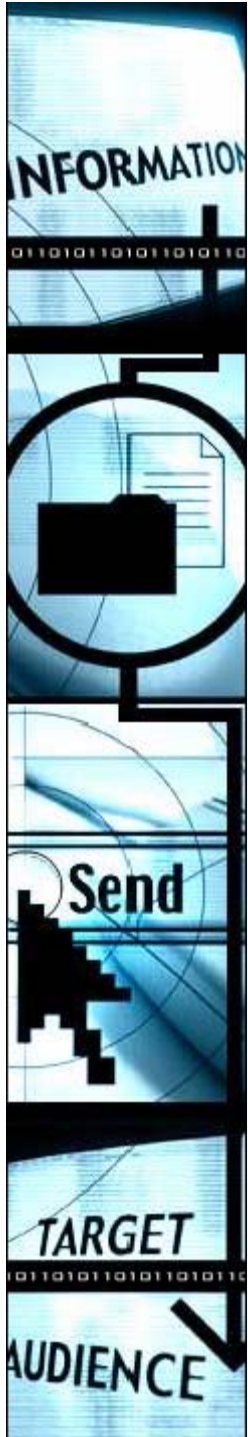


CPOE IMPLEMENTATION AT DUKE UNIVERSITY MEDICAL CENTER

Carol Drye, RN, MSN
Jeanette Jansen, RN, MSN

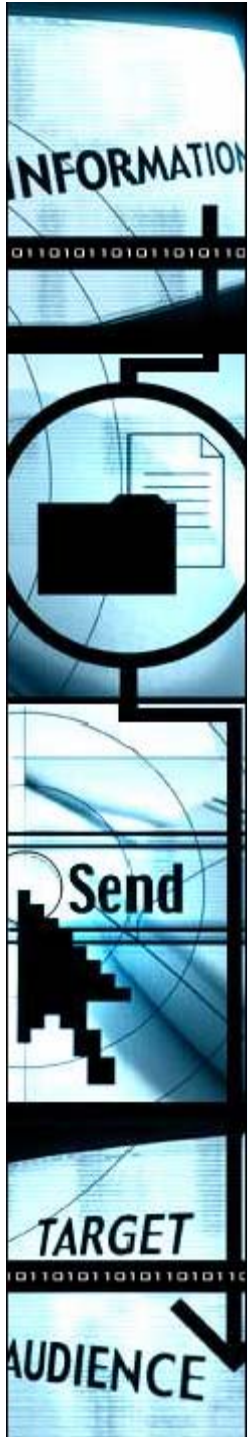




Introduction

- **Why CPOE?**
- **Implementation**
 - Challenges
 - Work flow processes
 - Barriers to implementation
 - Strategies and tools used
 - User preparation and support
- **Nursing Informaticists' Role**
- **Why was implementation at Duke University Hospital successful**

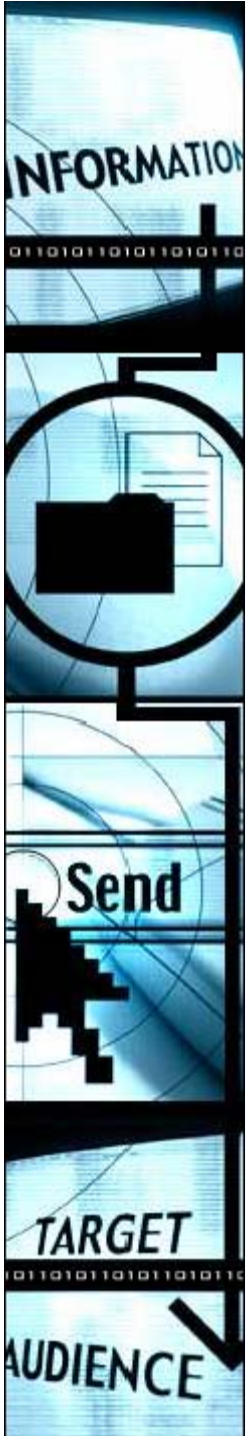




Duke University Hospital

- **995 Bed Teaching Hospital**
- **Tertiary Care Facility**
- **Trauma Center**
- **36,879 Patients Admitted 2004**
- **Average daily census 609**
- **2000 Nurses**
- **975 Attending Physicians, 842 residents**
- **A 2004 *U.S. News & World Report* ranking placed Duke among the top six of 6,012 American hospitals.**





WHY CPOE?

CPOE? A New Member of the Health Care Team

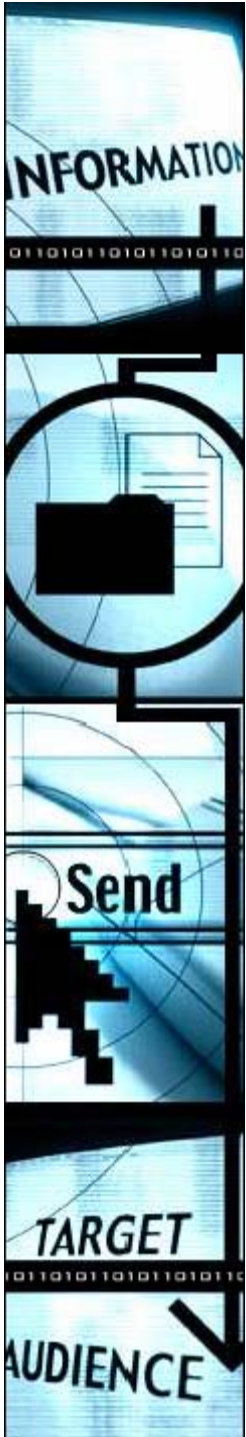
Wanted: A health care team member who can work 24/7, has patient safety as a top priority, and is humble enough to learn best practices from physicians, nurses, and other providers yet smart enough to remember everything.



Actual Written Order

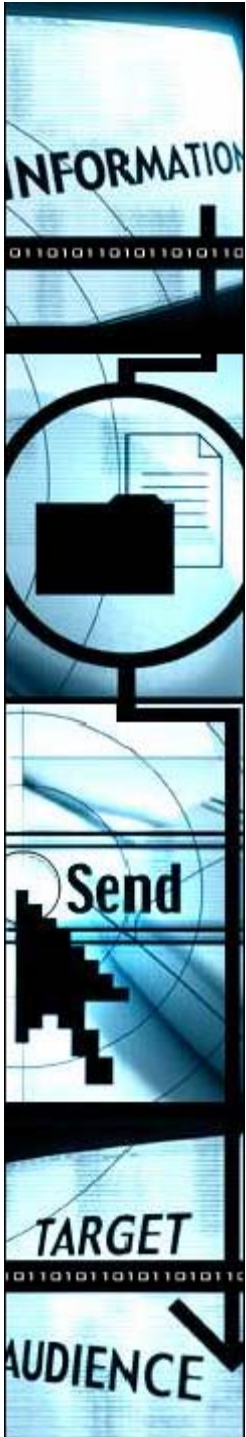
DATE	TIME	DOCTORS' ORDERS
3/19/03	1720	cc
3/19/03	1940	cc
3/19/03	2320	cc
3/20/03		① ↑ heparin by 1000/Hr.
1a		② ✓ Ptt @ 8 am

[Signature] 3/20/03

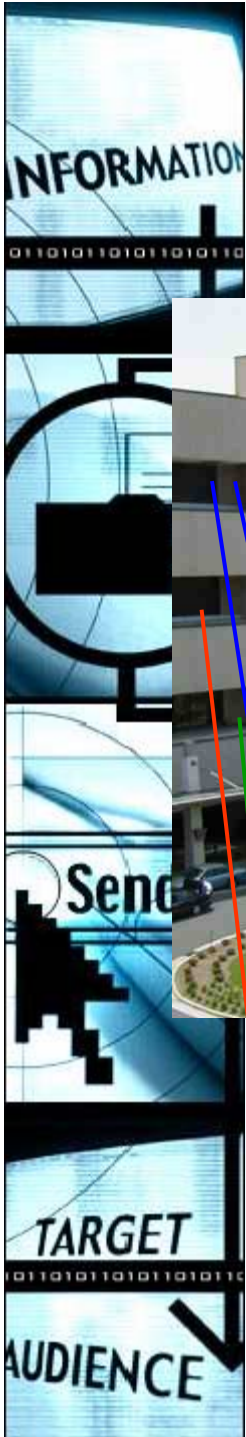


Current Adoption

- CPOE systems in the US are in use in only 223 hospitals – about 4 percent penetration of the market. In 144 of these 233 live sites, physicians placed more than 50 percent of the orders using CPOE
- More than 113,000 physicians were using CPOE in 2004 – a more than 50 percent increase from the 69,000 users reported in 2003
- CPOE jumped 163 percent in 2004 (from a very small base) in community hospitals and rose 16 percent in teaching hospitals (Klas 2005)



Where is CPOE Live at Duke ?



- 9. Oncology & BMTU
- 8. Gen Med & MICU
- 7. Cardiology & CCU
- 6. Ortho & Other Surg
- 5. Peds & PICU
- 4. Neuro, NSurg, NICU
- 3. CT Surg & ACU
- 2. Gen Surg & SICU

7. Pulm, MICU Step-down

7. Gyn Onc

5. NICU, ICN

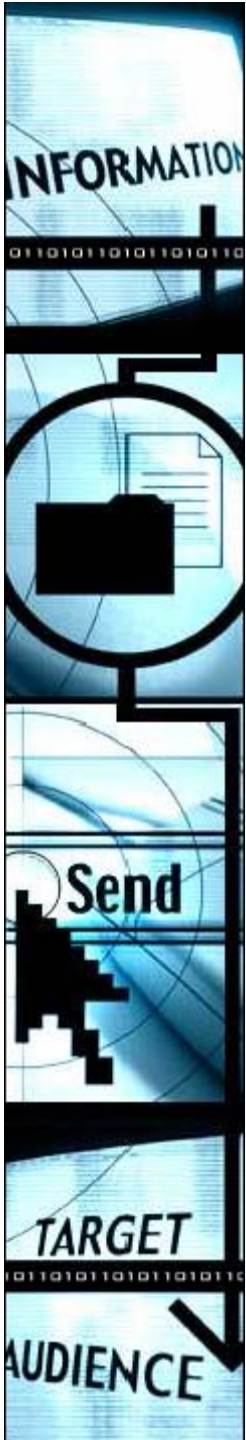
OB

3. PACU

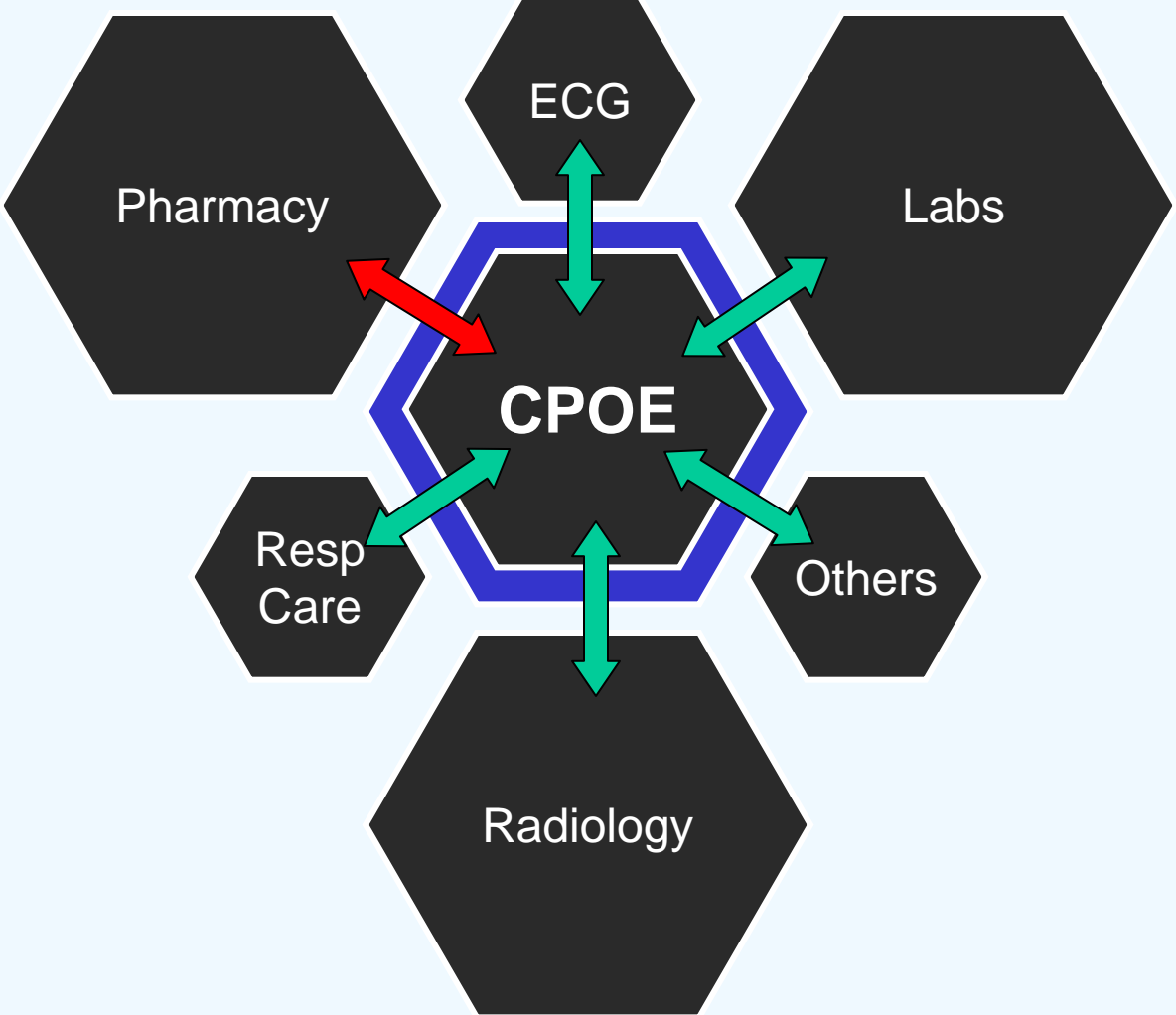
Inpatient Psychiatric Units

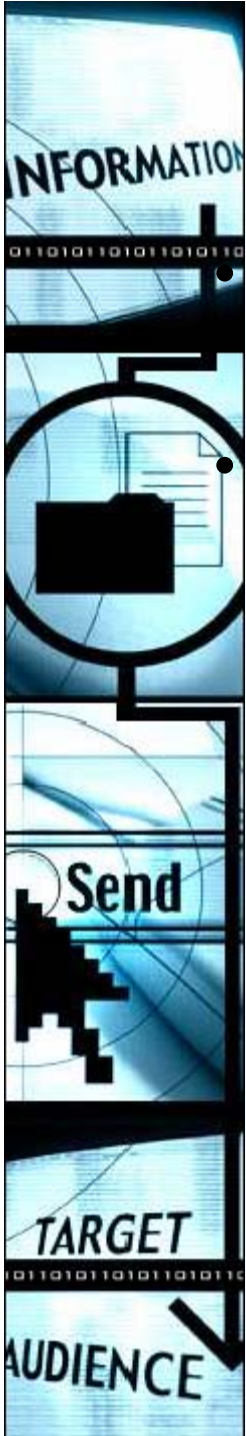
- Fully Deployed
- Near Deployment
- Later Deployment





CPOE Communicates with Other Key Systems





Hardware

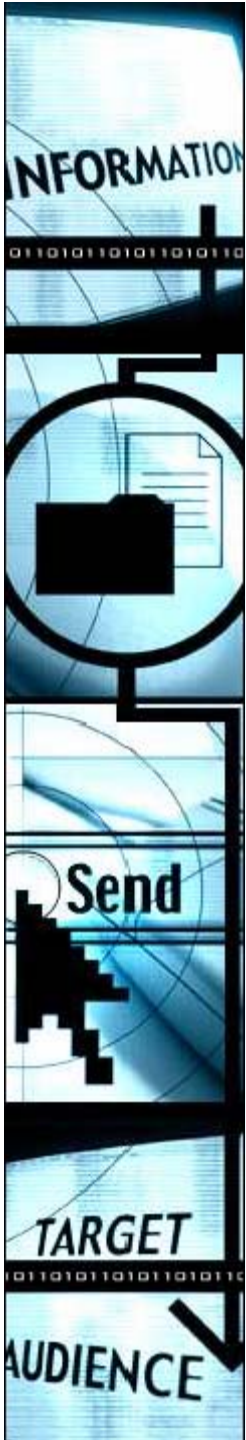
Server

- 2 AIX boxes: Failover
- Data on SAN

Desktop

- Duke Patient Information Network
- Access via eBrowser (Duke's electronic medical record)
- Spent \$1,000,000:
 - 8 computers and 1 printer /med-surg unit
 - 2 computers and 1 printer to ICU due to bedside computing already in place
- Added computers to sleep rooms, cafeteria, offices, procedure areas as needed
- Desktops (2/unit), Wallmount (6/unit), 2 rolling carts or # for each rounding team/unit





Mobile Wireless

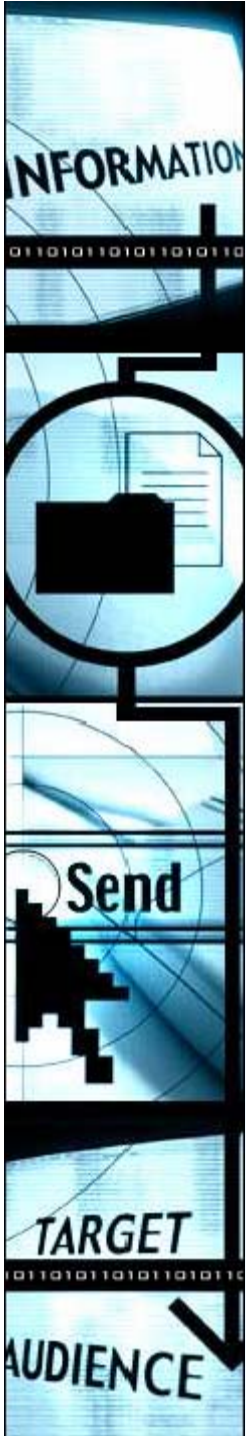


Wall Mounted



Desktop





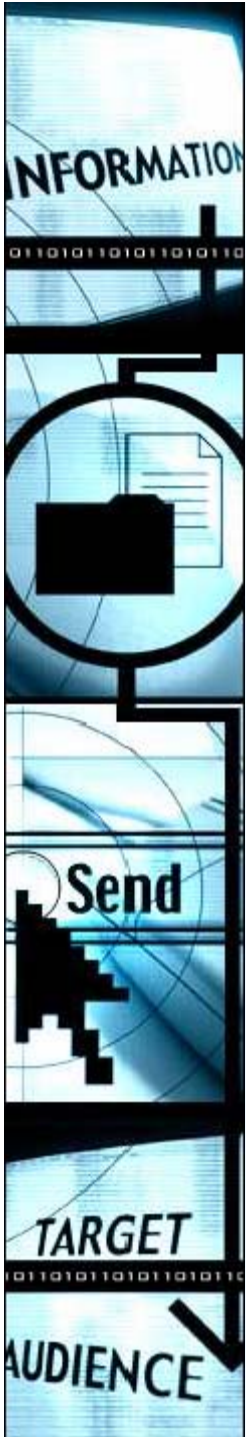
Keys to Success

“The study sites confirmed many of the success factors presented in earlier studies including:

- Executive leadership commitment*
- The engagement of physician champions*
- Continued dedication of financial resources beyond implementation*
- Intensive user support*
- Rapid computer response times*
- User friendly interfaces”*

- From: AHA, First Consulting Group report: *Computerized Physician Order Entry: Costs, Benefits and Challenges, Jan 2003***





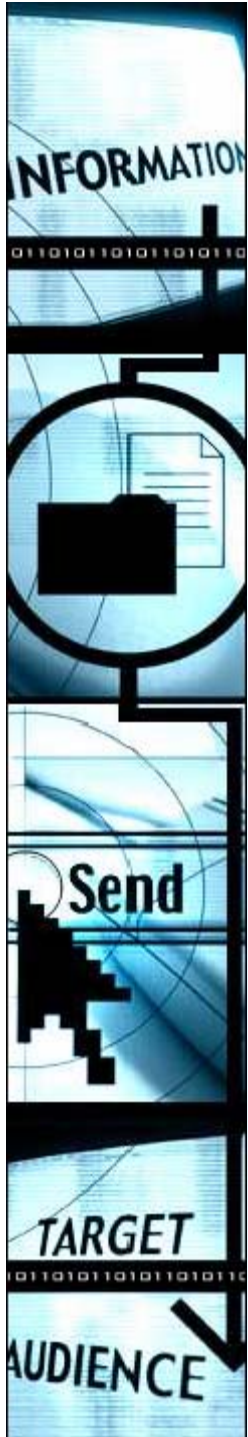
IT TAKES A VILLAGE

Duke Hospital had to prepare for this new member of the health team just as any unit prepares for a new employee. But when your new employee is going to interact with more than 800 practicing physicians, 2,000 nurses, and thousands of radiology technicians, dietitians, respiratory therapists, and other caregivers, preparing the ground gets a wee bit more complicated.

Inside Archives,
Duke University Medical Center and Health Systems Employee Newsletter
August 18, 2003 Volume 12 #16



Duke University Health System



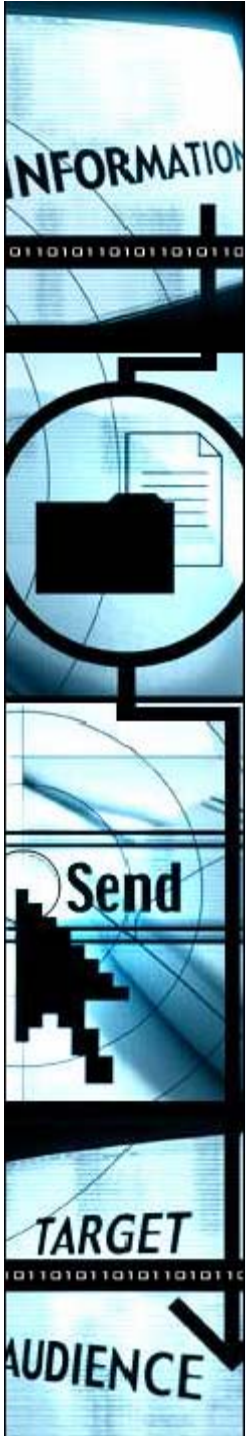
DUKE HEALTH TECHNOLOGY SOLUTIONS (DHTS)

- **STAFF OF >450**
- **30 NURSING INFORMATACISTS**

CPOE TEAM

- **PROJECT DIRECTOR (IT PHARMACIST)**
- **2 APPLICATION MANAGERS**
- **CPOE BUILD MANAGER**
- **CPOE IMPLEMENTATION MANAGER**
- **6 NURSE ANALYSTS**
- **1 IT PHARMACIST**
- **2 IT PHYSICIANS**
- **>100 OTHER PART TIME STAFF (INTERFACE PROGRAMMERS, DATA BASE ANALYSTS, SYSTEMS ANALYSTS, TRAINERS)**

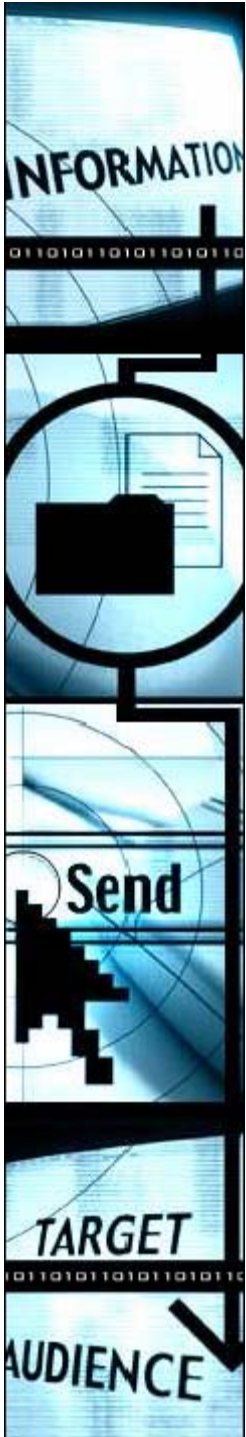




Go Live Preparation

- Mapping hospital process flows throughout the hospital to understand how CPOE may impact them
- Future state review
- Formation of Clinical Operations Committee
- IT analyst unit assignments
- Multi-disciplinary team meetings to
 - order set build
 - Unit preparation of managers and staff
- Installation of hardware including rolling laptops, wall mounts, and printers
- Training





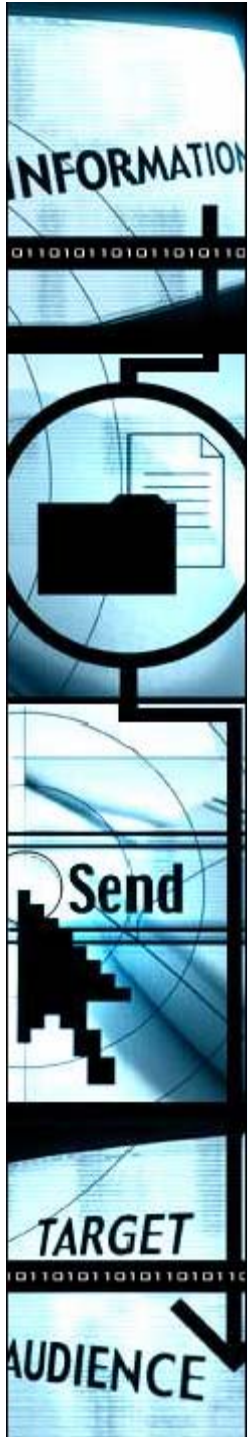
CPOE Training

- Web site to register for class online or call to register option
- Training lab set up with 28 computers
- Designated CPOE training staff
- Notification of staff of need to schedule training
- Follow up of who was trained and who still needed to be trained

When:

- 2 weeks prior to go-live
- 2 months prior to go-live for nurse managers
- Nurses: 3-4 hours
- Health Unit Coordinator: 2 hours
- Attendings /Residents/ PA/NP : 2 hours
- “On the fly training”: 30 minutes





Physician Training

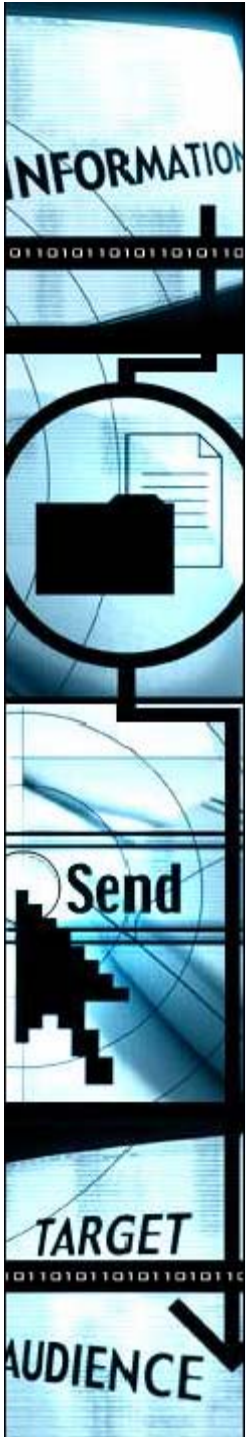


- **Class led by instructor**
- **Proctored self paced learning class**
- **Special classes for services arranged upon request**
- **“Personal training”**
- **On the fly training**



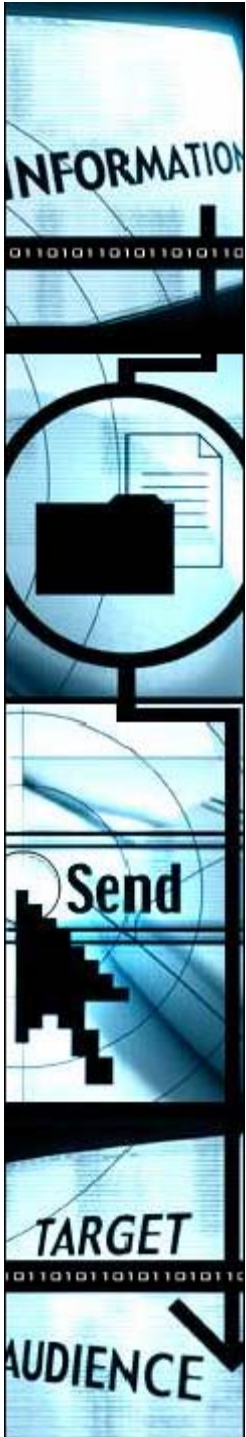
Patient Management

- Where is the doctor?
- Where is the patient?
- Where is the patient in the computer?
- When does the doctor write orders?



CARE GIVER COMMUNICATION

- CPOE does not replace the need for physician to nurse communication
- CPOE does not decrease the need to question





CPOE, DRYE
 Duke University Hospital OPT OUT:
 FROM: 05/01/05 18:15 TO: 05/02/05 18:15
 ROOM: 7724-01 ADM: 09/18/04 11:19
 AGE: 25Y SEX: F MD: WILSON, JOANNE A
 DOB: 03/03/1980 ID: 003364 MR: AA0120
 REQUESTED:05/02/05 18:15

Order Confirmation Report - CPOE, DRYE
 DEPT: N77 ROOM: 7724-01 MR: AA0120
 Ordered by: MD RUSSELL, MICHAEL L
 Entered by: RN DRYE, CAROL N - 05/02/05 18:15
 Order mode: Verbal - Session Id: 32662

ALLERGY
 Not Documented

CORE

Ord#	Action	Order Name	Freq	Priority	Duration	Start	Stop
977	Started	ADMIT AS INPATIENT	CONT	ROUTINE		05/02 18:00	Indefinite
978	Started	ATTENDING: Name: Dr. Vail	CONT	ROUTINE		05/02 18:00	Indefinite
979	Started	DIAGNOSIS: Diagnosis: s/p total knee replacement	CONT	ROUTINE		05/02 18:01	Indefinite

DIE

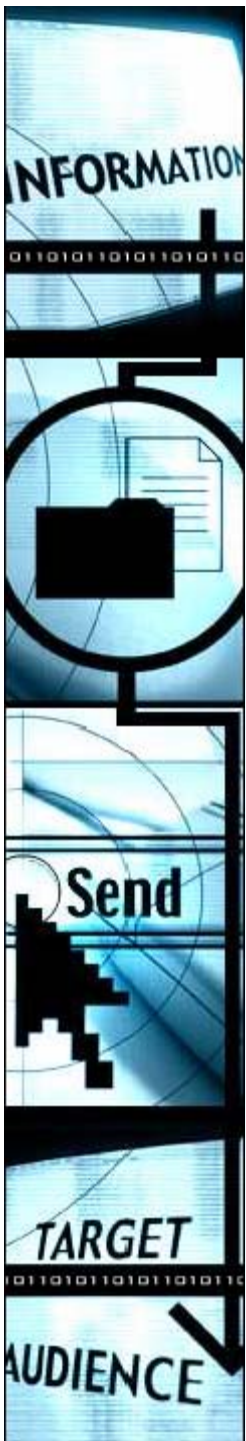
Ord#	Action	Order Name	Freq	Priority	Duration	Start	Stop
1016	Started	NO CONCENTRATED SWEETS Food Allergy: No known food allergy	CMEALS	ROUTINE		05/02 18:11	Indefinite

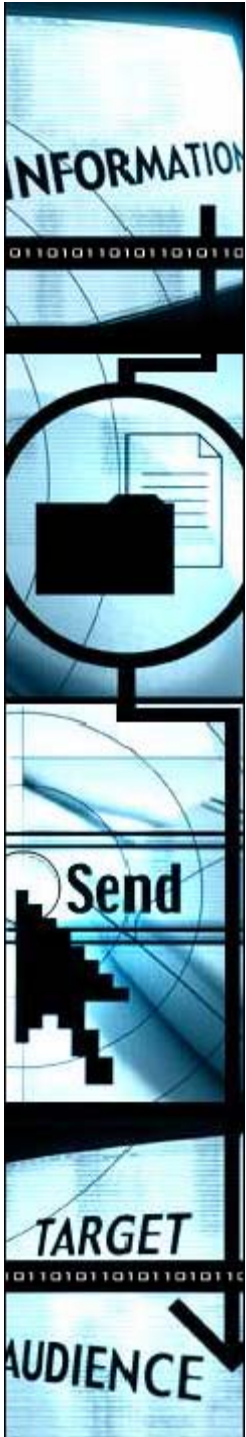
LAB

Ord#	Action	Order Name	Freq	Priority	Duration	Start	Stop
1005	Active	AUTOMATED BLOOD COUNT	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1006	Active	HEMOGLOBIN & HEMATOCRIT	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1007	Active	PROTHROMBIN TIME	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1008	Active	ACT PARTIAL THROMBOPLASTIN TIM	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1009	Active	CHEM CS-CO2,CL,K,NA,BUN,GLU,CR	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1010	Active	POTASSIUM	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1011	Active	ALBUMIN	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45
1012	Active	VITAMIN B-12	EARLY AM	URGENT	1 Time	05/03 04:45	05/03 04:45



The Path of Least Resistance





UNIT SUPPORT

- Day 1-5: 24 hour per day of nurse informaticists on the unit
- Day 5-10: 18 hours (0700-2300) of nurse informaticists on the unit support, then on-call at night

DAILY UPDATE MEETINGS

- “How was your day?”
- Problems with CPOE
- Process issues
- What was good?
- Feedback to the unit of the nurse informaticists perceptions
- Reassurances

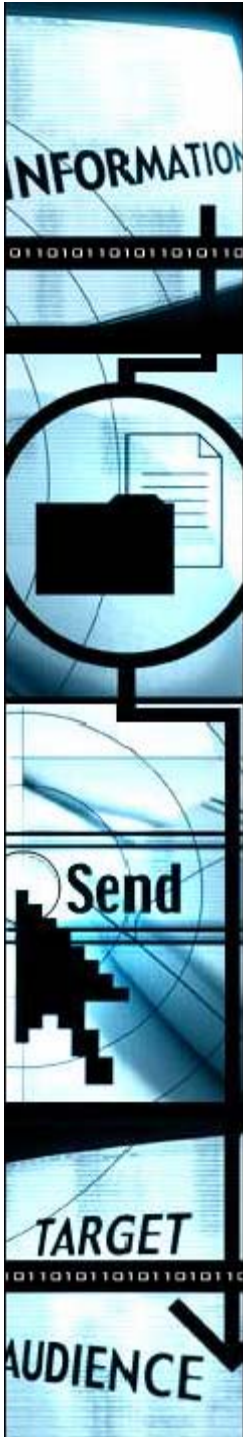




Problem Solving and Follow-up

- Created data base to document issues and assign follow-up
- Communication tool for the team supporting units as well as documentation for future referral
- Weekly review of issues with team for update and resolution status





CPOE Incident Database

Incident Date & Time: at
Analyst:

Problem:
Category:
Location:

Staff Contact:

Patient Data:
(If necessary)
Remedy Ticket #
McKesson Case #

Details:

Requests

1. please add aliases **folate, vitamin**
2. please add a [bracketed] section to the name to make them *look like* drugs, even if it's just
folic acid inj [folic acid]
folic acid [folic acid]
or maybe
folic acid inj [folate]
folic acid [folate]
Pharmacist's call.

Time Spent in minutes

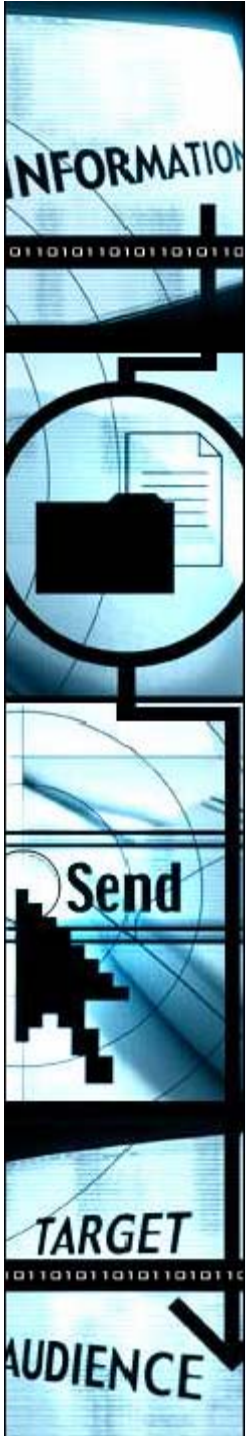
Follow-Up - please date/time and initial

Incident Resolved: Yes YES = resolved, no further investigation required
 No NO = unresolved; requires investigation
 Unable to resolve UNABLE TO RESOLVE = unresolvable; investigation complete no resolution available
 Non-Incident NON-INCIDENT = build or informational record

Date Resolved: by:

Modified by Lille N Plumer on 03/22/2005 10:23 AM
Modified by Robert C Musser on 03/18/2005 07:37 AM
Created by Robert C Musser on 03/18/2005 07:37 AM

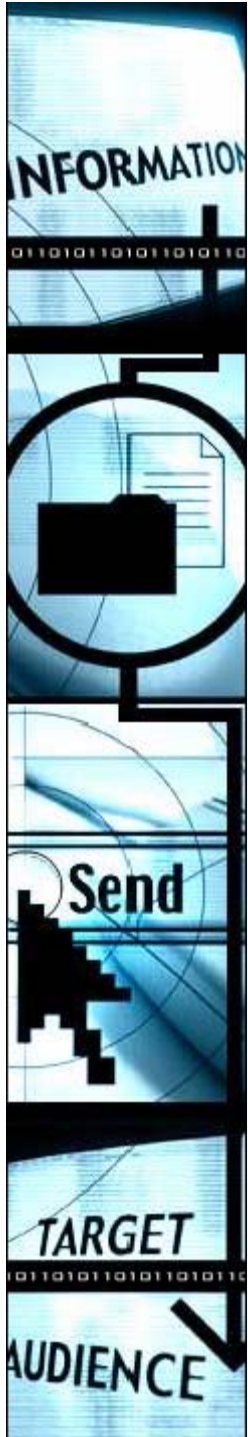




WHAT DUKE DID WELL

- Created a knowledge base viewable by all working on the ordersets
- Creative in finding ways to use the expertise of physicians to create ordersets
- Eliminated barriers as much as possible; ensured computer access would not be a problem
- Took away responsibilities of down time during early phases
- Created flexible training schedules and offerings
- Support: presence on units and 24/7 nursing informaticist on call for timely response to questions/issues

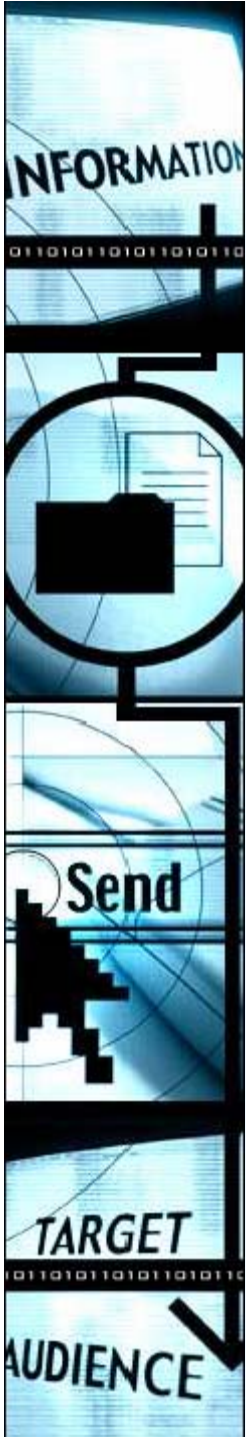




Spend as much time as possible in the clinical environment

- **Read orders in charts**
- **Talk through processes with all levels of staff**
- **Watch the nursing processes**
- **Audit the transition processes**
- **Round with the physicians**
- **Watch the physicians write orders**
- **Do not assume that any 2 nursing areas are alike**





Customer Support

- We firmly believe that the customer is always right
- Listen, listen, listen, then listen some more
- We changed the mechanics of the assembly line while the workers had to maintain the line with no change in pace, they deserved the highest level of support
- A high level of support eliminates most anxiety and allows learning
- Most of the questions we were asked were about Duke process not the computer application
- Because we “hung out” as we said we would, we created trust and alleviated fear





Benefits of CPOE at Duke

- Handwriting errors eliminated
- Transcription errors eliminated
- Decreased turnaround time
- Formulary Adherence
- Identification of prescriber
- Order Sets- evidence based, disease specific
- Pre-defined route, dose, frequency, timing
- Data collection



? QUESTIONS ?

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