

## From the Chairperson



By Mark M. Simonian, MD, FAAP

Chairperson, Steering Committee on Clinical Information Technology

This is my first report to the Steering Committee on Clinical Information Technology (SCOCIT) as chairperson. What will our next 2 years bring?

At the last National Conference & Exhibition (NCE) in San Francisco, CA, as our Executive Committee meeting came to an end, one *new* member emphatically requested specific direction in SCOCIT's activities. This was echoed by another who explained that some direction could be applied by developing a **strategic plan**.

Previously, our agenda was broken into 3 approaches—education, policy, and technology. Approaching the plan from my past responsibilities, I can use my experience in promoting member participation and showing how that enriches the value of the committee. Challenged in the past to produce the education program almost 2 years in advance with the topic information technology, it seems impossible to exactly predict what we would be doing even 1 year from now.

I won't predict, but I can promise to steer our committee to prepare the information technology foundation of what pediatricians must do to practice more efficiently and safely.

From the education perspective, our agenda is evolving, with the American Academy of Pediatrics (AAP) recognizing that we should have an expanded role at the NCE.

**Christoph U. Lehmann, MD, FAAP,** and **Lewis C. Wasserman, MD, FAAP,** are merging their skills to set up an improved environment for learning in a location for training and education in a dedicated space off the exhibit floor. I will let them explain how they will achieve that at the next meeting in Washington, DC. The future plan is evolving and looks wonderful.

Our written education through the newsletter has developed positively with an overflow of topics and writers who share their soup-to-nuts experiences, guided by **David C. Stockwell, MD,** and **Dana A. V. Braner, MD, FAAP.** Also, the Web site design has been enhanced to provide more useful information.

From a technology perspective, we are midway through a useful project that **Kevin B. Johnson, MD, MS, FAAP,** and **Stuart T. Weinberg, MD, FAAP,** have developed. Members will participate in describing their electronic health record (EHR) experiences and using that to educate the entire AAP membership on technologies that have, or will lead them to, a system that works. The tool is an online questionnaire and review of many of the systems that are being used by pediatricians to create and view a clinical record, create orders, and capture images and laboratory data.

From a policy perspective, our plan should be to support our ongoing projects, including devel-

opment of policy and technical statements by **Robert S. Gerstle, MD, FAAP,** and the SCOCIT Policy Committee. These will form a written outline for the future of information technology that is supported by the AAP.

My hopes and plans for SCOCIT are to improve member participation and enhance what members see as valuable in their practice and activities.

With a wide variety of executive committee member experiences, from informaticists to knowledgeable general pediatricians, we are aggressively fulfilling the challenges of participation in the national effort to design and create the technologies to improve patient safety and meet the needs of the practicing clinician. In the articles written in this issue and future issues, we will describe the tasks that are being addressed in more detail.

Where will we be in 1 to 2 years? I believe that we must continue our current educational, policy, and technical activities. We have expanded our role by participating in many national initiatives in information systems and sharing our committee's experiences to provide pediatric templates for Health Level 7 (HL7), the EHR, e-prescribing, and clinical decision support for all practices.

It will not be my role alone to write a detailed strategic plan, but the entire membership who will be shaping our 2-year strategy. Thanks for your help.

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## Editor's Column



by David C. Stockwell, MD

Editor, scocitnews

Welcome to the spring edition of *scocitnews*. It is an honor to be able to tell you that our members are very eager to write articles for our newsletter. Thank you very much for your interest. If this continues, it will only help make our publication better. This is all thanks to you!

The spring 2005 issue has a diverse array of articles to exemplify the above point. We cover decision support in pediatrics, digital prescribing, electronic voting, local electronic health record (EHR) fairs, data management, and more. There are also the usual excellent contributions from our Executive Committee with updates on

its work and its terrific insight into pediatric health information technology (HIT).

One thing that is new to this edition and one that we will try to continue is deciphering the alphabet soup of HIT groups and their interests. Furthermore, we would like to inform you about the groups in which the American Academy of Pediatrics (AAP) is particularly interested, and, with that aim, 2 of our members describe their involvement in an exciting new HIT group called the Certification Commission for Health Information Technology. In our next newsletter, you will hear an update from another Steering Committee on Clinical Information Technology (SCOCIT) member, who is helping this group.

Thank you to everyone for the interest and the suggestions. As usual, if you have any ideas or would like to contribute, please contact me at [dstockwe@cnmc.org](mailto:dstockwe@cnmc.org).



## Vice Chairperson's Report



By Joseph Schneider, MD, MPH, FAAP  
Vice Chairperson, Steering Committee on Clinical Information Technology

The Steering Committee on Clinical Information Technology (SCOCIT) Executive Committee and a number of SCOCIT members have been very active in the past 6 months working to represent the American Academy of Pediatrics (AAP) in national and local meetings and in organizations that are working on electronic health record (EHR) standards/certification. The level of activity is amazing, compared to just 1 year ago, yet so much more is needed as the overall level of EHR activity in the nation has mushroomed.

You don't have to be a member of the SCOCIT Executive Committee to represent the AAP. For example, **Alan E. Zuckerman, MD, FAAP**, who conveniently lives in Washington, is one of our most active members and is not on the Executive Committee (yet). So stay alert for EHR activities in your city, and let our staff person, Beki Marshall, know that you're interested in participating in them.

Speaking of Beki, I want everyone to know that she is the force behind our increased activity. Sometimes I think there are 2 of her, as she has

managed to stay on top of all the documents that need review and comment from the AAP and national organizations. She also has identified key meetings and organizations and gets SCOCIT represented. Many thanks to her.

Even if you cannot become active in conferences or standards, we need your participation. Please contribute to our e-mail lists and share your experiences with the EMR vendors you use or encounter by using the electronic medical record (EMR) reviewer on our Web site ([www.scocit.org](http://www.scocit.org)). It is only through communication that the good ones will become better known. Speaking of good EHR vendors, Jeannie Marcus and I hope to repeat the TEPR (Towards an Electronic Patient Record) Pediatric Documentation Challenge in Salt Lake City, UT, in May.

Managing the development and introduction of EHRs may be the greatest challenge that pediatrics has ever faced. We need your help to do this right. Thank you for your support.

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## A Tour of the SCOCIT Electronic Medical Record Review Web Site



by Stuart T. Weinberg, MD, FAAP, SCOCIT Webmaster and  
Kevin B. Johnson, MD, MS, FAAP, SCOCIT Executive Committee Member

### [www.scocit.org/emr](http://www.scocit.org/emr)

Selecting an electronic medical record (EMR) continues to be a hot topic among members of the Steering Committee on Clinical Information Technology (SCOCIT) and American Academy of Pediatrics (AAP) members in general. To assist with this process, SCOCIT has been developing a feedback tool that will allow AAP members who have already had experience with one or more EMRs to post their opinions on various features and select ratings. Others who wish to browse these postings will be able to review specific product profiles that list each feature with ratings and comments, or review a specific feature with ratings and comments across various products.

### Posting a Review

In the initial phase of this project, only AAP members with valid ID numbers will be allowed to post reviews. A list of approximately 25 products has been compiled to date, from which the reviewer can select. Information on an unlisted product also can be submitted.

The reviewer will be asked to submit his or her full name, AAP ID number, and preferred e-mail address as a bare minimum, along with verification of the product being reviewed and an approximate year that the product was purchased or updated. Additional information is requested about the practice where the product has been implemented, and there are several privacy options that specify how much of this information can be shared as other people browse reviews—ranging from a general knowledge that a product is being used in a geographic area, to more specific contact information such as practice name or name of reviewer.

To complete the review, 13 separate features currently have been identified on which reviewers can comment and select a rating: (1) General Overview; (2) Growth Parameters, Percentiles, Curves; (3) Data Pertaining to Birth History; (4) Adolescent Privacy Features; (5) Immunization Data Handling, Analysis; (6) Prescription Generation, Transmission; (7) Installation, Training, Support Issues; (8) Lookup Features, Identifying Data; (9) Ease/Methods of Data Entry, Including Pediatric Terminology; (10) Awareness/Comparison to Age-Base Values; (11) Standard and Flexible Format Reporting; (12) Tracking Disclosures, Parental Appendices; and (13) Linkages Between Family Members. It will not be necessary to complete all 13; only those about which the reviewer feels he or she can make a meaningful contribution.

When all of the information has been submitted, there is an opportunity to edit/update both the contact information and the reviews. An additional review can be submitted as well. All of the information will be held in a temporary database until the contact information and AAP ID number

can be verified, after which the information will be fed into the permanent Web-based database that will be accessible to others viewing the EMR Review Web site.

### Reading the Reviews

Two lists—one of product names and one of features—currently are displayed on the publicly accessible portion of the SCOCIT EMR Review site from which people can begin looking for information. Product names are highlighted only if there is at least one review, and clicking on the name displays a product profile with ratings by feature and an additional link to comments, if any. Clicking on any feature, either from the product profile or from the list mentioned above, will display all products for which a review has been submitted for that feature, including ratings and comments.

This section also enables people to enter information on products not listed, and also on suggested features not currently specified.

### Locating Where Products Are Being Used

An upcoming feature of this site will be the ability to list what products are being used in various geographical areas, depending on how many reviewers have chosen to share this information. This would be of particular value to those who may want to contact other practices in their area to get direct feedback on current systems being used.

### Final Notes

The SCOCIT Executive Committee has been involved with the development of this site for several months and is anxious to make it available to AAP members and the public as soon as it receives final approval. An announcement will be made on the SCOCIT e-mail list when the site is ready, and we hope many of you who are currently using EMRs will participate in providing feedback to assist those who are following your footsteps and can benefit from your wisdom. Please feel free to forward any additional comments or suggestions about this site to Beki Marshall ([bmarshall@aap.org](mailto:bmarshall@aap.org)), any Executive Committee member, or Webmaster Stuart Weinberg ([webmaster@scocit.org](mailto:webmaster@scocit.org)).

*Stuart Weinberg, MD, FAAP, is an assistant professor in the Department of Biomedical Informatics at Vanderbilt University Medical Center, participating in the research and development of clinical applications being used throughout Vanderbilt University Hospital and Vanderbilt Children's Hospital. He does not have any conflicting financial relationships with any vendors or companies.*

## ☆☆☆ COMMITTEE UPDATES ☆☆☆



### Technology Committee

By Kevin B. Johnson, MD, MS, FAAP  
Applications/Technology Chairperson

Got EHR (electronic health record)? There's definitely a buzz in the air now that probably is bigger than anything a partisan agenda can stifle! This fall, the Technology Committee was hard at work keeping the pediatric EHR initiative moving forward.

Speaker's kits for chapters to use when they talk about adopting electronic medical records (EMRs) will be available this year. The first components of the kit will be 2 annotated slide sets—one focusing on how to select an EMR, and one focusing on whether an EMR is right for your practice (specifically talking about the benefits, potential challenges, and return on investment data associated with an EMR). In addition, the Steering Committee on Clinical Information Technology (SCOCIT) has launched a Web site devoted to peer review of EMR, and plans to develop a "buddy list" so that practices may contact each other to help with EMR selection.

**Kevin Johnson, MD, MS, FAAP**, presented a talk about pediatric EHR adoption at MEDINFO 2004 in San Francisco, CA, last fall. Excerpts from that presentation have appeared in newsletters with national circulation. In that talk, Dr Johnson mentioned 2 key points (only one of which was discussed in subsequent press releases). First, he noted that using the Task Force on Medical Informatics article about pediatric requirements for an EMR as a guide, systems that currently are available do about 70% of those things. Therefore, there is more work to be done to make these systems **optimal** for pediatrics. However, it has become clear from the enlarging pool of adopters that a 70% solution is adequate (and actually quite usable) for pediatric health care providers. The message was one of optimism and support for adoption of currently available technology. S. Andrew Spooner, MD, MS, FAAP, and Dr Johnson also were given an opportunity to discuss these issues in detail at a meeting sponsored by the Cumberland Pediatrics Foundation in Tennessee.

On December 16, 2004, American Academy of Pediatrics (AAP) representatives met with David Brailer, MD, PhD, director of the US Department of Health and Human Services' Office of Health Information Technology, to discuss the need for a national network that would allow EHRs to be shared among pediatric health care providers. Also at the meeting were James A. Stockman III, MD, FAAP, president, American Board of Pediatrics (ABP), and representatives from the National Association of Children's Hospitals and Related Institutions (NACHRI) and the Child Health Corporation of America. The group made a series of presentations to Dr Brailer on specific pediatric measures and standards, as well as an overview of various AAP initiatives, to date, relative to EHR systems. The meeting served to introduce Dr Brailer to the pediatric community, and was successful in adding more work to the SCOCIT agenda for this year!



### Education Committee

By Christoph U. Lehmann, MD, FAAP  
Education Chairperson

When asked to write this column, I realized how much there is to learn for me as the new Education Chairperson for the Steering Committee on Clinical Information Technology (SCOCIT). Fortunately, I have Mark Simonian, MD, FAAP, SCOCIT chairperson and the previous education chairperson, to rely on. I hope that this new year will bring lots of suggestions and input from our membership on the type of educational activities you would like to see.

As you know, **David C. Stockwell, MD**, and coeditor, **Dana A. V. Braner, MD, FAAP**, continue to manage this newsletter and they have done a fabulous job. It is very encouraging that the number of submissions has increased dramatically, resulting in an informative, diverse publication. Clearly, the newsletter relies on your feedback and your submissions, and I hope that you will continue to provide us with your articles. Previous issues of the newsletter can be found online at [www.scocit.org](http://www.scocit.org) (go to the Members-Only Area—username: aap; password: scot).

I would like to direct your attention to the upcoming abstract submission deadline for the American Academy of Pediatrics (AAP) National Conference & Exhibition (NCE). For many years now, we have had a scientific session, where cutting-edge research on informatics and clinical systems has been presented. Many of the presentations have been published later in the medical literature. In the past, I have been the sole chair for this event but, this year, **George R. Kim, MD, FAAP**, will join me as co-chair. Dr Kim has been reviewing abstracts for this event for years and has been instrumental in the selection of presentations. As co-chairs of the abstract session, Dr Kim and I are very proud of the quality of the presentations

and the exciting research. I am challenging you now to consider submitting an abstract to the scientific session this year. We all know that information technology has the ability to improve the life of our patients and the practice of management, but evaluation data are still sparse. So, if you implemented a new electronic sign-in system in your practice, bought and implemented an electronic health record (EHR), or introduced computers in the examination room (just to name a few examples) and are able to collect data on the effectiveness or acceptance of these interventions, please consider sharing your experiences in form of an abstract. We truly are looking to provide evidence for the use of information technology in pediatrics and we hope to continue to provide an excellent abstract and poster session with your help.

This year, we are expecting to see a significant expansion of our computer lab. **Lewis W. Wasserman, MD, FAAP**, has been instrumental in organizing this event and we will see the lab (renamed the Technology Learning Center) be moved from the exhibit floor to its own venue. We hope this atmosphere will be more conducive to the large number of talks and presentations that will occur. Dr Wasserman has been able to attract a large number of outstanding speakers who should attract your interests.

The main program for the SCOCIT meeting during the NCE will focus on EHRs. We have 3 speakers who understand the complexities of selection, purchase, implementations, and maintenance, and will provide us with great information. In addition, this year, we will have 3 brief presentations by speakers who recently implemented EHRs in their practices and will share their experiences.

I am new to this position, and it is my intention to take as much of your feedback as possible and transfer it into new educational programs. Please feel free to contact me ([clehmann@jhmi.edu](mailto:clehmann@jhmi.edu)) with any suggestions you may have.



### Policy Committee

By Robert S. Gerstle, MD, FAAP  
Policy Chairperson

As you might expect, the Policy Committee of the Steering Committee on Clinical Information Technology (SCOCIT) monitors the state of computer and information technology as it relates to the pediatrician. In that role, we have members participating in national standards development organizations and other national initiatives where we feel it is important for the American Academy of Pediatrics (AAP) membership to be heard. I hate giving examples of our involvement because I invariably leave someone out, but I'll give 2 examples of members' involvement.

Andy Spooner has been actively involved in Health Level Seven (HL7) work to define functionality in electronic medical record (EMR) systems, particularly in its Pediatric Data Standards Special Interest Group, mapping general functionality to specific pediatric functions that might be part of an EMR. Eugenia Marcus has, for several years, been instrumental in various "face-offs" between EMR vendors, such as those at TEPR (Towards an Electronic Patient Record) meetings sponsored by the Medical Records Institute.

The committee's members also are reviewing our (the former Task Force on Medical Informatics') policy paper from 1999 on the pediatric requirements of an EMR. This paper has been widely referenced and brought to the attention of EMR vendors to promote EMR systems that meet the pediatrician's requirements. The paper is now 5 years old and, in light of the HL7 work to define EMR functionality, Andy Spooner, Eugenia Marcus, and Joe Schneider are in the process of updating the original paper.

One aspect of policy issues as they affect the AAP membership is our struggle whether to make recommendations for AAP policies regarding the adoption of EMRs by the membership. For example, is there sufficient evidence (safety, efficacy, etc) in the literature on which to base a recommendation that might set a target for EMR adoption by pediatricians (eg, set a goal for 50% of AAP members to be charting in an EMR within 5 years)?

A related issue is the recognition that the costs of such systems are assumed by the pediatrician, but most of the benefits of the systems accrue to others—a case of misaligned incentives for inducing physicians to use EMRs. Clearly, we would like to advocate for increased reimbursement (based on improved patient care) for those who use EMRs in their offices. My question is to you is: What is the minimum financial incentive that would be an effective inducement for your pediatric practice to install an EMR, assuming a start-up cost of \$40,000, and yearly maintenance and upgrade costs of \$8,000? Would 4% additional premium on net reimbursement be sufficient? 6%? 10%? As the Policy Committee deliberates possibly putting forth recommendations on the adoption of these expensive systems, I would like to get your input.

# Report on the Certification Commission for Health Information Technology

In November 2004, the Certification Commission for Health Information Technology (CCHIT) created 4 work groups to develop the process by which electronic health records (EHRs) could be certified as meeting criteria for functionality, interoperability, security, and reliability. The American Academy of Pediatrics (AAP) was pleased to have Steering Committee on Clinical Information Technology (SCOCIT) members appointed to 3 of these work groups. Alan E. Zuckerman, MD, FAAP, is on the Interoperability work group, Eugenia Marcus, MD, FAAP, is on the Functionality work group, and Joseph H. Schneider, MD, MBA, FAAP, is on the Certification Process work group.



## Interoperability

By Alan E. Zuckerman, MD, FAAP  
Member, Steering Committee on Clinical Information Technology

The Interoperability work group of the CCHIT, on which I serve, is charged with enabling standards-based data exchange between ambulatory EHR and other information systems. Lack of interoperability has been a source of frustration and risk for pediatricians implementing EHR in their practices. The work of the CCHIT will help to change the marketplace, improve workflow in the office, and enable vendors to work together using well-defined standards. Certification will mean that products that are certified independently will plug and play seamlessly. It also will enable new roles for the AAP as a provider of information resources and decision support that can be used with a variety of EHR vendor products.

In a perfect interoperable world, it would be possible to export all of the information stored in one vendor's EHR and import it into the EHR of another vendor. This functionality requires a shared model of the structure, content, and encoding of the medical record, and we are still years away from a common vision and vocabulary. What we can do today is export a patient summary similar to a paper face sheet that contains all of the key data elements about a patient, such as the patient's problem list, medication list, encounter list, immunizations, vital signs including growth chart, and laboratory results. This can form the basis for starting a new EHR in another system with the ability to move forward quickly.

This portable patient summary is called the Continuity of Care Record (CCR), and the ability of multiple EHR vendors to exchange the CCR has been demonstrated at national meetings, such as Towards an Electronic Patient Record (TEPR) and the Healthcare Information and Management Systems Society (HIMSS). Another important use for a CCR will be sharing data with patient-maintained Personal Health Records. Pediatricians can then use a certified interoperable CCR to give patients copies of their immunization and growth data at a well child visit, or diagnoses, prescriptions, laboratory results, and referrals at an acute care visit.

Top priority for pediatricians will be interoperable immunization records that can be sent to immunization registries or downloaded from a registry with patient permission to eliminate the need for duplicate data entry. The format that transfers immunization records also can be used to check the completeness of immunizations and generate advice based on the latest guidelines.

The task that is most in demand by all physicians is the automatic electronic transfer of laboratory results with tracking results for all orders, direct import of the data into an EHR and clinical notes, and easy integration of annotation of review and notification of patients. Certification of a single standard method for laboratory data exchange would make this valuable service available in all parts of the country from all laboratories to all EHR vendors without the need for expensive custom interfaces.

Interoperability is already an important part of everyday practice through the use of National Council for Prescription Drug Programs (NCPDP) Script electronic prescriptions and Health Insurance Portability and Accountability Act of 1996 (HIPAA) 837 electronic claims forms. Certification of interoperability enables standards to do their intended job in the hands of multiple vendors and users.



## Certification Process

By Joseph H. Schneider, MD, MBA, FAAP  
Vice Chairperson, Steering Committee on Clinical Information Technology

The Certification Process work group doesn't sound exciting, but there is plenty to do. There are already several efforts in Canada and other countries to certify electronic health records (EHRs) and the group is in contact with these organizations to learn how they are going about this. They also are looking at how vendors are certified in US industry, including how they incorporate quality into their products.

It is too soon to know what the final process may be, but it probably will have a detailed vendor application that describes what its EHR can do, and then live testing, probably using standard scripts that test the functionality, security, and reliability of the product. Independent laboratories under contract with the certifying body will probably do this testing. There probably will be some user input into the evaluation, but this is the most difficult thing to incorporate. Vendors will either pass or fail this process; at the current time, there are no plans for products to be "graded."

The concept of US Food and Drug Administration (FDA) approval for EHRs comes up from time to time in this discussion, especially as EHRs become more like medical devices. For example, in the hospital where I work, in the not-too-distant future physicians will place an order to change the rate on a pump and this will trigger the change, with only a nurse or pharmacists' review. The order changes the pump. So far, the FDA hasn't shown much interest in EHR certification, but stay tuned.

The certification process must be generic in the beginning, so it is difficult to insert pediatric interests into it but, wherever there is the possibility, we are doing so. We will continue to offer the Pediatric Documentation Challenge at TEPR (Towards an Electronic Patient Record) and other places until there is truly a Pediatric Certification, which may be a while in coming.

Just like nephrologists know that the kidney is the most important organ of the body, the Certification Process work group knows that if it doesn't do its part right, the rest of the certification process will be worthless. So, your comments, questions, and suggestions are helpful. Please feel free to contact me at [drjoes@pol.net](mailto:drjoes@pol.net).

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## The Evolution of Data Coming In: Opportunities for Quality Improvement, Costs Savings, and Asset Creation



By Alice A. Loveys, MD, FAAP  
Member, Steering Committee on Clinical Information Technology

Many studies have shown the significant time and cost involved each time you pull a patient's chart. It is estimated that it costs the physician \$5 to \$8 each time a staff member has to handle a chart. The amount of time the chart is in the "work flow" stream can be more than 2 days. Ask any of your staff how long they spend searching for a chart already pulled. Multiple reports coming in on the same patient can be problematic. Do you save each preliminary report coming in? How thick can one chart get? Are the reports filed in a manner that makes them easy to access?

You pay to organize the incoming data and you pay to access the data.

Electronic Health Record (EHR) systems have allowed us to take a step forward in the assimilating data, with resulting increases in quality of care as well as significant cost and time savings. What are your options if you

have an EHR now and what may they be in the future? Data still have to get into the chart. Several options are available.

### Scanning

Using relatively inexpensive scanners (we use an all-in-one copier, printer, and scanner from Hewlett Packard) and a relatively inexpensive staff member (college student), we scan in many of our reports from outside specialists, laboratories, etc. There is an option to use OCR (optical character recognition) but we found too many errors in translation, if you will, when using this option. Some specialists still send handwritten notes. Documents are scanned in image form and imported into the appropriate chart. We have signed off on the reports before they are scanned in. We attach a header to the scanned image so we can easily search for the report once it is placed in the chart.

### Manual Entry

For some routine laboratory reporting (New York State newborn screen and newborn hearing tests), we manually enter results in custom electronic laboratory forms with a few clicks of the mouse.

### Digital Importing

Many of us receive consultation letters or reports via fax. Instead of printing out these faxes, we can capture them as image files (we use tagged image format files [TIFF]) directly to our computer (no toner or paper costs). A staff member attaches a header to the incoming fax and it then can be imported into the patient's chart digitally.

To access the report later, the physician just needs to click open the chart at his or her desk, open the report section of the chart, and choose which report to look at.

The cost to assimilate the data is reduced and the cost to access the data in the future is almost eliminated.

The next step in the evolution is system-to-system interfaces between

electronic medical records (EMRs) and outside laboratories or specialists. This is an all-electronic solution to data coming into the chart. The interface occurs using file transfer protocols for one system to get data from another. The data are directly imported into the patient chart.

Note: NO STAFF is involved in the workflow in this system. The costs for importing data have been eliminated AND the data are in a searchable form. The data in this form have tremendous value to organizations researching outcomes. We have not only eliminated costs, but also created an asset.

As more systems use digital reporting, the evolution of how data are handled will continue. As caregivers, we are the keepers of the data and can assimilate data in a way that is cost-effective, increases the quality of care of our patients, and becomes one of our greatest assets.

*Alice Loveys, MD, FAAP, is partner at Pediatrics @ the Basin. She has no financial relationships with any of the companies listed above.*

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## Meet the Candidates for American Academy of Pediatrics Vice President

*With recent pediatrician demographics (more women) and practice patterns (more part-time), and with the number of young pediatricians making up a substantial proportion of the American Academy of Pediatrics (AAP) membership, how do you envision the AAP adapting to these changes regarding leadership positions, membership benefits, and advocacy efforts?*

*Jay E. Berkelhamer, MD, FAAP  
Atlanta, GA*

Although women have become the majority of the AAP membership, the challenges of balancing career and personal life belong to all. Today, families often have 2 working parents dividing child care and household responsibilities. These demographic trends have profound implications on how the AAP can support its membership.

We can encourage greater participation in **leadership positions** by viewing contributions to the AAP longitudinally. Instead of moving from committee membership to chairperson, or chapter involvement to chapter or district office, most young physicians need to see the AAP as flexible, appreciating involvement as their lives permit and at any level of activity they choose. Members often will serve when asked and they should receive appropriate guidance and coaching. Meetings should be family friendly, providing child care and financial discounts for family activities.

**Membership benefits** we choose to use may change over time. The resident section is a great step forward, getting young professionals involved from the beginning of their training. Although we have some programs for medical students, I would like to see us provide them with additional support for educational materials and mentoring. The current tiered dues structure and the flexible payment options also encourage early involvement. We also should address part-time pediatricians and members who are temporarily out of the workplace to help sustain their involvement.

Current **advocacy efforts** appropriately focus on issues such as access to care, quality of care, reimbursement, immunizations, reduction of violence, and the appropriate use of tobacco funds. To these efforts, we should add increased medical education funding for those entering pediatrics, programs that assist younger members with employment, and managing student loan debt. Let's also advocate for more "going into practice education" as part of residency training. Frequent surveys of our membership to assess their personal priorities should help determine additional effort for support.

Finally, let's continue to increase the role of the Internet to disseminate important and timely information. Becoming an active advocate for children and staying connected to our mission has been made easier by this medium, which offers added value to our members, their communities, and their lives.

*Charles W. Linder, MD, FAAP  
Augusta, GA*

The demographics of the AAP are changing. These changes present new challenges and new opportunities for the AAP. If the AAP is to be successful in its child health and welfare mission and in ensuring the satisfaction of its members, we must take deliberate steps to accommodate these changes. I think that the following actions are needed:

- An increase in mentoring by more experienced members to introduce and educate young members (beginning in residency) about the AAP operations and how they can become involved. "Demystifying" how the AAP works will help attract more involvement.
- All members should be encouraged to become involved in AAP activities at a level that is compatible with their interests and professional situation. Clearly defined and limited participation usually is more acceptable to young members at the onset of their involvement.
- Leadership training at the state, district, and national level should be an ongoing effort and be made available to any member who is interested.
- More assistance should be given to residents and young members in preparation for the transition from training to career. Much can be done in educating members about the business aspects of entering practice and practice management.
- The entire spectrum of member benefits needs to be evaluated and adjusted to accommodate contemporary needs. It is obvious that "one size does not fit all" when it comes to possible benefits of AAP membership.
- American Academy of Pediatrics conventions and continuing medical education (CME) courses should continue to evolve into more family friendly meetings held at sites that are attractive to young families.
- There needs to be continuing progress in the development of electronic means for communication, for continuing education, and for participation in volunteer activities. This will promote involvement by a wider number of members who are in situations that make travel difficult or who prefer not to travel.

By mentoring, facilitating early involvement, tailoring membership benefits, and reshaping AAP activities, we can develop a more diverse and involved membership. This will ensure a pipeline of committed and productive members and leaders for the future. The opportunities are much greater than the obstacles.

## Nanobyte

### Excellent Government-Sponsored Health Care Web Sites

- **ClinicalTrials.gov** (<http://clinicaltrials.gov>)—ClinicalTrials.gov provides regularly updated information about federally and privately supported clinical research in human volunteers. It gives information about a trial's purpose, who may participate, locations, and phone numbers for more details.
- **MedlinePlus** (<http://medlineplus.gov>)—A patient-focused medical resource from the National Institutes of Health (NIH); also has a Spanish version.
- **National Guideline Clearinghouse** ([www.guidelines.gov](http://www.guidelines.gov))—A public resource for evidence-based clinical practice guidelines.

# Online Chapter Voting: A Deployment and Lessons Learned



by George R. Kim, MD, FAAP, Member, Steering Committee on Clinical Information Technology, and Christoph U. Lehmann, MD, FAAP, Education Chairperson, Steering Committee on Clinical Information Technology

Internet technology has the potential to increase voter turnout in elections, but there are concerns regarding its effect on fairness, validity, and security. E-voting is more error-prone than paper, lever, and optical-scanning methods,<sup>1</sup> with additional concerns about Internet-based voting.<sup>2</sup> In 2004, such concerns caused the US military to cancel a plan for Internet-based voting by overseas personnel.<sup>3</sup> Despite this, Internet-based voting is compelling to organizations (including the American Academy of Pediatrics [AAP]). We present a prototype for online Chapter voting and lessons learned from its deployment.

## Background

In 2004, an online voting system was requested to support an AAP Chapter leadership election. The intent of the system was to save on printing/ mailing costs and time and to increase membership participation. The prior election was reported to have been the result of e-mail ballots sent in response to a broadcast e-mail to members, with 2% to 3% participation.

## Design, Implementation, and Deployment

Guidelines for designing the voting system were as follows:

- All eligible voters must have an opportunity to vote.
- All voters must be allowed to vote once and only once.
- All ballots must be unbiased.
- Validation (allowing an eligible voter to cast a ballot) and verification (demonstrating a ballot was cast by an eligible voter) must be recorded and linked to the current list of eligible voters as determined by bylaws.
- Voting should be as secure as possible.

### **Not all members have access to the Internet, therefore,**

- All voters must receive an unbiased mailed paper ballot.
- Multiple methods of balloting (mail, online, fax) must be allowed with sufficient time for dissemination and return.
- No eligible voter may be disenfranchised.

In the data flow for the designed Internet-based voting system (Figure 1),

- Members gain access to the online voting booth from an embedded hyperlink in a group (broadcast) e-mail (URL also in print ballot).
- Eligible voters gain access to the ballot by entry of their membership ID (validated online) and may submit only one ballot.
- After balloting, a voter must send a confirmatory e-mail to the Chapter Office (from a manually verified e-mail address checked against the ID).
- Voters may alternatively fax or mail ballots (manually verified by ID).
- Ballots are tabulated only when validated and verified.

The online system was designed in Microsoft Active Server Pages (ASP) and deployed on the Chapter Web site. During the election, 3 periodic group e-mail reminders were sent to the Chapter membership. Validation and verification were dependent on a list of vote-eligible members provided by the Chapter Office. Submitted e-ballots were stored in a central database.

The online voting system was managed by one person (who did not participate in the election) and was monitored daily. Unverified e-ballots were followed-up for verification by e-mail or telephone. An e-mail survey was distributed to users of the online system. Results of the online component of the election were compiled into an electronically locked document with the final report.

## Results and Evaluation

The system appeared to function as designed. The virtual “turnout” was triple the reported response from the prior election, with an additional 15% from faxed ballots. No duplications were noted. In only one case was a ballot unverified after 3 attempts (uncounted).

In a non-anonymous survey of all successful users of the system, there was a 68% response. Of those, 92% thought the system was easy to use, 97% said they would use it again if presented with it, and 53% responded that the system got them to vote (due to repeated reminders) where they might not have done so. One respondent complained of “feeling watched” during balloting. There was no available feedback from unsuccessful system users.

## Discussion: Lessons Learned

In this combined paper-electronic voting system, participation increased from 2% to 3% (the prior election) to about 10% (with average participation for AAP polls and elections being under 30%). Timed e-mail reminders stimulated voting activity. A smaller segment of the voting population used fax and none used mail. Submitted ballots allowed examination of geographic trends in participation.

Security did not appear to be a problem in this election. The use of a single person to run the online voting system was a potential weakness, but time constraints posed by the Chapter leadership did not allow a full and formal consideration of security and monitoring issues or for full system testing before deployment. Time and resources for these important aspects should be allocated in future deployments.

Management of organizational expectations and responsibilities must include understanding the following:

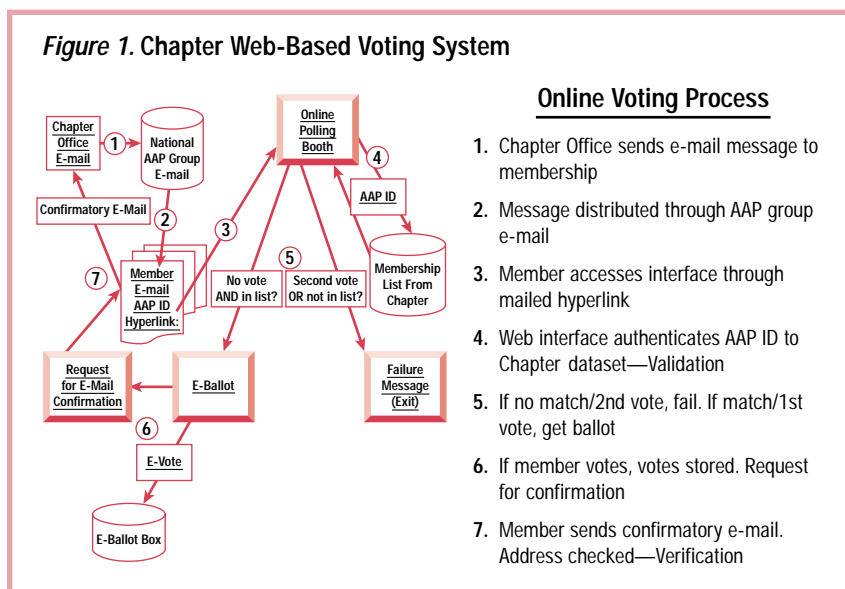
- Technology does not eliminate requirements or costs of running a valid election. E-mail, as a sole method of voting, disenfranchises eligible voters and creates an invalid election, since not all members are online. Allocation must be made to disseminate print ballots to all eligible voting members, with adequate time for return.
- Voting rules must be established, clearly posted, and maintained throughout the voting process without change during the election.
- All ballots must be unbiased in their presentation of candidates.
- Membership data, including voting status, must be kept up-to-date.
- Reporting of election results should include numerical breakdowns.
- Low voter turnout should not be attributed solely to membership apathy without full consideration of notification and balloting processes.

## Conclusions

The ubiquity of the Internet and e-mail among pediatricians allows and encourages their use as part of pediatric advocacy. Information technology can increase voter turnout in Chapter elections for little additional cost (beyond that required for standard elections) as illustrated, but information assurance and election validity must be considered in design and implementation, and organizational expectations must be realistic. Data from balloting patterns can yield information about Chapter membership participation behaviors that may be helpful in developing new initiatives.

*Christoph Lehmann is the director of Clinical Information Technology at Johns Hopkins Hospital Children's Medical and Surgical Center and has no financial interests to declare.*

*George Kim has no financial interests to declare.*



<sup>1</sup> The Caltech/MIT Voting Technology Project. Residual votes attributable to technology: an assessment of the reliability of existing voting equipment. March 30, 2001. Available at: [www.hss.caltech.edu/%7Evoting/CalTech\\_MIT\\_Report\\_Version2.pdf](http://www.hss.caltech.edu/%7Evoting/CalTech_MIT_Report_Version2.pdf). Accessed January 5, 2005.

<sup>2</sup> Jefferson D, Rubin AD, Simons B, Wagner D. A security analysis of the secure electronic registration and voting experiment (SERVE). SERVE security report. January 20, 2004. Available at: <http://servesecurityreport.org>. Accessed January 8, 2005.

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# An Information Technology Wish List

By J. Randolph Bak, MD, FAAP

Member, Steering Committee on Clinical Information Technology

The winter months at a busy practice are a good time for an information technology (IT) activist to leave his colleagues alone and reflect, so let me share with you an “IT wish list” that I hope is interesting and, perhaps, challenging.

## 1. A Web-based bilirubin management guide

The new bilirubin practice guideline could use information technology in the collection, analysis, and reporting of data around newborn jaundice. An online tool could:

- Prompt us to collect the appropriate information for decision making (*time* of birth; gestational age; complicating factors), and place the patient on the appropriate nomogram.
- Provide access to the clinical data and allow additional entries from anywhere there is an Internet connection, plotting progress on the nomogram.
- Include access to reference materials on hyperbilirubinemia.
- Be updated by the American Academy of Pediatrics (AAP), so that it is the state-of-the-art whenever it is accessed.
- Collect deidentified data for a research registry, and allow institutional membership, so that hospitals or groups can track their performance.
- Act as a “utility” resource for an electronic medical record (EMR), passing data back to the EMR for the patient’s record, or generate a printable summary of the care for inclusion in the paper chart.

Who better to manage such a thing than the AAP? The AAP and its committees already are positioned to manage this decision-support tool. Moreover, with care spread across the community (hospital, clinic, home), who else should take the lead in raising the standard of care?

## 2. ...and/or give me a personal digital assistant (PDA)-based version of the bilirubin management tool

Take the features above and load them on a PDA. I can upload data to a registry when I synch my PDA, and get updated decision-support at the same time.

## 3. An online version of the AAP attention-deficit disorder (ADD) program

Imagine a Web site that, similar to the bilirubin “utility”:

- Gives secure access to physicians and families to the process and a record of ADD evaluation and follow-up. Allows privileges for teachers and others to contribute information without full access to record.
- Uses electronic forms mirroring the existing paper process. Automates the scoring, with trending of the scores.
- Allows entry of and tracks weight, blood pressure, and drug doses.

- Includes access to updated reference materials, data collection, performance evaluation, and medical record reports, as above.
- Sends reminders—update data, interval follow-up visit...

The AAP already publishes a process, and the community involved (teachers and parents) is often already online. It is calculations, communications, and database—perfect for IT.

## 4. A Web-based immunization calculator for catch-up immunization

Put in the child’s immunization record and her date of birth, and it calculates the “catch-up” schedule. Print it out, give a copy to the parents, and run it again if things change.

## 5. Put other AAP publications online, just like the *Red Book*

How about the *Pediatric Nutrition Handbook*? *Care of the Young Athlete*? Searchability and ubiquity are the watchwords.

## 6. Integrate scanning more thoroughly into EMRs

I know, EMRs are supposed to get rid of paper. Nonetheless:

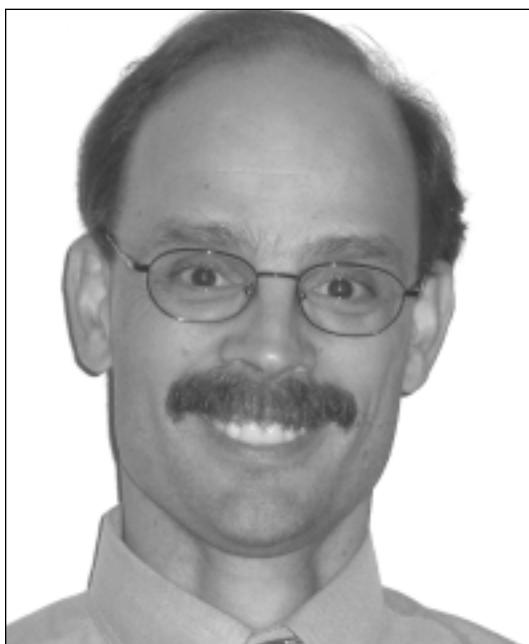
- The world still will send us paper for a while.
- When the power fails, visits will be completed on paper. When the power comes back up, we’ll scan them in.
- When my just-can’t-get-the-hang-of-it docs cannot find a way of documenting in a digital world, I give them a structured, blank visit note to scan in later.

Many products will let you scan documents into a file tree of images outside of the usual information flow. What I’m talking about is richly indexed image files (date of service, not date of scanning; type of document...). Thus indexed, the item of information could be brought into the presentation of clinical care wherever appropriate, mixed in with the digitally documented information.

## 7. Good Luck

In some cases, the technology is here; we need products. So, I wish “good luck” to the makers of better batteries and less power-hungry displays; lighter-weight devices; and, ever-improving speech recognition. Also, those working to get us some capital support for making IT investments surely could use some luck. Finally, good luck to those who work to keep particularly pediatric IT issues in the vanguard of what may become a rush to health care IT.

So, there you have it—an IT wish list that doesn’t have an iPod on it. I suppose that wishes are something that someone else ultimately fulfills. If the responsibility for fulfillment belongs to us, then perhaps they are better called goals. Maybe that’s why, in active organizations, they say “be careful what you wish for”—you may end up on the committee.



## Meet Your New Executive Committee Member!

When Mark M. Simonian, MD, FAAP, became the Steering Committee on Clinical Information Technology (SCOCIT) chairperson during the American Academy of Pediatrics (AAP) National Conference & Exhibition (NCE) in October 2004, his seat on the Executive Committee became vacant. **Mark A. Del Beccaro, MD, FAAP**, was appointed to complete the remainder of Dr Simonian’s Executive Committee member term.

Dr Del Beccaro received his MD degree from the University of Washington, and residency training in Pediatrics at the University of Washington and Children’s Hospital and Regional Medical Center in Seattle. Dr Del Beccaro has had more than 10 years’ experience in clinical systems selection, design, and implementation. In his role as clinical director of information services (IS), he helped lead a hospital-wide rollout of Computerized Provider Order Entry at Children’s in 2002, and currently is helping to move the organization forward in implementing interdisciplinary online documentation. He integrates his IS role with his other roles as chair of Medical Informatics/Records Committee, chair of the Physicians Education and Compliance Committee, and associate chief of Emergency Services. He is the Web site administrator and serves as the secretary for the Washington Chapter of the AAP.

# Executive Summary: Steering Committee on Clinical Information Technology Executive Committee

Conference Call October 7, 2004

and at the Hilton San Francisco, San Francisco, CA, October 11, 2004

The Steering Committee on Clinical Information Technology (SCOCIT) Executive Committee met via conference call on October 7, 2004, and in San Francisco, CA, on October 11, 2004. The Executive Committee discussed the following items:

- The SCOCIT core and non-core budgets were reviewed.
- The SCOCIT membership was discussed, and it was noted that quite a few members have voluntarily dropped their membership since the fiscal year 2004-2005 dues billing was mailed. Plans for a reactivation campaign were discussed.
- The SCOCIT Annual Report of Sections was reviewed.
- A discussion was held regarding plans for SCOCIT chapter-level contacts. Dr Gregg Lund will be responsible for coordinating activities of chapter-level contacts.
- The recommendations and resolutions from the 2004 Annual Leadership Forum were discussed. Staff will work with the Executive Committee to submit responses where requested.
- Plans were developed to solicit nominees for the 2005 Byron Oberst Award.
- Dr Gerstle provided a report on the work of the Policy Committee, including plans to revise the policy statement on "Special Requirements for Electronic Medical Record Systems in Pediatrics."

- A report was provided on the September 2004 Meeting to Define and Plan for the Pediatric Electronic Health Record held in Indianapolis, IN.
- The report from the Education Committee included plans for the 2005 and 2006 scientific abstract sessions, the development of the Publications Committee, and the need to use the education survey to establish goals.
- The report from the Technology Committee included plans for the electronic health record (EHR) speaker's kit/toolkit and the electronic medical record (EMR) review Web site.
- There was a brief discussion on SCOCIT liaisons to the Health Level Seven (HL7) Pediatric Data Standards Special Interest Group and the Continuity of Care Record project.

The SCOCIT Executive Committee will next meet in a stand-alone meeting in Spring 2005 (dates and location to be determined).

For a complete set of minutes or further information on specific items, please contact Rebecca Marshall, Health Policy Analyst, at 800/433-9016, ext 4089, or [bmarshall@aap.org](mailto:bmarshall@aap.org).

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## Digital Signature



By Alan E. Zuckerman, MD, FAAP  
Member, Steering Committee on Clinical Information Technology

All clinical documents require signatures and it is, therefore, necessary for all electronic documents to have electronic signatures. A simple electronic signature such as a typed name or a graphic image of a manual signature shows the intent to sign the document, but a true public key infrastructure (PKI) Digital Signature is a cryptographic device that adds 3 key functions to the signature process. Unlike a simple electronic signature, a digital signature validates message integrity, provides third-party authentication of the signer's identity and credentials, and assures non-repudiation.

There has been much debate over the need for digital signature in health care because of cost and inconvenience. **The Drug Enforcement Administration** (DEA) considers digital signature essential for allowing electronic prescription of controlled substances and that is a function that will have an important impact on the lives of pediatricians and their patients. Controlled substance prescriptions for Ritalin and many other attention-deficit/hyperactivity disorder (ADHD) medications cannot be sent electronically, faxed, or called in by phone; physicians must write new prescriptions every month and families must be diligent in refilling medications over several years of treatment. A national system of digital signature of prescriptions will allow automation and simplify the process.

Verification of message integrity means checking that the document you signed has not been altered. This is accomplished by computing, encrypting, and then rechecking a message digest that is very sensitive to even the smallest change in the document. I have had patients add zeros to the quantity prescribed on a prescription. Digital signature makes this

immediately detectable. I once was involved with a malpractice case that centered on whether the doctor wrote the wrong prescription or the pharmacist dispensed the wrong medication. A digital signature would eliminate any doubt as to where the error occurred.

A nurse once borrowed my DEA number to feed her addiction to codeine-containing cough medicine. Third-party authentication of the signer would make this impossible. Authentication requires an authentication certificate issued by a third party that associates the name of the signer and other attributes, such as address, DEA number, and medical licensure numbers, with the signer's public key.

Public key infrastructure Digital Signature uses public-private key pairs for encryption. There is a private key that only the signer can use to encrypt the message digest and an associated public key that anyone can use to decrypt the message digest and check the document. The user first generates a key pair and keeps the private key in a safe place such as a smart card. The public key is sent with registration materials to the DEA-designated third-party issuer of the certificate.

Non-repudiation means that you cannot deny signing a document in the future because your authenticated identity has been permanently linked to the document you signed. To strengthen non-repudiation and prevent fraud, the DEA wants private keys used on smart cards where they cannot be forged, read, or stolen; and the act of signing controlled by at least 2 forms of authentication, such as a password, and a biometric, such as a fingerprint.

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## One Member's Experience in Applying Health Information Technology



By Salvatore Volpe, MD, FAAP, FACP  
Member, Steering Committee on Clinical Information Technology

I am a pediatrician/internist practicing on Staten Island, NY. We still have paper medical records. Over the past 2 years, we have begun the migration toward automating the practice. We began with an e-Prescribing product as part of a pilot project for GHI (a local managed care company). This gave us a taste of an electronic medical record (EMR) without giving up our beloved 6-part medical folders. As my staff and I acquired the taste of electronic prescribing, we opened the door to Internet communication

with our patients. The recruitment has been slow but steady. Following is a synopsis of the events this past fall that helped reaffirm our decision to move toward our ultimate goal of an electronic health record (EHR).

Last fall, Merck & Co. issued a recall of Vioxx. Fortunately, our practice has been using 2 products: Pocketscript and MyDocOnline Connect. Pocketscript is an e-Prescribing product that permits us to check patients' formularies, drug allergies, and drug-to-drug interactions. The prescriptions

are then either faxed to the pharmacy or printed in the office for the patient. I used the Pocketscript report option to generate a report of patients who had been prescribed Vioxx via the Pocketscript program. This report was used to generate a contact list that will be used to notify patients of the current status of Vioxx. MyDocOnline permitted me to send an e-mail to the subset of registered patients to deliver the same information in a very efficient manner. We found a total of 16 patients out of a total patient population of 2,500 who had been prescribed Vioxx in the past.

Pocketscript is an example of an e-Prescribing product. There are many others available, including Allscripts, DrFirst, EmpoweRx, Epocrates, Newcroprx, and OnCallData. Depending on the vendor, a physician can have access to information on medications, drug interactions, and formularies via a variety of devices, including: BlackBerrys, Palm-based personal

digital assistants (PDAs), PocketPC-based PDAs, and Smartphones (like the Treo 600/650) as well as from a computer with a browser.

MyDocOnline (which is no longer available) was an example of an application service provider (ASP)-based physician portal. RelayHealth, which has contracts with many managed care companies, currently is available. These contracts permit patients to have online office visits for the price of their co-pay. The managed care company pays the balance.

These programs, which are just 2 of the many programs available to the physician, are evidence of the value of medical office automation in improving patient safety and improving medical practice efficiency.

*Salvatore Volpe, MD, FAAP, FACP, has worked as a consultant for ZixCorp and GHI.*

## Call for Abstracts for the American Academy of Pediatrics National Conference & Exhibition

October 8-12, 2005  
Washington, DC

**SUBMISSION DEADLINE:**  
**April 15, 2005**

Section programs provide a forum for the discussion of clinical matters or research related to a particular subspecialty or special interest area. Submissions by American Academy of Pediatrics (AAP) members and nonmembers are welcome; participation is open to health professionals in any field. (However, some sections require a sponsor for any papers whose authors do not include a member of the Section.)

The following Sections accept abstracts for presentation at the AAP National Conference & Exhibition (NCE). Abstracts are not accepted for general pediatrics or for other pediatric subspecialties or special interest areas not listed as follows:

- Administration & Practice Management
- Adoption & Foster Care
- Breastfeeding
- Cardiology & Cardiac Surgery
- Steering Committee on Clinical Information Technology*
- Critical Care
- Emergency Medicine
- Epidemiology
- Hospital Care
- Injury & Poison Prevention
- Orthopaedics
- Perinatal Pediatrics
- Plastic Surgery
- Residents
- School Health
- Sports Medicine & Fitness
- Surgery
- Transport Medicine
- Urology

Submit electronically from the AAP Web site ([www.aap.org](http://www.aap.org)) under "Professional Education." Questions? Contact [abstracts@aap.org](mailto:abstracts@aap.org) or 847/434-4079.

## Highlights From the 2004 American Academy of Pediatrics National Conference & Exhibition



Christoph U. Lehmann, MD, FAAP, presents the Best Paper Award to Eneida A. Mendonca, MD, PhD, for her abstract entitled, "Automated Surveillance of Pneumonia in Neonates Using Natural Language Processing of Radiology Reports."



Outgoing SCOCIT Chairperson, S. Andrew Spooner, MD, FAAP, presents the 2004 Byron Oberst Award to Stuart T. Weinberg, MD, FAAP, in recognition of his contributions to the field of clinical information technology.

The Steering Committee on Clinical Information Technology (SCOCIT) has added an "Upcoming Meetings" list to its Web site at [www.scocit.org](http://www.scocit.org). If you have information about an upcoming meeting (local or national) that you would like to share, please contact SCOCIT's Webmaster, Stuart T. Weinberg, MD, FAAP, at [stweinberg@aap.net](mailto:stweinberg@aap.net).

# Clinical Decision-Support Systems in Pediatrics



By Chris Longhurst, MD, MS, and Jin S. Hahn, MD, FAAP  
Members, Steering Committee on Clinical Information Technology

Clinical decision-support systems (CDSS) are generally defined as any computer program designed to help health professionals make clinical decisions.<sup>1</sup> Although we still do not have anything resembling Dr McCoy's famous tricorder on Star Trek, there has been an explosion of useful CDSS in recent years, and an increasing number are relevant to the care of children.

The concept of computerized decision-support in pediatrics is not new. As far back as 1961, Warner described a mathematical approach for the diagnosis of congenital heart disease.<sup>2</sup> In this study, long before the advent of echocardiography, data were drawn from 1,035 patients referred for cardiac catheterization. Given multiple clinical findings, a matrix of 33 different congenital heart diseases and 50 associated clinical findings was used to calculate the probability of a specific diagnosis. The diagnostic accuracy of this system matched that of 3 pediatric cardiologists.

Although, historically, CDSS primarily were focused on diagnostic recommendations, pediatric decision-support can be provided by any computer system that deals with clinical data and medical knowledge to help deliver patient-specific advice.<sup>3</sup> Laboratory systems that flag abnormal values, immunization registries that issue vaccination reminders, and automated pediatric electrocardiograph (ECG) interpretation are just a few examples of CDSS in common use today.

Clinical decision-support systems can be categorized by type (simple rule-based alerts vs more complex methods like neural networking and Bayesian statistics), domain (problem-focused vs general diagnostic support), or access (handheld computer vs Web-based vs integrated within an electronic medical record [EMR]). For the purposes of clarity, we will look at a few examples categorized by means of access.

## Decision-Support Tools on Handheld Computers

While the house officer of yesterday routinely carried a notebook to record pearls of wisdom, the resident of today typically carries a Palm™ or PocketPC™ handheld. Widely referred to as a "peripheral brain," the personal digital assistant (PDA) is well-suited for decision-support tools since it always is accessible at the clinician's side. However, the complexity of tools available on the handheld generally is restricted by the hardware limitations inherent to this platform, including the cumbersome nature of entering data. Patient-specific information is, therefore, generally focused on one particular problem or diagnosis.

An example of a decision-support tool on the handheld is ePocrates Rx™, a drug reference tool with pediatric dosing guidelines (available at <http://www.epocrates.com>). A recent survey of pediatricians conducted by ePocrates suggested significant positive impact on quality of care from the use of PDAs in pediatric practice. Seventy-five percent of survey respondents used their PDA more than 6 times per day, most often to access drug information (96%). Most significantly, 80% of respondents said they practice safer medicine using a PDA, while nearly two thirds said that using their PDA had decreased the number of potential medical errors. Unbiased reviews of other pediatric software available for handhelds can be found at Pediatrics on Hand (<http://www.pediatricsonhand.com/>), a useful Web site run by our own newsletter editor, David C. Stockwell, MD.

## Decision-Support Tools on the Internet

The exponential growth of the Internet has made deployment of decision-support systems much easier, particularly since a server-based system can access virtually unlimited memory and database resources. Here we consider 2 different tools that represent the full gamut of clinical decision-support tools, from the most problem-focused to the most general diagnostic support.

BiliTool (<http://bilitool.evidencebasedcare.org/>) is an online decision-support system built to facilitate hyperbilirubinemia risk stratification in newborns. Based on the recently published 2004 AAP guidelines, it stratifies patients into risk categories based on the age of the patient at time of blood sampling (in hours) and the total bilirubin level.<sup>4</sup> Although the now-familiar Bhutani nomogram was first published in 1999, it required manual calculation of the baby's age and plotting of the bilirubin level, a process prone to human error. Since BiliTool will perform this calculation automatically, it is a fine example of how a decision support tool can both facilitate adherence to already existing clinical guidelines and potentially reduce human errors in the process.

On the other end of the spectrum, ISABEL (<http://www.isabel.org.uk/>) is a diagnosis reminder system designed exclusively for use in pediatrics. It was developed with the help of the parents of an English girl who nearly died after doctors failed, at multiple visits, to diagnose necrotizing fasciitis, a rare but known complication of varicella. Results from an initial performance evaluation suggested that ISABEL showed more than 90% accuracy in producing the final diagnosis for a variety of real as well as hypothetical case scenarios.<sup>5</sup> Although such tools can be very helpful in challenging cases, as well as useful for educational purposes, the need to enter patient-specific data generally prevents it from being useful for every patient.

## Decision-Support in the Electronic Medical Record

From a process perspective, the problem with the previously described systems is that they require clinicians to actively seek out the tool and enter relevant patient data, a potentially time-consuming task in an already busy day. The future of clinical decision-support systems clearly lies in tight integration with the EMR, so that the very concept of a decision-support system fades away. When integrated with a robust EMR, decision-support can be tailored much more closely to individual patient needs since it does not require duplicate data entry. Additionally, when combined with computerized physician order entry (CPOE), the decision can be affected at the time of entry. Ultimately, automated decision-support should take place in a transparent manner that is integrated with the clinical workflow.

One example of such an effort was the development of a pediatric anti-infective decision-support system program that was integrated into the hospital information system in Utah. The authors concluded that use of the tool in a pediatric intensive care unit (PICU) was considered beneficial to patient care by the clinicians, reduced the rates of erroneous drug orders, improved therapeutic dosage targets, and was associated with decreased costs per patient.<sup>6</sup>

The increasing use of computers in health care is being driven not only by the need to manage large amounts of information, but also by the desire to make evidence-based decisions, standardize care, and prevent medical errors. There is accumulating evidence to prove that clinical decision-support systems improve health care processes as well as patient outcomes.<sup>7</sup> It may not be too long before handhelds with wireless links to the EMR will become as useful as Dr McCoy's tricorder!

*Chris Longhurst, MD, MS, is the physician lead for Clinical Informatics, and Jin Hahn, MD, FAAP, is the Chief Medical Information Officer and Division Chief for Pediatric Neurology at Lucile Packard Children's Hospital. Neither author has financial relationships with the companies mentioned above.*

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## Content Submission

Would you like to contribute to this newsletter? Articles should be approximately 500 to 1,000 words in length. Submit articles to David C. Stockwell, MD, newsletter editor, at [dstockwe@cnmc.org](mailto:dstockwe@cnmc.org).

Watch the Steering Committee on Clinical Information Technology (SCOCIT) Web site at [www.scocit.org](http://www.scocit.org) for information on submission deadlines for the Fall 2005 issue.

## Not-So-Nanobyte

### Health Care Information Technology Alphabet Soup

- **AHIMA—American Health Information Management Association ([www.ahima.org](http://www.ahima.org))**  
A community of professionals engaged in health information management, providing support to members and strengthening the industry and profession.
- **AMIA—American Medical Informatics Association ([www.amia.org](http://www.amia.org))**  
A membership organization of physicians, nurses, computer and information scientists, biomedical engineers, medical librarians, and academic researchers and educators dedicated to developing and using information technologies to improve health care.
- **ASTM—American Society for Testing and Materials ([www.astm.org](http://www.astm.org))**  
Develops technical standards for materials, products, systems, and services. American Society for Testing and Materials International standards have an important role in the information infrastructure that guides design, manufacturing, and trade in the global economy.
- **CCHIT—Certification Commission for Healthcare Information Technology (<http://cchit.org>)**  
Created by HIMSS (Healthcare Information and Management Systems Society), AHIMA, and NAHIT (National Alliance for Health Information Technology [HIT]) to accelerate the adoption of robust, interoperable HIT throughout the US health care system, by creating an efficient, credible, sustainable mechanism for the certification of HIT products.
- **CCR—Continuity of Care Record ([www.medrecinst.com/pages/about.asp?id=54](http://www.medrecinst.com/pages/about.asp?id=54))**  
A standard specification being developed jointly by ASTM, the Massachusetts Medical Society, HIMSS, AAFP (American Academy of Family Physicians), and the AAP (American Academy of Pediatrics).
- **COSI—Commission on Systemic Interoperability ([www.os.dhhs.gov/healthit/commission.html](http://www.os.dhhs.gov/healthit/commission.html))**  
A federal group charged with developing a comprehensive strategy for the adoption and implementation of health care information technology standards.
- **eHI—eHealth Initiative ([www.ehealthinitiative.org](http://www.ehealthinitiative.org))**  
An organization focused on engaging multiple and diverse stakeholders—including hospitals and other health care organizations, clinician groups, employers and purchasers, health plans, health care information technology organizations, manufacturers, public health agencies, academic and research institutions, and public sector stakeholders—to define and then implement specific actions that will address the quality, safety, and efficiency challenges of our health care system through the use of interoperable information technology.
- **HIMSS—Healthcare Information and Management Systems Society ([www.himss.org](http://www.himss.org))**  
A membership organization exclusively focused on providing leadership for the optimal use of health care information technology and management systems for the betterment of human health.
- **HL7—Health Level Seven ([www.hl7.org/](http://www.hl7.org/))**  
Standard setting for HIT specifically in clinical and administrative data.
- **NAHIT (aka The Alliance)—National Alliance for Health Information Technology ([www.nahit.org](http://www.nahit.org))**  
Composed of almost 100 member organizations from 4 industry sectors: providers (medical groups, care providers), payers, supply chain, information technology suppliers, and other relevant non-health care organizations and government liaisons, working to advance the adoption and implementation of health care information technology.
- **NAPCI—National Alliance for Primary Care Informatics ([www.napci.org](http://www.napci.org))**  
A coordinating group of primary care organizations committed to the development and implementation of a national strategy for the use of information technology and management in primary care.
- **NHII—National Health Information Infrastructure (<http://aspe.hhs.gov/sp/nhii>)**  
An HHS (Health and Human Services) initiative “set forth to improve the effectiveness, efficiency, and overall quality of health and health care in the United States.”
- **NHIN—National Health Information Network**  
The goal of David Brailer, MD, this network would link disparate health care information systems together to allow patients, physicians, hospitals, public health agencies, and other authorized users across the nation to share clinical information in real-time under stringent security, privacy, and other protections.
- **ONCHIT—Office of the National Coordinator for Health Information Technology ([www.hhs.gov/healthit](http://www.hhs.gov/healthit))**  
Office of Dr David Brailer.
- **PEHRC—Physicians’ EHR (electronic health record) Coalition ([www.pehrc.org](http://www.pehrc.org))**  
More than 20 organized medicine groups (eg, AAP, AMA [American Medical Association], AAFP, etc) addressing physician interests with EMR (electronic medical record) and other health care information technology projects. Its goal is to assist physicians, particularly those in small- and medium-size ambulatory care medical practice, to acquire and use affordable, standards-based EHRs and other health information technology to improve quality, enhance patient safety and increase efficiency.
- **PHII—Public Health Informatics Institute (formerly All Kids Count) ([www.phii.org](http://www.phii.org))**  
Funded by The Robert Wood Johnson Foundation to advance public health practitioners’ ability to strategically apply and manage information systems.
- **SCOCIT—Steering Committee on Clinical Information Technology ([www.scocit.org](http://www.scocit.org))**  
The AAP information technology group and your source for pediatric HIT.
- **TEPR—Towards an Electronic Patient Record ([www.medrecinst.com/conferences/tepr/2005/index.asp?id=121](http://www.medrecinst.com/conferences/tepr/2005/index.asp?id=121))**  
A conference from the Medical Records Institute (MRI) that selects a faculty of 450 experts to present analyses and descriptions of new approaches, successes, and pitfalls in the EHR arena.

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# Electronic Medical Records for Pediatricians: Learning and Working Together in Washington, DC



by Mark Weissman, MD, FAAP  
Member, Steering Committee on Clinical Information Technology

Close to 200 pediatricians and office managers in the Washington, DC, region attended a half-day education program (December 8, 2004, in Vienna, VA) on "Pediatric EMRs," sponsored by their local pediatric practice network, Children's National Health Network (CNHN). The program was added to the CNHN's yearly Pediatric Practice Management Seminar to help member pediatricians learn more about electronic medical records (EMRs) for their pediatric practices. The CNHN partnered with the American Academy of Pediatrics (AAP) chapters in Washington, DC, Maryland, and Virginia to make the program available to any interested pediatrician in the mid-Atlantic region. Attendees traveled from as far as Pennsylvania and Norfolk, VA.

Affiliated with Children's National Medical Center (Washington, DC), the CNHN includes more than 400 primary care pediatricians in 125 independent pediatric practices in Maryland, Virginia, and Washington, DC. Very few mid-Atlantic practices currently use EMRs. To assist network pediatricians in EMR education, the CNHN sought to replicate the "Pediatric EMR Challenge" offered at TEPR's (Towards an Electronic Patient Record) May 2004 program. Leading pediatric EMR vendors were "challenged" to demonstrate how well their EMRs captured common pediatric office scenarios (eg, an unscheduled sick sibling at a well child visit) play-acted, and documented real-time at the session. Joseph H. Schneider, MD, MBA, FAAP, and Eugenia Marcus, MD, FAAP, Steering Committee on Clinical Information Technology (SCOCIT) Executive Committee members and 2004 TEPR moderators, provided guidance and assisted with developing the office case scenario for the EMR demonstration. Dr Marcus opened the session with a lunchtime presentation: "Electronic Patient Management: When, Not If." Dr Marcus and Mark Weissman, MD, FAAP, CNHN medical director, then acted out the office visit and moderated the EMR presentations.

Four of eight invited EMR vendors accepted the "challenge": Electronic Healthcare Systems, Inc (Birmingham, AL), JMJ Technologies, Inc (Atlanta, GA), NextGen Healthcare Information Systems (Horsham, PA), and Noteworthy Medical Systems, Inc (Mayfield Heights, OH). While not a scored competition, all 4 companies were clearly up to the challenge. All demonstrated the ability to quickly document a pediatric office visit and anticipate the special clinical data and practice management needs (eg, growth charts, immunization tracking,

age-appropriate well child visits, weight-specific dosing) and office workflow that make the EMR needs of pediatricians unique and more than just an ambulatory or adult product.

The CNHN has conducted on-site EMR interest and readiness surveys at its last 2 practice management seminars (Figure 2). Results suggest an increasing interest in EMR transition, but still a significant need for assistance with education, purchase, implementation, and support. Based on survey results, the CNHN has formed its own "EMR Interest Group." Working with the AAP/SCOCIT and other networks around the country, this group plans to assist our local pediatricians in EMR education, purchase, and support. The CNHN hopes that the AAP and other practice networks can play a role identifying and disseminating "best practices" (and worst mistakes to avoid) to achieve successful EMR implementation.

Local EMR-interested pediatricians see many barriers beyond the cost of purchasing an office EMR system, including hardware and network expense, training and ongoing tech support, managing existing paper records, and integrating with existing or new practice management systems and office workflow. Unbiased case studies/business analyses of the impact of EMR implementation on pediatric practice workflow and revenue need to be identified.

In our DC region, most pediatricians still practice in small, independent group practices. The CNHN's EMR Interest Group is exploring whether developing a network business model for EMR group purchase and support might be timely and of value to our independent practices. In particular, developing a network application service provider (ASP) model opportunity for independent practices might offer small practices an earlier opportunity to get an affordable pediatric EMR and local practice tech support. The CNHN welcomes hearing from other networks around the country that have developed successful models or might be interested in collaborating on such an initiative. Contact Mark Weissman, MD, CNHN medical director, at [mweissma@cnmc.org](mailto:mweissma@cnmc.org).

*Mark Weissman, MD, FAAP, is medical director of Children's National Health Network and chief of general pediatrics at Children's National Medical Center in Washington, DC. He has no financial relationships with any of the companies listed above.*

Figure 2. Electronic Medical Record (EMR) Interest and Readiness

