National Web-Based Teleconference on Health IT: Quality Metrics and Measurement

April 28th, 2011

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Agency for Healthcare Research and Quality

Presenters:
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Andrew Hamilton
Mark Weiner

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Using EHRS for Quality Improvement: Lessons from UPQUAL

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Northwestern University

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I do not have any relevant financial relationships with any commercial interests to disclose.

Northwestern Memorial Hospital

Northwestern University Feinberg School of Medicine

Northwestern Medical Faculty Foundation

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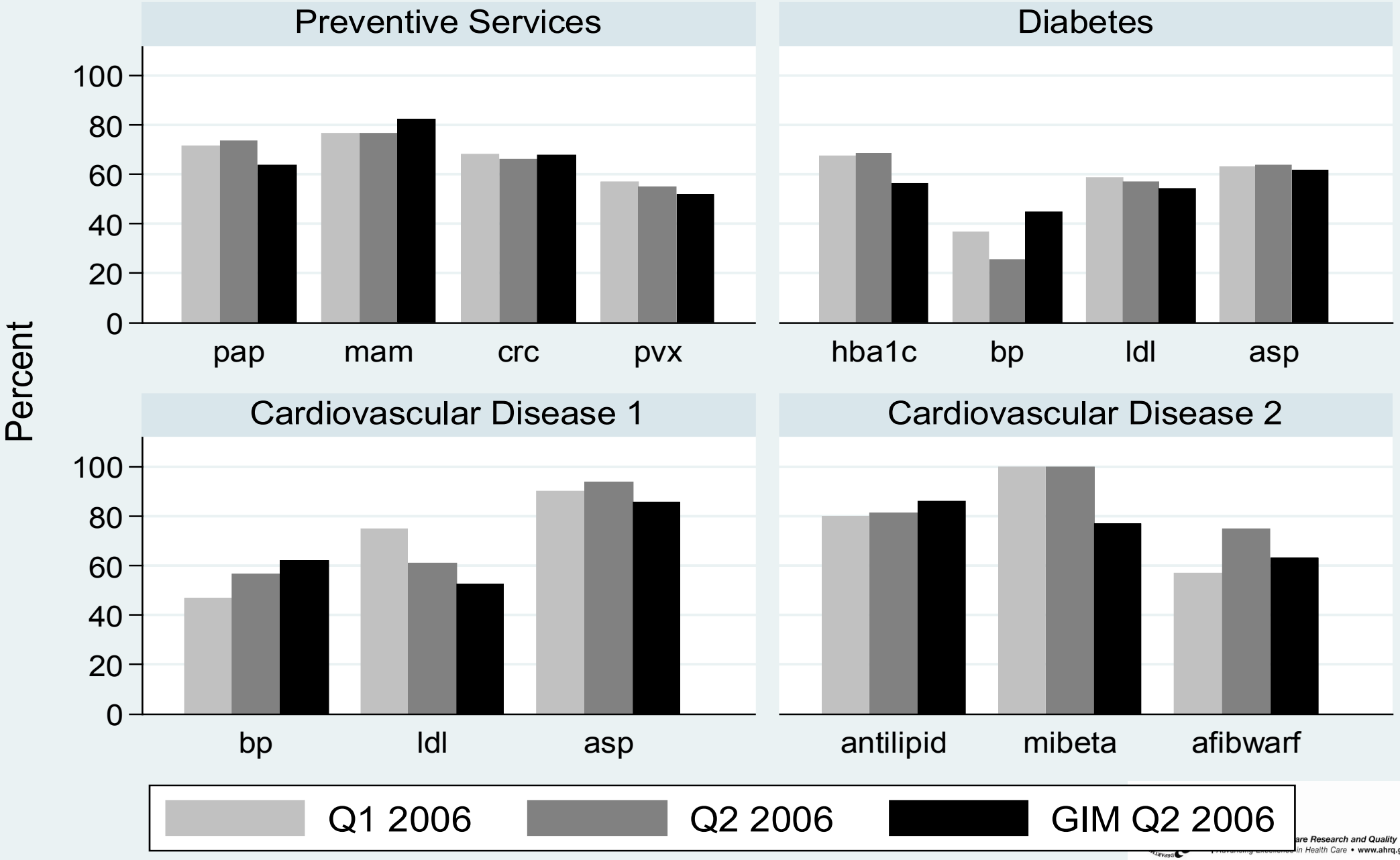
The Problem in Primary Care

- We want to routinely measure quality of care for dozens of measures in outpatient practice and use this information to improve care
- Cost of chart abstraction problematic
- Administrative (claims) data inaccurate
  - Need to capture *medical and patient* reasons for not achieving a quality measure

The Solution?

- EHR systems have the *potential* to routinely measure quality with a high accuracy
  - Denominator (if diagnoses entered…)
  - Numerator (e.g., satisfied measure): meds, screening tests, blood pressure, etc
  - Exceptions: diagnoses, allergies, lab abnormalities

Initial Quality Measurement & Feedback



Automated Measurement vs. Hybrid Measurement

Quality measure	Automated %	After MD review %	Percent change
1. Antiplatelet drug	82	96	+ 14
2. Lipid lowering drug	93	97	+ 4
3. Beta blocker	83	90	+ 7
4. BP measured	97	99	+ 2
5. Lipid measurement	82	88	+ 6
6. LDL control	85	87	+ 2
7. ACE inhibitor	85	89	+ 4

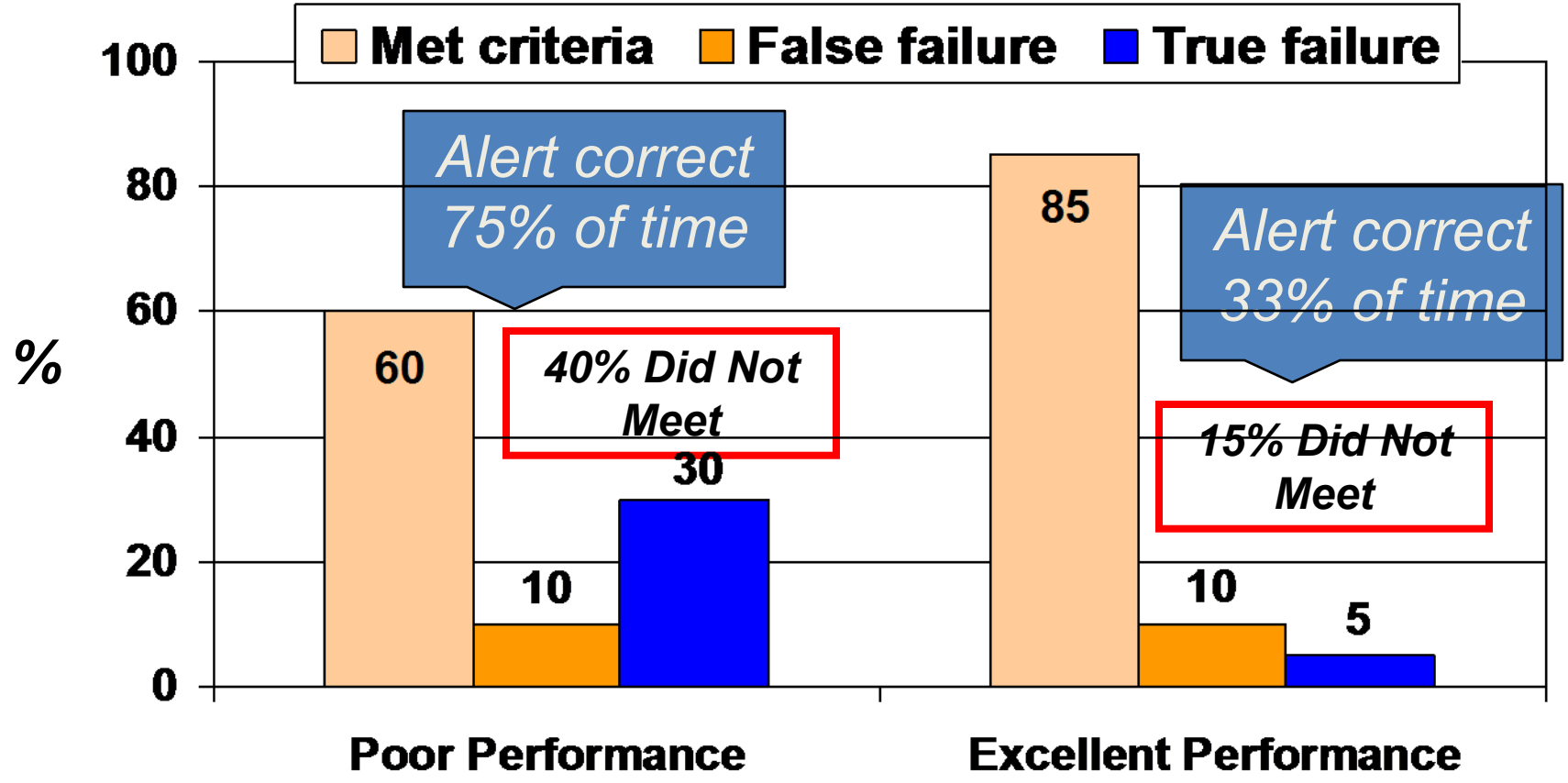
Conclusions

- Overall, good agreement between quality measured by EHR data compared to MD notes
- Several factors limit accuracy of EHR measures
  - Many pts did not actually have HF, CAD
  - Medications were not always documented
  - Some of the exclusion dx codes were not valid
  - *Exclusion criteria often not captured*

Baker DW, Ann Intern Med 2007
Persell SD, Arch Intern Med 2006

But, is this good enough?

Consequences of Missed Exceptions: Accuracy of Feedback Decreases As Performance Improves



Implications for QI

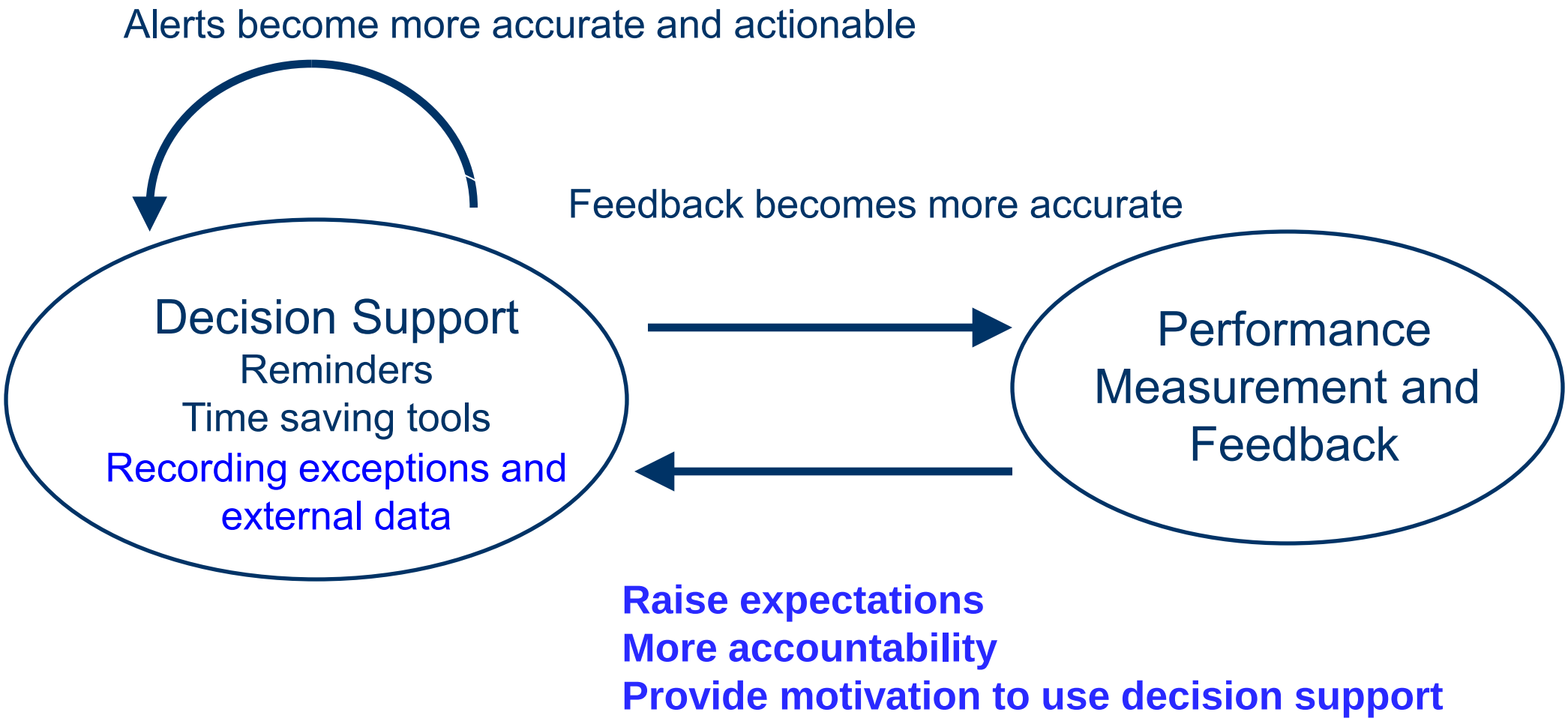
- As quality of care improves:
  - Point-of-care alerts for individual patients are usually incorrect: MDs ignore alerts
  - List of patients who need outreach usually incorrect: outreach expensive, inefficient

Persell SD, Jt Comm J Qual Patient Saf. 2008

EHR Can Improve Measurement by Letting MDs Document Reasons Why a Patient Is Not Getting an Indicated Medication/Service

- Medical reason
  - Not indicated
  - Contraindication
  - Adverse reaction
- Patient reason
  - Declined despite recommendation
  - Unable to afford
- System reason
  - Not available (e.g., influenza vx)

Accurate Measurement and the Virtuous Cycle for QI



Quality Improvement: UPQUAL

Utilizing Precision Performance Measurement for Focused Quality Improvement

Funded by AHRQ

- Implement multi-component quality improvement intervention
- Aim to achieve ultra-high level of performance through more accurate performance measurement
- Use quality measurement system to drive focused quality improvement

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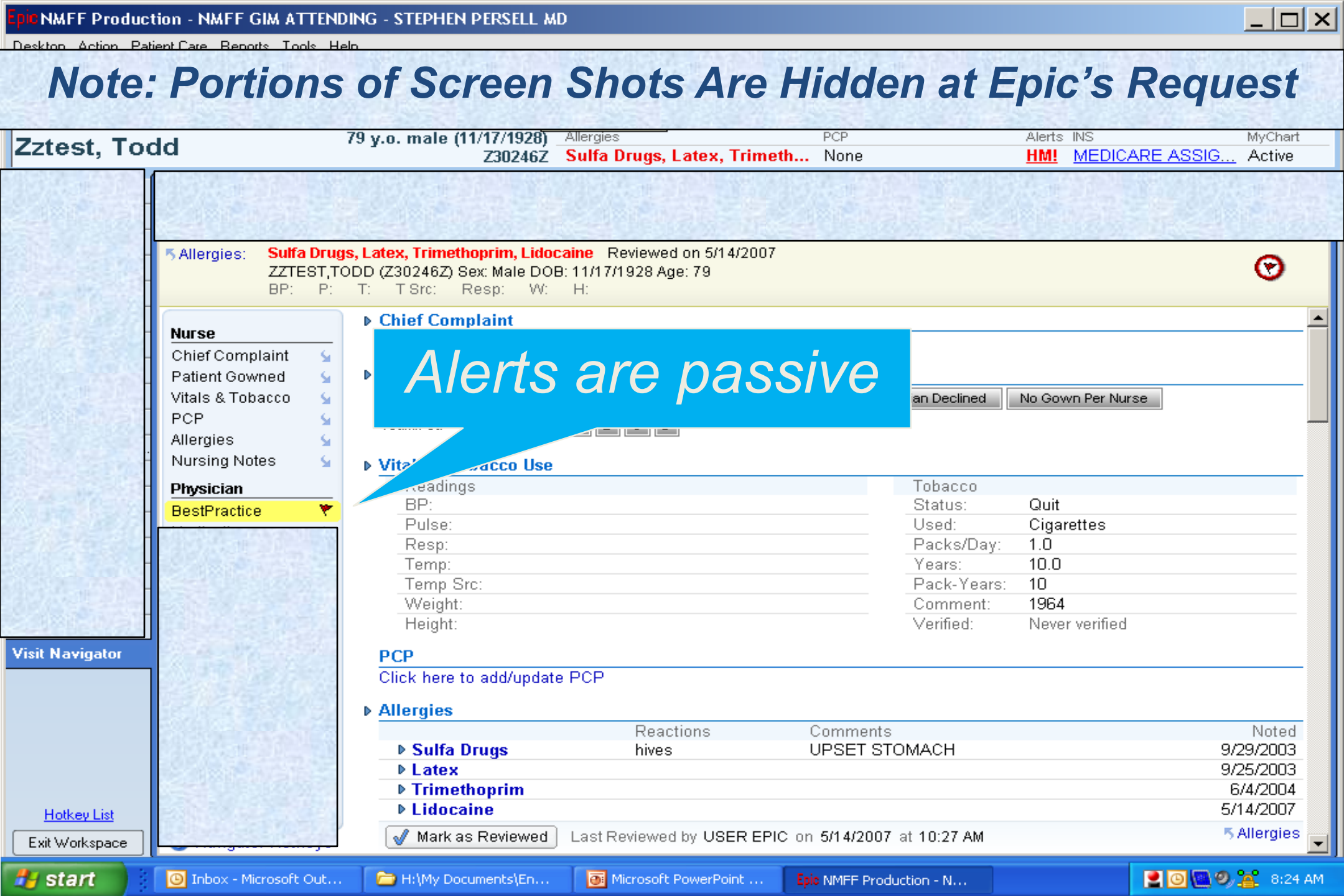
UPQUAL—Components

- Audit and feedback to physicians
- Point of care alerts for quality measures which are not satisfied
  - Allows easy review and ordering
  - Allows documentation of medical and patient reasons for not ordering
- Medical and patient reasons sent to care manager and member of quality committee
- Monthly feedback on individual patients not receiving essential medications

UPQUAL Targets

- CHD
  - Antiplatelet therapy
  - Lipid lowering
  - Beta blocker-MI
  - ACE/ARB-CHD+DM
- Heart failure
  - Beta blocker-LVSD
  - ACE/ARB-LVSD
  - Anticoagulation-AFIB
- Hypertension control
- Diabetes
  - HbA1c control
  - LDL control
  - Blood pressure control
  - Nephropathy screen/treat
  - Aspirin primary prevention
- Preventive care
  - Mammography
  - Cervical cancer screen
  - Colon cancer screen
  - Pneumonia vaccine ≥65 y
  - Osteoporosis screen/treat

Best Practice Alert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Desktop Action Patient Care Reports Tools Help
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Zztest, Todd
79 y.o. male (11/17/1928)
Z30246Z
Allergies
Sulfa Drugs, Latex, Trimeth...
PCP
None
Alerts
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Allergies: Sulfa Drugs, Latex, Trimethoprim, Lidocaine Reviewed on 5/14/2007
ZZTEST,TODD (Z30246Z) Sex: Male DOB: 11/17/1928 Age: 79
BP: P: T: T Src: Resp: W: H:
Nurse
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Patient Gowned
Vitals & Tobacco
PCP
Allergies
Nursing Notes
Physician
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Alerts are passive
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Click here to add/update PCP
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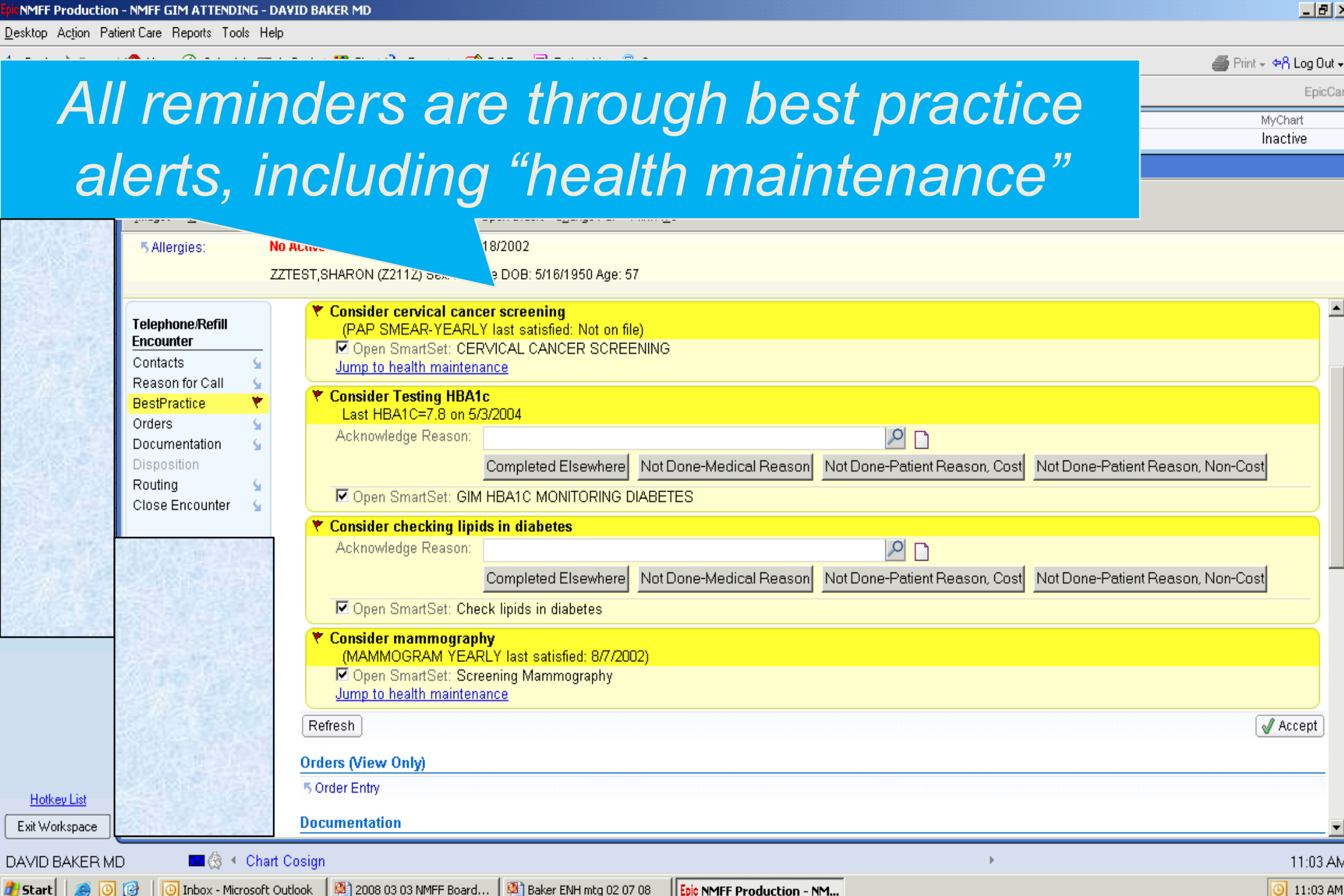
All reminders are through best practice alerts, including “health maintenance”
NMFF Production - NMFF GIM ATTENDING - DAVID BAKER MD
Desktop Action Patient Care Reports Tools Help
Print Log Out
MyChart
Inactive
Allergies:
ZZTEST,SHARON (Z211Z)
DOB: 5/16/1950 Age: 57
Telephone/Refill Encounter
Contacts
Reason for Call
BestPractice
Orders
Documentation
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Close Encounter
Consider cervical cancer screening
(PAP SMEAR-YEARLY last satisfied: Not on file)
Open SmartSet: CERVICAL CANCER SCREENING
Jump to health maintenance
Consider Testing HBA1c
Last HBA1C=7.8 on 5/3/2004
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: GIM HBA1C MONITORING DIABETES
Consider checking lipids in diabetes
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: Check lipids in diabetes
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Open SmartSet: Screening Mammography
Jump to health maintenance
Refresh
Accept
Orders (View Only)
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Documentation
Hotkey List
Exit Workspace
DAVID BAKER MD
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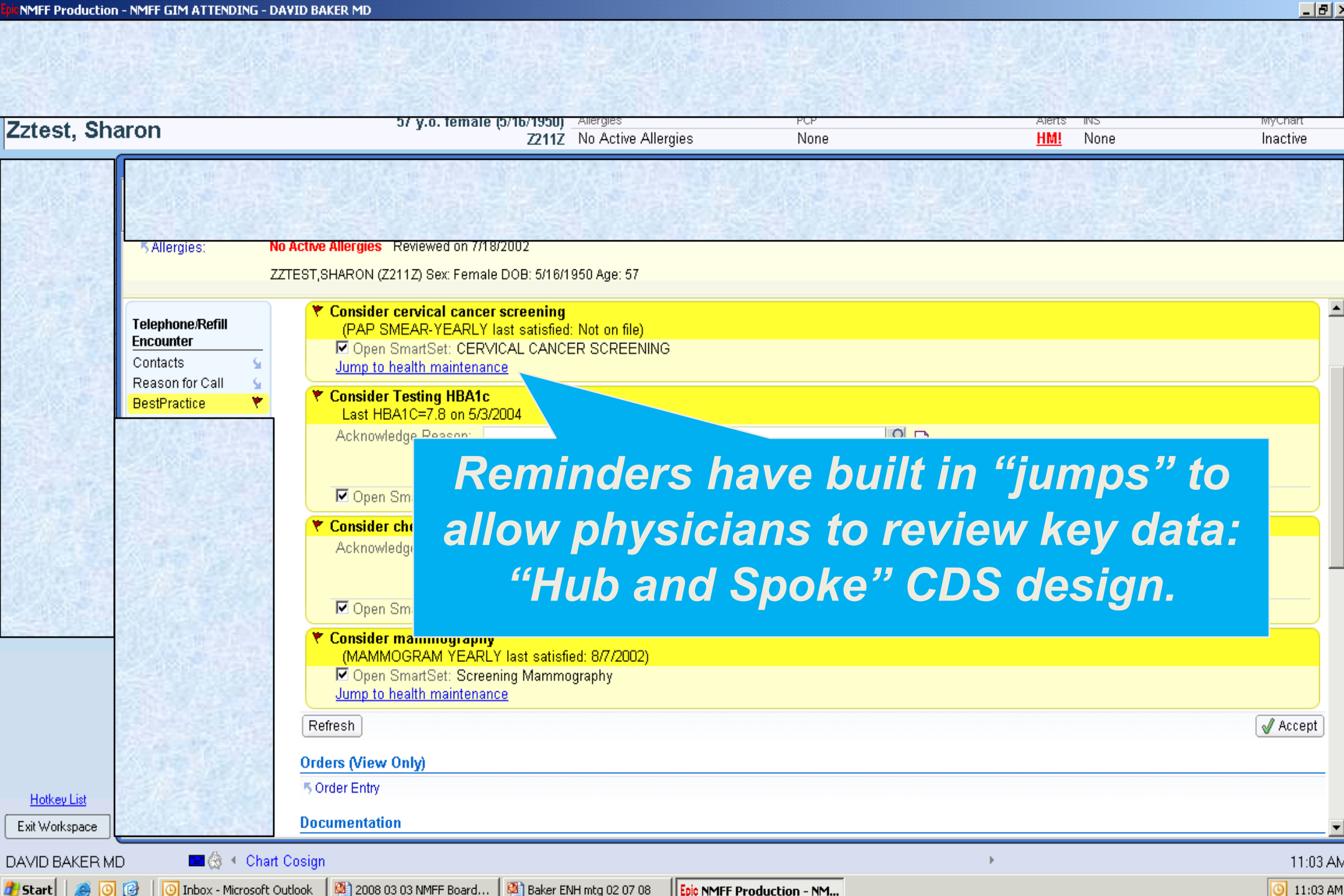
NMFF Production - NMFF GIM ATTENDING - DAVID BAKER MD
Zztest, Sharon
57 y.o. female (5/16/1950)
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Allergies
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PCP
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Reviewed on 7/18/2002
ZZTEST,SHARON (Z211Z) Sex: Female DOB: 5/16/1950 Age: 57
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Jump to health maintenance
Consider Testing HBA1c
Last HBA1C=7.8 on 5/3/2004
Acknowledge Reason:
Reminders have built in "jumps" to allow physicians to review key data: "Hub and Spoke" CDS design.
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Open SmartSet: Screening Mammography
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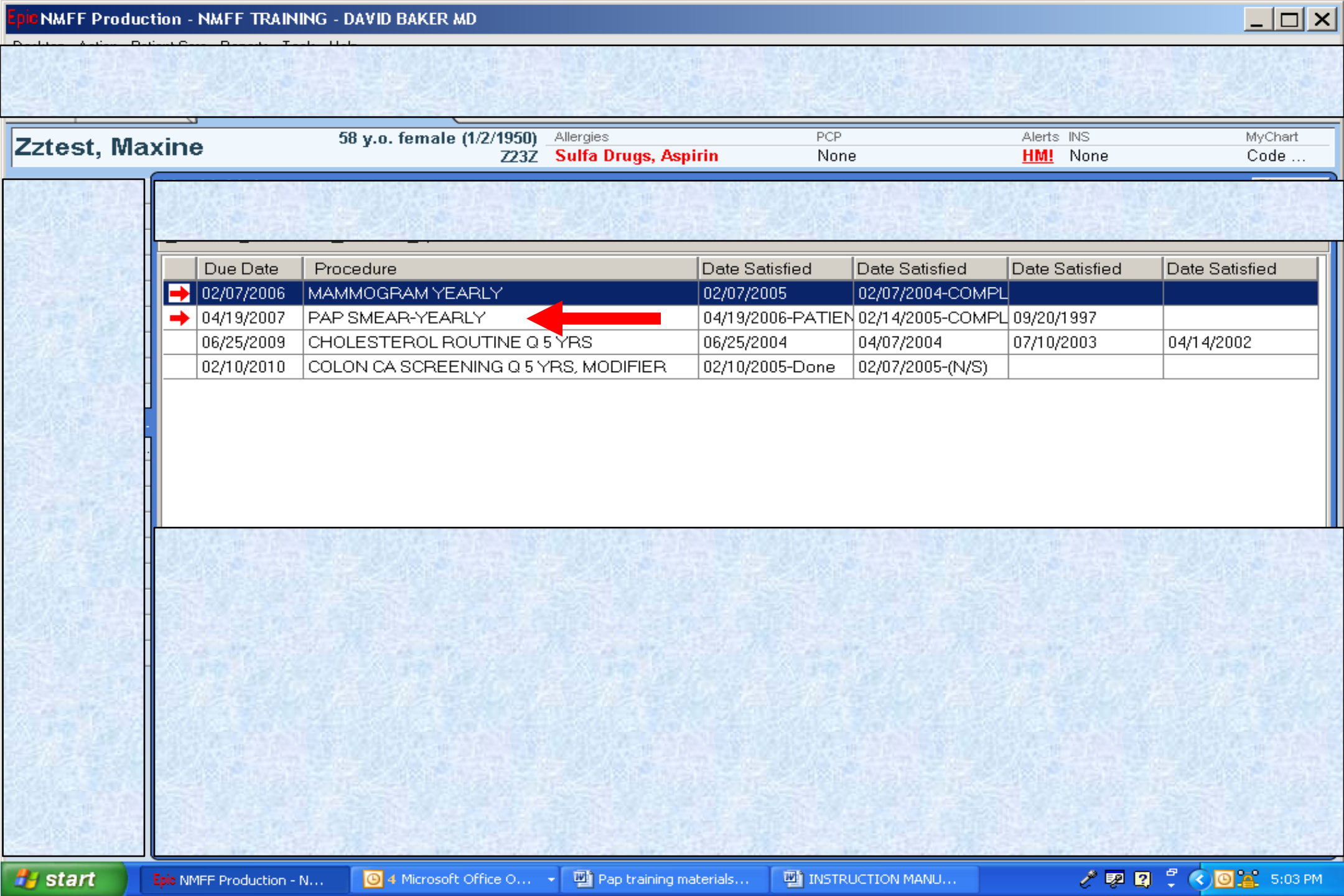
Epic NMFF Production - NMFF TRAINING - DAVID BAKER MD
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06/25/2009
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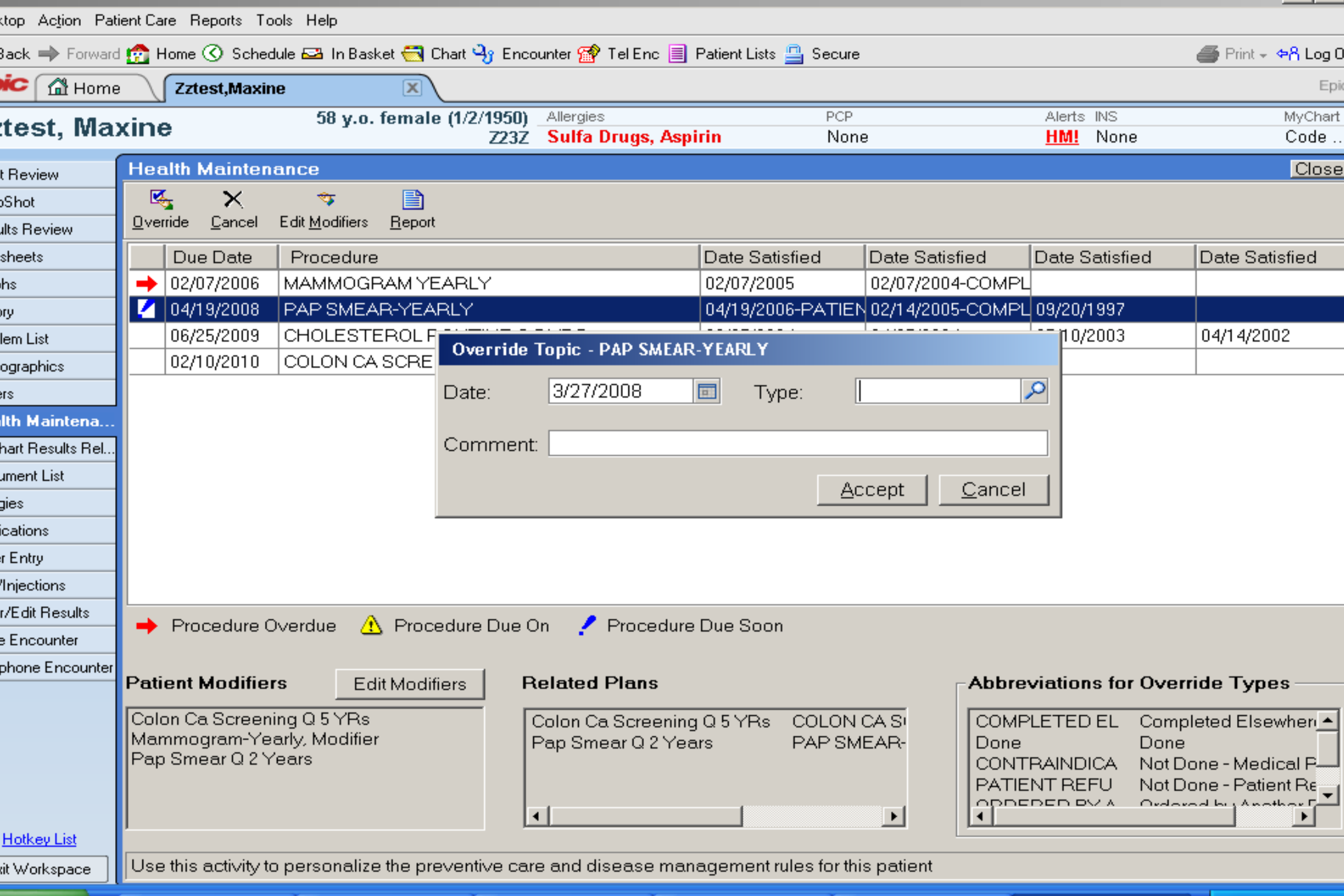
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Override Topic - PAP SMEAR-YEARLY
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Comment:
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Procedure Due Soon
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Edit Modifiers
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Mammogram-Yearly, Modifier
Pap Smear Q 2 Years
Related Plans
Colon Ca Screening Q 5 YRs
COLON CA S
Pap Smear Q 2 Years
PAP SMEAR-
Abbreviations for Override Types
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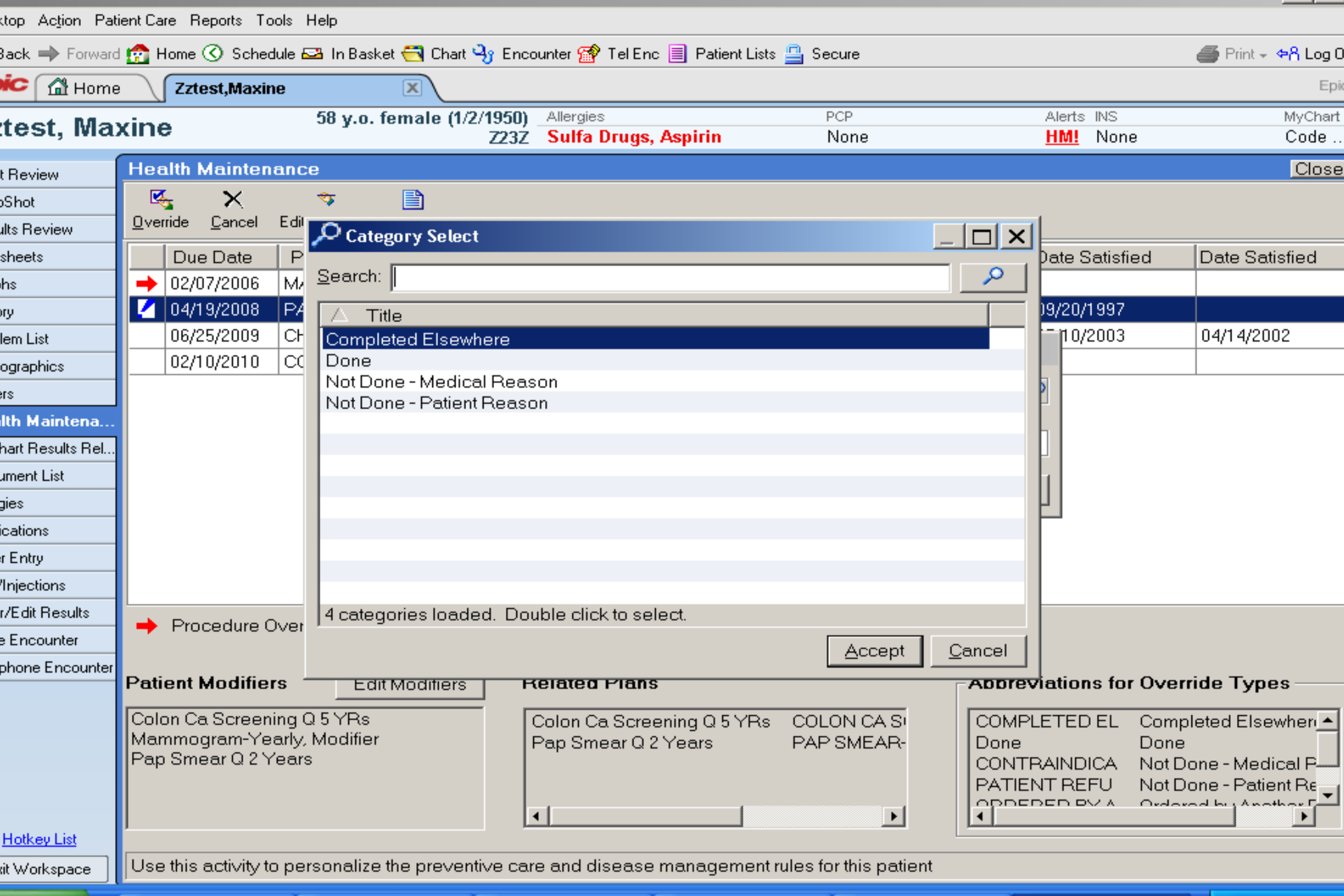
Use this activity to personalize the preventive care and disease management rules for this patient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Allergies
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Due Date
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06/25/2009
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09/20/1997
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04/14/2002
Procedure Over
Category Select
Search:
Title
Completed Elsewhere
Done
Not Done - Medical Reason
Not Done - Patient Reason
4 categories loaded. Double click to select.
Accept
Cancel
Patient Modifiers
Edit Modifiers
Colon Ca Screening Q 5 YRs
Mammogram-Yearly, Modifier
Pap Smear Q 2 Years
Related Plans
Colon Ca Screening Q 5 YRs
COLON CA S
Pap Smear Q 2 Years
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Abbreviations for Override Types
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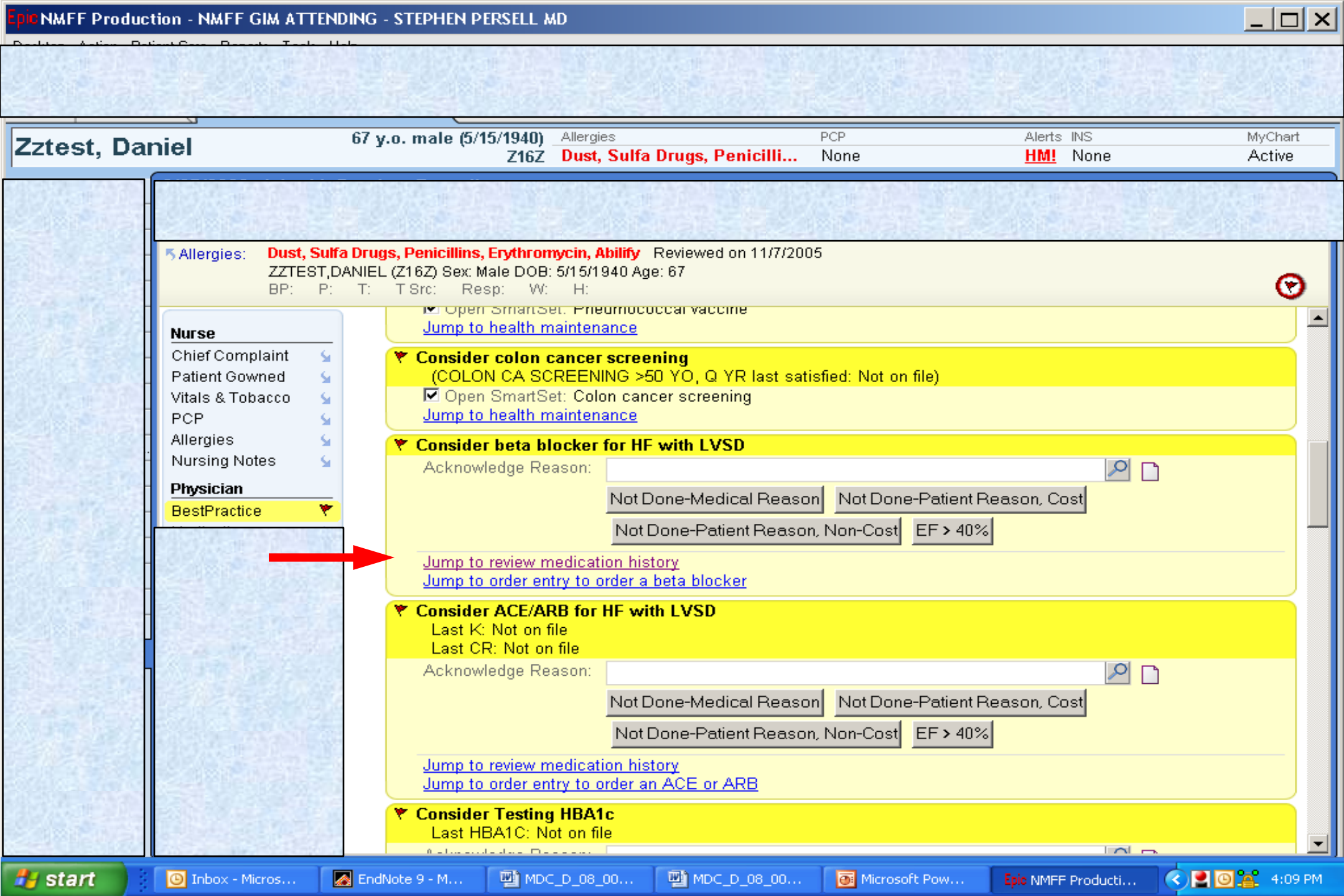
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Zztest, Daniel
67 y.o. male (5/15/1940)
Z16Z
Allergies
Dust, Sulfa Drugs, Penicilli...
PCP
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Alerts
HM!
INS
None
MyChart
Active
Allergies: Dust, Sulfa Drugs, Penicillins, Erythromycin, Abilify Reviewed on 11/7/2005
ZZTEST,DANIEL (Z16Z) Sex: Male DOB: 5/15/1940 Age: 67
BP: P: T: T Src: Resp: W: H:
Nurse
Chief Complaint
Patient Gowned
Vitals & Tobacco
PCP
Allergies
Nursing Notes
Physician
BestPractice
Jump to health maintenance
Consider colon cancer screening
(COLON CA SCREENING >50 YO, Q YR last satisfied: Not on file)
Open SmartSet: Colon cancer screening
Jump to health maintenance
Consider beta blocker for HF with LVSD
Acknowledge Reason:
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
EF > 40%
Jump to review medication history
Jump to order entry to order a beta blocker
Consider ACE/ARB for HF with LVSD
Last K: Not on file
Last CR: Not on file
Acknowledge Reason:
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
EF > 40%
Jump to review medication history
Jump to order entry to order an ACE or ARB
Consider Testing HBA1c
Last HBA1C: Not on file
start
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EndNote 9 - M...
MDC_D_08_00...
MDC_D_08_00...
Microsoft Pow...
Epic NMFF Producti...
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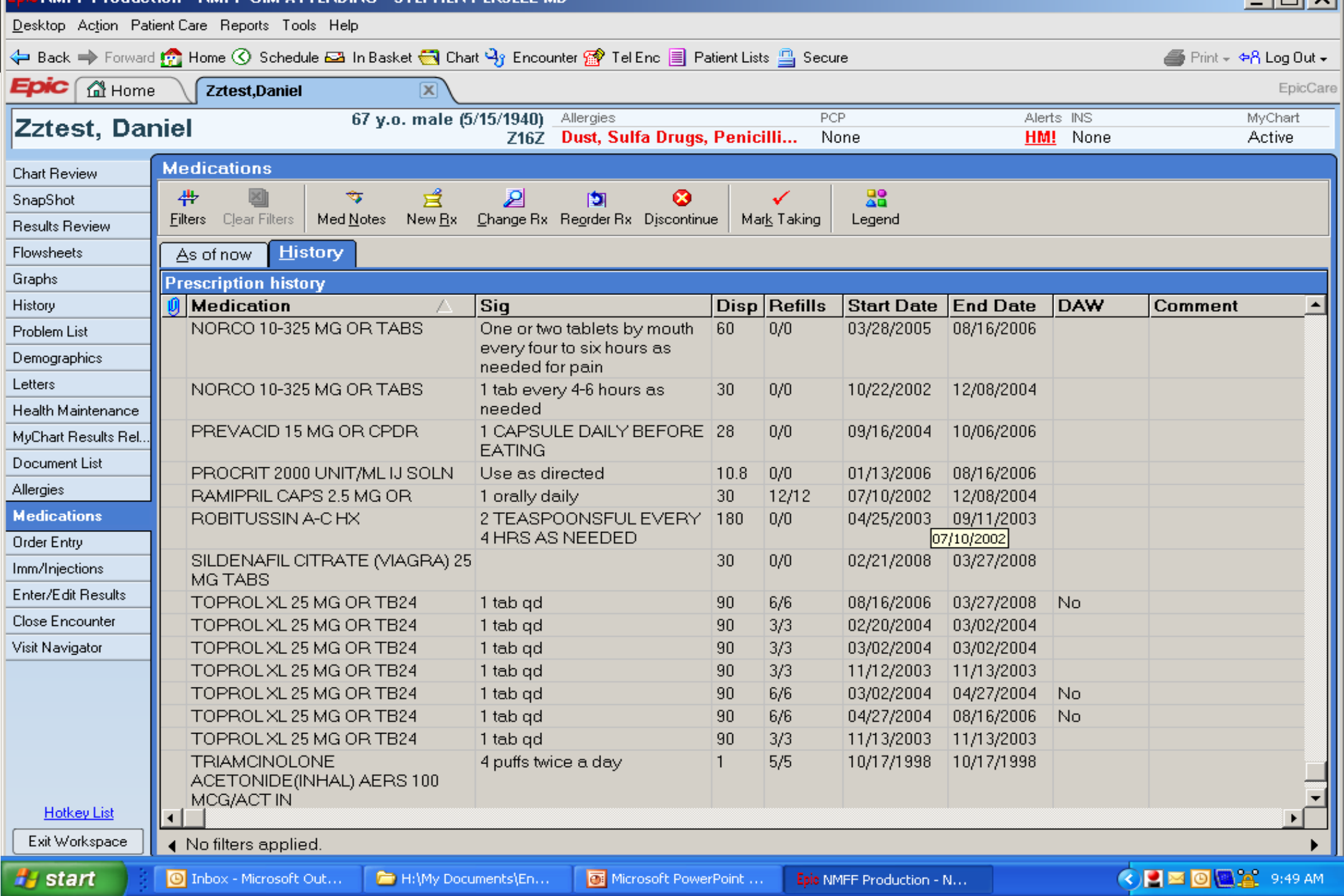
Desktop Action Patient Care Reports Tools Help
Back Forward Home Schedule In Basket Chart Encounter Tel Enc Patient Lists Secure
Print Log Out
Epic Home Zztest,Daniel EpicCare
Zztest, Daniel
67 y.o. male (5/15/1940)
Z16Z
Allergies
Dust, Sulfa Drugs, Penicilli...
PCP
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Alerts
HM!
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None
MyChart
Active
Chart Review
SnapShot
Results Review
Flowsheets
Graphs
History
Problem List
Demographics
Letters
Health Maintenance
MyChart Results Rel...
Document List
Allergies
Medications
Order Entry
Imm/Injections
Enter/Edit Results
Close Encounter
Visit Navigator
Hotkey List
Exit Workspace
Medications
Filters
Clear Filters
Med Notes
New Rx
Change Rx
Reorder Rx
Discontinue
Mark Taking
Legend
As of now
History
Prescription history
Medication
Sig
Disp
Refills
Start Date
End Date
DAW
Comment
NORCO 10-325 MG OR TABS
One or two tablets by mouth every four to six hours as needed for pain
60
0/0
03/28/2005
08/16/2006
NORCO 10-325 MG OR TABS
1 tab every 4-6 hours as needed
30
0/0
10/22/2002
12/08/2004
PREVACID 15 MG OR CPDR
1 CAPSULE DAILY BEFORE EATING
28
0/0
09/16/2004
10/06/2006
PROCRIT 2000 UNIT/ML IJ SOLN
Use as directed
10.8
0/0
01/13/2006
08/16/2006
RAMIPRIL CAPS 2.5 MG OR
1 orally daily
30
12/12
07/10/2002
12/08/2004
ROBITUSSIN A-C HX
2 TEASPOONSFUL EVERY 4 HRS AS NEEDED
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04/25/2003
09/11/2003
07/10/2002
SILDENAFIL CITRATE (VIAGRA) 25 MG TABS
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02/21/2008
03/27/2008
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03/27/2008
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02/20/2004
03/02/2004
TOPROL XL 25 MG OR TB24
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90
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3/3
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11/13/2003
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TRIAMCINOLONE ACETONIDE(INHAL) AERS 100 MCG/ACT IN
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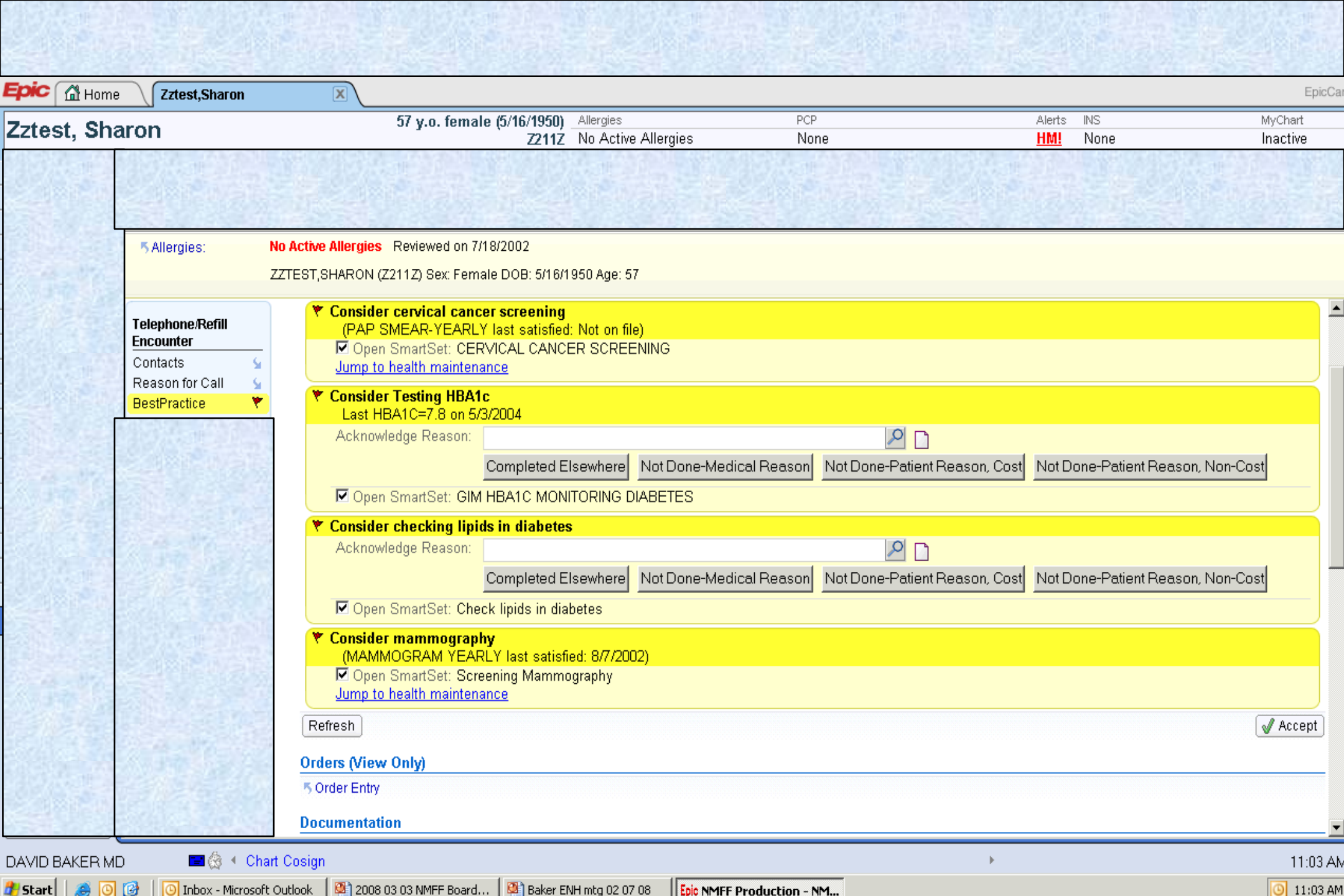
9:49 AM

Physician Sees Patient Who Needs Testing or Treatment


Epic
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Zztest,Sharon
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Zztest, Sharon
57 y.o. female (5/16/1950)
Z211Z
Allergies
No Active Allergies
PCP
None
Alerts
HM!
INS
None
MyChart
Inactive
Allergies:
No Active Allergies
Reviewed on 7/18/2002
ZZTEST,SHARON (Z211Z) Sex: Female DOB: 5/16/1950 Age: 57
Telephone/Refill Encounter
Contacts
Reason for Call
BestPractice
Consider cervical cancer screening
(PAP SMEAR-YEARLY last satisfied: Not on file)
Open SmartSet: CERVICAL CANCER SCREENING
Jump to health maintenance
Consider Testing HBA1c
Last HBA1C=7.8 on 5/3/2004
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: GIM HBA1C MONITORING DIABETES
Consider checking lipids in diabetes
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: Check lipids in diabetes
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Open SmartSet: Screening Mammography
Jump to health maintenance
Refresh
Accept
Orders (View Only)
Order Entry
Documentation
DAVID BAKER MD
Chart Cosign
11:03 AM
Start
Inbox - Microsoft Outlook
2008 03 03 NMFF Board...
Baker ENH mtg 02 07 08
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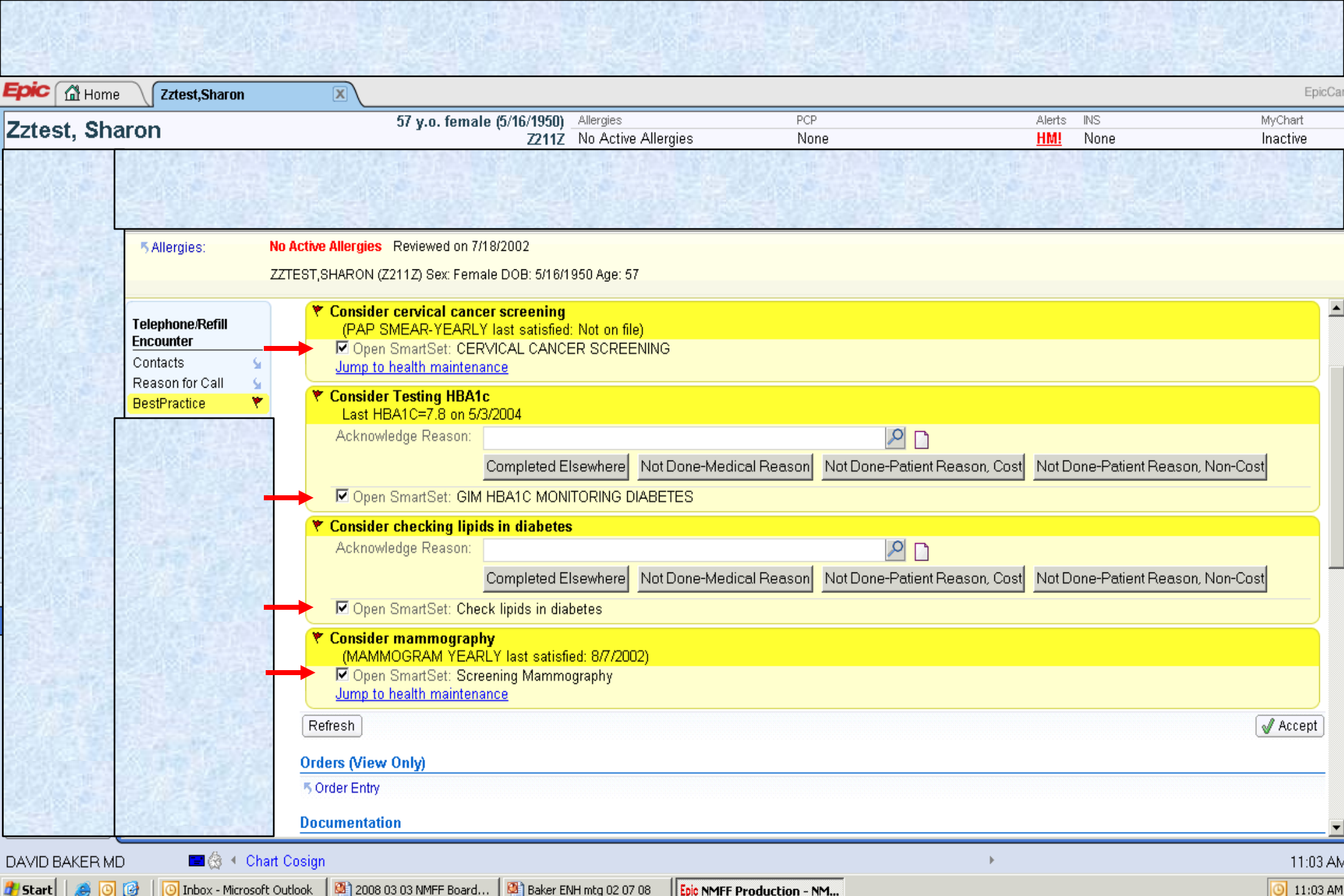
Epic
Home
Zztest,Sharon
EpicCare
Zztest, Sharon
57 y.o. female (5/16/1950)
Z211Z
Allergies
No Active Allergies
PCP
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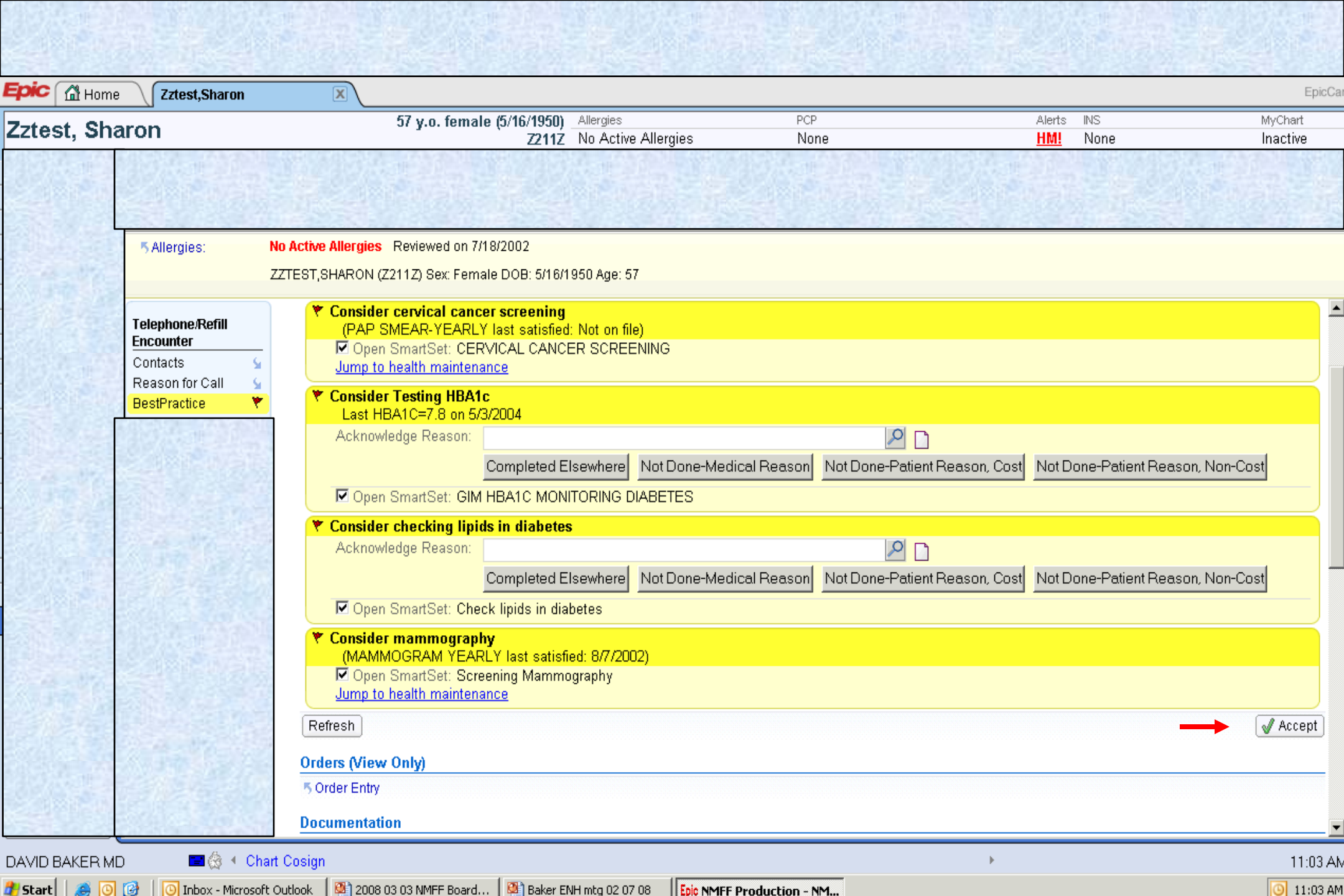
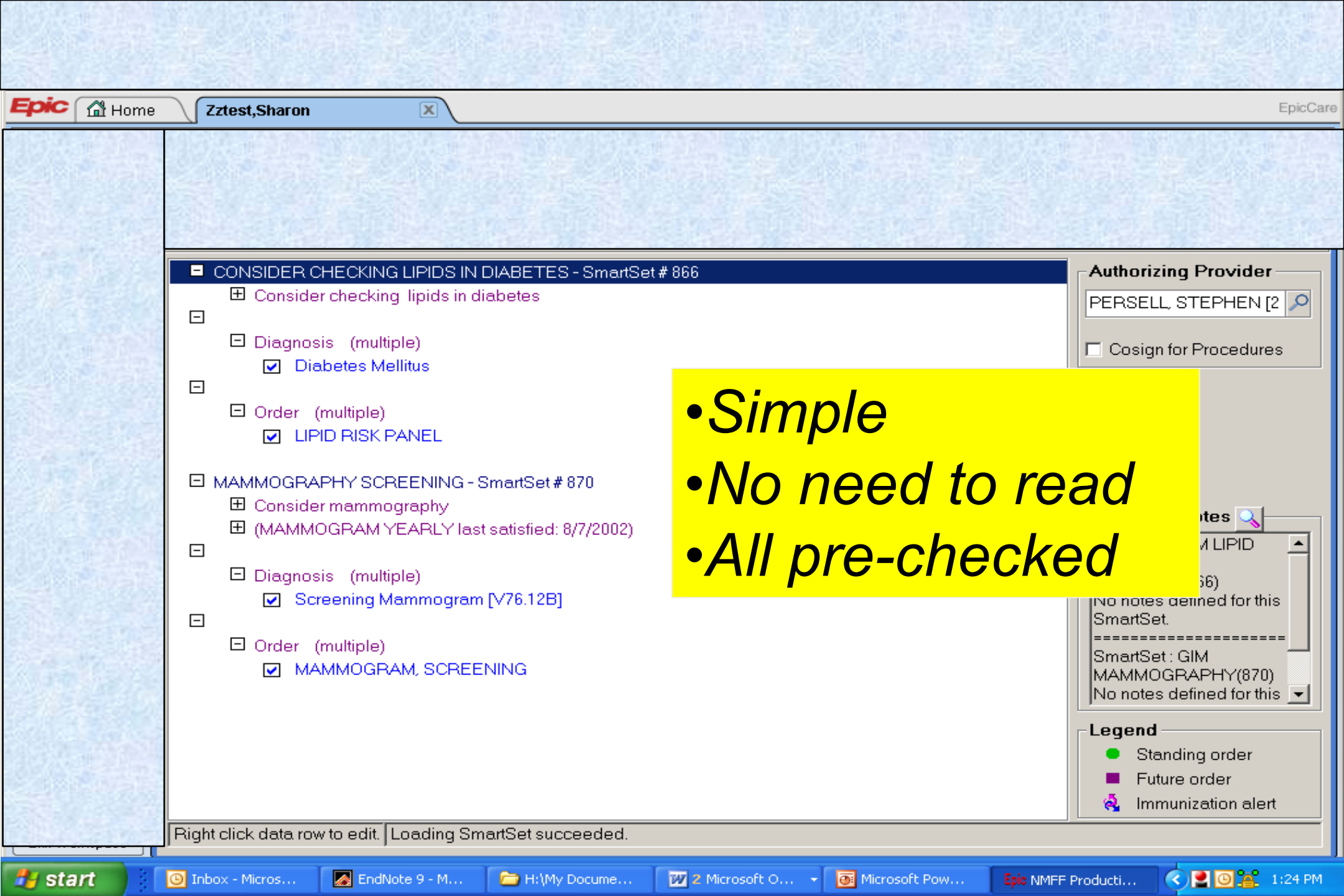
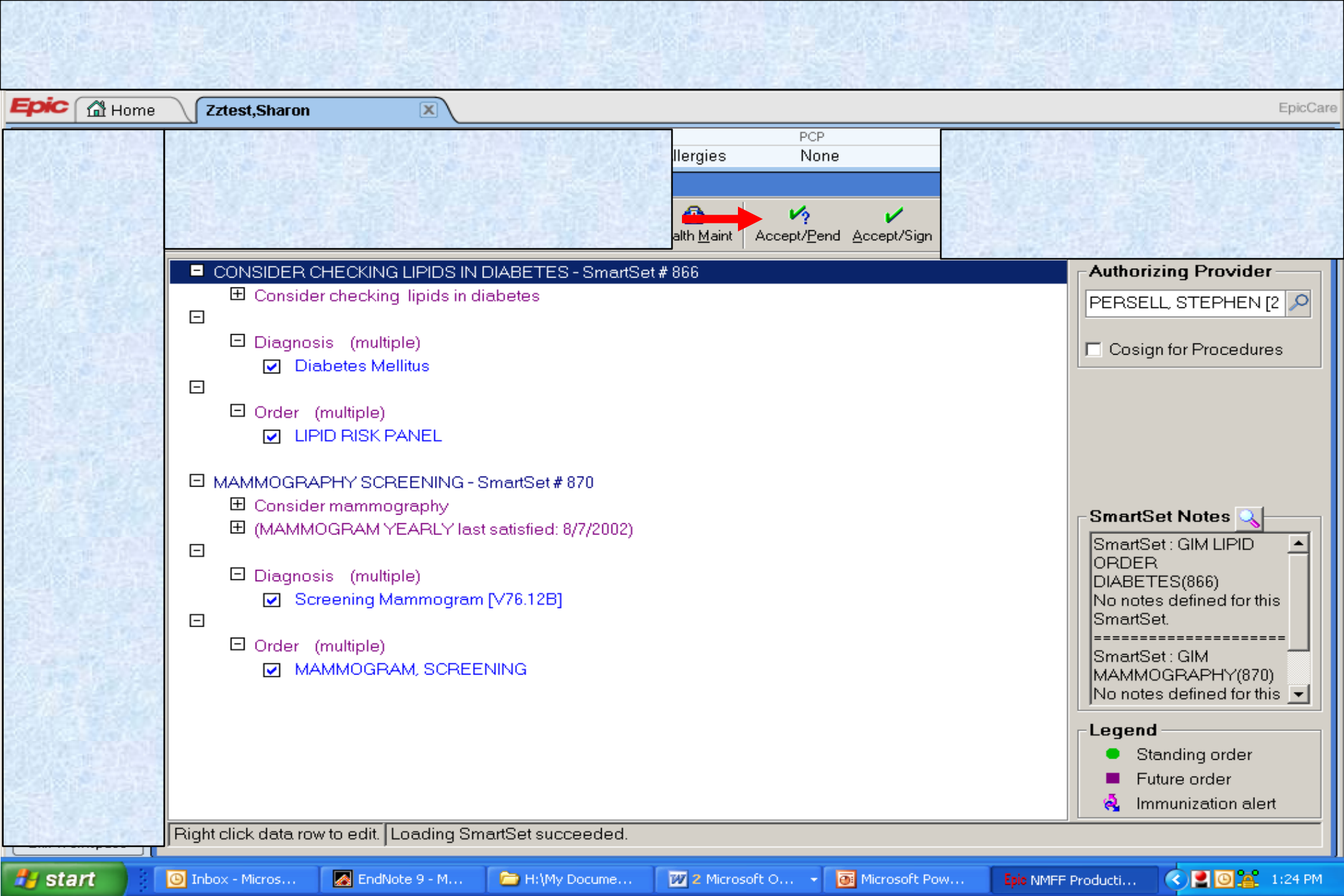
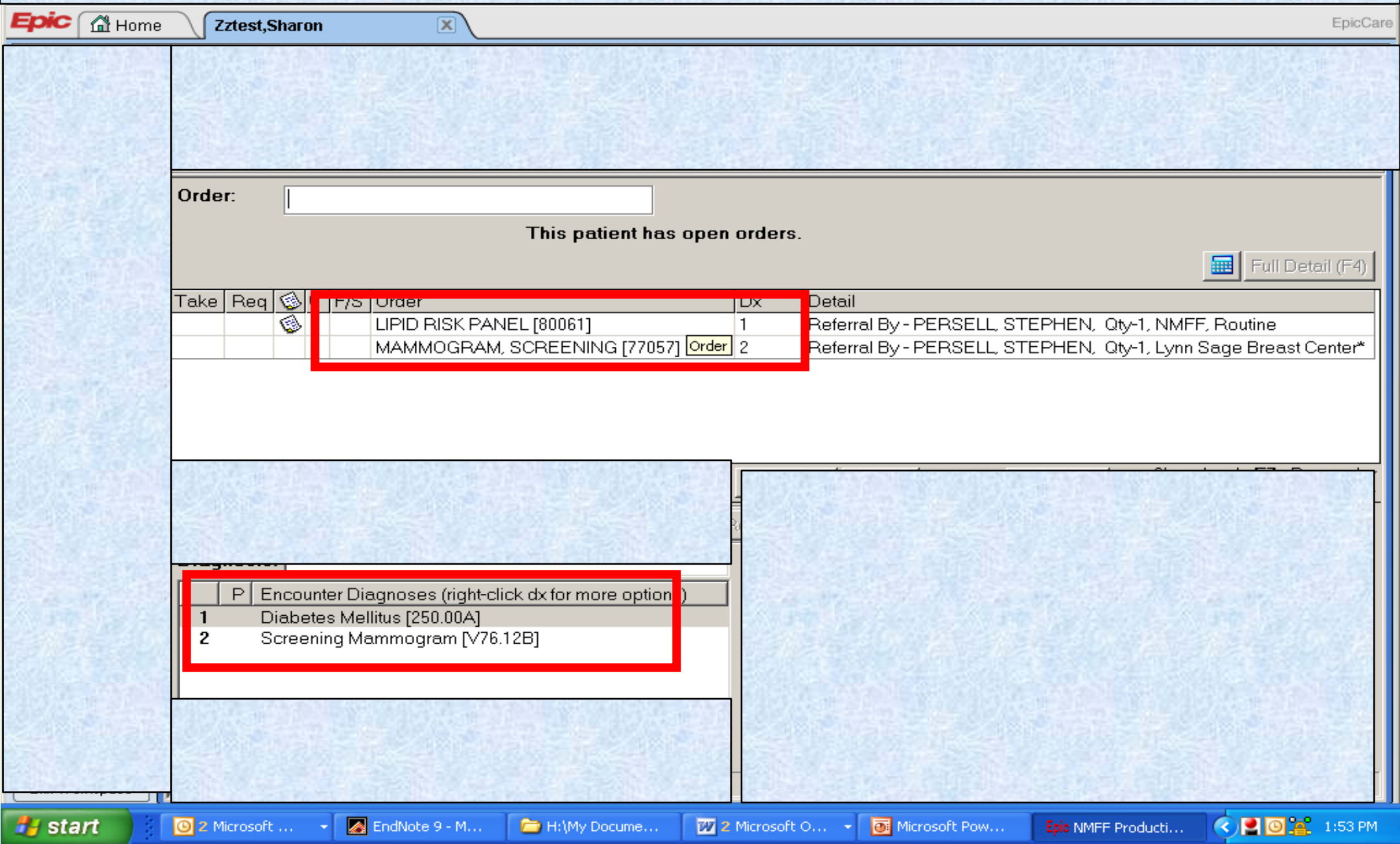
Chart Cosign
11:03 AM
Start
Inbox - Microsoft Outlook
2008 03 03 NMFF Board...
Baker ENH mtg 02 07 08
Epic NMFF Production - NM...
11:03 AM

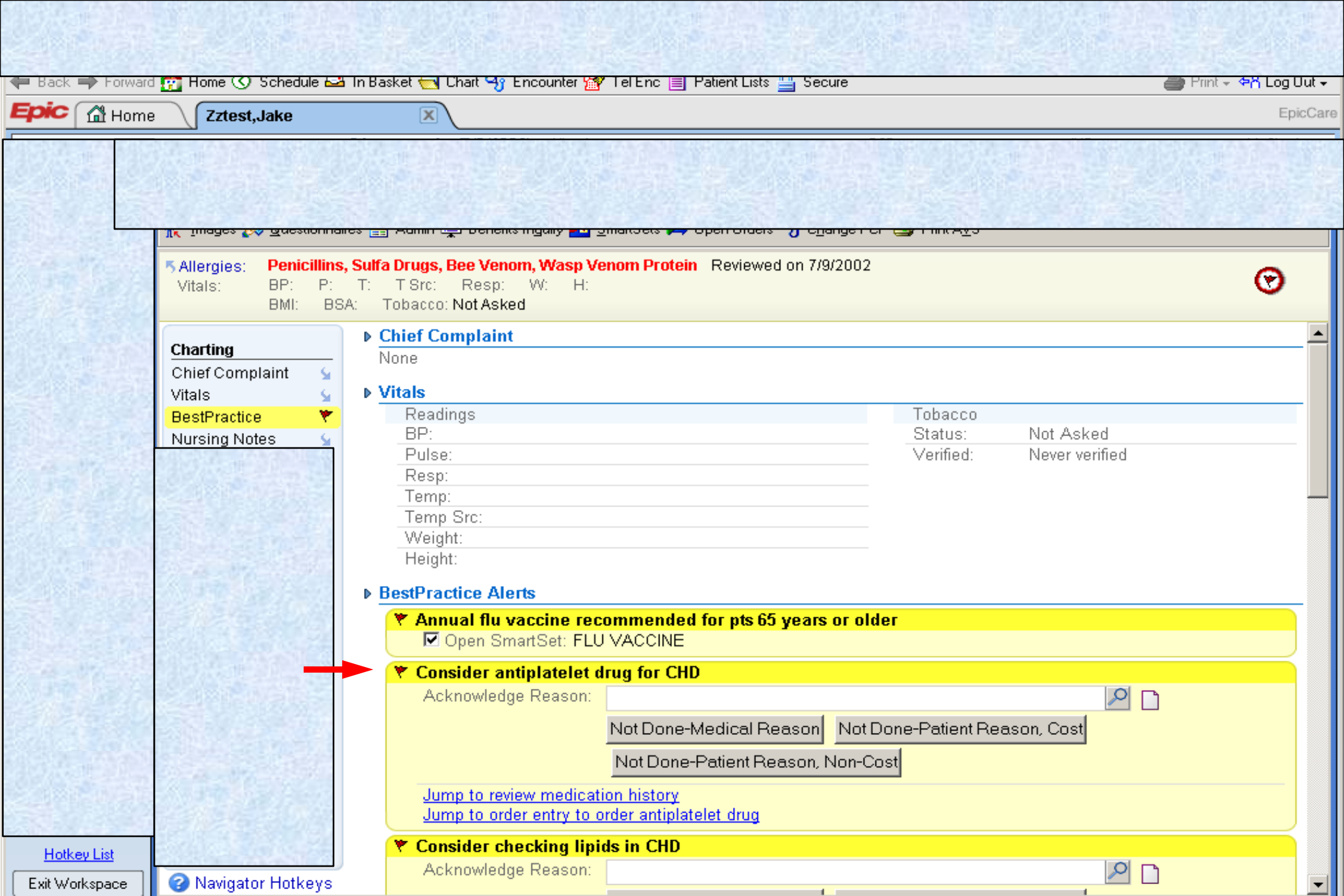

Epic
Home
Zztest,Sharon
EpicCar
Zztest, Sharon
57 y.o. female (5/16/1950)
Z211Z
Allergies
No Active Allergies
PCP
None
Alerts
HM!
INS
None
MyChart
Inactive
Allergies:
No Active Allergies
Reviewed on 7/18/2002
ZZTEST,SHARON (Z211Z) Sex: Female DOB: 5/16/1950 Age: 57
Telephone/Refill Encounter
Contacts
Reason for Call
BestPractice
Consider cervical cancer screening
(PAP SMEAR-YEARLY last satisfied: Not on file)
Open SmartSet: CERVICAL CANCER SCREENING
Jump to health maintenance
Consider Testing HBA1c
Last HBA1C=7.8 on 5/3/2004
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: GIM HBA1C MONITORING DIABETES
Consider checking lipids in diabetes
Acknowledge Reason:
Completed Elsewhere
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Open SmartSet: Check lipids in diabetes
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Open SmartSet: Screening Mammography
Jump to health maintenance
Refresh
Accept
Orders (View Only)
Order Entry
Documentation
DAVID BAKER MD
Chart Cosign
11:03 AM
Start
Inbox - Microsoft Outlook
2008 03 03 NMFF Board...
Baker ENH mtg 02 07 08
Epic NMFF Production - NM...
11:03 AM


Epic
Home
Zztest,Sharon
EpicCare
CONSIDER CHECKING LIPIDS IN DIABETES - SmartSet # 866
Consider checking lipids in diabetes
Diagnosis (multiple)
Diabetes Mellitus
Order (multiple)
LIPID RISK PANEL
MAMMOGRAPHY SCREENING - SmartSet # 870
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Diagnosis (multiple)
Screening Mammogram [V76.12B]
Order (multiple)
MAMMOGRAM, SCREENING
•Simple
•No need to read
•All pre-checked
Authorizing Provider
PERSELL, STEPHEN [2
Cosign for Procedures
No notes defined for this SmartSet.
SmartSet : GIM MAMMOGRAPHY(870)
No notes defined for this
Legend
Standing order
Future order
Immunization alert
Right click data row to edit.
Loading SmartSet succeeded.
start
Inbox - Micros...
EndNote 9 - M...
H:\My Docume...
2 Microsoft O...
Microsoft Pow...
NMFF Producti...
1:24 PM


Epic
Home
Zztest,Sharon
EpicCare
PCP
llergies
None
alth Maint
Accept/Pend
Accept/Sign
CONSIDER CHECKING LIPIDS IN DIABETES - SmartSet # 866
Consider checking lipids in diabetes
Diagnosis (multiple)
Diabetes Mellitus
Order (multiple)
LIPID RISK PANEL
MAMMOGRAPHY SCREENING - SmartSet # 870
Consider mammography
(MAMMOGRAM YEARLY last satisfied: 8/7/2002)
Diagnosis (multiple)
Screening Mammogram [V76.12B]
Order (multiple)
MAMMOGRAM, SCREENING
Authorizing Provider
PERSELL, STEPHEN [2
Cosign for Procedures
SmartSet Notes
SmartSet : GIM LIPID ORDER DIABETES(866)
No notes defined for this SmartSet.
==========
SmartSet : GIM MAMMOGRAPHY(870)
No notes defined for this
Legend
Standing order
Future order
Immunization alert
Right click data row to edit.
Loading SmartSet succeeded.
start
Inbox - Micros...
EndNote 9 - M...
H:\My Docume...
2 Microsoft O...
Microsoft Pow...
NMFF Producti...
1:24 PM


Epic
Home
Zztest,Sharon
EpicCare
Order:
This patient has open orders.
Full Detail (F4)
Take
Req
F/S
Order
Dx
Detail
LIPID RISK PANEL [80061]
1
Referral By - PERSELL, STEPHEN, Qty-1, NMFF, Routine
MAMMOGRAM, SCREENING [77057]
Order
2
Referral By - PERSELL, STEPHEN, Qty-1, Lynn Sage Breast Center*
P
Encounter Diagnoses (right-click dx for more option
1
Diabetes Mellitus [250.00A]
2
Screening Mammogram [V76.12B]
start
2 Microsoft ...
EndNote 9 - M...
H:\My Docume...
2 Microsoft O...
Microsoft Pow...
NMFF Producti...
1:53 PM

Physician Sees Patient Who Cannot Afford or Refuses Recommend Service


Back Forward Home Schedule In Basket Chart Encounter Tel Enc Patient Lists Secure Print Log Out
Epic Home Zztest,Jake EpicCare
Allergies: Penicillins, Sulfa Drugs, Bee Venom, Wasp Venom Protein Reviewed on 7/9/2002
Vitals: BP: P: T: T Src: Resp: W: H:
BMI: BSA: Tobacco: Not Asked
Charting
Chief Complaint
Vitals
BestPractice
Nursing Notes
Chief Complaint
None
Vitals
Readings
BP:
Pulse:
Resp:
Temp:
Temp Src:
Weight:
Height:
Tobacco
Status: Not Asked
Verified: Never verified
BestPractice Alerts
Annual flu vaccine recommended for pts 65 years or older
Open SmartSet: FLU VACCINE
Consider antiplatelet drug for CHD
Acknowledge Reason:
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Jump to review medication history
Jump to order entry to order antiplatelet drug
Consider checking lipids in CHD
Acknowledge Reason:
Hotkey List
Exit Workspace
Navigator Hotkeys

Epic | Home | Zztest,Jake | EpicCare

Allergies: **Penicillins, Sulfa Drugs, Bee Venom, Wasp Venom Protein** Reviewed on 7/9/2002
Vitals: BP: P: T: T Src: Resp: W: H:
BMI: BSA: Tobacco: Not Asked

Charting
- Chief Complaint
- Vitals
- BestPractice
- Nursing Notes

Chief Complaint
None

Vitals

Readings		Tobacco	
BP:		Status:	Not Asked
Pulse:		Verified:	Never verified
Resp:			
Temp:			
Temp Src:			
Weight:			
Height:			

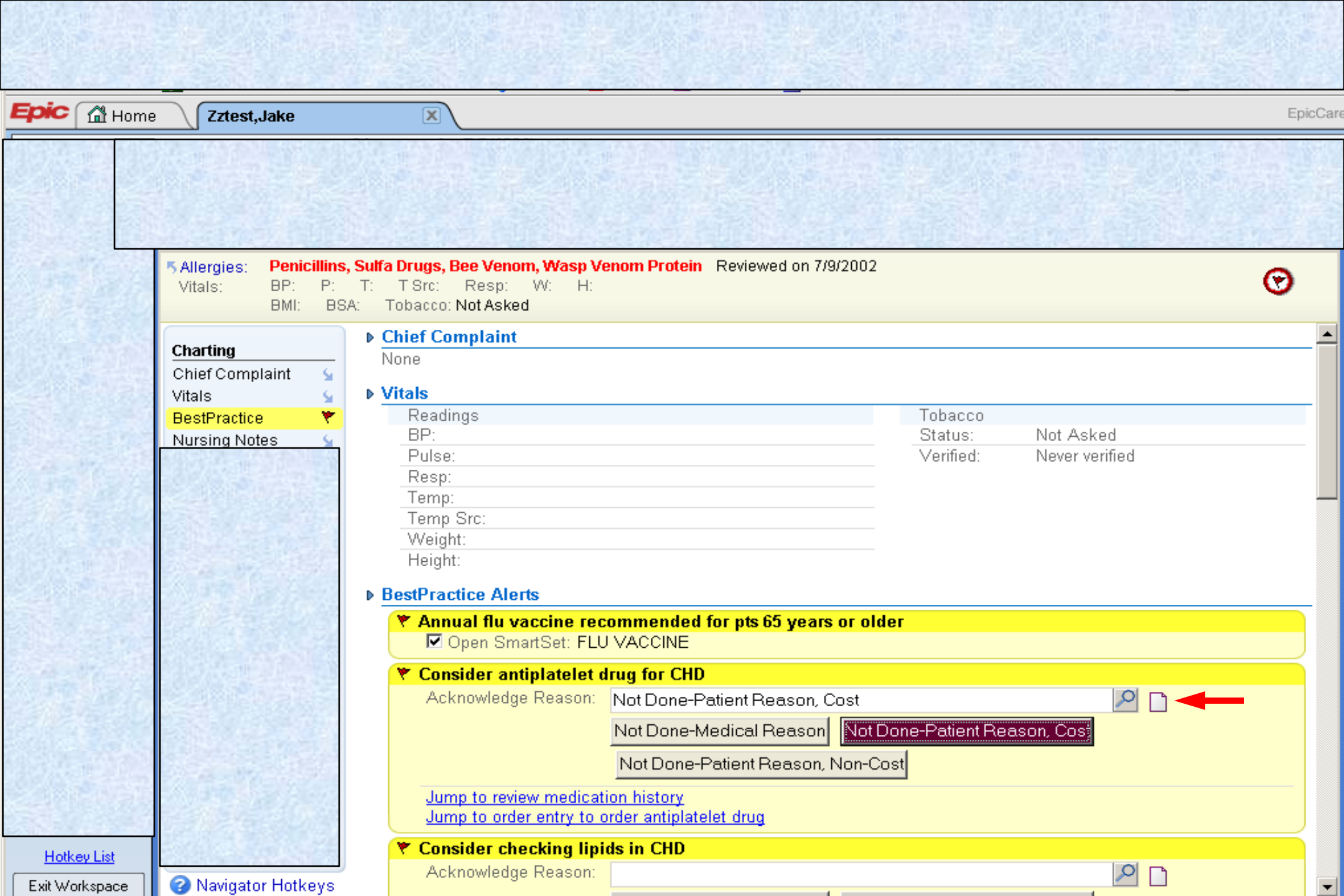
BestPractice Alerts

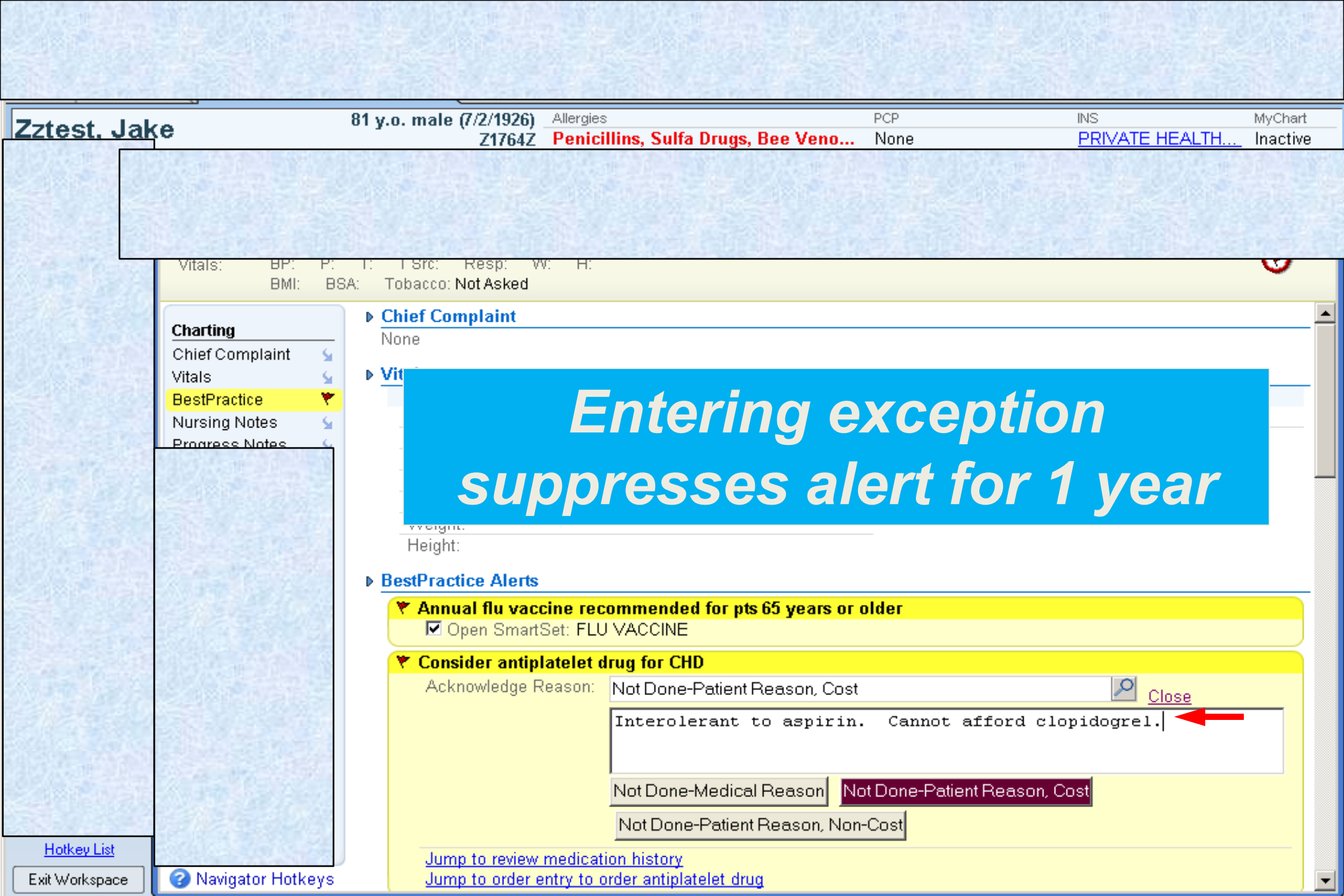
Annual flu vaccine recommended for pts 65 years or older
☑ Open SmartSet: FLU VACCINE

Consider antiplatelet drug for CHD
Acknowledge Reason: Not Done-Patient Reason, Cost
Not Done-Medical Reason | Not Done-Patient Reason, Cost | Not Done-Patient Reason, Non-Cost
Jump to review medication history
Jump to order entry to order antiplatelet drug

Consider checking lipids in CHD
Acknowledge Reason:

Hotkey List
Exit Workspace
Navigator Hotkeys


Epic
Home
Zztest,Jake
EpicCare
Allergies: Penicillins, Sulfa Drugs, Bee Venom, Wasp Venom Protein Reviewed on 7/9/2002
Vitals: BP: P: T: T Src: Resp: W: H:
BMI: BSA: Tobacco: Not Asked
Charting
Chief Complaint
Vitals
BestPractice
Nursing Notes
Chief Complaint
None
Vitals
Readings
BP:
Pulse:
Resp:
Temp:
Temp Src:
Weight:
Height:
Tobacco
Status: Not Asked
Verified: Never verified
BestPractice Alerts
Annual flu vaccine recommended for pts 65 years or older
Open SmartSet: FLU VACCINE
Consider antiplatelet drug for CHD
Acknowledge Reason: Not Done-Patient Reason, Cost
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Jump to review medication history
Jump to order entry to order antiplatelet drug
Consider checking lipids in CHD
Acknowledge Reason:
Hotkey List
Exit Workspace
Navigator Hotkeys

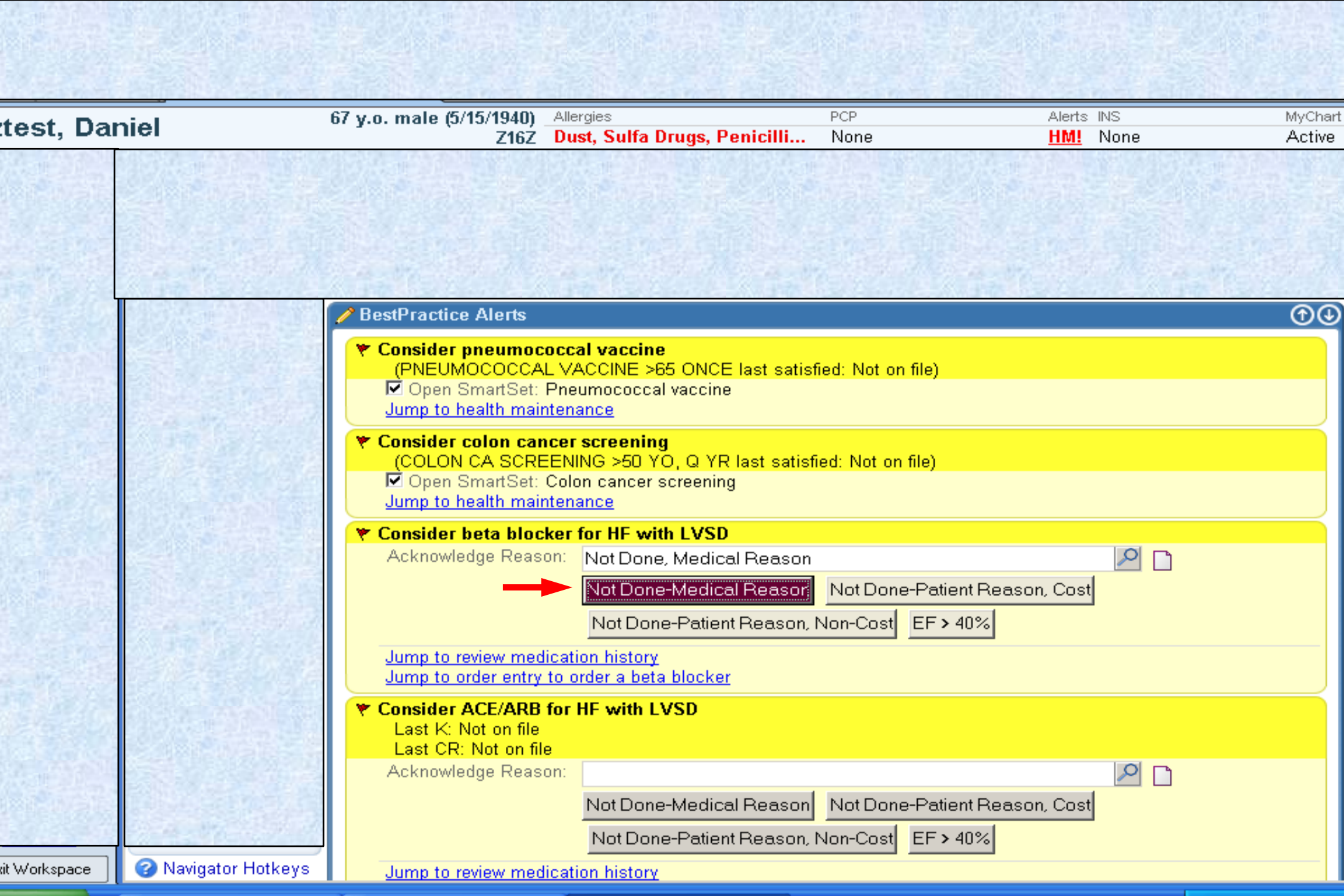

Zztest, Jake
81 y.o. male (7/2/1926)
Z1764Z
Allergies
Penicillins, Sulfa Drugs, Bee Veno...
PCP
None
INS
PRIVATE HEALTH...
MyChart
Inactive
Vitals: BP: P: T: T Src: Resp: W: H:
BMI: BSA: Tobacco: Not Asked
Charting
Chief Complaint
Vitals
BestPractice
Nursing Notes
Progress Notes
Chief Complaint
None
Entering exception suppresses alert for 1 year
Height:
BestPractice Alerts
Annual flu vaccine recommended for pts 65 years or older
Open SmartSet: FLU VACCINE
Consider antiplatelet drug for CHD
Acknowledge Reason:
Not Done-Patient Reason, Cost
Close
Interolerant to aspirin. Cannot afford clopidogrel.
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
Jump to review medication history
Jump to order entry to order antiplatelet drug
Hotkey List
Exit Workspace
Navigator Hotkeys

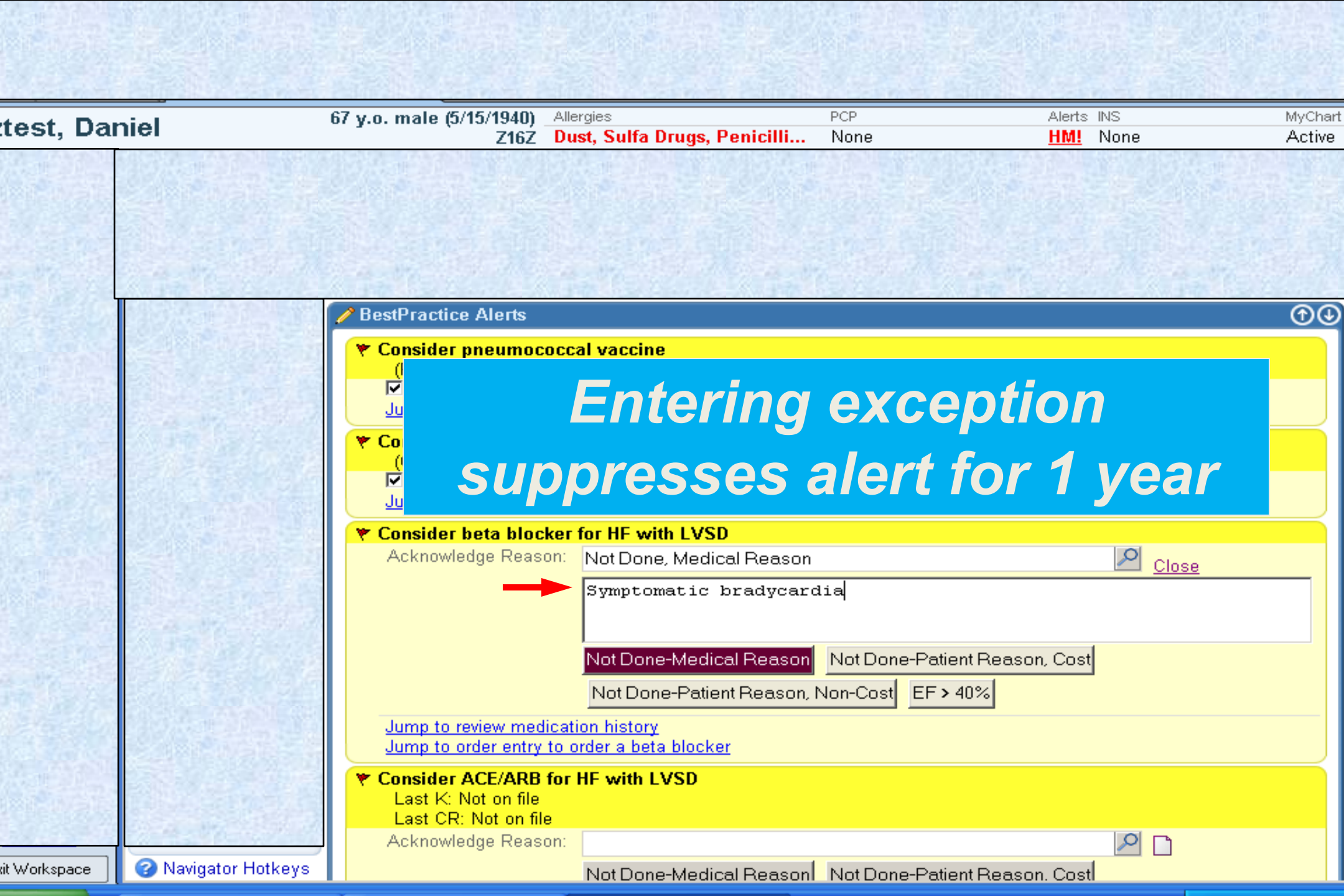
Outreach to Patients with Documented "Patient Exception"

- Each week, care manager received list of patients who refused recommended test
- Sent informational materials and called
- 6.1% completed preventive services, but no difference compared to year before UPQUAL

Persell SD, et al. Under review

Physician Sees Patient Who S/he Thinks Has Contraindication to Medication


test, Daniel
67 y.o. male (5/15/1940)
Z16Z
Allergies
Dust, Sulfa Drugs, Penicilli...
PCP
None
Alerts
HM!
INS
None
MyChart
Active
BestPractice Alerts
Consider pneumococcal vaccine
(PNEUMOCOCCAL VACCINE >65 ONCE last satisfied: Not on file)
Open SmartSet: Pneumococcal vaccine
Jump to health maintenance
Consider colon cancer screening
(COLON CA SCREENING >50 YO, Q YR last satisfied: Not on file)
Open SmartSet: Colon cancer screening
Jump to health maintenance
Consider beta blocker for HF with LVSD
Acknowledge Reason:
Not Done, Medical Reason
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
EF > 40%
Jump to review medication history
Jump to order entry to order a beta blocker
Consider ACE/ARB for HF with LVSD
Last K: Not on file
Last CR: Not on file
Acknowledge Reason:
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
EF > 40%
Jump to review medication history
Navigator Hotkeys


test, Daniel
67 y.o. male (5/15/1940)
Z16Z
Allergies
Dust, Sulfa Drugs, Penicilli...
PCP
None
Alerts
HM!
INS
None
MyChart
Active
BestPractice Alerts
Consider pneumococcal vaccine
Entering exception suppresses alert for 1 year
Consider beta blocker for HF with LVSD
Acknowledge Reason:
Not Done, Medical Reason
Close
Symptomatic bradycardia
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Not Done-Patient Reason, Non-Cost
EF > 40%
Jump to review medication history
Jump to order entry to order a beta blocker
Consider ACE/ARB for HF with LVSD
Last K: Not on file
Last CR: Not on file
Acknowledge Reason:
Not Done-Medical Reason
Not Done-Patient Reason, Cost
Navigator Hotkeys

Results of Peer Review

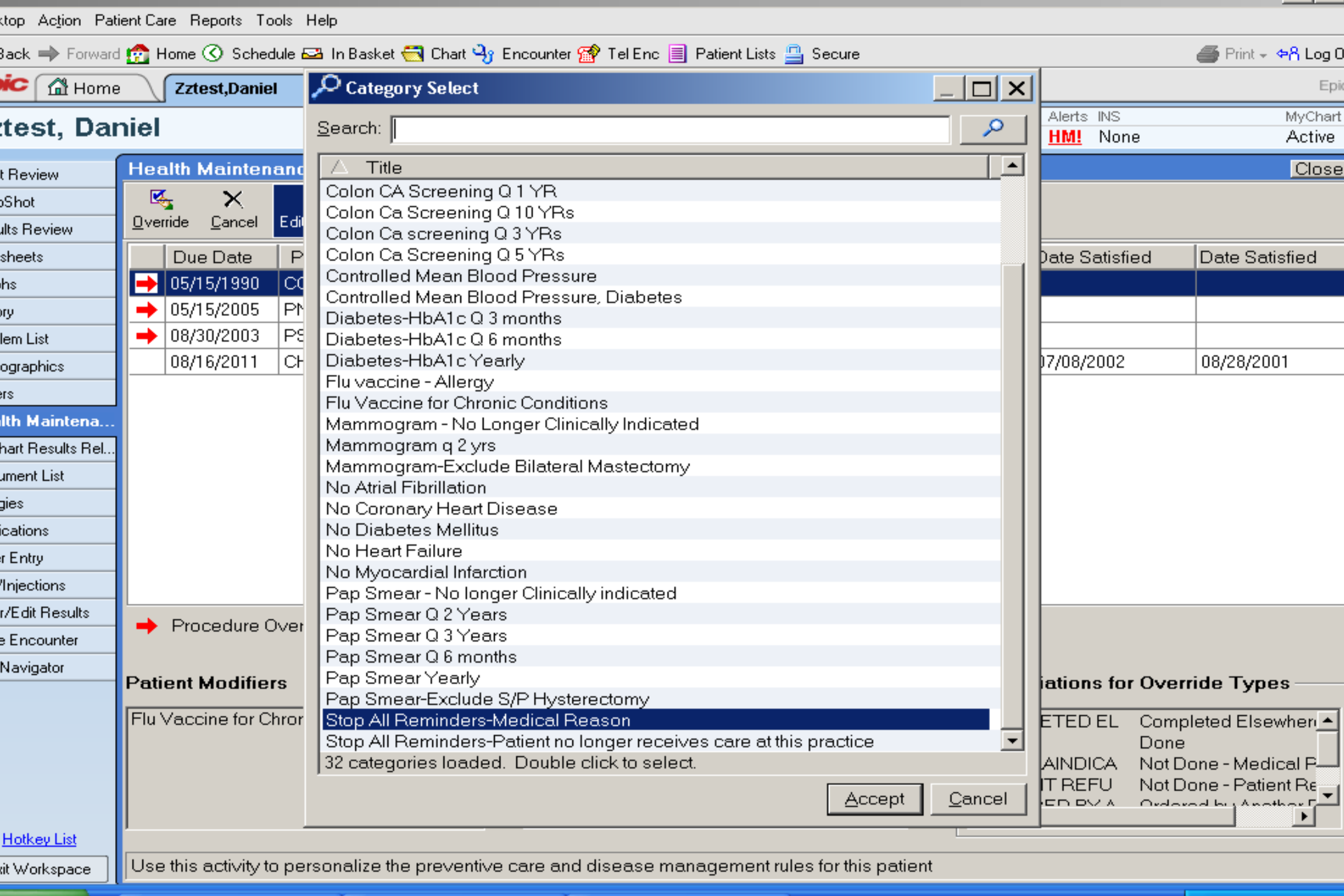
- 614 exceptions entered
- 94% were medically appropriate,
- 3% were inappropriate and 3% were of uncertain appropriateness
- Cases of inappropriate exceptions were discussed at faculty meeting
  - E.g., ASA contraindicated if hemorrhagic stroke or diabetic retinopathy
- Cases now used for new physicians

Persell SD, Baker DW, et al. Ann Intern Med 2010

Preserving Physician Judgment:

Removing Patients from QI Registries with "Global Exceptions"

AHRQ
Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov


Action Patient Care Reports Tools Help
Back Forward Home Schedule In Basket Chart Encounter Tel Enc Patient Lists Secure Print Log O
Home Zztest,Daniel
ztest, Daniel
Alerts INS MyChart
HM! None Active
Close
Health Maintenanc
Override Cancel
Due Date
05/15/1990
05/15/2005
08/30/2003
08/16/2011
Date Satisfied
Date Satisfied
07/08/2002
08/28/2001
Procedure Over
Patient Modifiers
Flu Vaccine for Chror
iations for Override Types
ETED EL Completed Elsewher
Done
AINDICA Not Done - Medical P
IT REFU Not Done - Patient Re
Hotkey List
Use this activity to personalize the preventive care and disease management rules for this patient
Category Select
Search:
Title
Colon CA Screening Q 1 YR
Colon Ca Screening Q 10 YRs
Colon Ca screening Q 3 YRs
Colon Ca Screening Q 5 YRs
Controlled Mean Blood Pressure
Controlled Mean Blood Pressure, Diabetes
Diabetes-HbA1c Q 3 months
Diabetes-HbA1c Q 6 months
Diabetes-HbA1c Yearly
Flu vaccine - Allergy
Flu Vaccine for Chronic Conditions
Mammogram - No Longer Clinically Indicated
Mammogram q 2 yrs
Mammogram-Exclude Bilateral Mastectomy
No Atrial Fibrillation
No Coronary Heart Disease
No Diabetes Mellitus
No Heart Failure
No Myocardial Infarction
Pap Smear - No longer Clinically indicated
Pap Smear Q 2 Years
Pap Smear Q 3 Years
Pap Smear Q 6 months
Pap Smear Yearly
Pap Smear-Exclude S/P Hysterectomy
Stop All Reminders-Medical Reason
Stop All Reminders-Patient no longer receives care at this practice
32 categories loaded. Double click to select.
Accept
Cancel

Population Disease Management: Improving Quality for the Unseen Patient

AHRQ
Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

Essential Medication Lists

- Identified patients with diagnoses on problem list, PMH, or encounter dx
- Identified those without medication on active list, no exception
- List given to physicians
- Physicians asked to review charts and either document exception or contact patient to initiate therapy

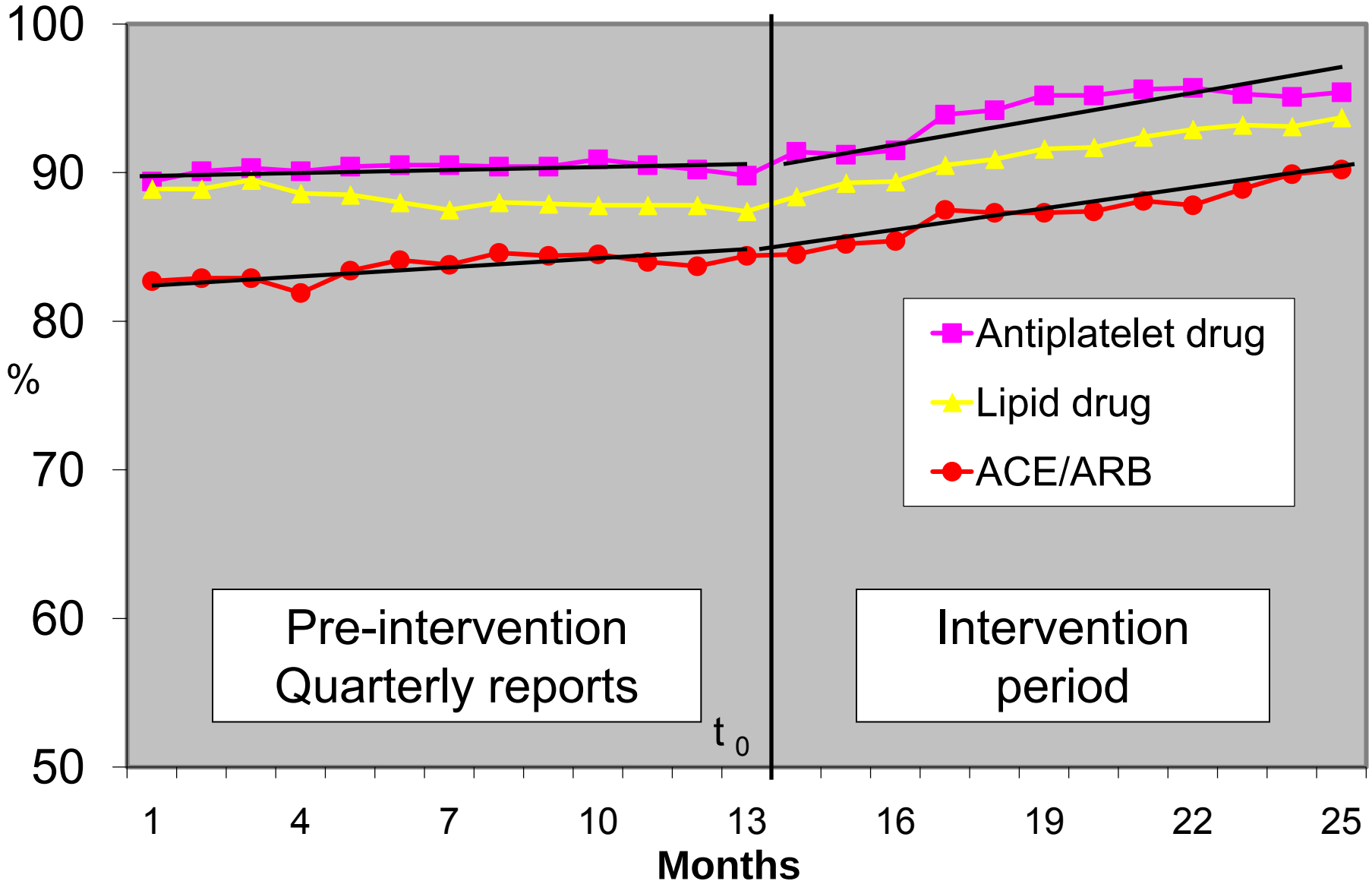
Monthly List of Patients Sent to MD

Provider: Marcus Welby, M. D.

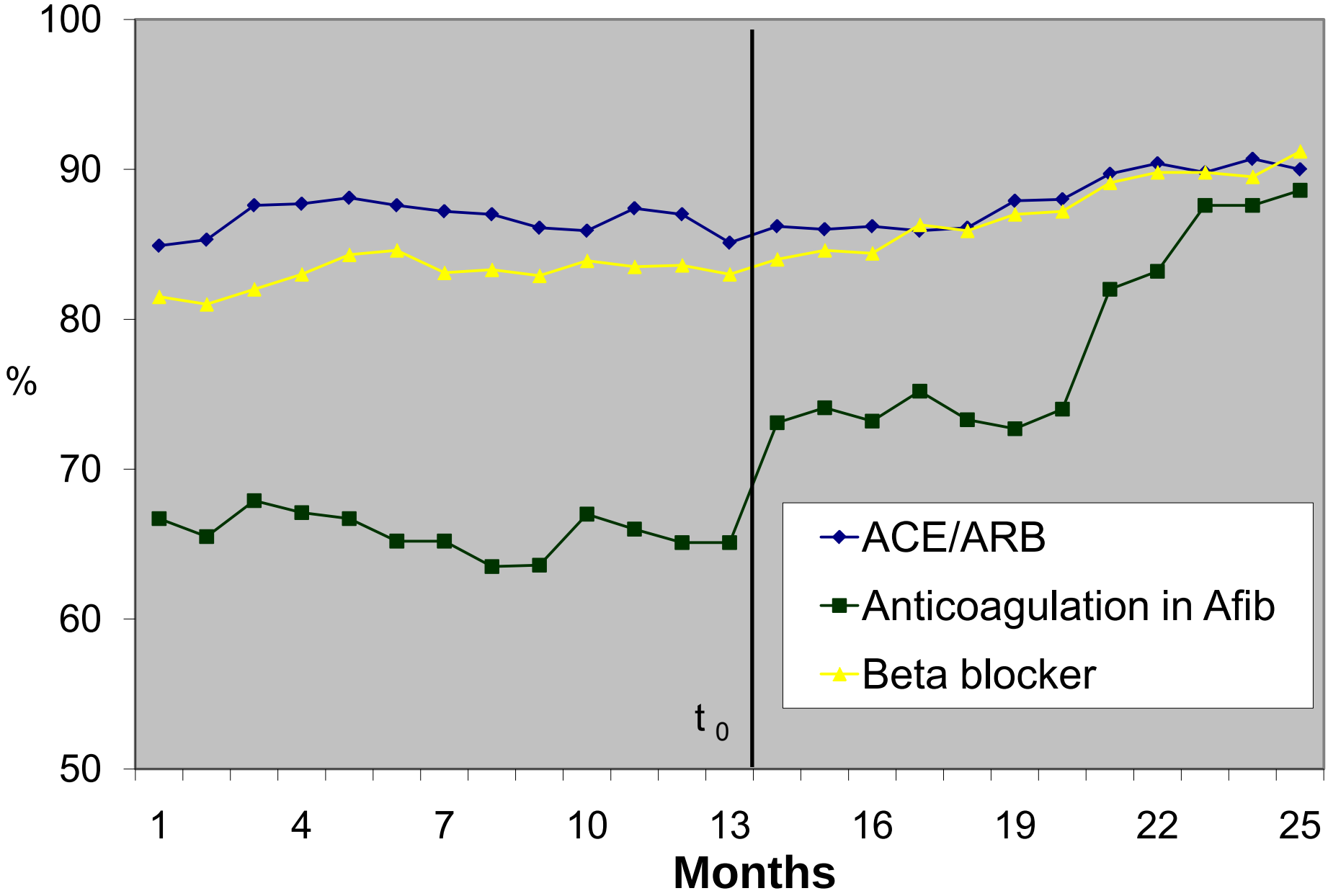
Name	MRN	DOB
DOE, JANE	123919	2/1/54
Consider antiplatelet drug for CHD		
JUAN, DON	999660	4/4/37
Consider beta blocker for prior MI		
Consider ACE/ARB for CHD with DM		
SMITH, ZORRO	139784	7/3/24
Consider antiplatelet drug for CHD		

Changes in Quality During the First Year of UPQUAL

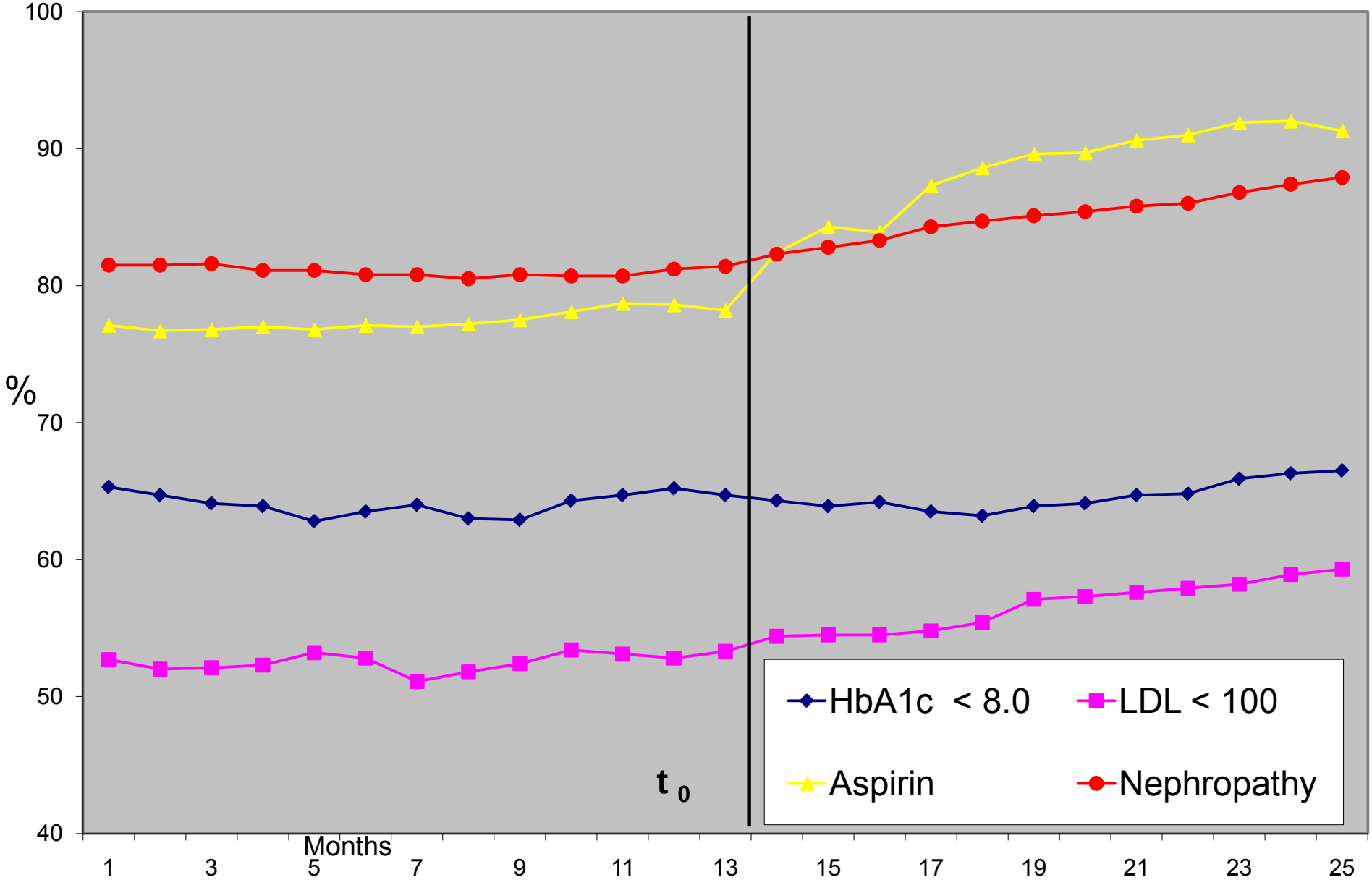
CAD Measures Improved More Rapidly After Intervention



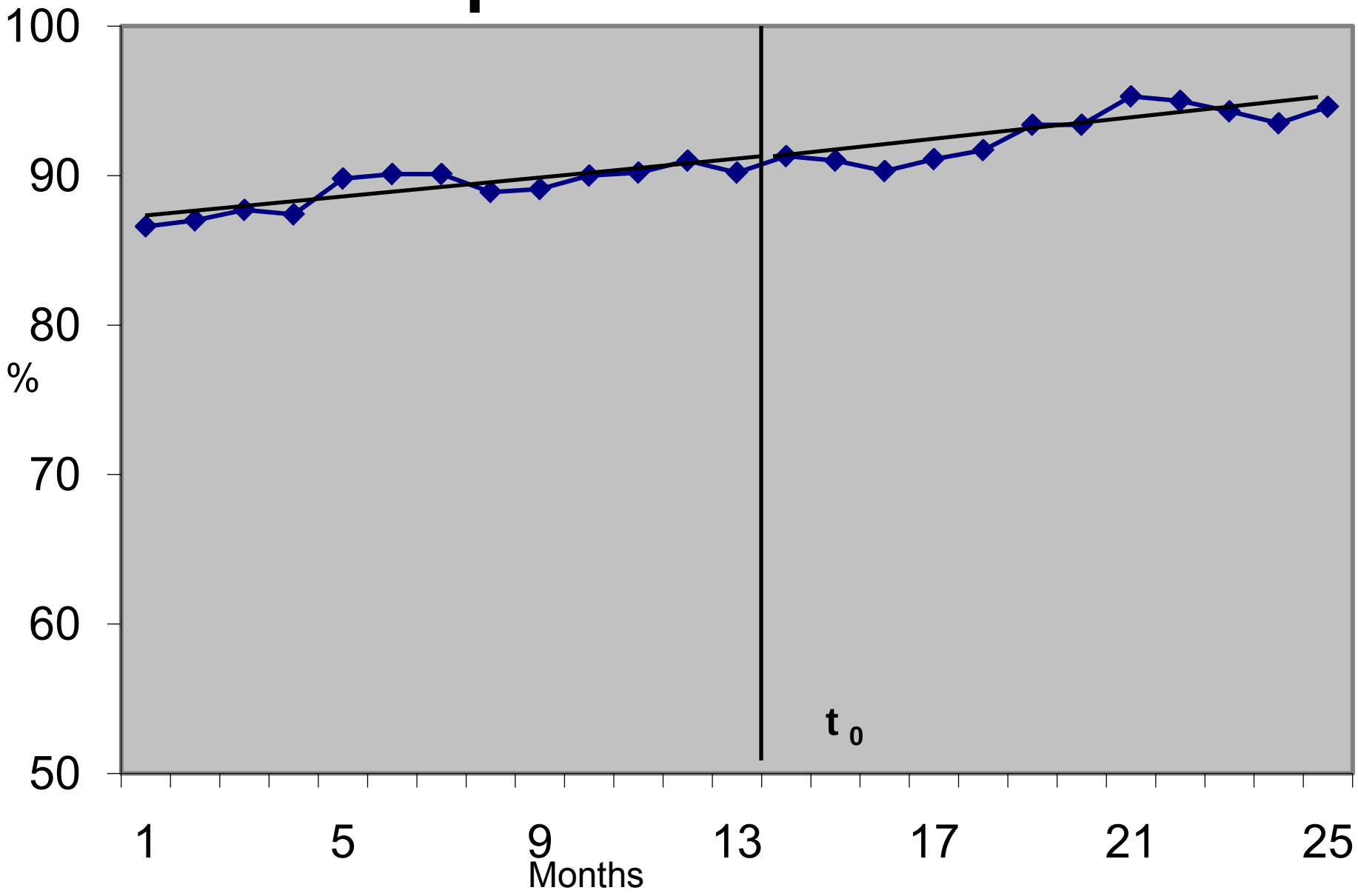
Heart Failure Measures Improved More Rapidly



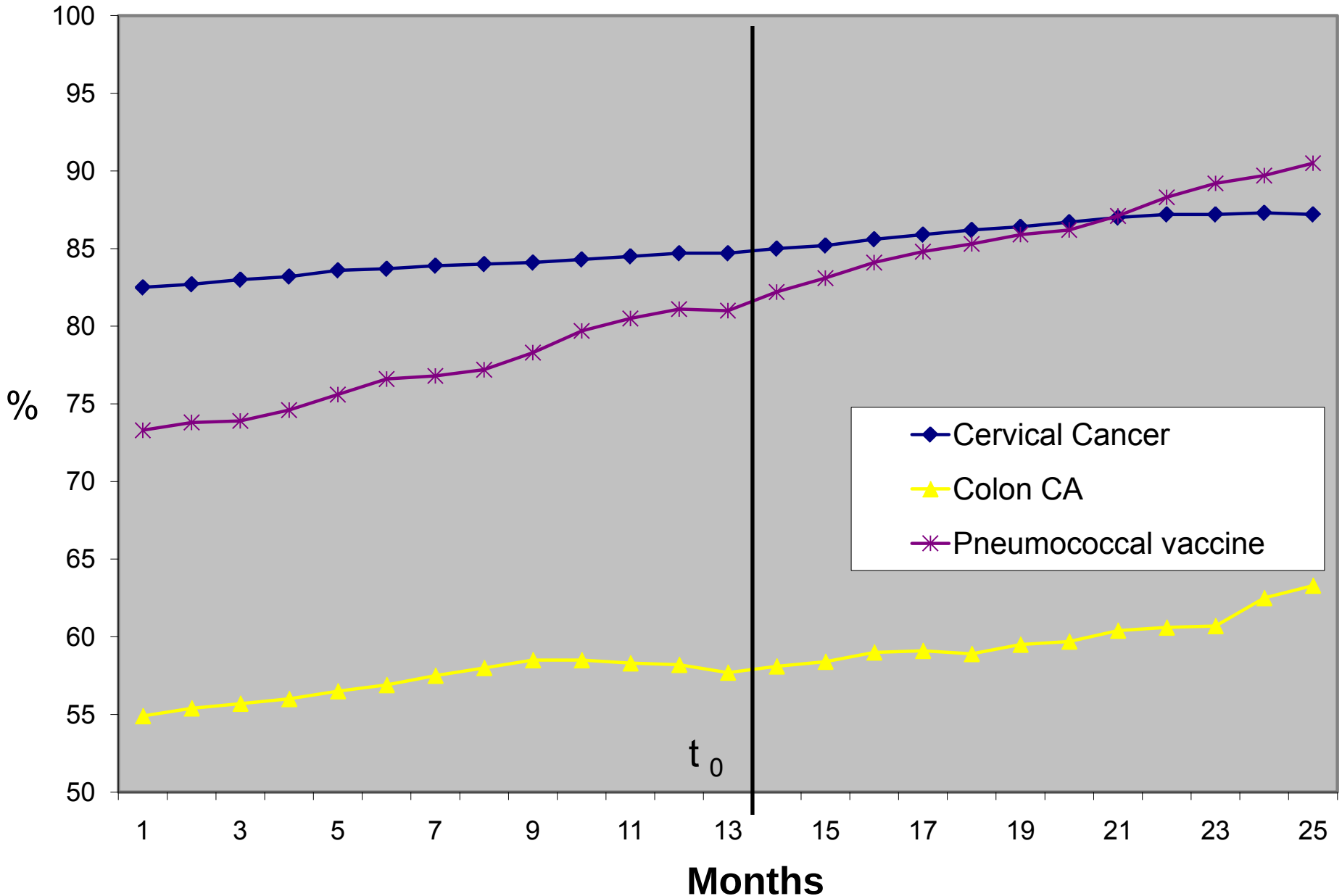
Diabetes Measures Improved More Rapidly, Processes Much More than Outcomes



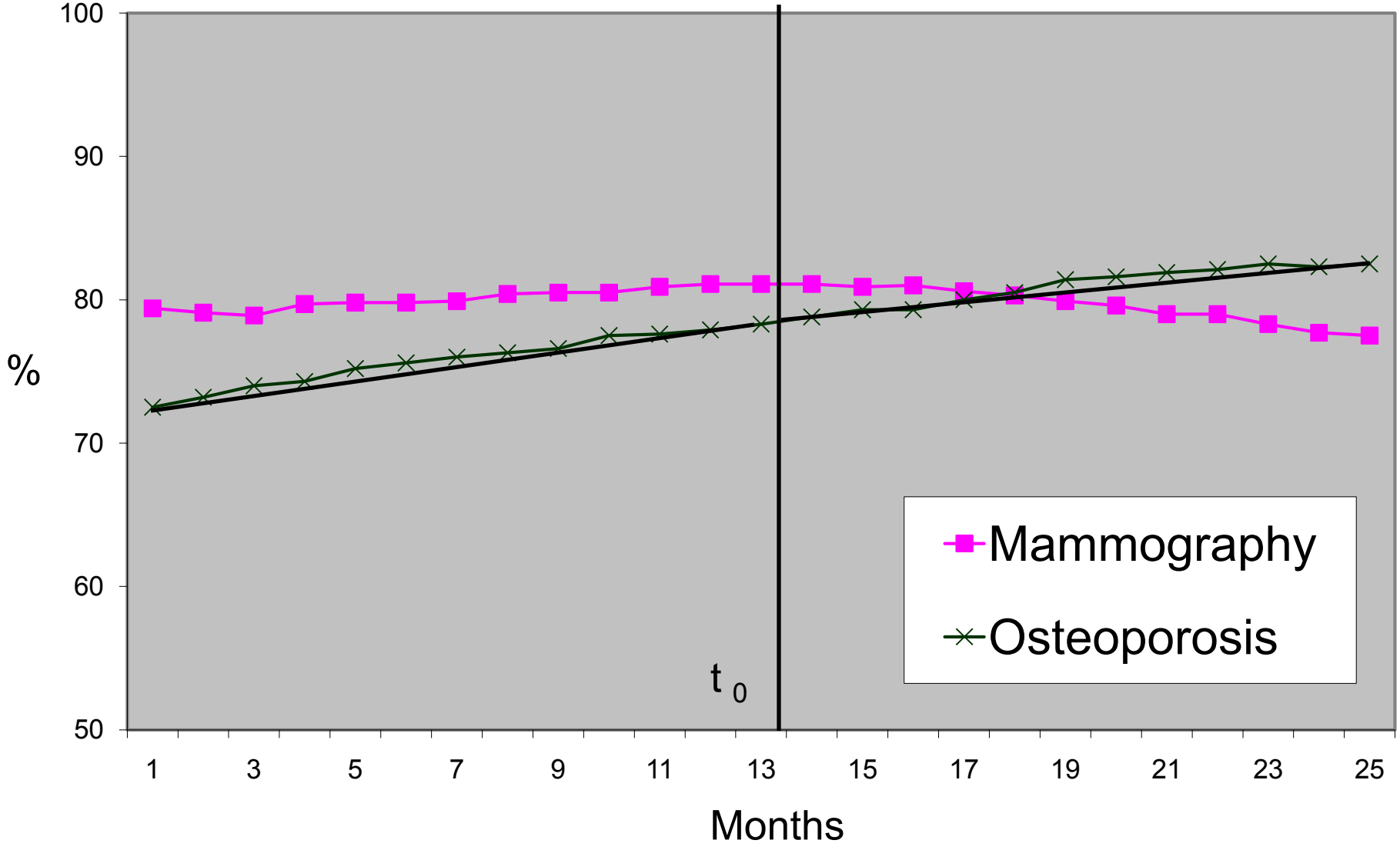
Beta Blocker For Patients with Previous MI Improved at Same Rate



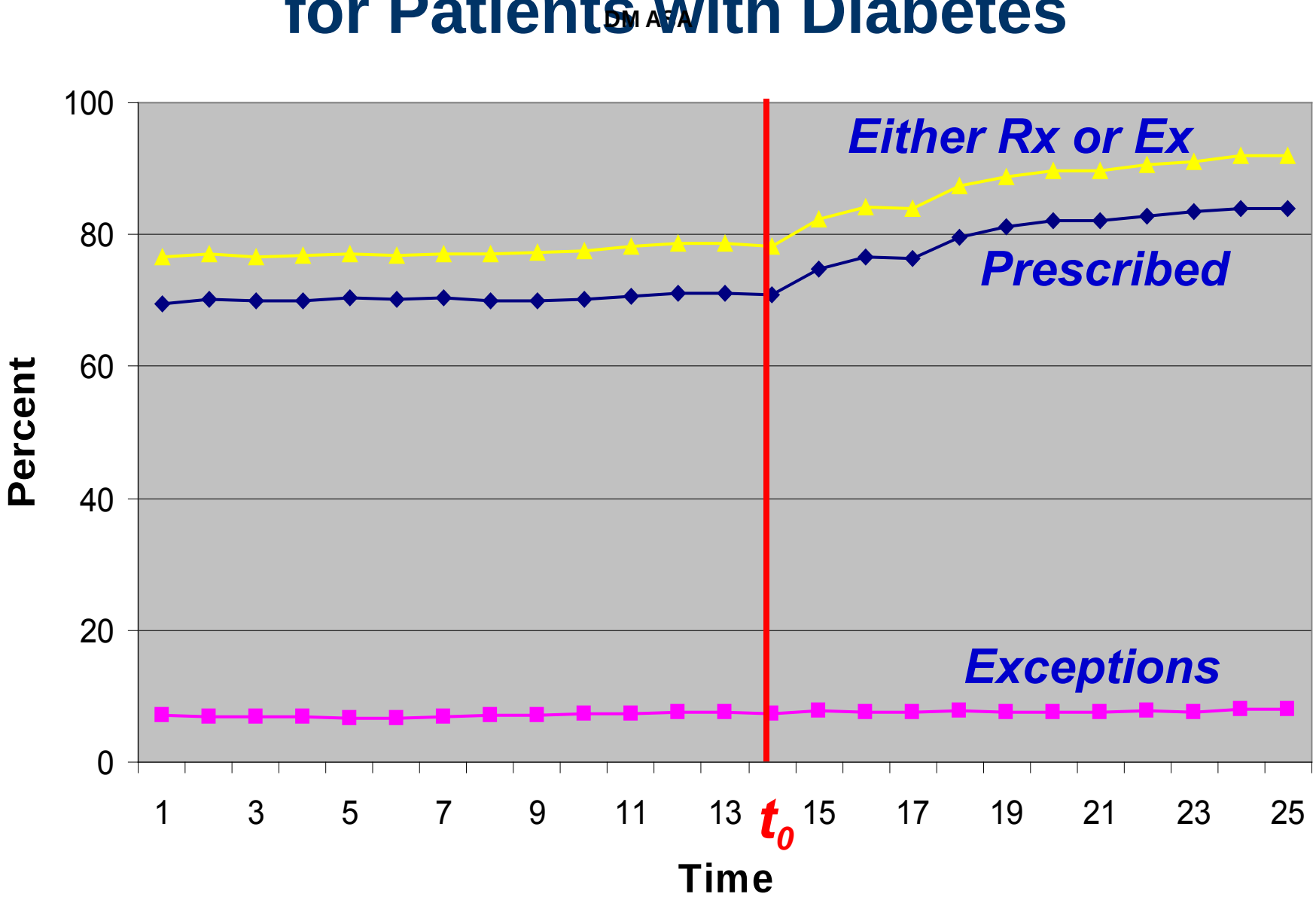
Prevention Measures: 3 Improved at Same Rate



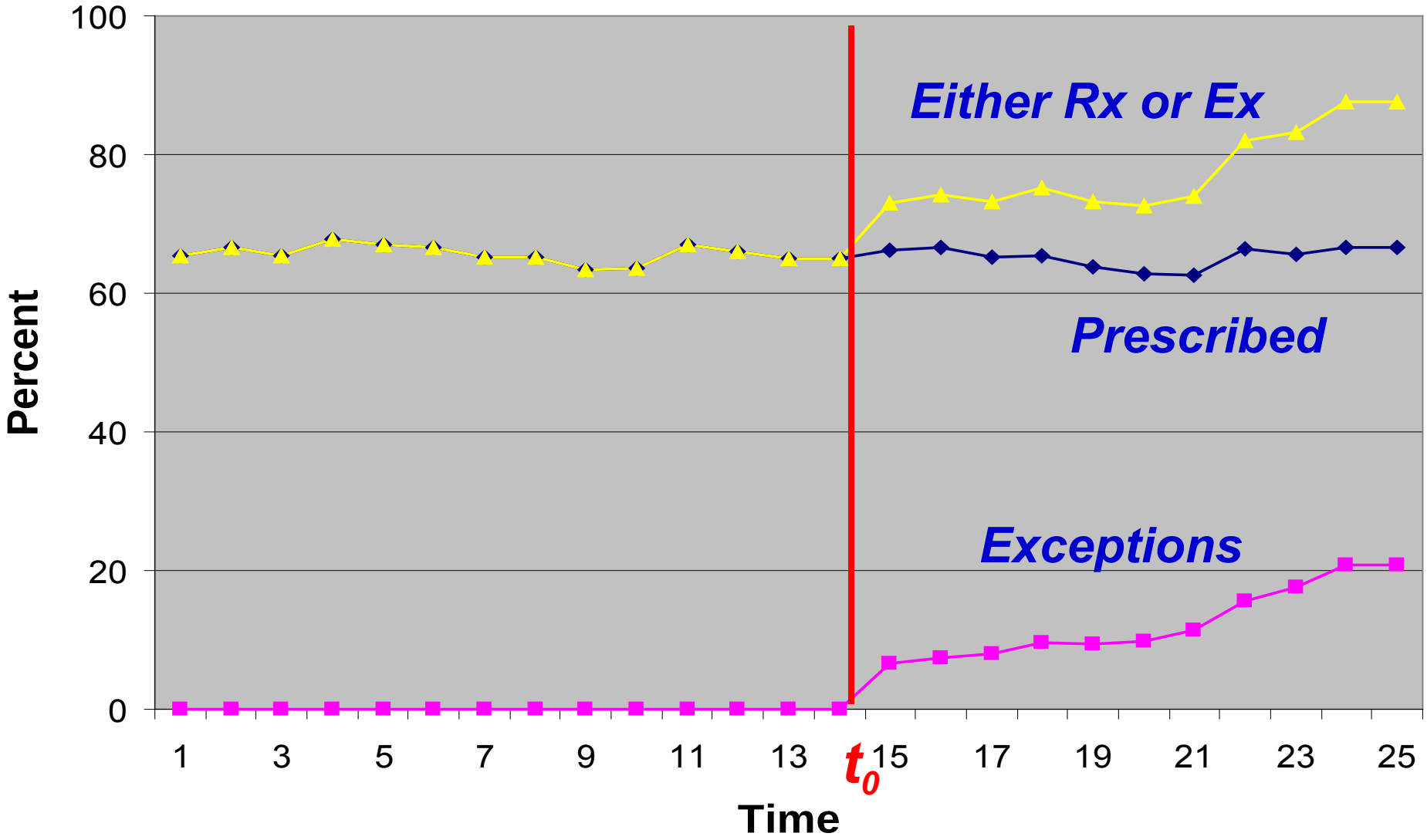
Osteoporosis: Rate of Improvement Significantly Lower
Mammography: Performance Declined



Improved Performance Prescribing Aspirin for Patients with Diabetes



Improved Documentation of Exceptions for Anticoagulation for CHF and A Fib



Summary – First Year of UPQUAL Intervention

- 14 of 16 measures improved significantly
  - 9 measures improved faster than over the preceding year
  - 4 others improved at the same rate compared to the preceding year
  - 1 improved but at a slower rate
  - 1 did not improve, and 1 decreased

Persell SD, et al., Med Care 2011

Key Lessons from UPQUAL

- HIT is just a tool to execute your QI strategy. It is not a strategy in itself.
- If HIT is used to support a comprehensive QI strategy, care can be significantly improved.
- But, clinical decision support and other QI tools must be seen by physicians as their own personal QI tools.

"You know, you can do this just as easily online."

Medication Safety – The Role of Decision Support in Ambulatory Electronic Health Record Systems

Andrew Hamilton, RN, BSN, MS
Chief Operating Officer and Director of Clinical Informatics
Alliance of Chicago

I do not have any relevant financial relationships with any commercial interests to disclose.

Institute *for* Nursing Centers
Access - Quality - Evidence

ALLIANCE OF Community Health S

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

Alliance Overview

- HRSA funded Network of 4 Federally funded Health Centers located on the Near North Side of Chicago
- Essentially a joint venture of four independent organizations with the desire and ability to work together on building some common infrastructure to improve service delivery and health status
- Dedication to quality
- Ability to access higher quality, efficiency and economy of scale
- Desire to ultimately share with others

INSTITUTE FOR NURSING CENTERS: Overview

- A Network of Partners Funded initially by the W.K. Kellogg Foundation
- Facilitate the development and promotion of NMHCs
- Create a national Data Warehouse for NMHCs that captures standardized clinical and financial data
- Inform policy with data
- Generate educational and business products relevant to NMHCs

A Partnership for Clinician EHR Use and Quality of Care:
INC and Alliance of Chicago

To study the effectiveness of a **partnership** that shares resources, and utilizes a data driven approach **to promote full use of an EHR** by clinicians in settings that serve vulnerable populations, in order **to improve the quality of care** in the areas of preventive care, chronic disease management, and medication management.

- *Project Goals*
  - Testing the links between clinician use of an EHR and quality of preventive care, chronic disease management, and medication safety
  - Examining organizational processes in the implementation and full utilization of an EHR in relationship to care delivery and outcomes.

Currently starting our 4th year of funding

(Funded by: Agency for Healthcare Research and Quality)

Characteristics of Participating Nurse Managed Health Centers

Center name	Location	Center type	Annual visit volume	Population served	Type of care
Glide Health Services (GHS)	Tenderloin Neighbor-hood, San Francisco	NMHC and FQHC	13,782	Urban, homeless Financially disadvantaged	Primary Care, Mental Health Complimentary care HIV testing and risk reduction
Campus Health Center of Detroit	Detroit, MI	NMHC	10,100 +	Wayne State University College Students	Primary Care
Arizona State University (ASU)	Phoenix, AZ	2 NMHCs	7,000 +	Urban, insured and uninsured	Primary Care, Integrated Mental Health and Physical Health Care

Characteristics of Participating Community Health Centers

Center name	Location	Center type	Annual visit volume	Population served	Type of care
Howard Brown Health Center	Chicago	CHC FQHC	>10,000 medical visits	Urban, HIV + Gay, Lesbian, Bisexual, and Transgender	Primary Care Large Mental Health & Substance Abuse Programs
Erie Family Health Center – West Town	Chicago	CHC FQHC	>42,000 medical visits	Urban Hispanic and Recent Mexican & Puerto Rican	Primary care OB/GYN Internal Medicine Pediatric
Heartland Health Outreach (HHO)	Chicago	CHC FQHC	>14,000 medical visits	Urban Homeless, & Migrant, and Recent Refugee	Primary Care Mental Health OB/GYN

Methods

- Quantitative Data– System Use, User Satisfaction and Clinical Quality Measures (% pts with Known Allergies Documented)

- Qualitative Data – Key informant interviews

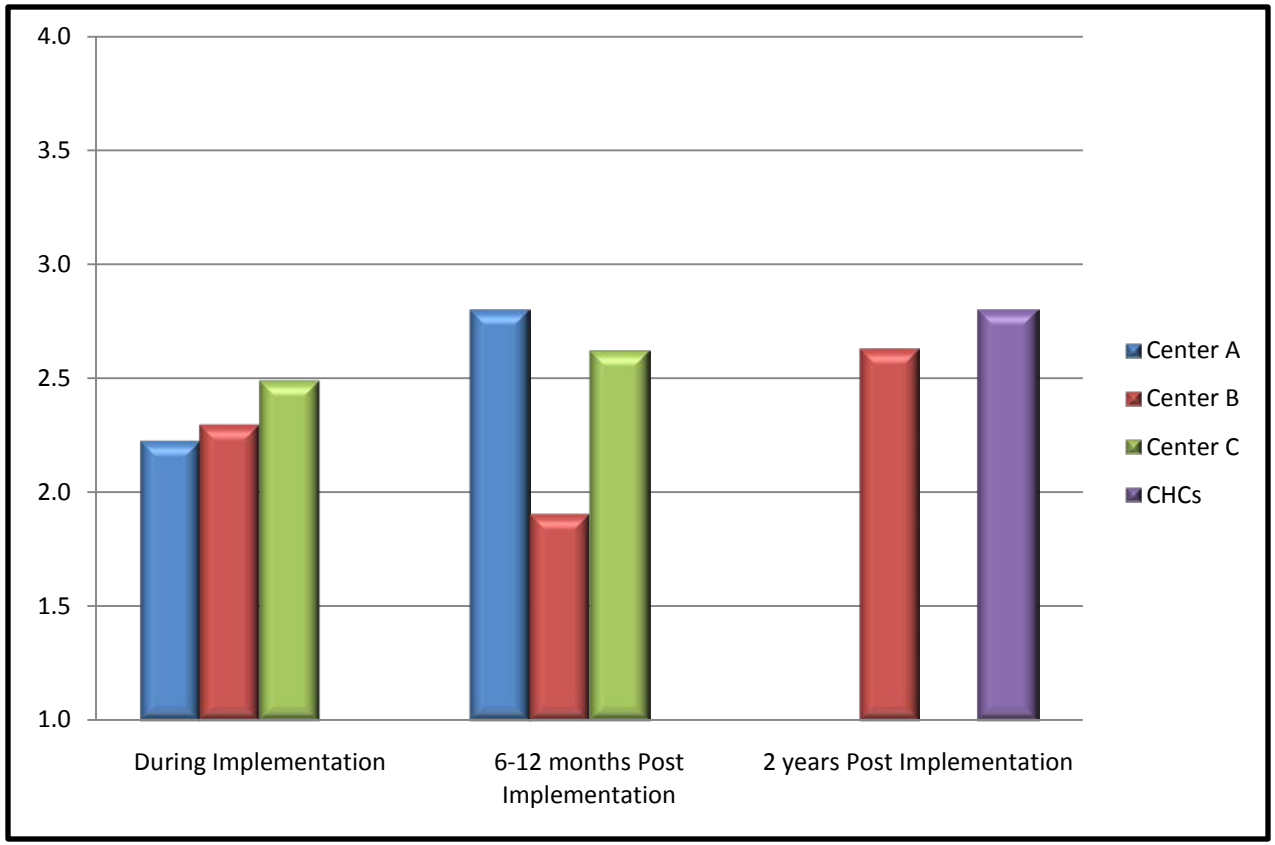
- System Set up Review – Observed enterprise settings related to drug to drug interaction checking

Quantitative Data

- Query searched for drug pairs with:
  - Overlapping start/stop periods
  - End dates in 2008 or greater

- Query/Definition of drug-drug interaction (DDI) pair
  - Severe probable alerts at baseline preload
  - CMS list of drug to drug interaction list

Overall Satisfaction (9 items)



- *Use of the EHR is easy/intuitive*
- *Provides all expected functionalities*
- *Would recommend to others*
- *Interferes with my work*
- *Would not favor ceasing use*

4 point scale: 1-Very Unsatisfied, 2-Unsatisfied, 3-Satisfied, 4-Very Satisfied

Summary of User Evaluation

- Post-implementation evaluation rebounded following initial decline at baseline
- Overall satisfaction improved over time
- Areas of initial high expectations, may not rebound to pre-implementation levels
- Areas that related to patient-provider relationship concerns pre-implementation did improve beyond expectations

Key Informant Interviews

- DDI alerts are generally infrequent
- Not all DDI alerts clinically relevant
  - Antibiotics
  - Psychotropic Medication
- User generally wish the system would differentiate between serious DDI alerts and common DDI alerts (antibiotics/psychotropic)

Drug to Drug Interaction Results

- 645 DDI pairs across **all** sites
  - ➢*Approximately 64,000 unduplicated patients*
- Many of DDIs were related to Warfarin and antibiotic use
  - ➢*Often a temporary clinical necessity*
- A majority of DDIs were related to:
  - ✓Hypertension medications
  - ✓Statins
  - ✓Other cardiovascular medications

Real Medication Safety Concern or Artifact of EHRS Use?

- 565 of the 645 unique DDI pairs (88%) of DDI pairs had a missing end date on one or both drugs (system default=Dec 31, 4007)
- For 342 or 53% of the DDI pairs, one drug had no end date *and* start date before 2008 (in other words we can't be sure that the patient was really on both medications at the same time during 2008-10)
- 214 or 33% had start dates within 1 month of each other
- 120 or 19% of total had start dates within 1 month of each other, and both drugs appeared to be during 2008-10

Discussion

- Current decision medication safety decision support does not reliably eliminate potentially harmful combinations from being prescribed

- The decision support functionality is often too sensitive or ambiguous

Limitations

- Although DDIs can be captured what is NOT captured is when a clinician receives an alert and acts on it and does NOT prescribe the potentially problematic medication

- Pursuing follow up data through more qualitative interviews and correlating results to the PPPSA tool

Crossing the Quality Assessment Chasm: Aligning Measured and True Quality of Care

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Defining Quality of Care

- What makes a good doctor?
- Who is the best judge of a good doctor?
- What are relevant metrics of a good doctor?
- How do you compare the quality of care of two doctors
- How should the characteristics of patients served by a doctor be incorporated into the assessment of quality of care
- Is the “best doctor” the same for all people?

Defining Quality of Care

- Donabedian provides 4 axes of quality:
  - Structural measures – appropriate credentialing of staff, Board certification
  - Satisfaction measures – patients' perception of the relative benefits of treatment on quality and quantity of life balanced by the difficulty of undergoing the necessary treatment
  - Process measures – Assessment of the degree of adherence to standards of practice
  - Outcomes Measures - Evaluation of clinical endpoints (functional status, mortality, hospitalization) as a result of treatment

Outcomes Measures

- Pros
  - Rewards tangible benefits of the care process
- Cons
  - Real change in outcomes take years to develop and it is difficult to detect statistically meaningful differences
  - Many outcomes are highly dependent on patient behaviors and conditions beyond the control of providers

- A1c, LDL and Blood Pressure goals are INTERMEDIATE outcomes.

Quality Measurement - Diabetes

- You are a good doctor if a high proportion of your patients with Diabetes have a most recent HBA1c < 7, LDL < 100 and
  BP < 130/80
- You are an improving doctor if your score this year is better than your score last year.
  - But how many ways can this happen without any real change in the quality of care?

Quality Measurement - Diabetes

- We can agree that controlling Diabetes is an important goal, but what is wrong with using control as the quality measure?
  - Who should count as having Diabetes?
  - My patients have hypoglycemic episodes
  - My patients are already on a lot of meds
  - My patients are sicker
  - My patients are non compliant
  - My patients had a good A1c LAST time
  - I am REALLY busy

Quality Measurement - Diabetes

- We can agree that controlling Diabetes is an important goal, but what is wrong with using the degree of control as the quality measure?
  - Do I have a large enough panel to reliably assess quality?
  - Have I been responsible for a patient long enough to have an impact?
  - Are the patients really mine?
  - Are there factors of success that are more the patients responsibility than my own?

Who should count as having Diabetes?

- If I label some “barely diabetic” individuals as Diabetic, I can improve my quality score
  - They may have better A1cs, but not necessarily meet the stricter LDL or BP criteria
- If I send away my worst controlled patients, I can improve my quality score
- Should the case definition of diabetes for a quality measure be the same as a definition to assess the prevalence of diabetes?

Case Definition of Diabetes

- Anyone with one or more diagnoses of diabetes:

Number of Diabetes Diagnoses	Average HBA1c
1	6.46
2	6.81
3	7.01
4	7.04
5	6.95
6	7.05
7	7.05
8	7.06
9	7.16
>=10	7.3

Case Definition of Diabetes

- *Medication use among patients with at least 2 Diabetes diagnoses*
  - on Hyperglycemic meds Avg A1c – 7.36
  - Never on hyperglycemic meds – 6.23
- *Inpatient Diagnoses*
  - Only Diabetes Dx as inpatient - Avg A1c – 6.6
  - Diabetes Dx as outpatient – 7.18
- *Defining on the basis of elevated A1c*
  - Stacks the deck against having good control since inclusion requires high A1c

Problems with current outcomes measures

- Look only at point-in-time parameters without accounting for change from prior levels
  - What proportion of a panel has parameters below a certain threshold?

- No accounting for patient-level characteristics
  - Need to avoid easy gaming of system
    - If patients with depression are known to be more difficult to care for, and quality measure gives a “bye” to patients with depression, then labeling more patients with depression will alter apparent quality score
  - Need to avoid impression of double standard
    - If patients with depression are found to have systematically worse control, and this characteristic is specifically adjusted in the quality model, then providers of patients with depression with diabetes can seem to provide high quality of care while essentially allowing patients with depression to have worse control

Problems with current outcomes measures

- No accounting for provider effort
  - Need to avoid disingenuous medication prescribing just to look good.

- Unintended consequences of sub-optimal quality measures
  - If higher socioeconomic status predicts better control, then providers of “easy” diabetic patients in the rich suburbs receive P4P bonuses to the exclusion of providers of “hard” diabetic patients in the urban poor community
  - Apparently High ranking (excellent) providers may attract difficult patients for which the provider has little experience.

Other Generic problems

- Where/how to set threshold for quality
  - Are you trying to recognize/remediate poor-performing providers?
  - Are you trying to reward good performance
  - Are there clinically meaningful differences between the highly ranked and lower-ranked providers
  - Panel size issue – can good or poor measures in 1 patient skew the overall quality measure?
  - Criteria should be clinically important, but also have good discriminatory characteristics – if everyone can achieve the goal, it should carry less weight.

A novel solution

- Rather than ranking providers based on the proportion of their panel with good control, create a level of expectation for clinical parameter values and rank providers on the degree to which they are doing better than expectations
  - Even though patients with certain characteristics will have lower expectation of control, this is not a double standard. Maintaining status quo is NOT rewarded. You must improve control to receive quality points
  - Providers of “easy” patients with good control are not labeled as “poor” doctors, but nor are they the “best” doctors. To receive the “best” label, they need to take on some riskier patients and improve control.

Patient selection

- Patients with at least 2 DM diagnoses from 11 Primary Care Clinics
- Visits between 1/1/2006 and 12/31/2007 (n=7705)
- current A1C between 12/06 - 11/07, and current A1C at least 90 days post 2nd DM dx (n=5757)
- last visit data within 1 year of current A1C (n=5631)
- could assign to a primary provider Between 1.5 years prior to current A1c and 90 days prior to current A1c
- Patients of Providers with at least 10 patients in this sample (n=4845)
- Patients seen by 92 providers

Patient Characteristics

- 2685 Female, 2160 Male
- 2457 Black, 2139 White

Race	SEX	AvgOfAGE
ASIAN	F	60.25
ASIAN	M	58.5
BLACK	F	62.1584038694075
BLACK	M	60.2241594022416
OTHER	F	59.3035714285714
OTHER	M	63.3823529411765
UNKNOWN	F	63.92
UNKNOWN	M	62.0416666666667
WHITE	F	66.2603938730853
WHITE	M	64.8302040816327

Patient Characteristics by race and gender

Current A1c

Race	F	M
ASIAN	6.7	6.65
BLACK	7.097702539	7.251307597
OTHER	6.917857143	6.714705882
UNK	6.928	6.6875
WHITE	6.640919037	6.675673469

Current SBP

Race	F	M
ASIAN	127.25	124.4864865
BLACK	131.7883397	132.1460235
OTHER	128.3454545	128.3114754
UNK	127.0952381	125.5909091
WHITE	128.1648616	127.1737944

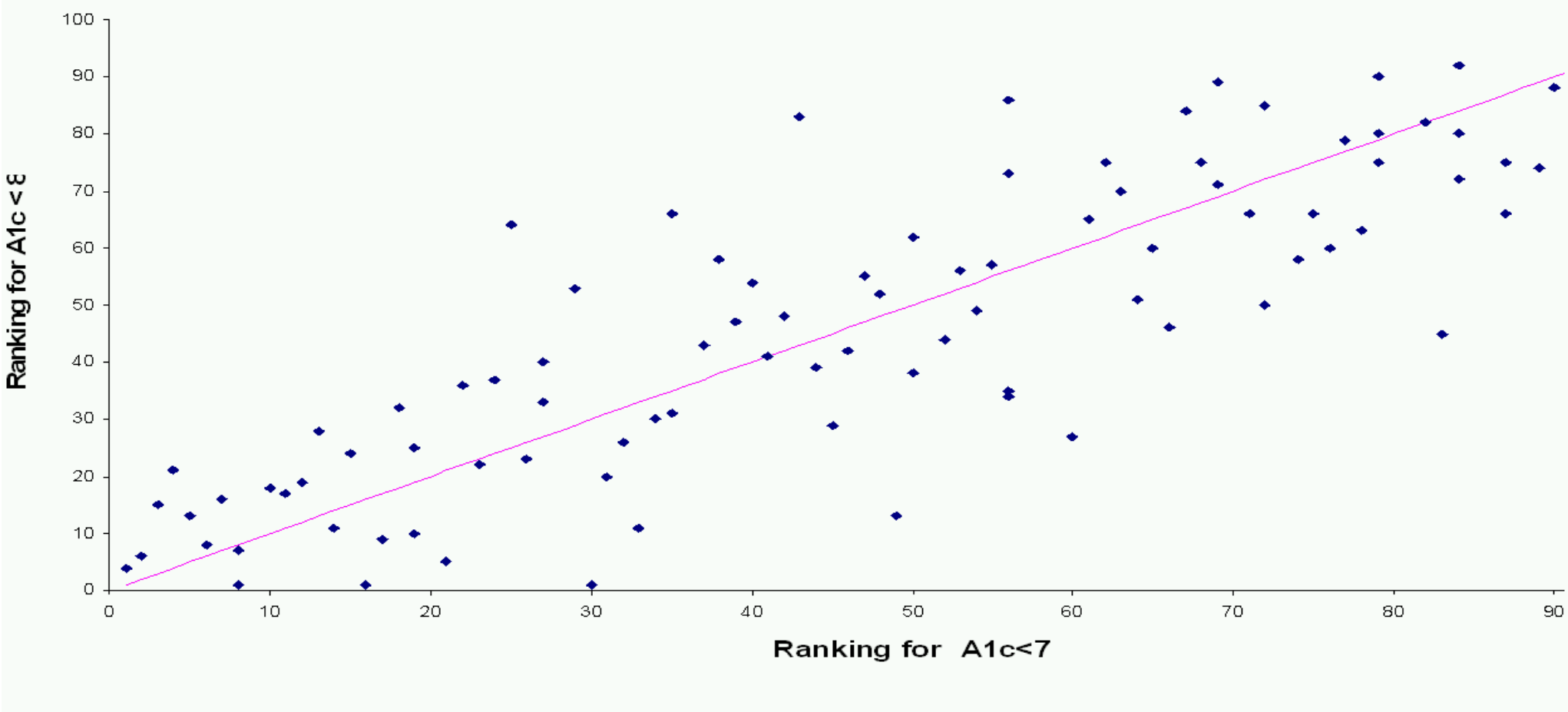
Current LDL

Race	F	M
ASIAN	91.34285714	88.79487179
BLACK	103.4335378	96.09668508
OTHER	95.80357143	77.57575758
UNK	90.22727273	79.52173913
WHITE	89.98124267	80.64211438

Depression and A1c control??

			HBA1c	
Race	**Depression**	**Number**	**Female**	**Male**
ASIAN	Yes	7	6.1	6.9
	No	69	6.775	6.62972973
BLACK	Yes	272	7.075877193	7.284090909
	No	2185	7.101192146	7.249407115
OTHER	Yes	14	6.5	6.85
	No	110	6.9875	6.701612903
WHITE	Yes	194	6.636607143	6.787804878
	No	1945	6.641521197	6.667629046

Comparison of rankings A1c<8 vs A1c <7



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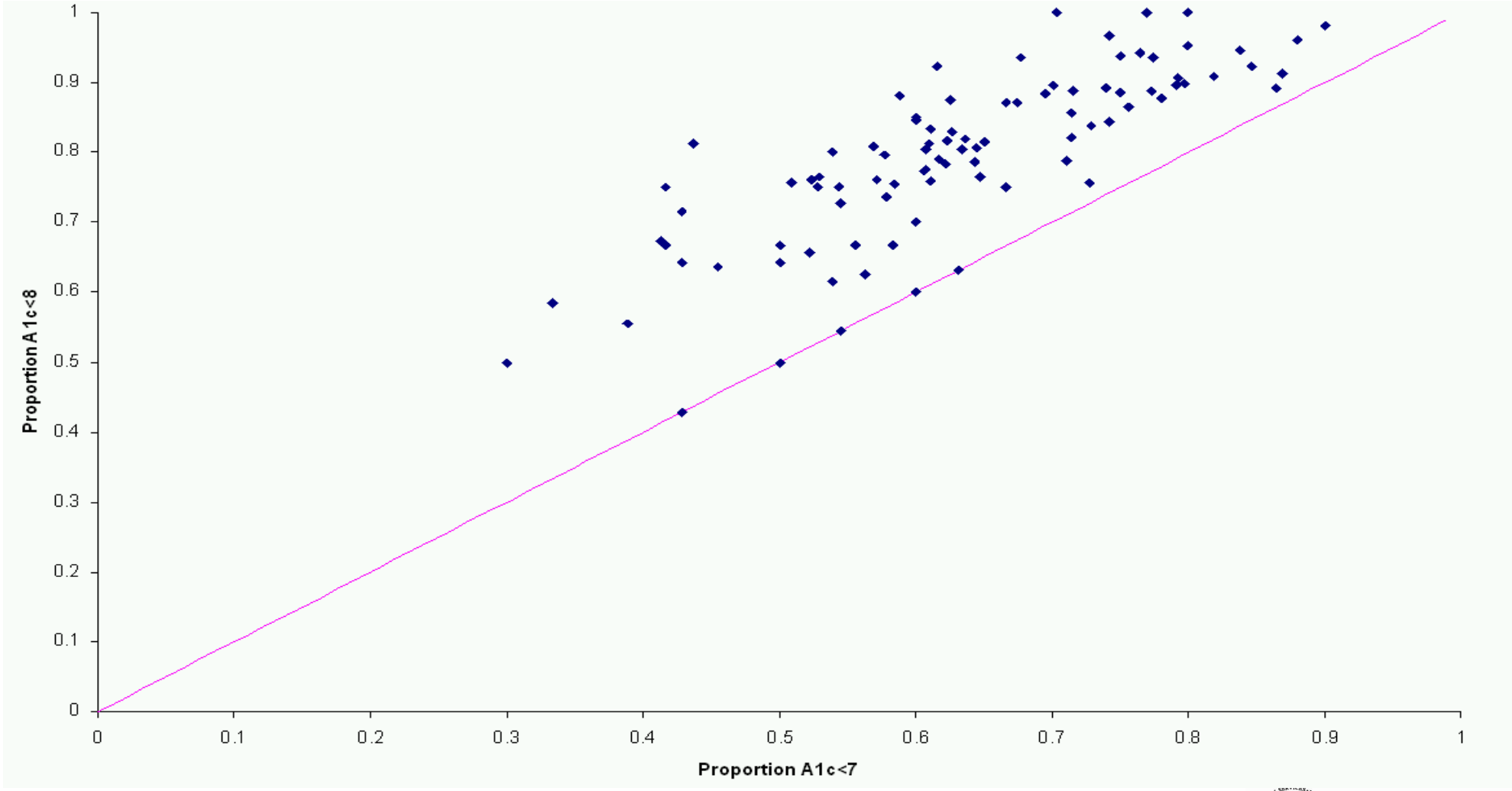
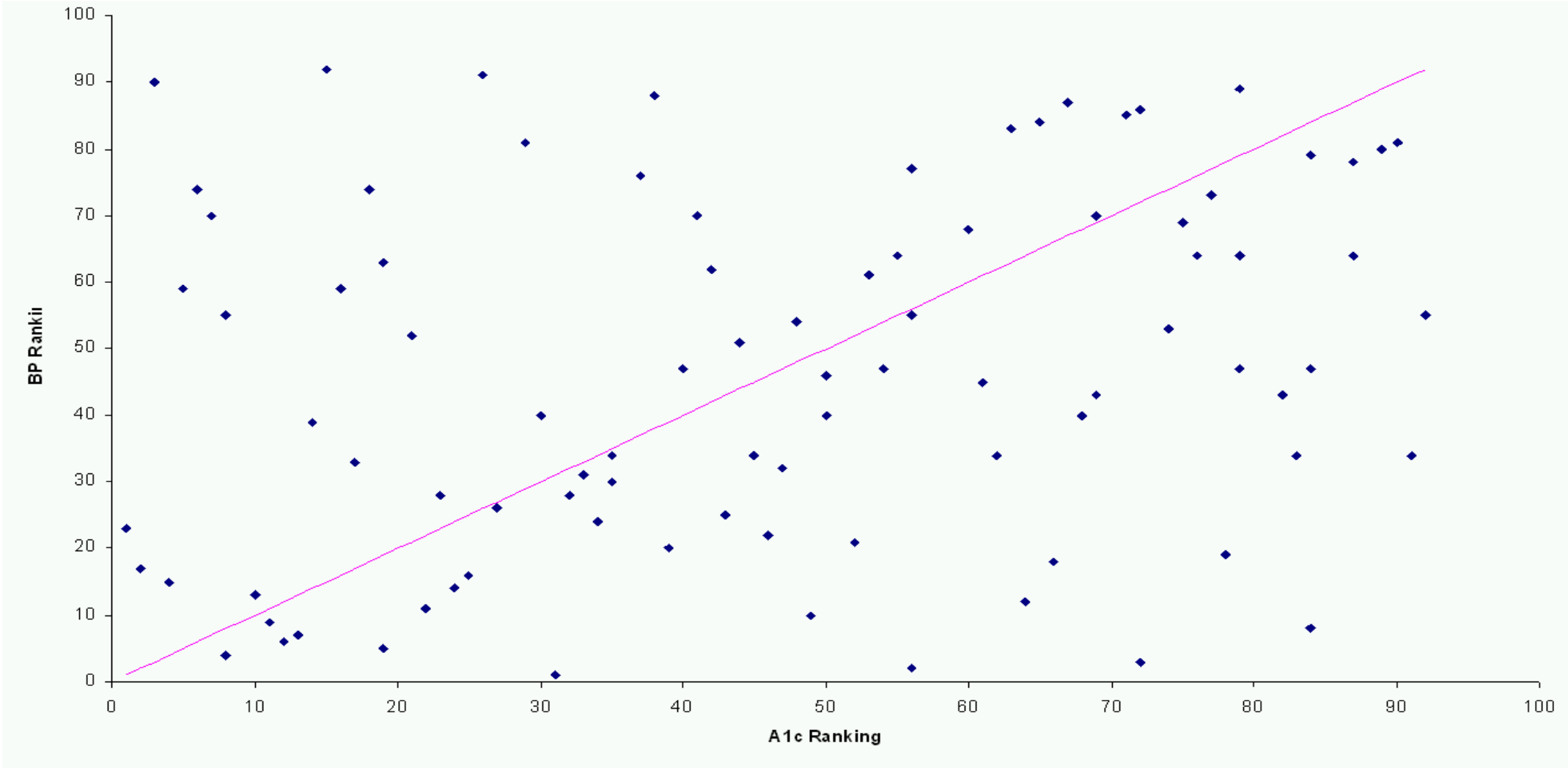
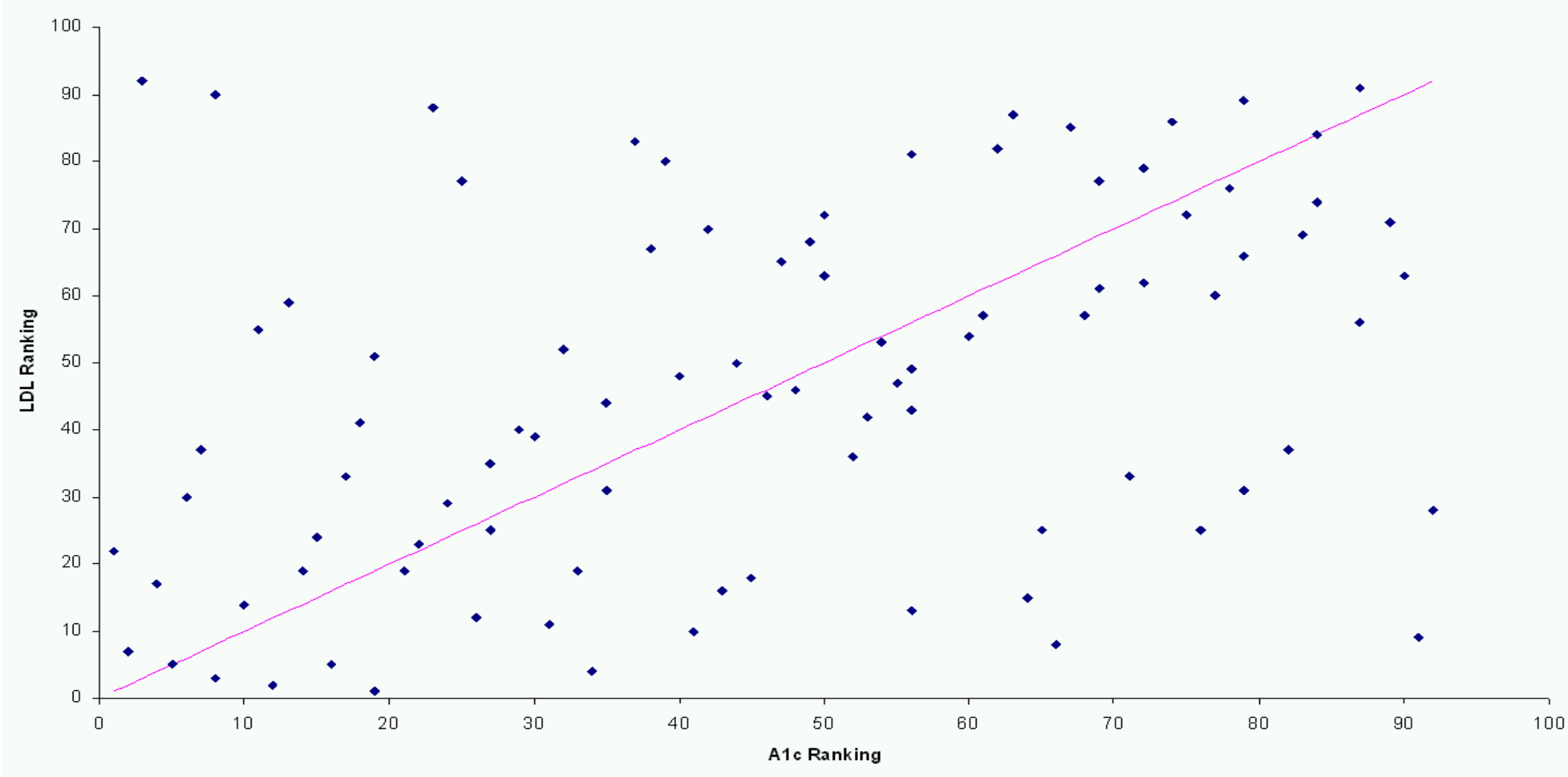


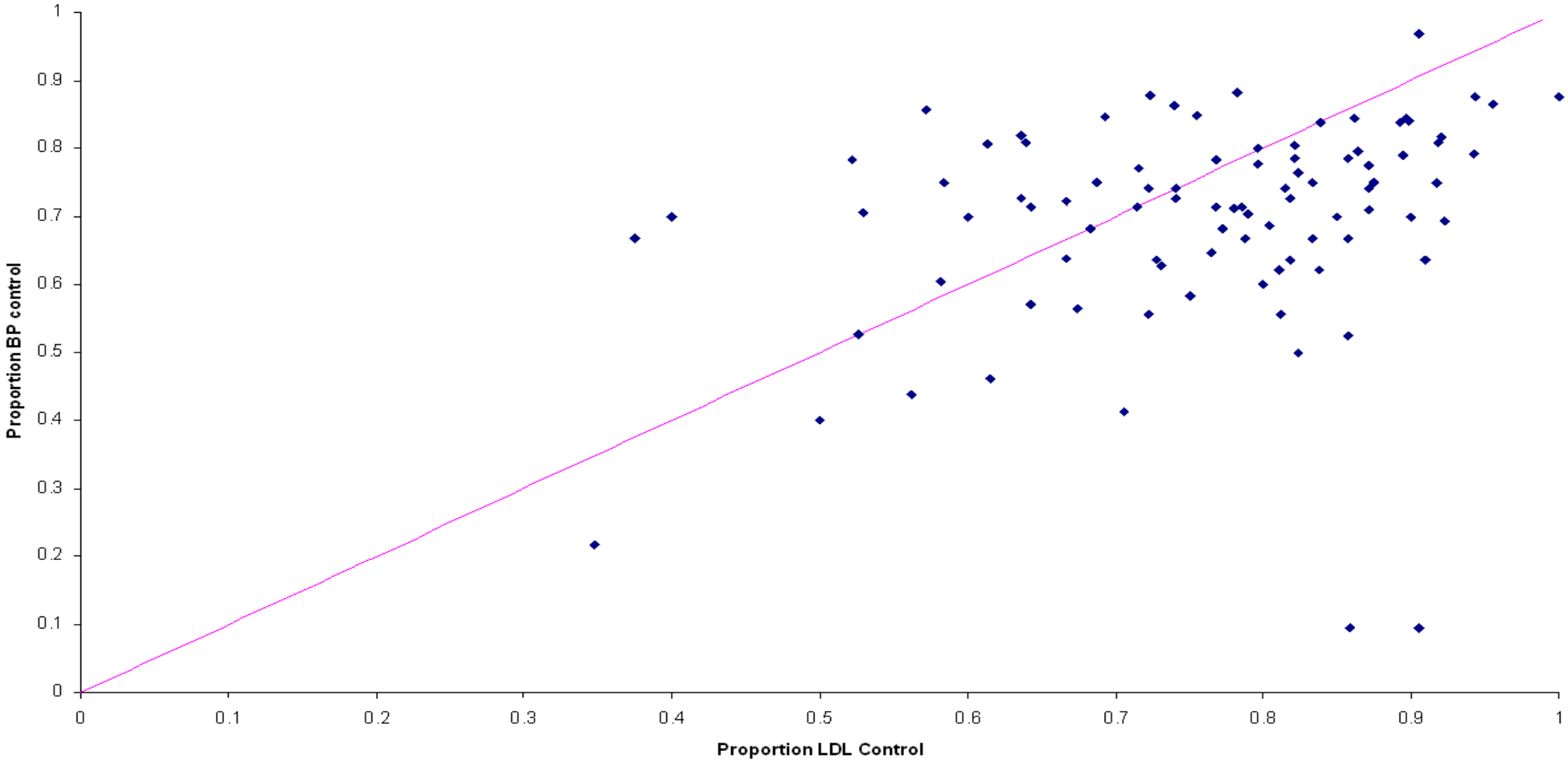
Comparison of rankings A1c<7 vs BP control



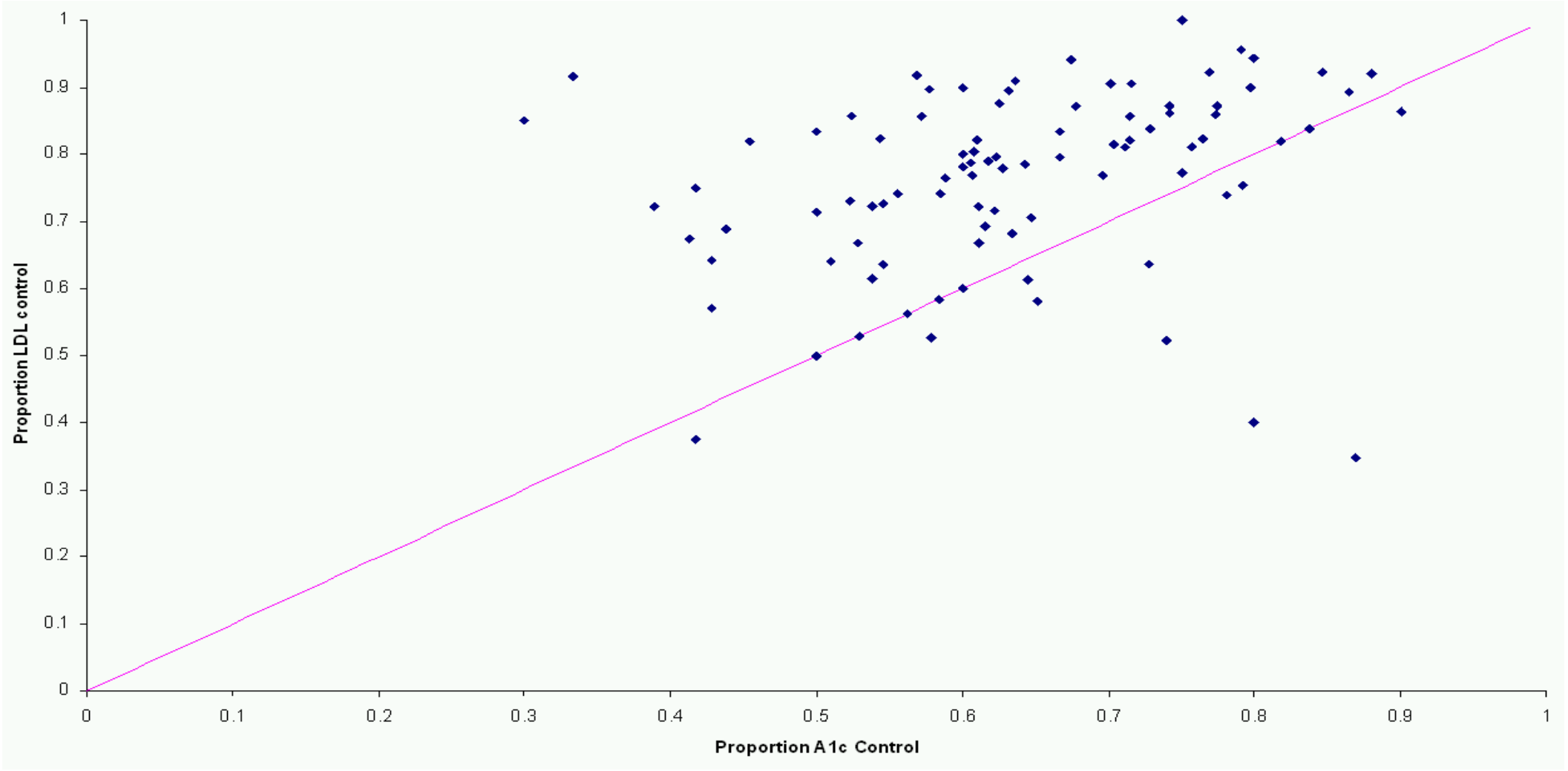
Comparison of rankings A1c<7 vs LDL control



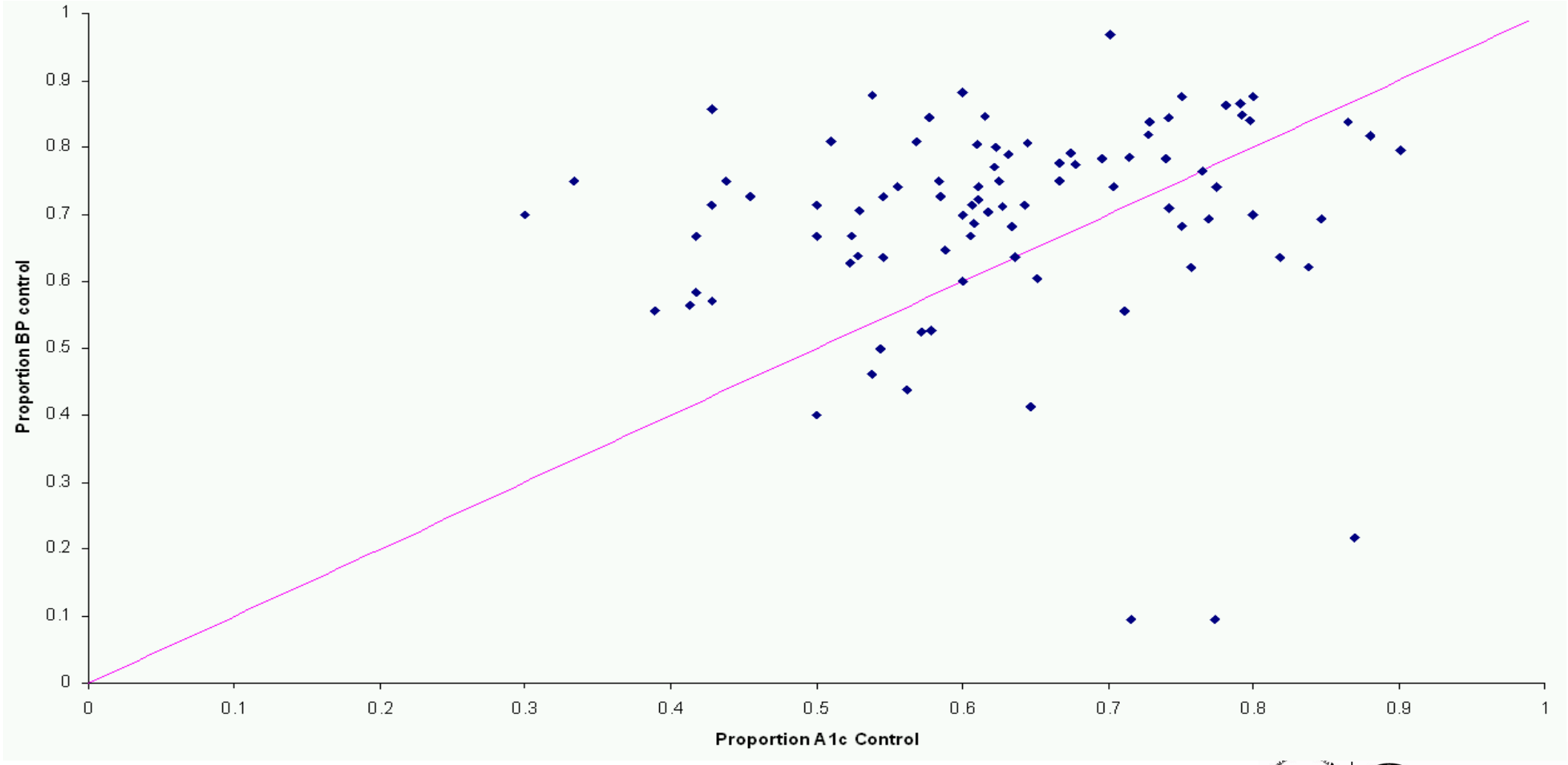
Comparison of proportion in control BP vs LDL



Comparison of proportion in control HBA1c vs LDL



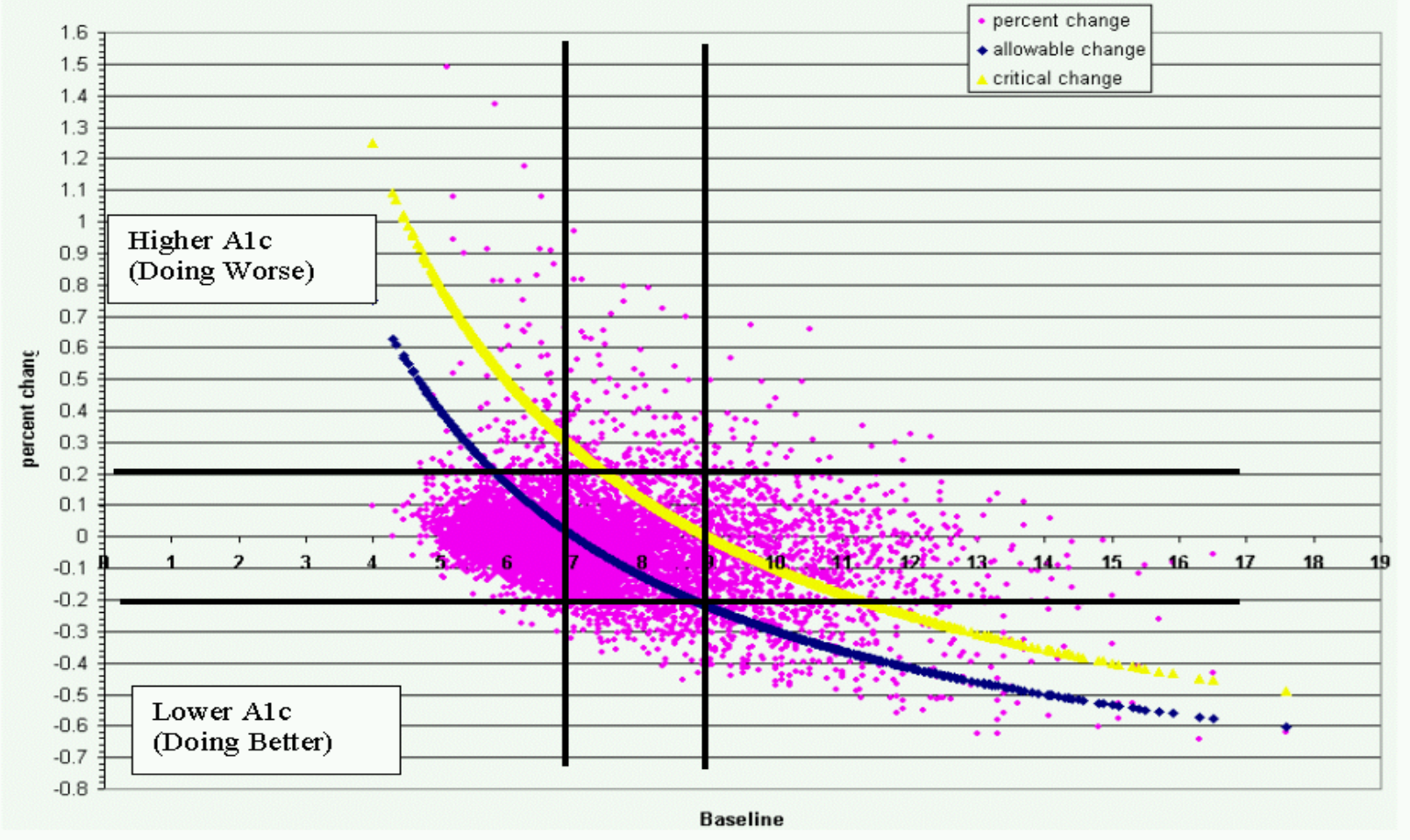
Comparison of proportion with controlled BP vs HBA1c



But those rankings were all based on current unadjusted clinical parameters

- Create a model that predicts current level of control
  - Test the predictive value of the following putative independent variables:
    - Age
    - Race
    - Sex
    - Median family income (race stratified within zip code)
    - Body weight; other vital signs
    - Number of DM diagnoses
    - Individual comorbid diagnosis categories (CCS)
    - Number of comorbid diagnosis categories
    - Types of DM medication classes ever attempted

Patients with different baseline A1c values have different likelihoods of change



>20% better	1%	10%	31%
Within 20% change	**96%**	84%	65%
>20% worse	3%	6%	4%

Perhaps not surprisingly

- The single biggest predictor of current A1c is Average Prior A1c
  - Is the average prior A1c an integrative parameter that represents all the clinical an behavioral issues of a patient that impact current diabetes control?

    OR
  - Do patients with poor prior A1c cluster within panels of poor quality doctors

- Other predictors
  - age, pulse, income, use of diabetes drugs
  - No diagnosis category made the cut

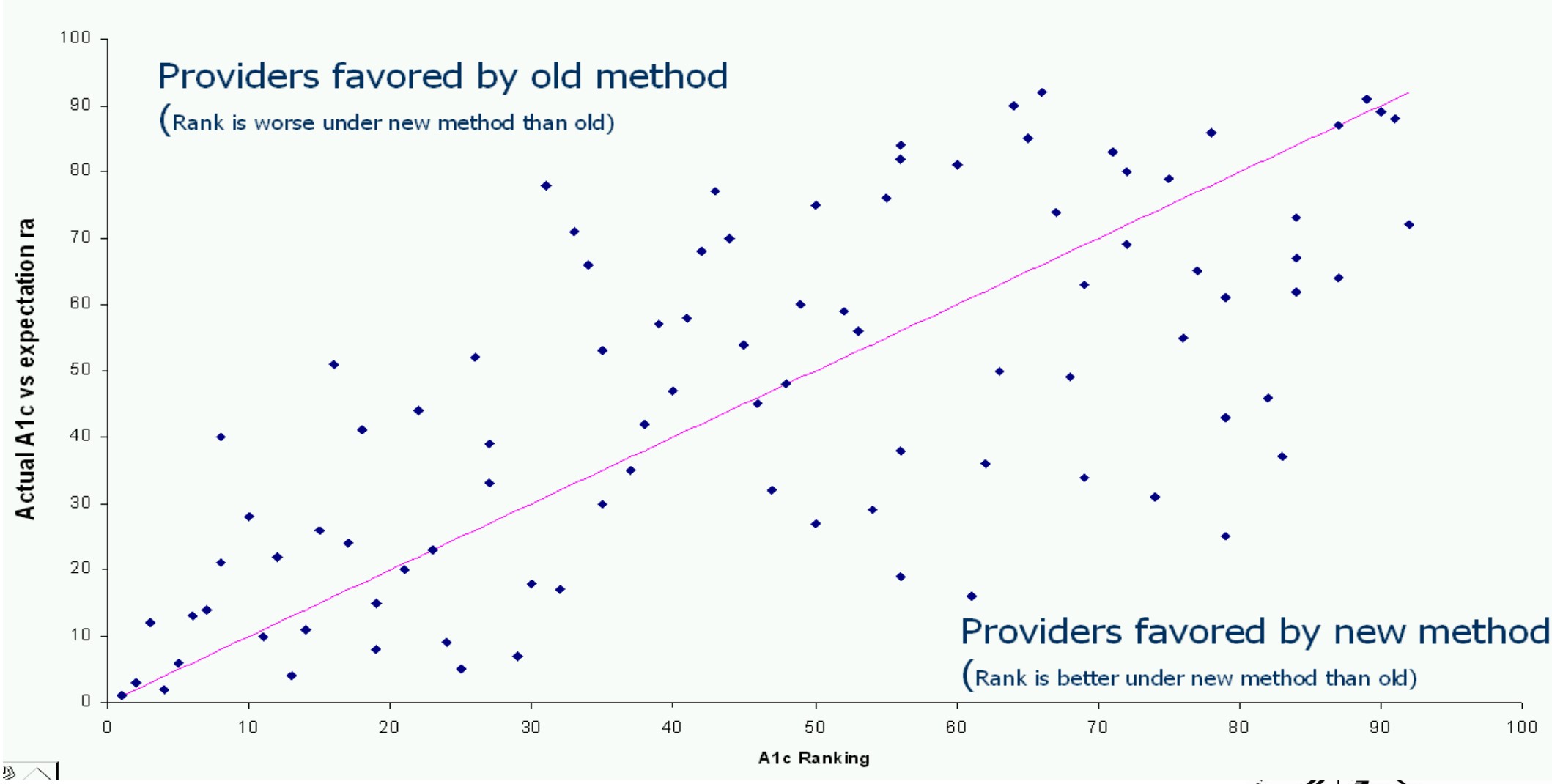
Analysis

- For each patient, calculate an expected A1c based on : prior A1c, age, pulse, income, and indicators for the use of insulin, insulin sensitizing agents, and sulfonylureas

- Sum the residuals with respect to actual values

- Rank the providers based on the sum of the residuals

Comparison of new method with old method



New Method: Better or just different?

- Better
  - Incorporates longitudinal aspects of diabetes management
  - Values improvement in HBA1c, even when HbA1c does not achieve usual threshold
  - Recognizes that sustaining HBA1c < 7 is clinically important, but relatively common across all providers who have well-controlled patients, so the new method values this achievement less
  - Incorporates all patients, regardless of comorbidity. Makes no assumptions about associations between measurable or unmeasurable confounders and HBA1c.

New Method: Better or just different?

- Unresolved
  - May over-value large improvements for individuals over more modest improvements in more patients
  - Confidence intervals around expected HbA1c values mean that most providers except the highest and lowest ranked are statistically indistinguishable
  - Needs better adjustment for panel size.
  - Requires addressing of patients with no HbA1c
  - Attribution to correct provider is difficult
    - Effort to assign patients to responsible provider should be an independent quality measure
  - Dealing with patients not seen in the past year
    - Active assessment of patient affiliation with clinic should be an independent quality measure

Implications

- Providers who succeed in moving patients from poor control to better control will be ranked highly
- However, once success is achieved, rank will drop if panel remains constant
- Only way to sustain high ranking is to take on, and succeed with new poorly controlled patients.

Your thoughts and questions!

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