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# Pediatric Pharmacy Advocate

## Patent Ductus Arteriosus in Preterm Infants—Debating the Treatment Options

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The incidence of patent ductus arteriosus (PDA) remains high and is inversely related to the maturity of the infant. In a review of 3,779 very low birth weight infants, 28% required treatment for symptomatic PDA.<sup>1</sup> Infants with lower birth weight were more likely to require surgical ligation despite medical treatment. In preterm infants, the inhibition of prostaglandins and nitric oxide, which work to keep the PDA open, occurs to a lesser extent than a term infant making it easier for the ductus to remain open.<sup>2</sup> An untreated PDA could potentially lead to heart failure, poor postnatal growth, renal dysfunction, intraventricular hemorrhage, and necrotizing enterocolitis (NEC).<sup>3</sup> The prophylactic use of indomethacin or ibuprofen lysine for prevention of PDA in high risk infants is beyond the scope of this review. It is important to note that only prophylactic indomethacin has been shown to be effective at reducing the likelihood that a symptomatic PDA will develop and the incidence of grade III/IV intracranial hemorrhage and pulmonary hemorrhage. While ibuprofen was shown to have some neuroprotective effects in animal models, IVH prevention has not clinically been seen.<sup>4</sup> To date, ibuprofen lysine has not been studied or approved for prophylactic use. Currently, the treatment of PDA includes surgical ligation and/or medical therapy with indomethacin or ibuprofen lysine.

Indomethacin, a non-selective cyclooxygenase inhibitor, has been widely studied for treatment of PDA, and has been shown to have a reported efficacy of 66–80% with approximately 35% reopening despite medical treatment.<sup>5,6</sup> While indomethacin remains the gold standard for mediating ductal closure in preterm neonates, proper dosage, administration, treatment duration, and optimal timing of treatment remain varied in the literature and among institutions.<sup>7</sup> In most reports, a single dose of indomethacin has not resulted in persistent contraction of the ductus, therefore, the size of the dose and number of doses must be considered. A recent Cochrane Review of continuous infusion versus intermittent bolus dosing showed that while the primary outcome of PDA closure on days two and five favored bolus dosing, there was no statistical difference.<sup>8</sup> Indomethacin levels have also been used in some institutions in an

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effort to target the PDA-closing dose for a particular patient. While the relationship between response, dose, and administration remain uncertain, a short 3-dose schedule given intermittently every 12 hours over 30–60 minutes has been widely adopted.<sup>9-11</sup> Indomethacin has also been shown to be more effective when dosed within the first days of life rather than later, perhaps due to the decreased effect prostaglandins have in maintaining patency with increasing postnatal

Therapy	Advantages	Disadvantages
Indomethacin	<ul style="list-style-type: none"> <li>• Prevention of IVH</li> <li>• Less risk than surgery</li> </ul>	<ul style="list-style-type: none"> <li>• Vasoconstriction of mesenteric, cerebral, renal beds</li> <li>• Prolongs bleeding times</li> </ul>
Ibuprofen lysine	<ul style="list-style-type: none"> <li>• Less renal toxicity</li> <li>• Less gastrointestinal hemodynamic disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• No IVH protection</li> <li>• Potential bilirubin displacement</li> </ul>
Surgical Closure	<ul style="list-style-type: none"> <li>• Reduces duration of mechanical ventilation</li> <li>• Improves hemodynamics and lung compliance</li> <li>• Low morbidity/mortality</li> </ul>	<ul style="list-style-type: none"> <li>• Respiratory compromise</li> <li>• Blood pressure fluctuations</li> <li>• Intracranial hemorrhage</li> <li>• Infection</li> </ul>

ages. There are also potential adverse effects of indomethacin that should be considered including a reduction in cerebral, mesenteric, and renal blood flow and a decrease in platelet function. The changes in organ blood flow are thought to be caused by vasoconstriction that can lead to spontaneous gastrointestinal (GI) perforation or NEC. Because the mesenteric blood flow is rate-related, the extent of reduced flow may be lessened with extended infusion times.

Ibuprofen lysine, another non-selective cyclooxygenase inhibitor, has also emerged as an option for the treatment of PDA. Use of ibuprofen has been reported to have fewer side effects including less GI disturbance or renal toxicity.<sup>12-16</sup> A meta-analysis of three small trials showed that ibuprofen was as effective as indomethacin in PDA closure.<sup>17</sup> Most recently a Cochrane Review of ibuprofen for treatment of PDA concluded that there, again, is “no statistically significant difference in the effectiveness of ibuprofen compared to indomethacin in closing the PDA”.<sup>18</sup> In addition, the review found that ibuprofen may increase the risk for chronic lung disease, pulmonary hypertension, and has the theoretical risk of bilirubin displacement. Dosing of ibuprofen is similar in that a short course of three doses can be given, to be evaluated at 24 and 48 hours for the second and third doses. Generally, the patient is to be kept NPO while receiving ibuprofen, and for a longer time period than indomethacin according to the package insert. However, a survey of responses from pediatric pharmacists revealed that some institutions practice with similar guidelines to indomethacin or proceed with trophic feeding.

Although the Cochrane Reviews provide a great compilation of data, small sample sizes and lack of head-to-head studies has limited the ability to truly say one therapy is ‘better’ than another. Without a difference in efficacy, other factors including adverse effects, cost, and administration should be considered when choosing an agent for the treatment of PDA in preterm infants. The risk of short-term renal dysfunction, a well-known and generally easily managed side effect, with indomethacin versus the risk of potential long-term effects, like neurologic and pulmonary consequences, with ibuprofen must be weighed.

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# Joint Commission Sentinel Event Alert: Preventing Pediatric Medication Errors

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Preventing medication errors is part of what we do daily. This spring, the Joint Commission asked that each institution reevaluate in several specific areas.<sup>1</sup> The following are the focus areas and this institution's answers. Each children's hospital has unique strengths and weaknesses, and will develop measured plans for improvement.

Measures already in place – List P&Ps and practices	
<p><b>Establish and maintain a functional pediatric formulary system with policies for drug evaluation, selection and therapeutic use.</b></p> <p>The Pharmacotherapy (P&amp;T) Committee reviews and approves all drugs added to the ORLANDO HEALTH formulary. Each review addresses pediatric use. The patient care policy addressing the formulary is on the corporate intranet site [intranet address]. Pharmacotherapy Committee approved a Therapeutic Interchange list that includes medications used in the pediatric population. The list can be found on the intranet at [intranet address].</p>	<p><b>Provide ready access, including website access, to up-to-date pediatric-specific information for all hospital staff. This information should include pediatric research study data, pediatric growth charts, normal vital sign ranges for children, emergency dosage calculations, and drug reference materials with information about minimum effective doses and maximum dose limits.</b></p> <p>Lexi-Comp, Micromedex, Facts and Comparison, Skolar MD (textbooks), and journals are all available online. Additionally, literature searches may be conducted from each hospital computer (using OVID software).</p>
<p><b>To prevent timing errors in medication administration, standardize how days are counted in all protocols by deciding upon a protocol start date (e.g., Day 0 or Day 1).</b></p> <p>We always use a Day 1 start date for all protocols (including chemotherapy).</p>	<p><b>Orient all pharmacy staff to specialized neonatal/pediatric pharmacy services in your organization.</b></p> <p>There is a three month orientation for all new staff members (pharmacists and technicians) rotating each member through the various patient care areas. During this time, they are trained to care for neonatal and pediatric patients.</p>
<p><b>Limit the number of concentrations and dose strengths of high alert medications to the minimum needed to provide safe care.</b></p> <p>Standard drip concentrations are utilized in all ICUs. Please see standard dilution chart for all intravenous medications (intermittent and continuous infusions) including pressors, electrolytes, insulin, etc. [intranet address]</p>	<p><b>Provide a dosage calculation sheet for each pediatric critical care patient, including both emergency and commonly used medications.</b></p> <p>Weight-specific dosing sheets are available for neonatal and pediatric patients on code carts. Placement of these in the hospital medication computer (Sunrise XA) has been requested. Pediatric ICU pocket dosing cards are used. Lexi-Comp is often used and is frequently updated online and is replacing the historical Pediatric and Neonatal Medication information guidelines.</p>
<p><b>For pediatric patients who are receiving compounded oral medications and total parenteral nutrition at home, ensure that the doses are equivalent to those prepared in the hospital (i.e., the volume of the home dose should be the same as the volume of the hospital prepared products).</b></p> <p>Patients who are admitted on TPN have their home TPN reviewed by a member of the NST team. If clarification is needed, a call is made to the home health provider. Patients discharged on TPN have a copy of their current TPN faxed to the home health provider at discharge.</p>	<p><b>Develop preprinted medication order forms and clinical pathways or protocols to reflect a standardized approach to care. Include reminders and information about monitoring parameters.</b></p> <p>Many of these are used and available in paper or in the hospital computer system (Sunrise XA). Examples of order sets include Infliximab, Cystic Fibrosis/Pneumonia, Asthma, Seizure, the Pediatric Heparin Order Form. There is a task force developing a pathway for asthma for all patients in the Pediatric Emergency Department and in the hospital.</p>
<p><b>Use oral syringes to administer oral medications. The pharmacy should use oral syringes when preparing oral liquid medications. Make oral syringes available on patient care units when "as needed" medications are prepared. Educate staff about the benefits of oral syringes in preventing inadvertent intravenous administration of oral medications.</b></p> <p>All oral doses dispensed by pharmacy are placed in oral syringes with blue caps. Oral syringes are available on patient care units.</p>	<p><b>Create pediatric satellite pharmacies or assign pharmacists and technicians with pediatric expertise to areas or services such as neonatal/pediatric critical care units and pediatric oncology units. At a minimum, pediatric medications should be stored and prepared in areas separate from those where adult medications are stored and prepared.</b></p> <p>Hematology/Oncology and the Nutrition Support team have pharmacists trained for the practice area. Additionally, specially trained personnel work in the Pediatric Cardiac Care Unit, Pediatric ICU, Neonatal ICU, Labor and Delivery satellites. The Neonatal ICU satellite only stocks neonatal medications (exception: adult code cart replacement tray locked and stored). All pediatric and adult medications are stored separately to the best of our ability.</p>
<p><b>Assign a practitioner trained in pediatrics to any committee that is responsible for the oversight of medication management.</b></p> <p>The pharmacy manager &amp; clinical coordinator attend the corporate Pharmacotherapy (P&amp;T) Committee. All Pharmacotherapy subcommittees and patient care committees include Clinical Specialist participation.</p>	<p><b>Use methods to ensure the accuracy of technology that measures and delivers additives for intravenous solutions, such as for total parenteral nutrition.</b></p> <p>Bar-code scanning of TPNs and other solutions (including individual ingredients and final product) are used. Weight and volume double verification is conducted for all TPNs by compounder.</p>
	<p><b>If dose and dose range checking software programs are available in hospital or pharmacy information systems, enable them to provide alerts for potentially incorrect doses.</b></p> <p>This has been accomplished in Sunrise XA, the pharmacy computer (HBOC), and with the recently instituted Medfusion Syringe infusion pumps.</p>

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<p>Medications in automated dispensing cabinets that do not undergo appropriate pharmacist review should be limited to those needed for emergency use and/or to those medications under the control of a licensed independent prescriber, as specified in Joint Commission standard MM 4.10. See automated dispensing cabinet override list updated 3/08 [intranet address].</p>
<p>Recognize that the use of infusion pumps, or smart pumps, is not a guarantee against medication errors. Appropriate education for nurses, pharmacists and other caregivers regarding these technologies is important for all institutions caring for pediatric patients. Medfusion Syringe infusion pumps were instituted with education for providers. To do this, the super users were trained and then they trained and guided staff prior to launch (Spring '08)</p>
<p>To prevent adverse outcomes or oversedation, use consistent physiological monitoring—particularly pulse oximetry—while children are under sedation during office-based procedures. Use age- and size-appropriate monitoring equipment and follow uniform procedures under the guidance of staff appropriately trained in sedation, monitoring and resuscitation. The corporate patient care policy (Moderate/Deep Sedation/Analgesia, last revised 9/07) addresses training, procedures, medication use, and monitoring. [intranet address]</p>
<p>Providers are encouraged to develop bar-coding technology with pediatric capability. Potential errors should be carefully considered while adapting this technology to pediatric processes and systems. For example, a pediatric bar-coding solution must be able to provide readable code for small-volume, patient-specific dose labels. Labeling is now completed on all manufactured syringes with bar code and all required medication information. The corporation is in the process of purchasing bar-code scanners that are practical for multiple users at different locations.</p>
<p>Since patient weight is used to calculate most dosing (either as weight-based dosing, body surface area calculation, or other age-appropriate dose determination), all pediatric patients should be weighed in kilograms at the time of admission (including outpatient and ambulatory clinics) or within four hours of admission in an emergency situation. Kilograms should be the standard nomenclature for weight on prescriptions, medical records and staff communications. The corporation computer systems (Sunrise XA and HBOC) contain this information and expresses weight in kg.</p>
<p>No high risk drug should be dispensed or administered if the pediatric patient has not been weighed, unless it is an emergency. Orders are not filled unless patient weight and allergies are entered into the computer systems (Sunrise XA and HBOC)</p>
<p>On inpatient medication orders and outpatient prescriptions, require prescribers to include the calculated dose and the dosing determination, such as the dose per weight (e.g., milligrams per kilogram) or body surface area, to facilitate an independent double-check of the calculation by a pharmacist, nurse or both. Exceptions to this are medications that do not lend themselves to weight-based dosing, such as topicals, ophthalmics, and vitamins. The Patient Care Policy for this (Medication Ordering/Prescribing/Reconciliation, last updated 9/07) states that orders for pediatric patients must include a weight based dose designation (e.g., mg/kg) and a total dose. Education is conducted to include this. The corporation physician order system (Sunrise XA) displays this information.</p>
<p>Whenever possible, use commercially available pediatric-specific formulations and concentrations. When this is not possible, prepare and dispense all pediatric medications in patient-specific "unit dose" or "unit of use" containers, rather than in commercially available adult unit doses. For oral liquid preparation medications, use oral syringes to ensure correct dosage. Commercially available products are used whenever possible. Currently unit-dosing is done for ~97% of all medications. We are actively pursuing addition of the remaining agents to standard dosing procedures.</p>

<p>Clearly differentiate from adult formulations all products that have been repackaged for use in pediatric populations. Use clear, highly visible warning labels. To prevent overdoses, keep concentrated adult medications away from pediatric care units. Avoid storing adult and pediatric concentrations in the same automated dispensing machine/cabinet drawer. Adult and pediatric medications are stored separately in the automated dispensing cabinets (i.e. separate drawer minimum, usually in separate cubies). Concentrated solutions are limited in floor-stock (only reversal agents remain), all are dispensed and administered at the concentration provided (i.e. dilution not required). Concentrated electrolytes are not available as floor-stock with exception of 3% Sodium Chloride in the Pediatric ICU which is secured in a locked box.</p>
<p>Ensure comprehensive specialty training for all practitioners involved in the care of infants and children, as well as continuing education programs on pediatric medications for all health care providers. Training and education should include information on how adverse effects should be reported. All pharmacists have pediatric training as a part of orientation. Clinical Specialists are all pediatric residency trained. Annual Clinical Review is conducted for both Pharmacists and Technicians. Clinical Pearls are given to staff and reported in HR software. All new nurses at ORLANDOHEALTH get training during orientation by clinical pharmacists. All new GNs at Arnold Palmer hospital get training during the Sick Kids Course.</p>
<p>Communicate verbally and in writing information about the child's medication to the child, caregivers and parents/guardians, including information about potential side effects. Ask the caregiver/parent/guardian to repeat back their understanding of the drug and how it is to be administered. Encourage the asking of questions about medications. Medication counseling is provided by Clinical Pharmacist Specialists: examples include asthma education on select patients, warfarin and low molecular weight heparin (Lovenox) for all patients. Nursing staff provides medication leaflets to patients/parents and provides counseling to all patients upon discharge.</p>
<p>Have a pharmacist with pediatric expertise available or on-call at all times. All staff pharmacists are pediatrics-trained when hired or during hospital orientation. Clinical Pharmacist Specialist are on call 24/7 365 days/yr.</p>
<p>Establish and implement medication procedures that include pediatric prescribing and administration practices. A multitude of protocols, order sets, and pathways developed for medication prescribing, administration, and monitoring (ex. acyclovir TDR, Xigris protocol).</p>
<p><b>Suggestions or Alternate Ideas to be implemented (include target date for implementation)</b></p>
<p><b>Unit-dosed acetaminophen (Tylenol) for nurseries (anticipated go-live date June 2, 2008)</b></p>
<p><b>Suggestions NOT chosen for implementation</b></p>
<p><b>None</b></p>
<p><b>Suggestions not relevant to Orlando Health</b></p>
<p><b>None</b></p>

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## The Transition from Student to Practitioner

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It was little more than one year ago that I graduated pharmacy school, yet as I reflect on the past year, I am amazed at just how fast it has gone by. I can vividly remember when I graduated, started my residency, and became a fully licensed pharmacist. As I look back on the year, there is so much that I have learned about pediatrics, as well as simply functioning as a practicing pharmacist.

I graduated in early May of last year, began my residency at the end of June, and subsequently became licensed in mid-July. For the first couple of months of my residency, I was in an orientation period where I rotated through various parts of the pharmacy, learning the traditional dispensing functions of a pharmacist.



Before becoming licensed in the state of Alabama, you are required to meet with the state board of pharmacy for an interview. My interview was scheduled early in the morning, and I was to spend time with the second-shift pharmacists that afternoon and evening. After I had officially obtained my license that day and arrived at work, I began

entering some orders for patients on one of the general pediatrics teams. But, before I actually clicked the "Done" button to finish the order, I went to get one of the other pharmacists to verify my work. And then, I suddenly had what was, at the time, the very scary revelation that I no longer had to depend on a preceptor to check my work!

When I was completing my clinical rotations during my fourth year of pharmacy school, I had the most wonderful preceptors that anyone could ask for. They allowed me a great deal of independence, but, as with all students, I had to check with them before making any recommendations. I think that, many times, students are often eager to graduate and get their license so that they no longer have to check with a preceptor before making any recommendations or dispensing a medication, but what they sometimes fail to realize is that they have a great safety net as students. When I received my license and could make decisions without checking with someone, I fully realized that pharmacists do sometimes hold patients' lives in their hands. This is particularly relevant to us as pediatric pharmacists, when even a seemingly minor error can lead to dangerous consequences.

Of course, just because you graduate and obtain your license to practice pharmacy does not mean that you automatically know everything there is about the profession of pharmacy. When I first began my residency and was in the orientation period, there were so many things I did not know about order entry, making IVs, etc. I sometimes felt embarrassed that I did not know things, and thus was reluctant to ask questions. But, I realized that if I did not ask questions, I would have missed out on so many learning opportunities. This was especially important for

me as a resident, when it was essential to learn the traditional duties of a pharmacist so that I could become a well-rounded clinical practitioner. I hope that all new graduates, whether going into a residency or to a staff position, are not embarrassed to ask questions and realize that they are not expected to know everything!

## Tubing Misconnection Errors

Stephen Webster

Tubing misconnection errors are a continuing problem that can have deadly consequences. In 2006, both the Joint Commission and the Institute for Safe Medication Practices (ISMP) addressed the issue. The ISMP focused on preventing accidental intravenous infusion of breast milk in the neonates. They reported a case of a hospitalized infant who inadvertently received about 10 mL of breast milk intravenously due to a nurse mistakenly connecting the syringe to the wrong line. While the baby recovered with no lasting effects, the IV infusion of a non-sterile, particulate fluid could have easily resulted in permanent injury or death. The Joint Commission released recommendations for prevention of such errors, they include: 1) tracing the tubing to the point of origin before making any connections, 2) rechecking connections and tracing all patient tubes and catheters to their sources upon transfer to a new setting, and 3) labeling tubes and administration sets. However, the ISMP states that the best chance to eliminate the risk of injecting enteral solutions intravenously is to use oral syringes which are incompatible with IV tubing. The utilization of parenteral syringe pumps to deliver breast milk enterally is common due to the need to deliver relatively small amounts in premature infants. Unfortunately, many syringe pumps are not compatible with oral syringes, which is a problem many pump manufacturers are currently working on. In these cases, syringes with standard Luer connections should be avoided and NG tubes should be connected to oral syringes via a syringe extension set. Currently, Viasys Healthcare and Neo Devices offer such systems, with non-Luer feeding tubes and extension sets. These systems make it impossible to connect IV tubing to the enteral system.

The intravenous administration of enteral products poses a potentially deadly risk to patients. The use of non-IV feeding tube, extension sets, and oral syringes will significantly reduce this risk. The ISMP also recommends labeling the pumps as "Medication" or "Breast Milk" as well as labeling the breast milk syringes. The ISMP recommends that if your institution has not addressed this issue, that you should make it a top priority.

## A Conversation with Michael Christensen, Director-at-Large

### Can you tell us a little about your professional background?

I received a BS in Pharmacy from North Dakota State University in 1978 and a PharmD from the University of Tennessee in 1982. I completed a Pediatrics Residency at LeBonheur Children's Medical Center in 1983 and a fellowship in Pharmacokinetics and Pharmacodynamics at St. Jude Children's Research Hospital in 1984. I have conducted research in many areas of pediatric drug therapy and helped train many pediatric residents at his institution.

### What is your current practice environment?

Currently, I am Director of Pharmacy at LeBonheur Children's Medical Center and the Stevens Professor at the University of Tennessee in Memphis.



### How long have you been involved with PPAG?

I've been a member of PPAG since 1997 and presented many times at PPAG Meetings. I am also a member of the Journal of Pediatric Pharmacology and Therapeutics Editorial Board.

### What is your current practice environment?

Le Bonheur is in the process of building a new hospital which will increase bed capacity more than 50% and with the new hospital will come 3 new satellite pharmacies.

### What area of your current position interests you the most?

Two areas, the first is developing the pharmacy into a more academic program much like the Department of Pediatrics. We have a great mix of veteran pharmacists who are embracing new roles and we have been fortunate to recruit some very talented young pharmacists, many of whom are residency trained. My other great interest is in enhancing clinical and translational research at Le Bonheur. I serve as the director of the pediatric clinical research unit. We have a dynamic new hospital president who has made it our goal to be a top children's hospital and having a strong research program is key to becoming a top children's hospital.

### How did you get involved with pediatric pharmacy?

It started with my residency. I had a one year opening before beginning my fellowship at St. Jude. I was fortunate to get into the pediatric pharmacy residency at Le Bonheur and I have been in pediatrics ever since. It is hard now to understand why everyone would not choose pediatrics, there is nothing more rewarding than helping children get better.

### When it comes to being an advocate for pediatric pharmacy, which is the one issue that you love to discuss/support?

I have spent much of the past 15 years promoting the need to increase the number of drug approved for use in children.

### What is your favorite non-professional activity?

VACATION! Visiting my lake cabin in Minnesota.

### When friends come to visit you in Memphis, where do you like to take them?

We head down to Beale Street to listen to Memphis music and eat great food. We have also had a number of recent graduations and we have been able to enjoy the Sunset Symphony at the end of May on the banks of the Mississippi.

## Core Competencies for Pediatric Pharmacists now Online!

The Pediatric Pharmacy Advocacy Group is pleased to offer Series I of its "Core Competencies for Pediatric Pharmacists" online.

The first series of core (aged-based) competencies consists of three modules:

1. Anatomic and Physiological Differences Between Children and Adults, led by Dr. Elizabeth Farrington.
2. Pharmacokinetic Differences in Children, led by Dr. Marcia Buck.
3. Pediatric Fluids and Electrolytes, led by Dr. Rachel Sykes.

The Series offers 2.5 hours of continuing professional education accredited by the Accreditation Council for Pharmacy Education. The courses are audio presentations synchronized with power point presentations. Handouts are also available. The program is available for \$10.00 for members and \$30.00 for non-members.

To take the online course go to [www.ppag.org](http://www.ppag.org) and visit CECentral!

## Call for Scientific and Best Practice Abstracts

All practitioners/investigators in the field of pediatric clinical pharmacy, whether members of PPAG or not, are invited to submit abstracts of papers to be considered for platform or poster presentation at the 17th PPAG Annual Meeting, October 2-5, 2008 at the Renaissance Harborplace Hotel, Baltimore, Maryland

All research and practice abstracts should be no longer than 450 words. Scientific and Practice Abstracts will be published in the Journal of Pediatric Pharmacology and Therapeutics. Platform presentations and Best Practice Awards will be chosen from the abstracts submitted.

The deadline to submit abstracts is June 27, 2008

### About Research/Scientific Abstracts

Research abstracts presented at PPAG report the results of a scientific investigation or a clinical observation (case report) involving some aspect of pharmacotherapy. Scientific investigations can be either clinical, basic, or translational and are either hypothesis-driven or descriptive in nature. To be accepted for presentation, research abstracts must have either preliminary or final results. The abstract may be submitted in any of the following categories: Scientific, Case Report, and Encore Presentations (a poster that has been presented and published elsewhere. The original citation must accompany encore presentations).

Students, Residents and Fellows whose research projects are ongoing at the time of submission but do not have preliminary results are encouraged to submit in the Research-in-Progress category. Abstracts accepted in this category will not be published in the Journal of Pediatric Pharmacy and Therapeutics. However, if such projects do have preliminary or final results, they should be submitted in Original Research, or Encore Presentation category.

All submissions, except those in Research-in Progress and encore categories, will be eligible for the Young Investigator or Best Original Paper award. The finalists will be judged by a panel of judges during the poster and platform presentation sessions.

### About Best/Innovative Practice Abstracts

Best and Innovative Pediatric Pharmacy Practice Abstracts typically describe programs, systems, or projects that are innovative, creative, cost-effective, and improve practice in pediatric pharmacy. BIPA Posters will be selected based on achievement of excellence in each of the four areas.

Winners of the Best Practice Award will be chosen from accepted abstracts. The program, system, or project can be an individual or collaborative effort in any type of practice setting, including academia, institutional, or ambulatory care. Unlike Research Abstracts, Best Practice Abstracts are not required to have final or preliminary data, but should include sufficient details about the rationale, process, and hypothesis of the impact should the program, system, or project be implemented.

For more information about abstracts or to submit your abstract online please go to [www.ppag.org/am08/abstracts.htm](http://www.ppag.org/am08/abstracts.htm).

# Committee Updates

## Education Committee PICU/NICU Specialty Meeting Recap: Two Tracks, One Meeting... A Huge Success!

At the end of April, 180 participants converged on Little Rock, Arkansas for the PICU/NICU Specialty meeting. This meeting utilized a new approach in which the attendees attended a small number of joint sessions, but were then split into either a NICU track or a PICU track which contained both lectures and workshops. This approach allowed participants to "customize" their own meeting to get the most out of the extended weekend.

Following the excellent preconference sessions on respiratory issues, the entire group joined together for a highly interactive keynote address provided by Dr. Bonnie Taylor and Dr. Micah Hester on Moral Distress and Pharmacist Responsibility in the ICU Setting. The entire group gathered together again on Saturday morning for a discussion on innovative approaches to pain management presented by Dr. Sunny Anand before breaking into specialty track sessions ranging in topics from Pediatric Burns to Nutrition.

In the late afternoon on Saturday, the group reconverged to provide support to those just entering our profession by attending sessions where residents completing pediatric-focused programs presented their research results. On Sunday, the residents had programming specifically created for them before rejoining the remaining participants for the final shared sessions of the meeting.

The education committee wishes to thank Dr. Holly Maples and her committee for the excellent job they did in creating this very successful meeting. We look forward to providing new approaches at future meetings, so look for some changes at our upcoming Annual Meeting this fall in Baltimore!

## PPAG Research Committee

The Research Committee has stayed busy with activities and preparation for the 17th Annual Meeting in Baltimore. A programming subcommittee was formed to develop topics and identify speakers for the two research workshops to be held at the Annual Meeting. The topic areas to be addressed are: Practical Statistics: How to Review and Interpret the Literature, and Scholarship in a Practice/Clinical Setting. These workshops will be interactive with a primary speaker/facilitator and may include game/activity based-learning and panel discussion components.

Over the past several months, the committee developed an abstract preparation guide that will be sent out with the Call for Abstracts for both the annual and specialty meetings each year. We hope that this tool will be useful for authors to create structured, quality abstracts.

In addition, the committee has teamed up with the Journal of Pediatric Pharmacology and Therapeutics (JPPT) to form the New Author Mentoring program. The objectives of this program are to provide PPAG members with opportunities for professional development in writing and submitting a manuscript for publication and to increase the number of quality manuscripts submitted by the membership to JPPT. For more information, visit <http://www.jppt.org/en/cms/?318> under Information for Authors (New Author Mentoring).

The committee is also in the early stages of developing clinical practice surveys that will be used for comparing aspects of practice within different areas of pediatric pharmacy. These surveys will likely be housed on the PPAG website. We encourage all members to complete these in order to capture a variety of practices reflective of contemporary pediatric pharmacy. Some of the information obtained from

these surveys may be used to develop multicenter medication use studies. Stay tuned for more details as we continue to work on survey development.

There are currently 10 members of the research committee, and we encourage you to consider joining us! If you are interested in participating in program planning for the Annual Meeting, reviewing abstracts and judging posters, and promoting engagement in pediatric research, please contact us or visit the Research Committee meeting at the Annual Meeting in Baltimore.

—Heather VandenBussche  
—Mike Chicella

## Membership Committee

The membership committee continues to focus on goals set by the board. The newsletter reflects changes made by members of this committee to explore opportunities to expand the content. Recent publications have focused on several hot topics. This and future issues include topics currently being discussed in the various PPAG list serves. In addition, the newsletters will discuss a variety of issues being addressed by ISMP and The Joint Commission as they relate to safe medication use in children. The membership committee continues to provide member feedback to the home office to expand the website to bring added benefits to our members. Current initiatives include revamping the list serve archives and adding to our residency directory. Continued growth in membership and expanding member benefits is the goal of the Membership Services Committee. You may be aware that PPAG has experienced tremendous growth over the last few years, and the committee continues to explore new opportunities such as our recent recruiting campaign "Just One". This latest recruitment effort continues to bring in new members weekly, keep getting the word out.

## Advocacy Committee

The Advocacy Committee has been working on position statements related to medication dosing in obese patients and antidepressant use in pregnancy and lactation. Other projects include expanding the parent lists on the web site to provide tips for keeping kids safe and healthy during the summer, fall, and winter seasons. We also continue to move forward with projects involving medication use in schools and standardized concentrations of intravenous fluids.

Once again, the Committee will select up to two Lexi-Comp Best Practice Award winners this year. The awards are given to innovative and creative pharmacy programs that advance the mission, vision, and goals of the organization and are evaluated based upon innovation, creativity, cost effectiveness, improvement in practice and leadership. All pediatric pharmacy practitioners are eligible and encouraged to apply. Submit your abstracts today to be considered!

We love comments and new ideas. Please feel free to contact Catherine Tom-Revzon at [pedspharmd@gmail.com](mailto:pedspharmd@gmail.com), or any of our other Committee members.

## Fundraising Committee

Bring a piece of home with you to the 17th Annual PPAG Meeting in Baltimore! Please consider donating an item to our ever popular silent auction. You could donate an item indigenous to your hometown, such as a gift certificate to a popular vacation spot, a local culinary treat or some state memorabilia! Pharmacy books and items are also a big hit. The money raised from the auction will benefit PPAG's advocacy program. For more information on how to donate, feel free to contact the PPAG office.

# Bruce Parks Memorial Residency Showcase

Presented at PPAG Specialty Meeting  
 April 26, 2008

1. Extended-Spectrum Beta-Lactamase Producing Bacteria from Urinary Isolates in a Hospitalized Pediatric Population - **Lisa Maher, Pharm.D.**; Aaron Milstone, MD; Marie Diener-West, Ph.D.; James Dick, Ph.D.; and Carlton K.K. Lee, Pharm.D., MPH
2. An evaluation of empiric amikacin dosing guidelines in adolescent oncology patients - **A. Martinez, A. Dabb, A. Chen, C. Lee**; The Johns Hopkins Hospital, Baltimore, Maryland
3. Appropriate Use of a Restricted Antibiotic Form - **David Shoop, Pharm.D.**
4. Appropriateness of Pharmacist Interventions in a Pharmacist-managed Aminoglycoside Monitoring Program at a Large Children's Hospital - **Kimberly N. Le, Pharm.D.**; Sara J.D. Bork, Pharm.D.; Jennifer L. Gardner, Pharm.D.; Carol J. Baker, M.D.; Karen D. Gurwitsch, Pharm.D.
5. Development of a Once-Daily Gentamicin Dosing Nomogram for Non-Cystic Fibrosis, Acute Care Pediatric Patients Greater than Three Months of Age - **Erin J. Myers, Pharm.D.**, Jeffrey L. Wagner, PharmD, Brady S. Moffett, PharmD, Debra L. Palazzi, MD
6. An observational prospective study of amino acid administration at St. Vincent Women's hospital - **Caitlin Crosley, PharmD**, Gina Ellis, PharmD, Robert Jansen, MD, Maria Whitmore, PharmD
7. Aluation of Adverse Events Noted in Children Receiving Continuous Infusions of Dexmedetomidine in the Intensive Care Unit - **Brooke L. Honey, Pharm.D.1.**, Donald Harrison, Ph.D. 1, Andrew K. Gormley, M.D. 2, Peter N. Johnson, Pharm.D., BCPS1. 1College of Pharmacy and 2College of Medicine, Department of Pediatrics at the University of Oklahoma Health Sciences Center; Oklahoma City, Oklahoma.
8. Analysis of a NICU Methadone Taper Guideline for Opioid-dependent Neonates - **Melissa A. Gervase, Pharm.D.**, Amy L. Potts, Pharm.D., Brian S. Carter, MD
9. The Use of Oral Sucrose for the Treatment of Neonatal Pain - **Surti PA, Pham JT, Kraus DM.** University of Illinois at Chicago/College of Pharmacy, 833 S. Wood Street (Room 164), M/C 886, Chicago, IL
10. Stability of moxifloxacin in an extemporaneously compounded oral liquid - **David J. Hutchinson**; Cary E. Johnson; Kristin Klein, The University of Michigan Hospitals and Health Centers, Ann Arbor, MI
11. Evaluation of Targeted Beta-Lactam Continuous Infusion on Forced Expiratory Volume in one second for an Acute Pulmonary Exacerbation in Cystic Fibrosis Patients - **Julia Ho, PharmD**, Michael Anstead, MD, Don Hayes, Jr., MD, Jamshed Kanga, MD, April Anderson, PharmD, Doug Steinke, PhD, Sue Overman, MS, Robert Kuhn, PharmD. University of Kentucky HealthCare, Lexington, KY
12. Lidocaine/Tetracaine patch vs. Lidocaine cream with heat in superficial venous access and line placement - **Mital M. Desai, Pharm.D.**, Jennifer W. Chow, Pharm.D., Michael F. Chicella, Pharm.D. Children's Hospital of The King's Daughters, 601 Children's Lane, Norfolk, VA 23510
13. Evaluation of Enoxaparin Dosing and CHEST Recommendations for Monitoring and Dose Changes in Pediatric Patients - **Christina C. Piro, PharmD**, Julie Sinclair-Pingel, PharmD, and Alison C. Grisso, PharmD, - Monroe Carell Jr. Children's Hospital, Nashville, Tennessee
14. Retrospective analysis of the initiation of antibiotic therapy in severe sepsis in pediatric patients - **Joseph M. LaRochelle,**

**Pharm.D.**; Jill A. Morgan, Pharm. D., BCPS; Kristine A. Parbuoni, Pharm. D. University of Maryland School of Pharmacy and University of Maryland Medical Center Hospital for Children, Baltimore, MD

15. Evaluation of Dosing in Overweight Pediatric Patients - **Jamie L. Miller**, Peter N. Johnson, Donald Harrison, Tracy M. Hagemann. University of Oklahoma College of Pharmacy, Oklahoma City, OK
16. Dose Standardization of Oral Liquid Medications in Pediatric Patients - **April Anderson, Pharm.D.**, Karen Garlitz, Pharm.D., Ann Hamlin, R.Ph., Robert Kuhn, Pharm.D. University of Kentucky HealthCare, Lexington, KY
17. Copper, selenium, and zinc assessment in pediatric patients maintained on long term parenteral nutrition - **Emma M. Tillman, Pharm.D.1,3**, Catherine M. Crill, Pharm.D.1-3, Emily B. Hak, Pharm.D.1-3, Departments of Clinical Pharmacy1 and Pediatrics2, The University of Tennessee Health Science Center and Le Bonheur Children's Medical Center3, Memphis, Tennessee
18. Developing the Role of a Clinical Pharmacist in a Pediatric Emergency Department - **Megan Foster, Pharm.D.**, Brandon Edgeron, Pharm.D., M.S., The University of Tennessee Health Science Center and Le Bonheur Children's Medical Center, Memphis, Tennessee
19. Drug Use Review Evaluating the Incidence of Rebound Hypertension Associated with Dexmedetomidine Therapy in a Pediatric Intensive Care Setting, **Becky A. McGee, DPh**, Kelly S. Bobo, Pharm.D.,BCPS, Michael Christensen, Pharm.D.,BCNSP, Le Bonheur Children's Medical Center and The University of Tennessee Health Science Center, Memphis, Tennessee

## ASHP Residency Program Facts

For the 2008 match:

The number of residency programs grew from 872 in January 2007 to 980 in January 2008.

The number of students applying for a PGY-1 program increased from 1900 (2007) to 2092 (2008).

PGY1: 1487/1769 positions were filled = 82% of the positions were filled ( last year = 81%).

In addition, > 300 more candidates have been post-matched.

PGY2: 267/344 positions were filled = 78% fill ( last year = 68%).

PGY2 Pediatrics: 21/28 positions filled = 75% ( last year 17/22 =77% fill).

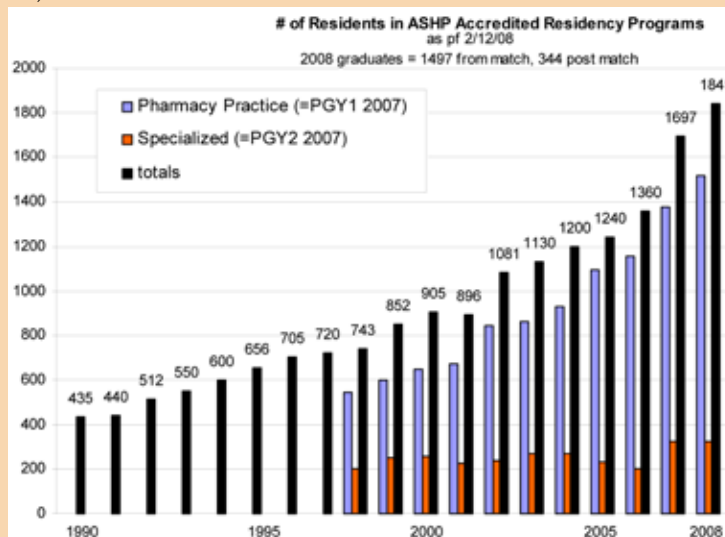


Chart: ASHP 2008, used with permission.

# The Presidential Candidates and Pediatric Healthcare

Matthew Helms, Executive Director, PPAG & Cindy Dusik, Pharm.D., Chair, PPAG

Attempting to sort out the similarities and differences between the remaining candidates in the upcoming presidential election can be a challenge, especially in the area of Health Care. All three who remain in this dwindling presidential primary season agree that health care costs have skyrocketed out of control; that wellness, prevention of illness, and provision of preventative care should be a priority; that too many Americans are uninsured or underinsured; that access to health care should be available to every American; and that health insurance should be portable and affordable.

As we tried to become enlightened and responsible citizens, and position ourselves to cast our votes based on factual knowledge of the issues, we found the following. In this effort, we attempted to highlight those areas that would likely be important to PPAG’s mission, as well.

The issue	The Candidates and their Positions	
	Barack Obama (Democrat, Illinois)	John McCain (Republican, Arizona)
Healthcare Coverage	<ul style="list-style-type: none"> <li>Require that all children have health insurance; pay for it by rolling back President Bush’s tax cuts for households earning over \$250,000; aims for universal coverage.</li> <li>Expand Medicaid and State Children’s Health Insurance Program (CHIP)</li> <li>Prohibit insurance companies from denying coverage to people with health problems or charging them higher rates.</li> <li>Advocate of National Health Insurance Exchange</li> </ul>	<ul style="list-style-type: none"> <li>Opposes mandate requiring everyone to obtain health insurance; emphasis on free-market, consumer-based system; says universal health care is possible without a tax increase.</li> <li>Provide \$2,500 tax credits for individuals and \$5,000 for families to buy their own insurance, nationwide, across state lines.</li> <li>Believes that families should be in charge of their health care dollars and have more control over care.</li> </ul>
Healthcare Quality	<ul style="list-style-type: none"> <li>Chronic Care Management: Requires that providers that participate in the new public plan, Medicare or the Federal Employee Health Benefits Program (FEHBP) utilize proven disease management programs.</li> <li>Will establish an independent institute to guide reviews and research on comparative effectiveness</li> <li>Invests \$10 billion over five years to move to an electronic health information system</li> <li>Promotes biomedical research</li> </ul>	<ul style="list-style-type: none"> <li>Move to compensate medical providers based on the quality of their work.</li> <li>Promotes chronic care management</li> <li>Promotes coordinated care</li> <li>Advocates tort and medical malpractice reforms</li> <li>Promotes paper-less health records</li> </ul>
Medication Error Reduction	Will require providers to report preventable medical errors and support hospital and physician practice improvement to prevent future occurrences.	No specific information provided as of yet, except to state that Medicaid and Medicare should not pay for preventable medical errors or mismanagement.
Autism	<ul style="list-style-type: none"> <li>Supported(s) the Combating Autism Act</li> <li>Supports \$1 billion in federal funding for autism research on the root causes and treatments</li> <li>Increase funding for the Individuals with Disabilities Education Act (IDEA)</li> </ul>	Has speculated that vaccinations have played a major role in the Autism epidemic.
Further Information	“Quality Affordable Health Care for All by the End of Barack Obama’s First Term in Office” at <a href="http://barackobama.com">barackobama.com</a>	“Straight Talk on Health System Reform” at <a href="http://johnmccain.com">johnmccain.com</a>

## Just One Recruiting Campaign...

Our campaign might be officially over but PPAG is still benefiting from the recruiting effort as new members join us each week. Please continue to help our organization grow.

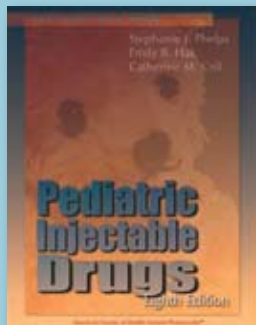
A special thanks to our member recruiters:

Kim Benner  
Robert Daniels  
Keith Delmonte  
Elora Hilmas  
Robert Kuhn  
Ralph Lugo  
Selina Soo-Hoo



# Pediatric Pharmacy Advocacy Group Bookstore

Featuring the following items:

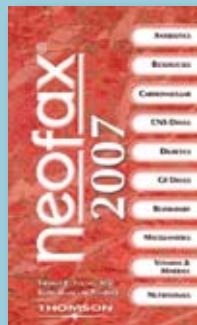


**Pediatric Injectable Drugs, 8th Edition**

Stephanie J. Phelps, Emily B. Hak, and Catherine M. Crill

New Edition! If you work with children, you must have this book. Teddy Bear Book, Pediatric Injectable Drugs, 8th Edition features 217 monographs (52 new to this edition), of the most commonly used pediatric medications, standardized headers for easy location of data, and coated pages that resist spills.

Price: \$94.00  
Member Price: \$79.00

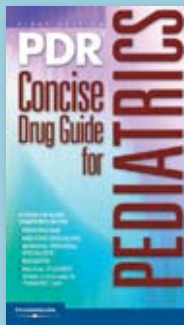


**Neofax**

THE PREMIER NEONATAL DRUG REFERENCE MANUAL  
NEW EDITION!

The premier drug reference manual to aid in the treatment of neonates, this reference contains a comprehensive selection of useful drug and infant nutritional data.

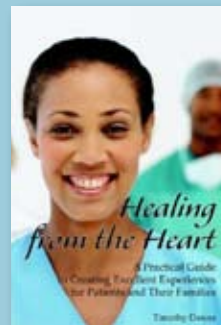
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**PDR® Concise Drug Guide for Pediatrics**

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Authors:  
Carol K. Taketomo, PharmD  
Jane H. Hodding, PharmD  
Donna M. Kraus, PharmD

Price: \$51.95  
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For more products and ordering information go to <http://www.ppag.org/en/catalogs/>

