



มหาวิทยาลัยราชภัฏนครปฐม
Nakhon Pathom Rajabhat University

4172801 Digital Technology and Nursing Information

Topic 5

Nursing Information System



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Learning Questions → Objectives

- How information technology has changed nursing and health care practice ?
- How technology can reduce errors and improve efficiency and effectiveness ?
- What technology applications are used in patient care ?
- Why technology benefits nurses ?
- What concerns with privacy have emerged with information technology ?
- What is predicted for the future of technology in health care ?

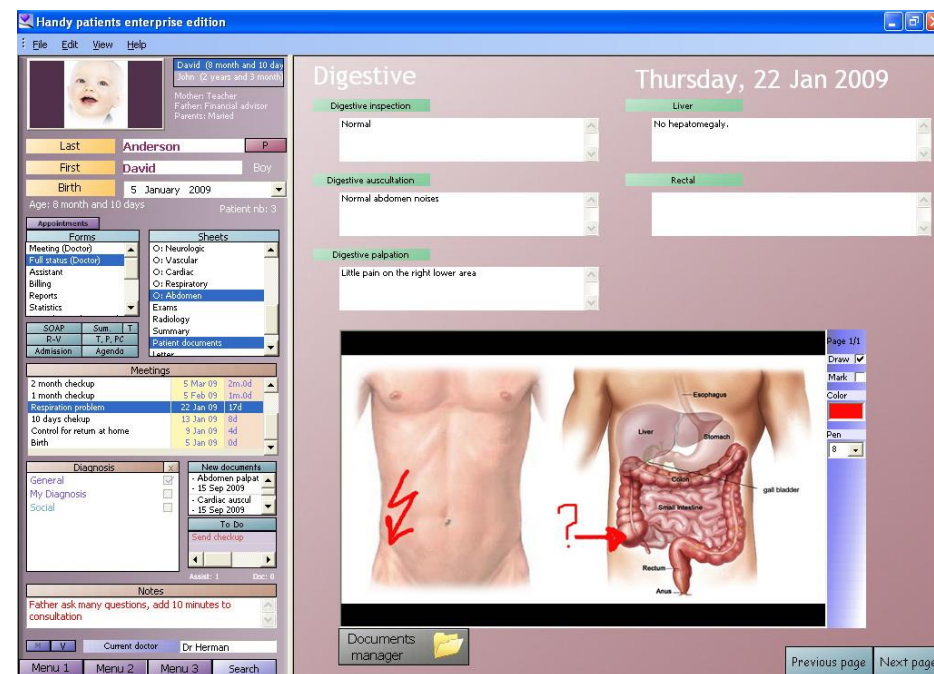
Information System

- Integrated and complex automated systems consisting of networked computers to process data, answer questions, solve problems or make decisions
- Seamless integration of information minimizing the need for multiple record keeping



Hospital Information Systems

- An integrated information system used in healthcare to manage patient information
- Collaborative framework
- Electronic Medical Record (EMR)
- Shared and integrated repository for patient demographics and billing information, orders, results, clinical documentation and images



The screenshot displays a software interface for patient management. On the left, a sidebar contains patient information for David Anderson, born on January 5, 2009, and lists various medical forms and appointments. The main area is titled 'Digestive' and shows a clinical record for Thursday, January 22, 2009. It includes sections for 'Digestive inspection' (Normal), 'Digestive auscultation' (Normal abdomen noises), and 'Digestive palpation' (Little pain on the right lower area). Below the text is a diagram of the human digestive system with a red lightning bolt and a red arrow pointing to the right lower quadrant, indicating the location of the pain. The interface also features a 'Documents manager' and navigation buttons for 'Previous page' and 'Next page'.

State of the art HIS include

- **CPOE – Computerized physician (provider) order entry**
- **Point of care devices**
- **Expert and decision support systems**
- **Integration with clinical equipment**
- **Patient monitoring equipment (vents, pumps, monitors)**
- **Point of care testing devices (glucose monitors)**

Benefits of an HIS in healthcare service

- ✓ Reduce errors Streamline and improve efficient care
- ✓ Lower costs
- ✓ Improved revenue capture
- ✓ Coordinate services
- ✓ Improve quality of service
- ✓ Improve patient satisfaction
- ✓ Automate repetitive manual tasks
- ✓ Make more efficient use of resources

Types of HIS

Nursing Information System

- patient information/charting
- staffing and scheduling

Clinical Information System

- EMRs

Pharmacy Information System

- pharmacy ordering
- prescription handling

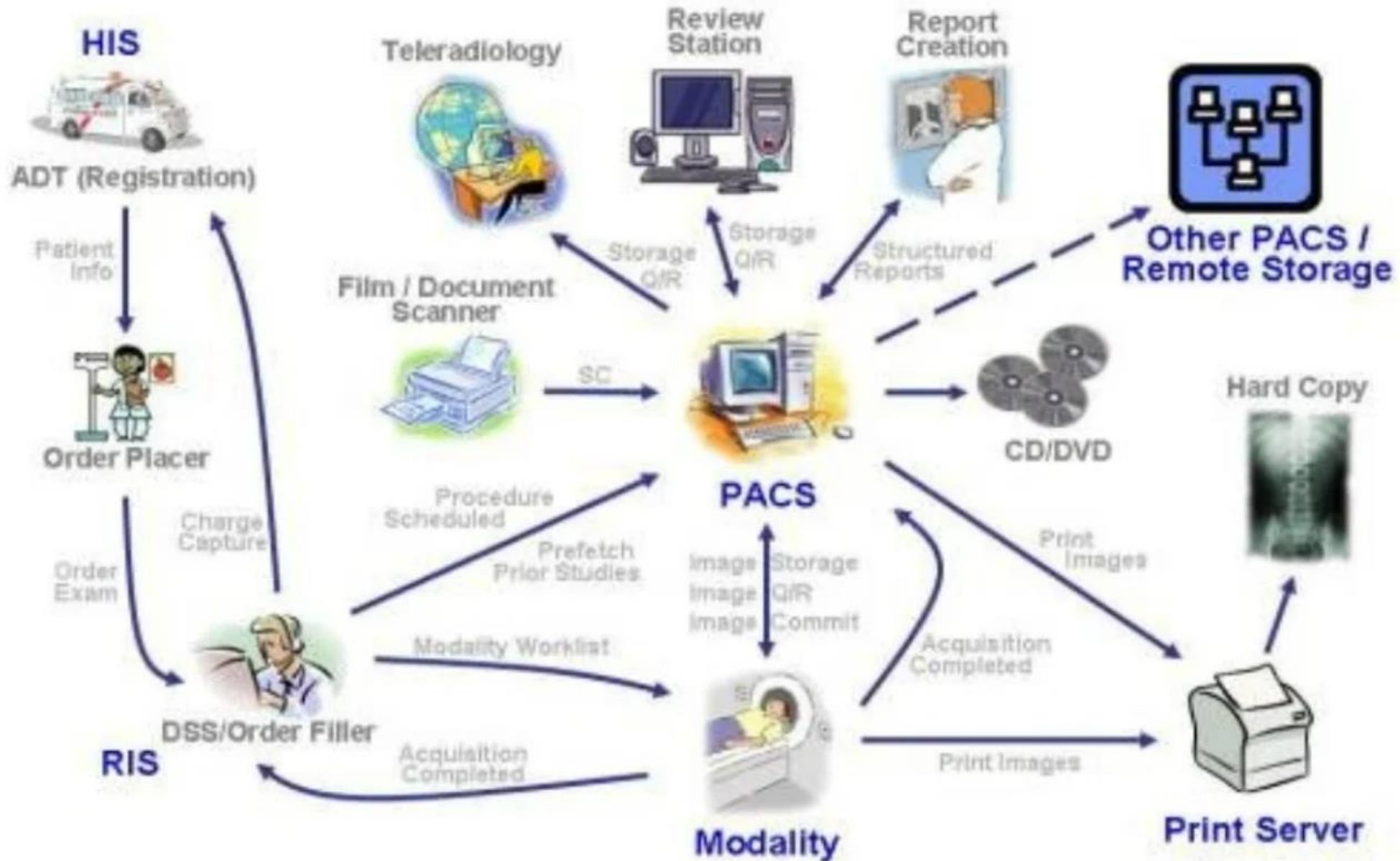
Financial Information System

- Billings

Laboratory Information System

- tracking of patient's lab/test results

Healthcare Enterprise Data Management



Clinical Information Systems

- Collect, integrate and deliver information to the appropriate areas of responsibility
- Results to the physician
- Orders to the nurse
- Inventory and par levels to central supply and pharmacy
- Just in time stock
- Match research candidates to clinical trials
- Patient load and acuity to staff scheduling
- Allows providers to have access to aggregate patient information that is otherwise difficult to acquire and manipulate in a timely manner



Clinical Information Systems – For the Nurse

- Assess patient acuity and condition
- Prepare a plan of care or maintain a critical path
- Specify and track interventions
- Document care
- Observe and document outcomes
- Improve quality control

Contribution of information technology to efficiency and effectiveness of nursing

- Information technologies allow us to access information effectively and efficiently
- Technology is transforming healthcare delivery.
- Advances in diagnostic technologies enable practitioners to contribute to clinical decision making from a distance.



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Typical clinical system Example

Patient with suspected pneumonia admitted



 dreamstime.com

ID 178604428 © Photosvit

Sputum specimen sent to lab

- (+) culture – physician alerted via automated alert to text pager or personal digital assistant (PDA)
- Medication ordered by physician in provider order entry system – physician chooses the medication based on current clinical research results and statistical use by peers for same organism infecting same specimen source (evidence based medicine)
- System does conflict checking with other meds the patient is on, does allergy check – reports to physician if any warnings allowing the physician to change med or override and document justification for doing so (patient safety)

Patient with suspected pneumonia admitted

How nurse use the clinical system for this case?

- Nurse removes medication from floor stock (unit dose with barcode)
- Nurse checks bar-coded ID band of patient and asks name (two method identification), verifies medication with barcode
- 5 R's Right Dose, the Right Patient, the Right Time, the Right Medication, the Right Route
- Delivers medication to patient
- Completion of order in HIS triggers documentation in Nursing Information System

Nursing Informatics

- ANA (1994) has defined nursing informatics as the development and evaluation of applications, tools, processes and structures which assist nurses with the management of data in taking care of patients or supporting the practice of nursing.

Purpose of Nursing Informatics

- **Micro-level**: Study the process and structure of nursing information to support clinical decision-making and the delivery of nursing care.

Macro-level: Helps in retrieving evidence-based standards of practice, legislation acts, statistical analysis of the profession of nursing and practitioners of nursing at any given time or interval of time.



General Implication of NIS

Patient Charting

Staff Scheduling

**Clinical Data
Integration**

Decision Support

General Implication of NIS

Patient Charting

- Patient's vital signs, admission, nursing assessments, care plan and nursing notes can be entered into the system.
- These are stored in central repository and can be retrieved when needed



General Implication of NIS

Staff Scheduling

- Nurse can self schedule their shifts using scheduling rules provided in shift modules.
- It can later be confirmed or changed by a scheduling coordinator/manager.
- Shift modules are created to handle absences, overtime etc.

Shifts	Day 1			Day 2			...	Day 7			Number of shifts
	M	E	N	M	E	N	...	M	E	N	
Nurse 1	■			■			...	■			6
Nurse 2	■	■					...		■	■	7
Nurse 3		■			■		...	■			7
Nurse 4			■			■	...		■		7
.....
Nurse J		■	■				...		■		6
Number of nurses assigned	15	18	13	13	18	13	...	13	14	13	314

General Implication of NIS

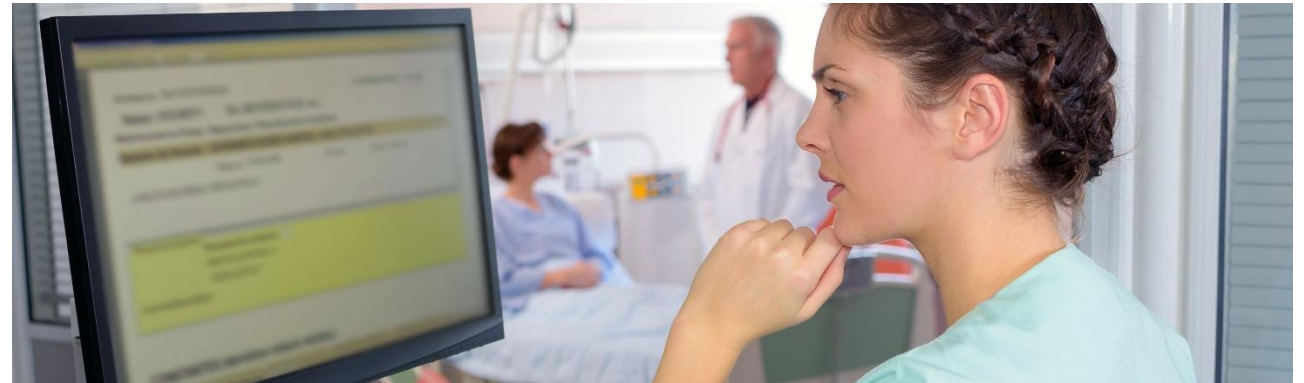
Clinical Data Integration

- **Clinical information from all other departments/disciplines can be retrieved, viewed and analyzed by nursing staff.**
- **Then, it can be put into the patient's care plan.**

General Implication of NIS

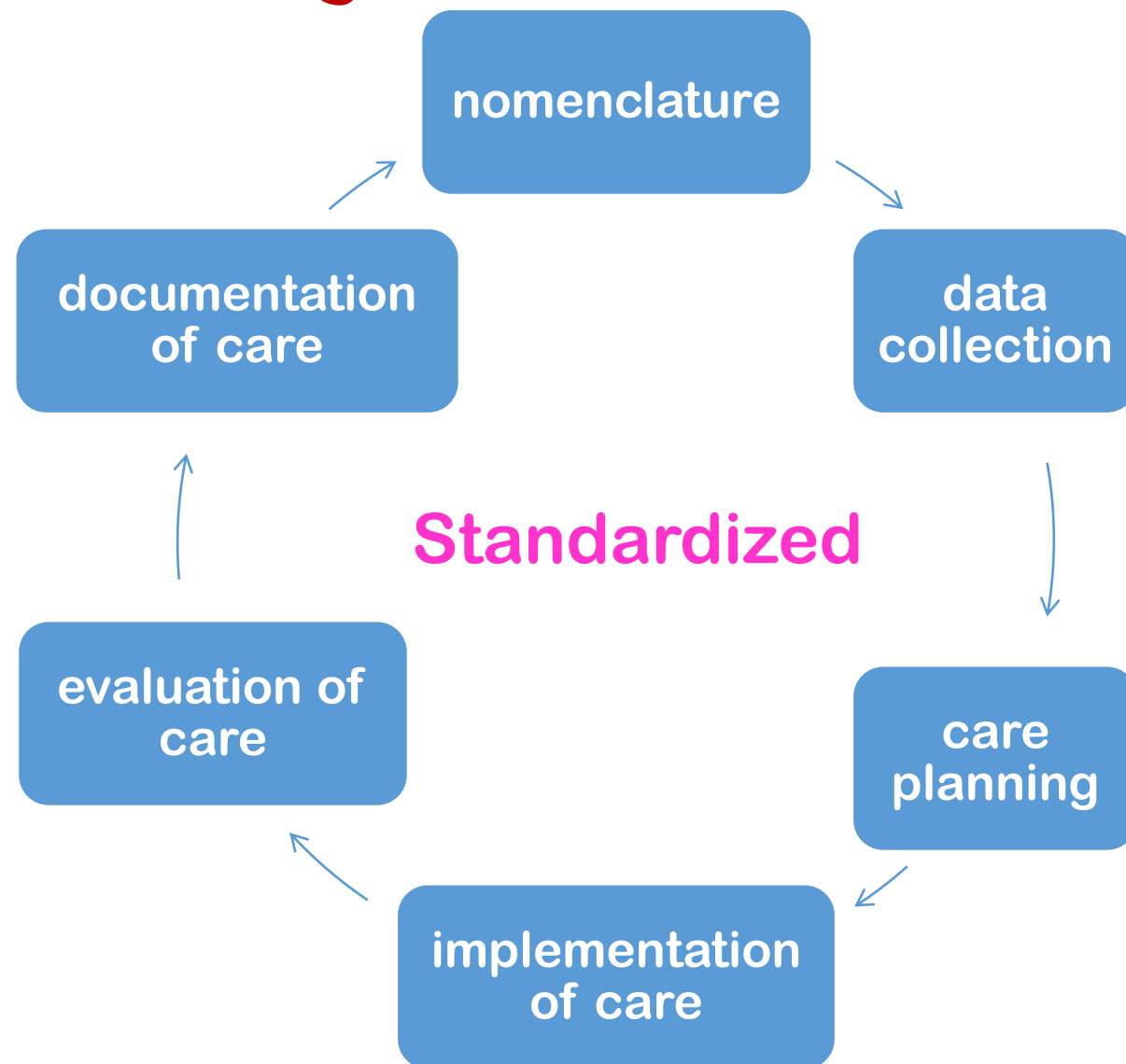
Decision Support

- Provide prompts and reminders, along with guides to disease linkages between signs & symptoms and related factors.
- Online access to medical resources are also available



Nursing Information System

- Standardized nursing record
- Reduces reporting workloads
- Improves the quality of patient care
- Although a Nursing Information System would be part of a Hospital Information Systems, many HIS fall short of a Nursing Information Systems



Nursing Nomenclature

Nursing Minimum Data Set (NMDS):

- establish comparability of nursing data across clinical populations, settings, geographic areas, and time
- describe the nursing care of individuals, families and communities in a variety of settings
- demonstrate or project trends regarding nursing care provided and allocation of nursing resources to patients or clients according to their health problems or nursing diagnoses
- stimulate nursing research through links to the data existing in health-care information systems
- provide data and information about nursing care to influence practice, administrative, and health policy decision making.

Nursing Nomenclature

North American Nursing Diagnosis Association (NANDA)
– Nursing Interventions Classification (NIC) / Nursing
Outcomes Classification (NOC)

NANDA Taxonomy II provides nursing diagnostic concepts that identify and code a patient's responses to health problems or life processes that explain variance in patient outcomes that is different than the variance explained by disease diagnoses.

NIC encompasses nursing interventions used in all clinical settings and is used at the point of care to document care planning and nursing practice.

NOC includes a comprehensive list of nursing outcomes, which provides a measurable way to evaluate the effect of nursing interventions on patient progress.

Nursing Information System

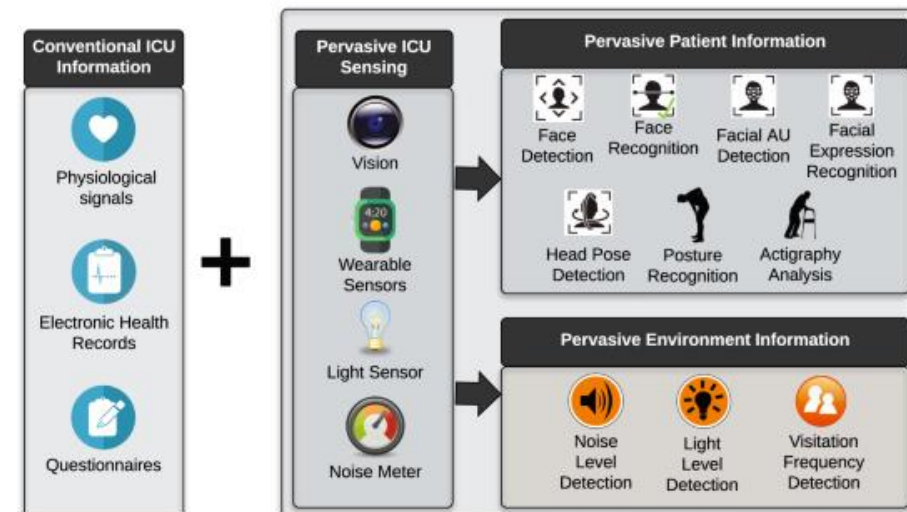
- Provide the legal record of care
- Support clinical decision making
- Capture costs for billing, costing and/or accounting purposes
- Accumulate a structured, retrievable data base for:
 - administrative queries
 - quality assurance
 - research
- Support data exchange with internal and external systems

Monitoring / Data Acquisition Systems

- Because so much data is collected in the critical care environment, documentation can be complex and time-consuming for the nursing staff
- Data Acquisition Systems automatically integrate information directly from medical equipment such as cardiac monitors, invasive lines, ventilators, IV pumps
 - This greatly reduces documentation time and the potential for errors in transcribing vital signs and other readings
- Using a data acquisition system nurses can confirm and automatically record key information from medical devices at specified intervals or on demand and insert those readings directly into the medical record



a)



b)

CPOE

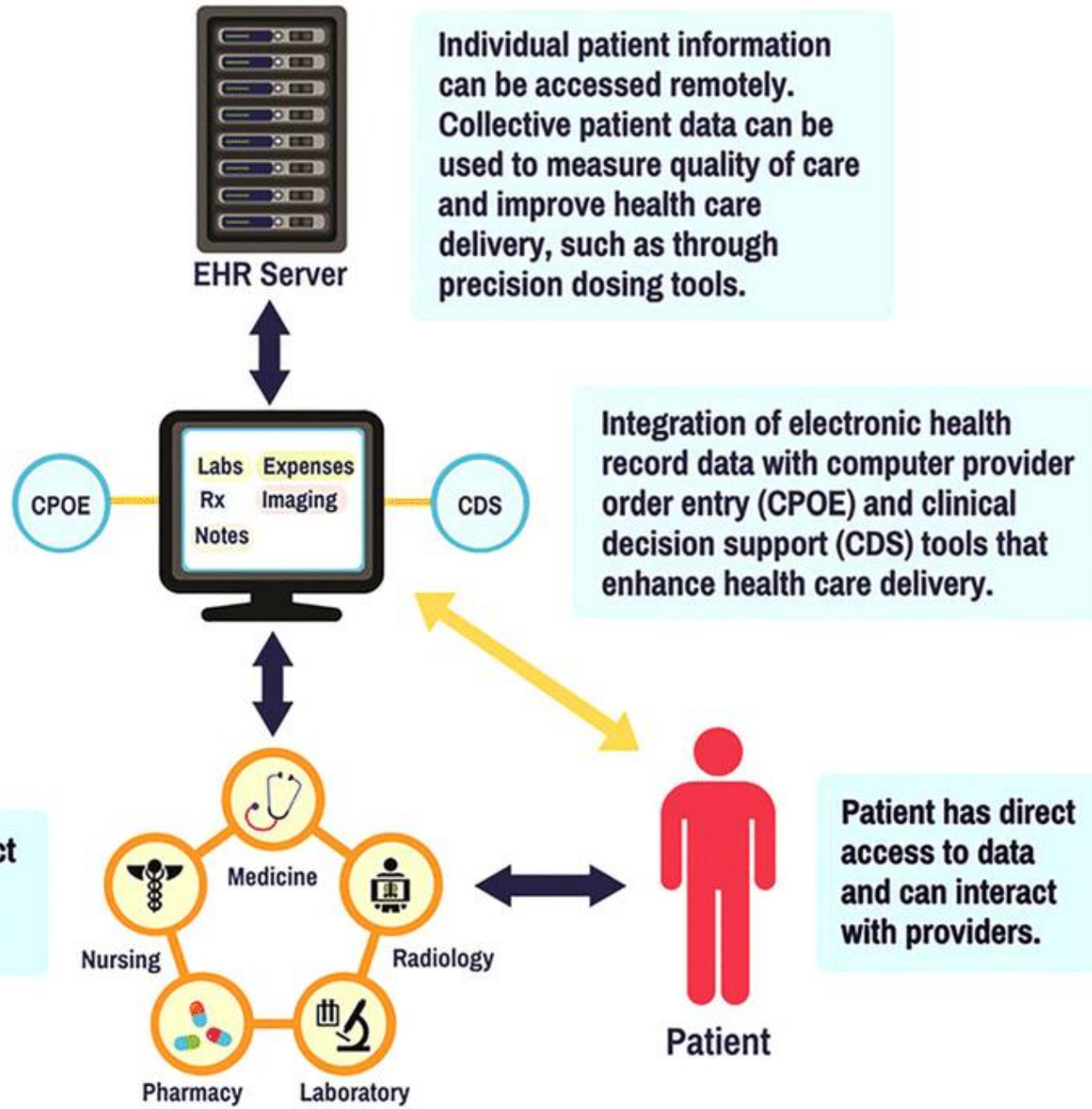
Computerized Physician (provider) Order Entry

- Match the physician's workflow with point-of-care clinical decision support powered by an interactive expert knowledge engine that displays clinically relevant information about a patient's condition along with treatment protocols to assist them in making the best possible decisions for patients
- Provide adaptive order sets and treatment guidelines based on the role of the clinician, the patient's condition, and evidence-based clinical knowledge
- The system revolutionizes the order entry process and produces real-time alerts when inconsistencies are detected, helping to improve quality of care.

Place Dilation Nursing Order

Tropicamide		
Bilateral Eyes	Perform Dilation BE - Tropicamide with Phenylephrine HCl 0.5% Freq.: Once	Edit
Right Eye	Perform Dilation RE - Tropicamide with Phenylephrine HCl 0.5% Freq.: Once	Edit
Left Eye	Perform Dilation LE - Tropicamide with Phenylephrine HCl 0.5% Freq.: Once	Edit
Cyclopentolate		
Bilateral Eyes	Cyclopentolate HCl 1% BE	Edit
Right Eye	Cyclopentolate HCl 1% RE	Edit
Left Eye	Cyclopentolate HCl 1% LE	Edit
Atropine		
Bilateral Eyes	Atropine 0.5% BE	Edit
Right Eye	Atropine 0.5% RE	Edit
Left Eye	Atropine 0.5% LE	Edit

Electronic Health Record and Drug Dosing



Point of Care (POC) Devices

POC Devices (COW) Computer on Wheels (COW)

- Enable nurses, doctors and other clinicians to wirelessly access real-time patient data in a convenient, secure, and cost-effective mobile computer cart
- Healthcare professionals are empowered to access electronic medical records (EMR) from any wireless-enabled location within the healthcare facility.

Targeted Medications



Leading the News: Roche Test Promises to Tailor Drugs to Patients --- Precise Genetic Approach Could Mean Major Changes In Development, Treatment

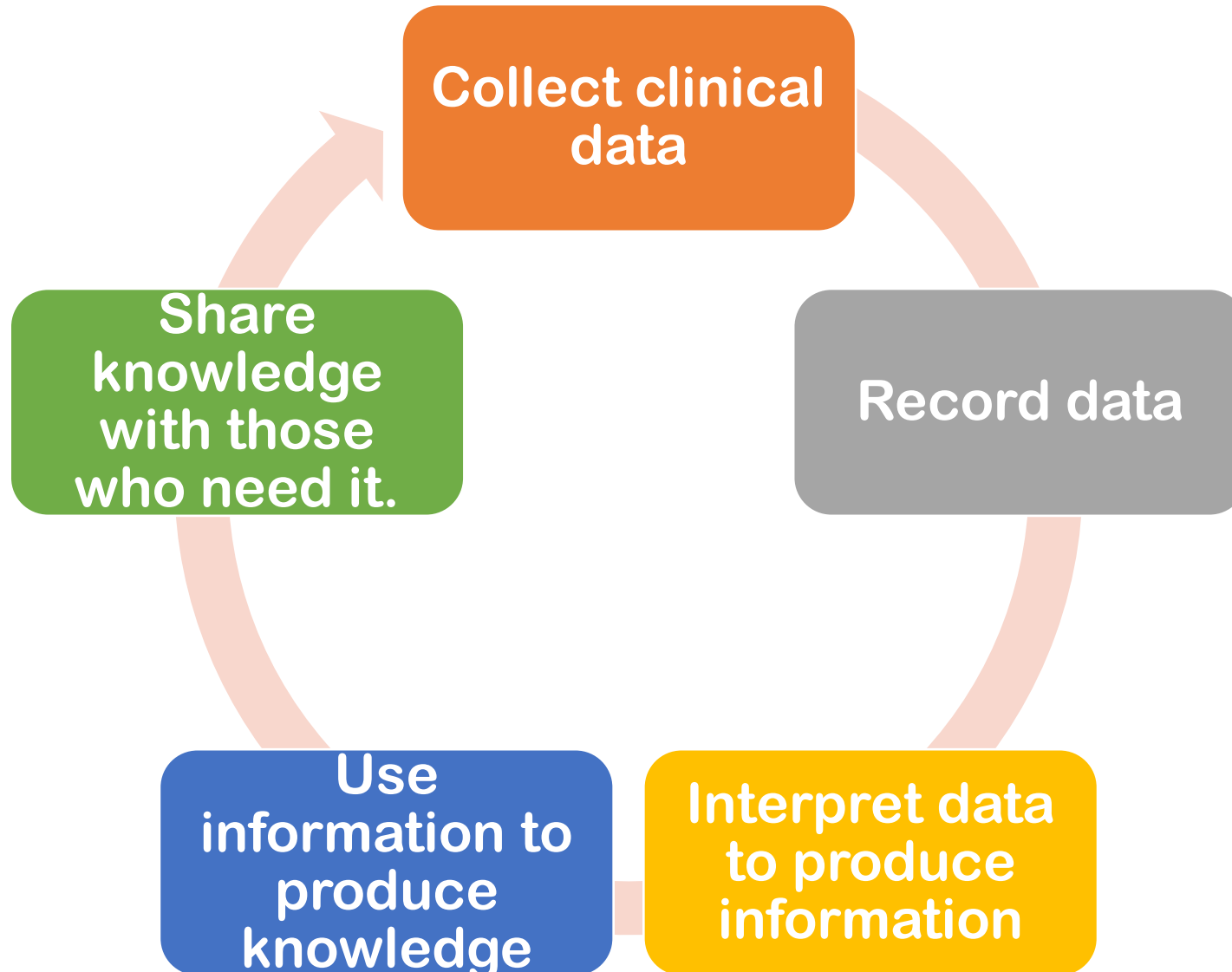
June 25, 2003

Roche Holding AG is launching the first gene test able to predict how a person will react to a large range of commonly prescribed medicines, one of the biggest forays yet into tailoring drugs to a patient's genetic makeup.

The test is part of an emerging approach to treatment that health experts expect could lead to big changes in the way drugs are developed, marketed and prescribed. For all of the advances in medicine, doctors today determine the best medicine and dose for an ailing patient largely by trial and error. The fast-growing field of "personalized" medicine hopes to remove such risks and alter the pharmaceutical industry's more one-size-fits-all approach in making and selling drugs.



Role of nurse manager in nursing informatics



Different obstacles with NIS.



Different obstacles with NIS

- **Some nurses may be more comfortable with paper documentation than computers.**
- **It takes time to become a nurse informatics**
- **Lack of integration in computer systems and software**
- **Some nurse informatics, followed by inadequate financial resources**
- **Other issues were lack of administrative support, staffing issues, user acceptance, problems with the organization's strategic plan, software design, infrastructure and time management. In some cases, the technology simply wasn't available.**

Future trends in Healthcare Technology related NIS

- **New technology will allow Healthcare Information Technology to go places it has not gone before**
- **Exam rooms**
- **Patients homes**
- **More information means we have a “movie” rather than a “photograph” on how patients are doing, thereby improving the quality of patient care by detecting changes in health status early**
- **Genomics, nanotechnology, robotics**
- **Community or Regional Electronic Medical Record**
- **Disposable and unobtrusive health sensors**
- **Expert based and evidence based decision support systems**
- **Ubiquitous wireless access**

Conclusion

"Today's nurses are identifying and developing new ways of using computers and information science as a tool to support the practice of nurses in the performance of their duties.

At the same time, computers and information science are facilitating a more sophisticated and expanded level of nursing practice.

There is an interactive and synergistic effect between nursing informatics and nursing practice

The boundaries of nursing informatics are contiguous with those of nursing and like them dynamic and constantly changing."



Thank You