Electronic Health Records and Treatment Plans – Multiple Opportunities

Institute of Medicine

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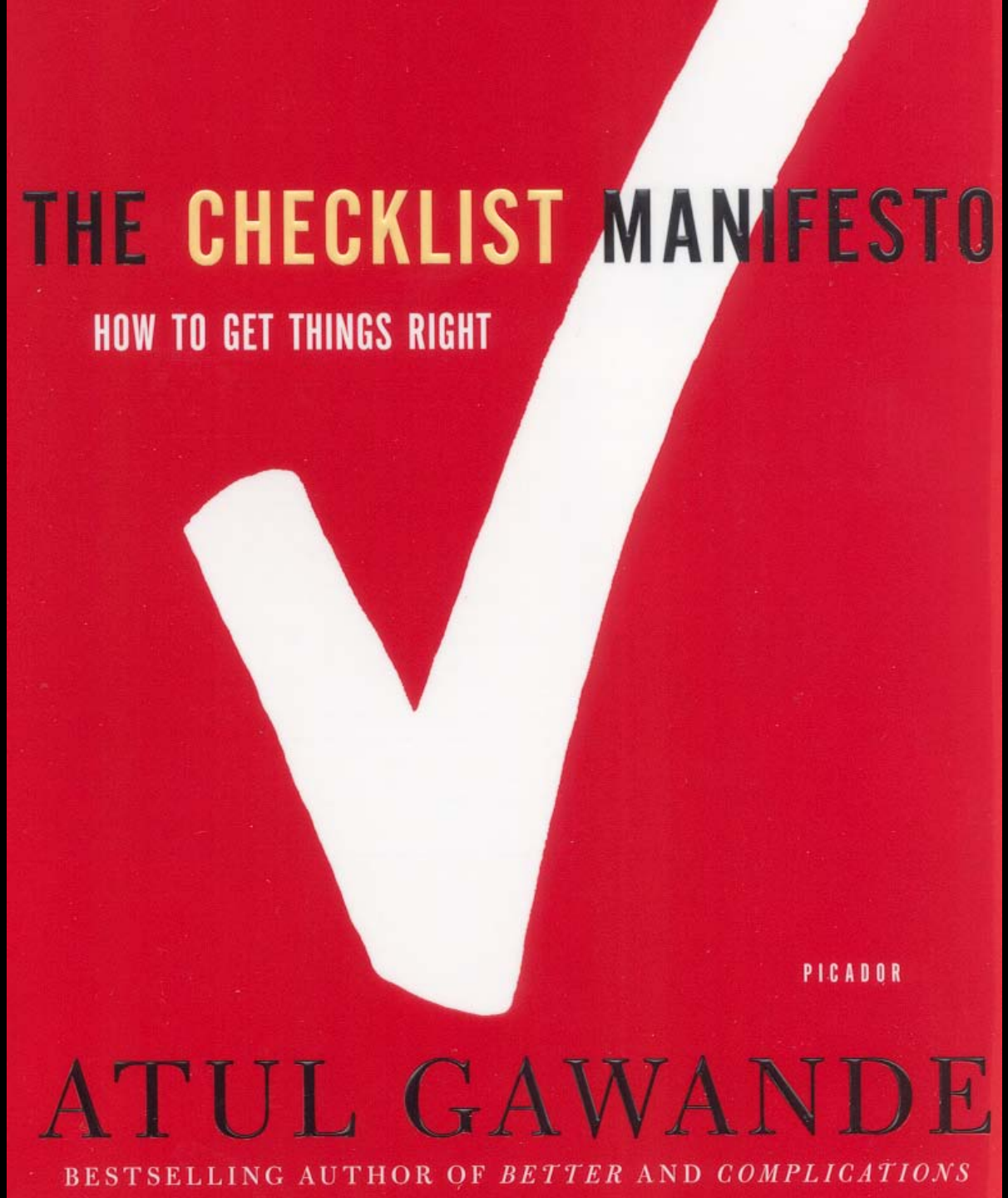
Some personal thoughts:

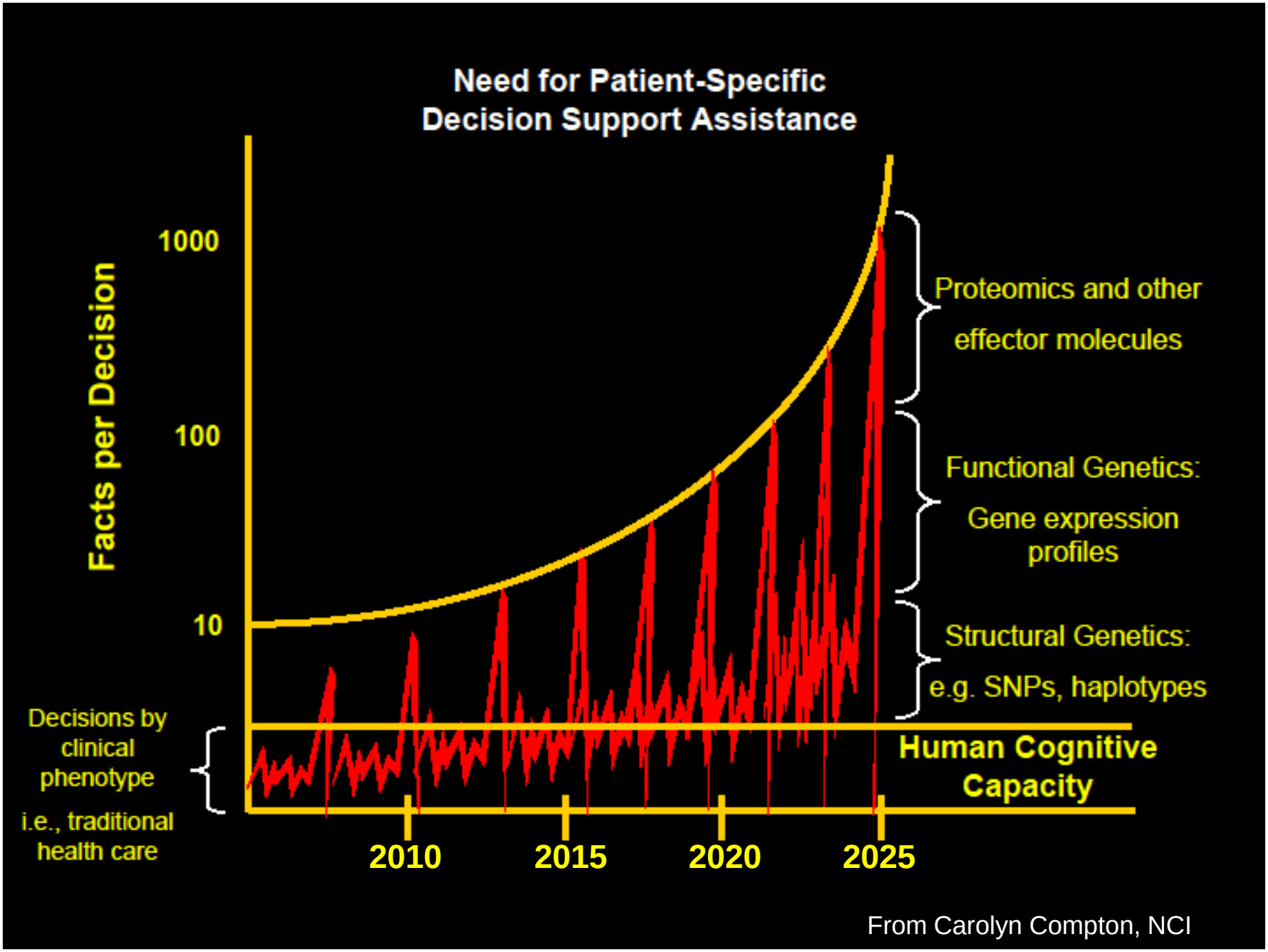
- Treatment plans have been endorsed for some time, but implementation has been minimal
- Implementation has been minimal because of the incremental work without a clear benefit perceived by many providers
- Manual processes will always be a deterrent to implementation of treatment plans
- Electronic health records can improve safety, quality and efficiency of cancer care
- EHRs can facilitate the use of treatment plans both increasing ease of use, and accuracy and completeness

Why Treatment Plans???

“Medicine has become the art of managing extreme complexity – and a test of whether such complexity can, in fact, be humanly mastered.”



“There are degrees of complexity, though, and medicine and other fields like it have grown so far beyond the usual kind that avoiding daily mistakes is proving impossible even for our most super-specialized.”


Need for Patient-Specific
Decision Support Assistance
Facts per Decision
1000
100
10
Proteomics and other
effector molecules
Functional Genetics:
Gene expression
profiles
Structural Genetics:
e.g. SNPs, haplotypes
Decisions by
clinical
phenotype
i.e., traditional
health care
Human Cognitive
Capacity
2010
2015
2020
2025
From Carolyn Compton, NCI

The Treatment Plan

- A form of “Checklist” – listing and codifying data needed to make a treatment decision, putting them down in a logical and complete document

- Resistance by providers
  - “Not necessary – unneeded extra work burden”
  - “I know what I am doing”
  - “I know what my intent is”
  - “I tell my patients what they need to know”
  - etc

The Reality of our Work Lives

- There are more data that we must process when making clinical decisions, than we sometimes admit to, and the amount of data is increasing rapidly
- We are continually distracted in our work – by calls about other patients, other non-clinical issues, etc
- We work under ever increasing time pressure and stress
- We work in a field where infrequent errors with potential to harm patients are too frequent – the airline phenomenon
  - 132,000 treatment visits at DFCI per year (enterprise wide)
  - If “accurate” 99.99% of time,
  - 132 errors per year will occur

Treatment Plans

- Treatment plans represent a critical decision point in initiating a new direction in therapy for a patient
- Treatment plans represent an aggregate of critical clinical data, at a particular time point in a patient's course, that should already be in an oncology EHR, but not necessarily well organized
- These data should help to guide a provider through a thought process for making the best treatment decision
- ….and would help to articulate this to the patient, facilitate an interactive exchange between provider and patients, and give the patient a written copy to take home with her

Components of a Treatment Plan

- Critical clinical data, organized in one location, and presented in a coherent way
- Goals of treatment
- Specifics of treatment

How can EHRs Help?

- Specify data that are required to be part of the treatment plan
- Automatically pull data from elsewhere in an EHR, where it exists, entering it into the Treatment Plan, avoiding manual re-entry – and avoiding errors of omission, transcription, etc
- Automatically saves treatment plan, and allows you to print it for the patient. "cc's" are also sent to associated providers
- Act as a "force function" – could be required to initiate a new therapy
  - Either in workflow – "no treatment plan, no treat"
  - IT enforced – treatment plan needs to be completed before the system will allow you to order a new chemotherapy regimen

Certification Commission for Health Information Technology (CCHIT)

- One of the government sanctioned groups to certify EHRs for Meaningful Use
- A long hx of comprehensive certification of EHRs
  - Security
  - Functionality
  - Usability
- Certification “modules”
  - Ambulatory
  - Other specialties (cardiology, mental health)
  - Clinical research
- In December 2008 ASCO and NCI petitioned CCHIT to develop oncology specific criteria
- In July 2010 an oncology work group was initiated to develop oncology specific criteria, and in November 2010 proposed criteria were posted for public comment. Final criteria are likely to be released in late Spring 2011

Certification Commission for Health Information Technology (CCHIT) – Some Basic Principles

- Essential data must be entered into the EHR, and be structured (codified) data
- Codified data permits decision support, safety functions and utilization of data for derivative “products” such as the treatment plan
- Clinic workflow and EHR must be “in synch” and support each other

CCHIT Treatment Plan Requirements DRAFT from Public Comments Period

"The system shall provide the ability to generate electronic output and/or printed copy of the treatment plan for each patient, including:"

CCHIT Treatment Plan Requirements
DRAFT from Public Comments Period

1. Patient name
2. Patient record number
3. Date of birth and age
4. Patient phone and email
5. Physician name and contact information
6. Problem list
7. Allergies
8. Medication list
9. Advanced directives
10. AJCC staging including anatomic and non-anatomic data, prognostic data, location of metastatic disease if applicable
11. Height, weight, BSA, AUC (if applicable)
12. Treatment intent (curative vs palliative)
13. Name of chemotherapy regimen (R-CHOP)
14. Specific chemotherapy drug names, doses and schedule
15. Number of treatment cycles
16. Estimated duration of therapy
17. Major toxicities (short and long-term – may be manually added or pulled from resource data based on chemotherapy drugs
18. Radiation therapy plan (if applicable)

CCHIT Treatment Plan Requirements DRAFT from Public Comments Period

"For any treatment plan generated for a patient at the initiation of a course of treatment, the system shall provide the ability to save each plan"

"A new treatment plan must be completed at the initiation of each new therapy"

ASCO Health Information Technology (HIT) Workgroup

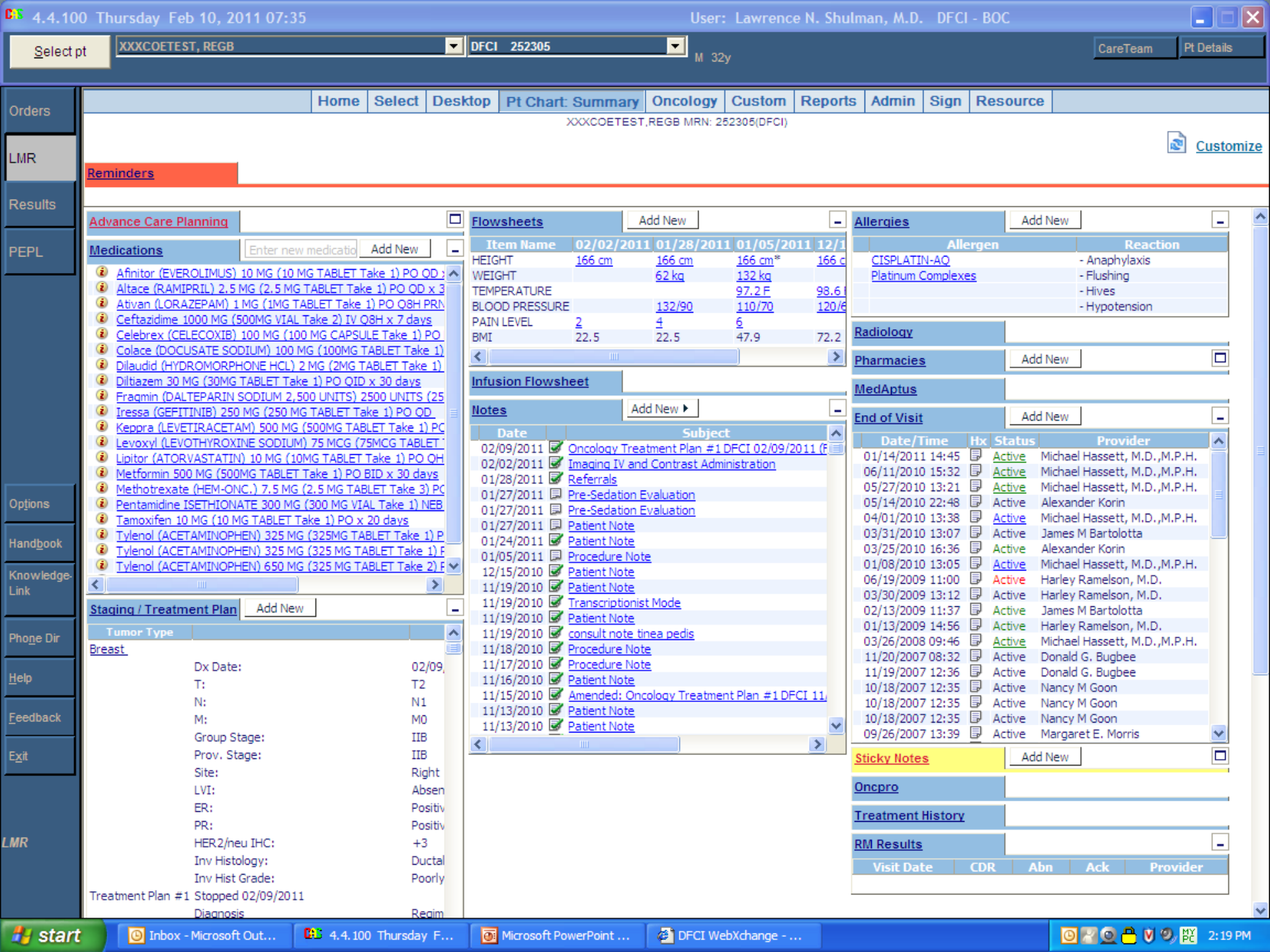
- Vendor lab at annual mtgs
  - "Ticket" of basic functionality to get into lab
  - ASCO's attempt to drive direction of EHR development – treatment summaries, QOPI reporting, etc
  - Gives attendees a chance to see many vendor products at once
- Symposium in 2007 & 2009 and again in 2011

What else might a treatment plan embedded in an EHR do?

- Auto-generate patient teaching sheets specific to the drugs outlined in the treatment plan
- Auto-generate a patient consent specific to the drugs outlined in the treatment plan
- Serve as an “auto-fill” for the creation of a post-treatment summary care plan

Dana-Farber's Approach

- This is a work in progress – initially focused on providers and not patients, but will focus on patients in phase II
- We believe the success of this effort will be dependent on eliminating duplicative efforts – enter something just once
- We believe we will end up needing a "force function" for full implementation
- This is currently part of our Pay for Performance work with BCBSMA
  - To improve quality and reduce errors
  - To allow for proactive management of patients by nurse navigators


4.4.100 Thursday Feb 10, 2011 07:35
User: Lawrence N. Shulman, M.D. DFCI - BOC
Select pt
XXXCOETEST, REGB
DFCI 252305
M 32y
CareTeam
Pt Details
Orders
LMR
Results
PEPL
Options
Handbook
Knowledge-Link
Phone Dir
Help
Feedback
Exit
LMR
Home
Select
Desktop
Pt Chart: Summary
Oncology
Custom
Reports
Admin
Sign
Resource
XXXCOETEST,REGB MRN: 252305(DFCI)
Customize
Reminders
Advance Care Planning
Medications
Enter new medicatio
Add New
Afinitor (EVEROLIMUS) 10 MG (10 MG TABLET Take 1) PO QD
Altace (RAMIPRIL) 2.5 MG (2.5 MG TABLET Take 1) PO QD x 3
Ativan (LORAZEPAM) 1 MG (1MG TABLET Take 1) PO Q8H PRN
Ceftazidime 1000 MG (500MG VIAL Take 2) IV Q8H x 7 days
Celebrex (CELECOXIB) 100 MG (100 MG CAPSULE Take 1) PO
Colace (DOCUSATE SODIUM) 100 MG (100MG TABLET Take 1)
Dilaudid (HYDROMORPHONE HCL) 2 MG (2MG TABLET Take 1)
Diltiazem 30 MG (30MG TABLET Take 1) PO QID x 30 days
Fragmin (DALTEPARIN SODIUM 2,500 UNITS) 2500 UNITS (25
Iressa (GEFITINIB) 250 MG (250 MG TABLET Take 1) PO QD
Keppra (LEVETIRACETAM) 500 MG (500MG TABLET Take 1) PO
Levoxyl (LEVOTHYROXINE SODIUM) 75 MCG (75MCG TABLET
Lipitor (ATORVASTATIN) 10 MG (10MG TABLET Take 1) PO QH
Metformin 500 MG (500MG TABLET Take 1) PO BID x 30 days
Methotrexate (HEM-ONC.) 7.5 MG (2.5 MG TABLET Take 3) PO
Pentamidine ISETHIONATE 300 MG (300 MG VIAL Take 1) NEB
Tamoxifen 10 MG (10 MG TABLET Take 1) PO x 20 days
Tylenol (ACETAMINOPHEN) 325 MG (325MG TABLET Take 1) P
Tylenol (ACETAMINOPHEN) 325 MG (325 MG TABLET Take 1) P
Tylenol (ACETAMINOPHEN) 650 MG (325 MG TABLET Take 2) P
Staging / Treatment Plan
Add New
Tumor Type
Breast
Dx Date: 02/09
T: T2
N: N1
M: M0
Group Stage: IIB
Prov. Stage: IIB
Site: Right
LVI: Absen
ER: Positiv
PR: Positiv
HER2/neu IHC: +3
Inv Histology: Ductal
Inv Hist Grade: Poorly
Treatment Plan #1 Stopped 02/09/2011
Diagnosis Regim
Flowsheets
Add New
Item Name 02/02/2011 01/28/2011 01/05/2011 12/1
HEIGHT 166 cm 166 cm 166 cm* 166 c
WEIGHT 62 kg 132 kg
TEMPERATURE 97.2 F 98.6
BLOOD PRESSURE 132/90 110/70 120/6
PAIN LEVEL 2 4 6
BMI 22.5 22.5 47.9 72.2
Infusion Flowsheet
Notes
Add New
Date Subject
02/09/2011 Oncology Treatment Plan #1 DFCI 02/09/2011 (F
02/02/2011 Imaging IV and Contrast Administration
01/28/2011 Referrals
01/27/2011 Pre-Sedation Evaluation
01/27/2011 Pre-Sedation Evaluation
01/27/2011 Patient Note
01/24/2011 Patient Note
01/05/2011 Procedure Note
12/15/2010 Patient Note
11/19/2010 Patient Note
11/19/2010 Transcriptionist Mode
11/19/2010 Patient Note
11/19/2010 consult note tinea pedis
11/18/2010 Procedure Note
11/17/2010 Procedure Note
11/16/2010 Patient Note
11/15/2010 Amended: Oncology Treatment Plan #1 DFCI 11
11/13/2010 Patient Note
11/13/2010 Patient Note
Allergies
Add New
Allergen Reaction
CISPLATIN-AQ - Anaphylaxis
Platinum Complexes - Flushing
- Hives
- Hypotension
Radiology
Pharmacies
Add New
MedAptus
End of Visit
Add New
Date/Time Hx Status Provider
01/14/2011 14:45 Active Michael Hassett, M.D.,M.P.H.
06/11/2010 15:32 Active Michael Hassett, M.D.,M.P.H.
05/27/2010 13:21 Active Michael Hassett, M.D.,M.P.H.
05/14/2010 22:48 Active Alexander Korin
04/01/2010 13:38 Active Michael Hassett, M.D.,M.P.H.
03/31/2010 13:07 Active James M Bartolotta
03/25/2010 16:36 Active Alexander Korin
01/08/2010 13:05 Active Michael Hassett, M.D.,M.P.H.
06/19/2009 11:00 Active Harley Ramelson, M.D.
03/30/2009 13:12 Active Harley Ramelson, M.D.
02/13/2009 11:37 Active James M Bartolotta
01/13/2009 14:56 Active Harley Ramelson, M.D.
03/26/2008 09:46 Active Michael Hassett, M.D.,M.P.H.
11/20/2007 08:32 Active Donald G. Bugbee
11/19/2007 12:36 Active Donald G. Bugbee
10/18/2007 12:35 Active Nancy M Goon
10/18/2007 12:35 Active Nancy M Goon
10/18/2007 12:35 Active Nancy M Goon
09/26/2007 13:39 Active Margaret E. Morris
Sticky Notes
Add New
Oncpro
Treatment History
RM Results
Visit Date CDR Abn Ack Provider
start
Inbox - Microsoft Out...
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Microsoft PowerPoint ...
DFCI WebXchange - ...
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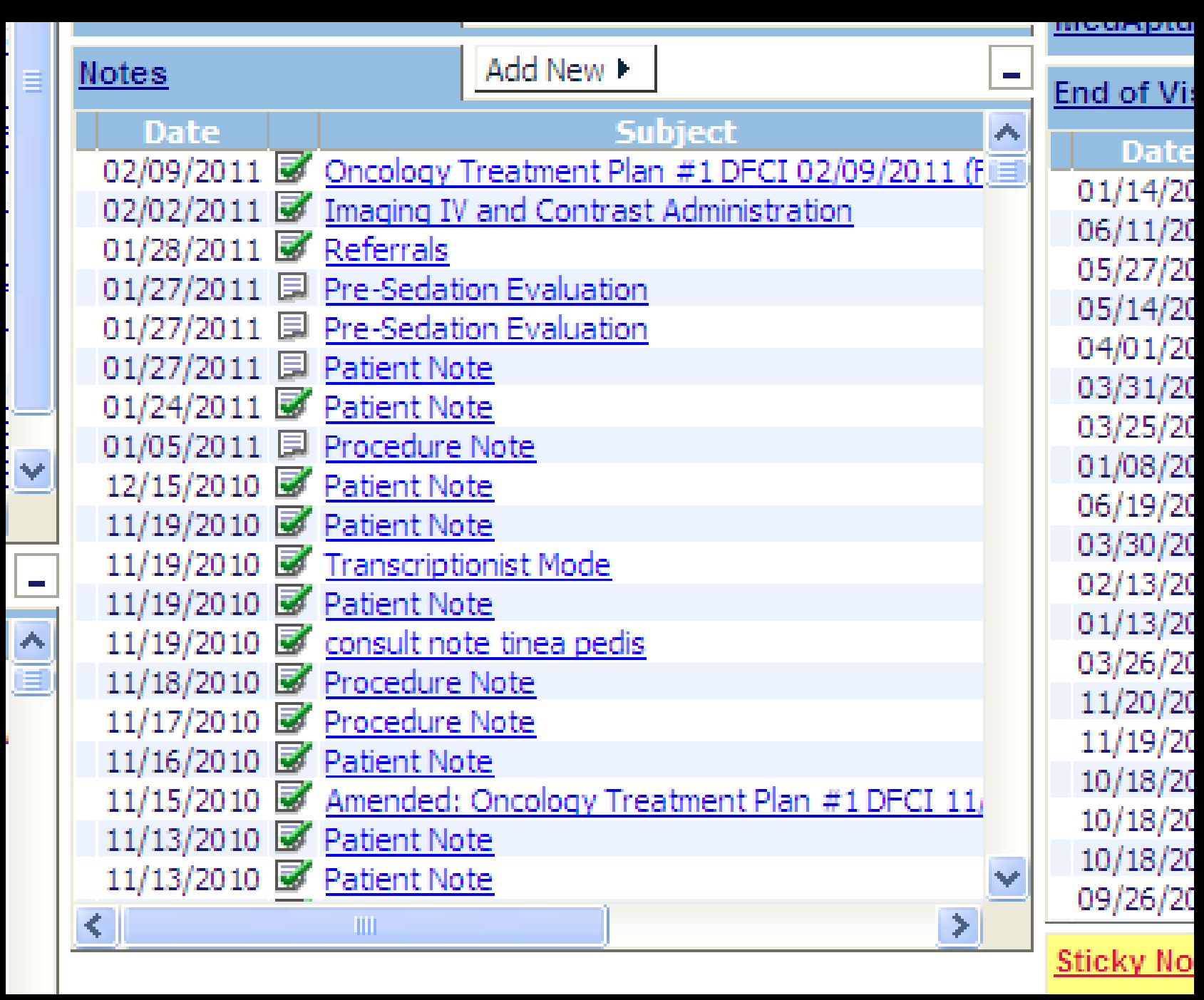
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Add New
Date
Subject
02/09/2011 Oncology Treatment Plan #1 DFCI 02/09/2011
02/02/2011 Imaging IV and Contrast Administration
01/28/2011 Referrals
01/27/2011 Pre-Sedation Evaluation
01/27/2011 Pre-Sedation Evaluation
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11/17/2010 Procedure Note
11/16/2010 Patient Note
11/15/2010 Amended: Oncology Treatment Plan #1 DFCI 11/
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Date
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02/13/20
01/13/20
03/26/20
11/20/20
11/19/20
10/18/20
10/18/20
10/18/20
09/26/20
Sticky No

XXXCOETEST,REGB MRN: 252305(DFCI)

Subject: Amended: Oncology Treatment Plan #2 DFCI 02/11/2011 (Stopped)

Patient: XXXCOETEST,REGB 252305(DFCI) 12/01/78 **Status:** Signed

Author: Electronically Signed by Lawrence N. Shulman, M.D. **Visit Date:** 02/11/2011

- - BOC - Notes Module

Header

Breast Cancer

Problems
Pernicious anemia
Low back pain
Von Willebrand disorder
Borderline Hypertension
FH Polyp Of Colon:
Comment: Type: Chronic

Medications
Colace (DOCUSATE Sodium) 100 MG (100MG TABLET Take 1) PO TID PRN constipation x 30 days #90 Tablet(s)
Dilaudid (HYDROMORPHONE Hcl) 2 MG (2MG TABLET Take 1) PO Q4H x 30 days #180 Tablet(s)
Diltiazem 30 MG (30MG TABLET Take 1) PO QID x 30 days #120 Tablet(s)
Fragmin (DALTEPARIN Sodium 2,500 Units) 2500 UNITS (2500/0.2ML DISP SYRIN ML) SC QD x 30 days #30 Pre-filled Syringe(s)

Allergies
CISPLATIN-AQ - Anaphylaxis

Breast Cancer

Staging
Dx Date (Pre Therapy): 02/09/2011
T: T2
N: N1
M: M0
Group Stage: IIB
Prov. Stage: IIB
Site: Right
LVI: Absent

Other Tumor Characteristics

Cancel | History | CC List | E-mail | Cl.Message | Addendum | Copy | Error | Reviewed

Breast Cancer

Problems
Pernicious anemia
Low back pain
Von Willebrand disorder
Borderline Hypertension
FH Polyp Of Colon:
Comment: Type: Chronic

Medications
Colace (DOCUSATE Sodium) 100 MG (100MG TABLET Take 1) PO TID PRN constipation x 30 days #90 Tablet(s)
Dilaudid (HYDROMORPHONE Hcl) 2 MG (2MG TABLET Take 1) PO Q4H x 30 days #180 Tablet(s)
Diltiazem 30 MG (30MG TABLET Take 1) PO QID x 30 days #120 Tablet(s)
Fragmin (DALTEPARIN Sodium 2,500 Units) 2500 UNITS (2500/0.2ML DISP SYRIN ML) SC QD x 30 days #30 Pre-filled Syringe(s)

Allergies
CISPLATIN-AQ - Anaphylaxis

Breast Cancer

Staging
Dx Date (Pre Therapy): 02/09/2011
T: T2
N: N1
M: M0
Group Stage: IIB
Prov. Stage: IIB
Site: Right
LVI: Absent

Other Tumor Characteristics

Breast Cancer

Staging
- Dx Date (Pre Therapy): 02/09/2011
- T: T2
- N: N1
- M: M0
- Group Stage: IIB
- Prov. Stage: IIB
- Site: Right
- LVI: Absent

Other Tumor Characteristics
- ER: Positive
- PR: Positive
- HER2/neu IHC: +3
- HER2/neu FISH: Positive

Histology Grade
- Inv Histology: Ductal
- Inv Hist Grade: Poorly Diff (grade 3)

Treatment Plan #2 (Stopped)

Regimen
- Goal of Treatment / Indication: Curative / Adjuvant / Neo-adjuvant;
- Diagnosis: Breast
- Regimen: AC EVERY 2 WEEKS/PACLITAXEL EVERY 2 WEEKS
- Chemo Med:

CYCLOPHOSPHAMIDE (600 mg/m2) IV BOLUS Daily Days: 1 x 4 cycles
DOXORUBICIN (60 mg/m2) IV PUSH Daily Days: 1 x 4 cycles

PACLITAXEL (TAXOL) (175 mg/m2) IV BOLUS Daily Days: 1 x 4 cycles

Header

Regimen

Goal of Treatment / Indication: Curative / Adjuvant / Neo-adjuvant;
Diagnosis: Breast
Regimen: AC EVERY 2 WEEKS/PACLITAXEL EVERY 2 WEEKS
Chemo Med:

CYCLOPHOSPHAMIDE (600 mg/m2) IV BOLUS Daily Days: 1 x 4 cycles
DOXORUBICIN (60 mg/m2) IV PUSH Daily Days: 1 x 4 cycles

PACLITAXEL (TAXOL) (175 mg/m2) IV BOLUS Daily Days: 1 x 4 cycles

Risk / Side Effects:
neutropenia and fever
allopecia
neuropathy
;

Additional Information

Planned Growth Factor: Pegfilgrastim;

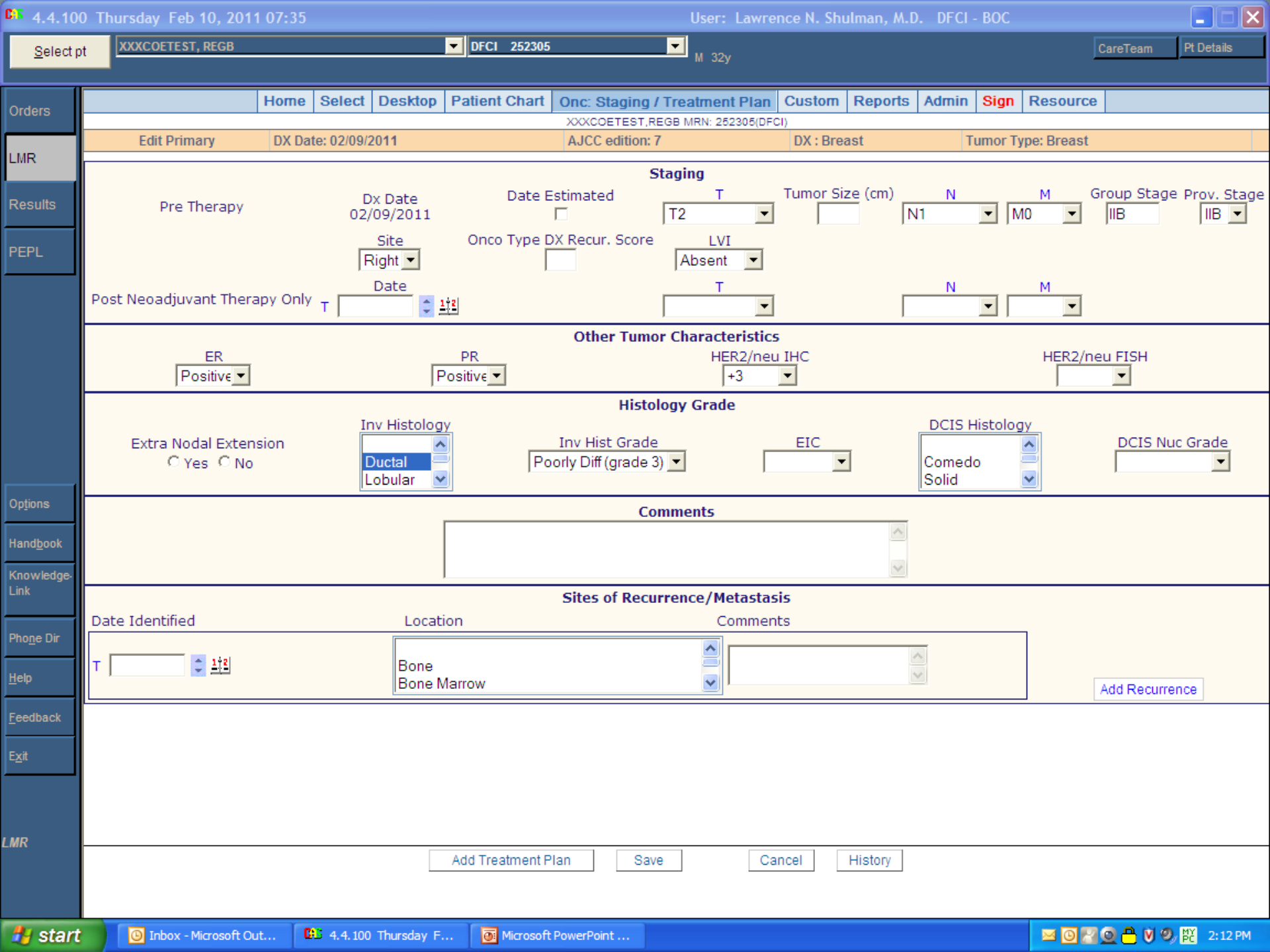
Active Concurrent Oral Chemotherapy:
Tamoxifen 10 MG (10 MG TABLET Take 1) PO

Parameters to Treat: anc > 1000
;
ECOG Performance Status: 1=Restricted in physical strenuous activity;

Reason for Stopping

Was the treatment administered as planned or with Modifications: Administered as Planned;
Reason for Stopping: Completed Planned Therapy;
Disease Status at End of Treatment: No Evidence of Disease;

Cancel | History | CC List | E-mail | Cl.Message | Addendum | Copy | Error | Reviewed


4.4.100 Thursday Feb 10, 2011 07:35
User: Lawrence N. Shulman, M.D. DFCI - BOC
Select pt
XXXCOETEST, REGB
DFCI 252305
M 32y
CareTeam
Pt Details
Orders
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Results
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Handbook
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XXXCOETEST,REGB MRN: 252305(DFCI)
Edit Primary
DX Date: 02/09/2011
AJCC edition: 7
DX : Breast
Tumor Type: Breast
Staging
Pre Therapy
Dx Date 02/09/2011
Date Estimated
T
T2
Tumor Size (cm)
N
N1
M
M0
Group Stage
IIB
Prov. Stage
IIB
Site
Right
Onco Type DX Recur. Score
LVI
Absent
Post Neoadjuvant Therapy Only
Date
T
N
M
Other Tumor Characteristics
ER
Positive
PR
Positive
HER2/neu IHC
+3
HER2/neu FISH
Histology Grade
Extra Nodal Extension
Yes
No
Inv Histology
Ductal
Lobular
Inv Hist Grade
Poorly Diff (grade 3)
EIC
DCIS Histology
Comedo
Solid
DCIS Nuc Grade
Comments
Sites of Recurrence/Metastasis
Date Identified
Location
Comments
T
Bone
Bone Marrow
Add Recurrence
Add Treatment Plan
Save
Cancel
History
start
Inbox - Microsoft Out...
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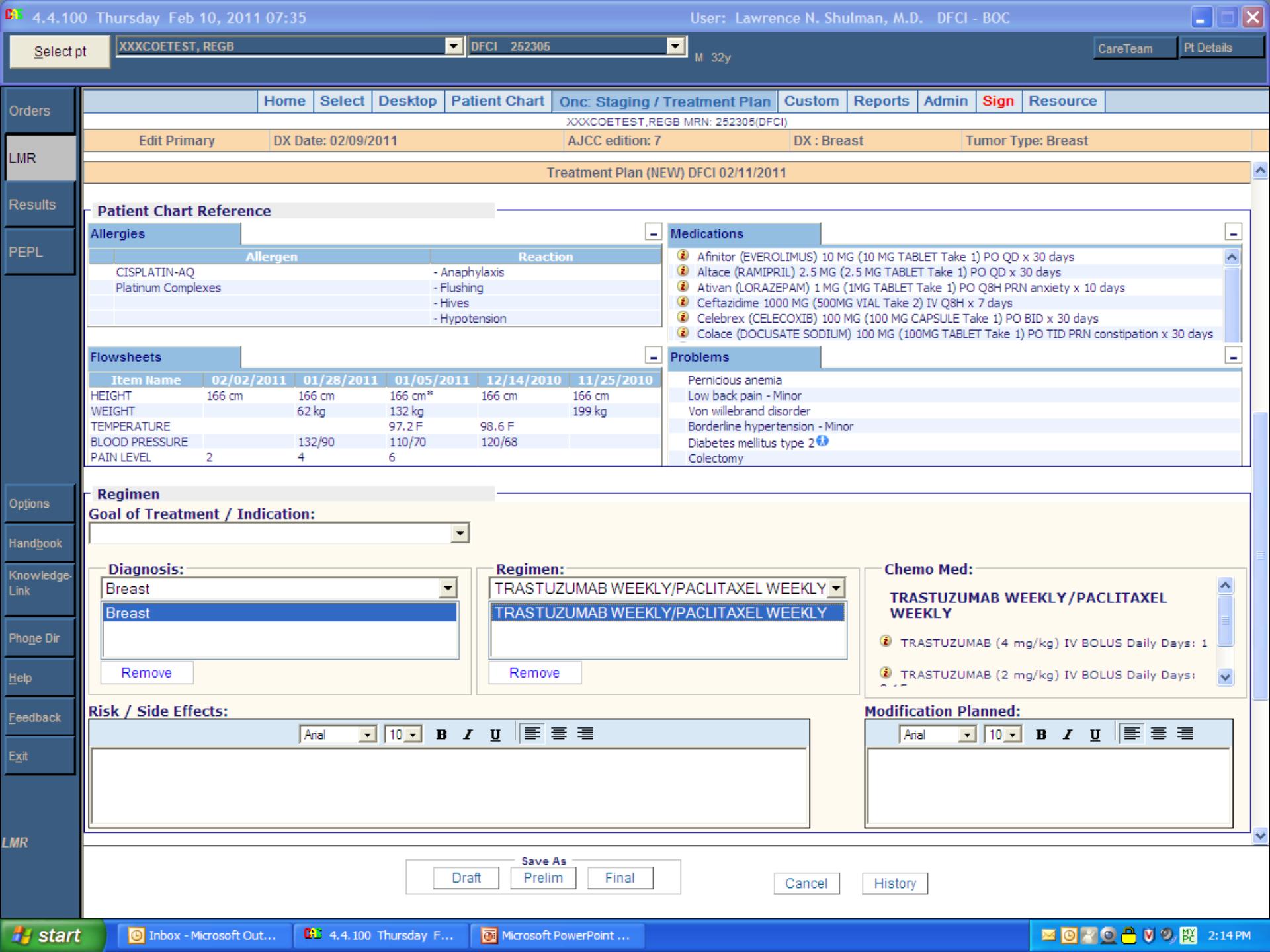
Microsoft PowerPoint ...
2:12 PM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Select pt
XXXCOETEST, REGB
DFCI 252305
M 32y
CareTeam
Pt Details
Orders
LMR
Results
PEPL
Options
Handbook
Knowledge-Link
Phone Dir
Help
Feedback
Exit
LMR
Home
Select
Desktop
Patient Chart
Onc: Staging / Treatment Plan
Custom
Reports
Admin
Sign
Resource
XXXCOETEST,REGB MRN: 252305(DFCI)
Edit Primary
DX Date: 02/09/2011
AJCC edition: 7
DX : Breast
Tumor Type: Breast
Treatment Plan (NEW) DFCI 02/11/2011
Patient Chart Reference
Allergies
Allergen
Reaction
CISPLATIN-AQ
- Anaphylaxis
Platinum Complexes
- Flushing
- Hives
- Hypotension
Medications
Afinitor (EVEROLIMUS) 10 MG (10 MG TABLET Take 1) PO QD x 30 days
Altace (RAMIPRIL) 2.5 MG (2.5 MG TABLET Take 1) PO QD x 30 days
Ativan (LORAZEPAM) 1 MG (1MG TABLET Take 1) PO Q8H PRN anxiety x 10 days
Ceftazidime 1000 MG (500MG VIAL Take 2) IV Q8H x 7 days
Celebrex (CELECOXIB) 100 MG (100 MG CAPSULE Take 1) PO BID x 30 days
Colace (DOCUSATE SODIUM) 100 MG (100MG TABLET Take 1) PO TID PRN constipation x 30 days
Flowsheets
Item Name
02/02/2011
01/28/2011
01/05/2011
12/14/2010
11/25/2010
HEIGHT
166 cm
166 cm
166 cm*
166 cm
166 cm
WEIGHT
62 kg
132 kg
199 kg
TEMPERATURE
97.2 F
98.6 F
BLOOD PRESSURE
132/90
110/70
120/68
PAIN LEVEL
2
4
6
Problems
Pernicious anemia
Low back pain - Minor
Von willebrand disorder
Borderline hypertension - Minor
Diabetes mellitus type 2
Colectomy
Regimen
Goal of Treatment / Indication:
Diagnosis:
Breast
Breast
Remove
Regimen:
TRASTUZUMAB WEEKLY/PACLITAXEL WEEKLY
TRASTUZUMAB WEEKLY/PACLITAXEL WEEKLY
Remove
Chemo Med:
TRASTUZUMAB WEEKLY/PACLITAXEL WEEKLY
TRASTUZUMAB (4 mg/kg) IV BOLUS Daily Days: 1
TRASTUZUMAB (2 mg/kg) IV BOLUS Daily Days:
Risk / Side Effects:
Arial
10
Modification Planned:
Arial
10
Save As
Draft
Prelim
Final
Cancel
History
start
Inbox - Microsoft Out...
4.4.100 Thursday F...
Microsoft PowerPoint ...
2:14 PM

Treatment Plans

- I believe they are important now and will become increasingly important as cancer medicine becomes ever more complex
- I believe the electronic health records are key for safe and high quality oncology practice, and will facilitate the utilization of treatment plans, which in themselves will support safe and high quality care.
- I believe that treatment plans will aid communication between providers and patients in regard to goals of care, resultant treatment choices, and specifics of a proposed treatment
- I think that we all need to help move this agenda forward