The Season is Upon Us...

The packages have been opened, all the turkey leftovers eaten, and people are making their lists of New Year’s resolutions. We have survived the holiday season, but the bigger question looms...will we survive influenza season??!

Children, especially school age children, play a large role in the spread of influenza. Many times, cases in these children will peak, followed by cases in adults and infants, presumably from household contact. The presentation of influenza in children, and especially infants, may be atypical, making it difficult to diagnose and distinguish from other febrile illnesses. Many times this leads to higher hospitalization rates and a strain on health care resources. On top of that, there are several complications of influenza infection including pneumonia (both viral and secondary bacterial), bronchiolitis, croup, otitis media, myositis, myocarditis, febrile seizures and encephalitis. There are many different opportunities to prevent, diagnose and treat influenza, and these have been reviewed in the literature very recently.

Every year, there is the question of influenza vaccine supply. Because of this, the CDC and AAP have made recommendations for who should receive the inactivated vaccine first. They include: any child with underlying chronic medical condition (especially asthma and congenital heart disease), healthy children between 6 and 24 months, people in contact with high-risk children or children under the age of 2 years, and women in their 2nd or 3rd trimester during influenza season, as maternal antibodies protect infants for the first 6 months of life. The live attenuated vaccine is not recommended for children under the age of 5 years.

The presentation of influenza varies by age, but most commonly consists of fever accompanied by myalgias, malaise, headache, non-productive cough, sore throat and rhinitis. In children less than 5 years, fever, cough and rhinitis predominate while in very young children, fever may be the only symptom. Often times in infants less than 6 months of age, the fever is associated with other nonspecific symptoms (i.e. decreased oral intake, vomiting, diarrhea, etc), making the diagnosis more difficult to make and may result in higher hospitalization rates.

Testing for the influenza virus has been a common task the past few winters in our ED, but studies have shown that the clinical diagnosis is highly predictive, and testing can lead to false negative results. Not to mention the fact that rapid testing has not resulted in either a decrease in the number of antibiotics prescribed or an increase in the amount of antivirals used. This tends to add costs without adding improved outcome. There are times, however, when testing is useful. Rapid tests tend to have higher detection rates in younger children, when the cause of the febrile illness is more difficult to illicit. This is especially true during Influenza B outbreaks, as oseltamivir (which is more effective than amantadine against influenza B) is more expensive relative to the cost of test-
What’s In The News

Do Pacifiers Reduce the Risk of Sudden Infant Death Syndrome? A Meta-Analysis

Sudden infant death syndrome…just typing those words makes me uncomfortable. On my last overnight shift, the dreaded 6am ambulance call came … 2 month old, “found down”. We have all had exposure to this event, some in a more personal way than others. It always leaves us wondering what we can do to help prevent this from happening. The Back to Sleep campaign has been very successful in decreasing the number of SIDS cases, but what else can we do?

The authors reviewed 7 studies evaluating the effect of pacifier use on the rate of SIDS. They were able to find that a strong relationship between pacifier use and decreased rate of SIDS. Some postulate this occurs because of a lower arousal threshold, while others feel the pacifier helps to displace the tongue forward, reducing the chance of obstruction. Therefore they recommend offering a pacifier to infants up to 12 months of age when being placed for any sleep episodes (even naps). For breastfed infants, the pacifier should be introduced after nursing has been well established.

Many may be reluctant to recommend this intervention because of the potential side effects (OM, disruption of breastfeeding, dental malocclusion). Further research needs to be done in this area as a whole, but pacifiers may be a potentially easy, inexpensive way to reduce the rate of SIDS. We have dealt with the issues Back to Sleep has raised; if this intervention has the potential to save lives, we can deal with those as well.

Mental Health Visits in a Pediatric Emergency Department and Their Relationship to the School Calendar

We all find ourselves doing it…when the child or adolescent comes in with the psychiatric complaint, one of the things that goes through our mind is “There must be a big exam coming up”, or “They are just looking for an excuse to get out of school”. Are these anecdotal experiences actually revealing the truth in the matter?

These authors performed a retrospective chart review over the course of a year, of those patients (<18 years of age) presenting to the ED with psychiatric complaints. 719 patients (4.8% of their annual volume) met the criteria. They found that a greater proportion of visits occurred during the week, and during the school year, with the busiest day being Wednesday, and the busiest month being February. Increased stress at school, as well as the teacher’s inexperience with dealing with any particular child may account for some of these visits. It was not known if these patients had been seen before for similar problems.

Although this study has several limitations, it does present several questions to be considered, including ED staffing issues, school-based mental health system availability, and the possibility of increased psychiatric referral accessibility. There is a lot of further research that needs to be done, but for now, let’s all hope for an early summer!

Reappraisal of Criteria Used to Predict Serious Bacterial Illness in Febrile Infants Less than 8 Weeks of Age

We keep looking for that magic answer…that one sign or symptom that is going to tell us which febrile infants are the ones with the serious bacterial infection. Well, I guess until either they can tell us, or they start reading the textbooks, we will keep looking. The authors of this study decided to validate the previously accepted Philadelphia protocol and Rochester criteria for identifying low risk infants in a new population.

A prospective validation study was performed in an urban pediatric emergency department. Over an almost 6 year period, infants 56 days of age or younger and having a rectal temperature of ≥ 100.6°F were enrolled in a consecutive fashion. Prior to work-up, the infant was given an Overall Impression of Sepsis and an Infant Observation Score by the attending physician. All infants received CBC, blood culture, UA, urine culture, and CSF evaluation. CXR, stool studies, or viral testing was done at the discretion of the treating physician.

A total of 259 infants were included in analysis. 25% (n=65) were identified as having a SBI (51 with UTI, 5 with UTI/bacteremia, 8 with bacteremia, 1 with bacteremia/bacterial meningitis). 3 infants were identified as low-risk by the Philadelphia protocol and Rochester criteria and had a SBI, all having bacteremia. Both of these criteria maintain their previously stated sensitivities and negative predictive values. It wasn’t perfect, and more research could still be done….or we could try and teach them to talk…

What’s In The News Continued bottom page 3
These days, everyone is looking for a way to reduce spending, especially in the health care arena. That, coupled with increasing Medicaid costs and decreased reimbursements has everyone seeking out the answer. Use of the ED for nonurgent problems has contributed to these costs. Continuity of care, access to primary/preventive care, increased parental education on childhood illness, and enrollment in managed care have all been associated with a reduction of ED utilization by children. This study looks at the ED utilization and costs differences in 2 groups of Medicaid eligible patients: those enrolled in a pilot ED diversion program, and those who received their care elsewhere. Over 17,000 children were enrolled in the pilot group, and 26,000 were in the control group. All participants were 18 years of age and younger.

The pediatric primary health care provider that hosted the pilot study provided the following to their patients: case management, mandatory second opinions for all referrals, expanded after-hours care at select locations every night (until 9 pm), walk-in services with no appointment necessary, after-hours registered nurse triage system, centralized records for all clinics, and a comprehensive website to provide information and facilitate patient communication.

The researchers found a decreased ED use among the children enrolled in the diversion program as compared with other Medicaid programs (on average 8 fewer visits per month per thousand members). This data was extracted during the first year of the study, and long term observations should be made. The authors readily admit their limitations…this study excluded children with special health care needs, did not evaluate quality of care, and did not evaluate urgency of ED visits. However, it seems this could eventually become a good model to emulate.
Two recent studies have been performed examining the cost-effectiveness of rapid testing and anti-viral therapy, as well as attempting to reduce hospitalization rates by implementing a clinical practice guideline during influenza season. One found rapid testing to be of benefit only when the probability of influenza was less that 50-60%, and that empiric treatment within 48 hours of onset of symptoms resulted in a cost savings. Much of this was from parents not missing days of work. However, as was stated before, some antiviral medications are more expensive than others, and not effective against certain strains. The other study attempted to implement a clinical practice guideline in the pediatric emergency department to see if that resulted in a decrease in hospital admissions during influenza season. Their clinical practice guidelines are summarized in Table 1. They found that using the guidelines significantly decreased admission rates, although they did not provide information on follow-up, adverse events, or repeat ED visits.

For your patients less than 1 year of age, there are no approved antivirals for the treatment of influenza. Amantadine and oseltamivir are approved for children >1 year of age, zanamavir for those >7 years of age, and rimantadine for 13 years and older. To be effective, therapy should be initiated within 48 hours of onset of symptoms. Appropriate vaccination remains the best way to prevent infection in infants, but both amantadine and rimantadine are approved for prophylaxis in children >1 year of age. A summary of treatment and prophylaxis options can be found in Table 2. Prophylaxis generally consists of half the treatment dose given once daily, but each case should be reviewed individually.

Historically in Birmingham, we see more influenza A than B. It has been identified as early as November, but for the most part peaks in January and February. Anecdotally, I have tested several people in the ED over the past month, and have had no positive results. I know it’s coming, and I’m not sure what we’re in for, but I want to be as prepared as possible. I think our mothers had it right...wash your hands, and cover your mouth when you cough.

### Table 1: Clinical Practice Guideline for Influenza-like Illnesses

**Hospitalization Recommended:**
(if 1 or more of the following are present):
- Respiratory distress (RR > 70 bpm and/or O₂ sat < 90%)
- Neurologic symptoms (ex. first febrile seizure)
- Severe dehydration

**Hospitalization “Appropriate”:**
(if 1 or more of the following are present):
- Respiratory distress (RR 60-70 bpm and/or O₂ sat 90-94%)
- Presence of host-related risk factors
- Inability of parents to cope with the situation at home, or specific request for hospitalization
- Need for specific hospital interventions (ex. oxygen, IVFs)


### Table 2: Treatment and Prophylaxis of Influenza in Children

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Amantadine (Symmetrel)</th>
<th>Rimantadine (Flumadine)</th>
<th>Oseltamivir (Tamiflu)</th>
<th>Zanamavir (Relenza)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus Activity</td>
<td>A</td>
<td>A</td>
<td>A and B</td>
<td>A and B</td>
</tr>
<tr>
<td>Approved Treatment Age</td>
<td>≥ 1 year</td>
<td>≥ 13 years</td>
<td>≥ 1 year</td>
<td>≥ 7 years</td>
</tr>
<tr>
<td>Approved Prophylaxis Age</td>
<td>≥ 1 year</td>
<td>≥ 1 year</td>
<td>≥ 13 years</td>
<td>Not approved</td>
</tr>
<tr>
<td>Pediatric Treatment Dose</td>
<td>5 mg/kg/d up to 150 mg in 1 or 2 divided doses</td>
<td>5 mg/kg/d up to 150 mg in 1 or 2 divided doses</td>
<td>&lt; 15 kg: 30 mg BID 15-23 kg: 45 mg BID 23-40 kg: 60 mg BID &gt; 40 kg: 75 mg BID</td>
<td>2 puffs BID for 5 days (Same as adult dose)</td>
</tr>
<tr>
<td>Formulations</td>
<td>100 mg capsule 50mg/5ml syrup</td>
<td>100 mg capsule 50mg/5ml syrup</td>
<td>75 mg capsule 60mg/5ml syrup</td>
<td>5mg/puff inhaler</td>
</tr>
</tbody>
</table>

Special thanks to the department of diagnostic virology at Children’s Hospital for the recent influenza data.

References:
2005: The Year in (Pediatric) Medicine

It’s still hard to believe that 2005 is over, especially when you think about all the events that occurred...Katrina seems to top the list, with Rita close behind. We saw Michael Jackson declared not guilty of child molestation charges, and Martha Stewart released from jail. Deep Throat was identified, and Prince Charles got married. 2005 brought the deaths of many prominent people, including Pope John Paul II, Peter Jennings, Johnny Carson and Rosa Parks. On a more local front, we felt a mother’s desperation as she searched for her missing daughter in Aruba, we saw Bo Bice become the runner-up on American Idol, and we witnessed Richard Schrurgy acquitted in the HealthSouth scandal...and this does not even begin to scratch the surface of what happened.

In the December 5th issue of Time magazine, they reviewed “The Year in Medicine” from A to Z. Let’s review the topics that are pertinent to pediatrics.

A ...air bags. A University of Georgia statistician challenged the National Traffic Safety Administration’s claims that air bags have saved 14,000 lives since 1998. She found that air bags were associated with a slightly higher chance of death in an accident...especially in children who are riding in the front seat. Stress the importance of car seats, booster seats, and proper restraints for children.

...autism. The Mayo Clinic analyzed the rise in cases of autism since 1988 to dispute the claim that it is caused by immunizations. They found that the apparent increase could be traced to increased awareness and changes in diagnostic modalities. Will this be the end of the debate? Probably not, but I feel comfortable telling parents that immunizations are safe.

B ...black box warnings. This year brought the black box warning for Strattera. Reports linked its use to suicidal thoughts in children and teenagers. It seems that black box warnings are on the rise as we become more experienced and drugs become more sophisticated. Keep your eyes and ears open...

D ...Down syndrome. Since the introduction of second trimester screening about 15 years ago, the number of cases of Down syndrome has fallen dramatically. On the horizon are tests that could be conducted as early as 11 weeks gestation to detect signs of the syndrome. Is this good news? Depends on what side of the fence you fall on...

L ...laughter. Laughter increased blood flow by 22% in a recent study, while stress decreased it by 35%. Need I say more?

O ...obesity. The World Health Organization estimates that 22 million children are overweight worldwide, and those numbers are on the rise. This is a general population problem, not just a pediatric problem, but let's continue to encourage healthy diets and plenty of exercise. It's proven that obese children become obese adults.

P ...polio. There were 1,499 cases of polio reported as of mid-November this year...down from 350,000 cases in 1988. We're almost there, but concerns about immunizations have continued to postpone attempts at complete eradication. 5 children from an Amish family in Minnesota contracted the disease this fall. That hasn't happened in the U.S. since 2000.

R ...right to die. The Terri Schiavo case played out for all of us to see. We don't think of this issue as a pediatric one, but it is out there. As our medications and methods improve, and children with chronic illnesses live longer, this question will rise from parents, families and patients. Are we ready to answer?
The First Annual Birmingham Polo Classic was a smashing success!! The event featured two polo matches, tailgating, a luncheon tent with live music, children’s games, and a silent auction. The Bottega team won the tournament, taking home the Brookwood Medical Center Cup. People got a chance to do the traditional “stomping of the divots” and wear their most outrageous hat! Most importantly, $35,000 was raised for the CHIPS clinic, and fun was had by all!!

There are plans for the Second Annual Classic to be held next Fall. Keep your ears open...you won’t want to miss this event!
The Year in (Pediatric) Medicine
Continued from page 5

S...sexually transmitted diseases. There has been a rise in both syphilis and chlamydia in recent years. Interestingly, the group of teenagers who made pledges to abstain from sex until marriage are just as likely to contract sexually transmitted diseases. These teens are more likely to experiment with oral and anal intercourse, and are less likely to use condoms. I guess it all goes back to the definitions...

...smoking. We all know the adverse effects of secondhand smoke on children...the wheezing, the ear infections, etc. But did you know that children raised by smokers have up to 3 times higher risk of developing lung cancer as an adult? Maybe that statistic will get through to more people.

...sudden infant death syndrome. This has already been discussed in this issue, but still a good reminder. The AAP recommends pacifier use at nap and bedtime between the ages of 1 month and 1 year (after breastfeeding has been established and before dental problems are likely to occur). And don’t forget...back to sleep.

V...vaccines. The CDC is reviewing the use of Hepatitis A vaccines in small children, estimating it could decrease the disease by 180,000 cases. Also recommended is a pertussis booster for teens and adults, which could prevent 1 million cases annually.

Z...zinc. Studies have shown that zinc supplements increased memory, word recognition, attention and learning in 7th graders in North Dakota, and lessened symptoms of pneumonia and diarrhea (along with mortality rates) in infants in developing countries. Has the new miracle drug been here all along?!

2006 promises to be equally as exciting, and I look forward to being able to share it with you. Thank you for reading The Polhill Report over the past year. On behalf of the division, I wish you and your families a safe and healthy new year!

Reference:

1.  A. In the 10 year period from 1979 to 1988, there were 56,133 deaths attributed to carbon monoxide poisoning (25,889 were listed as suicide). The next leading cause of poisoning deaths was heroin with 5,948 deaths.

2.  B. Pulse oximetry is an inaccurate measure of the level of hypoxia in carbon monoxide toxicity, as the wavelength of carboxyhemoglobin is very close to that of oxyhemoglobin. Therefore, your measurement is falsely elevated. The most accurate way to measure the level is by obtaining a carboxyhemoglobin level, available on a venous blood gas with co-oximetry.

3.  C. The first step in treating carbon monoxide toxicity is removing the source. Activity should be limited to decrease the oxygen consumption/demand of the body. Subsequently, the patient should be placed on 100% O₂. On room air, the half life of carbon monoxide is ~6 hours. On 100% O₂, the half life decreases to 90 minutes. Hyperbaric oxygen therapy is reserved for special circumstances, including pregnancy, severe or persisting symptoms, cardiac arrhythmias, or focal neurologic deficits. Other testing, such as a pregnancy test, EKG, CXR, etc should be done on a case-specific basis.

4.  D. Automobile exhaust is the most common source of unintentional carbon monoxide poisoning in the United States, followed by coal, wood, or kerosene stoves/fireplaces, combustion of natural gas from a pipeline, combustion of gasoline, acetylene, or utility gas, and industrial sources.

5.  E. Symptoms of carbon monoxide toxicity most resemble, and are frequently misdiagnosed as “the flu”. A high index of suspicion is required for detection. Some clues that may differentiate CO toxicity from the flu is absence of fever, symptoms that come and go (i.e. when they leave the house), or others with the same symptoms. Smaller children and animals will be affected at lower levels because of their overall higher basal metabolic rate and oxygen consumption. So, when your family tells you that “even the dog is sick”, consider CO toxicity!

Reference:
Mark Your Calendars!

**What:** 3rd Annual Rud Polhill Memorial Lecture

**Where:** Children’s Harbor, Bradley Lecture Center

**When:** Thursday April 13, 2006
12:00 pm