NeuroTracker – A Case Study

Neuro Tracker | Consult Form | Patient Info | Progress Note | Graphs & Reports

In 2007 I began a project with the Neurotrauma center at San Francisco General Hospital and BASIC (Brain & Spinal Injury Center) to create a DBMS (Data Based Management System) to track TBI (Traumatic Brain Injury) patients for purposes of treatment and research.

Over the last seven years we have created an elaborate and sophisticated system that replaced the 3 home brewed databases and several excel sheets that were being used for previous tracking.

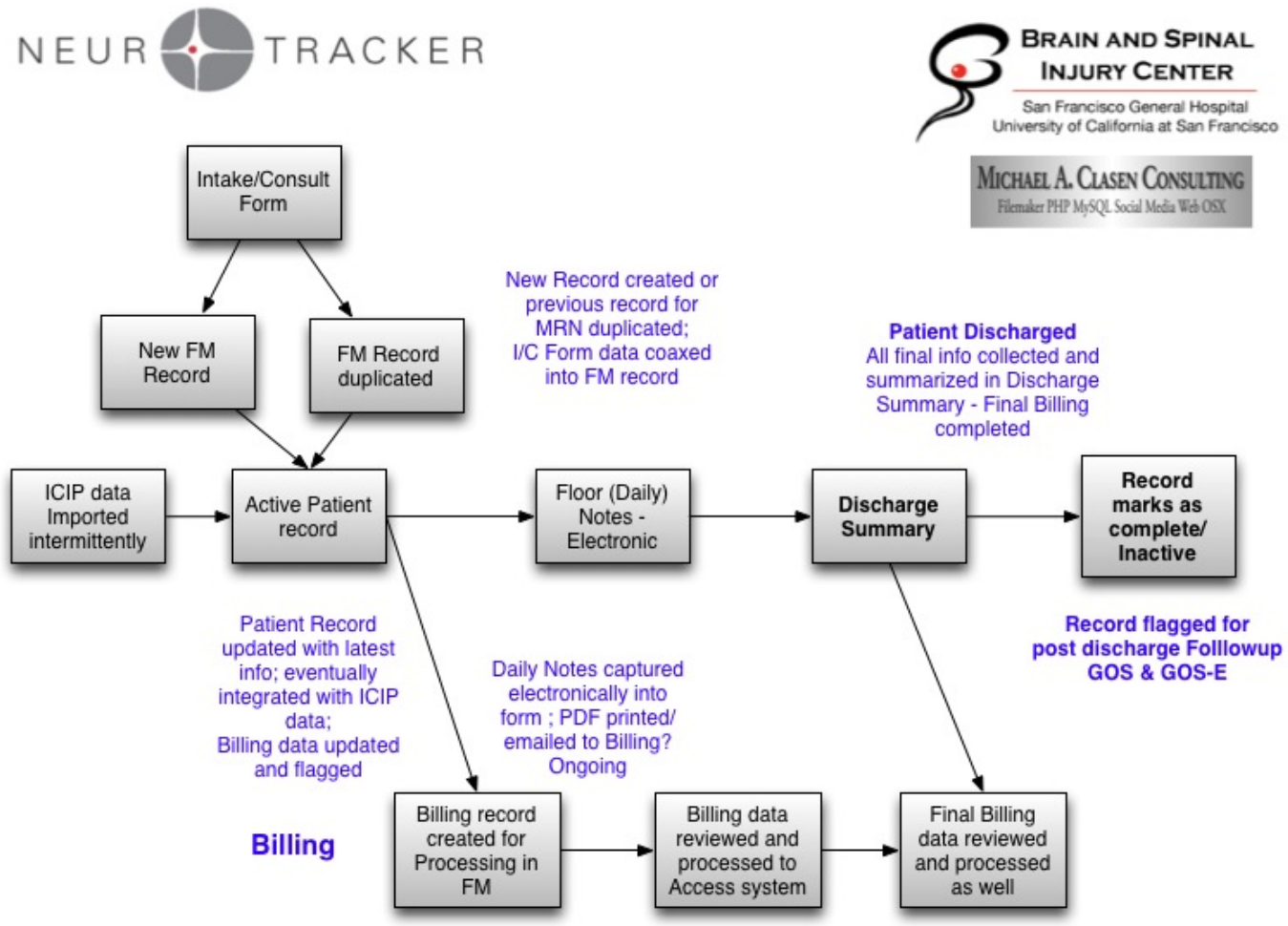
The system employs three systems:

- Patient Info: to track each hospi\yal visit/ stay and the info associated with a patient across

multiple visits

- Consult Form: A series of forms employed for the initial consult/entry into the system
- Progress Notes: a set of daily progress forms tracking and assessing the TBI patients in ICU (Intensive Care Unit) and on the Floor

Neurotracker™ is an integrated Filemaker-based management system to track details and measurements which goes far beyond the Hospital forms to enhance treatment for the patients and enable study and analysis to better improve current and future patient care.



NeuroTracker flow

Features of the overall system (details of the 3 main systems explained below)

- There is a many-to-one relationship used for patients. Each patient has a unique MRN (Medical Record Number) and a unique Visit ID number so that One visit equals one record

and a patient can be tracked across multiple visits

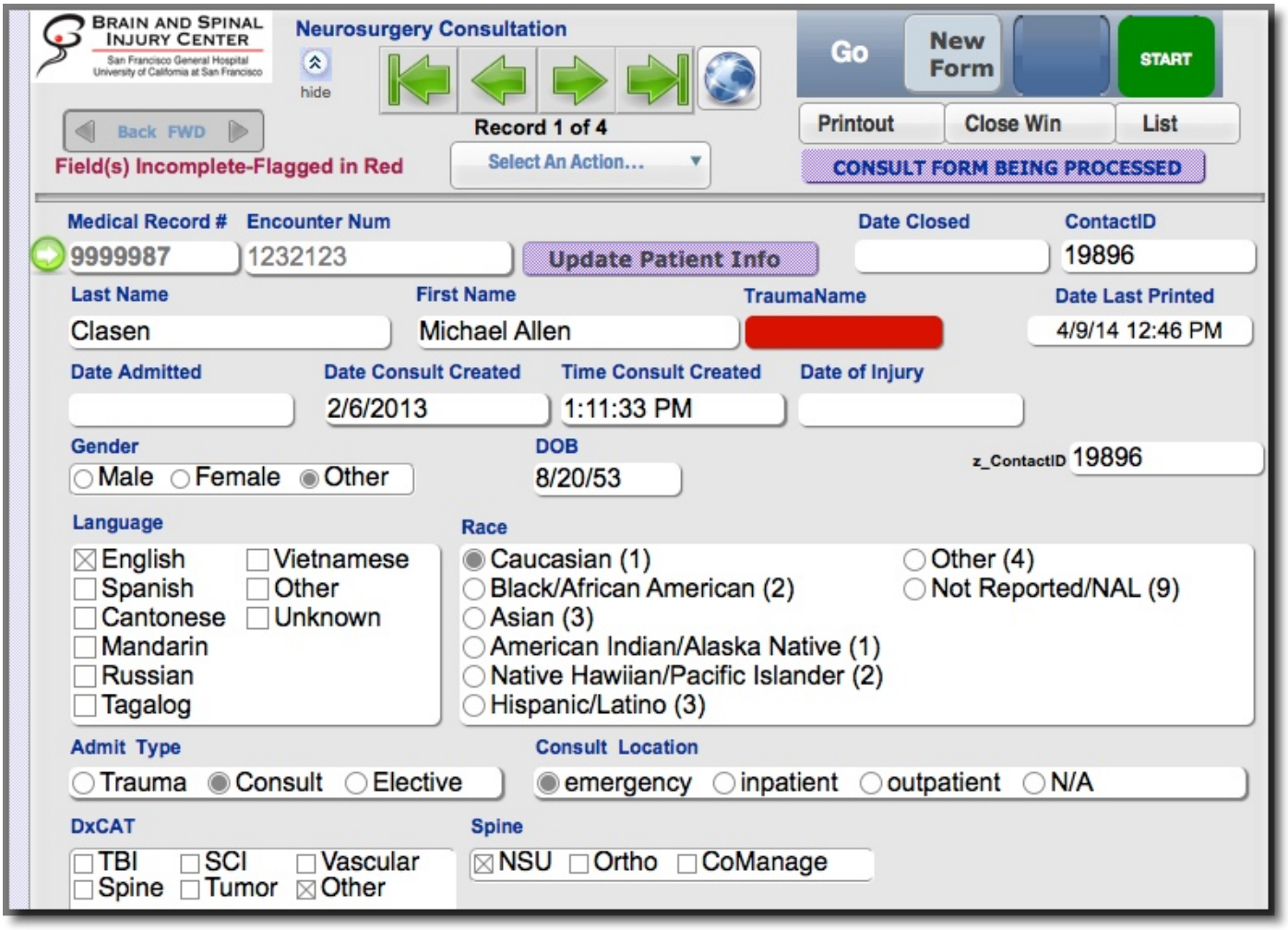
- A Consult form is created at the same time as a new Patient Record. If there is a previous visit/record old info is rolled over to the new record for verification and updating, preserving old info for comparison
- A PDF printout summary of the Consult is created and uploaded to the hospital system for reference as well as a billing record so that the consult can be submitted to the billing department
- Some information is imported into the Patient record (Insurance Info) via an ODBC connection to the SFGH Hospital system
- A Progress Note is created for that day and for the next day's rounds. Data from the consult is rolled into the next day's Progress note to aid entry. As a progress note is completed and electronically signed, a new progress note is created for the next day with selected data rolled into the new record until the patient is discharged
- Selected elements in the progress note are flagged for the billing department
- entry is performed on Laptops, iPads and on desktop computers
- Progress notes summaries are printed to paper and PDFs for inclusion in the patient's physical and electronic records. For many elements only THAT day's events are recorded so as to better track a day's treatment. A history of a patients Progress forms can easily be pulled up and Reviewed on-screen
- Upon discharge, a well formatted Summary of all data is created and saved to PDF for inclusion with the patient's records.

The Consult Forms

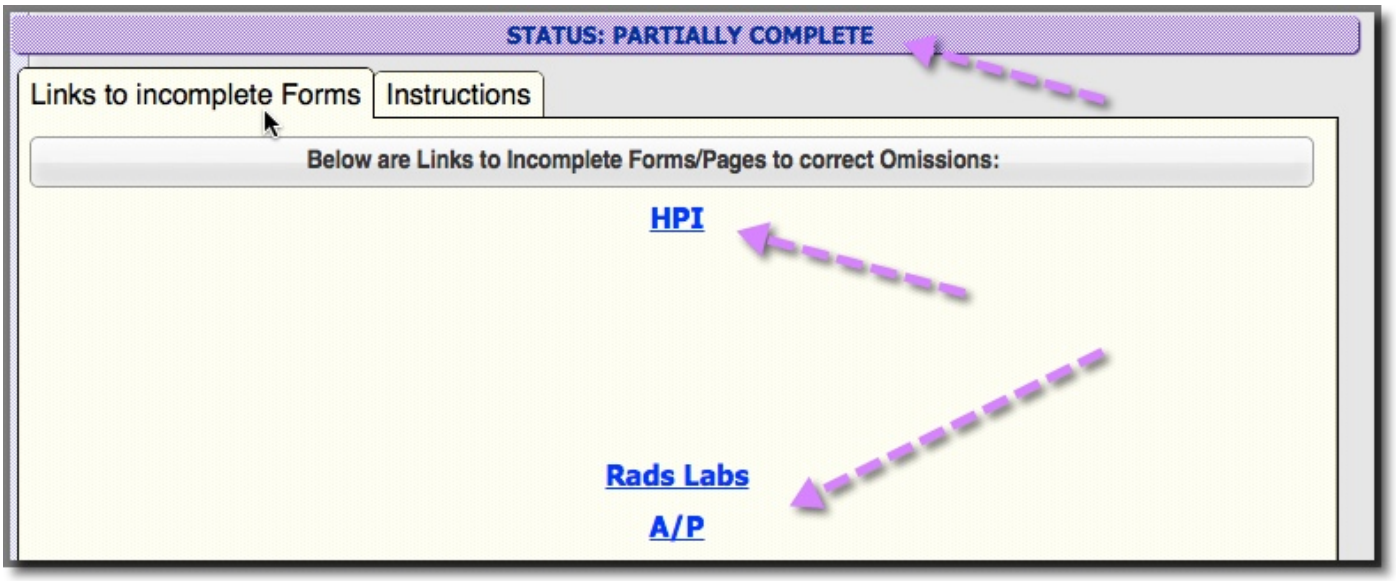
NEUR TRACKER

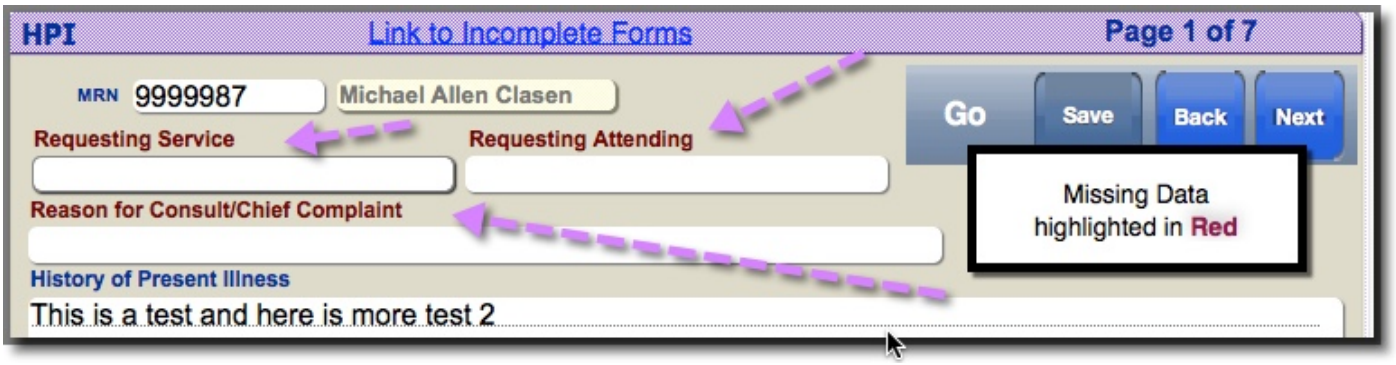
Neuro Tracker | Consult Form | Patient Info | Progress Note| Graphs & Reports

The Consult Forms overview:

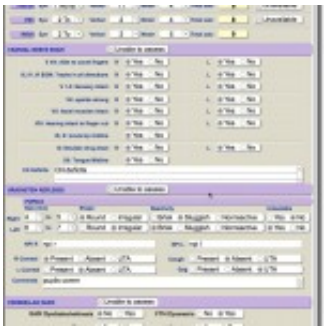


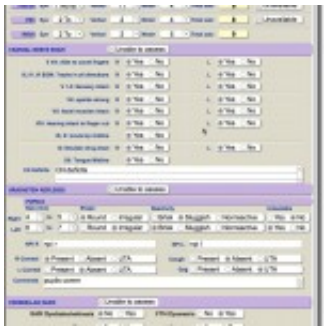
The consult form consists of a series of 7 onscreen entry pages which are designed to require entry without interfering with entry on any one page. Fields left empty ate flagged in red and required to be finished before the Consult can be closed.



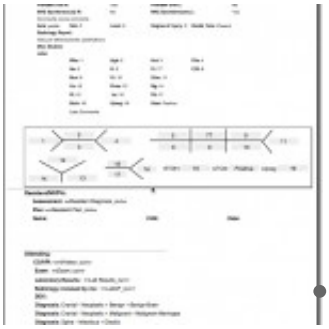






The entry forms are formatted with the appropriate check boxes, radio buttons and popup lists



and menus to enable accurate format of data. Merge fields are used for presentation on the final printout.

Other details

- Many systems require entry with just looking for a value in the field. The consult system checks the value of entries and requires other values to further explain. For example when Other is checked or selected then the Other Comments field must have a value.
- Many times patients are unconscious or Unable To Assess (UTA) so a checkbox is included to override sections, BUT if data is actually entered the real data overrides UTA as some patients become available during an exam. This aids in ease of input as it does not require unchecking override boxes, just entering data
- Data entered into portals are summarized into nice neat text summaries that are easier to read than entry forms
- When the Consult is signed, closed and finalized an electronic signature is attached and Consult data is copied to the Patient record and data from the three Physical Exam pages are copied to the next days Progress form to give it a jump start
- Completed and Incomplete forms are managed by an Admin and finalized and printed as a group to PDFs for upload to the Hospital system. The form lock can be overridden in special cases to insure the most accurate data.

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Patient Info

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Patient Info

The Patient Info was the first system developed and became a catchall for managing patient data. It is a series of entry screens with a main menu for initial navigation.

Different Main Menus are presented based on the User, i.e. Nurses, Doctors and Developers might see a different screens based on there needed functionality. This applies to the popup Go Menu navigation system which is driven by Privilege sets, allowing control over navigation based on what is need by the user and the user privilege set.

The details are either entered here or presented for review on a multi-tabbed interface. Data from the Consult Intake form is transferred to the patient record upon completion as well as data from Daily progress reports.

Other tasks:

- To-Dos for patients can be reviewed here
- Prog notes can be navigated to by portal
- Discharge summaries can be updated and printed
- QA ensuring accuracy is overseen here
- Admin functions are displayed here for navigation if their Privilege set allows

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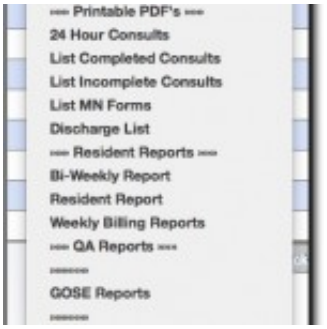
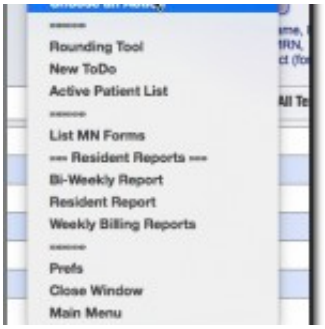
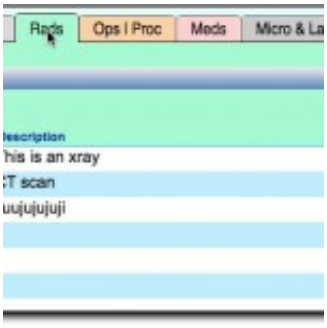
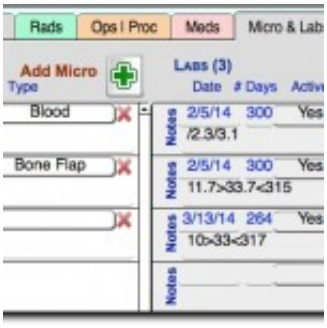

--- Printable PDF's ---
24 Hour Consults
List Completed Consults
List Incomplete Consults
List MN Forms
Discharge List
--- Resident Reports ---
Bi-Weekly Report
Resident Report
Weekly Billing Reports
--- QA Reports ---
GOSE Reports


Rounding Tool
New ToDo
Active Patient List
List MN Forms
--- Resident Reports ---
Bi-Weekly Report
Resident Report
Weekly Billing Reports
Prefs
Close Window
Main Menu


Choose an Action
Rounding Tool
Active Patient List
List MN Forms
Resident Report
GOSE Reports
About...
Close Window
Main Menu


Rads
Ops I Proc
Meds
Micro & La
Description
This is an xray
CT scan
uujujuji


Events
Rads
Ops I Proc
Meds
Micro & Labs
Filter Mode
Medication
Active
Type
Rx Name
Yes
Medicatio
good one
hello
med
this is a test


Rads
Ops I Proc
Meds
Micro & Labs
Add Micro
Type
Labs (3)
Date
Days
Blood
Bone Flap
Notes
2/5/14 300
/2.3/3.1
2/5/14 300
11.7>33.7<315
3/13/14 264
10>33<317

Daily Progress Note

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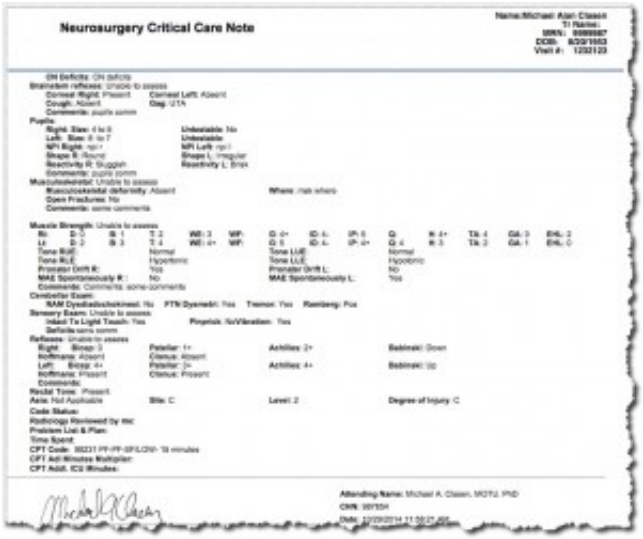
The progress note system is the last to be included in the system allowing for the daily requirement of updating Patient Info as the Doctors make their rounds. A dual system supports the ICU (Intensive Care Unit) patients as well as the standard Floor patients.

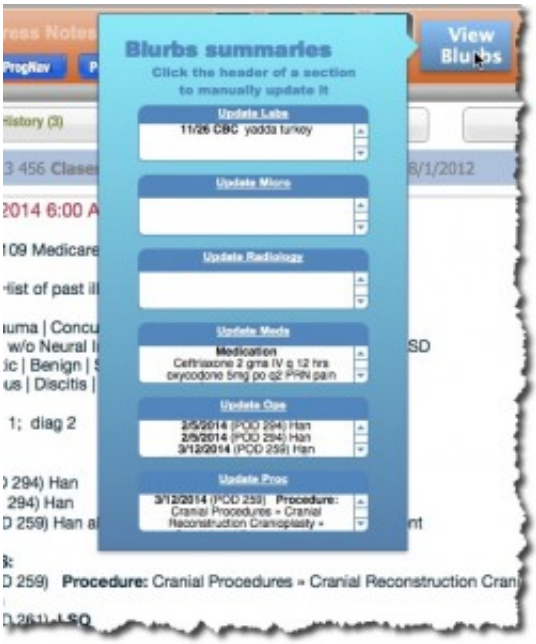
Features include:

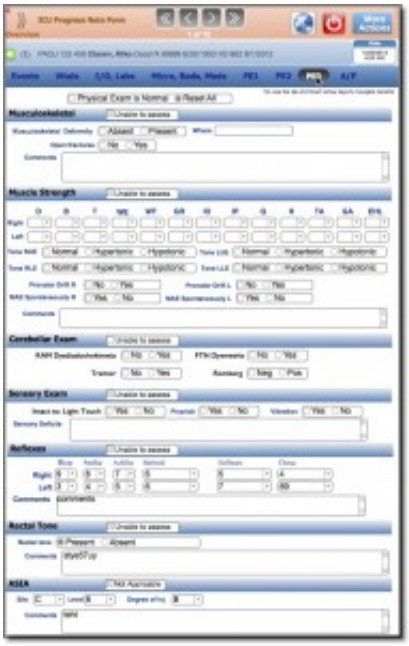
- Color coded listing of active patients automatically found and sorted
- Overview page designed for quick review non computer or iPad
- A progress note is created when the Consult Intake form is signed and finalized
- Physical exam data from the Consult is rolled into the days and next days progress note upon creation
- When a Progress note is closed and signed and new Noten is created for the next day and selected data is rolled over to the next day's note to aid ease of use
- Entry is performed on 8 tabbed layouts, the last of which includes ban electronic signature system
- Summary data from portals is continually updated with server scripts and when signing/finalizing a Note
- Overview is a calculated presentation which combines data from fields and portals presenting relevant data and filtering out blank sections of data Unable to Assess
- Completed Progress notes can easily be found sorted and printed to paper records and PDFs for upload to hospital systems
- System is optimized for data entry, presentation, printing and review
- Data is captured not only for the Patient record but for research and analysis to better develop health strategies

Neuro Tracker | Consult Form | Patient Info | Progress Note


More Actions
More Actions
Back FWD
Active Patient List
Current Search Pt List
Consult
QA
Disch
Prog Notes
Quit
Close
Menu
Admin
Select An Action...

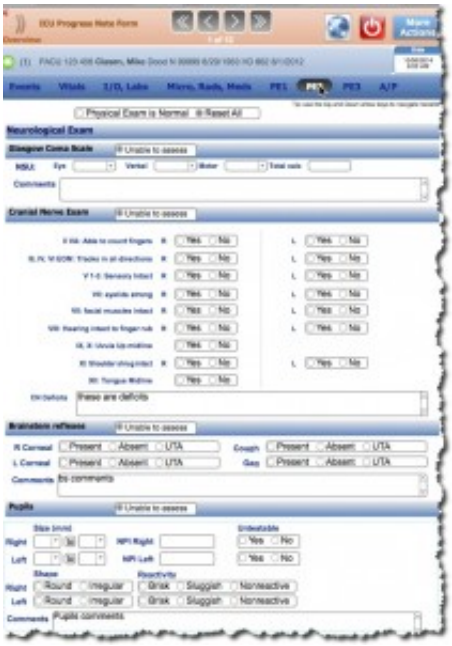

Neurosurgery Critical Care Note


Blurbs summaries
Click the header of a section to manually update it
View Blurbs
Update Labs
11/26 CBC yadda turkey
Update Micro
Update Radiology
Update Meds
Medication
Ceftriaxone 2 gms IV q 12 hrs
oxycodone 5mg po q2 PRN pain
Update Ops
2/5/2014 (POD 294) Han
2/5/2014 (POD 294) Han
3/12/2014 (POD 259) Han
Update Pros
3/12/2014 (POD 259) Procedure:
Cranial Procedures » Cranial Reconstruction Cranioplasty »
Procedure: Cranial Procedures » Cranial Reconstruction




ICU Progress Note Form
More Actions
Events Vitals I/O, Labs Micro, Rads, Meds PE1 PE2 PE3 A/P
Code Status
Radiology Imaging reviewed by me:
Problem List & Plan
Time Spent
CPT Code
Michael A. Clasen, MOTU, PhD
Sign Form:Attending

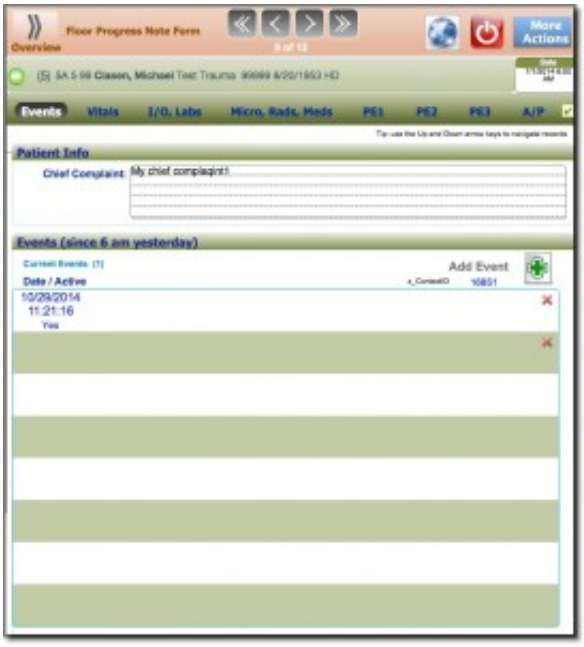

ICU Progress Note Form
More Actions
Events Vitals I/O, Labs Micro, Rads, Meds PE1 PE2 PE3 A/P
Micro (2)
Add Micro
Radiology Report today(1)
Add Imaging
Allergies
aspirin
Medications (4)
Add Meds


ICU Progress Note Form
Events Vitals I/O, Labs Micro, Rads, Meds PE1 PE2 PE3 A/P
Neurological Exam
Pupils


ICU Progress Note Form
More Actions
Events
Vitals
I/O, Labs
Micro, Rads, Meds
PE1
PE2
PE3
A/P
Vitals
T Max C
T Current C
Art SBP
Art MAP
CVP
Art DBP
NBP SBP
NBP MAP
MAP Goal
NBP DBP
HR
Rhythm
RR Spont
O2 Sat
Supp O2
Vent
Neuro Monitors
ICP
Parameters:
Mannitol
CPP
Pressor
CBF
CBF


ICU Progress Note Form
More Actions
Events
Vitals
I/O, Labs
Micro, Rads, Meds
PE1
PE2
PE3
A/P
Input
PO
IVF
Tube Feed
Propofol
Free H2O
Phenyl
Dex
Output
UO
Stool
EVD
LD
JP 1
JP 2
JP 3
JP 4
Weight
Admit
Today
Balance
Labs (4)
Add Lab
Type
Active
CBC
Troponin
CD4 Count
Coags


Floor Progress Note Form
More Actions
Events
Vitals
I/O, Labs
Micro, Rads, Meds
PE1
PE2
PE3
A/P
Vitals
T Max C
T Current
NBP SBP
NBP MAP
NBP DBP
HR
Rhythm
RR Spont
O2 Sat
Supp O2


Floor Progress Note Form
More Actions
Events
Vitals
I/O, Labs
Micro, Rads, Meds
PE1
PE2
PE3
A/P
Patient Info
Chief Complaint
My chief complaint
Events (since 6 am yesterday)
Add Event
Date / Active
10/29/2014
11:21:16
Yes

Graphs & Reports

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An elaborate system of reporting is updating daily on the server grabbing relevant data from patient info, hiding Patient Info and graphing the data into a series of visual reports for analysis

- datan is updated every 24 hours
- patient records can be identified which populate the graphs
- sets of data from year to year, ,month to month is easily navigated
- tables of data can be reviewed and exported for further analysis
- graphs are easily printed en masse

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