

The EHR Chronicle in USA and Europe from the 60's to the future

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1935



2004



1935

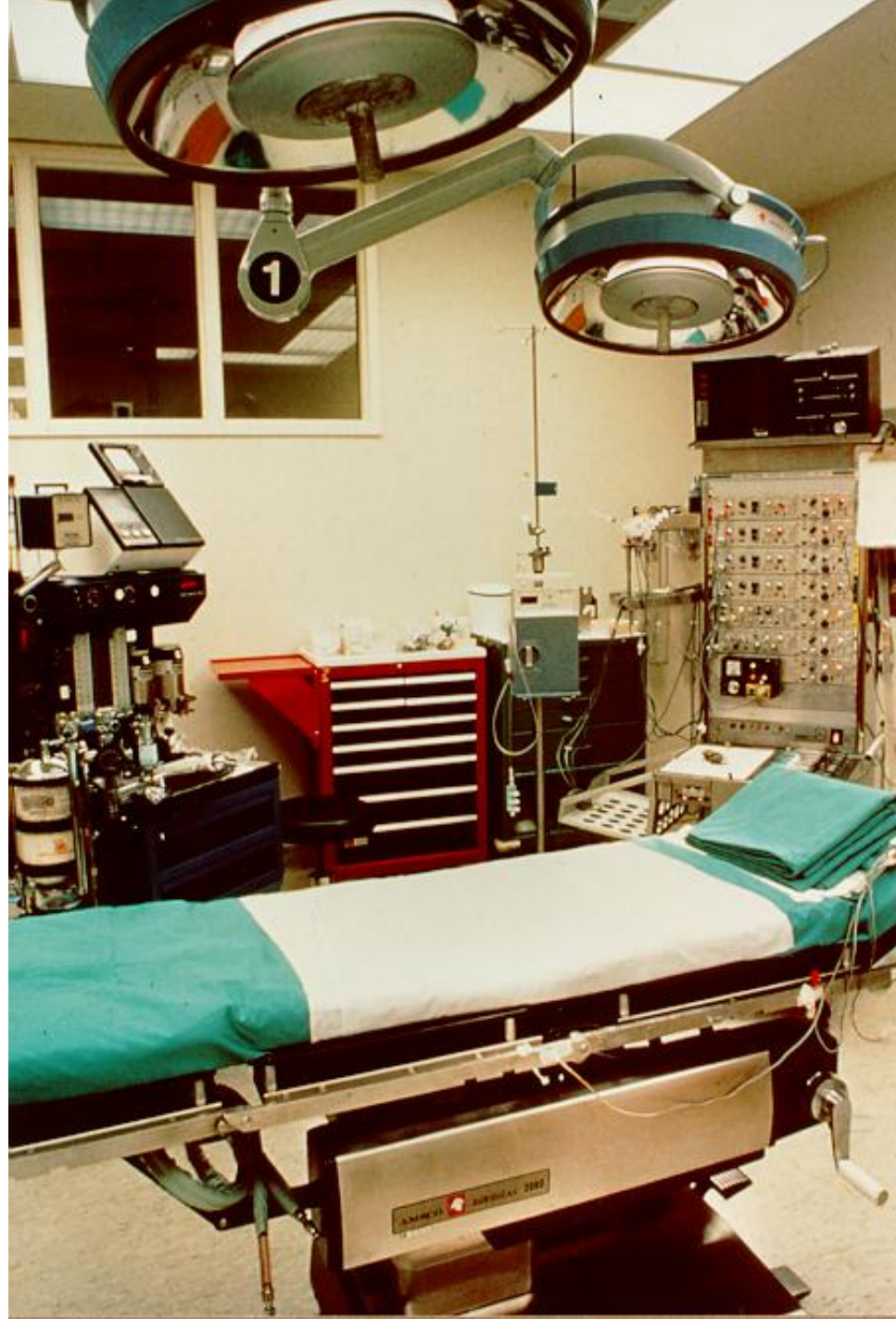


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In 1970, Dr. W. B. Schwartz (Brigham's Womens) wrote “that few systems have fully explored the possibility that the computer as an intelligent tool can reshape the present system of health care, fundamentally alter the role of physicians, and profoundly change the nature of medical manpower – in short, the possibility that the healthcare system by the year 2000 will be basically different from what it is today.”

Over the last 44 years ...

- **Technology has exceeded the challenges**
 - Moore's Law has outpaced demand.
 - Computing power is more than adequate for IT needs.
 - Storage is more than adequate and affordable even for multimedia volumes.
 - Bandwidth is more than adequate for networking.
 - Standards are approaching adequacy.
 - Internet provides ubiquity and universal accessibility.
 - Wireless is an added bonus that provides untethered freedom.
 - Hardware costs are reasonable making systems affordable.
 - Programming languages and application development packages continue to advance to meet needs.

Over those same years ...

- **Application development is lagging**
 - **EHRIS is still an elusive goal**
 - **Concepts introduced 20 years ago have not been widely implemented.**
 - **Choices today for IT systems have changed little over that last 25 years.**
 - **We keep reinventing the wheel.**
 - **We have not learned from experience.**
 - **We make the same mistakes.**
 - **Progress is a result of technology, not innovation.**
 - **The value proposition has not been proven and is still challenged.**
 - **Needs continue to outpace progress.**
 - **The demands continue to increase.**
 - **Systems don't survive.**
 - **We have not developed the killer application.**

During the years ...

- **Administrative needs have continued to dominate clinical needs.**
- **Financial systems, research systems, auditing and reporting systems are independent of clinical systems.**
- **Difficult decisions have not been made.**
- **Problems faced 20 years ago still remain unsolved today. Highest among those is the creation and acceptance of a common clinical terminology.**

Comparing Europe and the U.S.

- Application development follow similar lines
- Successful applications have had only modest success in spreading to other sites.
- Successful applications have died when developer or administrative leadership have changed or when funding has stopped.
- Differences
 - Europe's developments have been largely academic
 - U.S. development have been both academic and commercial

Comparison of health care systems

- Major differences in the role of general practitioners
- More general providers use EHR than in U.S., but systems are less structured and contain less clinical data.
- No billing in Europe.
- Government has more control of system.
- Less connection between inpatient physicians and outpatient physicians.
- Pharmacy process slightly different.

A start ...

- **Computers introduced in 1950s to handle the large volumes of data in the health environment.**
- **Early systems resulted in spectacular failures (a condition that still remains today).**
 - Largely due to unmanaged expectations, failed promises, and failure to function as advertised
- **Early systems were level 1 – data collection, messaging switching, charges, orders, report results, data communications, data storage**

The Early Years ...

- **Main frame based**
- **Focused on the larger hospitals**
 - Only large hospitals could afford main frame computers and the resources to support
- **Existed as a Hospital Information System (HIS)**
- **Was mainly service oriented**
- **Batch oriented**
- **Non-threatening to healthcare professionals**
- **Still the dominating image in the commercial world**
- **Functional requirements of HIS remain essentially the same today as 30 years ago**

In the U.S. ...

- **Early commercial development came from the aerospace industry**
 - Lockheed (Technicon)
 - McDonnell Douglas (McAuto)
 - Martin Marietta
- **And the computer industry**
 - IBM
 - Burroughs (Medidata)
 - National Data Company (Reach)
 - Honeywell
 - Control Data
 - NCR

And in Europe ...

- **J5 developed jointly with IBM at Karolinska in Stockholm, Sweden in mid 1960s**
- **King's Hospital HIS – UK**
- **London Hospital – UK**
- **University of Hannover**
- **Danderyd Hospital Information System**
- **DIOGENE – Geneva**
- **BAZIS – The Netherlands**
- **Erasmus – The Netherlands**

- **To name a few ...**

Academia in the U.S.

- **HELP at LDS, Salt Lake City, Utah**
 - Homer Warner
 - Marketed by 3M
- **Beth Israel System**
 - Bleich and Slack
- **Duke DHIS**
 - Marketed by IBM as PCS
 - 1976 – 1988
 - Innovative in that application code was independent of stored data location and screen content was independent of storage and application

IMIA WG 10 HIS

- **Dedicated to HIS systems**
- **Workshops held in 1985, 1988, 1991, 1994, 2002**
- **Meeting planned for 2005 in Nashville, TN**
- **Provided an opportunity for international sharing in developing and evaluating HISs**
- **Helped formulate definition of goals of HIS in 1988**
- **Discussed (actually debated HIS versus EHR)**

Departmental Systems

Development of minicomputer in 1970 led to development of specialized departmental systems

- Laboratory systems**
- Pharmacy systems**
- Radiology systems**
- Generally were stand-alone systems**
- Lower costs of minicomputers made them affordable to a wider community**
- Were uncoupled from HISs**
 - Redundant data entry was necessary in both settings**
- Development paralleled in Europe and U.S.**

Networking

- The 1980s were the beginning of networking through LANs and the development of broadband channels
- In U.S. Simborg introduced Network Interface Components and STATLAN – a broadband channel to which the various components of an HIS were connected to permit a “best of breed” approach
- Cost of interfacing led to need for data messaging standards and the creation of Health Level 7 in 1987.

Outpatient Systems

- Largely academic developments – not perceived as a viable market for vendors.
- EHR associated more with outpatient systems than inpatient systems because of persistence of data
- Most systems in U.S. and Europe survive only as long as funding exists.
- Relative cost must be low
 - AAFP says \$2400 annual cost per provider
 - Others say \$10,000/provider
- Impact time on provider major barrier
- US using incentive reimbursement

Some cost data

- **The cost of information handling in healthcare is estimated to be between 25% and 39% of total expenses. Amount spent on IT is between 2% and 5% - compared to 10% to 20% in other industries.**
- **Typical HIS cost is \$20-\$25 million in today's market. Costs 15-20 years ago were in the same range.**
- **Maintenance costs prohibitive – estimated for each \$1 software cost, maintenance cost is \$8 - \$12.**

Instability of industry

- **Approximately 450 vendors sell EHR systems in the US in any given year. Mean survival rate is 2 – 3 years.**
- **Physicians buy systems from vendors who disappear; systems are unsupported; buy another system.**
- **Europe as perhaps a dozen relatively strong vendors; and as many as another 100 weaker vendors.**
- **ONCHIT David Brailer urged the creation of a coalition to**
 - **Set conformance requirements**
 - **Evaluate existing systems**

A shift in priorities

- A renewed interest on preventive and outpatient care and the EHR has occurred largely as the emergence of a national healthcare information infrastructure.
- The EHR has emerged as a patient-centric, aggregated, life long record that is derived from both inpatient and outpatient provider/ institutional records.
- Still few commercial alternatives exist for the EHR.
- Of the 450 plus systems available in the U.S. today, most will be replaced by new entries over the next two years.

European standards

- Europe began its health standards activities in 1991 through the creation of CEN TC 251 as an activity of the EU. Currently CEN has 28 member bodies and 8 associate member bodies.
- Work is done as open participation by any interested party. Working volunteers are recruited from member bodies. Drafts are developed through a consensus process. Standards are first released as pre-standards (ENV). A pre-standard becomes a CEN standard by approval of 71% of its member bodies.
- Member bodies have different numbers of votes depending on size and other considerations. Maximum vote is 29. Denmark has 7 votes.

European Standards

- **CEN may move its standards to ISO status through the Vienna Agreement.**
- **CEN has created a new relationship called Partner Standardization Bodies who are primarily 3rd world countries. CEN proposes to export solutions to technical problems via CEN standards.**
- **Funding for the development of CEN standards is provided by the EU.**
- **Business standards are created primarily through EDIFACT, a UN organization.**

U.S. Standards

- **American National Standard Institute**
 - ASC – X12 – transactions standards, associated with EDIFACT
 - ASTM – CCR, clinical standards
 - HL7 – clinical standards
 - NCPDP – pharmacy reimbursement standards
- **Other U.S. players**
 - ADA
 - WEDI
 - NCVHS
 - CHI
 - eHI
 - HIMSS
 - IHE

HL7

- Suite of health IT standards
- Has 27 international affiliates
- Data exchange standard standards V2 and V3 used world-wide
- Consensus-based processed based on ANSI rules; voluntary organization
- HL7 may submit standards to ISO through partner relationship to become ISO standards
- HL7 RIM becoming accepted as global standard
- HL7 activities expanding into clinical arena through EHR functional standards and EHR exchange.

CEN – HL7 noteworthy events

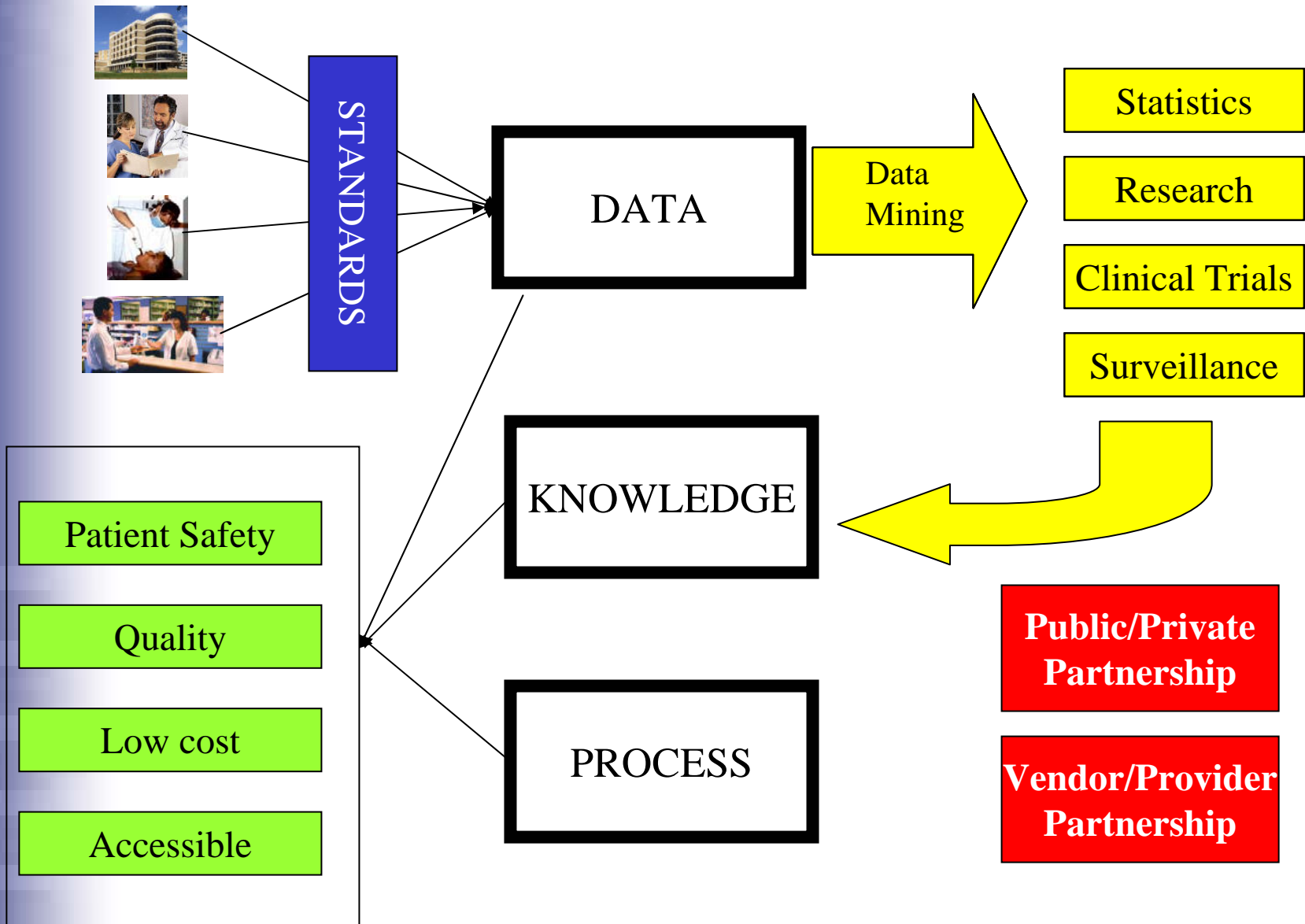
- **CEN letter to ANSI asking who represented US standards**
- **Georges deMoor's visit to HL7 to share approach to modeling and messaging methodology**
- **US/CEN movement to create ISO TC 215**
- **CEN/HL7 cross fertilization in working groups by individuals**
- **CEN acceptance of HL7 RIM and use of HL7 data types**
- **CEN/HL7 Memorandum of Understanding**

Future of standards

- **Although some competition and maneuvering exists, we are moving toward new levels of international collaboration in the creation of standards.**
- **Major issue is still terminology.**
 - **SNOMED is expensive. LOINC is free and provides some choice.**
- **Adoption is an issue.**
- **Implementation manuals are a necessity.**
- **New standards will be more application oriented and more clinical.**

What's happening today?

- **Similar approaches in Europe and U.S.**
 - Combination of self-development, joint development with vendor, or totally commercial
 - Funded by government grants and private money
- **Commercial opportunities**
 - Europe – U.S. vendors plus European vendors
 - U.S. – mainly U.S. vendors, although some of those vendors are international
- **If I answer what are the best systems today, my top choices are mostly home-grown**
 - Regenstrief
 - Vanderbilt
 - Intermountain Health
 - Mayo – combination
 - Columbia Presbyterian
 - Kaiser – Epic
 - Paris – Patrice Degaulet

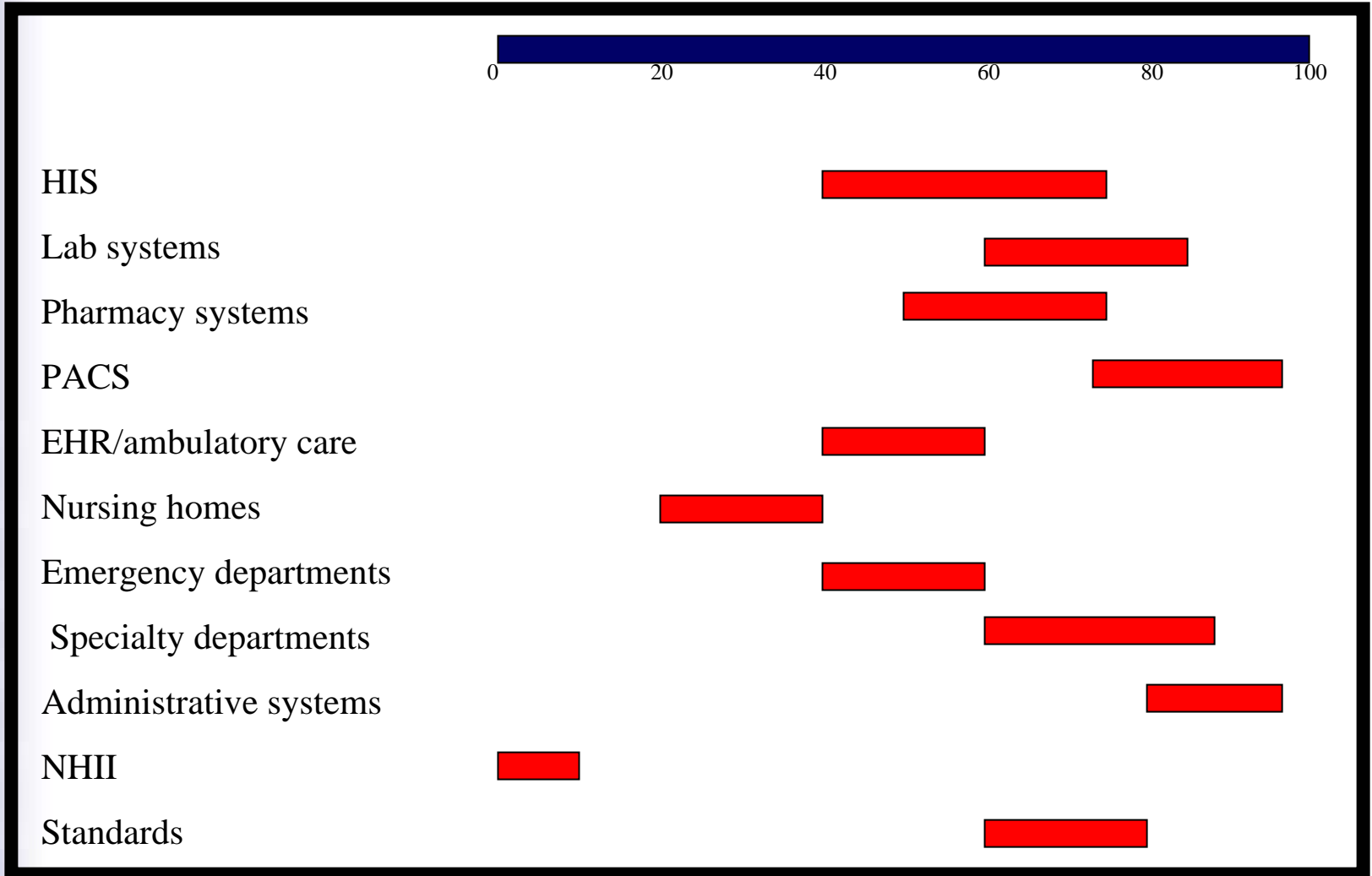


Privacy, Security, Trust, Integrity

So, where are we?

- **Patient safety, demand for quality, and cost reduction are driving HIT.**
- **Over 70 countries are moving toward creating EHR for all citizens.**
 - **Provider/institution EHR for patient care and other uses**
 - **Longitudinal record for sharing, health surveillance, clinical trials, research**
 - **Consumer health records**
- **Commercial systems significantly lag today's requirements for comprehensive clinical information systems that embrace EHR, CPOE, ePrescribing, decision support, standards, sharing, HIS**

How far along the way are we?



How do we change the future?

- **Increasing evidence and acceptance of evidence that IT in healthcare is necessary. Availability of data and access to knowledge permits informed decision making.**
 - Patient safety
 - Increased quality
 - Decreased cost
- **We need to understand where healthcare is going and develop the applications to support it.**
- **We need to play a more active role in the decision making process. We need to move out of just the technical arena and become involved in the politics, the financing, and the image of what health shall become in the 21st century.**
- **We need to be willing to face the tough and unpopular decisions.**
- **We need to share ideas and solutions.**

Requires sharing of knowledge across functional domains...

