marasmus. Thus, the initial impression of the child with kwashiorkor may be misleading because the edema, which can be profound, may mask the degree of wasting. If wasting is present, it may be evident as a loss of fat and subcutaneous tissue in the face and buttocks. Neurologically, the patients may have lethargy, apathy, or irritability and may be weak or hypotonic. Severely affected children are often anorectic, further complicating their malnutrition. Skin changes include hypopigmentation and branny (scaly) desquamation, as well as a mosaic appearance from peeling and fissuring (“flaky paint”). Hyperpigmented lesions, especially on the extensor surfaces, can also be seen. The hair is often brittle, pale, easily plucked out, sparse, and discolored red-brown. Alternating strips of discolored hair can produce the “flag sign”. Transverse ridges may be seen in the nails. Examination of the mouth may show angular stomatitis, cheilosis, oral erosions, dental caries, or a smooth, shiny tongue from atrophy of tongue papillae. Hepatomegaly from hepatic steatosis can be a prominent feature and ascites may be present.

Laboratory values include low total protein and low albumin. Pre-albumin is also often low, and because of its short half-life it better reflects protein production. Blood urea nitrogen and amylase may be low as well. Low serum sodium, potassium, magnesium, phosphate, and glucose can be seen. Anemia is common but usually not severe.

It should be noted that in any type of malnutrition, deficiencies of various vitamins and trace elements may also be seen, each with its own clinical findings. Zinc, copper, iron, and vitamin A, in particular, are common deficiencies seen in kwashiorkor.

Differential Diagnosis

Patients with FTT and edema can be categorized into four major categories: 1) inadequate intake, 2) malabsorption,
3) increased metabolic demands, and 4) defective utilization of calories. Inadequate intake is common with disturbed parent-child relationships, neglect, food aversions or reflux. Malabsorption is common in a variety of gastrointestinal pathologies including milk protein intolerance, bacterial overgrowth, cystic fibrosis, celiac disease, and inflammatory bowel disease. Increased metabolic demands are seen in a great number of cardio-respiratory conditions including congestive heart failure and chronic lung disease, chronic kidney disease, and malignancies. Defective utilization of calories occurs with inborn errors of metabolism, chromosomal abnormalities, diabetes mellitus, and renal tubular acidosis. The preceding list is by no means all-encompassing, but it serves as a starting point for the differential diagnosis.

Answer A will not aid in the diagnosis since the urinalysis lacked any proteinuria, and the child does not have nephrotic syndrome as a cause of the edema. A biopsy may help but will not yield the definitive diagnosis. Answer C may help him gain weight, but not knowing the underlying etiology of his malnutrition or his electrolyte status, especially phosphorus, can place him at risk for re-feeding syndrome. Answer D is not appropriate based on the fact that optimal management of severe malnutrition usually requires hospitalization for monitoring of caloric intake and the risk of electrolyte disturbances. Answer B will give you the best diagnostic information to evaluate the malnutrition, including micronutrient deficiencies, as well as information to allow you to begin a safe, appropriate re-feeding program.

Outcome

This patient did extremely well. His phosphorous corrected with intravenous sodium phosphate. Feeds were slowly reintroduced via nasogastric tube due to his refusal to eat infant formula. After 48 hours of feeds, his irritability markedly decreased, and his rash began to clear. He gradually began to eat higher calorie formula by mouth and his electrolytes remained stable. On hospital day 3, oral supplementation with zinc sulfate was initiated when his serum zinc level came back at 44 mcg/dL (70-120 mcg/dL). After initial weight loss, likely due to diuresis of edema, he demonstrated weight gain. After a thorough evaluation by Social Services, there were no concerns for abuse or neglect, only parental ignorance to appropriate feeding practices. Education around this issue was accomplished during the hospitalization. He was discharged on an oral feeding regimen after a six day hospital stay and scheduled to follow up with his primary care physician.

References


Management

In the initial management of kwashiorkor, fluid resuscitation is paramount, as is correcting any electrolyte disturbances. When feeds are begun, small frequent feeds should be given so as not to overwhelm the damaged intestinal mucosa and exacerbate any diarrhea. Anorexia is common and may necessitate feeding by nasogastric tube. Vitamin and trace element deficiencies should also be addressed. If the etiology of the disorder is dietary restriction, extensive teaching and reinforcement of sound feeding practices with the caregivers is often necessary.

Have an interesting case you’d like to write up for You Are the Hospitalist? Contact Lisa Zaoutis, MD, FAAP at zaoutis@email.chop.edu, and she’d be glad to help.
Creating a Culture of Pediatric Patient Safety in a Community Hospital: One Pediatric Hospitalist Group’s Experiences

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In community hospitals that care for adults, neonates, and children, pediatric hospitalists face particular challenges when it comes to promoting and maintaining patient safety. Creating a culture of responsiveness to the safety needs of pediatric patients requires leadership and representation in all departments. Whether you are attempting to create such a culture where none existed previously, or you are interested in enhancing the culture of patient safety in your community hospital, I hope you will gain useful insight and ideas from our experiences at Holy Redeemer Hospital. In addition, there are numerous resources to help you get started in the planning of a safety program. (Table 1)

The Pediatric Hospitalist as Child Safety Advocate in the Community Hospital
One does not have to “re-invent the wheel” when it comes to promoting patient safety for children in a community hospital. The Joint Commission has launched numerous initiatives dealing with this issue. Likewise, your hospital probably has several processes in place to enhance patient safety. The pediatric hospitalist in a community hospital can expand that focus from an adult-based system to include infants, children, and adolescents.

At Holy Redeemer Hospital in Meadowbrook, Pennsylvania, our pediatric hospitalist group has representation on several hospital committees including: Medication Safety Committee, Pharmacy and Therapeutics Committee, Physician Advisory Committee for Informatics, and the Quality Improvement Committee. In these meetings we pay close attention to short-term details and provide long-range plans to improve pediatric care by preventing medication and monitoring errors from reaching our patients. Additionally, our hospitalist group has reached out to all departments, especially the emergency department, radiology, anesthesiology, surgery (including pre-op and post-op areas), neonatal intensive care unit, pharmacy, nursing, and information services. We have also worked closely with hospital administration who supports us in our commitment to pediatric quality improvement and patient safety.

Specific Goals and Interventions in Specific Departments: Pharmacy, Emergency Care, CPOE
Pharmacy
We have worked closely with like-minded leaders in our pharmacy to enhance patient safety in all areas of the hospital. We are currently fine-tuning our pediatric formulary with policies for drug evaluation, selection, and therapeutic use. We have limited the number of concentrations and dose strengths of high-alert medications such as narcotics and aminoglycosides. Our pharmacists have helped improve pediatric code carts in specific areas of the hospital and have provided valuable input in bridging communication between computerized physician order entry (CPOE) and the pharmacy. We physically separated our pediatric medications from adult medications in our pharmacy and require patient wristbands that identify allergies. Our nurses match the patient-specific wristband to a pharmacy order, and then two nurses “double verify” to check the patient’s name, medical record number, and dose prior to administration.

Emergency Department (ED)
Our pediatric hospitalist group has extended our services to see a large number of pediatric patients in our ED. We have developed clinical care pathways for acute respiratory diseases including croup, asthma, and bronchiolitis, as well as diabetic ketoacidosis, suspected intussusception, and dehydration/gastroenteritis. The combination of our 24/7 availability and these care pathways have helped streamline care, improve quality, and eliminate unnecessary interventions in the ED. Presently, our ED has separate computer and drug dispensing systems. Because there is greater acuity and variety in patient size and age, increased vigilance is required in the ED setting. Through double verification, weight-based dosing, and clear communication between physicians and nurses, we apply the same hospital-wide patient safety principles in the ED. Presently, we are in the process of integrating the ED and hospital-wide computer systems to improve communication and care.

Additionally, we have cultivated an environment of preparedness and anticipatory communication regarding sick patients en route to the ED. Our referring primary care providers are instructed to call our hospitalists when referring an acutely ill pediatric patient to the emergency department. Our hospitalist then contacts the ED triage nurse. The triage nurse notifies the hospitalist immediately upon arrival of the acutely ill pediatric patient. We have found that, even in the busiest times in the ED waiting area, streamlined communication allows for prompt triage and immediate evaluation and treatment when necessary. Pediatric code carts on the inpatient unit and ED are equipped with alphabetized, laminated sheets with Braselow color-coded drug dosing for each drug listed in the PALS manual. Each drug specifies the dose, concentration, and volume required in a code or emergency situation. Nurses check the code carts and expiration dates of medications on a daily basis, while the pharmacy checks monthly.

Computer Physician Order Entry
Our inpatient pediatric group has worked closely with our information
services department to prepare and revise order sets for our computerized physician order entry system (CPOE). Our computerized order sets (as well as our corresponding “best-practice” policies) incorporate evidence-based guidelines for diagnostic and therapeutic decision-making, and integrate monitoring to optimize quality, minimize unnecessary discomfort to children, and support patient safety interventions for hospitalized children. Each of our hospitalists has bought into the best-practice policies and order sets because each provider has reviewed evidence in the literature, provided input and feedback, and taken ownership of the process.

The CPOE system requires that the patient’s weight in kilograms and allergy status is entered before a physician can submit an order. This information also appears on every printed order sheet. The CPOE defaults to a suggested milligram per kilogram per dose and interval, but the ordering physicians can change these suggestions to meet the individual needs of their patients. This allows the pharmacist to check our intended doses, and the inpatient pediatric nurses to double verify each dose prior to administration. CPOE has eliminated issues of illegible penmanship and has been particularly helpful in avoiding “do not use” abbreviations, look-alike/sound-alike medications, and in communicating doses and intervals clearly. However, it is important to view the printed order sheet after a physician enters the computerized orders to review the clarity of the orders and make sure there are no typographical errors. Finally, one must remember that the computerized orders are meant to help enhance communication, and it should not replace direct communication with the pediatric nurses.

The process of implementing the CPOE was laborious and still requires continuous monitoring and regular revision. We are working closely with our information services and medical informatics departments to transfer our current order sets to a new computer system that will allow us to insert “rules” or reminders about drug dosing with dose-range checking capabilities, and information regarding drug interactions and monitoring. These “rules” should further help reduce the risk of potential medical errors from reaching inpatients.

**Conclusion**

Pediatric hospitalists must play an essential role in creating a culture of patient safety across all departments of a community hospital. Hospitalists must enlist equally motivated leaders in administration and other vital departments to prioritize a commitment to pediatric patient safety. Through collaboration with administration, pharmacy, nursing, information services and other patient safety leaders, hospitalists can help define achievable goals based on the efficient use of resources. Once safeguards have been initiated they must be continuously monitored, re-assessed, and revised on a regular basis.

**Table 1: Patient Safety Resources**

- Things that work. http://www.aap.org/visit/thingsthatworkcall.htm
- Child Health Corporation of America CHCA http://www.chca.com/company_profile/pi/index.html
- Agency for Healthcare Research and Quality AHRQ www.ahrq.org
- 100 Lives campaign.
- AAP Safer Heath Care for Kids Webinars http://www.aap.org/saferhealthcare/

**Interested in writing an article about hospital medicine at a community hospital? Contact Dr John A Pope: j pope@phoenixchildrens.com**

**Section On Hospital Medicine**


And join the SOHM LISTSERV®. E-mail Niccole Alexander at nalexander@aap.org
An Apparent Life-Threatening Event or ALTE is an irreproducible and sudden event. It is not a diagnosis, and the child is usually well when seen by the physician in the Emergency Department or clinic, making it difficult to delineate a path which will lead to a diagnosis after relevant investigations.

In view of this difficulty, we at Arkansas Children’s Hospital after a thorough literature search, designed guidelines to provide direction and uniformity in the management of ALTE patients. This was reviewed by our hospitalists and pulmonologists and is in use along with specific order sets and History and Physical forms. In addition, we have established an ALTE clinic where ALTE patients admitted to the hospital can be followed up on discharge.

The ultimate goal is to improve awareness, to bring about uniformity of care, to provide more precise and targeted use of apnea monitors and to develop a data set that will enable future research in this area.

For more information about the clinic or for copies of the H&P form, apnea monitor settings, or the ALTE order set, please contact the authors.

Arkansas Children’s Hospital Pathway for Apparent Life-Threatening Events

Arti Lal, MD, Assistant Professor, Department of Pediatrics, UAMS, LalArti@UAMS.edu
Nancy Lowe, RRT, CPHQ, Quality Improvement Coordinator, lowenj@archildrens.org
Arkansas Children’s Hospital, Little Rock, AR

Definition
ALTE is defined as an episode that is frightening to the observer. It is characterized by some combination of apnea (central or occasionally obstructive), color change (usually cyanotic or pallid but occasionally erythematous or plethoric), marked change in muscle tone (usually marked limpness), choking or gagging. In some cases the observer fears that the infant would have died.

Note that “Near Miss SIDS” and “aborted crib death” are no longer acceptable terms as there is no causal link between ALTE and SIDS.

Focus Population
Inclusion: These guidelines will be used by the General Ward Team for Infants, 0-12 months of age, admitted to the inpatient medical service at ACH with a diagnosis of Apparent Life-Threatening Event (ALTE) with gestational age of 37 weeks or more.

Exclusion: These guidelines are not intended for use in
• infants with apnea of prematurity
• those infants who carry an underlying diagnosis or a known cause for ALTE
• are technology dependent in any way.
• infants presenting with recurrent ALTE’s or severe ALTE’s where more emergent diagnostic and treatment measures should be carried out.

Introduction
ALTE is a common presenting episode among infants. A variety of identifiable diseases or conditions can cause such episodes (e.g. ALTE secondary to gastroesophageal reflux or ALTE secondary to seizures), but in approximately half the cases, despite extensive work-up, no cause can be identified. These episodes can occur during sleep, wakefulness, or feeding and generally occur in infants who are over 37 week’s gestational age at the time onset.

ALTE is not a fatal syndrome but may represent the presentation of a condition that could prove fatal. A detailed history of the event should be obtained as soon as possible directly from the individual or individuals who witnessed any part of the event. Such stories often change with time and are notoriously inaccurate when obtained secondhand. Since these episodes are rarely witnessed by medical personnel, obtaining an accurate history form untrained observers is difficult, but critically important.

ALTE is not to be confused with other clinical entities, such as periodic breathing, in which there is no change in color or heart rate or prolonged respiratory pauses; hence some useful definitions are provided.

Helpful Definitions
Periodic breathing: A breathing pattern in which there are three or more respiratory pauses of greater than 3 seconds duration with less than 20 seconds of breathing between pauses.
Apnea: Cessation of airflow. The respiratory pause may be central or diaphragmatic (i.e., no respiratory effort), obstructive (usually due to upper airway obstruction or mixed. Infants may exhibit central apnea which lasts up to 20 seconds: it is still considered normal or “benign” if not associated with color change or bradycardia.
Pathological Apnea of Infancy: unexplained respiratory pauses lasting more than 20 seconds or pauses less than 20 seconds accompanied by pallor, cyanosis, bradycardia or hypotonia in the term infant. This term is reserved for infants with ALTE in whom no plausible cause is identified.
Apnea of prematurity: Apnea associated with preterm delivery, usually resolves
by 37 weeks gestation but may continue several weeks beyond term.

**Extreme apnea:** Apnea lasting longer than 30 second for all age infants.

**Extreme bradycardia:** A low heart rate lasting for more than 10 seconds. A low heart rate is defined as:
- 60 beats per minute or less for infants who are less than 44 weeks post menstrual age
- 50 beats per minute or less for infants who are more than 44 weeks post menstrual age

**Special Note: Bottom Line--pathological apnea is associated with physiological compromise, whereas apneic events without these changes are considered normal.**

**Work-Up**

History is the single most important component in the evaluation of infants with ALTE. It should include:

1. Description of event as outlined in H&P form.
2. History of present illness
   - Sickness in days or hours leading up to event
   - Fever, URI symptoms
   - Poor Feeding
   - Weight loss
   - Rash
   - Snoring
   - Irritability, lethargy
   - Contact with someone who is sick, medications administered, immunization
3. Medical history
   - Prenatal history; use of drugs, tobacco, or alcohol during pregnancy
   - Small for gestational age, prematurity
   - Birth history: birth trauma, hypoxia, presumed sepsis
   - Feeding history: gagging, coughing, poor weight gain
   - Developmental history: appropriate milestones
   - Previous admissions, surgery, apparent life-threatening event
   - Accidents (being dropped or tossed; possibility of trauma)
   - Medications
4. Family history
   - Congenital problems, neurologic conditions, metabolic disorders neonatal and child deaths
   - Smoking in the home
   - Cardiac arrhythmia
   - Sudden infant death syndrome
   - Family structure, socioeconomic status

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### Guidelines for Inpatient Management

Laboratory and imaging studies should be based on the history and physical examination. Once admitted to our inpatient service, the **basic minimum work up** includes:
- Complete blood count
- Electrolytes, serum bicarbonate, glucose
- Calcium and Magnesium
- Liver function tests
- Chest X Ray
- Urinalysis
- CSF, Blood and Urinal cultures on all infants below the age of 2 months with fever.
- Capillary blood gas
- EKG
- Apnea monitoring for 48hrs / entire length of stay
- Continuous pulse oximetry for 48 hours / entire length of stay

**Other work-up**, in selected cases, may include the following:

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<thead>
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<td><strong>Order</strong></td>
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<td>Metabolic: Lactate, pyruvate, ammonia, urine and serum amino acid and organic acids.</td>
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<tr>
<td>UGI, Barium Swallow, pH monitoring, technetium scan</td>
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<tr>
<td>Pulmonary consultation (Lateral neck x-ray, bronchoscopy, laryngoscopy, airway fluoroscopy).</td>
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<tr>
<td>ENT consultation</td>
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<td>EEG</td>
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<tr>
<td>CT/MRI head</td>
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<tr>
<td>EKG monitoring, Holter monitoring</td>
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<tr>
<td>Urine toxicology screen</td>
</tr>
<tr>
<td>Nasopharyngeal aspirate for pertussis, RSV and Chlamydia</td>
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<tr>
<td>Skeletal survey, dilated fundoscopic examination</td>
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<tr>
<td>Polysomnography</td>
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*Continued on page 14*
Other work-up considerations are:
• Physicians should be aware that infections, GER and seizures are the most common causes of ALTE. Broad evaluations are not productive.
• If there is history of severe ALTE (severe was defined as needing CPR), and/or the home monitor revealed recent pathologic apnea, hospital admission is warranted for observation, documentation and evaluation.
• ALTE patients cannot be confined by minimum or maximum number of tests. For ill looking infants evaluate and stabilize patient rather than adhere to a strict algorithm.
• Always observe feeding and caregiver interaction.
• Appropriate therapy should be prescribed for those conditions amenable to treatment. Conditions causing apnea that resolve or are controlled with specific treatment do not require home monitoring.

Apnea Monitors
As per the NIH Consensus development program 1986 for Infantile Apnea, no randomized studies of adequate size have addressed effectiveness of home monitoring for any category of patients. In deciding to monitor or not to monitor, the primary objective is to serve the best interest of the infant; therefore the decision should be based primarily on the infant’s history. For all groups, it should be clearly understood that monitoring cannot guarantee survival. All monitors should be event recorders and have the EKG tracing turned on.

NIH 1986 Indications for Apnea Monitors:
• Infants with ALTE who present with an initial episode requiring vigorous stimulation or resuscitation.
• Symptomatic preterm infants.
• Siblings of two or more SIDS victims.
• Infants with certain diseases like Central Hypventilation.

AAP Committee on Fetus and Newborn 2003 indications for Apnea Monitors:
• Infants who have experienced an ALTE
• Infants with tracheotomies or anatomic abnormalities that make them vulnerable to airway compromise.
• Infants with neurologic or metabolic disorders affecting respiratory control.
• Infants with chronic lung disease/ BPD, especially those requiring supplemental oxygen, CPAP, or mechanical ventilation.

Special Note: Cardiorespiratory monitoring is not medically indicated for normal infants. The above recommendations are not specific to ALTE since there are no formal guidelines in the medical literature. Placing an infant on an apnea monitor is done by the physician on a case by case basis.

For several groups like siblings of infants with SIDS, infants with less severe ALTE episodes, and infants of mothers abusing opiates or cocaine, evidence on the benefits and risks of monitoring is inconclusive. For infants in this category, the decision to monitor must be made by the physician after a full discussion with the family of the potential benefits and the psychological burdens. The decision reached will be specific to the infant, as there are no hard and fast guidelines that will apply to all cases. No family in this category should be made to feel that monitoring is necessary.

Special Note: Decision-making about home monitoring is a collaborative enterprise.

When the clinician concludes that cardiorespiratory monitoring is medically indicated and parents disagree, the clinician has several options:
1. Defer to parental preferences
2. Continue hospitalization.
3. Seek suitable assistance and support to facilitate monitoring.
4. Remove infant from home.

When cardio-respiratory monitoring is not indicated, clinicians are advised not to prescribe monitors when they are requested by parents. When evidence on the benefits and risks of monitoring or alternative treatments is inconclusive and there is disagreement, the decision should be left to the parents, who take primary responsibility for their choice.

Key Points
• Monitoring does not prevent SIDS, may alert parents to ALTE, and event recording may help as a diagnostic tool.
• Can be stressful due to high incidence of false alarms, cost of monitoring, difficulty finding daycare.
• Provide written guidelines on home monitoring.
• Monthly downloads; follow up with PCP/Apnea specialist.
• Training and demonstrated proficiency in infant CPR and resuscitation methods.
• Discuss SIDS risk factors like prone position, smoking, safe sleeping environment.
• There could be parental dependence on equipment and it may be very difficult to discontinue use of monitor later.

Special Note: An adequate monitoring system encompasses medical, technical, psychosocial and community support services.

Discharge Criteria
• Documented medical and airway stability.
• Review results of apnea monitor download before discharge.
• Adequate initiation of therapy for any treatable underlying disorder identified.
• Adequate parental education and training in airway management.
• Clearly outlined and individualized follow-up plans for periodic review by PCP.

During hospitalization and prior to discharge, the physician should review the apnea monitor's settings, making sure they conform to age-appropriate criteria. The provider should also establish the times of the day and situations under which the patient should be on the monitor. Usually this is when the infant is asleep at night, and during the day when care givers are around the child but cannot see her.

When to Discontinue Apnea Monitor
If the patient is asymptomatic and download results show no abnormality, the monitor can be discontinued in one to two months. If symptoms persist, an Apnea Specialist should be consulted for evaluation. It is important to remember that the apnea monitor is a monitoring and diagnostic tool, and home monitoring may provide clues to the diagnosis.

Follow-Up
Arkansas Children’s Hospital has instituted an ALTE clinic, where ALTE patients admitted to the hospital can be followed up on discharge.

References:
3. 2003 Committee on Fetus and Newborn, AAP Policy Statement on Apnea, Sudden Infant Death Syndrome and Home Monitoring.
Editor's Note:
The following is an interview conducted on August 18, 2008 with Robert M. Wachter, MD, who is well known to our community for originally coining the term “hospitalist.” He is Professor and Associate Chairman of the Department of Medicine at the University of California, San Francisco where he holds the Lynne and Marc Benioff Endowed Chair in Hospital Medicine. He is also Chief of the Division of Hospital Medicine, and Chief of Medical Service at UCSF Medical Center. Bob has been an active leader in the field of quality and safety and has many accomplishments, some of which are detailed below. In the spirit of this section, our discussion focused on his work and achievements in this field, as well as some of his thoughts on the role that pediatric hospitalists may play in the movement.

Q: How did you go from being a leader in hospital medicine to national safety expert?
A: When the hospitalist field began in the mid-1990s, I worried that it was in danger of being branded as being mostly about saving hospitals money. Of course, the efficiency argument was the main initial catalyst for the growth of the field, but I felt that hospitalists could bring so much more to the table. When the Institute of Medicine report To Err is Human came out in late 1999, I was President of the Society of Hospital Medicine, and I immediately saw an opportunity. Given the unprecedented media coverage, I knew that hospitals would be under tremendous pressure to finally move on the quality and safety agenda. And I believed that hospitalists were in a unique position to jump in and help. Here was a new, young, energized group of physicians who had a systems focus, who were trying to make themselves indispensable, and who depended on hospitals for financial support. So I pushed the hospitalist field to focus like a laser on quality and safety, both because I thought it would be great for the young specialty and because it was the right thing to do.

My own personal expertise in quality and safety gradually emerged over the next few years. I found the topics compelling, in sync with my own focus on systems and politics, and I was lucky to have several colleagues – particularly Kaveh Shojania, Andy Auerbach, and later Peter Pronovost – who helped augment my understanding of the key issues in the field and were wonderful collaborators. From that point on, it was a series of lucky bounces that led to our Annals of Internal Medicine series on medical mistakes (Quality Grand Rounds), which ultimately led to Internal Bleeding and finally to our selection as the editorial team for the Agency of Healthcare Research and Quality (AHRQ) Web M&M and AHRQ Patient Safety Network.

Q: How does the average hospitalist, frustrated with a complex system, lack of resources, and the over simplistic PDSA concept make a difference in quality and/or safety in their hospital?
A: So much of hospital care is broken that hospitalists need to gain satisfaction from making the system better for even one patient. The Plan-Do-Study-Act (PDSA) tool is one relatively simple way of structuring improvement activities. I am not convinced that it is the only, or the best, one, and hospitalists need to help not only improve quality and safety at their own institutions but help to invent better, more sophisticated tools. There will never be enough resources to do everything that we need to do, but as the skin in the game grows with more transparency, pay-for-performance, State Health Department visits, and more, I imagine that the resources will be found to do the most important work. It will partly be up to the hospitalists to articulate what those resources need to be so that they are distributed in a sensible way.

Q: You edit the AHRQ Web M&M site - how did that idea come up and may I shamelessly steal that idea for this section? (This is an attempt to get readers thinking about similar submissions to the Quality and Safety column of this news journal.)
A: The AHRQ Web M&M idea was actually developed by Dr. John Eisenberg, then Director of the Agency for Healthcare Research and Quality. By coincidence, John had been one of my first mentors when he was a Professor of Medicine at Penn and I was a medical student. He was a remarkable guy: brilliant, charming, Hollywood-handsome, and one of the first physicians to see the potential to combine an academic professorial life with an MBA and an orientation toward systems and leadership. It wasn’t until I first met John that I recognized the possibility of a career combining my dual interests in medicine and policy.

Anyway, by the late 90s, John was head of AHRQ and, after the publication of To Err is Human, saw the value of using the Internet, which was then pretty new, to disseminate case-based findings about medical errors. John, of course, knew of M&Ms from his academic experience, but also knew that most community hospitals did not have them. Ultimately, AHRQ floated an RFP to turn this idea into reality, and we competed to be the editorial team. In part based on our experience in case-based education about medical errors from our work on the Quality Grand Rounds series in the Annals of Internal Medicine, we were awarded the contract in 2001. Tragically, John died of brain cancer a year later.

(Of course, you can shamelessly steal the idea.)
Q: According to Modern Physician magazine, you are the 19th most influential physician executive (and only hospitalist/academic physician). Do you get to sit next to Jessica Alba at Warriors games?
A: I have never met Jessica Alba, but would certainly like to. As I wrote on my blog, my placement on this influential physicians list was quite amusing. Virtually everybody ahead of me on the list controls budgets of billions of dollars, and the biggest budget decision that I made lately is whether to go for the 1- or 3-movie plan at Netflix. That said, I was pretty proud of this ranking since my influence derives largely from my ideas and relationships rather than from my position and budget.

Q: In your blog, you have articulately critiqued a few of Don Berwick’s (the #2 most influential physician executive) concepts that emanate via the Institute for Healthcare Improvement (IHI) - do you two get along?
A: I think the world of Don Berwick, and believe that he has done more to advance the quality and safety revolutions than anyone in the world. It is one thing for someone like me to come along to promote patient safety and quality after there is already momentum and funding, and fully another to do what Don did -- to articulate a vision well before it was popular and to spend nearly a decade pounding his shoe on the table trying to get people to pay attention to the critical needs of patients.

That said, I do have some philosophical differences with Don and the IHI in how they are balancing the sometimes competing philosophies of evidence-based medicine versus “Just Do It.” On this, I fully understand Don’s point of view and recognize that he may prove to be right in some of our areas of disagreement. For example, Rapid Response Teams – a strategy whose evidence base I’ve questions -- may turn out to be the best thing since sliced bread. However, I continue to worry that without pressure from leaders like Don to study the commonsensical ideas to be sure they are working as we intend and that the resource allocation on them is appropriate, the quality and safety field may become faddish. Over time, the early “let’s do something” period will pass and we will need to have a thoughtful, reflective approach to how we focus our energies and resources. That will be impossible if we don’t study anything that we have done.

My most recent blog, on Don’s speech to the American Board of Internal Medicine (ABIM) Forum on patient-centeredness, reflects another philosophical difference that we appear to have. Don argued for the primacy of patient decision-making and choice, and denigrated the role of professional expertise. This, too, is a legitimate point of view, but one that I disagree with. In all of these matters, I recognize the possibility that Don is acting as a provocateur, taking a relatively polar position in order to drive the system forward. The problem is that Don has become an international sensi for all things quality and safety, and so if he says we should do A, B, and C, or think X, Y, and Z, there are a lot people who will do and think just that. As they say in Spiderman, with great power comes great responsibility.

Q: From your vantage point, what can the field of pediatrics do in the realm of quality and safety besides just follow the adult lead (e.g. retrofitting goals such as reducing ventilator-associated pneumonia (VAP) and decubitus ulcers)?
A: I have become convinced by many of my pediatric colleagues that children are not simply little adults – that the quality and safety agendas need to be individualized for pediatrics, not simply a pint-sized version of the adult agendas. For example, many of the problems with medication errors are related to adult-type processes adapted to pediatrics, without an adequate understanding of the importance of weight- and age-based dosing. Our Children’s Hospital at UCSF is presently a “hospital within a hospital,” but we are building an independent, free-standing children’s hospital. In these discussions, it has become clear to me that there are many advantages to a pediatric-focused institution and agenda as it comes to quality and safety.

Q: You’re an author, an editor, a parent, a hospitalist, an academic physician, a division leader, and you see patients? Take me through the life of a day in the life of Bob Wachter.
A: I am exhausted just hearing that, but somehow my life seems to work pretty well. I am pretty efficient; I write relatively easily, and I have managed to surround myself with terrific, highly competent people. I delegate pretty well, and I’ve gotten better at saying “no” to certain things in order to make sure that I have the bandwidth to do the things that I have said “yes” to well enough to get by.

A typical day? I live only about 10 minutes from the hospital (my father had an hour commute each way to work and I vowed not to do that). I hang out with the kids in the morning, sometimes taking one or the other to school. I generally get to work at about 8:30. My day is filled with a combination of meetings, phone conferences, educational conferences (for example, I run our Mortality & Morbidity conference), and a variety of odds and ends that changes every day. In the interstitial moments, I try hard to answer the e-mails that can be answered quickly. I get about 100 a day, and really start feeling antsy when my in-box spills over onto a second screen. I’m usually home by 6:00, and try religiously to have dinner with my family. Most nights, I will fire up the computer again at about 8:30 and do some combination of work and television watching between 8:30 and 11:30. I am not sure this is a good thing, but my parents let me do my homework with the TV on, so I became pretty good at multitasking. I am usually sleeping by midnight, after watching the Daily Show and Colbert, and don’t function very well if I get fewer than seven hours of sleep. About two months of the year I serve as a ward attending, which adds about 4-6 clinical hours to those days, which just means that everything else just needs to get stuffed into a smaller space. I let things slide for awhile, but recently have picked up my golf game (I’m a 7-handicap and play once
a week) and I’m trying to get to the gym more religiously. Also, I can’t finish a day without reading the New York Times.

Q: In one of your most recent posts on your blog, you opposed the extremist view of patient-centeredness and consumerism, yet you also believe in value-based purchasing as a future change agent in our field. Can you reconcile these two views?

A: I don’t see these issues as being in real conflict. I think consumers can be a powerful force for change in healthcare if they are given sufficient information to allow them to make a choice between one hospital versus another, or one doctor versus another. That is a far cry from saying that the consumer has all of the information to make the right choices about their care at the individual level. The extremist view of patient-centeredness, which argues that patients should be left to make all their own choices, implies that professional expertise is a vehicle by which an entrenched guild retains power. That doesn’t feel right to me.

I think many patients will, if given a choice, will favor systems that are a bit paternalistic and in which professional expertise is valued. These systems must also be ones that thoughtfully engage patients and families in decision-making where appropriate. This is a tricky balance, but I believe that our health system would be a far better place if we could combine an attitude toward patients that respects their expertise and desire to be informed and engaged in decisions where appropriate, but also thoughtfully and without hubris recognizes that the physician-patient relationship will always be one in which there is asymmetrical knowledge and there needs to be a degree of trust that the physician is acting in the patient’s best interest. I think such a system would triumph in a value-based purchasing environment.

Q: I’m going to San Francisco and wine country in a few weeks; any restaurant or winery suggestions?

A: Call me and I’ll give you a few helpful hints. There’s no dearth of choices.

Section on Hospital Medicine

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RESOURCES FOR MEMBERS

Pediatric Hospitalist Programs of North America – Newly Updated

The Pediatric Hospitalist Programs of North America resource can be used by individuals and programs to network as well as by members to seek out contacts and job opportunities in a location of interest. Visit the SOHIM web site at www.aaphospmed.org for more information.

Neonatal/Pediatric Transport Team Database – Newly Updated

The Neonatal/Pediatric Transport Team Database is a resource for professionals who are interested in reviewing transport programs across the country. Visit the Section on Transport Medicine web site at www.aap.org/sections/transmed for additional information.
The Dangers of Crossing the Hospital Chasm

Mark Shen, MD, FAAP, Pediatric Consultation and Referral Service, mshen@seton.org Dell Children’s Medical Center of Central Texas, Austin, TX

An adolescent girl is admitted to a hospital for palatal dysfunction of unknown etiology. A significant work-up is unrevealing, and she is discharged with follow-up. She presents in extremis several months later, having had inconsistent follow-up. Despite this body of work, many questions remain unanswered. There are few studies on the impact of admission, emergency room and consultant communication on care. The literature to date is based almost entirely on adults and generalization to pediatric patients may not always be appropriate. What of those without a medical home? Perhaps the group at highest risk, they are also the most challenging problem to address. Technology continues to rapidly advance around us, but its integration into medicine is decidedly slow. Finally, should preventable errors due to poor communication be classified as “never events” such that patients and payers will no longer be required to bear the burden of these costs?

Hospital discharge is a dangerous time for patients. Nearly one-quarter of adult patients discharged from the hospital experience an adverse event and at least half seem to be preventable or ameliorable. Not surprisingly, communication deficits between hospital-based physicians and primary care physicians (PCPs) are prevalent as well. In a recent systematic review of the literature, Kripalani et al. revealed some sobering findings. Only 17%-20% of primary care providers (PCPs) were always notified of discharge and one-quarter of discharge summaries never reached the PCP. When the discharge summary did reach the PCP, it was often delayed or of poor quality, missing key elements such as pending tests or discharge medications. A handful of studies have now specifically linked these deficits in continuity to higher rates of medical errors, readmission, as well as death.

When Wachter and Goldman first described an emerging trend in hospital medicine, the correspondence from generalists centered around fears of discontinuity. In response to these fears, the authors replied, “We believe that high-quality providers and systems will develop protocols based on contact by telephone, e-mail, and fax to guarantee continuity of care at admission, during hospitalization, and at discharge.” As the case above illustrates, preventable adverse outcomes still occur as a result of discontinuity of care. Although high-quality systems and outcomes are ultimate aims, the literature suggests that we are just beginning to understand the full impact of the hospitalist model on transitions of care.

Despite this body of work, many questions remain unanswered. There are few studies on the impact of admission, emergency room and consultant communication on care. The literature to date is based almost entirely on adults and generalization to pediatric patients may not always be appropriate. What of those without a medical home? Perhaps the group at highest risk, they are also the most challenging problem to address. Technology continues to rapidly advance around us, but its integration into medicine is decidedly slow. Finally, should preventable errors due to poor communication be classified as “never events” such that patients and payers will no longer be required to bear the burden of these costs?

Those looking for a quick evidence-based solution will be disappointed. This is yet another complex problem in the highly interconnected system that is the practice of medicine today. The remainder of this review aims to offer some basic principles that may be broadly applicable. Our first approach should be to adopt a systems view of these problems and move beyond the emotionally gratifying “blame and shame” techniques that dominated medicine in the last century. A poor system of care led to the preventable adverse event in the vignette above. Although it would be easy to point the finger at any one of the physicians involved in the care, the 21st century physician is a team player focused on continuous improvement and multidisciplinary problem-solving. We embrace errors as learning opportunities, recognize our infallibility and work to bridge the broad array of gaps that surround patients in our healthcare system. Accordingly, focusing on the improvement of discharge summaries would necessitate examination of not only physician practice, but also the medical record, transcription efficiency and the database of PCP contact information.

At the patient level, we should develop a deep appreciation for the medically complex child. By definition, the complex patient may have more medicines to review, more tests to follow-up and more providers to see. All of these factors combine to increase the number of gaps in the system. Care coordination has shown promise in chronically ill adults, but the field of pediatric hospital medicine would be well-served to first identify those at highest risk of lapses during hand-offs.

The Joint Commission’s National Patient Safety Goal 2E provides further recommendations as it asks us to “Implement a standardized approach to ‘hand off’ communications, including an opportunity to ask and respond to questions.” They further specify that this goal does apply to hospitalist and PCP communication at discharge and may occur in a “more protracted time frame,” though it should still be completed before the patient sees the PCP. Hospitalist groups should partner with community PCPs to identify optimal local approaches to this standardized communication.

Information technology offers a solution to standardization that is easy to envision but perhaps more difficult to implement. A discharge summary that automatically populates fields from the electronic medical record and then auto-faxes to the PCP is an achievable, universal goal in the near future.
However, the implementation process will be both onerous and tedious at times, necessitating significant physician involvement. Other innovative solutions have made their way into the medical arena recently. A new generation of voice messaging systems is being used to facilitate information transfer from emergency department nurse to floor nurse or radiologist to ordering physician. It may not be long before hospitalists are routinely exploring this avenue of communication in lieu of waiting on hold with PCP offices.

A final suggestion, and perhaps the most important, is to embrace families in our attempts to bridge continuity gaps. Collaborative care improves health outcomes and pediatrics has always been a leader in the arena of patient and family-centered medicine. Pediatric hospitalists have focused on the process, i.e., family-centered rounds, and it is now time to advance the partnership towards improved outcomes during transition back to the medical home.

References

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Comprehensive Care for Medically Complex Children: The Pediatric Nurse Practitioner – Pediatric Hospitalist Model of Collaborative Care

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Corresponding Author: Sherri Adams

Medically Complex Children (MCC) have acute and chronic health needs that are challenging and require collaboration by many health care providers over extended periods of time. In the inpatient environment the care of these patients may be suboptimal due to both fragmentation and discontinuity of care. This may result in frequent hospital admissions, increased lengths of stay, increased risks of medical errors, and poorer family satisfaction.

In an effort to improve continuity of care and communication for these children and their families a model of collaborative coordinated care for MCC who are frequently admitted to the hospital has been implemented at The Hospital for Sick Children, a 300 bed tertiary care teaching hospital in Toronto. It is the only freestanding pediatric hospital for the greater Toronto area with a catchment population of 5 million people. The model for caring for this population of patients has been developed based on close collaboration between one Pediatric Nurse Practitioner (PNP) and eight Pediatric Hospitalists (PH).

Patient Identification:
Patients are identified by the PNP or PH from the pediatric inpatient unit if they have both complex medical needs and the need for care coordination services. Referral criteria are listed in Table 1.

Referrals are also evaluated for children who have prolonged or frequent admissions to the hospital, and if their care is fragmented. Due to the demand for this program, children who are followed by a comprehensive program for a single disease entity (e.g. complex cardiac conditions, organ transplant) are not followed by our team. In a review of the program from 2000-2002, 94 children were cared for through this model of whom 74 (79%) were neurologically impaired (NI); 70 (74%) were technologically dependent (TD); and by the year 2004 18 (19%) of the children had died.

Program Structure:
A caseload of up to 100 patients is maintained and a second PNP has been added to the team to assist with patient management. Continuity and coordination of care is led by the PNP-PH team in conjunction with the family. This care is provided in collaboration with the many other care partners in the inpatient, outpatient, and home setting (FIGURE 1). This model maximizes the seamless transition of care from hospital to home-based settings and vice versa. At any given time between six and eight patients are admitted to the inpatient service. In the inpatient setting, care is provided by one PNP in conjunction with a PH. Often, an additional PH is also involved intermittently (eg. Family meetings) to promote continuity of care.

Creating a Plan of Care (POC):
Comprehensive written medical care plans that summarize patient issues and emergency preparedness are created during the identifying admission. These documents are crafted by the nurse practitioner with the family’s input and take approximately four to eight hours to produce the initial draft. The care plans are regularly updated by the PNP in order to maintain accuracy and updated copies are appended to the electronic medical record. The family is strongly encouraged to carry the

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<th>Referral Criteria (adapted from the framework of Srivastava et al.2)</th>
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<td>Age</td>
<td>≤ 18 yo</td>
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<td>Referred by</td>
<td>attending pediatric hospitalist and/or member of the allied health team</td>
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<td>Health problems affecting</td>
<td>≥ 2 organ systems</td>
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<td>Treatment</td>
<td>≥ 2 medical or technological therapies</td>
</tr>
<tr>
<td>Medical Sub-specialists</td>
<td>≥ 2 medical sub-specialists</td>
</tr>
<tr>
<td>Allied Health Specialists</td>
<td>≥ 2 allied health specialists</td>
</tr>
<tr>
<td>Health Care settings</td>
<td>≥ 2 health care settings (e.g. paediatric hospital, community paediatricians office, community rehabilitation center)</td>
</tr>
<tr>
<td>Resuscitation Status</td>
<td>NO CPR or Full Resuscitation</td>
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document with them to all healthcare encounters to facilitate a central plan of care (POC). The POC contains information about the child and family that is relevant to all aspects of their care. It is a fluid document that is constantly in evolution and changing based on the needs of the child at any given time. Information regarding primary and secondary diagnoses, resuscitation status, current medication lists and feeding regimens, common presentations when ill and management strategies are all included in this document (FIGURE 2).

Access to Services:
For outpatients, access to either the PNP or a PH is available to patients and their families during regular business hours in person or via telephone. Follow-up appointments in the outpatient clinic are also provided by the same medical team on a scheduled and as needed basis. The goals of regular follow-up by the PNP-PH team are twofold; both to proactively manage the patient's complex medical issues and to prevent readmission to hospital. Coordination of care and access to services typically provided in the hospital (e.g. gastrostomy tube maintenance) are facilitated. Communication and partnership with the primary care provider (PCP) is an essential component of this model, empowering the PCP to continue to provide a medical home for these patients. General primary care (e.g. immunizations, visits for mild illnesses) is not provided by the team, but the PCP is given an open avenue of communication to the team to facilitate optimal delivery of integrated care.

Example of Success:
Important aspects of the PNP-PH model such as communication, coordination, and access to the right services at the right time have been identified as elements of our program's success. Joey is a 13 year old by with profound NI cared for by the team. He is completely dependant on his parents for all activities of daily living – he cannot talk, eat by mouth, or follow simple commands. He has had multiple bouts of aspiration pneumonia, is oxygen dependent, feeds exclusively via a gastrojejunosty (GJ) tube 20 hours/day, and takes multiple medications to manage both reflux and seizures.

Joey’s mother pages the PNP as she thinks Joey's breathing is worse than usual. The PNP speaks with the homecare nurse who provides more details and with whom the PNP has a good relationship. The PNP instructs the nurse to hang up and call 911. While the PNP-PH team is waiting for the patient they inform the rest of the allied health team (social work, dietitian, pharmacist, physiotherapist) and the Emergency Department (ED) of the situation. A detailed written care plan is provided for the ED staff. The PNP-PH team is contacted when the patient arrives. The ED physician feels the patient is very unstable and would like to start some positive pressure ventilation and transfer to the ICU, however, the POC states that the child is not to be resuscitated. The PNP-PH team quickly assesses the child and speaks with the mother. They also note that the team social worker is already there. The mother tells them that the child has been vomiting formula and his seizures have increased. She also reconfirms that she does not want him to be ventilated or have CPR performed.

The team speaks once again with the ED physician and reassures her that the child should not be ventilated or sent to the ICU. They request that feeds be held and the GJ tube be checked by interventional radiology as they are concerned that the gastrostomy portion of the tube is cracked - leading to vomiting and aspiration. The team speaks with the child’s neurologist who recommends both acute management as well as long term changes. They contact the palliative care service to liaison and support the family. Finally, the PCP is contacted to update the status of his patient who he has been following for 13 years – he says he will come immediately to see his patient.

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COMPREHENSIVE CARE PLAN

PATIENT NAME
PARENT/GUARDIAN NAME
Address, Telephone numbers, E-mail address
Medical Record Number
DOB
Allergies
Resuscitation Status
Primary Diagnosis
Secondary Diagnoses

EMERGENCY MANAGEMENT GUIDELINES
Common presenting signs, symptoms, and diagnoses
An approach for work-up
An approach to treatment
Name and contact information for PNP or PH who best knows patient

Procedural Preparation
List any information that is relevant to preparing the child for a procedure
This may include something as straightforward as an IV start

PATIENT DIAGNOSES
Main Diagnosis and relevant information
List common presentations
List relevant test results

Secondary Diagnosis (list all diagnoses)
List common presentations
List relevant tests results

Medications
Scheduled
PRN
Supplements

Nutrition
Formula, route, frequency, duration, calories for enteral or parenteral feeds

Hospitalizations
Date of Admission – Date of Discharge and main issues during hospitalization

Primary Care Provider & contact information

Hospital Contacts and Specialists Involved
List Names and contact phone/e-mail for all involved
Physicians
Nurse Practitioners
Allied Health professionals (e.g. dietitian, social work)
Sub-Specialists

In Summary:
Management of the MCC is challenging. An understanding of the unique needs of these children and their families is essential as is a considerable investment of both time and resources. There is a significant role for care coordination and medical homes in caring for this population. There has been some research in this area that has demonstrated that hospital-based care coordination models are cost-effective, and can improve parental satisfaction, however, other indicators of quality of care such as child and parental quality of life, and patient safety have not been assessed. PHs working in collaboration with PNPBs have specialized skills that place them in a unique position to be valuable partners in improving health outcomes for this vulnerable population of children.

References
Participation of Child Life Specialists during Placement of Peripherally-Inserted Central Catheters

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**Note from the Editor-in-Chief:**
Recently we welcomed Child Life Specialists to the Section on Hospital Medicine. This is the first piece about the role of Child Life in the hospitalized patient and I suspect there will be many more to help those of us with Child Life available to us and provide tips to us without this support. We welcome submissions from our Child Life colleagues or physicians on how to make our patients’ stays more comfortable.

Child Life programs are present at hospitals nationwide. Their roles vary from location to location, but, in general, Child Life Specialists are involved in patient education and provide psycho-social support for patients and families. Child Life Specialists work in different areas of the hospital, such as the Emergency and Radiology Departments and Pediatric Inpatient units to decrease anxiety before, during, and after procedures. At our institution, Kentucky Children’s Hospital, Child Life Specialists perform an invaluable service during the placement of peripherally inserted central catheters, or PICC lines, in children. The process for their involvement is as follows:

1. Child Life Specialists participate from the time of the decision to place a PICC line, as an important adjunct to the reduction of pain and anxiety before, during, and after the procedure.
2. The typical patient who requires their services is a 3-10 year old with high levels of anxiety about undergoing yet another procedure soon after their initial encounter with hospital services (e.g. multiple “sticks” to get blood or place a peripheral IV, trips to multiple areas of the hospital which may not be family-centered or child-friendly). Procedural sedation is used for the placement of PICC lines in these patients.
3. The preparation for the procedures (both the PICC placement and the sedation) entails the arrival to the patient’s room of a set of “strangers”, with machines, monitors, vials, and needles, which create an extra level of anxiety to the patients and their families.
4. Before the procedure, child life is notified (usually by the bedside nurse). They come to the room to introduce themselves to the patient and the family, to assess the level of patient and parental anxiety about the procedure, to explain (with the aid of toys, stuffed animals and other props) the placement of a PICC, and to respond to any questions and/or needs that have gone unmet.
5. While the PICC nurse and the physician doing the sedation prepare for their procedures, Child Life Specialists utilize a variety of age-and patient-specific distractions techniques to decrease anxiety. For younger children, this includes reading a book, coloring, or playing with electric toys. For older children, they utilize TV viewing, videogame playing, reading, and casual conversation to redirect the attention of the patient.
6. As the sedation begins, Child Life Specialists continue with distraction techniques to reduce the patient’s anxiety level as the sedation drugs slowly reduce the patient’s perceptual abilities.
7. The moderate sedation drug usually used for the placement of PICC lines at our institution is ketamine, a “dissociative” agent that causes the patient to remain in an awake-but-disconnected and analgesic state. During this state, patients may suffer from hallucinations, which sometimes can be scary for both patient and parents. The child life specialist continues to distract the patient, to “redirect” these hallucinations in order to create a state of “pleasant sedation.” Although ketamine is an analgesic agent, patient will cringe or startle when a painful procedures is initiated, and the child life specialist’s presence is essential in distracting the patient in this initial stage of the procedure. Usually, after the initial reaction, the procedure can continue without significant patient concerns.
8. Child life is also important in the post-sedation stage, as anxiety returns when the medicinal effects of the sedatives wear off. They can help reorient the patient in the post-sedation stage and decrease fear and anxiety.

Child Life Specialists are integral members of the pediatric care team. They offer invaluable support for children and their families during their hospital stay, as well as provide support for ancillary procedural services to reduce pain and anxiety during “frightening” procedures. In our experience at Kentucky Children’s Hospital, having these specialists available to us and activated early in the process has made placing a PICC line easier and faster than in the past.

**References**
Central Venous Cather related Blood Stream Infections: Prevention Strategies

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Introduction
Central venous lines (CVL) facilitate life-saving interventions, but also present risks to recovery in the form of catheter related bloodstream infections (CRBSI). As more is learned about the medical and financial impact of CRBSI, institutions increase focus on systems, devices, and materials to decrease CRBSI. These efforts are reviewed here, including a summary of landmark papers and data, national initiatives, and recommendations of the National Association of Children's Hospitals and Related Institutions (NACHRI).

Impact of CRBSI
In the United States, CVL use exceeds 15 million patient days annually, with a reported infection rate of 5.3 per 1000 catheter-days in the intensive care unit (ICU) and a hospital wide mortality rate of 12-25% attributable to CRBSI. The estimated cost of CRBSI in the United States is $25,000 per incidence hospital wide, and $34-56,000 in ICU, with a total cost between $300 million and $2.3 billion per year.

Measures to decrease CRBSI
Among strategies to decrease CRBSI, combinations of new materials and devices are least effective and measures focused on systems based practices - particularly relating to insertion, maintenance of the dressings, and prompt removal - are most effective. Three nationally acclaimed strategies are summarized below.

Centers for Disease Control
2002 Guidelines for the Prevention of Intravascular Catheter-Related Infections

Areas of emphasis:
1. Education and Training
2. Maximal sterile barrier precautions
3. 2% chlorhexidine skin prep
4. Avoid routine replacement of CVL
5. Antibiotic/antiseptic impregnated CVL if infection rates are high

 Pronovost
An intervention to decrease catheter-related bloodstream infections in the ICU. Simple, systematic methods to decrease CRBSI in adults include five actions:
1. Hand washing
2. Full barrier precautions during CVL insertion
3. Chlorhexidine skin prep
4. Avoidance of the femoral site if possible
5. Prompt removal of CVL when no longer needed

When the Pronovost proposed system was implemented in 103 Michigan intensive care units, with 375,757 catheter-days, the median CRBSI rate decreased from 2.7 per 1000 catheter days to 0 within three months. Adherence to all 5 techniques led to a dramatic reduction in the number of CRBSI at all participating sites.

This paper was quoted in the mainstream media when Atul Gawande used this simple method to highlight the complexities of modern medicine and the organizational interventions that MUST be employed in order to provide the level of care we are capable of. “The Checklist” was published in the “New Yorker” in December 2007.

NACHRI PICU Catheter-Associated Bloodstream Infections Collaborative
In response to the need for a clear and concise standard of practice, NACHRI spearheaded development of a CVL insertion bundle (geared mainly toward physician practice) and a CVL maintenance bundle (geared mainly toward nursing practice). This collaboration includes NACHRI, the American Board of Pediatrics, the Center for Healthcare Quality, Johns Hopkins Bloomberg School of Public Health and the Johns Hopkins Quality and Safety Research Group, CDC, the National Outcomes Center and the Virtual PICU Performance Center.

NACHRI Insertion Bundle Components:
1. Insertion Checklist Form to be completed in real time by an observer who is empowered to interrupt the procedure if it is not being performed within strict guidelines
2. Hand washing immediately prior to insertion
3. Chlorhexidine scrub at the insertion site (no iodine)
4. Full sterile barriers for all healthcare team members involved in the insertion (cap, gown, mask, gloves)
5. Maximum sterile drapes for the patient (from head to toe)
6. Dedicated procedure cart or tray
7. Polyurethane or Teflon catheters only
8. Standardized training for all providers
Maintenance Bundle Components:
1. Daily assessment of need
2. Site and Dressing Care
   a. Adherence to CDC guidelines for intervals/indications for dressing changes
   b. Chlorhexidine scrub with dressing changes
   c. Prepackaged dressing change kits
3. Catheter Hub, Cap, and Tubing care
   a. Adherence to CDC recommendations for tubing & cap change intervals/indications
   b. Prepackaged cap change kits
   c. Dedicated kits and carts in a centralized location

Adherence to these bundles in participating institutions decreased CRBSI and, over time, most units had “zero” months, during which no CRBSI was detected. Institutions with the best bundle compliance were most likely to have “zero” months, implying a direct association between the implementation of insertion and maintenance bundles and decreased rates of CRBSI.

Review of CRBSI Research
Site of placement: A comparison of CVL in the internal jugular, subclavian, and femoral veins demonstrated an increased rate of catheter colonization with femoral site placement, but no increased rate in CRBSI.16

Catheter material: Teflon and polyurethane catheters have lower rates of infection than polyvinyl chloride or polyethylene catheters.17

Hub Connectors: No difference in colonization or CRBSI with standard (stopcock) hubs vs. needleless connectors.18-21

Skin Preparation: Chlorhexidine gluconate 2% is superior to 10% povidone-iodine or 70% isopropyl alcohol in reducing catheter colonization, but does not decrease CRBSI.22-25

Maximal sterile barriers: Using maximal sterile barriers (cap, mask, gloves, sterile gown and a large sterile drape instead of “standard precautions” (sterile gloves and small drapes only).decreased rates of CRBSI26

Securing CVL: Sutureless peripherally inserted central catheters decreased infection,26 but sutureless CVL have not been studied.

Catheter site dressing: Transparent, semipermeable, polyurethane dressings allow visualization of the insertion site, stand up to bathing, require less frequent changes, and decrease CRBSI.27 A chlorhexidine impregnated sponge (Biopatch) placed over the insertion site reduces CRBSI in adults.28

Routine replacement of catheters: A 1991 trial of scheduled “routine” replacement of CVL, including replacement over a guidewire, demonstrated no decrease in infection.29

Prophylactic Antibiotics: Systemic antibiotic prophylaxis in adults with CVL does not decrease CRBSI.30,31 Vancomycin prophylaxis for CVL in low birth weight infants decreased CRBSI, but not mortality.32,33 Local application of povidone-iodine ointment for hemodialysis catheters decreased rates of CRBSI.34 Antibiotic lock solutions decrease CRBSI in patients with long-term catheters and neutropenia.35,36

Education & Training: “IV teams” comprised of experienced staff trained in the insertion and management of CVL decrease rates of CRBSI.38,39

Summary of Conclusive Interventions
Interventions with proven efficacy in reducing rates of CRBSI:
- Education of nurses and physicians placing and maintaining CVL
- Prompt removal of unnecessary CVL
- Teflon or polyurethane catheters
- Use of maximal sterile barriers
- Sutureless securement of peripherally inserted central catheters
- Transparent, semipermeable, polyurethane dressings
- Biopatch over the insertion site
- Vancomycin prophylaxis in low birth weight infants (<1500gm)
- Povidone-iodine ointment at the site of hemodialysis catheter insertion
- Antibiotic lock therapy for neutropenic patients with long-term catheters

Interventions shown to decrease colonization rates, but not shown to decrease rates of CRBSI:
- 2% chlorhexidine skin preparation instead of povidone-iodine or isopropyl alcohol prep
- Non-femoral site placement

Interventions shown to increase rates of CRBSI:
- Routine replacement of CVL, even over a guide wire
- Systemic antibiotic prophylaxis

Pediatric Implications
Extrapolating adult studied methods to children poses challenges and raises questions, particularly in regard to the site of insertion and ability to obtain alternative access. Femoral CVL are avoided in adults because of risk of phlebitis, high skin colonization, and mechanical complications. In children, with fewer mechanical complications and equivocal rates of CRBSI, the femoral site remains a reasonable choice for CVL. Regarding prompt removal of unnecessary CVL, obtaining alternative peripheral venous access or performing repeated venipuncture for blood sampling may be difficult, stressful and painful in children, especially children with prolonged or chronic illness. In order to deliver humane care, and assure venous access in a potentially urgent condition, leaving a CVL in place longer than “absolutely necessary” may be viewed differently in children than in adults.

Conclusions
The impact of CRBSI is immense and reducible. Simple interventions decrease the risk of infection, and standardization of these interventions in the form of a checklist may nearly eliminate CRBSI in many patient populations. Few studies have focused on these interventions in children, but it is reasonable to extrapolate these data to the children until pediatric specific data are available. Until conclusive data suggest otherwise, training modules and insertion and maintenance bundles should be employed in all clinical sites. The well documented human and financial burden of CRBSI in the United States justifies the cost of these improvements for CVL placement, care and removal. Finally, further studies specific to pediatrics are needed to determine best practice to decrease CRBSI in children.

References
3. Kluger DM, Maki DG. The relative risk of peripheral venous access or performing repeated venipuncture for blood sampling may be difficult, stressful and painful in children, especially children with prolonged or chronic illness. In order to deliver humane care, and assure venous access in a potentially urgent condition, leaving a CVL in place longer than “absolutely necessary” may be viewed differently in children than in adults.

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161:374-8.


Greetings from the Subcommittee on Residents and Young Careerists. Since the last update, I have made the transition from a resident member to a young careerist member of the Section. My personal transition in addition to the work I have done within the SOHM have highlighted the need for better resident access to Pediatric Hospital Medicine as a diverse career option. I see many opportunities for collaboration between the Section on Residents and the Section on Hospital Medicine, some of which I have set in motion, others of which I would like to continue to address as both the SORe and the SOHM improve their online resources. Specifically, as the Forum and Library continue to develop, I would like to establish a place specifically for residents. This will be an easily accessed, centralized place for residents to read relevant listserv® threads and access information about fellowships, elective opportunities, etc. If both the SORe and SOHM enhance their online resources as planned, I would like them to eventually link to one another.

A new resident liaison to the Section on Hospital Medicine will be chosen in the coming months. I am so thankful to have had the opportunity to work both with the SORe and SOHM. It is my hope that, as the first formal liaison, I have helped to define the role and responsibility and made some headway toward the ultimate goal of improving resident access to and communication with the Section and the field of pediatric hospital medicine. I am grateful to the Section’s ongoing support of residents, including the sponsorship of four travel grants for residents to attend the PHM Conference in Denver last July. Please see the article written by the resident recipients of the grants in this issue. It was a wonderful experience for residents to attend this well planned conference and meet many of leaders in our field. There are many more ways to reach out to residents, including more formalized mentorship opportunities or an away-elective program for residents from smaller programs to experience the field in a different setting. As always, the Subcommittee seeks new membership and new ideas on ways to improve resident involvement with the Section and access to careers in hospital medicine.

Interested in the work of this subcommittee? Write Julia Aquino, MD, at jaquino22@gmail.com, and get involved!

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Contact Niccole Alexander at nalexander@aap.org.
The Fundamentals of Critical Care Course was a sold-out success at the Denver meeting in July this year, and the feedback about the experience was very positive. We hope it will be offered again, if not in 2009, then hopefully in 2010. There have been a few articles in Hospitalist News about adult hospitalists participating in critical care arenas. To this end, we were hoping to get a better handle on the pediatric side of Pediatric Hospitalist participation in Pediatric Critical Care. So, after many revisions, you should see a survey in January which assesses the amount of time and responsibility that pediatric hospitalists have in Pediatric Critical Care.

We would also like to thank everyone who participated in the lunch table discussion about Critical Care at the Denver meeting. We had an informative and lengthy discussion about responsibilities that hospitalists should and do have in ICU’s as well as about Sedation Team participation. There were a number of different models discussed, and it was interesting to see how varied our different job descriptions can be from institution to institution. Other ideas that were mentioned were regarding trying to do a critical care workshop with skills stations and developing a 10 Best Articles for Pediatric Critical Care that would be most pertinent to Pediatric Hospitalists. We will be working on some of these over the next few months, and if you have any comments, questions or suggestions for our sub-committee, please feel free to contact us.

Want to participate in the activities of the Subcommittee on Critical Care? Please contact Ben Alexander, MD, FAAP, at balexander@wakemed.org or Kimberly Boland, MD, FAAP at k.boland@louisville.edu.

Subcommittee on Critical Care

Ben Alexander, MD, FAAP, Co-Chair, balexander@wakemed.org
Kimberly Boland, MD, FAAP, Co-Chair, k.boland@louisville.edu

We would also like to thank everyone who participated in the lunch table discussion about Critical Care at the Denver meeting. We had an informative and lengthy discussion about responsibilities that hospitalists should and do have in ICU’s as well as about Sedation Team participation. There were a number of different models discussed, and it was interesting to see how varied our different job descriptions can be from institution to institution. Other ideas that were mentioned were regarding trying to do a critical care workshop with skills stations and developing a 10 Best Articles for Pediatric Critical Care that would be most pertinent to Pediatric Hospitalists. We will be working on some of these over the next few months, and if you have any comments, questions or suggestions for our sub-committee, please feel free to contact us.

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Proposals for forming a Subcommittee may be sent directly to Nicole Alexander at nalexander@aap.org for review and discussion with the Section Chairperson. The proposal should:

- demonstrate that the proposed group has a formal structure in place (a preliminary membership list would suffice) with an identified leader and include a set of goals and objectives (long-term, short-term, preliminary, temporary) that would benefit the membership at large.

Subcommittees are required to periodically summarize the group’s activities for inclusion in the Section News Journal, as part of a poster presentation during the SOHM Program or the PHM conference, and/or via the listserv®. And in return the Section provides:

- a separate site within the SOHM web site for posting materials;
- space in the bi-annual News Journal;
- a separate listserv® dedicated to the Subcommittee;
- conference call access;
- a budget to cover face-to-face meetings (pre-approval needed), etc.
The Section on Hospital Medicine Visiting Professor Consultation Grants Program was developed to assist Pediatric Hospitalist Programs to assess and develop their programs.

Program Rules and Requirements:
• To be eligible the sponsor must be a member of the AAP’s Section on Hospital Medicine.
• The selection will be made by submission to the Visiting Professor Subcommittee of the SOHM.
• Each award provides a $3000.00 honorarium for a 2-day consultation. This honorarium does not include travel, hotel or meals. It is expected that the selected program will provide for these expenses.
• Selected programs should, if possible, suggest a consultant who is qualified to provide the requested assistance. These services may include, for example, information on how to start a program, practice management, and increasing the program’s academic involvement.
• Possible activities for the consultant include educational programs, meetings with key institutional stakeholders, detailed SWOT analysis of the program, review of the business plan, and more.
• The specifics of the proposed activities must be discussed and agreed to prior to the submission.
• The subcommittee is available for technical assistance in preparing the submission and can provide recommendations for Visiting Professors when requested.
• Members of the Visiting Professor Subcommittee of the SOHM are not eligible to be Visiting Professor Consultants in this program.
• Upon completion of the visit a summary will be required of the Visiting Professor to the program.
• Upon completion of the visit, a summary will be required of the program and the Visiting Professor to the Visiting Professor Subcommittee of the SOHM.
• Submissions must include the following:
  Name/Address/Contact information of Program
  Sponsor (SOHM member)
  Date of visit
  Choice of consultant and justification (one paragraph)
  Itinerary and Objectives of consultation (up to one page each)
• Submission should be directed to: Visiting Professor Subcommittee SOHM c/o nalexander@aap.org

Oversight Subcommittee Members Wanted for the Visiting Professor Consultation Grants Program

The SOHM Executive Committee is looking for Section members to serve on the Oversight Subcommittee for the brand-new Visiting Professor Consultation Grants Program.

The Visiting Professor Consultation Grants Program was created by the Section on Hospital Medicine (SOHM) Executive Committee a few months ago to assist Pediatric Hospitalist Programs in assessing and developing their programs.

Each award would provide a $3,000 honorarium for a two-day consultation. This honorarium would not include travel, hotel or meals (selected program would be expected to cover those expenses). Possible activities for the consultant include educational programs, meetings with key institutional stakeholders, detailed SWOT analysis of the program, review of business plans, and more.

The Oversight Subcommittee would be responsible for evaluating the overall Visiting Professor Consultation Grants Program and for providing technical assistance.

Term of service: January 2009 - January 2011.

If you are interested in serving on the Oversight Subcommittee, please e-mail Niccole Alexander at nalexander@aap.org.
Resident Voices from the 2008 Pediatric Hospital Medicine Conference

For the first time this year, the Section on Hospital Medicine offered four resident travel grants to the 2008 Pediatric Hospital Medicine Conference in Denver. Recipients were chosen based on their demonstrated interest in pediatric hospital medicine and their enthusiasm for the field. Of the applicants, three outstanding residents were selected and attended the conference, and the fourth grant was given to Resident Liaison to the SOHM.

Here is a glimpse of the conference through the eyes of a resident.

Lindsay Jackson, currently a third year resident at Stanford, Palo Alto, CA, writes:

The process of applying for the resident travel grant provided me the opportunity to reflect upon exactly what draws me to the field of hospital medicine. During residency, I have found the variety of inpatient problems both stimulating and challenging. While there can be repetitive themes at times (bronchiolitis, anyone?), what truly excites me is finding the patient who appears to have a common disease but in fact has something quite unusual. Being awarded the grant was truly an honor, and the education sessions I attended were excellent. While training at a quaternary care children's hospital has taught me much, this conference was a unique opportunity to meet and learn from hospitalists from across the country at centers both large and small. As I met those in the field, I found myself surprised by the wide variety of roles that pediatric hospitalists can play. I met many people at the conference whose work is dedicated to the ICU, the Emergency Room, and even to patient transport. Others were dedicated to research and teaching. I discovered that a career as a hospitalist is truly a career with limitless opportunities—and one that I am excited to pursue.

Amanda Lueshen, a third year resident from University of Florida, Gainesville, FL, writes:

The pediatric hospital medicine group is a community where members can share ideas and pose clinical questions. This was evident in the Clinical Conundrums session on Saturday morning. Complex cases were presented to a room full of interested colleagues. I found myself thinking "what would I do next?" or "what am I missing?" The ensuing discussion from audience members was a unique opportunity to learn from currently practicing hospitalists. I enjoyed listening to the diverse approaches that could be taken in each case. As I contemplated, I found myself drawn to the challenges of the hospitalized pediatric patient and excited about my future career choice. During the conference, I was also reminded of the research component of hospital medicine. Reviewing relevant journal articles is a critical part of caring for patients and one that I often overlook in my busy resident schedule. The articles presented during the Top 10 Articles in Pediatric Hospital Medicine session may change the way we practice medicine. I found myself looking up those articles myself and reviewing them with other residents and attendings upon returning from the conference. At times, I find that the answer to my question has not been studied yet. I am now more comfortable searching for articles that are pertinent to my patients.

Wambui Waruingi, a third year resident from Case Western Reserve University, Cleveland, OH, writes:

Having heard of the field of hospital medicine as a growing subspecialty, I was keen to find out what the future held for this career path. At the conference, I was particularly interested in the session on the care of medically complex children. During residency, my first experience with such a patient was a beautiful young woman with cerebral palsy who was nonverbal but communicated volumes with her eyes. We lost her due to complications of chronic intestinal obstruction. I was saddened because, at times, I felt helpless to communicate with her through her suffering and navigate through her complex needs. While I am drawn to working with this group of patients, I am often awed by the maze of issues involving their care. I often find myself deferring to different consultation services. At the conference, this session proved eye opening in helping prioritize and simplify their care. I also enjoyed the round table luncheon on how to avoid career burn out. I sat with a PICU doctor, two pediatricians from a very busy pediatric community hospital, an academician and an ED doctor. Over lunch, there was a lively discussion on the different ways to balance family and work life. At the airport, I was privileged to encounter one of the same physicians and continue this discussion while waiting for our flight. Through my experiences at the conference, I feel bonded with the group of people who have chosen the unique career path of pediatric hospital medicine. The opportunity to receive high quality education while being informally mentored was one that I will value for a long time.

Julia Aquino, Section on Hospital Medicine Resident Liaison to the Section on Residents writes:

As the Resident Liaison recipient of the travel grant, I feel privileged to be in the company of so many pediatric hospitalists who are dedicated to the growth and improvement of our field. I was invigorated by the research presented at the poster session and left with a commitment to quality improvement not only as an individual practitioner, but also as a member of this growing community of hospitalists. It was a pleasure to meet in person so many of the voices from the LISTSERV® discussions. I am sure that I speak for all the resident travel grant winners when I express my gratitude to the SOHM for its ongoing support of resident education and to all those involved with the planning of such a rewarding educational experience.
Section on Hospital Medicine Grant Opportunities

As previously noted in December’s monthly announcements …
The Section on Hospital Medicine offers a number of grants in support of various activities throughout the year.

To apply for one, two or all of the opportunities, please submit a letter of interest along with your CV to Niccole Alexander at nalexander@aap.org by the deadlines noted.

If selected, you would be responsible for writing an article on your experiences for Hospital Pediatrics and providing time sensitive ideas, comments, etc., via the Section LISTSERV® as necessary (check with Niccole for appropriateness before posting as there are certain advocacy items that cannot be circulated).

NICHQ Conference Travel Grant – Application Due Date: January 9, 2009
SOHM offers two $500 travel grants to attend the NICHQ Annual Forum for Improving Children’s Healthcare Conference in Grapevine, TX to be held March 9-12, 2008. For additional information visit www.nichq.org.

AAP Legislative Conference Grant – Application Due Date: January 23, 2009
SOHM covers registration, travel, and meeting-related expenses for one person to attend the Academy’s Legislative Conference to be held April 19-21, 2009 in Washington, DC. The brochure is included at the end of this month’s announcements.

Pediatric Hospital Medicine Travel Grants for Residents
– Application Due Date: February 6, 2009
SOHM offers three $500 travel grants to residents to attend the Pediatric Hospital Medicine Conference July 23-26, 2009 in Tampa, FL.

Important: you must be a member of the Section in order to be considered for any of the opportunities noted above except the Resident Travel Grant program.

Save the Date!

Washington, DC
October 17-20, 2009
www.aapexperience.org

California Pacific Medical Center
Division of Pediatric Hospital Medicine
Presents:
“FRONTIERS IN PEDIATRIC HOSPITAL MEDICINE”
4th Annual Symposium
Thursday, October 08
& Friday, October 09, 2009
Location: Grand Hyatt Hotel, San Francisco
Topics: Oncologic Emergencies, Palliative Care, Imaging of the Abdomen and Chest, Cardiology, Acute Pancreatitis, Asthma, and much more.

REGISTRATION FORMS TO BE MAILED IN MAY
Purpose: Respiratory illness (RI) is the most common reason for pediatric hospitalization. Understanding cost and length of stay for common respiratory illnesses is important in determining national, regional, and local benchmarks for inpatient care. Our objective is to determine the cost and length of stay for children admitted nationally with respiratory illnesses.

Methods: The 2003 Kids’ Inpatient Dataset was used to assess non-newborn pediatric hospital stays nationally for children with primary DRGs for respiratory illness (75-102). Three diagnoses (bronchiolitis, asthma, pneumonia) were examined separately. Total cleaned charges were examined using geometric means to control for lack of normality and STATA was used to control for the complex survey design.

Results: The sample comprised 290,373 children ages 0-20 hospitalized with respiratory illnesses in 2003, a rate of 5.9 admissions for every 1000 children, and $4.4 billion in total costs. 43% of children in the sample had any diagnosis of asthma, 37% pneumonia, and 30% bronchiolitis. Mean total charges were higher for a primary diagnosis of pneumonia ($5,757) than for asthma ($5,144) or bronchiolitis ($4,960), but the median length of stay was 2 days for all three diagnoses. Extended length of stay (>7 days) occurred in 5% of admissions for pneumonia, 3% for bronchiolitis, and 1% for asthma.

Conclusion: Pediatric hospitalization for respiratory illnesses cost over $4 billion dollars in 2003. Asthma was the most common reason for RI hospitalization. Pneumonia, asthma, and bronchiolitis all have similar median length of stay, however the mean daily charges were higher for pneumonia. Efforts to reduce costs in this setting should focus on avoiding admissions, examining areas for cost containment, developing alternative ways to deliver current inpatient services, and determining factors associated with extended length of stays. Monitoring of these trends, along with measures of care quality, will be essential as attempts are made to reduce cost and length of stay for hospitalized children.