

Letter to the Editor

Physician needs in health informatics: Just ask the docs

To the Editor:

An electronic survey of 107 allergists/immunologists in key leadership positions was undertaken to elicit their anonymous suggestions on electronic medical records (EMRs) and encompassing informatics infrastructure. Their views were solicited on the use of informatics for individualized and cutting-edge care.

Health information technology can help provide economical and effective care. It can potentially facilitate the translation of bench findings into clinical practice and the personalization of care. However, financial barriers, lack of system interoperability, need for a certified EMR, and legislative, ethical, and patient privacy concerns have impeded the adoption of EMRs. A recent survey¹ of hospitals reported that physician resistance was the second most important impediment (36%) after financial issues, even in hospitals that already had an EMR system. The American Recovery and Reinvestment Act of 2009 offers financial incentives for the adoption of health information technology. Given the documented concerns of physicians regarding adverse effects on productivity,^{2,3} it is important that their thoughts be heeded in shaping contemporary EMR systems as the nation prepares for large-scale deployment.

The survey (see Fig E1 in this article's Online Repository at www.jacionline.org) was carefully developed by the investigators, based in part on a previously published model that differentiates basic from fully functional EMR systems.⁴ Features that differentiate a fully functional EMR system from a basic system (Table I) are comprehensive order entry and results management (eg, electronic prescriptions and orders for laboratory and radiology tests, inclusion of electronic images with reports), and clinical decision support (eg, drug interaction warnings and guideline-based interventions). The survey explored which EMR features were available to the respondents and explicitly solicited suggestions for personalizing care and aspects of the informatics infrastructure that could accelerate the transition from bench to clinic. It consisted of multiple-choice questions estimated to take only 5 to 10 minutes to complete. Respondents were asked to limit their selection to a maximum of 5 to 6 choices for questions where the concurrent selection of multiple choices was applicable. Text boxes were included for voluntary supplementary information. The survey was pilot tested using a 6-member focus group (fellows-in-training and academic faculty) with feedback used for modifications and refinement. The project was approved by the Institutional Review Board of the Children's Mercy Hospital and Clinics.

A group of specialists in allergy, asthma, and immunology in key leadership positions—all members of the Board of directors of the American Academy of Allergy, Asthma & Immunology (AAAAI); the American College of Allergy, Asthma and Immunology; the Joint Council of Allergy, Asthma and Immunology; the American Board of Allergy and Immunology; the Interest Section leadership of the AAAAI; and the Annual Meeting Program Committee of the AAAAI, representing varied areas of expertise, geographical regions of the United States and post-fellowship training experience—was invited to participate in an

TABLE I. Advanced EMR features available to physicians

Features in fully functional EMR systems	n = 103*
Notes including medical history and follow-up	79
Orders for laboratory tests	59
Orders for radiology tests	59
Prescriptions sent electronically	59
Orders sent electronically	47
Electronic images returned	45
Warnings of drug interactions or contraindications provided	54
Out-of-range test levels highlighted	61
Reminders regarding guideline-based interventions or screening	27
All of the above	14

*A few respondents skipped the questions summarized in the tables.

anonymous Web-based survey conducted in January and February 2009. A total of 150 subjects received an initial e-mail with a concise cover letter and a link to the survey. A reminder e-mail was sent after 1 to 2 weeks.

The survey was completed by 107 respondents (71% response rate). No complaints on item wording were received. We assessed Kuder-Richardson (KR-20) scores for groups of related questions with each item scored as a binary (yes or no) response to provide evidence for the consistency of respondents. The Kuder-Richardson score is a measure of internal consistency of items and scales when items on a scale have dichotomous responses like YES or NO. The high KR-20 scores obtained—health information (.8543), order entry management (.7259), results management (.8329), clinical decision support (.7954), patient usefulness (.9192), and use of system prompts (.7748) suggest consistency in our groupings.

Items on the survey about translational research and personalization of EMR (Tables II and III) requested multiple responses on the groupings. Tetrachoric correlations could not be used in a factor analysis of grouping of survey items because of the small number of respondents relative to items.

This is the first study exploring perspectives of allergists/immunologists on EMR and health informatics. Half the respondents spent their time in clinical care, and two fifths in both clinics and research; one tenth were primarily researchers. Seventy-one percent of respondents had 10+ years in practice since fellowship training. Ninety-three percent indicated that they were at least somewhat familiar with the use of EMR. This differs from previous reports.^{5,6}

Yet access to key elements of EMR is lacking. Twenty-five percent of systems did not have patient problem lists, 15.6% did not have electronic lists of medications, and approximately half lacked capacity to view radiologic and other tests. As reported in other studies,^{1,4} a large proportion of deployed EMR systems are basic. A summary of the response to advanced features found only in fully functional features is given in Table I. Although several respondents reported having some of the advanced features, guideline-based prompts were found only in about one fourth of the systems, and only 13.6% had fully functional systems.

The responses to the question "How can informatics be used to make medical care more personalized?" are summarized in Table II. An overwhelming majority of respondents (82.5%) wanted the ability to link prescription files to insurance formularies, indicating

TABLE II. Elements of EMR desired by physicians to personalize care

Potentially useful EMR features	n = 103
Linking patient insurance plan to medications that can be prescribed and will be covered	85
Automatic translation of physician notes into standard codes	59
An EMR alert that provides an evidence based guideline or link to evidence-based information	51
The ability to carry out free-text searches within medical record databases (eg, search for the word “asthma” anywhere in the physician notes)	50
Having less free text entries in EMR (ie, having more pulldowns or check boxes)	46
Automatic notification of missed follow-up appointments	46
The ability to carry out field-specific searches within medical record databases (eg, search for patients with a family history of asthma)	44
The ability to combine relevant public biological (genetic, pharmacogenomic) data from bioinformatics resources with private patient data (eg, link to a genetic test for β -receptor polymorphisms in a patient with asthma on an ICS-LABA combination product)	38
The ability to combine data sets and increase statistical power without violating HIPAA (eg, values of specific IgE to peanut in children between 5 and 15 years seen between January 2007 and January 2008 in 2 different hospitals)	38
The ability to combine relevant environmental data from external sources with EMR patient data (eg, linking patient’s symptoms to local pollen count)	26
Integration of EMR with an expert system that simulates medical expertise	23

ICS-LABA, Inhaled corticosteroid-Long acting beta agonist; HIPAA, Health Insurance Portability and Accountability Act.

TABLE III. Physician-recommended strategies that would improve translation of research to clinical care

Potentially useful strategies	n = 100
Improving informatics for integrating findings (ie, combining data from different sources with different formats)	49
Improving informatics for analyzing findings (ie, finding patterns or generating and testing hypotheses)	49
Providing automated summary of updates in specialty backed by recent literature	48
Offering training programs in informatics for clinicians	48
Providing a Web-based question answering system to keep abreast of advances in field (eg, are there any drugs that can combine with drug X to decrease its side-effects when used for chronic urticaria?)	42
Having fewer free text entries in EMR; being able to carry out precise searches within medical record databases	36
Increasing collaborative research between basic and clinical scientists	34
Offering training programs in medicine for informaticians	17
Offering training programs in medicine for basic scientists	11
Offering training programs in bench research for clinicians	10

a desire to improve efficiency and quality of care provided. The responses suggest that physicians value comprehensive search capabilities. They also want to ensure that patients are managed appropriately, using the latest scientific evidence, with an EMR alert to identify appropriate evidence-based information.^{7,8} Automated monitoring of missed follow-up appointments and support for integrating EMR with genetic and pharmacogenomic data for both practice and study was desired. There was less interest in environmental data (eg, the ability to combine EMR patient data with local pollen count) or expert systems (eg, a computer system that simulates medical expertise).

The responses to the question “How can informatics help to translate bench findings to clinical practice?” are summarized in Table III. There is a perceived need to improve informatics for both integration and analysis of data. The need to stay current was emphasized by a preference for automated summaries of updates and Web-based questioning answering systems. About a third of respondents wanted more collaborative research between basic and clinical scientists. Opinions on the importance of cross-disciplinary training programs revealed an interesting perspective. Training programs in informatics for clinicians were perceived as being more important than training programs in medicine for informaticians or basic scientists. Only 10% thought that exposure to bench research for clinicians would be helpful in translating bench research to clinical practice.

The small number of open-ended responses (35 of 721 possible) to the “other” category provided for each question suggests that the choices provided accommodated most responses.

Additional ideas typed in by the respondents included integration of the personal health record with EMR⁹ and more interactive access to the system (eg, “Ability to view information in more than one window at a time”). Aspects counter-productive to personalization of care included the following: “Having to look at computer instead of at the patient makes care impersonal.” Two respondents commented that training programs for clinicians need to be meaningful and efficient, that all clinicians (and not just hospitalists) need to have access to health information technology, and that quantity and diversity made currently available information online daunting to navigate.

Do physician researchers have a different perspective on desirable features in an EMR system compared with those who spend their time exclusively in the clinic? This question was explored by comparing the responses of the 2 groups to the questions “How can informatics be used to make medical care more personalized?” and “How can informatics help translate bench findings to clinical practice?” Physician researchers included the following 2 choices in their top 6 more often than those who spent their time mainly in the clinic: (1) the ability to exploit bioinformatic/genetic information to improve care (50% vs 28%; $P = .03$, χ^2) and (2) the need to improve informatics methods (60% vs 42%; but $P = .09$).

On-the-field clinical providers are valuable resources to facilitate refinement of health informatics technology to personalize medicine. Actively involving practicing physicians in the design, selection, and deployment of EMR systems is necessary for meaningful adoption and consequent improvement in health care.

Deendayal Dinakarbandian, MD, PhD, MS^a
Arthur R. Williams, PhD, MA(Econ), MPA^b
Chitra Dinakar, MD^c

From ^athe School of Computing and Engineering, University of Missouri–Kansas City;
^bthe Center for Health Outcomes and Health Services Research, Children’s Mercy
Hospitals and Clinics and University of Missouri Medical School, Kansas City; and
^cthe Division of Allergy and Immunology, Children’s Mercy Hospitals and Clinics,
University of Missouri–Kansas City, Kansas City, Mo. E-mail: cdinakar@cmh.edu.

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Physician Needs for Informatics in Allergy, Asthma and Immunology

1. Default Section

* 1. How familiar are you with electronic medical records (EMR)?

- ☐ Very familiar
 ☐ Somewhat familiar
 ☐ Never used it

2.

Does your practice have a computerized system for any of the following? (Please check all that apply for each section below). Please add any additional features in the text boxes. We welcome your ideas.

1. Health Information

- ☐ Patient demographics
☐ Patient problem lists
☐ Electronic lists of medications taken by patients

Other (please specify)

2. Clinical notes

- ☐ Notes including medical history and follow-up

Other (please specify)

3. Order entry management

- ☐ Orders for prescriptions
☐ Orders for laboratory tests
☐ Orders for radiology tests
☐ Prescriptions sent electronically
☐ Orders sent electronically

Other (please specify)

4. Results management

- ☐ Viewing laboratory results
☐ Viewing imaging results
☐ Electronic images returned

Other (please specify)

FIG E1. Survey questions used to assess physician needs for informatics in allergy, asthma, and immunology.

Physician Needs for Informatics in Allergy, Asthma and Immunology**5. Clinical decision support**

- ☐ Warnings of drug interactions or contraindications provided
- ☐ Out-of-range test levels highlighted
- ☐ Reminders regarding guideline-based interventions or screening

Other (please specify)

3.**1. Does your system allow patients to do the following? (Please check all that apply)**

- ☐ View their medical records online
- ☐ Make changes to or update their medical records online
- ☐ Request appointments online
- ☐ Request referrals online
- ☐ Request refills for prescriptions online
- ☐ Use email for communication

4.**1. Has a prompt from the electronic-records system ever helped you do the following? (Please check all that apply)**

- | | |
|---|--|
| ☐ Prevent a drug allergy incident | ☐ Provide preventive care |
| ☐ Prevent a potentially dangerous medication interaction | ☐ Order a laboratory test that made an important difference in patient care |
| ☐ Be alerted to a critical laboratory value | ☐ Order a genetic test in a clinical/research setting |

5.**FIG E1.** (Continued).

Physician Needs for Informatics in Allergy, Asthma and Immunology

*** 1. How can informatics be used to make medical care more personalized? Please select UP TO SIX features in the following list that you believe are the most helpful. Add your thoughts in the text box if you have additional suggestions. We welcome your ideas.**

- ☐ Having less free text entries in the EMR (i.e., having more pulldowns or check boxes)
- ☐ Automatic translation of physician notes into standard billing or diagnostic codes
- ☐ An EMR alert that provides an evidence based guideline or link to evidence-based information
- ☐ Linking patient insurance plan to medications that can be prescribed and will be covered
- ☐ Automatic notification of missed follow-up appointments
- ☐ The ability to carry out field-specific searches within medical record databases (e.g., search for patients with a family history of asthma)
- ☐ The ability to carry out free-text searches within medical record databases (e.g., search for the word 'asthma' anywhere in the physician notes)
- ☐ The ability to combine relevant environmental data from external sources with EMR patient data (e.g. linking patient's symptoms to local pollen count)
- ☐ The ability to combine relevant biological (genetic, pharmacogenomic) data from bioinformatic resources with private patient data (e.g. link to a genetic test for betareceptor polymorphisms in an asthmatic patient on an ICS-LABA combination product)
- ☐ The ability to combine data sets and increase statistical power without violating HIPAA (e.g. values of specific IgE to peanut in children between 5-15 years of age seen between 1/07-1/08 in two different hospitals)
- ☐ Integration of the EMR with an expert system that simulates medical expertise

Other (please specify)

6.

FIG E1. (Continued).

Physician Needs for Informatics in Allergy, Asthma and Immunology

*** 1. How can informatics help translate bench findings to clinical practice? Please select UP TO FIVE choices that you believe will have the maximum impact. Please add additional suggestions/comments in the textbox.**

- ☐ Need to improve informatics for integrating findings (i.e., combining data from different sources with different formats)
- ☐ Need to improve informatics for analyzing findings (i.e., finding patterns or generating and testing hypotheses)
- ☐ Having less free text entries in the EMR; carrying out precise searches within medical record databases
- ☐ Automated summary of updates in your specialty backed by recent literature
- ☐ More collaborative research between basic and clinical scientists
- ☐ Training programs in informatics for clinicians
- ☐ Training programs in bench research for clinicians
- ☐ Training programs in medicine for basic scientists
- ☐ Training programs in medicine for informaticians
- ☐ A web-based question answering system to keep abreast of advances in your field (e.g. Are there any drugs that I can combine with drug x to decrease its side-effects when used for chronic urticaria?)

Other (please specify)

7.

*** 1. How would you classify yourself?**

- ☐ The majority of my time is spent in clinical care
- ☐ I am active both as a clinician and a researcher
- ☐ The majority of my time is spent on research

*** 2. How many years has it been since completion of fellowship training?**

- ☐ Less than 5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ 21-30 years
- ☐ 31 years or more

**3. THANK YOU VERY MUCH FOR YOUR TIME AND INPUT. YOUR THOUGHTS ARE HIGHLY APPRECIATED.
PLEASE ADD ANY ADDITIONAL THOUGHTS/COMMENTS.**

FIG E1. (Continued).