Using Information Technology to Drive Patient Care: Case Study in EHR Implementation

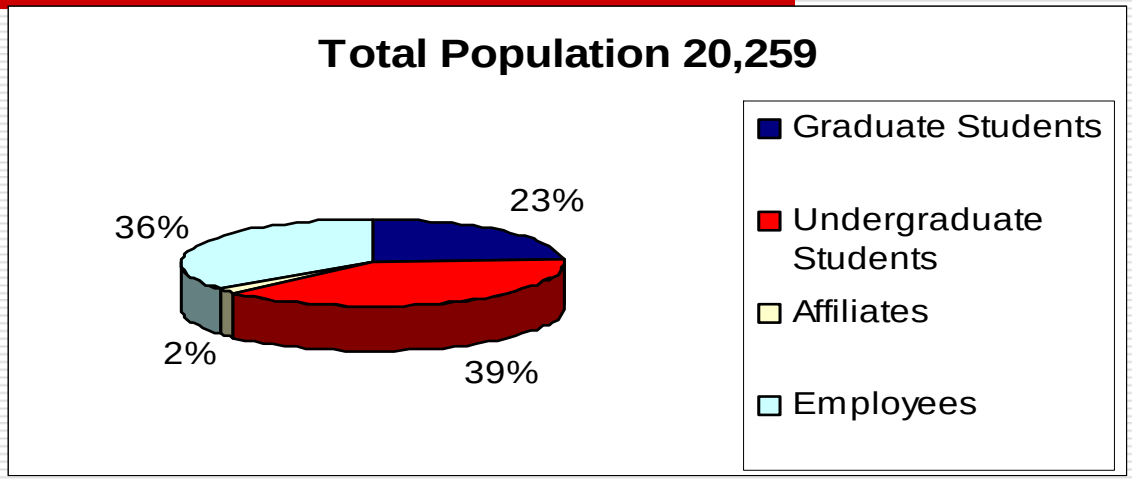
With Help From Monkeys, Mice, and Penguins

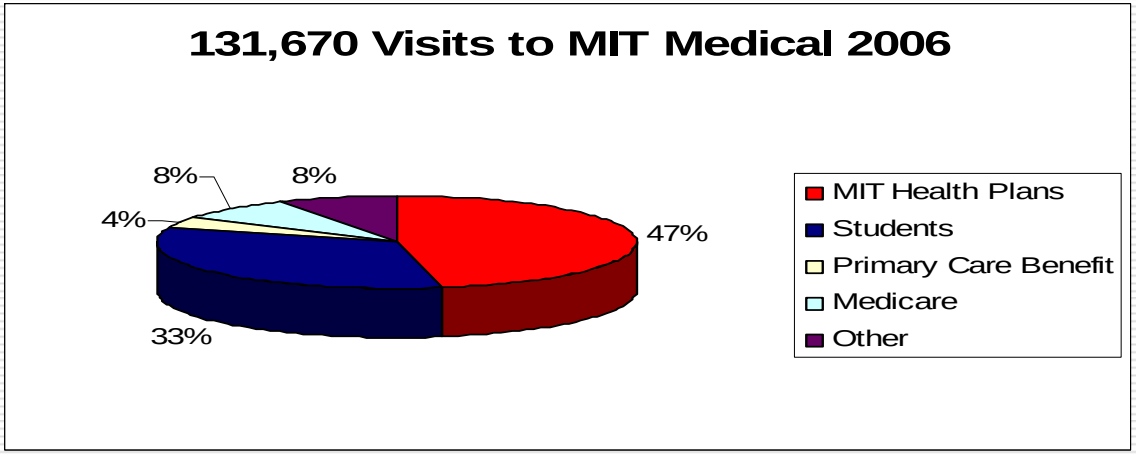
Tom Goodwin, MHA
MIT Medical
Cambridge, MA
March 2007

MIT Medical

- **Staff**
  - 122 Clinical Staff (Nearly all salaried)
  - 38 Administrative staff
  - 121 Support Staff
- **Scope of services**
  - Internal Medicine and Subspecialties
  - Center for Health Promotion and Wellness
  - Dental / Oral Surgery
  - General Surgery and Subspecialties / Eye Service
  - Mental Health
  - Nutrition
  - Obstetrics / Gynecology
  - Pediatrics / Adolescent medicine
  - Urgent Care
  - Worksite Health / Environmental Med / Health Screen
  - On Site: •Laboratory •Radiology •Pharmacy

Demographics / Visits





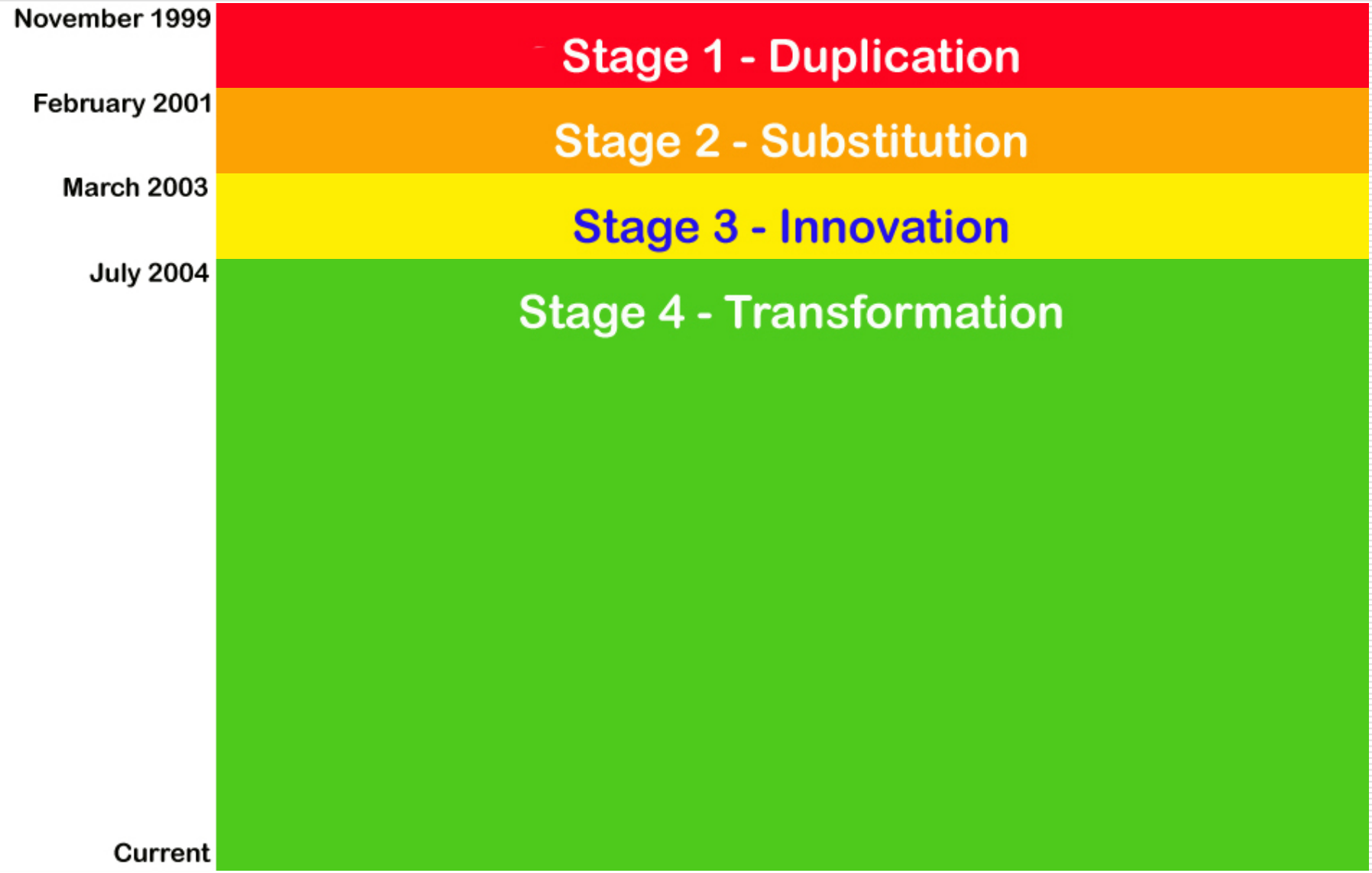
EMR Implementation: Major Goals

- Improve Care
- Control Costs
- Increase Productivity
- Increase clinician satisfaction
- Increase patient satisfaction (Make clinical information available to the patient)
- Meet Compliance Guidelines
- Interface With Practice Management System

Our Journey Began in Late 1997

Stages of Adopting to Technology

- Duplication Phase Also Known as the Please Don't Spank Me Phase
- Substitution Phase
- Innovation Phase
- Transformation Phase


November 1999
February 2001
March 2003
July 2004
Current
Stage 1 - Duplication
Stage 2 - Substitution
Stage 3 - Innovation
Stage 4 - Transformation

Duplication Via Building a Repository (beginning Late 1999)

- Stock the Water!
  - Data Repository
    - Dictations
    - Lab / X-ray / Cytology
    - Pharmacy Interface (Pharm -> EMR)
    - Provider Schedules
    - Patient Demographics
  - Duplicate The Existing Paper Record

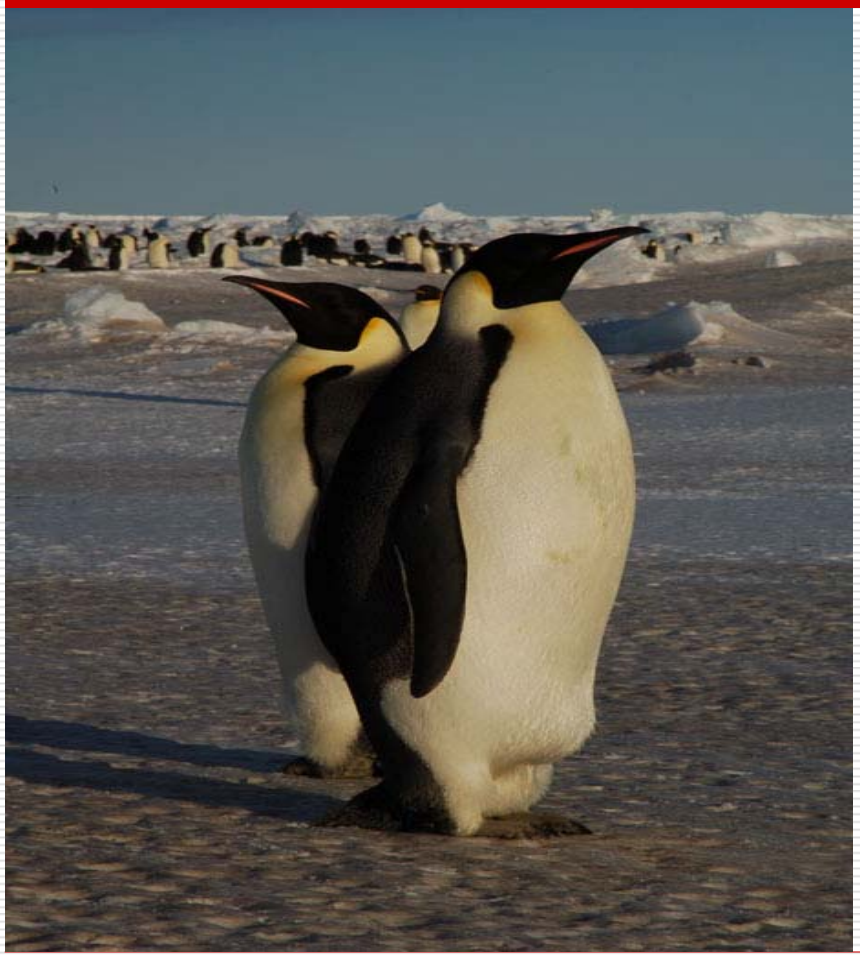
Duplication Phase at MIT Medical

Another Example of the Duplication Phase

Substitution Phase Begins Q1 2001

- Phone Messages into the EMR
  - No paper messages
  - No phone notes filed in the paper chart
  - Interoffice communications
    - Referral Note
    - Specialist cc
    - Follow up from Urgent Care
- E-mail
  - Copy to EMR, no paper note

No Substitution without a Physician Champion



- Any organization that wants to implement an EHR needs a Physician Champion
- Plus a strong Medical Director

A New Paradigm

- Clinician Interacts With EMR
  - Need to look for Tasks
  - Retrieve clinical information here!
  - Use EMR to communicate
  - Document all patient interactions in the EMR

Adoption

- No Choice
  - Medical Director Mandate
- Took Some Getting Used To
- No Rebellion
- Set A Path To Widespread EMR Use
- Grumpy Old Men Will Go For A Swim!

Our Medical Director meets with a reluctant clinician

An Opportunity to Sweep Away Bad Habits

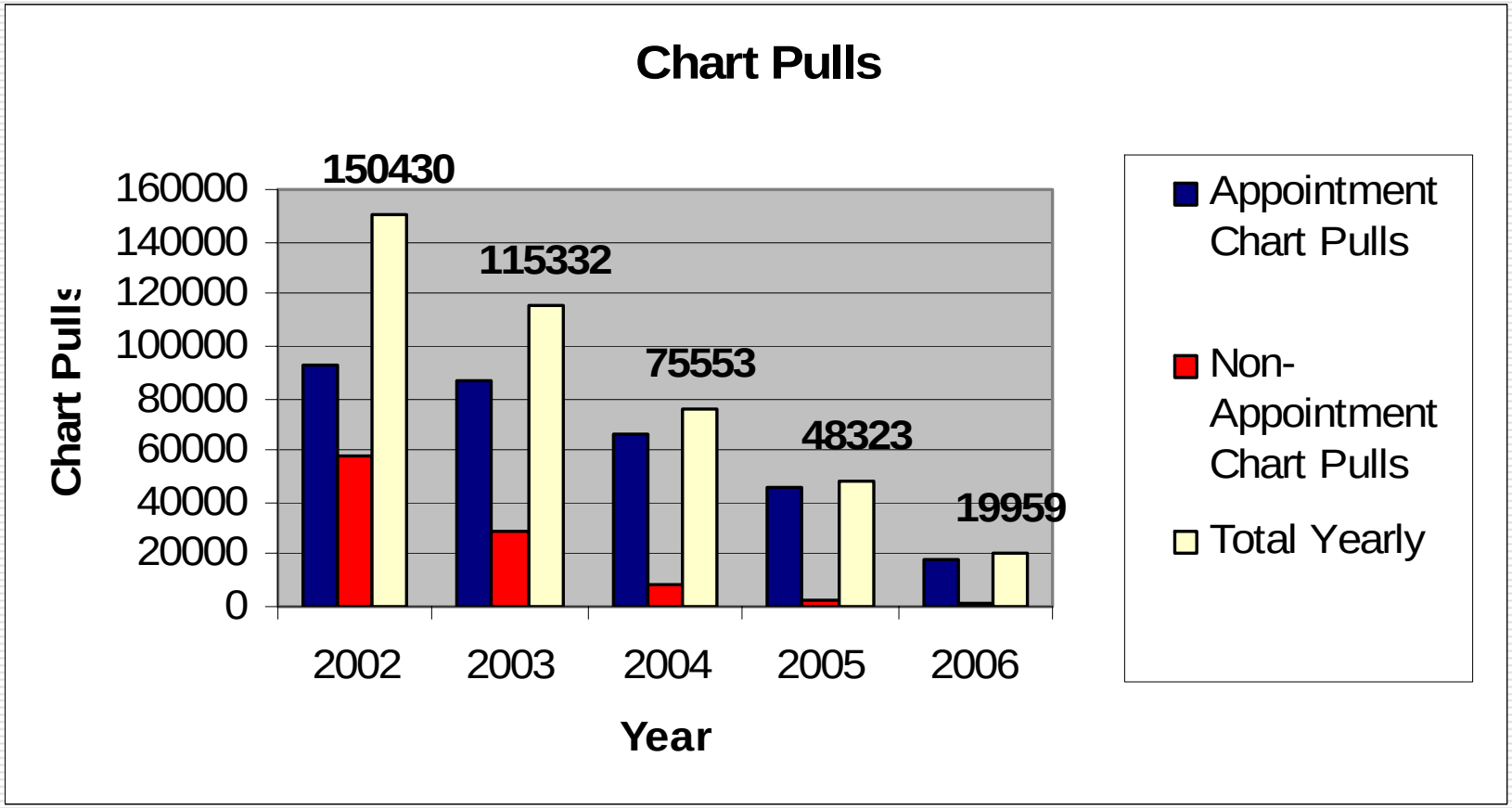
MIT Medical

We Realized These Are Bad For Our Health

- Deep fried outer shell
- Loaded with “trans” fatty acids
- Red #5 Dye
- Artificial Flavoring
- Lots of preservatives
- High in sodium

And…The Paper Charts Were Very Difficult To Transport

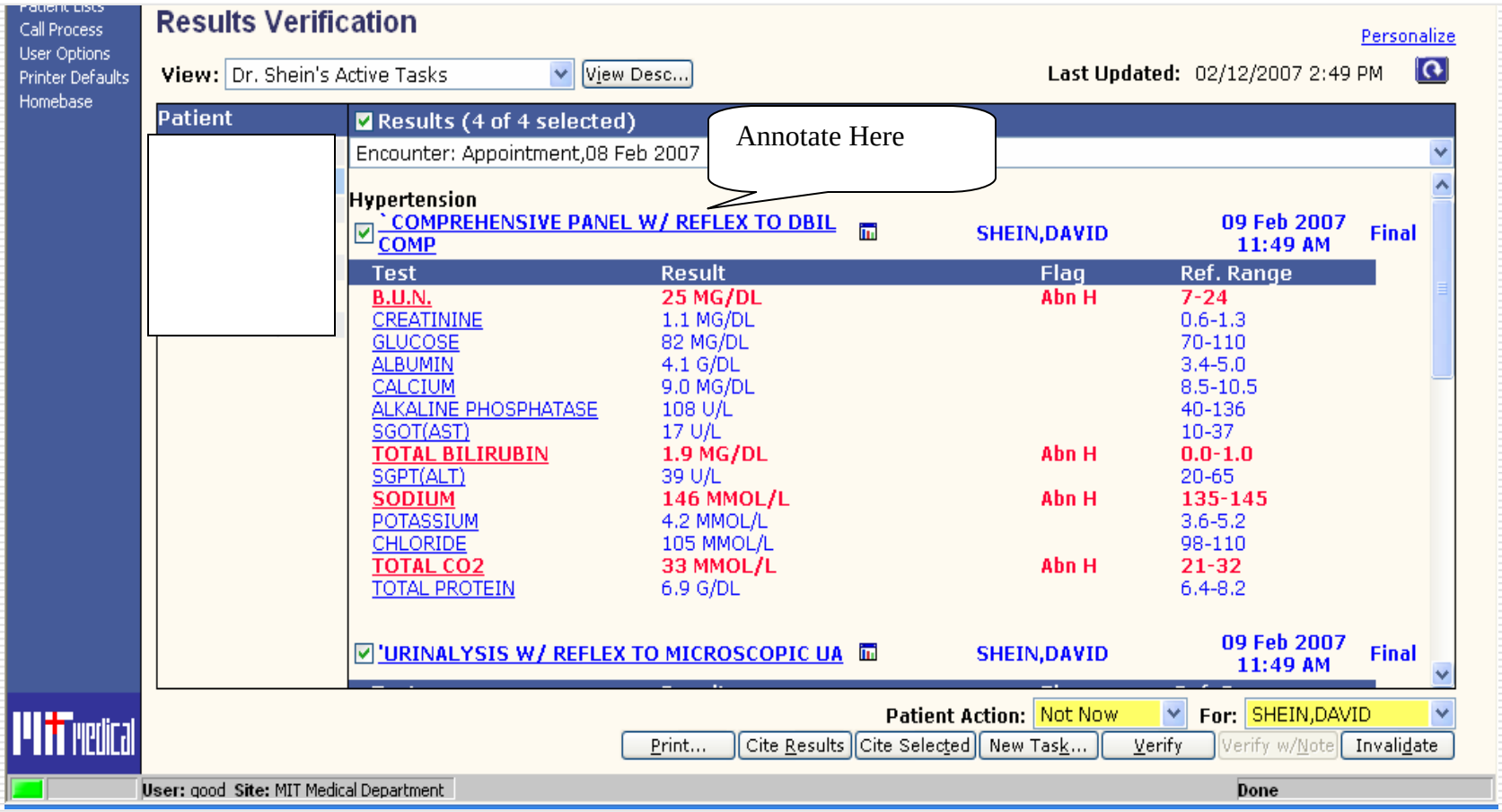
87% Reduction in Total Chart Pulls



Innovation Phase Begins March 2003

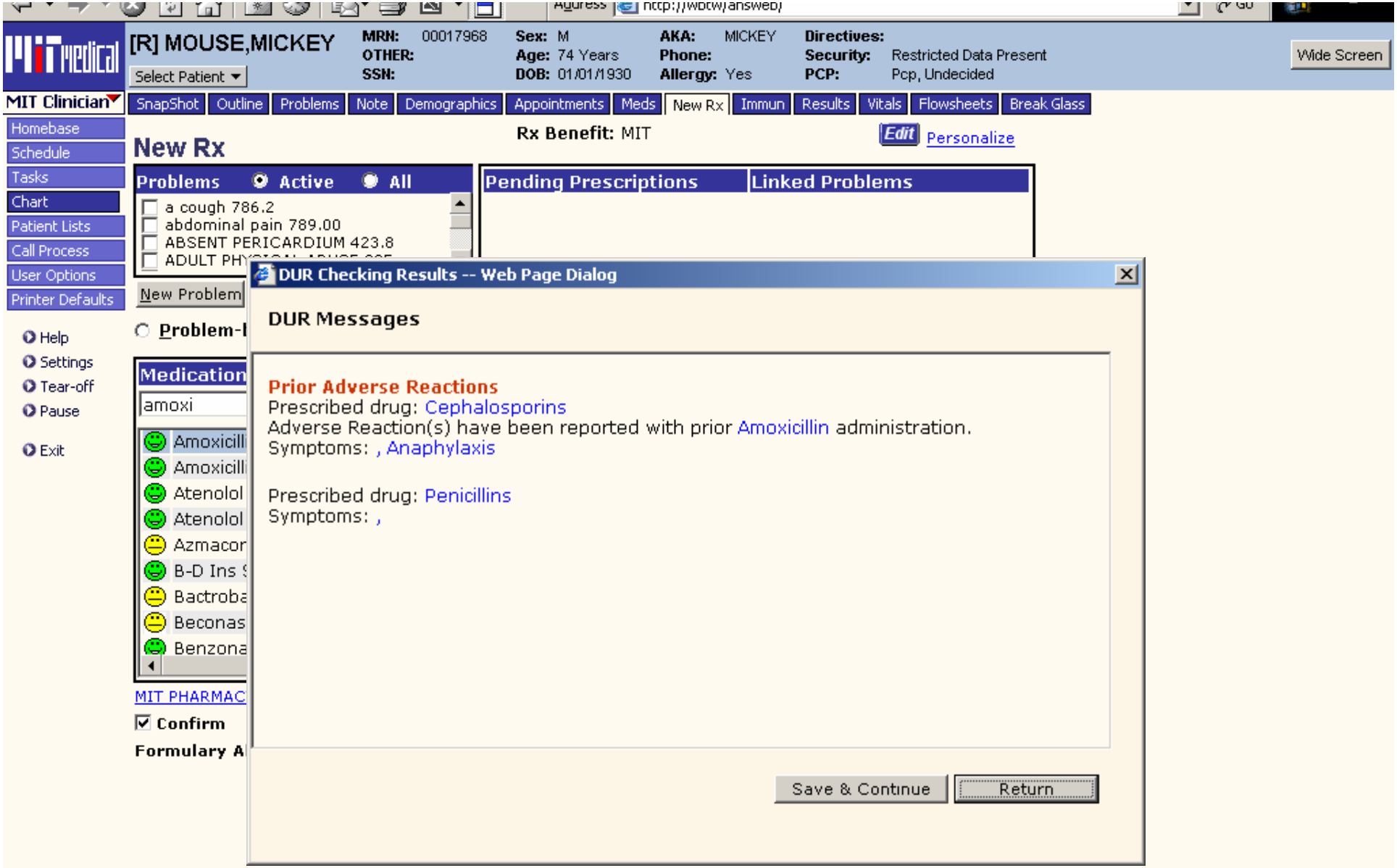
- Laboratory and Radiology results electronically verified by clinician
- Electronic Prescriptions
- Began scanning outside consults, diagnostic test results, and older notes
- One electronically signed note per visit required without printing for the paper chart.
- Remote access added

Result Verification Made Easy

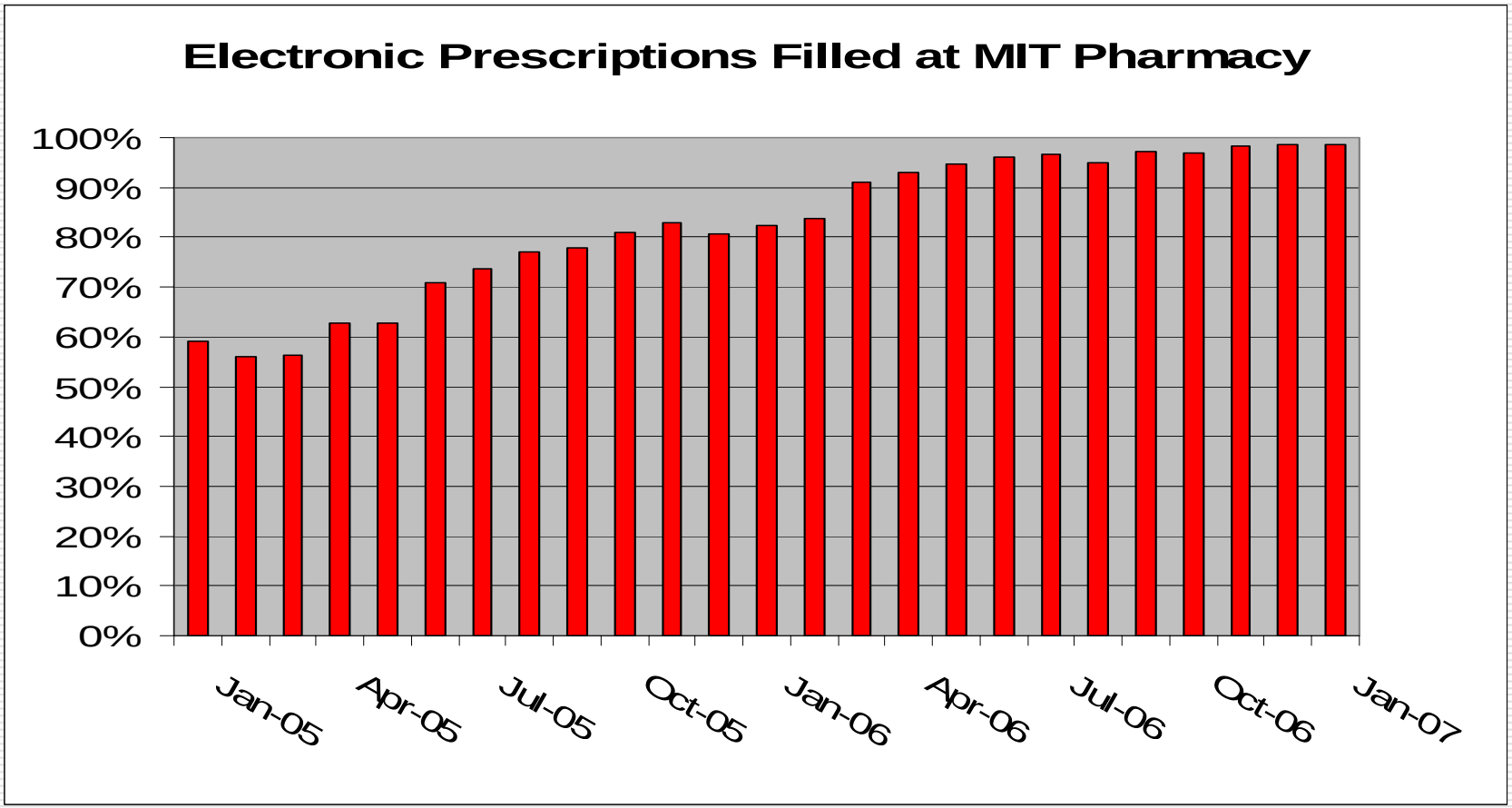


Electronic Prescribing

- Two Way Interface With MIT Pharmacy
- Three-Click Refills
  - Time Saving for Provider, Pharmacy and Patient
  - Error Reduction
- Formulary Information
  - Cost Saving for Health Plan, Pharmacy and Patient
- Information To Improve Health Outcomes
  - Drug – Drug Interactions
  - Drug – Allergy Interactions
  - Drug – Disease Interactions


[R] MOUSE,MICKEY
MRN: 00017968
OTHER:
SSN:
Sex: M
Age: 74 Years
DOB: 01/01/1930
AKA: MICKEY
Phone:
Allergy: Yes
Directives:
Security: Restricted Data Present
PCP: Pcp, Undecided
Wide Screen
Select Patient
MIT Clinician
SnapShot
Outline
Problems
Note
Demographics
Appointments
Meds
New Rx
Immun
Results
Vitals
Flowsheets
Break Glass
Homebase
Schedule
Tasks
Chart
Patient Lists
Call Process
User Options
Printer Defaults
Help
Settings
Tear-off
Pause
Exit
New Rx
Rx Benefit: MIT
Edit
Personalize
Problems
Active
All
a cough 786.2
abdominal pain 789.00
ABSENT PERICARDIUM 423.8
Pending Prescriptions
Linked Problems
New Problem
Problem-l
Medication
amoxi
Amoxicill
Amoxicill
Atenolol
Atenolol
Azmacor
B-D Ins
Bactroba
Beconas
Benzona
MIT PHARMAC
Confirm
Formulary A
DUR Checking Results -- Web Page Dialog
DUR Messages
Prior Adverse Reactions
Prescribed drug: Cephalosporins
Adverse Reaction(s) have been reported with prior Amoxicillin administration.
Symptoms: , Anaphylaxis
Prescribed drug: Penicillins
Symptoms: ,
Save & Continue
Return

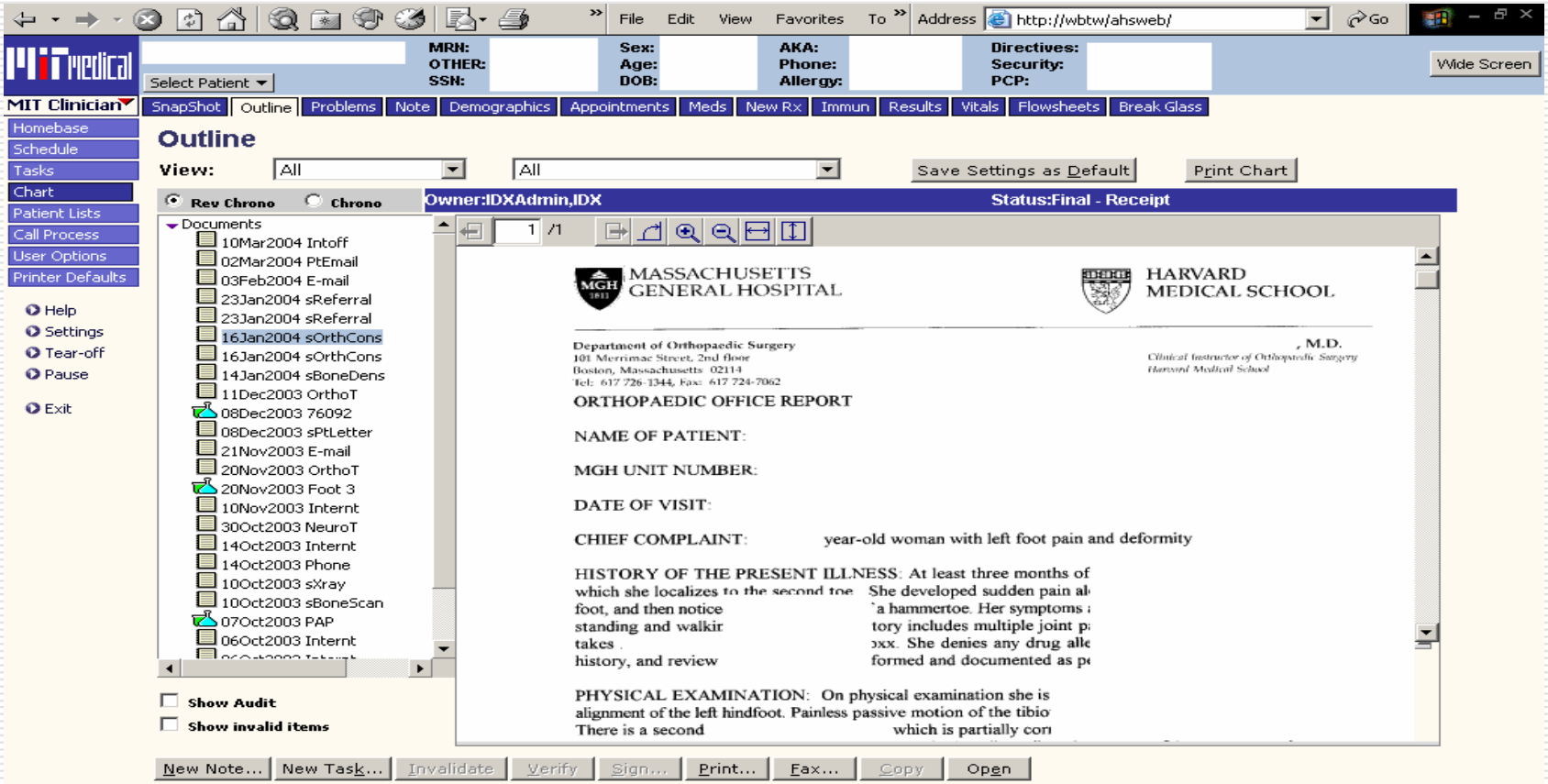
% Electronic Prescriptions Filled at MIT Pharmacy



Scanning Items into our EHR

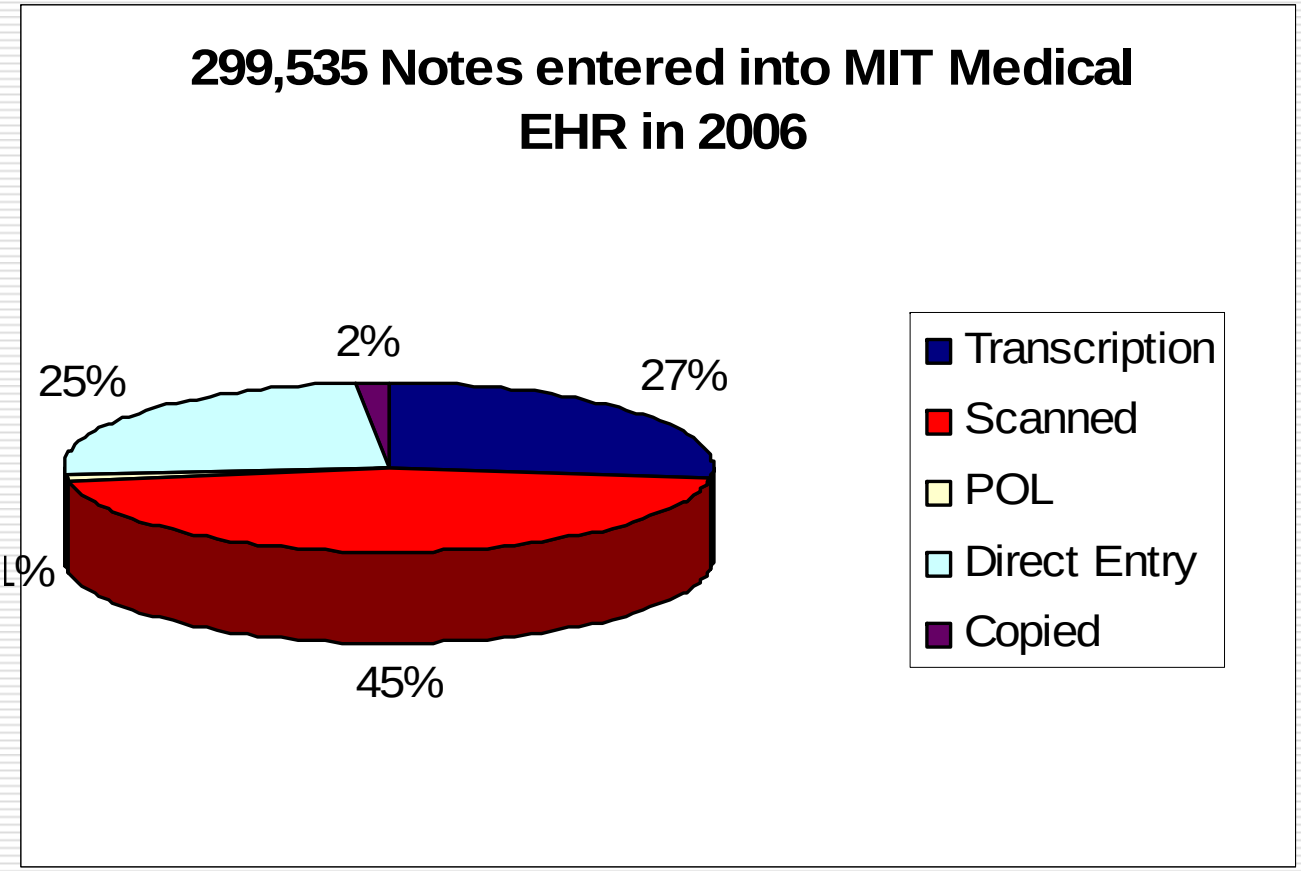
- Implementation October 2003
- No New Papers Filed in Charts from October 15, 2003 ($\rightarrow \infty$)
- 725,000+ Documents scanned in to date
- No New Paper Charts
- Eventually Reduced Staffing
  - 5.5 FTE reduction in medical record staffing

Scanned Items Viewed from the EHR



The Remaining Paper Charts Are Much Thinner

Note Types in MIT Medical EHR

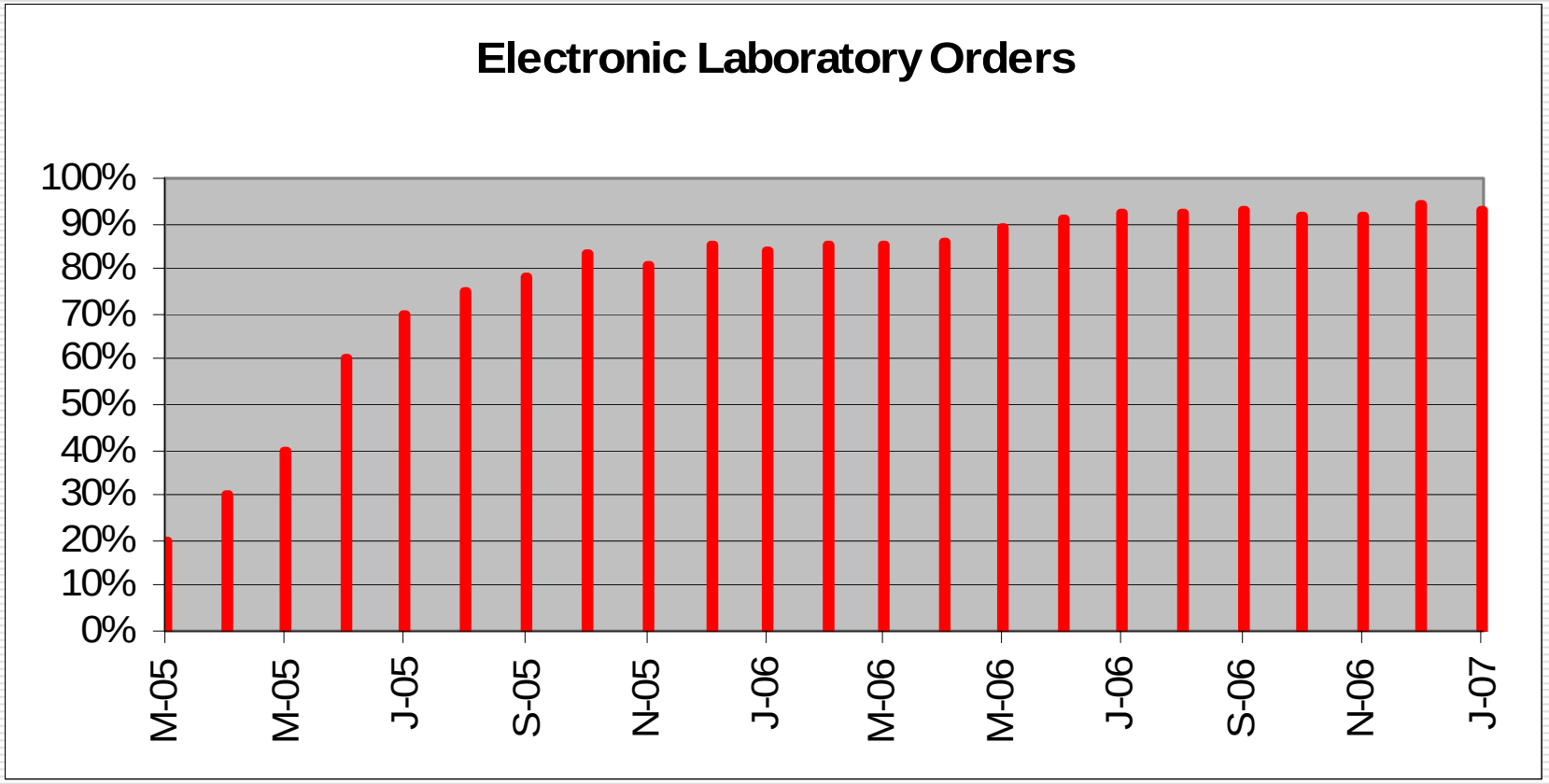


Remote Access Not Possible with 1980's High Technology

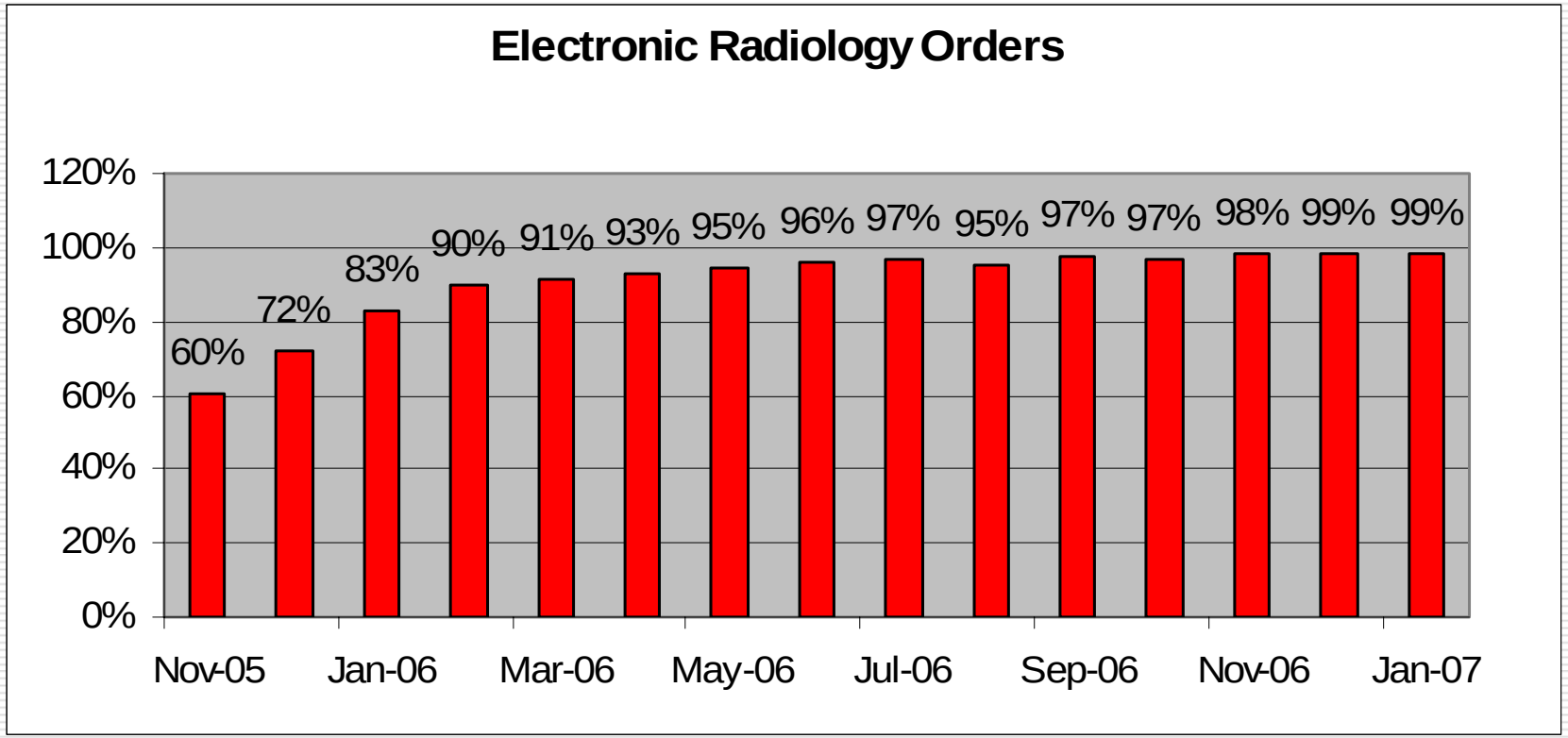
Further Innovation 2005 Forward

- Problem List becomes more important
- Orders go mainstream with the addition of Laboratory and Radiology interfaces.
- Patient Portal comes into operation
- Significant improvements in dictation procedure
- Mental Health Department begins using the EHR

Direct Order Interface with MIT Laboratory



Direct Order Interface to MIT Medical Radiology System



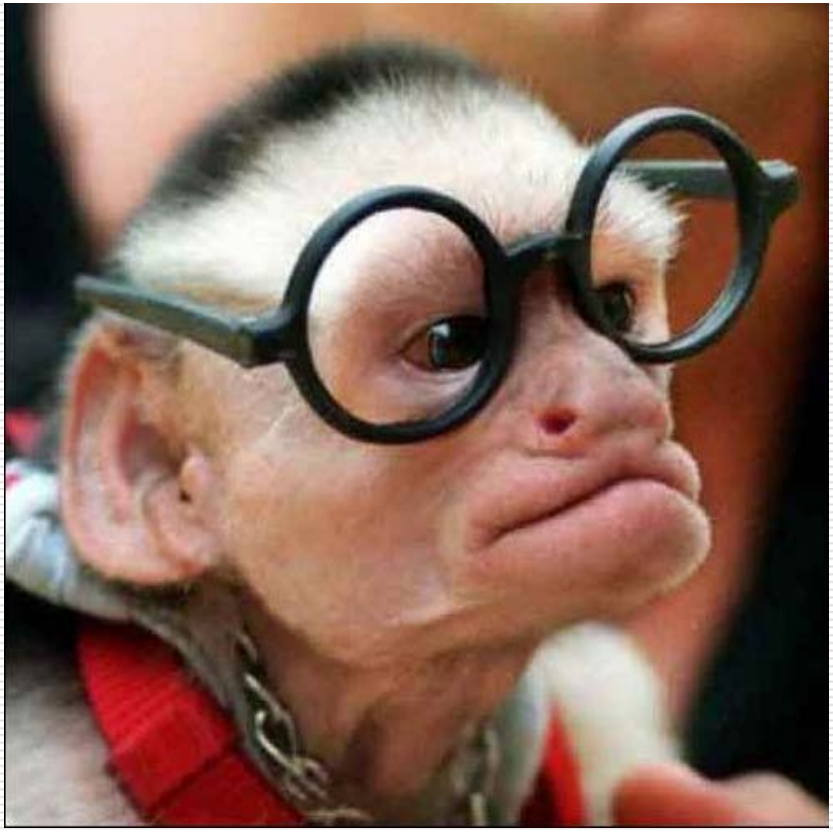
MIT Medical Patient Portal

Using our portal patients are able to:

- Exchange secure, encrypted messages with their providers
- Request new appointments, view past and upcoming appointments
- Receive automated appointment reminders
- Request updates to personal information
- View certain clinical information including: Allergies, Immunization History and Medications

Introducing the “Talking Mouse”

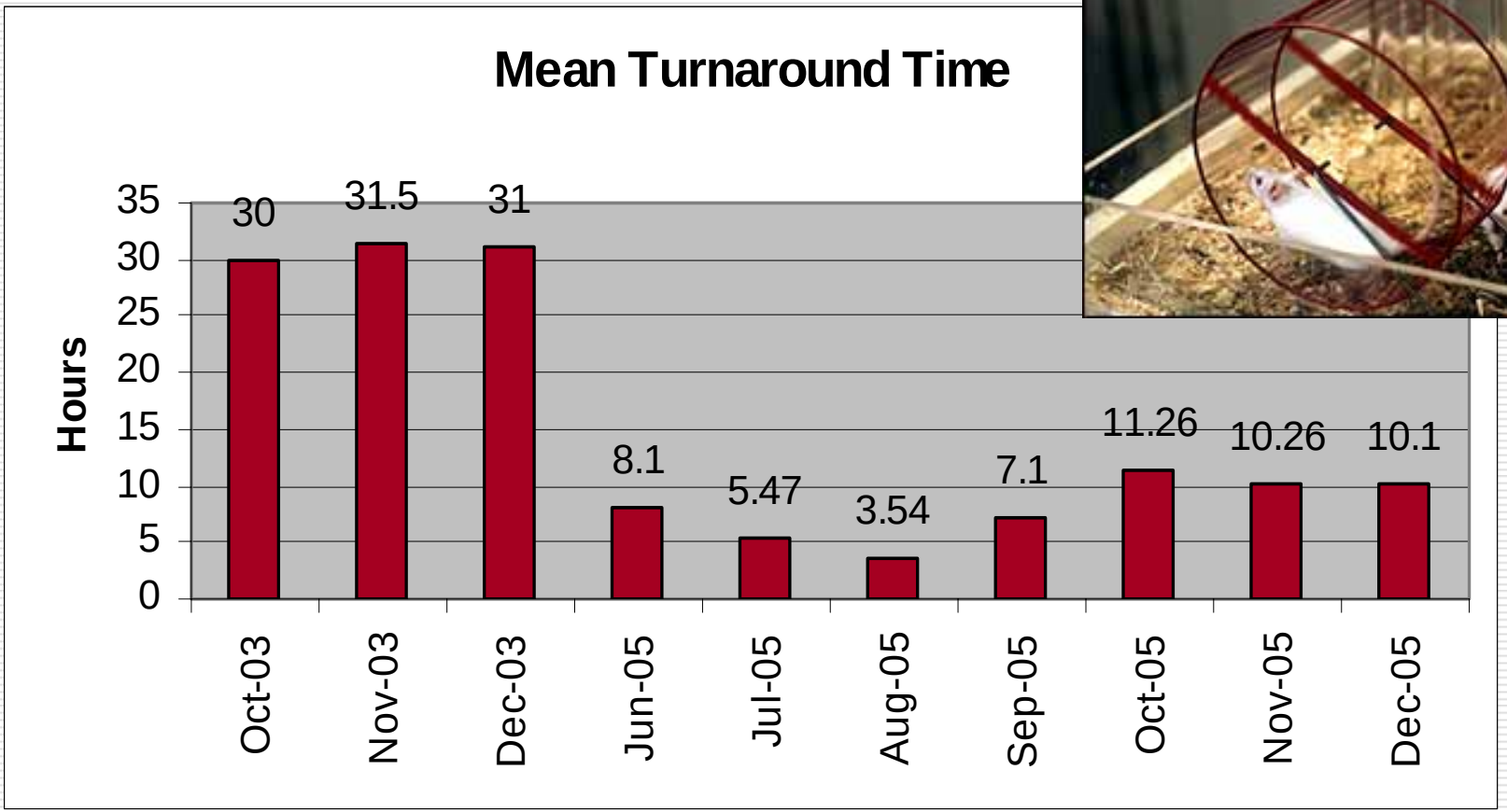
Desktop Dictation has improved clinician satisfaction



- No longer chained to a telephone.
- No need to identify yourself, dictate patient demographics, or punch in work types.
- Can easily pause for interruptions.
- Saves about 30 seconds per dictation over using the telephone.
- Learning is a snap!

A Video Representation of Our Dictation System

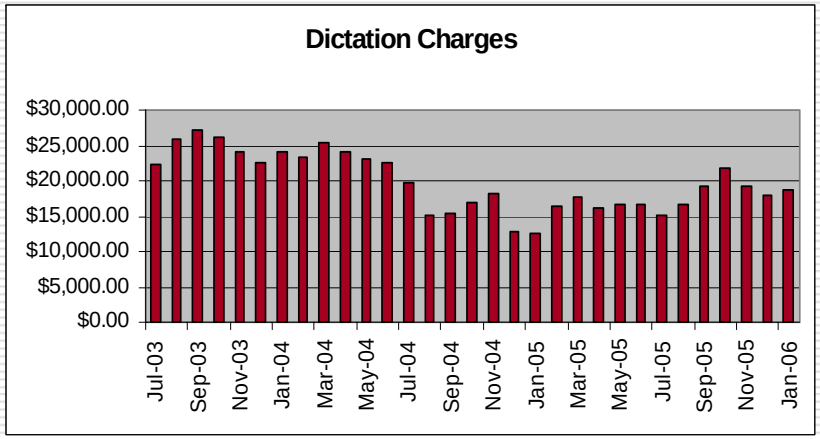
Drastic Improvement in Transcription Turnaround Time

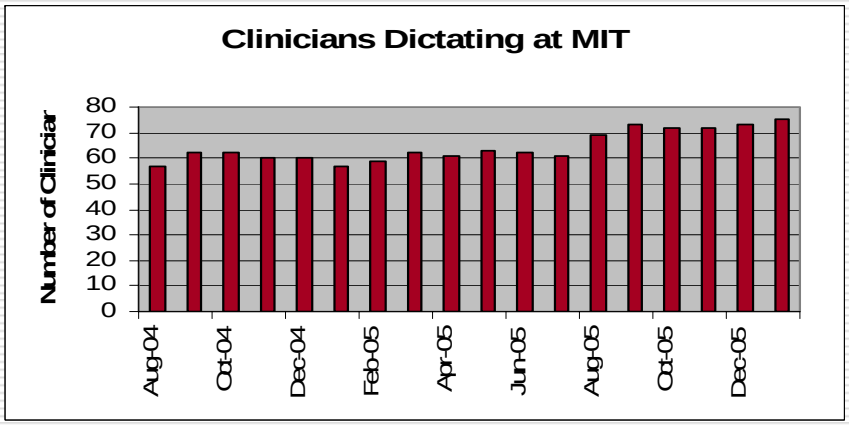


Mice can keep secrets!

- MIT Medical requires all 27 Mental Health clinicians to put their notes into TouchWorks as of September 2005.
- Ability to segregate Mental Health notes with added security.
- 7 of 27 Mental Health clinicians use dictate, the rest use direct note entry.

MIT Medical has saved a lot of cheese.





Transformation Sneaks Up On You

- Anticoagulation Clinic
- Diabetes Care Group
- Referrals entered into EHR
- Disease Management
- Enhanced role of Triage Nurses
- Fantastic reporting capacity
- And we got a grant to look at potential safety issues with electronic prescribing!

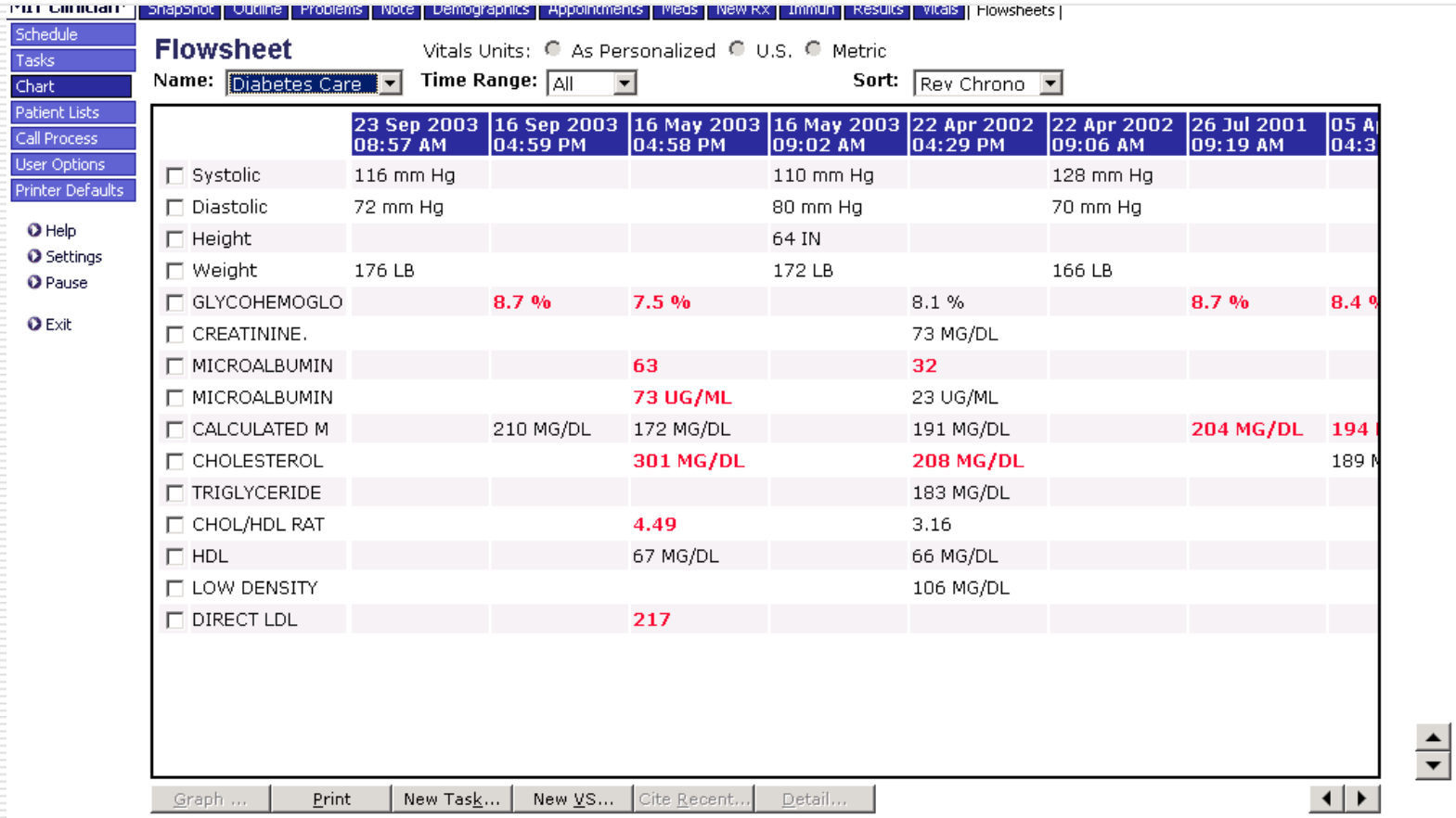
Anticoagulation Clinic

- 120 patients taking coumadin are managed via protocol by triage nurses
- Nurses verify PT / INR results, contact patient, change dosage if necessary, and inform Attending MD.
- Within the first 3 months a much higher percentage of patients are within therapeutic range than before.

Diabetes Care Group

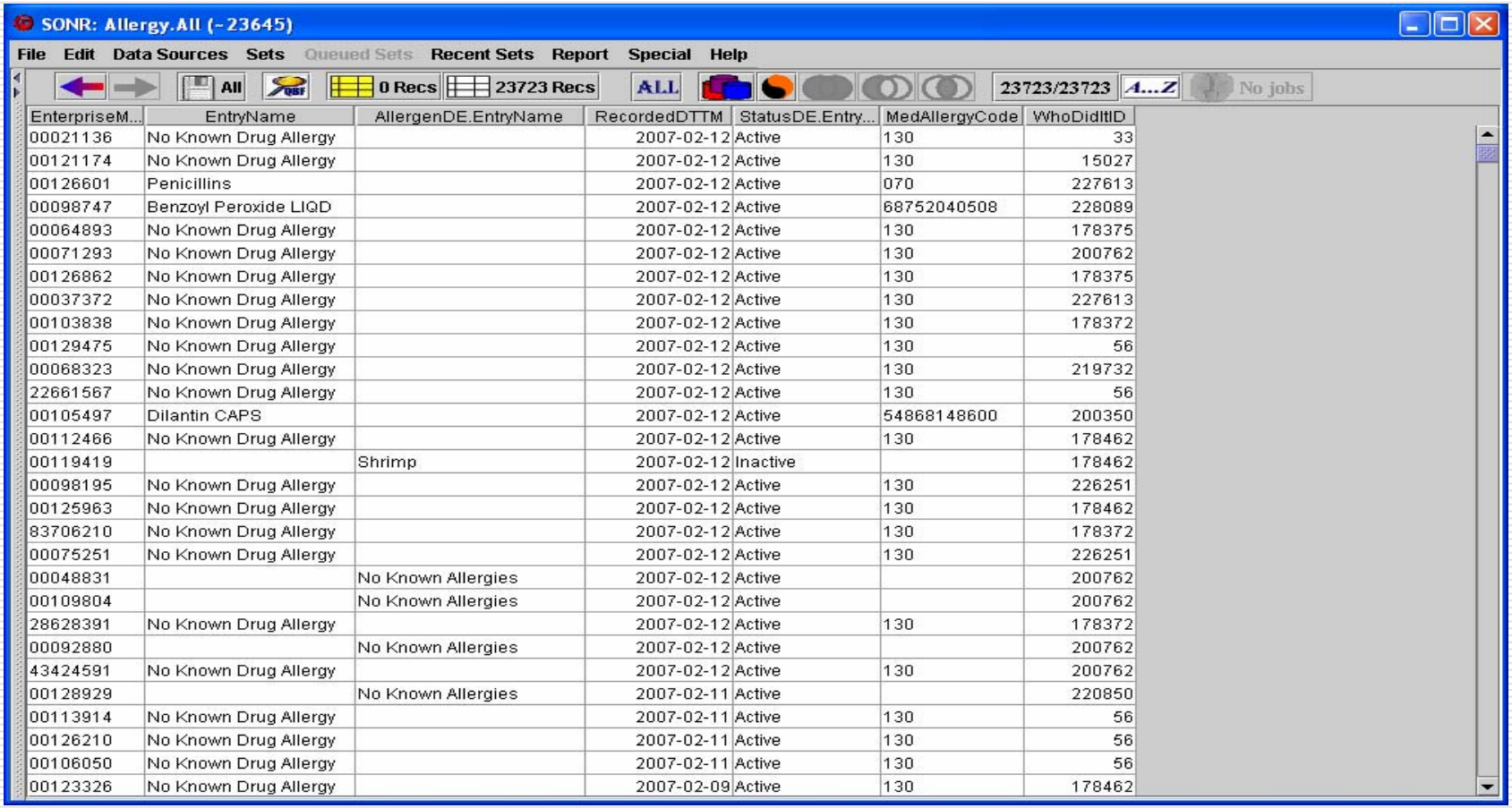
- Triage Nurses also participate in the care of approximately 550 Diabetic patients
- Monitor orders and results of HBA1C, ensure that patient has had yearly eye and foot exams, and is scheduled to see Attending MD.
- All functions done through the EHR

Flow Sheets Allow for Better Disease Management



	23 Sep 2003 08:57 AM	16 Sep 2003 04:59 PM	16 May 2003 04:58 PM	16 May 2003 09:02 AM	22 Apr 2002 04:29 PM	22 Apr 2002 09:06 AM	26 Jul 2001 09:19 AM	05 A 04:3
Systolic	116 mm Hg			110 mm Hg		128 mm Hg		
Diastolic	72 mm Hg			80 mm Hg		70 mm Hg		
Height				64 IN				
Weight	176 LB			172 LB		166 LB		
GLYCOHEMOGLO		8.7 %	7.5 %		8.1 %		8.7 %	8.4 %
CREATININE.					73 MG/DL			
MICROALBUMIN			63		32			
MICROALBUMIN			73 UG/ML		23 UG/ML			
CALCULATED M		210 MG/DL	172 MG/DL		191 MG/DL		204 MG/DL	194
CHOLESTEROL			301 MG/DL		208 MG/DL			189
TRIGLYCERIDE					183 MG/DL			
CHOL/HDL RAT			4.49		3.16			
HDL			67 MG/DL		66 MG/DL			
LOW DENSITY					106 MG/DL			
DIRECT LDL			217					

Reporting Allows Us To Know Our Patients and Clinicians



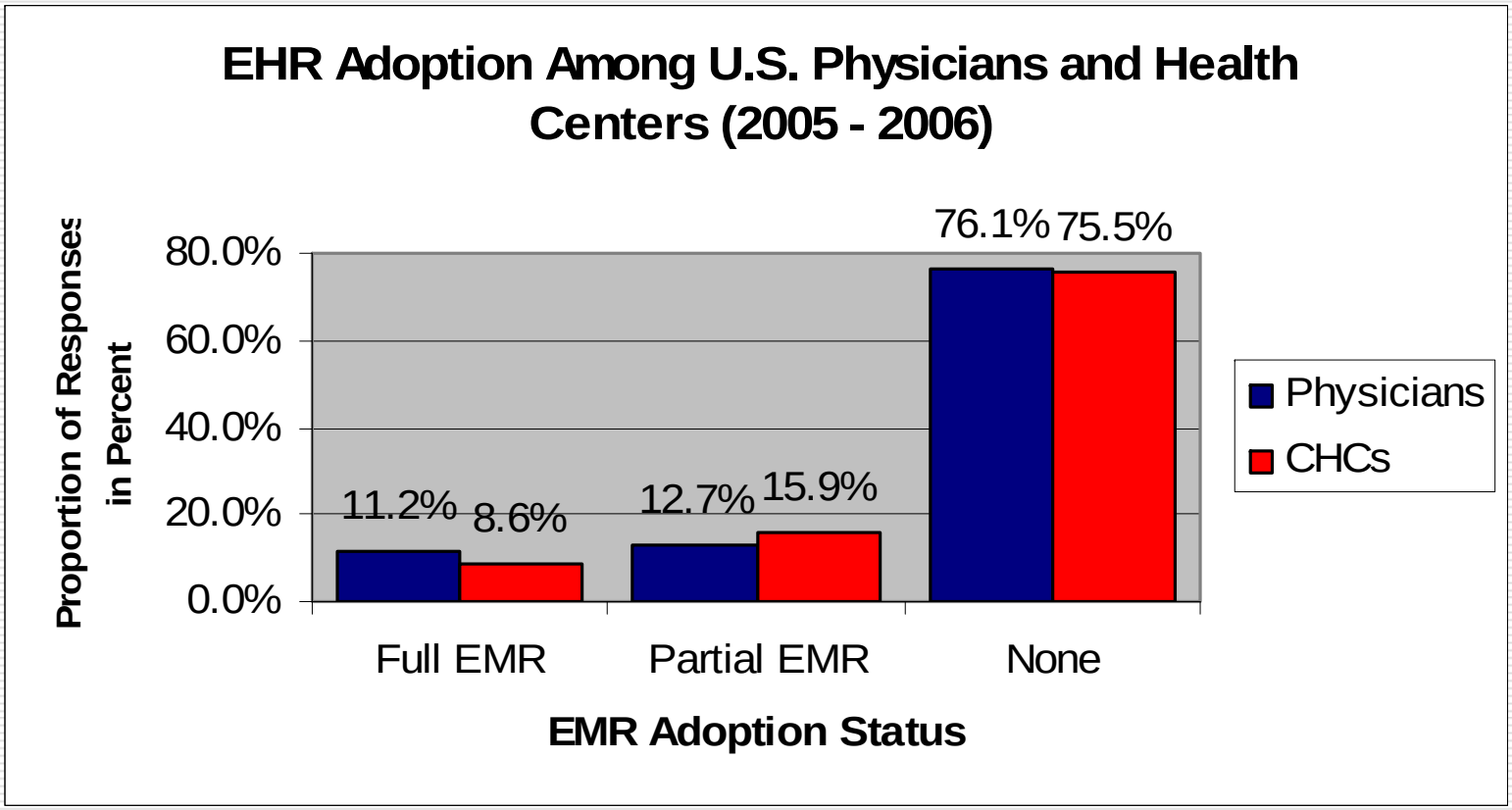
EnterpriseM...	EntryName	AllergenDE.EntryName	RecordedDTTM	StatusDE.Entry...	MedAllergyCode	WhoDidItID
00021136	No Known Drug Allergy		2007-02-12	Active	130	33
00121174	No Known Drug Allergy		2007-02-12	Active	130	15027
00126601	Penicillins		2007-02-12	Active	070	227613
00098747	Benzoyl Peroxide LIQD		2007-02-12	Active	68752040508	228089
00064893	No Known Drug Allergy		2007-02-12	Active	130	178375
00071293	No Known Drug Allergy		2007-02-12	Active	130	200762
00126862	No Known Drug Allergy		2007-02-12	Active	130	178375
00037372	No Known Drug Allergy		2007-02-12	Active	130	227613
00103838	No Known Drug Allergy		2007-02-12	Active	130	178372
00129475	No Known Drug Allergy		2007-02-12	Active	130	56
00068323	No Known Drug Allergy		2007-02-12	Active	130	219732
22661567	No Known Drug Allergy		2007-02-12	Active	130	56
00105497	Dilantin CAPS		2007-02-12	Active	54868148600	200350
00112466	No Known Drug Allergy		2007-02-12	Active	130	178462
00119419		Shrimp	2007-02-12	Inactive		178462
00098195	No Known Drug Allergy		2007-02-12	Active	130	226251
00125963	No Known Drug Allergy		2007-02-12	Active	130	178462
83706210	No Known Drug Allergy		2007-02-12	Active	130	178372
00075251	No Known Drug Allergy		2007-02-12	Active	130	226251
00048831		No Known Allergies	2007-02-12	Active		200762
00109804		No Known Allergies	2007-02-12	Active		200762
28628391	No Known Drug Allergy		2007-02-12	Active	130	178372
00092880		No Known Allergies	2007-02-12	Active		200762
43424591	No Known Drug Allergy		2007-02-12	Active	130	200762
00128929		No Known Allergies	2007-02-11	Active		220850
00113914	No Known Drug Allergy		2007-02-11	Active	130	56
00126210	No Known Drug Allergy		2007-02-11	Active	130	56
00106050	No Known Drug Allergy		2007-02-11	Active	130	56
00123326	No Known Drug Allergy		2007-02-09	Active	130	178462

Medication Safety Grant

- MIT Pharmacy error rate is well below the industry average of 1.6%
- Electronic Prescribing poses new opportunities for errors.
- We are using a Human Factors Engineer to review the whole process

Lots of Interest In EHRs But…

Slow EHR Adoption Rate in U.S.



Health Information Technology in the United States: *The information Base for Progress*, Robert Wood Johnson Foundation, 2006

Benefits of the EHR at MIT

- Patient care has improved with the availability of information.
- Reduction of 5.5 FTE in Medical Records
- Credit from Medical Liability Insurance Carrier
- Time savings for ancillary staff
- Expanded role for Triage Nurses
- Clinicians are more satisfied
- Patients like the availability of information in our portal
- Improved HIPAA and JCAHO compliance
  - *Specific* positive feedback from reviewers
- A collection of solo clinicians becomes a Group Practice

the Pot-o-Gold revealed...