Enterprise Health Information Systems (EHISs)

NUR308

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Paper-Based system

- Strengths of paper records:
  - Portable,
  - easy to use,
  - offers relatively good security against unauthorized access, &
  - allow flexibility in recording data.

Weakness of paper records:

- Difficulty of retrieving information
- Often incomplete , have inaccurate data & information, & unusual abbreviation.
- Lack of standardization of terms in the clinical documentation process.
- One copy of a paper records.
- Any backup copy of the records must be made by hand or by automatic copier.
- Susceptible to unplanned destruction, whether by flooding, fire, etc.

Weakness of paper records:

- Take a great deal of nursing time
- Clinicians may scribble notes on whatever paper is available,
- Cannot be searched quickly.
- Accurate summary information must be accumulated through an exhaustive review of all the records.
- Research purpose: very labor intensive


MEDICAL CENTER HOSPITAL
ODESSA, TEXAS
FOR Vasquez, Ramon
AGE
ADDRESS
DATE 6/23/95
Zerdil 20mg # 120 –
20mg P.O. Q6hrs
NO REFILLS
Ferrous Sulfate 300mg # 100
REFILLS
300mg P.O. TID c meals.
LABEL
Humulin N
30 units SQ Q AM.
PRODUCT SELECTION PERMITTED
DISPENSE AS WRITTEN
D.E.A. #

Enterprise Health Information Systems

- For all these reasons, health services delivery systems around the world are under enormous pressure to change & health organizations are undergoing reorganization & reengineering.

- Health informatics can play a major role in the reengineering & restructuring.

- Health Informatics has multidisciplinary focus on health services delivery including community needs assessment, population health status indicators, health promotion, & disease prevention in addition to the treatment of illness.

Enterprise Health Information Systems

- Health Informatics

EHR

New models for healthcare delivery in hospital, primary care, ambulatory care, the community, public health, & a multidisciplinary team of caregivers (e.g., physicians, nurses, physiotherapists, nutritionists, dentists, social workers, educators)

Health Information Systems

- Healthcare institutions generate massive volumes of information that must be collected, transmitted, recorded, retrieved, & summarized.
- As a result, computer-based Hospital Information Systems (HISs) were designed, tested, & installed in hospitals of all sizes to:

Health Information Systems

1. Facilitate communication of information between departments or with other health care setting
2. Coordinate all essential patient care activities.
3. Provide a central information system for receipt, sorting, transmission, storage, & retrieval of information
4. Provide a complete, accurate, timely data delivered at the point of care and higher quality of care at a more efficient cost

Types Of Information Systems

- Information systems being used in healthcare environments broadly categorized into **3 types**.

1. Composed of systems that are limited in objective & scope. Examples are Medicus & GRASP systems.

- In the hospital environment, this type found in clinical laboratory systems, financial systems, & radiology, electrocardiography, pulmonary function, pharmacy, & dietary systems.

2. Composed of hospital information systems, which usually consist of a communications network, a clinical component, & financial / administrative component.
3. Capture & store comprehensive patient information. Has the capacity to:
   (I) Provide clinical decision support
   (II) Support physician order entry
   (III) Capture & query information relevant to health care quality
   (IV) Exchange electronic health information with, & integrate such information from other sources.
4. e.g., EHR - Epic

Functions of Information Systems.

1. Recognize both sending & receiving stations, format all messages, & manage all the message routing (called message switching)
2. Validate, check, & edit each message to ensure its quality
3. Control all the hardware & software needed to perform the first two functions
4. Assemble transaction data & communicate with the accounting system

Components of HIS

1. Administrative & Financial Modules

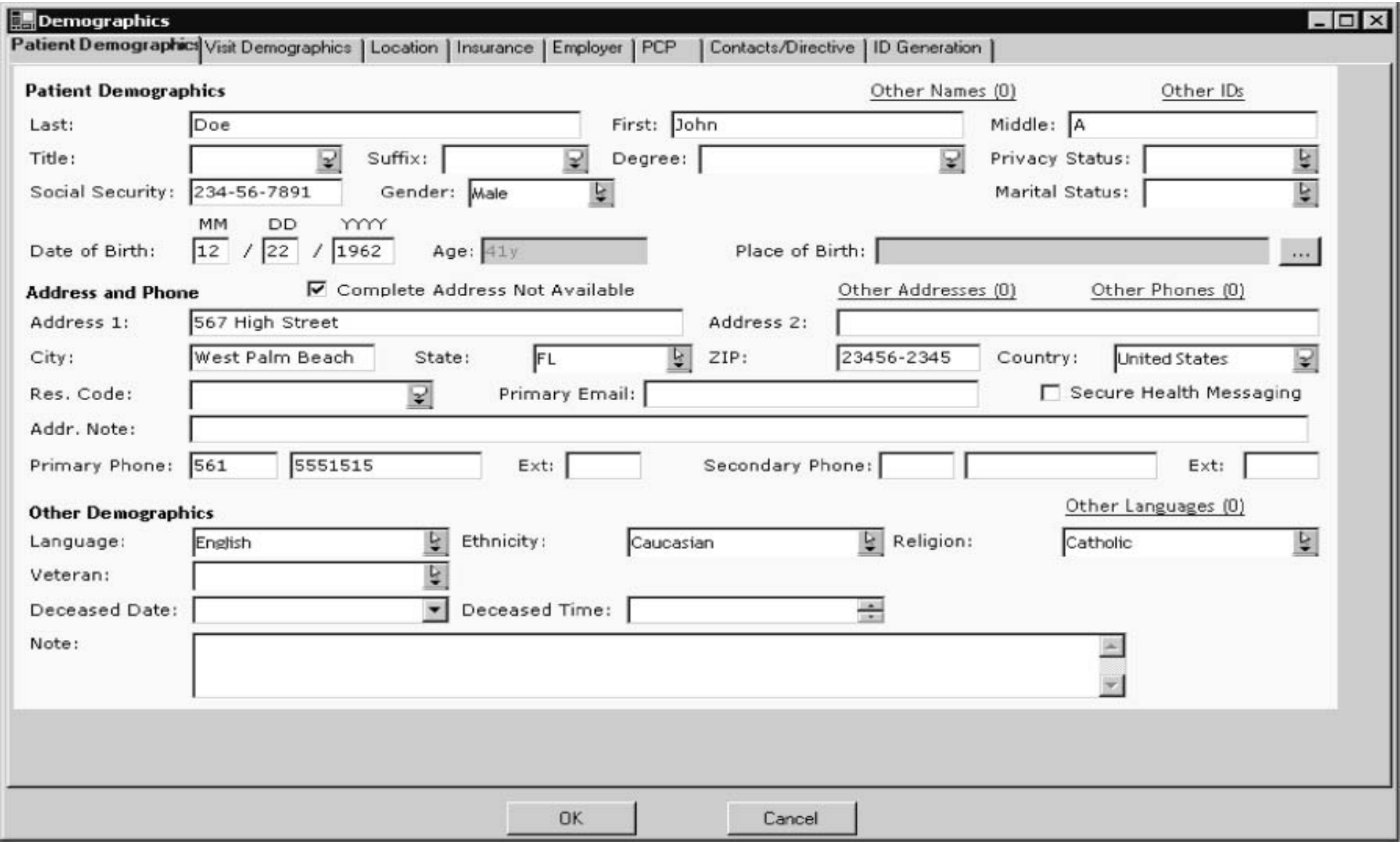
- Accounts receivable
- Accounts payable
- Payroll
- Human resources applications

Components of HIS

2. Admission/Discharge/Transfer Modules

- Core of any hospital information system.
- Involves all admission, discharge, & transfer processes (e.g., establish a patient record; unique identification number, & care provider; appointment; bed availability; call lists; scheduling; collection of demographic data, referral data & reason for admission; insurance information; & preadmission orders & presurgery preparation procedures)

Admission/Discharge/Transfer Modules



Components of HIS

3. Order Entry Module

- Doctors or nurses enter clinical orders or prescriptions
- Orders are transmitted through the computer system to the recipient for immediate implementation
- CDSS: Errors at the time of input of the orders are theoretically minimized (order verification, Drug-Drug interaction, Drug-Dose interaction, Drug-Allergy interaction, Drug-Pregnancy interaction, & order sets)
- Efficiency of data transmission in hospitals increases

Order Entry Module

- cost saving module

young physicians often lack professional self-confidence

tend to order more clinical tests than are required by more experienced physicians

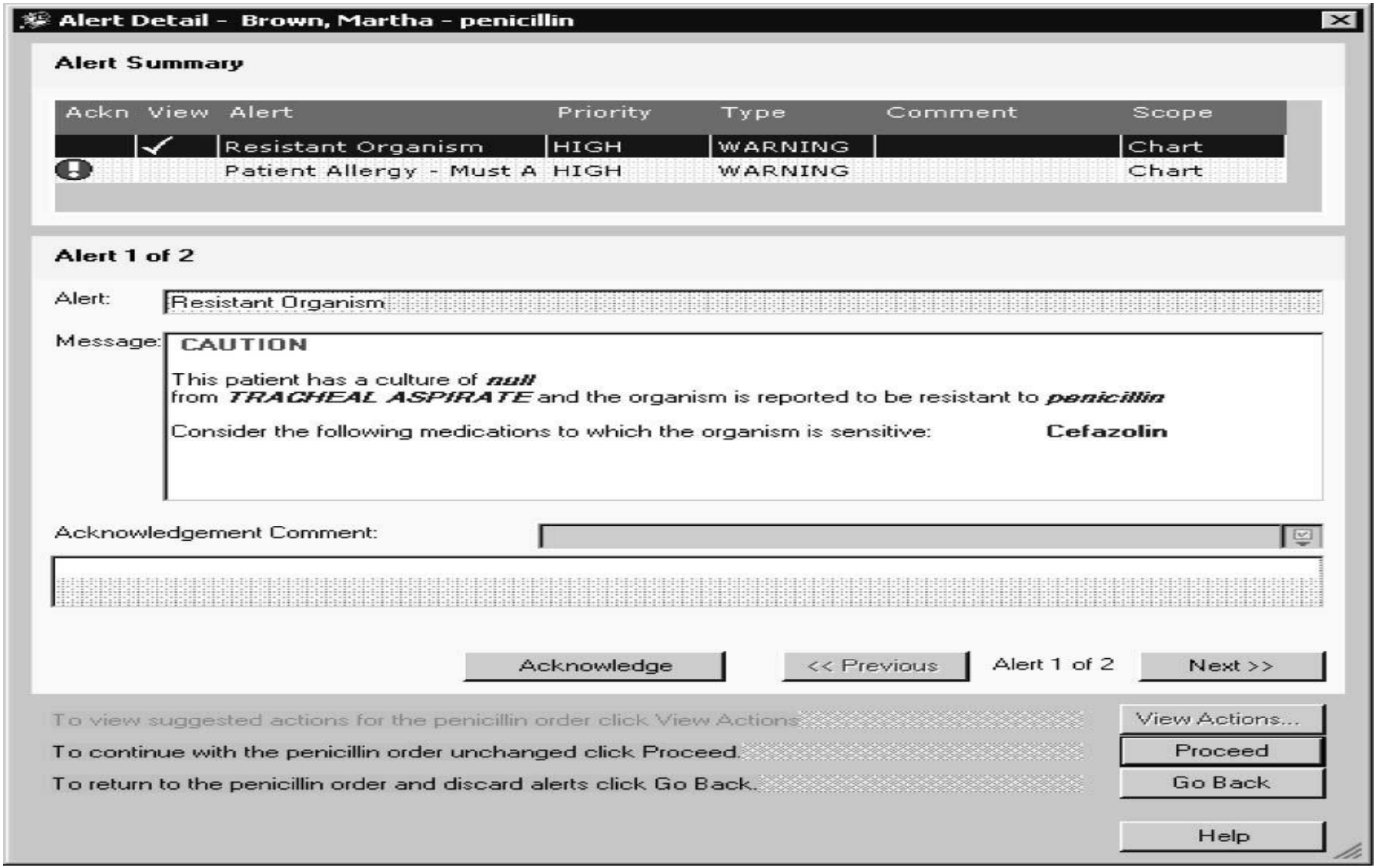
Financial problem

The warning alert on the order entry system had remarkable effects. It gives them a chance to reconsider the need for the clinical tests

cost saving

Order Entry Module

Order alert.

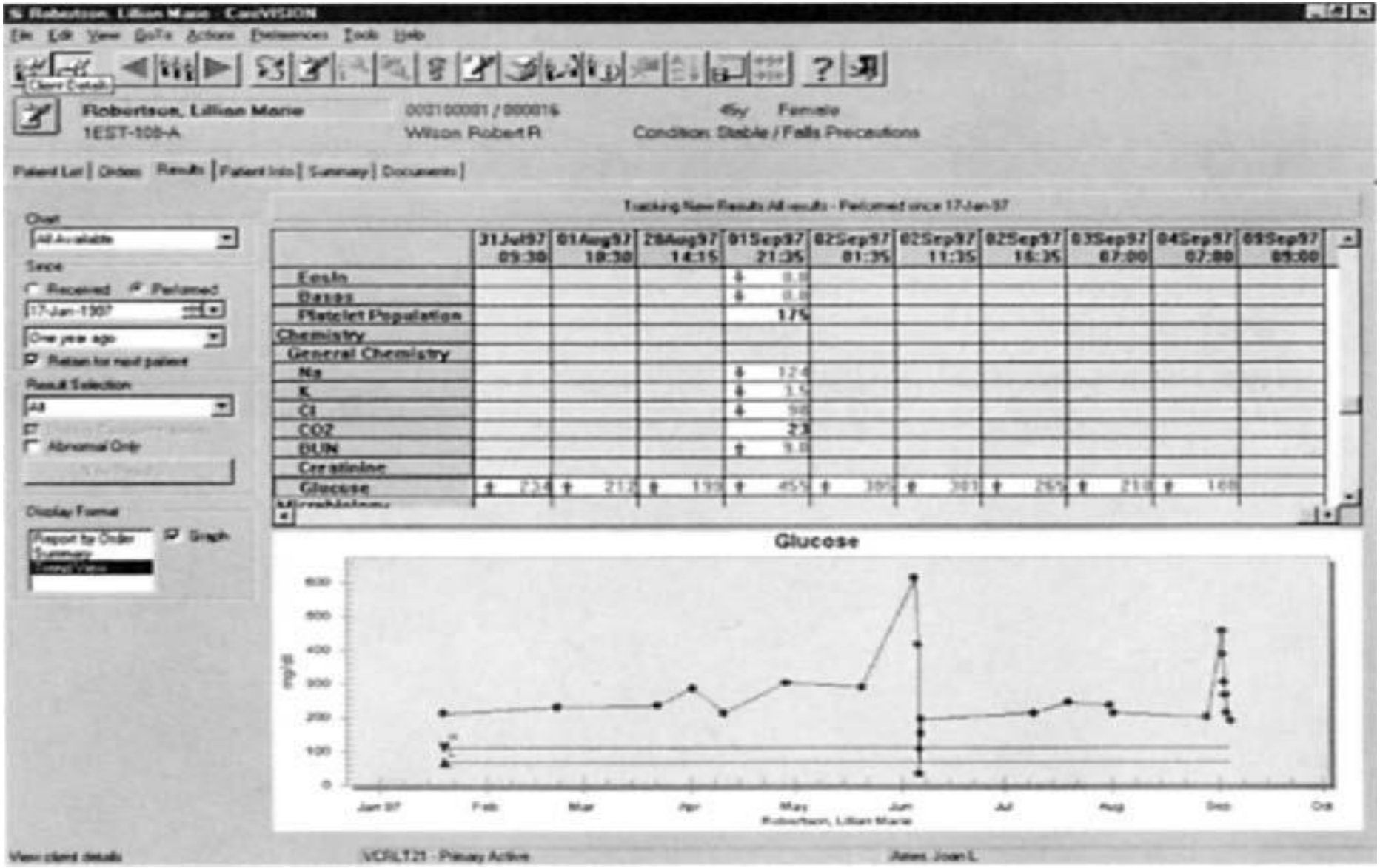

Alert Detail - Brown, Martha - penicillin
Alert Summary
Ackn View Alert Priority Type Comment Scope
Resistant Organism HIGH WARNING Chart
Patient Allergy - Must A HIGH WARNING Chart
Alert 1 of 2
Alert: Resistant Organism
Message: CAUTION
This patient has a culture of null
from TRACHEAL ASPIRATE and the organism is reported to be resistant to penicillin
Consider the following medications to which the organism is sensitive: Cefazolin
Acknowledgement Comment:
Acknowledge
<< Previous
Alert 1 of 2
Next >>
To view suggested actions for the penicillin order click View Actions
To continue with the penicillin order unchanged click Proceed.
To return to the penicillin order and discard alerts click Go Back.
View Actions...
Proceed
Go Back
Help

Components of HIS

4. Result Reporting Module

- Notification that a procedure is complete
- Canceling a procedure;
- Entering a result including
- Immediate result reporting
- Entering the normal/abnormal range (numeric, coded, or text)
- Checking data for accuracy

Result Reporting Module



Components of HIS

5. Scheduling

- Scheduling of admissions, surgery, outpatient encounters, & diagnostics
- Effective management of patients & length of time for encounters is facilitated by a good scheduling system.
- Patient notification of pending appointments increases ……

Components of HIS

6. Documentation Systems:

Available in various formats. A good documentation system is a part of the clinical workflow & provides communication of real-time information. These system remove the need to find the chart & allow all health care provider to access the chart at any time.

Components of HIS

7. Communication Systems:

- Such as e-mail, paging, & internet connections
- Facilitate exchange of information needed by the variuos health care disciplines
- Enhance information flow in an organization

Specialized Support for Clinical Functions

These are required to provide specialized support for departmental services. Some examples are as follows:

(I) Clinical laboratory tasks Include as example accession numbering, collection list, specimen tracking, automatic capture of results from instruments,

(II) Radiology tasks include result reporting, electronic signature, reference file, & images of various types.

Specialized Support for Clinical Functions

(III) Pharmacy tasks include verification of an order by the pharmacist, dual result reporting by pharmacy (number dispensed) & nurse (number administered), unit dose tracking,& chemotherapy protocols.

(IV) Nursing systems must provide nursing assessment, nursing diagnoses, nursing interventions, & care plans (including medication administration records, nursing workload, & nursing note of client outcomes).

Specialized Support for Clinical Functions

(V) Medical records require that the system provide a list of all diagnoses, an encounter-oriented summary abstract, & time-oriented summaries (flow sheets)

Specialized Support for Clinical Functions

(VI) Dietary tasks include meal planning, menu selection, food distribution, ordering, nutrition management, & drug–food interactions.

(VII) Consultation programs include bibliographic retrieval, calculations, decision support systems, protocols, & health knowledge bases such as the Physicians Desk Reference (PDR), emergency procedures, & poison index.

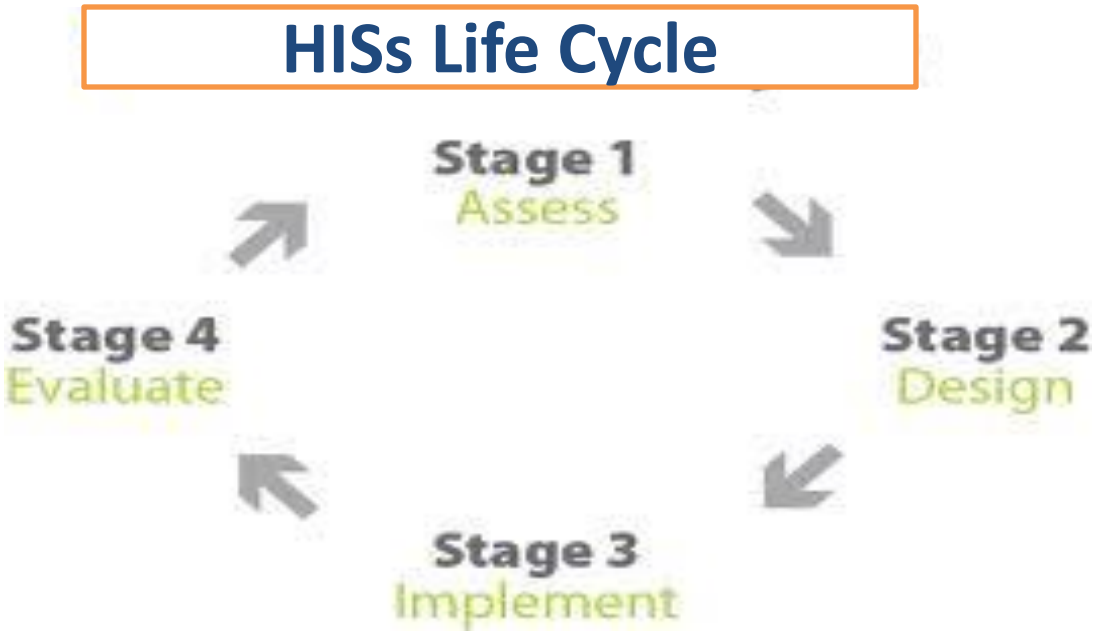
(VIII) Critical care areas have special needs for electronic data capture to facilitate patient monitoring & charting.

Specialized Support for Clinical Functions

(IX) Patient support should include security, privacy, confidentiality of patient data, information sheets for patient education & awareness, reminders of appointments, admissions, tests, & health maintenance reminders.

HISs Life Cycle

- To provide effective information system, all health care agencies must develop the system using a process known as the system life cycle
- The steps in this process involve: need assessment, planning, implementation, & evaluation/maintenance.



HISs Life Cycle

1. Need Assessment / Analysis:

- What is to be accomplished or provided by the information system?
- What impact will the new system have on current workflow?
- What are the cost & benefits of the system?
- Can the system be supported & maintained with current organizational structures & personnel?
- What is the level of training required?

HISs Life Cycle

2. Planning:

(a) Selecting a system:

- Data & information from the first phase are put together & translated to the needs for the system:
  - what features are essential to the new system
  - vendor selection
  - talk with several agencies & listen to both bad & good features about the selected system
  - site visits may be made to agencies that use the vendor being considered.
- Visitation team should include several users, not just IT services or administrative personnel

HISs Life Cycle

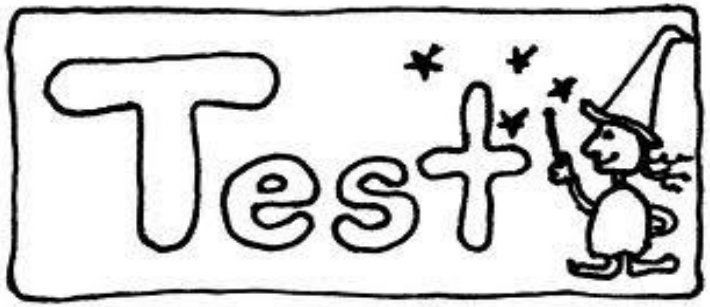
(b) System feature design: partly in conjunction with system selection, concerns such as security, data sharing, screen design, logging in & logging out, data entry, will start to be worked out

HISs Life Cycle

3. Implementation:

(a) Testing:

- Before the “go live date” , much testing is done. (i.e., hardware, backups, data capture & storage, network communication, etc.)
- During this stage, many “bugs” are discovered & worked out
- If consistent with workflow
- Observing users during testing highlight training needs



HISs Life Cycle

(b) Training:

- Training is best done with a “play” hospital, in which trainers can work with system but are not working with actual data.
- Well-prepared users are vital to the system success
- Ideal time for training is within 3 weeks of the “go live” date
- Security & data accuracy must be addressed during training
- Instruction on how to obtain help for the system
- Superusers?

HISs Life Cycle

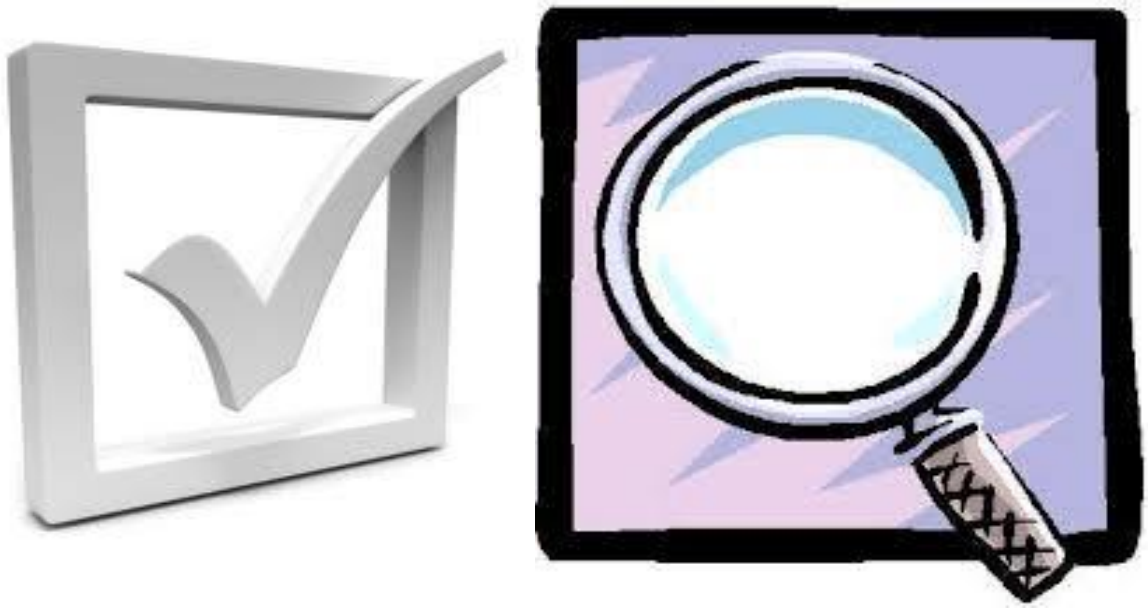
(c) Go Live: different methods of going live

- The big-bang approach: implementation of a new system at the time disruptive to an environment.
- Pilot conversation: testing of a system on a smaller scale. Used to determine operational or training needs for future implementation of the system.
- Support for go live: adequate system & user support for successful implementation of the system.
- Vendor support in the initial stage is important to troubleshoot unforeseen issues that need to resolved quickly.

HISs Life Cycle

4. Evaluation/Maintenance:

- Evaluation & maintenance are often one & the same
- Should be a part of every phase of the cycle
- Clinicians may find that there are some changes that would make the system easier to use



Benefits of Electronic patient care record

- Real-time information
- Improve quality of care
- Reduce medical errors
- Improve efficiency
- Reduce costs

Issues Related to HISs

- Data entry too difficult & Inability to type quickly enough
- Feeling that using the computer in front of the patient is rude
- Security & privacy issues
- (very) Costly to purchase, deploy, & maintain
- Problematic implementation could result in severe adverse consequences
- Mistrust of vendors
- Don’t see value in implementing EHR