AMERICAN COLLEGE OF EMERGENCY PHYSICIANS

SCIENTIFIC ASSEMBLY
1999

The Emergency Department of the Future

With new bedside technologies---computers, labs, diagnostics, and monitors---we have a wealth of information at our fingertips. This session will examine the role of these technologies in providing more efficient care to a greater number of patients in less time. Advice on the strengths and weaknesses of current emergency department management systems will be provided, as well as tips in selecting the most appropriate system. In addition, the clinical significance of emergency medicine--specific data standards will be explained.

- Describe the importance of computer technology as it relates to the delivery of care in the emergency department.
- List equipment and software currently available for managing emergency department flow and describe their limitations.
- Discuss the role of integrating bedside and laboratory information into computerized patient tracking.

WE-126
Wednesday, October 13, 1999
8:00 AM - 9:55 AM
Room # N212
Las Vegas Convention Center

FACULTY

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THE EMERGENCY DEPARTMENT OF THE FUTURE

1999 ACEP Scientific Assembly, Las Vegas

William H Cordell, MD

Indiana University School of Medicine-Methodist
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Countdown to the Third Millennium

The future is already here. It just isn't evenly distributed yet.

- This December 3 1, 1999, we will witness the concurrent end of a decade, century, and millennium. This be the first time in human history there has been a generally recognized transition from one calendar millennium to another. (Those who believe the end of the Millennium is actually December 3 1, 2000 are respectfully referred to the article by Loevinger.)

- The year 2000 is operating like a powerful magnet on humanity, amplifying emotions, accelerating change, heightening awareness and compelling us to reexamine ourselves, our values, and our institutions.(Naisbitt **&** Aburdene)

Studying the Future

- There are at least three compelling reasons why we as a specialty and as individuals should be interested in the study of the future:

  1. To identify opportunities.

  2. To anticipate risks.

  3. To serve as provocations for creative thinking.

Envisioning the Future in Order to Shape It

While the future is uncertain, and much of the future is beyond our control, there are large aspects of the future which we can control. Visions and strategies linked to a clear sense of trends and scenarios make us better able to shape the future we prefer.—Clement Bezold, Executive Director of the Institute for Alternative Futures

- A common occurrence in futures thinking is to project too little change. "Leaders at every level have usually assumed that their past experience is a fairly reliable guide to the future - the future will simply be a bigger and better version of the world with which they are familiar." But such thinking can lead to mistaken assumptions. Instead, we must make a conscious effort to be creative about envisioning the possible threats and opportunities we could face in the future. (C Bezold)

- Bezold noted that there is no single, certain forecast of any field, including healthcare. "While we would like to eliminate this uncertainty, we must be able to live with it effectively and use it creatively."

- To prepare for the uncertainty of the future more effectively, futurists, decision-makers, and planners have developed a wide range of techniques—examining trends, creating a vision, developing strategies, and composing and rehearsing alternative scenarios.

- Anticipating the future can be a positive, optimistic endeavor, one that gives us a sense of self-control over our destiny. Bezold noted we choose and create major aspects of the future by what we do or fail to do.

The Future as a Mind Change

The future is fundamentally a mind change.—Rear Admiral William Rowley

- As we envision and develop strategies for the future, we begin to see the present differently as well as developing "a strong tolerance for uncertainty." It is not critical that the forecasts or scenarios play out over time. We recognize our inability to predict the future. What is critical is that we see today differently and believe we influence the future rather than reacting to it. (W Rowley)

Pointers to more information ☞

3 **Article:** Cordell WH, Waeckerle JF: EM3M: Envisioning the future of emergency medicine (editorial). *Annals of Emergency Medicine* 1998;32:75-77.

3 **Article:** Loevinger L: *The* significance of *the* millennium. *Skeptical Inquirer* 1997;21:3 l-36.

3 **Book:** Naisbett J, Aburdene P: **Megatrends ZOO: Ten New Directions for the 1990s. New** York: William Morrow, 1990.

3 **Magazine and Web site:** *Wired* magazine (monthly in paper) and **www.wired.com.**

3 **Organization and magazine:** The **World Future** Society-Founded in 1966, the Society publishes The *Futurist,* a monthly magazine of forecasts, trends, and ideas about the future. For information, contact 301.656.8274 or **www.wfs.org/wfs.**

Information Management in Emergency Medicine

During the Industrial Age, we used machines to improve our lives by extending the capacity of our muscles. During the Information Age, we are improving our lives by extending the capabilities our minds.—Michael D McDonald

- Healthcare workers are knowledge workers.

- Information is used to make decisions.

- To most effectively influence decision-making behavior, information must be presented at the time the decision is being made (which for clinical decisions is usually at the point-of-care).

- Healthcare is one of the most information-intensive professions and businesses.

- Emergency Medicine is one of the most information-intensive healthcare specialties.

- Information technology is more than just computers and includes telecommunication devices and networking.

Pointers to more information ☞

➲ **Article:** Cordell WH, Overhage JM, Waeckerle JF, for the Information Management Work Group: Strategies for improving information management in emergency medicine to meet clinical, research, and administrative needs. Annals *of Emergency Medicine* 1998;3 1: 172-177 or *Academic Emergency Medicine* 1998;5: 162-167.

3 **Article:** Cordell WH: Information technologies in emergency medicine. *Academic Emergency Medicine* 1994: 1: 194- 197.

Potential Benefits of Improved Information Management

Taking responsibility for the costs of care of populations of people over time under a budget requires discipline and information.-Marshall Ruffin, MD, The Informatics Institute

An Opportunity to Reengineer

• "It is time to stop paving the cow paths. Instead of imbedding outdate processes in silicon and software, we should obliterate them and start over." (Michael Hammer)

Bridging "Islands of Information" and "Database Archipelagos"

• Developing an information infrastructure is more than just a "computer project." It is also a communications and systems project.

• Integration, networking, and communication with other systems is crucial.

• Managed care is in part predicated on the portability of information.

• Stand-alone systems are anachronisms.

Presenting Information at the Point-of-Care

Considerable experience to date has shown that computers can improve physician's problem solving and decision making by presenting pertinent data, information, and knowledge when it is needed, where it Is needed, and in an appropriate format.—ET Wong & TW Abendroth

• Reducing redundancy.

• Presenting cost information, counter-detailing at the point-of-care.

• Reducing error,

Pointers to more information ☞

3 **Article:** Tiemey WM, Miller ME, Overhage JM, McDonald CJ: Physician inpatient order writing on microcomputer workstations: effects on resource utilization. *JAMA* 1993;269:379-383.

➲ **Article:** Tiemey WM, Miller ME, McDonald CJ: The effect of test ordering of informing physicians of the charges for outpatient diagnostic tests. *N Engl J Med* 1990;322:1499-1504.

3 **Article:** Goldman L:Chaning physicians' behavior: the pot and the kettle (editorial): *N Engl J Med* 1990;322:1524-1525.

➲ **Article:** Leape LL: Error in medicine. *JAM.4* 1994;272: 185 1- 1857.

➲ **Article:** Blumenthal D: Making medical errors into 'medical treasures' (editorial). *JAMA* 1994;272:1867-1868.

➲ **Book:** Bogner MS (ed): *Human Error in Medicine.* Hillsdale, New Jersey, Lawrence Erlbaum Associates, 1994.

➲ **Article:** McDonald CJ: Protocol-based computer reminders, the quality of care the non-perfectability of man. N *Engl J Med* 1976;295:135 l-1355.

Which Information System Should We Buy for Our ED?

To Buy or To Build, That Is the Question?

- Is there an off-the-shelf solution?

- Off-the-shelf systems will require customization to meet local needs.

- Will niche market vendors and developers survive?

- The programmer's motto—"Software is never really finished."

- The **Smith-Feied** approach (Washington Hospital Center)—build a system around standards and plug in small disposable applets.

Don't Do It Alone-Collaborate

- Information management should be driven from the top down.

- Cultivate a relationship with your IS (Information Services) Department

Become a Smart Shopper

- Learn the language of information technology (iotech).

- Beware of alpha and beta (development) products.

- On-site visits to installed, paid sites and interview the users.

- Purchase technology in stages and allow for expansion.

Negotiating With a Vendor

- Prepare detailed requirements-"Looking at vendors without detailed requirements I like listening to the siren's rong. You forget your mission, forget your key requirements, and find yourself seduced by an attractive interface." (Marshall Ruffm, MD)

- Involve your purchasing department to negotiate contract.

- Specify training component.

- On-going support (on-site, remote diagnostics).

- Who owns the source code (should the company default)?

Pointers to more information ☞

3 **Meeting:** The 5th Annual Emergency Department Information Systems Symposium will be held in Las Vegas, December 5-8, 1999 at the MGM Grand Hotel. Contact **Pennsylvania ACEP** at 800.633.5784 ext. 1480 or at **www.paacep.org**. Anyone interested in seeing most of the ED information system vendors as well as network with other persons interested in "computerizing" their EDs *should not miss this meeting!*

⮑ **Free Book:** The *Directory of Software for Emergency Medicine* can be ordered through the American College of Emergency Physicians (800.798.1822 ➔ ext. 6 for Customer Service), Free for ACEP members.

3 **Book:** Keen PGW: *Every Manager's Guide to Information Technology,* ed 2. Boston, Harvard Business School Press, 1995. This is glossary of key terms and concepts regarding information technology. Harvard Business School Press (800.545.7685 ➔ Corporate Customer Team). $18.95 paperback.

3 **Article:** Cordell WH: Implementing an emergency medicine information infrastructure. *Topics in Emergency Medicine* 1995.

Ergonomics

"The 'ED' is more than a room or department, It is an environment and system of medical care that integrates humans, technologies, and facilities. It is a continuum of care that often begins in the streets and stretches to virtually every department in the hospital."—WH Cordell

- Terminology:
  - Ergonomics
  - Human engineering
  - Human factors engineering
  - User-centered design
  - Human-centered design
  - Usability engineering
- **Ergonomics** "is a philosophy or an approach to problems of designing and constructing things which people are expected to use-so that the user will be more efficient and less likely to make mistakes in the use of the article. In addition, it is an effort to make such articles more convenient, more comfortable, less confusing, and, in the end, less exasperating or fatiguing to the user." (Wesley E Woodson and Donald W Conover)
- Main areas of study in ergonomics
  - Physical aspects of the user-machine interface
  - Cognitive aspects of the user-machine interface
  - Work place design & work space layout
  - Physical environment

- Psychological **environment**
- Job design, selection, and training

Consequences of Ignoring Ergonomics

- Decreased productivity
- Lower quality work
- Increased probability of errors, accidents, and injuries
- Increased absenteeism
- Job dissatisfaction
- Less spare capacity to deal with emergencies
- Increased labor turnover

Human-Centered Technology

Grudin's Law-"When those who benefit are not those who do the work, then the technology is likely to fail or, at least, be subverted."

- Staff acceptance and "buy in" are crucial.
- What will make the users' lives better? The focus should be on how humans use information rather than how they use machines. (TH Davenport)
- Change management-the natural resistance to change cannot be ignored,
- "One of the most perverse aspects of human nature is that no matter how desirable an outcome, no matter how deplorable the status quo, significant numbers of people always resist change." (Wang CB)
- Phase-in is essential.

System Reliability and Support

- Staff will insist on system reliability and speed-staff will lose faith is systems are slow, frequently crash, or lose data.
- Servicing systems is becoming one of the major bottlenecks in health care computing.
- Because emergency medicine operates 24 hours a day, 7 days a week, "down time" is unacceptablededicated personnel, available 24 hours a day are needed
- Equipment left on 24 hours a days wears out and must be periodically replaced (include this in your budget) -have a supply of spares to replace equipment which breaks.

Pointers to more information ☞

3 **Book:** Wang CB: *TechnoVision*. New York, NY, McGraw-Hill, Inc., 1994.

3 **Book:** *Norman* DA: *Things That Make Us Smart: Defending Human Attributes in the Age of the Machine.* Reading, Mass, Addison-Wesley, 1993.

➲ **Book, cartoons, toys, software, etc.:** Anything Dilbert!

Security, Privacy, and Confidentiality

- Security is dependent on:

    1. Hardware (locks and keys, biometrics).

    2. Software (passwords and encryption).

    3. Management policies (delineation, communication, audit, and enforcement).

- Demands a system-wide, comprehensive approach to develop an institutional mindset.

Pointers to more information ☞

➲ **Article:** Mlinek EJ, Pierce J: Confidentiality and privacy breaches in a university hospital emergency department. *Academic Emergency Medicine* 1997;4: 1142-l 146.

The Future

Five years ago, physicians couldn't find the enter key on a keyboard: now they want to do their gallbladder surgeries from home.-Richard S Abrams, MD

Cool Things Just Around the Corner (or Already Arriving)

- Artificial intelligence and error checking.

- Computerized pharmaceuticals.

- Push technologies.

- Ubiquitous computing.

- Web-based virtual medical records.

- Web-based commerce.

- Voice recognition (really!).

Infrastructure Building and Networking

- Linking institutions, offices and clinics, and "islands of information."

- CHINS (Community Health Information Networks)

- National information infrastructure.

Moving Beyond Infrastructure

- We are sitting on mother lodes of data.

- We need to figure out what to do with all this information.

- Integrating clinical, financial, management, and outcomes data.

- Educating end-users to analyze practice information.

New Frontiers, New Opportunities

The home and community

- Wellness education and prevention.
- Home monitoring.
- Home delivery.

EMS/prehospital

- Integrating prehospital and hospital data.
- Tracking and GPS.

System-wide electronic triage and scheduling

- Emergency Medicine at the forefront of healthcare systems management.
- Automated triage.

Pointers to more information ☞

3 **Article:** Smith MS, Feied CF: The next-generation emergency department. Annals of *Emergency Medicine* 1998;32:65-74.

➲ **Book:** *Blur* : *The Speed* of *Change in the Connected Economy* by Stanley M. Davis, Christopher Meyer, Stan Davis. 265 pages (March 1998) Perseus Press; ISBN: 0201339870; $17.50 + S/H through amazon.com.

The ED of the Future is Not Synonymous With Technology

Over the next 40 years, health care and society will face more ethical dilemmas than in the entire history of humanity combined.-A health care futurist in 1995 B.D. (Before Dolly)

- Ethics.
- Ergonomics.
- Finance and reimbursement.
- Political.

For comments and questions, please contact me at wcordell@clarian.com.

American College of Emergency Physicians
1999 Scientific Assembly
(WE-126) The Emergency Department of the Future

Notes

The ED of the Future

Jonathan M. Teich, MD, PhD

I. What is the future?

A. New things the world will be doing to us

1. New diseases and problems

2. New changes in the healthcare environment

3. New redirection of care processes around the continuum

B. New tools we will have to respond

1. Technology, of course, and information

2. New drugs, therapies, and diagnostic methods

3. New ways of thinking about the body and the process of care

C. Imagining things we can't even imagine

1. New health workers and processes

2. Profound cures and epidemics

3. Unborn technologies

II. A whiz-bang tour; cases of the near future

A. Main concepts

1. Communication

2. Work processes

3. Care improvement innovations

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1999 Scientific Assembly
(WE-126) The Emergency Department of the Future

Notes

B. Home

1. Early awareness and self-care (NHAAP)

2. Home and implantable monitors

3. Disease management monitoring

4. Automatic summoning (I've fallen and my computer can't pick me up!)

5. Proactive call center

6. Reactive telephone triage

C. Pre-hospital

1. Doctor's "expect" call

2. EMS monitoring and treatment technology

3. EMS training status

4. Traffic manipulation (the Japanese highway trick)

5. Patient PMH information

    a) Communication to/from the hospital

    b) Smart cards – Denmark has 'em, will the US?

D. Arrival / Triage

1. The hospital system kicks in

2. The Boston Marathon foot chip

3. Registration

    a) ¿Se habla alemán?

    b) Your universal demographics file

4. Patient PMH information, again

    a) Sources
        (1) EMS
        (2) The physician expect

American College of Emergency Physicians
1999 Scientific Assembly
(WE-126) The Emergency Department of the Future

Notes

        (3)   Patient's card and on-line personal record

        (4)   Previous visits

        (5)   Emergency health network

    b)   Destination

        (1)   Triage assessment and note

        (2)   Order templates and data views

        (3)   Gantt charts for the visit

5.   Tracking

    a)   ED load balancing

    b)   How long will you wait? The "elevator-bay" problem

E.   Care unit

1.   Bedside and work-area information display

    a)   Data

    b)   Action templates

2.   Tracking and communication

3.   Order entry

4.   Surveillance and event detection

    a)   CC vs. patient's profile

    b)   Orders vs. patient's profile

    c)   CC-driven pathways and recommendations

    d)   *Primum non nocere* -preventing adverse events

    e)   Alerts

5.   Diagnostic methods

    a)   Smaller, faster, less invasive, more precise

    b)   Imaging, chemical, physiologic

Treatment methods

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1999 Scientific Assembly
(WE-126) The Emergency Department of the Future

Notes

a)   Faster, longer-lasting, more complete

b)   More dischargeable patients

c)   New pharmacotherapies

d)   Treatment of symptoms

7.   Telemedicine

F.   *Disposition and discharge*

1.   G.O.M.E.R. – improving the process

2.   ED1 and transfer eligibility

3.   Transfer communication

4.   File data to emergency health network

5.   Discharge orders and instructions

a)   Prescriptions: entry, checking, communication

b)   Managed-care follow-up

c)   Patient follow-up serial instructions

d)   Patient communication Web site

6.   Creating the note -- structured notes, voice recognition, and beyond

G.   *Follow-up*

1.   Communication to everyone

2.   Trending and monitoring

3.   Next-day departmental review

4.   Aggregate long-term analysis

5.   Economic trend: disease-program carveouts manage follow-up

H.   *Reference cases*

1.   Acute MI at home

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1999 Scientific Assembly
(WE-126) **The** *Emergency Department of the Future*

Notes

      2.   Chronic illness exacerbation: asthma ; CHF

      3.   Post-procedure complication

      4.   Multiple trauma

III.   Concepts by category

A.   *Communication*

      1.   Inter-, intra-, extra-nets

      2.   Smart communication and alerting

      3.   Alerts

      4.   Teleconsultation

      5.   Pharmacy communication

B.   *Communication II: Extended patient record*

      1.   Extended data sharing

      2.   Confidentiality vs. access

      3.   Patient ownership and entry of information

      4.   Data pooling for research

C.   *Work Processes*

      1.   Tracking and waiting systems

      2.   Smoother local collaboration

      3.   Follow-up: home as virtual extension of the hospital

D.   *Care improvement innovations I: active information*

      1.   Order entry

      2.   Clinical decision support -- adverse events reduction, detection, and trending

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Notes

3.   Proactive decision support -- algorithms and pathways

E.   Care improvement innovations II: New dx and tx tools

1.   Pharmacotherapies

2.   Noninvasive treatments

3.   Diagnostic instruments and methods

4.   Mechanical: airway management et. al.

IV.   To Contact Dr. Teich:

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From: Cordell, William MD [WCordell@clarian.com]
Sent: Friday, August 13. 1999 1:39 PM
To: ' P a t Lonsford'
Cc: 'Teich, Jonathan MD PhD'; 'Hayden, Steve MD
Subject: RE: Scientific Assembly

EDOF 1999 Syllabus   EDOF 1999 Syllabus
Cordell d   Teich doc.   Here are the handouts (2 files) for Dr. Teich and my presentation WE-126

<<EDOF 1999 Syllabus - Cordell.doc>> <<EDOF 1999 Syllabus - Teich.doc>>

Dr. Hayden and I will produce the booklets for the Evidence-Based Medicine
Workshop as we did last year.

Thanks, =wc=

> -----Original Message---
> From: Pat Lonsford [SMTP:plonsford@acep.org]
> Sent: Thursday, July 29, 1999 9:44 AM
> To: 'wcordell@clarian.com'
> Subject: Scientific Assembly
>
>   Dr. Cordell:
>
>   Just a reminder, we haven't received the following from you yet:
>
>   Contract
>   Equipment Checklist
>   Copyright
>   Syllabus & Disk
>   Profile Information
>   Reservations Request
>   CME Disclosure Form
>
>   The deadline has already passed so we would appreciate you prompt
> attention to getting the above information in to us as soon as possible.
> Please disregard if this e-mail has passed the above information in the
> mail.
>
>   Thank you,
>
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>   Rebekah Corder for Pat Lonsford
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