



May 10, 2006

Home

Site Map

Contact ASA

Join ASA!

Members Only

Search

Home >Newsletters >May 2006>Features

About ASA

Patient Education

Patient Safety

Clinical Information

Continuing Education Resources

Annual Meeting

Calendar for Meetings

Office of Governmental & Legal Affairs

Practice Management

Resident and Career Information

Placement Service

Publications and Services

Related Organizations

News Archives

Links of Interest

ASA NEWSLETTER

Index

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Medical Device Connectivity for Improving Safety and Efficiency*Julian M. Goldman, M.D.
Committee on Electronic Media and Information Technology****“Use wireless technologies to eliminate the ‘malignant spaghetti’ of cable clutter that interferes with patient care, creates hazards for the clinical staff and delays positioning and transport.”******“Synchronize the respiratory cycle of the anesthesia machine ventilator with portable X-ray exposure so that an X-ray will be triggered at end-expiration, thus avoiding the need to turn-off the ventilator for an intraoperative cholangiogram.”******“Trigger the portable X-ray at end-inspiration by synchronizing with the ICU ventilator.”******“Why can’t a pulse oximeter be connected to a PCA infusion and automatically interrupt the infusion and activate an alarm when a patient is hypoxic?”******“Support the recording of infusion pump data in the electronic anesthesia information system and permit control of the infusion rate at the anesthesia machine.”***

These are only a few examples of clinical scenarios provided by anesthesiologists to articulate their vision of improvements in clinical care that could be achieved by interconnecting medical devices.¹ The barriers to medical device connectivity (or “interoperability”) are well known to those anesthesiologists and clinical engineers who have tried to install anesthesia information management systems (AIMS) or to interconnect devices and computers for clinical research. In contrast to the ubiquitous USB memory devices that support effortless connectivity on all brands and types of modern computers, or the Internet browser programs and Web sites that enable secure banking over the Internet, we have not implemented equivalent secure, ubiquitous connectivity technology to

FEATURES

Health Information Technology: Changing the Practice of Anesthesia

- EMIT Committee: Helping ASA Members Stay in Touch With Technology
- **Medical Device Connectivity for Improving Safety and Efficiency**
- Handheld Computers: A Handy Overview
- Podcasting: Information How, When and Where You Want It
- Simulation: It’s for Real
- White Paper on Simulation: ASA Proposes Approval of Anesthesiology Simulation Programs
- Voice Over IP: The Future Is Calling

ARTICLES

- ASA Board of Directors Interim Meeting Summary
- 2006 Annual Meeting Plenary Session: John B. West, M.D., Ph.D.
- National Resident Matching Program Results for 2006
- Donation After Cardiac Death: Practical Issues and Ethical Dilemmas
- MHAUS to Offer Two Writing Awards

support vendor-neutral medical device networks. As a result, the cost and complexity of seamless connectivity is interfering with widespread deployment of AIMS, remote monitoring, use of comprehensive (laboratory + monitor) data to develop clinical decision support systems and smart alarms.

The importance of interoperability to support improvements in health care has been underscored by the establishment of the position of the National Health Information Technology (HIT) Coordinator on April 27, 2004, to provide leadership for the “development and nationwide implementation of an interoperable health information technology infrastructure to improve the quality and efficiency of health care.”²

The vision includes developing “a nationwide interoperable health information technology infrastructure that:

“2a. Ensures that appropriate information to guide medical decisions is available at the time and place of care;

2b. Improves health care quality, reduces medical errors and advances the delivery of appropriate evidence-based medical care;

2c. Reduces health care costs resulting from inefficiency, medical errors, inappropriate care and incomplete information; and

2d. Promotes a more effective marketplace, greater competition and increased choice through the wider availability of accurate information on health care costs, quality and outcomes.”

Similarly the 2005 Institute of Medicine Report, *Building a Better Delivery System: A New Engineering /Health Care Partnership*, emphasizes the need for a National Health Information Infrastructure “to support the information-driven practice of contemporary medicine. This infrastructure would consist of standards for connectivity, system interoperability, data content and exchange, applications and laws.”³

The absence of effective medical device connectivity has been due in part to an absence of implemented open standards, the lack of financial incentives for device manufacturers to provide systems to support vendor-independent connectivity, legal and regulatory concerns and unclear clinical specifications — or “clinical requirements” — for the proposed systems.

The national HIT agenda includes making the interoperability of electronic health care records (EHR) a reality, but we are concerned that EHRs will be neither complete nor accurate until the inclusion of medical device data is automated.

There are two distinct, and closely related, facets of medical device interoperability:


- *Data communication* standards will support accurate data acquisition by the EHR from monitors, infusion pumps, ventilators, portable imaging systems and other hospital and home-based medical devices. Reliable data will support complete and accurate EHRs and robust databases for continued quality improvement

- Anesthesiology in the News

DEPARTMENTS

- From the Crow's Nest
- Administrative Update
- Washington Report
- Practice Management
- State Beat
- What's New In ...
- Subspecialty News
- Residents' Review
- ASA News
- In Memoriam
- Letters to the Editor
- FAER Report

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 [2005 NL Subject Index](#)

 [2005 NL Author Index](#)

 [NL Archives](#)

 [Information for Authors](#)

use.

- *Medical device control* standards will permit the control of medical devices to produce “error-resistant” systems with safety interlocks between medical devices to decrease use errors, closed-loop systems to regulate the delivery of medication and fluids and remote patient management to support health care efficiency and safety (e.g., remote intensive care unit, management of infected/contaminated casualties).

The Medical Device Plug-and-Play (MD PnP) program was initiated in May 2004 at the Center for Integration of Medicine and Innovative Technology, or CIMIT, and Massachusetts General Hospital to identify and implement connectivity standards while ensuring that they remain clinically grounded <www.mdnpn.org>. ^{4, 5} The program has convened diverse stakeholders (clinicians, the Food and Drug Administration, manufacturers, biomedical and clinical engineers, clinical societies and others) to develop a roadmap for open-standards-based, vendor-neutral medical device interoperability. The early identification of the importance of basing interoperability solutions on clinical requirements led us to begin compiling the unique body of clinical requirements represented in the examples above. The clinical requirements were elicited from clinicians and engineers who were asked to provide examples of connectivity that could a) solve current clinical problems, b) improve safety or efficiency or c) enable innovative clinical systems of the future. A major goal is to identify potential solutions to perceived shortcomings of current clinical practice or ideas for future innovations that require improved interoperability for implementation. The MD PnP Lab, scheduled to open in the second quarter of 2006, provides a vendor-neutral environment in which to evaluate the feasibility of implementing some of these clinical scenarios, including evaluating connectivity products and standards as they are developed. The Lab thus provides the protected environment that will enable latent opportunities for improving patient safety to be explored and realized.

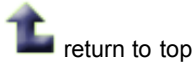
We will hold an open session at the ASA 2006 Annual Meeting in Chicago to gather *your* clinical requirements for inclusion in the master requirements list, which will guide national solutions. Feel free to get started now by sending your ideas to us at <asa@mdnpn.org> or posting your ideas and initiating discussion on the discussion area of <www.mdnpn.org> (free registration required to post information).

References:

1. Goldman JM, Whitehead SF, Weininger S. Eliciting clinical requirements for the Medical Device Plug-and-Play (MD PnP) Interoperability Program. *Anesth Analg*. 2006; 102:S1-54.
2. <www.whitehouse.gov/news/releases/2004/04/print/20040427-4.html>.
3. Reid PP, Compton WD, Grossman JH, Fanjiang G, eds. *Building a Better Delivery System: A New Engineering/Health Care Partnership*. Institute of Medicine and National Academy of Engineering. Washington, DC: National Academies Press, 2005.
4. Center for the Integration of Medicine and Innovative Technology, Cambridge, MA.
5. Goldman JM, Schrenker RA, Jackson JL, Whitehead SF. Plug-and-play in the operating room of the future. *Biomed Instrum Technol*. 2005; 39(3):194-199.



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return to top

[About ASA](#) | [Patient Education](#) | [Clinical Information](#) | [Continuing Education](#) | [Annual Meeting](#) | [Calendar of Meetings](#) | [Office of Governmental and Legal Affairs](#) | [Resident and Career Information](#) | [Placement Services](#) | [Publications and Services](#) | [Related Organizations](#) | [Recent News](#) | [Links of Interest](#)