Moving toward a United States strategic plan in primary care informatics: a White Paper of the Primary Care Informatics Working Group, American Medical Informatics Association

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On behalf of the AMIA Primary Care Informatics Working Group

ABSTRACT

The Primary Care Informatics Working Group (PCIWG) of the American Medical Informatics Association (AMIA) has identified the absence of a national strategy for primary care informatics. Under PCIWG leadership, major national and international societies have come together to create the National Alliance for Primary Care Informatics (NAPCI), to promote a connection between the informatics community and the organisations that support primary care. The PCIWG clinical practice subcommittee has recognised the necessity of a global needs assessment, and proposed work in point-of-care technology, clinical vocabularies, and ambulatory electronic medical record development.

Educational needs include a consensus statement on informatics competencies, recommendations for curriculum and teaching methods, and methodologies to evaluate their effectiveness. The research subcommittee seeks to define a primary care informatics research agenda, and to support and disseminate informatics research throughout the primary care community. The AMIA board of directors has enthusiastically endorsed the conceptual basis for this White Paper.

Keywords: clinical practice, education, infrastructure, research, strategy, United States of America
'Every primary care provider will use information technology that includes electronic health records with the ability to access and communicate needed clinical information to achieve high quality, safe, and affordable health care.' (Vision statement, Primary Care Informatics Working Group, American Medical Informatics Association)

Introduction

Primary care informatics is defined by the Primary Care Informatics Working Group (PCIWG) as the application of information technology to improve the practice, education and research of primary care, and the development of informatics tools appropriate for primary care practice. Primary care informatics brings the tools of information technology to the special constraints of primary medical care practice and the primary care environment. These unique aspects include an emphasis on the ambulatory care setting, where a wide range of common problems are encountered in the initial patient contact. Needs for decision support are unique, since the care of the patient is continuous over the lifespan, with special emphasis on comprehensive and preventive aspects of care. The patient population is large, diverse and family-oriented. The primary care provider is frequently called upon to co-ordinate the services of multiple consultants and ancillary healthcare providers, posing special challenges in the area of data capture. Individual patient encounters are brief, taking place in small office settings with limited on-site technology resources, and limited financial resources due to low margins. Unique information needs in this setting include rapid, 'just-in-time' access to medical knowledge at the point of care, applications which support continuity and coordination of care, and high-intensity doctor–patient communications.

The PCIWG of the American Medical Informatics Association (AMIA) has been developing a National Strategic Plan for Primary Care Informatics since November 1999. These efforts have produced a strategy encompassing the efforts of four subcommittees: informatics infrastructure, clinical practice, education and research. Each subcommittee contributes to the overall vision of the working group to promote the development and utilisation of information technology to improve the quality of ambulatory patient care.

The strategic plan was initiated under the direction of Dr John Zapp, then chair-elect of the PCIWG, in concert with Dr Moon Mullins, who championed the development of a PCIWG White Paper.1 The White Paper identified the absence of a national strategy for the use of information technology and management in primary health care, and the critical need for a centralised and co-ordinated 'one voice' for primary care informatics in the United States of America (USA). The paper identified important obstacles to the development of primary care informatics in the US, including the wide variety of primary care providers (general internal medicine, family practice, paediatrics, emergency medicine, nurse practitioners and others), sectors (public, private, academic and military), payers and vendors.

The PCIWG concluded that without such a ‘voice’ it would be nearly impossible to develop and implement an informatics strategy necessary to provide practitioners, and our patients, with the tools needed to improve the safety and quality of health care. It concluded with the following goals:

- To create strategic alliances that would become the ‘one voice’ for primary care.
- To promote the development of standards in clinical, educational and research informatics.

Following the development of the White Paper, the PCIWG leadership convened a series of summit meetings with leaders of major national and international primary care societies to build a consortium to become the ‘one voice’ (see Box 1). The first summit in November 2000 resulted in the development of the

Box 1 Participants in the National Alliance for Primary Care Informatics (NAPCI)

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<tr>
<th>Organization</th>
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<tr>
<td>American Academy of Family Physicians</td>
<td><a href="http://www.aafp.org">www.aafp.org</a></td>
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<tr>
<td>American Academy of Pediatrics</td>
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<td>Ambulatory Pediatrics Association</td>
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<tr>
<td>Society of General Internal Medicine</td>
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<td>North American Primary Care Research Group</td>
<td><a href="http://www.napcrg.org">www.napcrg.org</a></td>
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<td>Society of Teachers of Family Medicine</td>
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<td>Agency for Healthcare Research and Quality</td>
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<td>American Medical Informatics Association</td>
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<td>International Medical Informatics Association</td>
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<tr>
<td>World Organisation of Family Doctors (Wonca)</td>
<td><a href="http://www.globalfamilydoctor.com">www.globalfamilydoctor.com</a></td>
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vision statement, which was subsequently endorsed by every participating organisation and the PCIWG. The group agreed to move forward as an unfunded, volunteer alliance. The consortium subsequently adopted its new name, the National Alliance for Primary Care Informatics (NAPCI) and established two working goals: development of a White Paper on the role of the NAPCI, and continued exploration of funding sources for a working headquarters of NAPCI that could begin the actual work of planning and developing positions with the member organisations as well as with additional members to be defined (such as vendors, consumers, payers and government).

As the NAPCI organisation evolves, the PCIWG continues to work within AMIA to identify and address key issues in primary care informatics in the US. In conjunction with the AMIA 2001 Fall Symposium, each of the four PCIWG subcommittees met to update their goals and objectives for the working group in support of the vision statement. These goals are incorporated into the PCIWG Strategic Plan presented here.

Informatics infrastructure

The informatics infrastructure subcommittee examines the state of informatics within primary care practices across the US, including issues of funding, consensus building and representation of informatics interests in the future directions of the American healthcare system. In establishing the national infrastructure for primary care informatics, two key functions have been identified. The first is to disseminate the primary care informatics vision to all relevant interests throughout the healthcare system – clinicians, academic organisations, healthcare organisations, payers, policy makers, patients and informaticians. The working group has already met with success in communicating these notions, with recent publications on the need for primary care informatics funding, bioterrorism and the need for electronic medical records in ambulatory practice.1–3

The second function is to unite primary care societies in developing and refining this vision through the NAPCI organisation. This alliance is positioned to assume a leadership role in shaping the future of primary care informatics, and to promote a vital connection between the informatics community and the organisations that support primary care practice, training and research. NAPCI is presently seeking funding for a central office to co-ordinate its next phase of growth, the inclusion of additional primary care societies, vendors, payers, consumers and the government to develop and implement an effective national strategy for primary care informatics.

Clinical practice

The clinical practice subcommittee of the PCIWG exists to promote the incorporation of informatics applications to improve clinical practice in the ambulatory setting. The strategy of this group is to define the information technology needs of the practising clinician, and to advocate for the development and implementation of tools for clinical practice. To address these needs, the group has proposed four goals.

1 To examine the practice of primary care in the ambulatory setting, and conduct a global ‘needs assessment’ for information technology applications in clinical practice.

2 To review and evaluate point-of-care technology to meet the information needs of practising clinicians. The clinical practice subcommittee proposes to serve as an information conduit to assist in the development of point-of-care applications by the following objectives:
   • to catalogue and publish existing resources of clinical information;
   • to work with AMIA to create a mechanism to endorse the reliability of clinical information (‘seal of approval’) for point-of-care applications;
   • to examine the existing resources in the context of primary care practice, with the goal of defining the future information needs of the clinician in ambulatory practice.

3 To evaluate clinical vocabularies, such as SNOMED CT (SNOMED Clinical Terms) and progress toward better clinical coding strategies for ambulatory practice. There has been a long-standing disparity between clinical diagnoses and billing codes, particularly in the ambulatory setting. The presence of a strong primary care voice in the ongoing development and implementation of clinical vocabularies will facilitate improvements in coding and billing, and lay the framework for a standardised vocabulary to support the evolution of an ambulatory electronic medical record.

4 To define and communicate the essential components, features and functions of an electronic medical record in primary care. The electronic medical record (EMR) deployment in the US is substantially behind that of many other countries. Many factors pose as obstacles to EMR utilisation, especially in the ambulatory care setting. A number of these obstacles, identified by the clinical subcommittee,
are outlined in Box 2. This list is by no means exhaustive.

**Box 2 Essential components of the ambulatory electronic medical record (EMR)**

Technical features
- Clinical interfaces
- Billing interfaces
- Legacy data access
- Lifetime clinical records created from multiple sources
- International coding standards

Usability features
- Enhancement of clinical process
- Point-of-care usability

Functionality features
- Problem list
- Allergy list
- Medication list
- Laboratory results
- Radiology results
- Problem-oriented documentation
- Formulary
- Linkages with common problems or diagnoses within an episode of care
- Documentation of non-face-to-face care for clinical, legal, and reimbursement purposes

Barriers to EMR adoption
- Cost
- Organisational dynamics
- Provider adoption
- Point-of-care and problem-solving adaptability
- Consumer attitudes
- Medicolegal considerations; EMR ‘code of ethics’
- Range of functionality: do all practices need the complete system?
- Evolution

Vendor accreditation process

Security and privacy initiatives
- HIPAA (Health Insurance Portability and Accountability Act of 1996)
- Digital signatures

Personal (patient) access
- Ownership of information
- Records transfer
- Real-time authorisation for disclosure

Cost-effectiveness/return on investment

Legacy systems

The clinical subcommittee proposes to provide a clinical voice to the EMR development process. The greatest stumbling block to the ambulatory EMR is not technological, but organisational. Primary care clinicians need to have a seat at the table in the design and implementation of EMR technology. Through its liaison with primary care organisations within NAPCI, the clinical subcommittee will develop recommendations for vendors, funding agencies, and clinicians to address the fundamental and practical implementation issues surrounding the ambulatory EMR.

At present, the PCIWG lacks the manpower and budgetary resources to embark upon objectives of this magnitude. These objectives represent the types of activities that could be accomplished through the combined efforts of the major primary care societies within the ‘one voice’. These projects would become priorities for NAPCI when it becomes a funded and sustainable entity.

**Education**

The education subcommittee of the PCIWG exists to promote the development of informatics knowledge and skills across the spectrum of primary care. The subcommittee seeks to address the educational requirements of five groups: medical students, primary care residents, practising physicians, primary care faculty and primary care informatics specialists. Specific goals of the education subcommittee include:

- **Establishing a consensus statement on informatics competencies.** The task of producing a single, comprehensive set of recommendations for the primary care arena will involve the input of organisations within each of the relevant disciplines. National organisations such as the Association of American Medical Colleges, and the Accreditation Council for Graduate Medical Education have produced recommendations.4-6 Specialty-specific groups within primary care have also defined skill sets for their own audiences. The International Medical Informatics Association (IMIA) has also produced useful recommendations for health informatics education.7 These guidelines advocate a ‘train the trainers’ approach to dissemination of competencies, while serving as a model for initiatives in individual nations. We seek to build upon these recommendations in a more specific fashion, incorporating the unique needs of the primary care physician for longitudinal, integrated practice in the ambulatory setting. The education subcommittee recognises the need for a unified strategy for developing and disseminating informatics competencies throughout primary care.
We aspire to work through NAPCI to serve as a clearing house in defining informatics competencies, and to develop a body of educational resources to assist the various societies in meeting their training needs.

- **Establishing recommendations for curriculum and teaching methods.** Once the core competencies for training have been established, the subcommittee will devise curriculum recommendations for each level of training. Many of these recommendations will be derived from existing programmes in the US, the UK and Australia. The curriculum will be designed to incorporate informatics training into existing primary care education, including an assessment of the resources needed to implement such training activities.

A critical element in the integration of informatics into clinical teaching and practice will be the effective modelling of these core skills by faculty mentors. Thus, a successful faculty development strategy will be essential to encourage physicians in training to implement technology into their future practices. The eventual aim is to incorporate information management skills into the daily practice of medicine, rather than to advocate the use of technology for its own sake.

- **Disseminating these recommendations, and facilitating communication among professional and academic organisations across multiple disciplines.** Interest in teaching informatics skills in primary care is broad based, throughout undergraduate medical centres, residency programmes, faculty development initiatives, and continuing education programmes. Once a set of recommended competencies and teaching methods is developed, the committee envisions its role as a clearing house, where interested individuals may obtain the necessary resources and support to conduct their own programmes rather than reinventing the wheel.

This function will be enhanced further as the working group develops a network of faculties and clinicians with common interests. We will seek to encourage collaborative relationships and joint projects across institutions and disciplines. The development of NAPCI as a unified voice for informatics will provide opportunities to disseminate our findings. The PCIWG website (www.amia.org/working/pci/main.html) and printed publications will provide further opportunities to communicate our recommendations.

- **Evaluating the effectiveness of the informatics curriculum across the variety of primary care academic settings.** The long-term vision for the education subcommittee will involve evaluative studies of the effectiveness of informatics education. Baseline studies of informatics competencies, and comparative studies of curricula between institutions will document its benefits and lead to ongoing curriculum improvements. The multidisciplinary focus of the PCIWG and its clearing house functions will lend themselves to collaborative opportunities among multiple institutions.

### Research

The research subcommittee serves to propose, encourage, support and help with the dissemination of research activities that lead to the discovery of new knowledge that supports the practice of primary care. A central theme of the strategic plan is to think about research with an eye toward primary care.

- **How do we ensure that the findings of other research projects generalise to the world of primary care?**
- **Given the unique aspects of primary care practice, what areas of discovery are needed specifically for this domain, and how do we ensure that these areas are being addressed?**

The research strategic plan complements the clinical and educational plans of the working group. The research subcommittee has formulated four major goals.

1. **To promote funding for primary care informatics research.** The research subcommittee proposes to support research funding by identifying and publishing a list of current resources, and advocating for new support. Further, the subcommittee will explore mechanisms to obtain seed money to fund programmes for primary care informatics research projects.

2. **To define the primary care informatics research agenda.** The subcommittee proposes to develop White Papers on the primary care informatics research agenda, and the infrastructure necessary to support it. A recent literature review revealed that the primary care informatics literature contains many descriptive studies on individual interventions, but a paucity of evidence evaluating effects on patient outcomes.

   In order to follow through with the development of the primary care research agenda, the subcommittee will create partnerships with professional organisations, funding agencies, and vendors. These partnerships will address both national and global needs and explore opportunities to collaborate on multinational projects through the IMIA and other primary care informatics societies from around the world.

3. **To support informatics research and provide a primary care perspective.** Many of the research
activities throughout primary care interface with the informatics community. We will seek to collaborate with the North American Primary Care Research Group (NAPCRG) on their requirements and resources for primary care informatics projects. Opportunities for collaboration with practice-based research networks will also be explored. Practical projects, such as EMR usability studies, are another potential area for collaboration between the primary care clinical and informatics communities.

4 To disseminate results of primary care informatics research. The PCIWG has already enjoyed a measure of success in establishing a presence at the AMIA Fall Symposium. Additional dissemination of primary care informatics research will be pursued through IMIA, through a proposal to establish a yearbook section for primary care informatics.

An exciting development in primary care informatics is the relaunch in 2002 of the journal *Informatics in Primary Care*, which is now affiliated with AMIA. The research subcommittee will adopt this international journal as a mechanism to foster communication and enable collaboration in research.

**Discussion**

The field of primary care informatics is at a crossroads in its development. The US healthcare system lags far behind many other nations in its ability to employ information technology in the ambulatory care setting to provide co-ordinated and cost-effective care to the population. Recent bioterrorism attacks have dramatically demonstrated the absence of a ‘front line’ US primary care clinical information system capable of surveillance and early detection. Without such systems, delays in epidemiological tracking and intervention may result in a substantial increase in casualties as well as inappropriate management. AMIA, and particularly the PCIWG, is in a position to have a meaningful influence on the development and implementation of informatics systems to correct these deficiencies.

The PCIWG has proposed a co-ordinated strategy to promote the growth of informatics through developing a national infrastructure and facilitating clinical applications, education, and research. The key component to this strategy is consensus building with the influential organisations supporting all the primary care disciplines. The creation of NAPCI represents a significant first step in this process. Once the alliance is established and funded, NAPCI must embrace the collaboration of all stakeholders, support the evolution of the goals and objectives presented here, and lead primary care informatics to a new level of quality, safety, and responsibility.

On 3 April 2002, the AMIA board of directors endorsed the concepts set forth in the White Paper of the PCIWG *Moving Toward a United States Strategic Plan in Primary Care Informatics*. The board enthusiastically supports the plan’s ongoing development as an essential component of a comprehensive national information technology infrastructure necessary for safe patient care and national surveillance.

**REFERENCES**

1 Mullins HC and Zapp JA. Funding the infrastructure to support primary care informatics. *Informatics in Primary Care* 2002;10(1):45–7.


**CONFLICTS OF INTEREST**

None.

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