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Shifting Patient Safety into High Gear

Boston, MA, November 16, 2012

Shifting Patient Safety into High Gear

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Lessons from Obstetrics

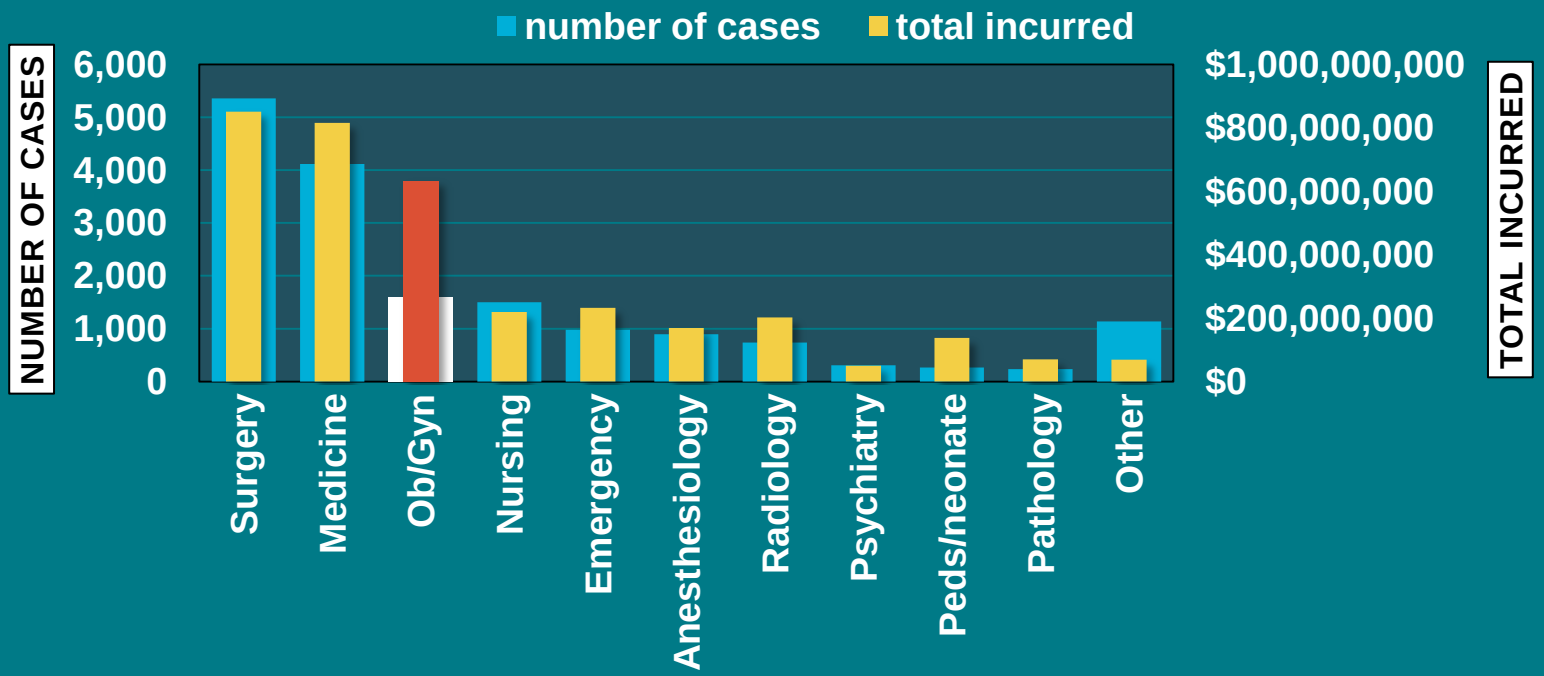
Roxane Gardner, MD, DSc | CRICO

Peter Bernstein, MD | Montefiore Medical Center

Eyal Ephrat, MD | MedCPU

Obstetrical services have a higher cost per claim.

National Landscape: Primary Responsible Services



CBS N=17,124 coded professional liability cases asserted 1/1/07–12/31/11.

Total incurred includes reserves on open cases and payments on closed cases.

Surgery includes: General Surgery, Neurosurgery, Orthopedics, and Surgery Subspecialties (Bariatric Surgery, Colorectal Surgery, Cardiac Surgery, Otorhinolaryngology (with Plastic), Hand Surgery, Ophthalmology, Otolaryngology (No plastic), Plastic (NOC), Pediatric Surgery, Oncology (Surgical), Thoracic Surgery, Urology Surgery, Vascular Surgery, Transplant, Podiatry).

Medicine includes: General Medicine and Medicine Subspecialties (Cardiology, Dermatology, Endocrinology, Gastroenterology, Genetics, Geriatrics, Hematology, Hospitalist, Immunology and Allergy, Infectious Disease, Oncology (Medical), Nephrology, Neurology, Physical Medicine/Rehabilitation, Pulmonary Disease, Rheumatology).

Other includes: Dentistry/Oral Surgery, Allied Health, Non-clinical, and Pharmacy.

Obstetrics-related Malpractice Data

937 cases | $522M total incurred

2007–2011

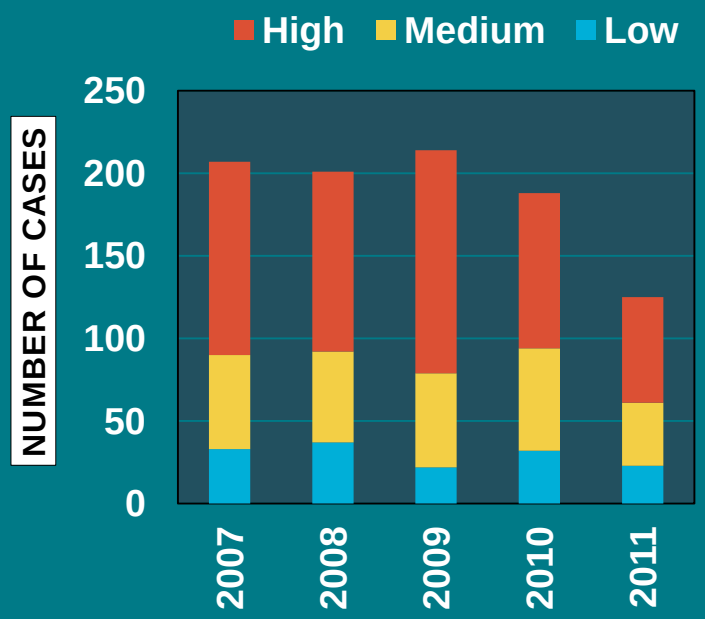
(cases with obstetrics or midwifery as primary responsible service)

937 cases | $522M total incurred

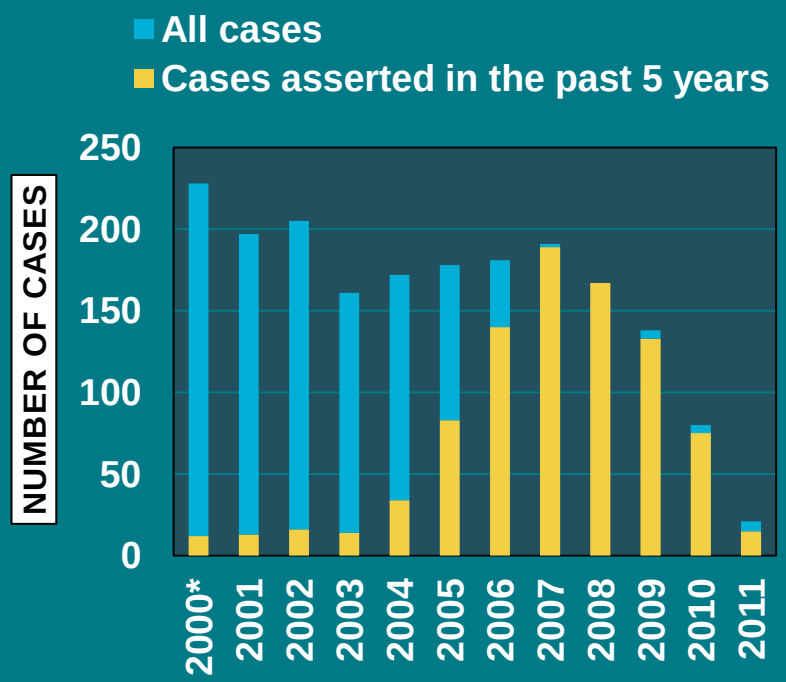
Frequency of OB cases declining

Assert Years vs. Loss Years in OB Cases

BY ASSERT YEAR



BY LOSS YEAR



CBS N=937 coded professional cases asserted 1/1/07–12/31/11 with Obstetrics or Midwifery as primary responsible service.

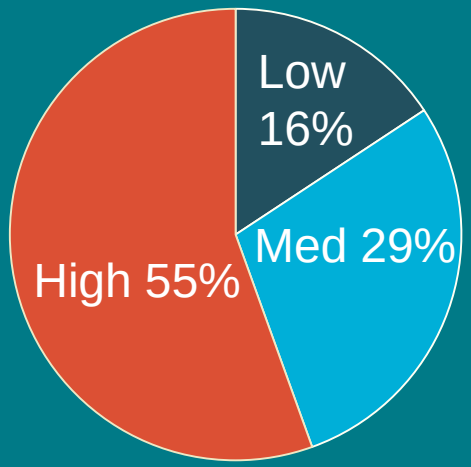
*14 OB cases occurred prior to 2000.

Severity Scale: High= Death, Permanent Grave, Permanent Major or Permanent Significant
Medium= Permanent Minor, Temporary Major or Temporary Minor
Low= Temporary Insignificant, Emotional Only or Legal Issue Only

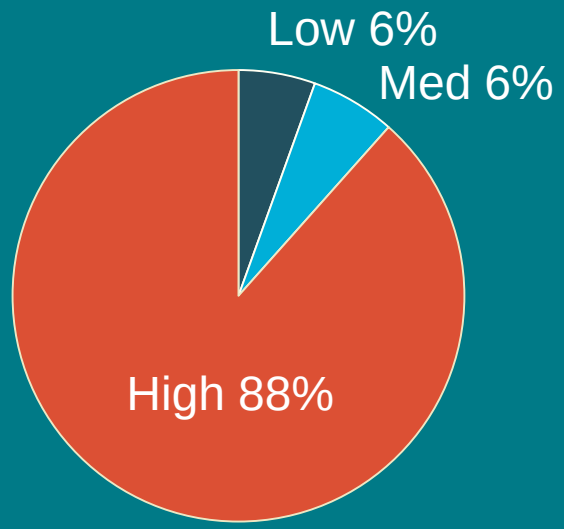
55% involved a high-severity injury

Injury Severity in OB Cases

PERCENT OF CASES



PERCENT OF TOTAL INCURRED



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Intrauterine hypoxia & birth asphyxia=20%

Top Final Diagnoses in OB Cases

DIAGNOSIS	# CASES
Intrauterine hypoxia and birth asphyxia	191
Complications of birth; puerperium affecting management of mother	109
Brachial plexus Injury	93
Other perinatal conditions	74
Anxiety state	66
Complications mainly related to pregnancy	39
Other complications	37
Foreign body accidentally left during procedure	32
Other birth trauma	30
Intrauterine death	25
Puncture/laceration during procedure	24
Cerebral palsy	21

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Judgment, Communication, Technical Skill

Top Contributing Factors in OB Cases

FACTOR	% CASES*
Clinical Judgment	69%
Communication	30%
Technical Skill	29%
Administrative	21%
Documentation	20%
Supervision	13%
Clinical Systems	12%

TOP CLINICAL JUDGMENT FACTORS	# CASES*
Selection/management therapy—labor and delivery	367
Selection/management therapy—pregnancy	113
Pt assessment—failure/delay in ordering diagnostic test	109
Pt assessment—misinterpretation of diagnostic studies	108

TOP COMMUNICATION FACTORS	# CASES*
Communication among providers regarding patient's condition	129
Communication between patient/family & provider—other	48
Communication between patient/family & provider—language barrier	34
Inadequate informed consent for other treatment options	26

TOP TECHNICAL SKILL FACTORS	# CASES*
Possible technical problem	135
Poor technique, other	53
Retained foreign body	33
Improperly utilized equipment	28

*A case will often have multiple factors id

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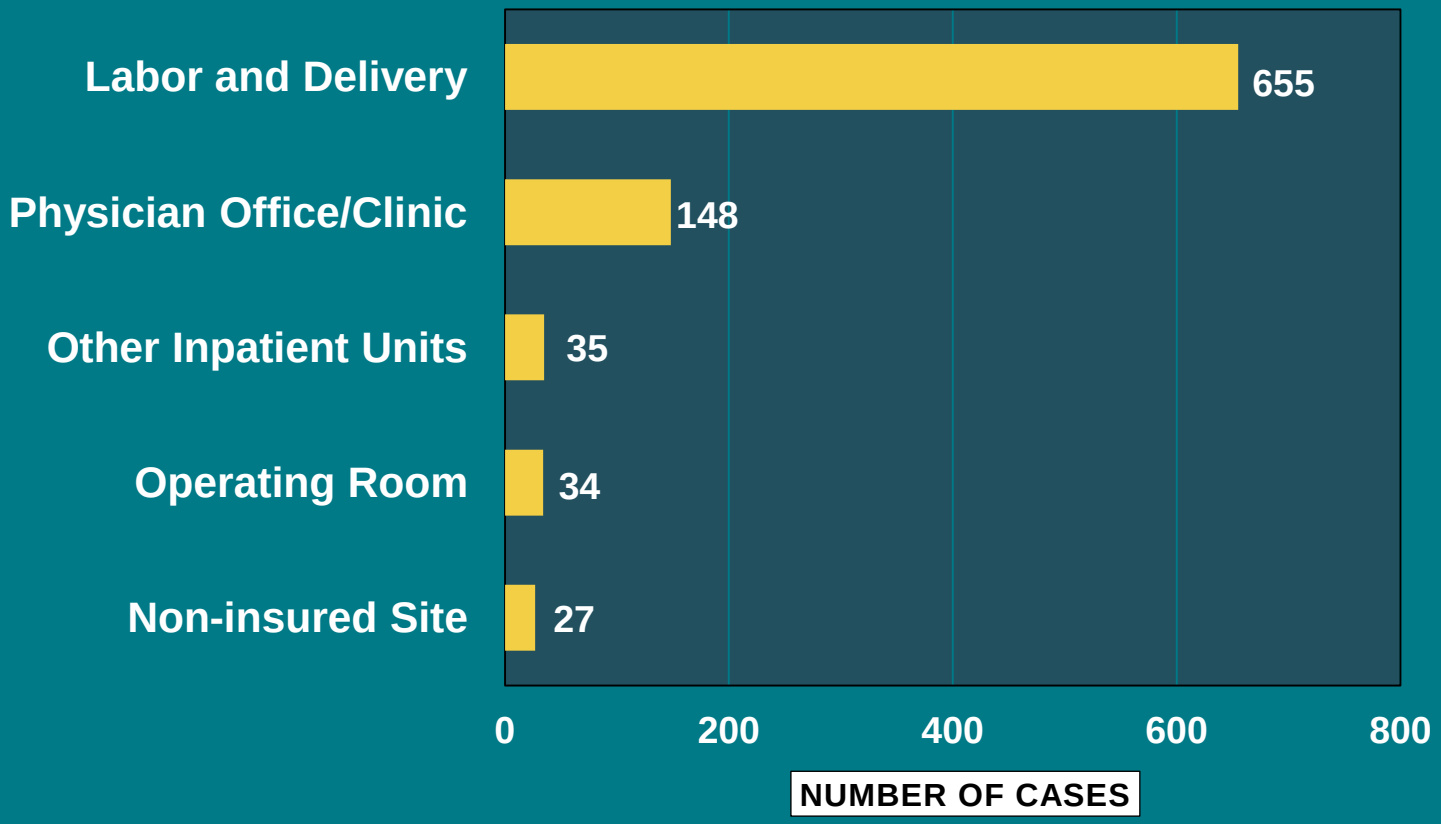
Labor & Delivery was the top location

Top Locations in OB Cases



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Case Study

Case Study

- Mother, G2P1 at 37.5 weeks, admitted at 8:00p for induction of labor due to pre-eclampsia.
- Past medical history: congenital deafness, obesity, hypertension, and poorly controlled diabetes
- A Sign Language interpreter was present at her pre-natal visits, and during delivery.
- Evaluation on admission was notable for complaints of mild headaches;
  no visual changes or abdominal pain
  - BP=160/100
  - Cervix=4cm/80% effaced/-2 station
  - 2-3+ pedal edema
  - 3+ proteinuria
  - FHR=140 baseline with moderate variability (Category I tracing)

Case Study (cont'd)

8:45p: oxytocin induction began, BP=155/95

11:45p: cervix=7cm/100% effaced; epidural placed

12:00a: exam notable for:

BP=183/99

cervix=8cm dilated/100% effaced; rupt. membranes, clear fluid

FHR=140 baseline w/minimal variability

IV fluids of D10 w/Insulin initiated to stabilize glucose levels

1:10a: bolus of MgS04 administered due to risk for seizures (platelet count=97K)

2:30a: cervix fully dilated and began to push

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Case Study (cont'd)

3:15a: episiotomy performed; head delivered, ob applied traction and encountered shoulder dystocia

Ob rotated the anterior shoulder to the oblique position

3:20a: female infant delivered (8lbs 3oz) Apgars 8/9

Case Study (cont'd)

- Infant immediately noted to have decreased movement of left arm and bruising on left arm
- Diagnosed with left Erb's Palsy
- Record review notable for:
- RN documentation that McRobert's maneuver was applied at 3:17a during delivery, but this note appeared to be inserted after the fact, between lines of entry
- Ob documented the mother's legs were "up," but no specific reference to McRobert's maneuver or application of suprapubic pressure was written in the delivery note; a dictated note was not performed

Case Study (cont'd)

- Infant received physical therapy but had continued problems with her left shoulder.
- 10 months later:
  - Reconstructive surgery was performed on her left shoulder
- One year later:
  - Patient continued to have weakness in her left shoulder and favors right-sided activities and motions
- Physical therapy is on-going, needed for strengthening and
  - maintaining flexibility of the left shoulder and arm

What are the key issues that led to this adverse outcome?

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Case Study (cont'd)

Contributing Factors

- Management and treatment of the patient prior to and during labor
- Communication
  - between providers
  - between patient, family and providers
  - language barrier-related issues
- Technical performance of delivery complicated by shoulder dystocia
- Documentation

Shifting Patient Safety into High Gear

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Lessons from Obstetrics

Peter Bernstein, MD, MPH

Professor of Clinical Obstetrics & Gynecology and Women's Health , Albert Einstein College of Medicine/Montefiore Medical Center

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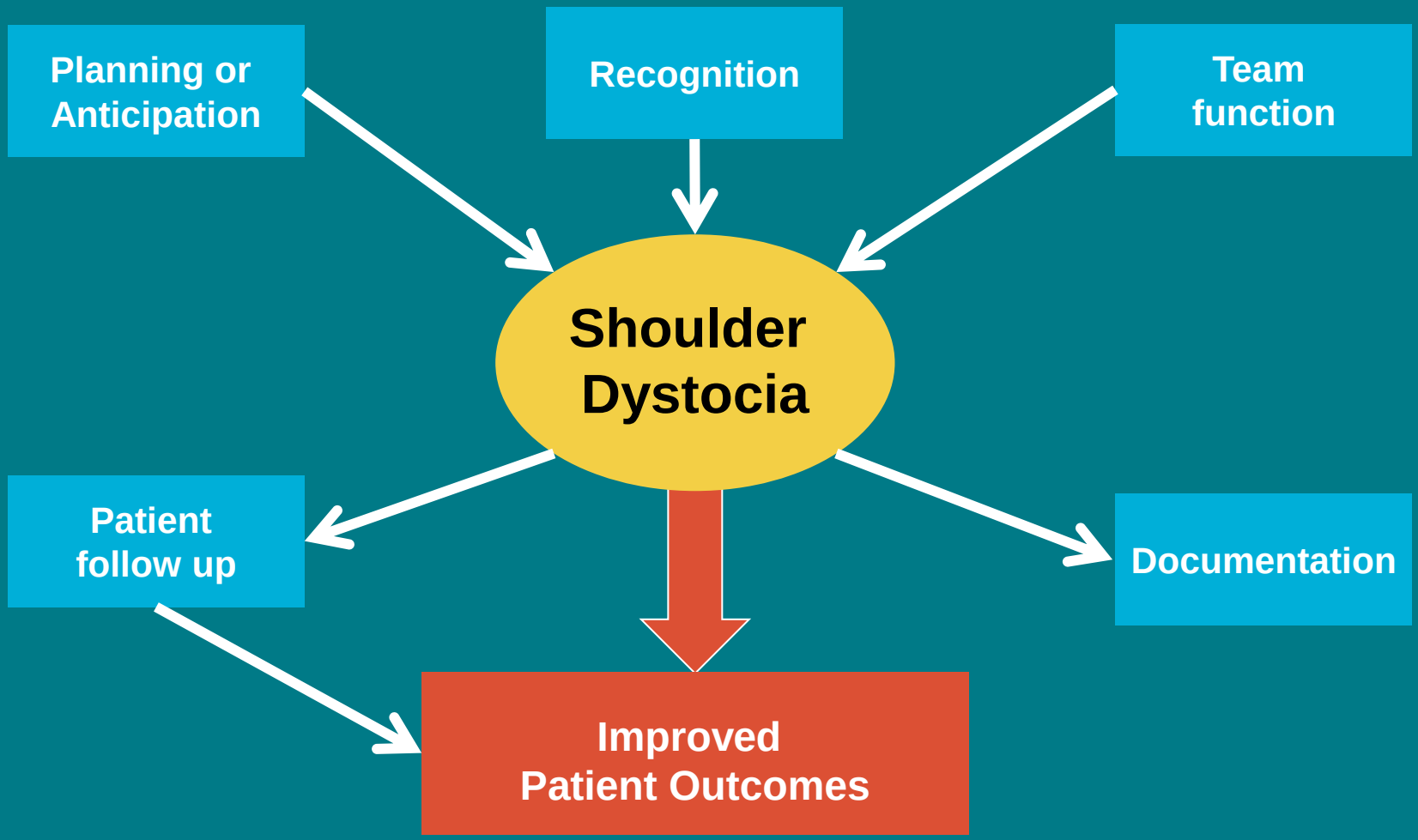
Creating a Culture of Patient Safety: Shoulder Dystocia



Obstetrical Quality Improvement Collaborative

Hospitals Insurance Company, Inc.

The Mount Sinai Hospital

Montefiore
THE UNIVERSITY HOSPITAL

Maimonides
Medical Center

Bronx-Lebanon Hospital Center
Health Care System

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OB QI Initiatives

- In house coverage requirements
- Team Training
- Multidisciplinary Obstetrical Emergency Simulation
- Patient Safety Officers/Nurses
- Documentation Guidelines
- Audit and Feedback
- Communication with Neonatology

Best Practices for Obstetrics

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Admission Note
- *Latent phase* — within 12 hours
- *Active phase* — within 4 hours
- Include history, exam, fetal assessment, plan of care and EFW

Progress Notes
- *Latent phase* — every 8 hours
- *Active phase* — every 4 hours
- *Stage 2, nullipara* — within first 2 hours and then hourly
  multipara — within first hour and then hourly
- Include labor progress, FH monitor findings, interventions, and plan of care

Attending Coverage
- Primary or covering attending must be in-house and readily available for patients:
  - in labor
  - receiving oxytocin
  - with epidural
- Covering attending will:
  - act on behalf of primary attending in an emergency
  - document at beginning and end of coverage period
- Primary attending must come in immediately when called by covering attending

Oxytocin Use
- When initiating — document need based on evaluation and assessment
- Document agreement between covering and primary attendings to start oxytocin
- Continuous fetal monitoring required
- *Latent phase* — reassess and document every 8 hours
- *Active phase* — reassess and document every 2 hours
- Discontinue for non-reassuring FHR

Suspected Macrosomia
- Recommend C/S for:
  - EFW > 4500 grams in *diabetic* mothers
  - EFW > 5000 grams in *non-diabetic* mothers

Best Practices for Obstetrics

Refusal of Treatment
- Document when patient refuses C/S or any recommended procedure

Operative Vaginal Delivery
- Do not attempt if:
  - EFW > 4000 grams in *diabetic* mothers
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- Pre-op requirements:
  - instrumentation privileges
  - OR availability, if C/S necessary
  - examined for position
  - station at least +2
  - cervix fully dilated
  - pelvis clinically adequate
  - analgesia adequate
  - bladder empty
- Use forceps ***or*** vacuum — NOT both
- Perform vacuum delivery only after 34 weeks
- Limit to 3 pop-offs or complete lack of descent
- Document:
  - pre-op requirements met
  - delivery procedure in detail
  - pop-offs, if applicable

VTOL / VBAC
- Document risk / benefit discussion and consent
- Use special caution for patients:
  - with unknown scar
  - unregistered to the institution
  - whose records are unavailable
- Contraindications:
  - prior upper segment incision
  - prior T-incision
  - prior uterine rupture or dehiscence
  - clinician assessment of inadequate pelvis

Management of Twins
- Inability to monitor second twin precludes trial of labor
- Must deliver in OR

Elective Deliveries
- Singletons — not before 39 weeks without FLM results
- Twins — not before 38 weeks without FLM results

Team Training

- Based on the Principles of Crew Resource Management (CRM)
- Adapted from the Military and the Aviation Industry
- Principles include:
  - Resource management
  - Communication
  - Briefing, debriefing, and leadership strategies
  - Error reduction techniques, including workload management, mutual support and cross-monitoring

Why Communication?

- The overwhelming majority of untoward events involve communication failure
- Somebody knows there's a problem but can't get everyone in the same movie
- The clinical environment has evolved beyond the limitations of individual human performance

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Medical Simulation

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Benefits of Medical Simulation

- Safe environment - mistakes don’t have a cost
- Trainee focus
- Allow for controlled exposure to rare scenarios
- Provides “hands-on” experiential learning
- Unique opportunity for team-training
- Reproducible, standardized, and objective
- Allows for debriefing of practice
- Increases public trust

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Obstetric Simulation: What?

- Technical Maneuvers
  - Normal delivery, shoulder dystocia, breech vaginal delivery, operative vaginal delivery
- Knowledge and Application
  - Eclampsia, PPH, maternal code
- Communication
  - Shoulder dystocia, 2 challenge rule
  - All emergencies

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Obstetric Simulation: What?

- Team Preparedness and Team Function
  - Shoulder dystocia, eclampsia, PPH, vaginal breech
  - All emergencies
- Documentation
  - Shoulder dystocia, eclampsia, operative vaginal delivery

Montefiore Sim Experience

- Over 800 simulations completed
  - Participants include: MDs (Attendings and Residents), CNMs, Physician Assistants, RNs
  - Multidisciplinary (OB, Anesthesia, Peds, Nursing)
  - Crew Resource Management and Team Training Principles Applied
  - Has been well received

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Simulations Improve Physician Performance: Shoulder Dystocia

		PRE	POST	P VALUE
Communication (6 items)	Resident	3.5(1.2)	4.9(1.0)	<0.0001
	Attending	3.6(1.6)	4.9(1.1)	<0.0001
Maneuvers (4 items)	Resident	3.3(0.9)	3.9(0.4)	0.001
	Attending	3.8(0.5)	3.9(0.3)	NS
Overall Performance (5 pt. scale)	Resident	2.4(1.0)	3.8(0.9)	<0.0001
	Attending	3.4(0.9)	4.1(0.7)	<0.0001

n = 43 attendings, 28 residents

Goffman 2008

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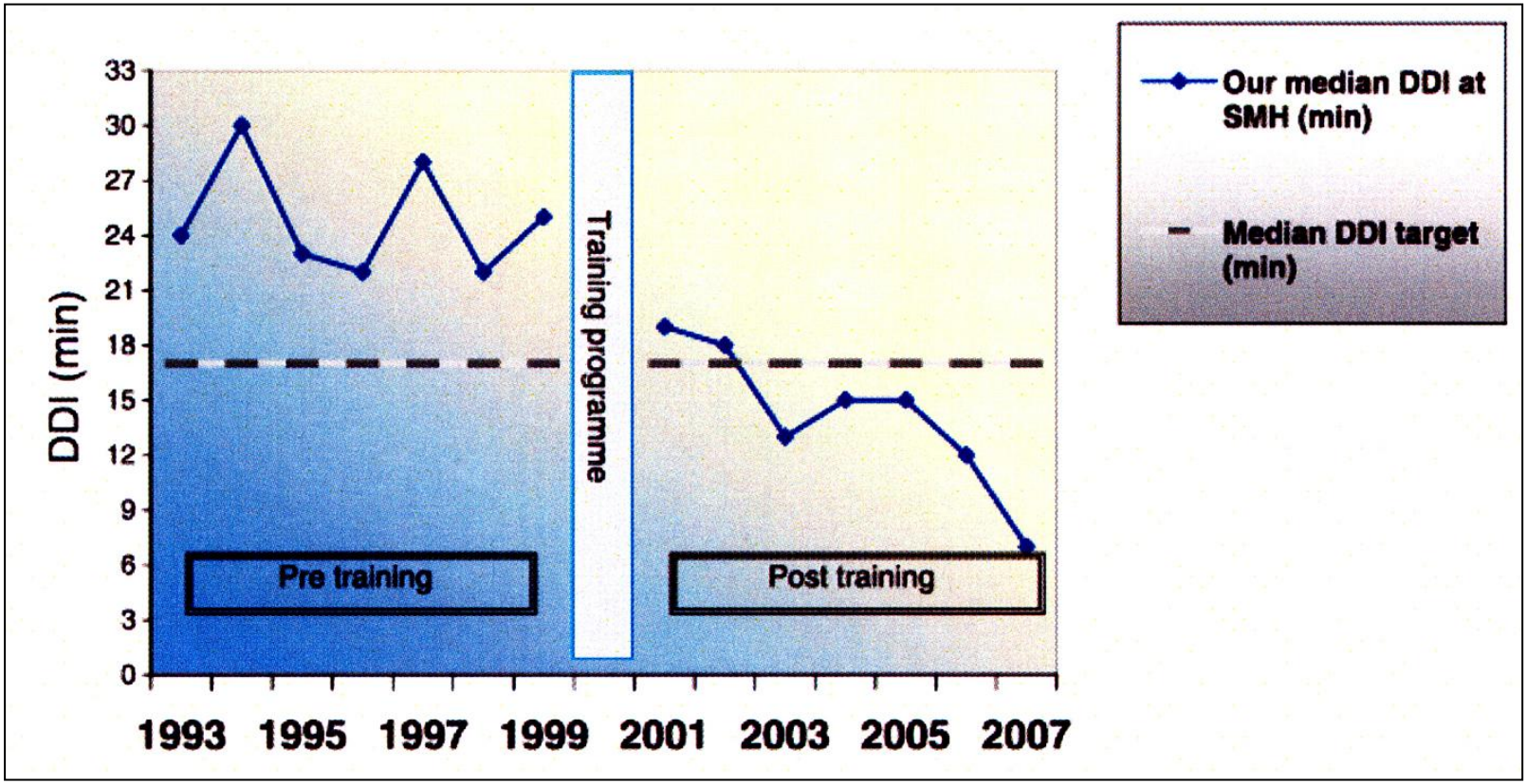
Simulations Improve MD Performance: Eclampsia

	LS (median, IQR)	SS (median, IQR)	SLS (median, IQR)
Baseline maternal score (max 21)		11.0 (7.5-13.00)	10 (8.3-13.5)
Post-education maternal score (max 21)	12.0 (9.0-15.0)	15.0 (12.0-18.5)*	15.5 (14.0-16.8)*
Baseline eclampsia score (max 30)		11.0 (8.5-11.0)	13 (9.5-16.5)
Post-education eclampsia score (max 30)	16.0 (13.0-19.0)	19.0 (16.0-22.0)	19.0 (17.3-20.8)*

$p<0.05$ Compared to LS

Fisher AJOG 2010

Obstetric Simulation: The Evidence



40% reduction in median decision-delivery interval for cord prolapse

Siassakos et al *BJOG* 2009

Obstetric Simulation: *The Evidence*

Before and after a required, annual, one-day course for all staff of emergency drills and FHR tracing interpretation

	1998–1999 (n=8,430)	2001–2003 (n=11,030)	Relative Risk
5 min Apgar ≤ 6 n (rate per 10,000)	73 (86.6)	49 (44.4)	0.51 (0.35-0.74)
HIE n (rate per 10,000)	23 (27.3)	15 (13.6)	0.50 (0.26-0.95)
Moderate/severe HIE n (rate per 10,000)	16 (19.0)	11 (10.0)	0.53 (0.24-1.13)

Draycott et al, *BJOG,* 2006

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Importance of Clear and Complete Documentation

- Improved communication between members of the team
- Standardized forms and Electronic Records can encourage better documentation
- Can encourage attending physician involvement
- Can mandate better documentation, e.g.
    - Nursing won't start oxytocin unless appropriate note written in chart
- Medical Malpractice Cases often significantly compromised just because of poor documentation
    - Reduce conflicts in the medical record
        - Neonatology initiative to document findings only

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MONTEFIORE MEDICAL CENTER
The University Hospital for the
Albert Einstein College of Medicine
1825 Eastchester Road
Bronx, NY 10461
718 904-

Non–Spontaneous Delivery Note

ADDRESSOGRAPH

Date of Delivery: _____

Type of Delivery: _____ Amniotic Fluid: _____

Episiotomy: ☐ No ☐ Yes Type: _____ Anesthesia: _____

Birth weight: _____ gm Sex: ☐ Boy ☐ Girl ☐ Ambiguous | **Newborn Transported to:**

Apgar scores: _____ 1 min. _____ 5 min. _____ 10 min. | ☐ NICU ☐ Well Baby Unit

Newborn Examination: Injury ☐ No ☐ Yes Describe: _____

Placenta: ☐ Spontaneous ☐ Manual ☐ Expressed Estimated Blood Lost: _____ml

Laceration/Extension: ☐ No ☐ Yes: Type_____ Laceration/episiotomy repair: _____

Indication (check and describe):

☐ Potential fetal compromise (bradycardia, decelerations, abruption)
Describe: _____

☐ Arrest of Labor _____ in the second stage
Describe: _____

_____

☐ Prolonged second stage
Describe: _____

☐ Maternal (exhaustion, cardiac, neurologic disorder)
Describe: _____

☐ Other
Describe: _____

OPERATIVE VAGINAL DELIVERY TYPE: ☐ Does not apply

Verbal consent obtained from patient: ☐ Yes ☐ No

Instrument Used – Note only one Instrument

☐ Forceps type: _____ ☐ Outlet ☐ Low ☐ Mid

☐ Vacuum type: _____ ☐ Outlet ☐ Low ☐ Mid

Position of fetal head at application: _____ Time of application: _____

Station of fetal head at application: _____ Newborn delivery time: _____

Number of pulls (contractions)_____ Placental delivery time: _____

Patient Name: _____ MR # _____ Acct # _____

Shoulder Dystocia Note: ☐ Does not apply

Time of delivery of fetal head_____ Anterior shoulder - ☐ Right or ☐ Left

Time of delivery of infant: _____

Maneuvers Used (Numbers in order performed) **Note – Fundal pressure should not be used.**

☐ Mc Roberts
☐ Suprapubic pressure
☐ Episiotomy: Type: _____
☐ Rotation (Rubin or Woods screw)
☐ Delivery of the posterior arm
☐ Gaskin all-fours
☐ Fracture of clavicle
☐ Zavenelli (cephalic replacement) – Dictated operative report required

Newborn examination of extremities

_____ Symmetric Moro

_____ Deficit describe: ☐ Right or ☐ Left: _____

Events of delivery reviewed with patient: ☐ Yes ☐ No

Other Comments: _____

Pediatrics Staff Present: ☐ Yes ☐ No

Obstetric Staff Present

Attending _____ CNM: _____

Resident_____ Other_____

_____ _____ Date: _____ Time: _____
CNM/Resident/PA Name (Print) CNM/Resident/PA Signature / Credentials

_____ _____ Date: _____ Time: _____
Attending Physician's Name (Print) Attending Signature / Credentials

Audit and Feedback of Guidelines

- Random sample of deliveries each quarter
- Charts reviewed by trained FOJP staff (4 FTE)
- Extensive and robust electronic database for reviews
- Analysis and feedback at the department and physician level
    - Persistent poor documentation jeopardizes provider privileges
- Analyze the data to determine future areas for quality improvement

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Composite Note (CN) Score

0–100 scale

- 10 indicators: 0–10 points for each indicator based on % adherence
- Admission note: 10 points each
  - History
  - Exam
  - Fetal Assessment
  - Plan of Care
  - Estimated Fetal Weight (EFW)

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Composite Note (CN) Score

0–100 scale

- Admission Notes On Time: 10 points
- Progress Notes: 10 points each
  - Assessment of fetal well-being and fetal heart rate
  - Progress of labor
  - Plan of care
- Progress Notes On Time: 10 points
- Cutoff point for the CN Score was the bottom 10% of Physicians

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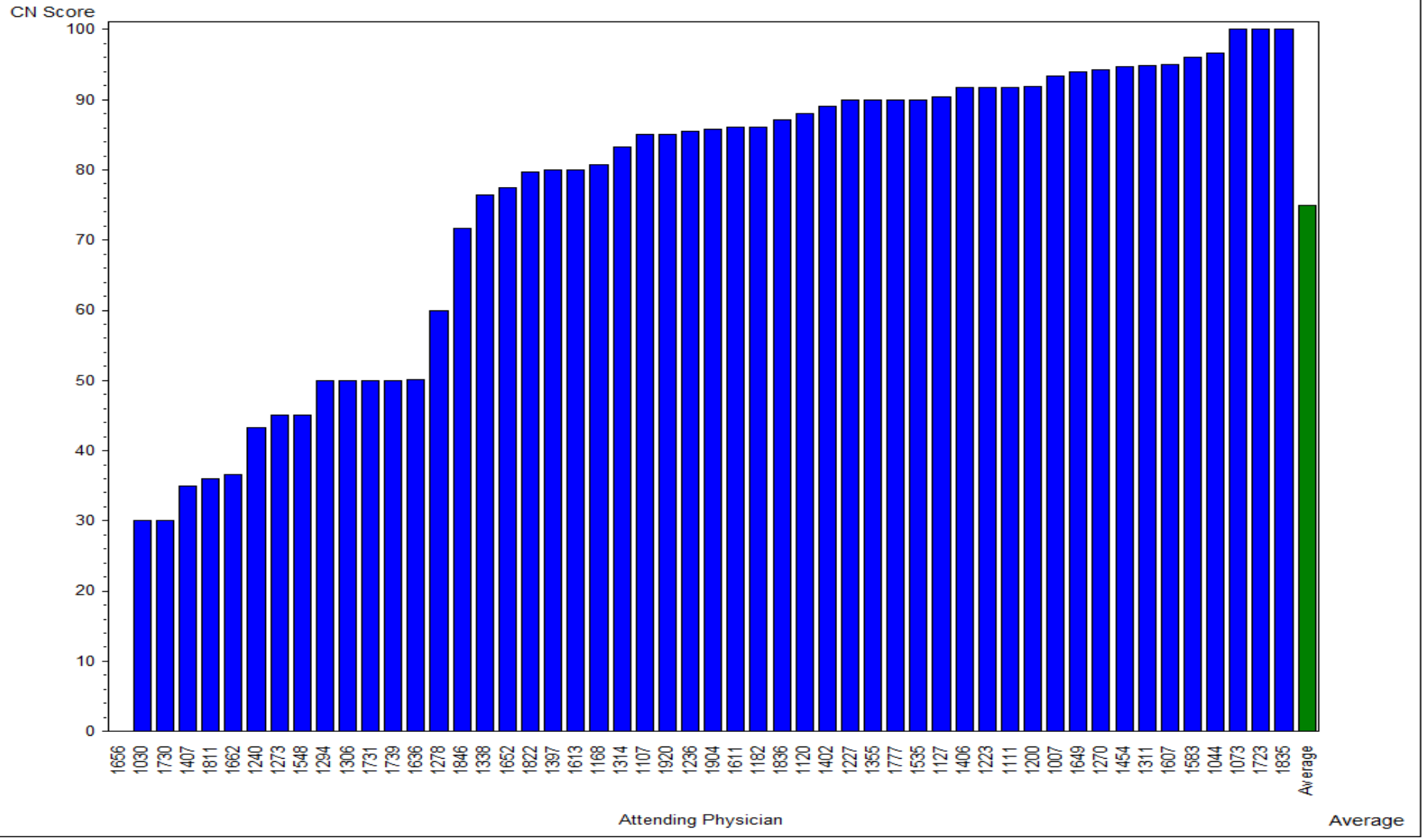
Admission Note Requirements

- For patients in the latent phase of labor, an attending should enter an admission note within 8 hours of admission
- For patients in the active phase of labor, an attending should enter an admission note within 4 hours of admission
- Estimated fetal weight must be documented in the admission note

Montefiore's Weiler Campus CN Score



Best Practices: Neonatal Care

The Jack D. Weiler Hospital and Montefiore North
Divisions of Montefiore Medical Center

Suspected Brachial Plexus Injury (BPI)
Evaluation and Management Form

	Date Admission		Date Discharge		BPI Typical Clinical Findings		
Physical Exam:	**Left**	**Right**	**Left**	**Right**	**Erb's Palsy**	**Erb's Paresis**	**Klumpke**
- Shoulder abduction					Absent	Decrease	Present
- Shoulder external rotation					Absent	Decrease	Present
- Elbow flexion					Absent	Decrease	Present
- Supination					Absent	Decrease	Present
- Wrist & finger extension					Present		Absent
- Biceps reflex					Absent	Decrease	Present
- Grasp reflex					Present		Absent
- Moro reflex					Abnormal		Abnormal
- Hand movement					Present		Absent
- Sensory					Varies		Varies
					"Waiter's tip position"		
Pain Management:					**Erb's + Klumpke = Total BPI**		
- Pain assessment	Pain: Present Absent		Pain: Present Absent		**Comments:**		
- Comfort care	Yes No		Yes No				
- Pain medication	Yes No		Yes No				
Diagnosis:							
Attending Name (Print)							
Attending Signature							

Imaging	
- Clavicles & Chest X-Ray	
- Upper Extremity X-Ray	
- Other	

Recommendations/Consults/Referrals		
Primary Care Follow Up Telephone #: Appointment Date and Time		
Peds Neurology Consult Date/Time Name	I O NN H	
Orthopedic Consult Date/Time Name	I O NN H	
PT / OT Consult Date/Time Name	Yes No	
Patient Safety Officer Notified	Yes No	Date: Time: Contact person:
Monte Home Care Referral	Yes No	
Early Intervention Referral EIP Child Find Referral (ICHAP)	Yes No Yes No	

↑: Increase U: Unchanged I: Inpatient H: HMO (Referral by Primary Care Provider)
↓: Decrease N: Normal O: Outpatient NN: Not needed

Patient Safety Nurse

- Organizes simulation program/patient safety course
- Conducts chart audits
- Participates in QI meetings
- Educates providers on Best Practices and Team Training principles
- Connects with families with poor outcomes (in particular those with families whose babies have neurologic deficits) to ensure appropriate follow up.

Shifting Patient Safety into High Gear

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Lessons from Obstetrics

MedCPU

Eyal Ephrat, MD | MedCPU

Ms. Jones, G2P1 at 37.5 weeks, was admitted to the hospital at 8pm for induction of labor due to preeclampsia.

Admission 8:00pm	• **Pt. admitted to the hospital for induction of labor due to preeclampsia.**
ERROR	**Failure to document severity of Preeclampsia as indication for induction**
ERROR	**Failure to document birth weight of her earlier delivery, and whether there were any complications**
ERROR	**Failure to document severity of her obesity**
ERROR	**Failure to perform anesthesia consult on admission; no documentation that one done antenatally**

8:00pm	• **BP: 160/100**
ERROR	**Failure to initiate treatment w/ antihypertensives at this point if sustained**
ERROR	**Failure to initiate treatment w/ magnesium sulfate at this point if sustained; pt qualified as severe preeclampsia**

8:45pm	• Oxytocin induction began
ERROR	Failure to evaluate and document fetal position
ERROR	Failure to evaluate and document EFW. Given her obesity and uncontrolled diabetes, EFW is even more important
ERROR	Failure to perform cervical examination to determine need for cervical ripening
ERROR	Failure to document maternal consent

12:00am	• BP = 183/99
	• Cervix = 8cm dilated/100% effaced; ruptured membranes, clear fluid
ERROR	Failure to initiate treatment w/ antihypertensives
ERROR	Failure to initiate treatment w/ magnesium sulfate
ERROR	Failure to document Station

1:10am	• a bolus of MgS04 was administered due to risk for seizures (platelet count = 97K)
	Pt has Severe Preeclampsia. Mag Sulfate could reasonably have been started a while ago

2:30am	• Cervix fully dilated and began to push
ERROR	Failure to document Station

3:15am	• Episiotomy performed and the head delivered the head Obstetrician applied traction and encountered shoulder dystocia
ERROR	Failure to document times
ERROR	Failure to document head position

3:20am	• Female infant delivered, Apgars 8/9, wt = 8 lbs 3 oz
ERROR	Failure to document cord blood gases (5 Minute shoulder dystocia)

	• OB MD documented mother's legs were "up" but no specific reference to McRobert's maneuver or application of Suprapubic pressure was written in the delivery note; dictation not performed
ERROR	poor documentation of mandatory items following SD.

The Data Challenge: Unstructured Clinical Data

Dictated Physician Encounter Note

DATE: 12/29/2010 13:45

REASON FOR CONSULTATION: Acute myocardial infarction.

HISTORY OF PRESENT ILLNESS: The patient is a 51-year-old without significant past medical history on no medication. He is a heavy smoker who comes to the Emergency Room with 2 days of chest pain. The patient started to have pain sometime on Saturday during the day. It was in her chest radiating up to her neck as it also hurt to breathe. This persisted for the next 2 days. She called her friend Monday morning, brought her to the Emergency Room. She is complaining of ongoing chest pain which she feels is similar to her presenting pain; however, it hurts to move or to take deep breaths as it goes up to her neck and jaw. It is a little better sitting forward. She has not had any of this discomfort prior to the onset on Saturday.

Her risk factor[illegible]s from looking in her record on SR[illegible]

Her son and fr[illegible] distress and c[illegible] the patient is i[illegible]

Her CK-MB ar[illegible] BUN 23, creat[illegible]olute neutrophil count of 16%, [illegible]ray showed what appeared to b[illegible]

On exam, her [illegible]o jugular venous distention. Lur[illegible] impulse was somewhat dis[illegible]

30% - 90%

of clinical data is unstructured

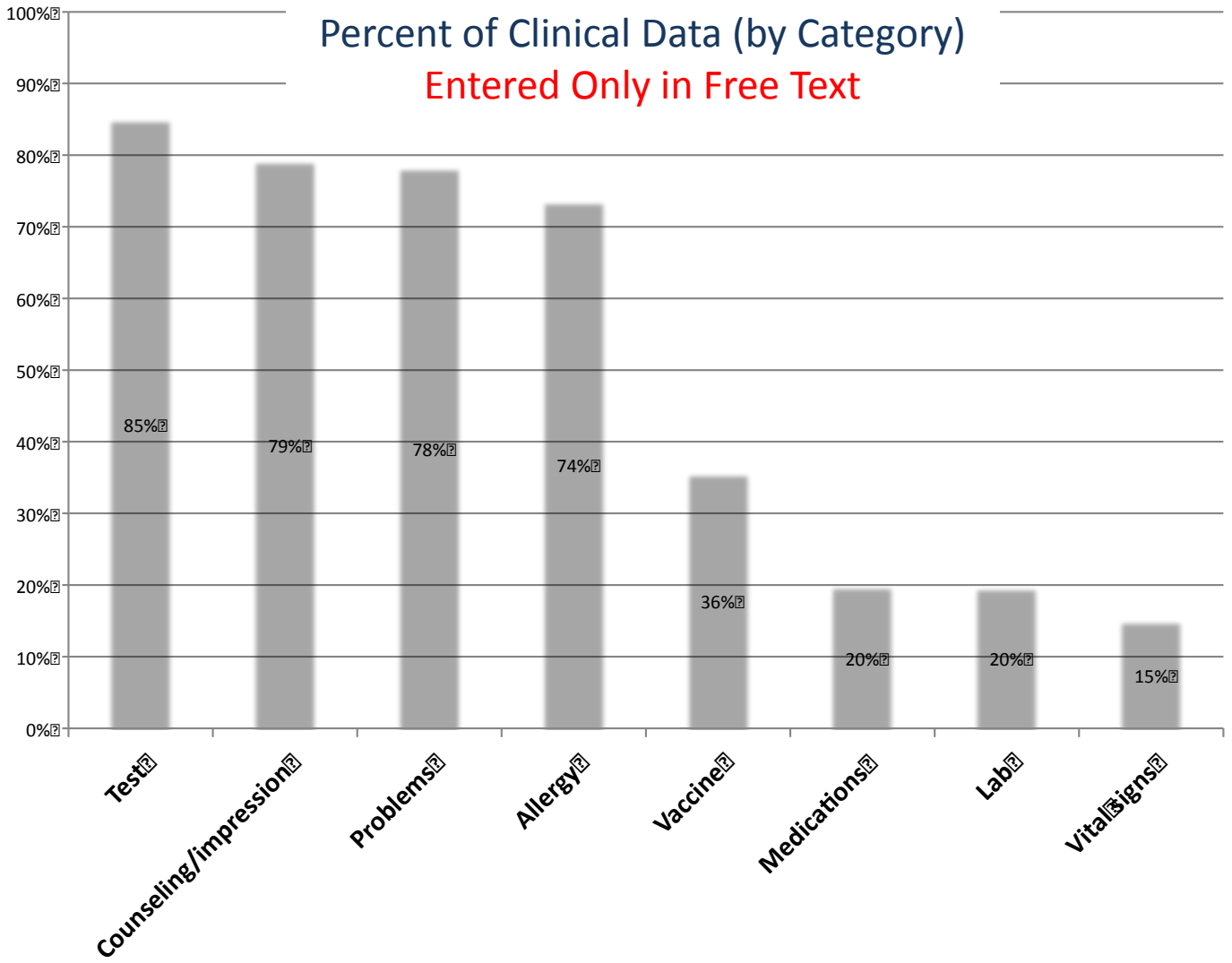
A stat echocardiogram done showed a very extensive inferior, posterior and lateral areas of akinesis; her anterior wall contracting normally. She had moderate mitral regurgitation, mild-to-moderate tricuspid regurgitation with an elevated pulmonary artery pressure estimate probably around 50 and there was no significant pericardial effusion.

ASSESSMENT AND PLAN: This is a 51-year-old who has had an extensive inferior posterior
lateral myocardial infarction and moderate mitral regurgitation as a consequence. She is not in heart failure and apparently her myocardial infarction began on Saturday and is ongoing. Whether her pain is now all infarct pericardotomy syndrome or ongoing ischemia is unclear. She says pain is the same although there is a pleuritic component. She does have ongoing ischemic ST depression of up to 2 mm, which could represent posterior infarct. At this point, I would proceed to cardiac catheterization and recommendations will be pending the results.

Discharge Plan:
1) beta blocker c lopressor 50mg PO BID
2) Start Cardiac diet
3) Follow up 3 months
4) Lipid profile

Dictated by: Dr Cardiology, MD

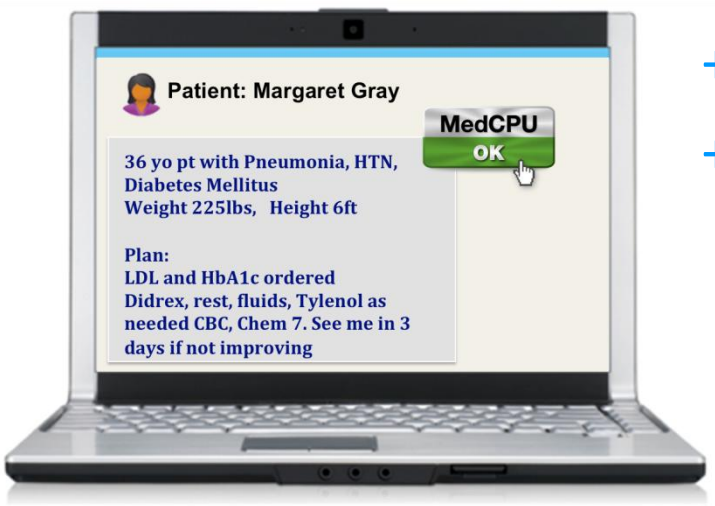
The Data Challenge: Unstructured Clinical Data



Incomplete Data = Incomplete Analytics

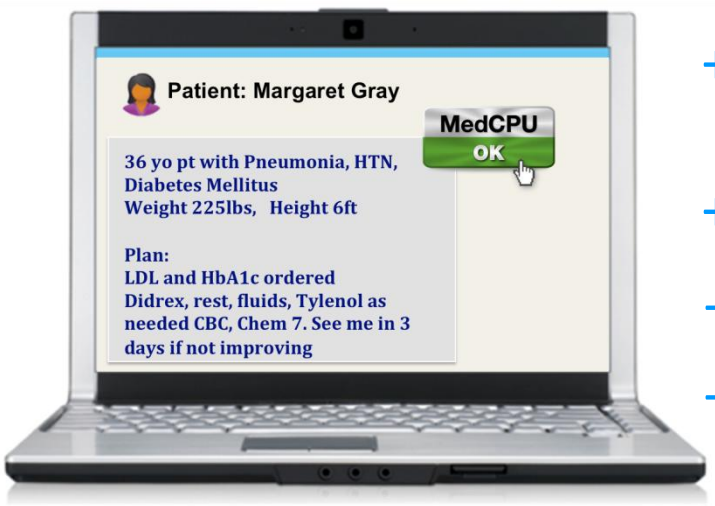
- **Incomplete Data for:**
  - Accurately **Prompting** for Care Quality Control and Standardization
  - Standardizing Patient Information Across Network
  - Meaningful Analytics
  - Care Coordination

The MedCPU Advisor™

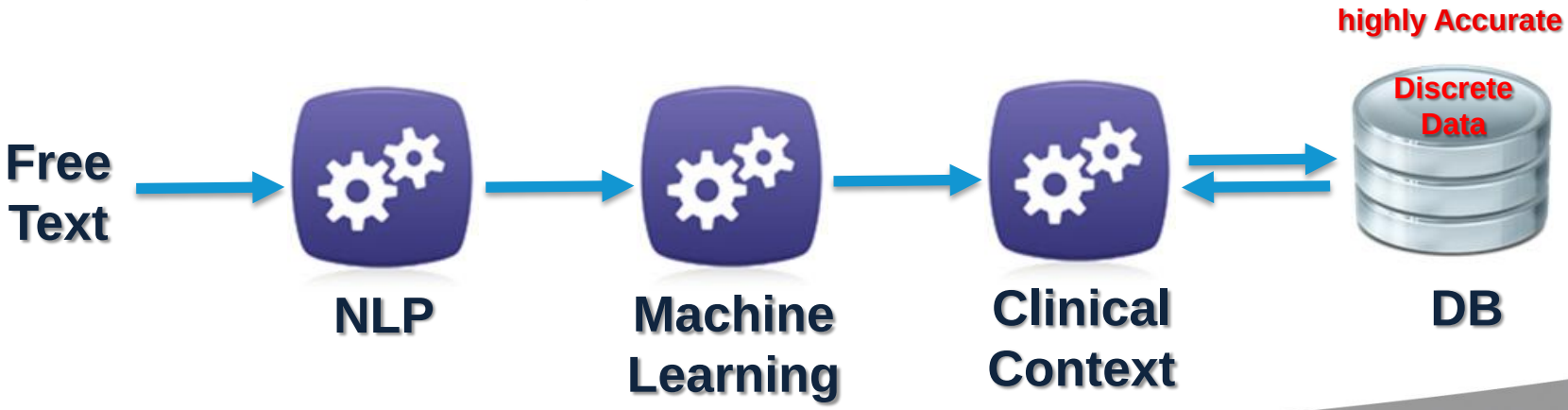


- Floats on top ANY EMR system (EMR Agnostic)
- Reads in real-time all patient information
  - Reading from the organization's EMR screen (using MSAA Reading technology)
  - Consuming from organization's Interface Engine (HL7)

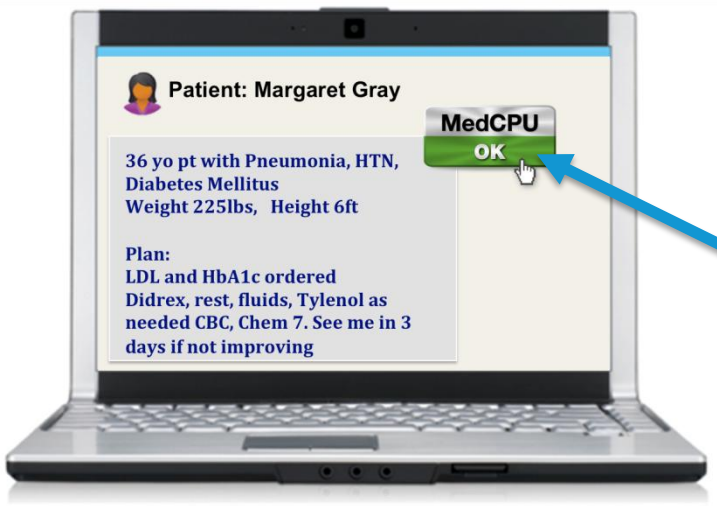
The MedCPU Advisor™



+ Converts narrative/free text notes to highly accurate discrete data, in real-time
+ Revolutionary **Medical Text Processor**
+ Also collects all structured fields entries
+ Functions as accurate **Data Agent** for the organization



The MedCPU Advisor™



\+ Robust **Clinical Decision Support Engine**

\+ Best Practice **Plug-Ins** Library

Decision Support Engine

ACO

PCMH

Home Health

Diabetes

Spine

Stroke

OB

MU CQM

ER

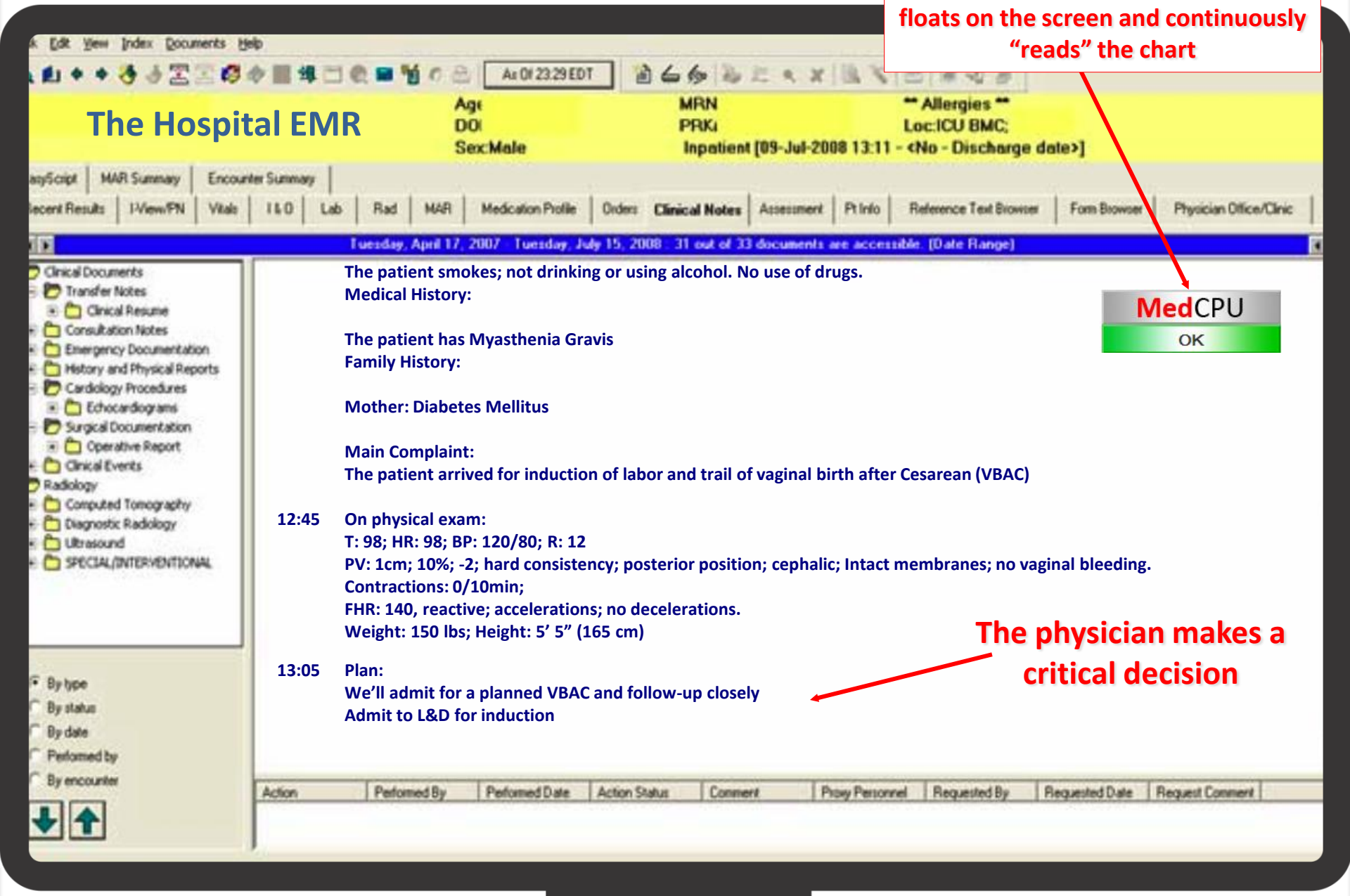
More…

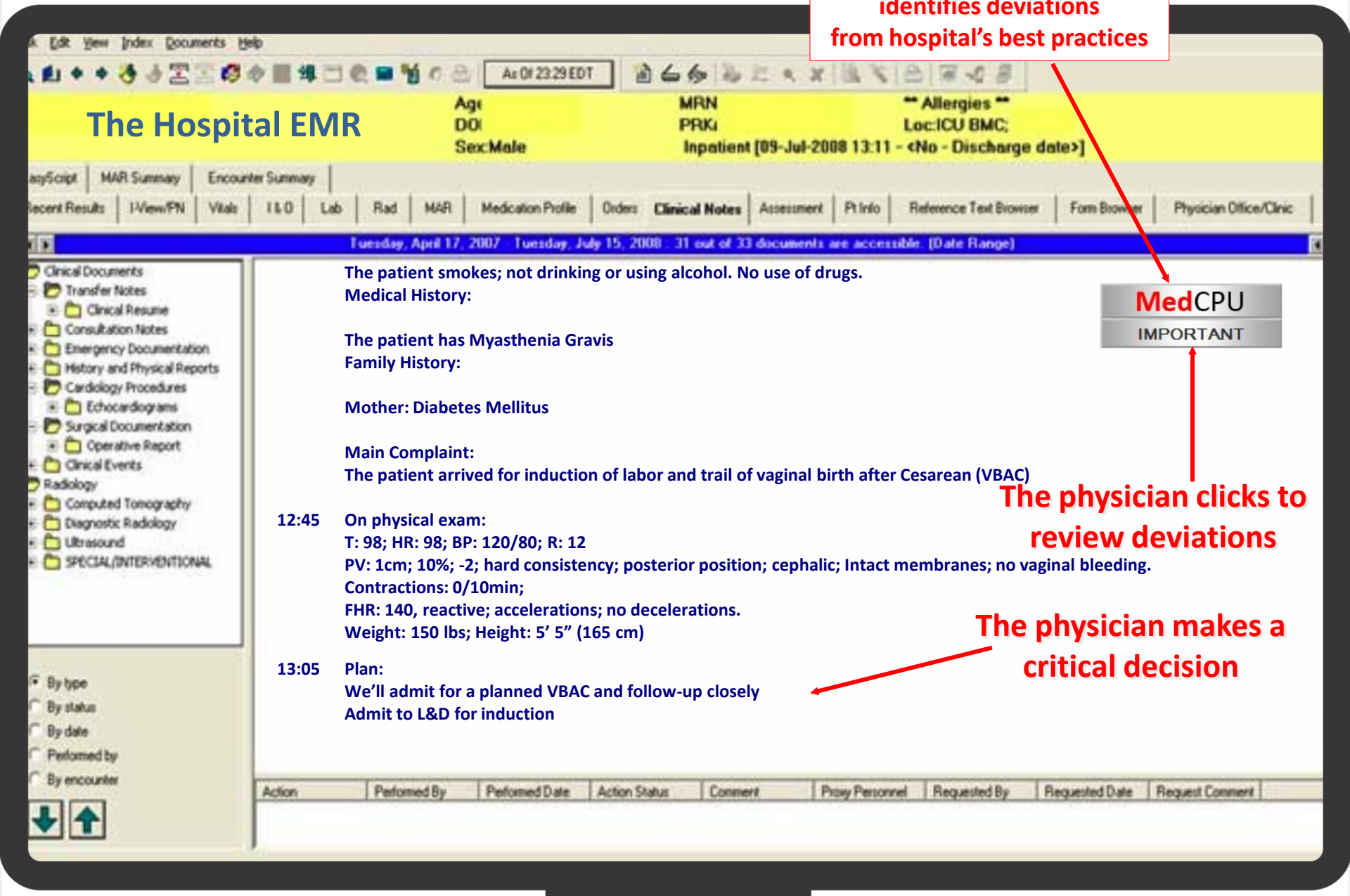
Asthma

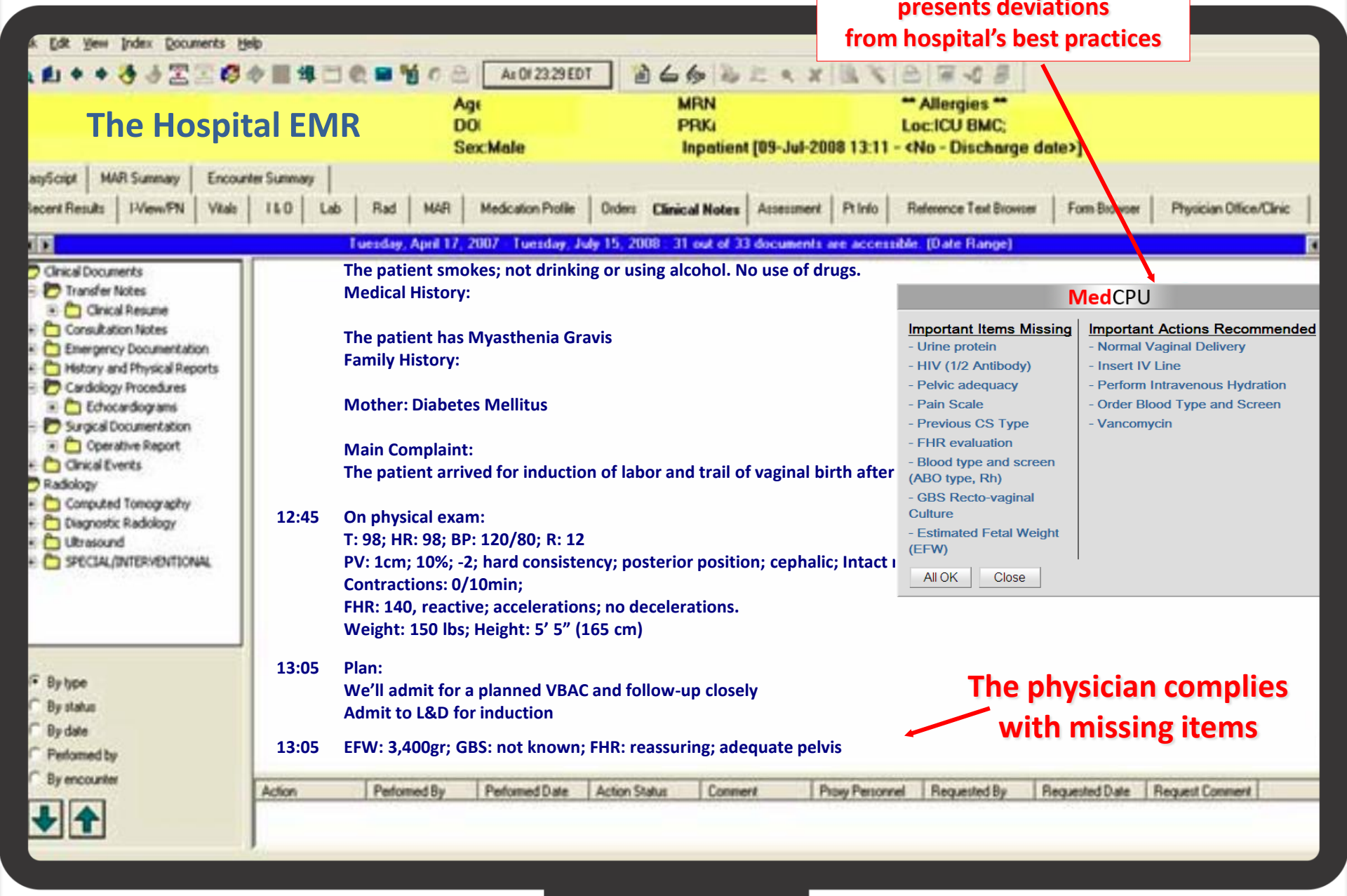
Readmissions Reduction

MedCPU

MedCPU in Action




MedCPU Advisor™ Button identifies deviations from hospital's best practices
The Hospital EMR
Age
DOI
Sex:Male
MRN
PRK
** Allergies **
Loc:ICU BMC;
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
MAR Summary
Encounter Summary
Vitals
I&O
Lab
Rad
MAR
Medication Profile
Orders
Clinical Notes
Assessment
Pt Info
Reference Text Browser
Physician Office/Clinic
Tuesday, April 17, 2007 - Tuesday, July 15, 2008 : 31 out of 33 documents are accessible. (Date Range)
Clinical Documents
Transfer Notes
Clinical Resume
Consultation Notes
Emergency Documentation
History and Physical Reports
Cardiology Procedures
Echocardiograms
Surgical Documentation
Operative Report
Clinical Events
Radiology
Computed Tomography
Diagnostic Radiology
Ultrasound
SPECIAL/INTERVENTIONAL
The patient smokes; not drinking or using alcohol. No use of drugs.
Medical History:
The patient has Myasthenia Gravis
Family History:
Mother: Diabetes Mellitus
Main Complaint:
The patient arrived for induction of labor and trail of vaginal birth after Cesarean (VBAC)
MedCPU
IMPORTANT
The physician clicks to review deviations
12:45 On physical exam:
T: 98; HR: 98; BP: 120/80; R: 12
PV: 1cm; 10%; -2; hard consistency; posterior position; cephalic; Intact membranes; no vaginal bleeding.
Contractions: 0/10min;
FHR: 140, reactive; accelerations; no decelerations.
Weight: 150 lbs; Height: 5' 5" (165 cm)
The physician makes a critical decision
13:05 Plan:
We'll admit for a planned VBAC and follow-up closely
Admit to L&D for induction
By type
By status
By date
Performed by
By encounter
Action
Performed By
Performed Date
Action Status
Comment
Proxy Personnel
Requested By
Requested Date
Request Comment


MedCPU Advisor™ Button presents deviations from hospital's best practices
The Hospital EMR
Sex:Male
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
Allergies
Loc:ICU BMC;
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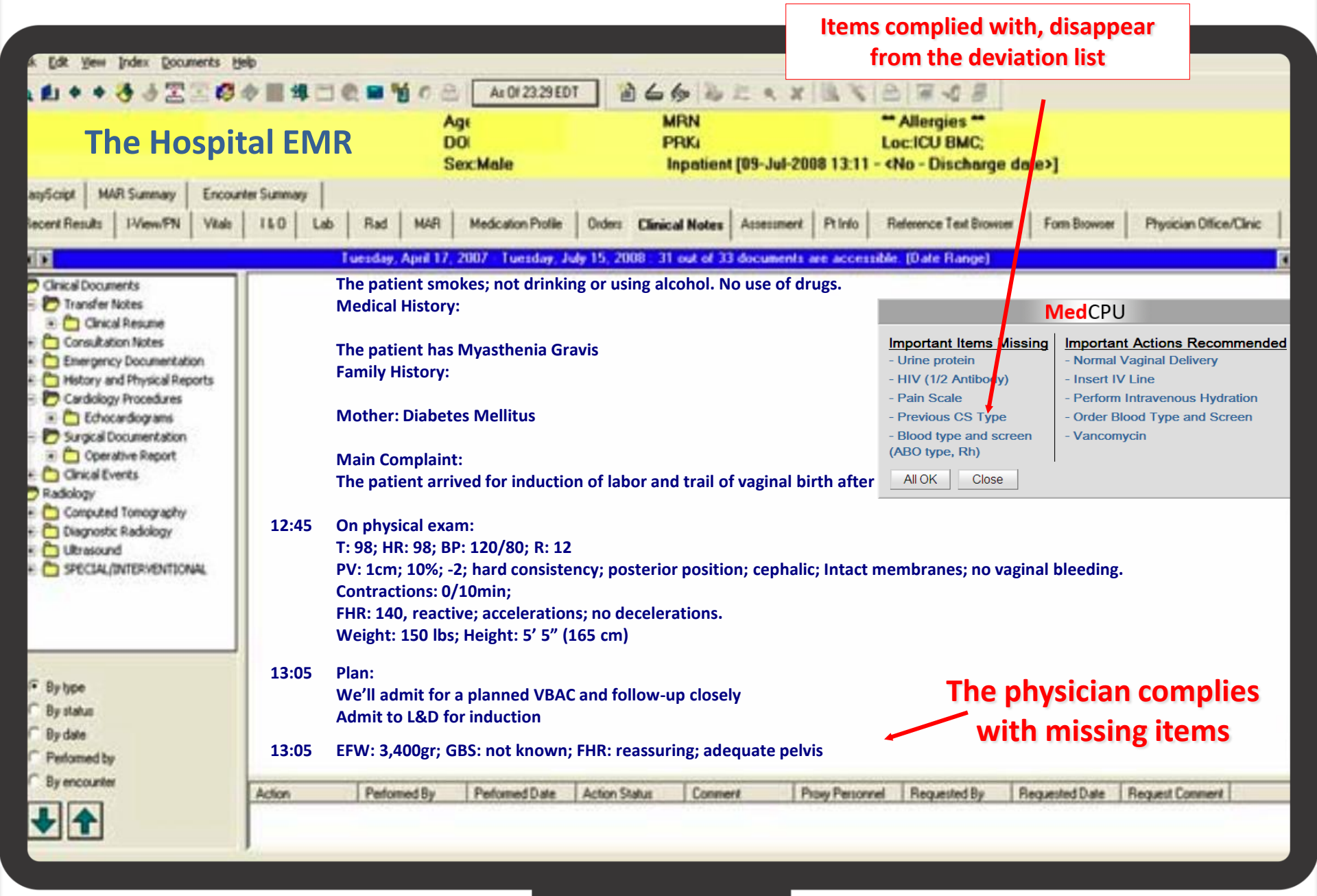
Contractions: 0/10min;
FHR: 140, reactive; accelerations; no decelerations.
Weight: 150 lbs; Height: 5' 5" (165 cm)
13:05 Plan:
We'll admit for a planned VBAC and follow-up closely
Admit to L&D for induction
13:05 EFW: 3,400gr; GBS: not known; FHR: reassuring; adequate pelvis
MedCPU
Important Items Missing
- Urine protein
- HIV (1/2 Antibody)
- Pelvic adequacy
- Pain Scale
- Previous CS Type
- FHR evaluation
- Blood type and screen (ABO type, Rh)
- GBS Recto-vaginal Culture
- Estimated Fetal Weight (EFW)
Important Actions Recommended
- Normal Vaginal Delivery
- Insert IV Line
- Perform Intravenous Hydration
- Order Blood Type and Screen
- Vancomycin
All OK
Close
The physician complies with missing items


Items complied with, disappear from the deviation list
The Hospital EMR
Edit View Index Documents Help
Sex:Male
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
MAR Summary
Encounter Summary
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I&O
Lab
Rad
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Ultrasound
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By type
By status
By date
Performed by
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- Vancomycin
All OK
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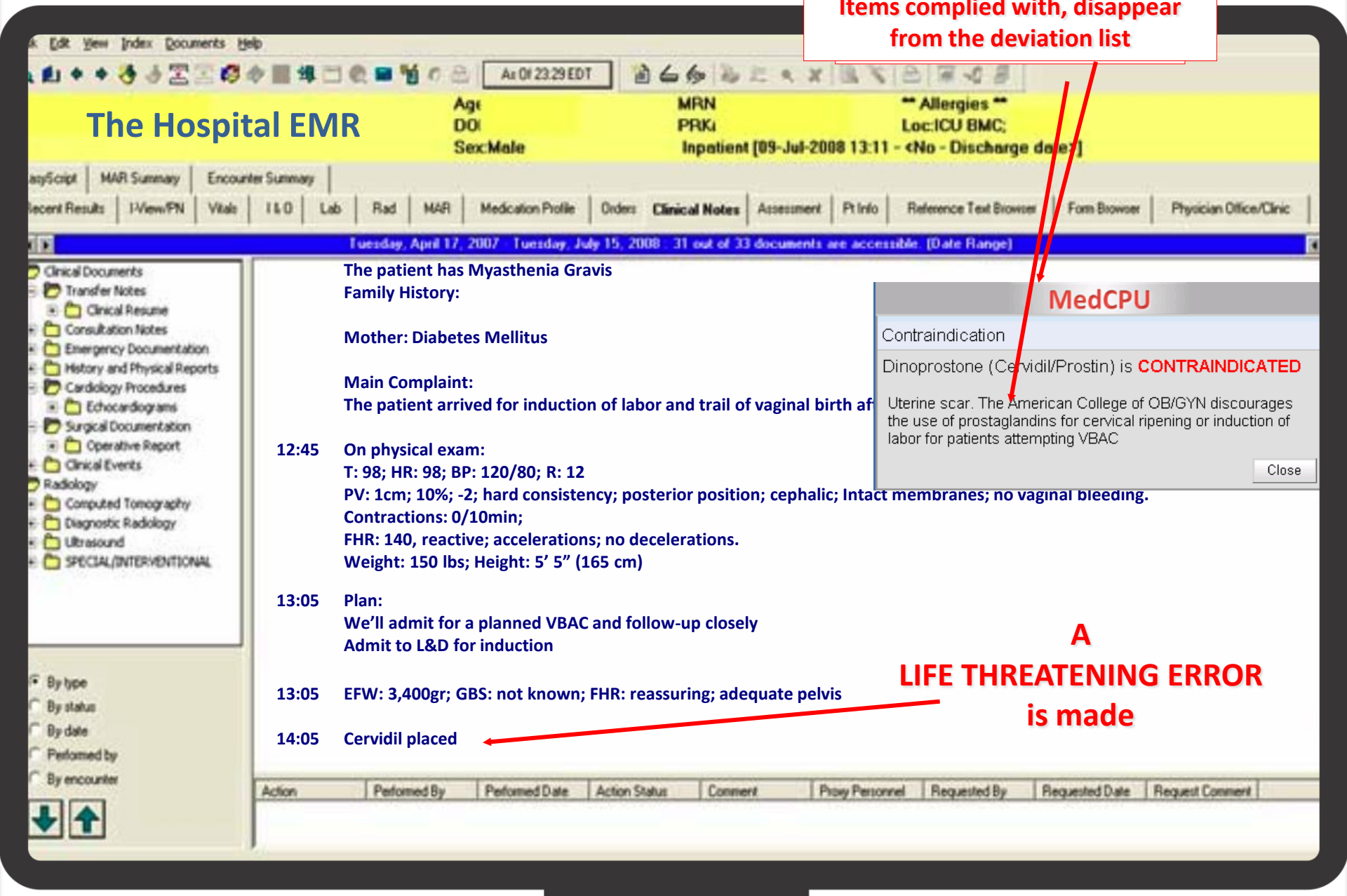
Admit to L&D for induction
13:05 EFW: 3,400gr; GBS: not known; FHR: reassuring; adequate pelvis
The physician complies with missing items
Action
Performed By
Performed Date
Action Status
Comment
Proxy Personnel
Requested By
Requested Date
Request Comment


Items complied with, disappear from the deviation list
The Hospital EMR
Sex:Male
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
Loc:ICU BMC;
** Allergies **
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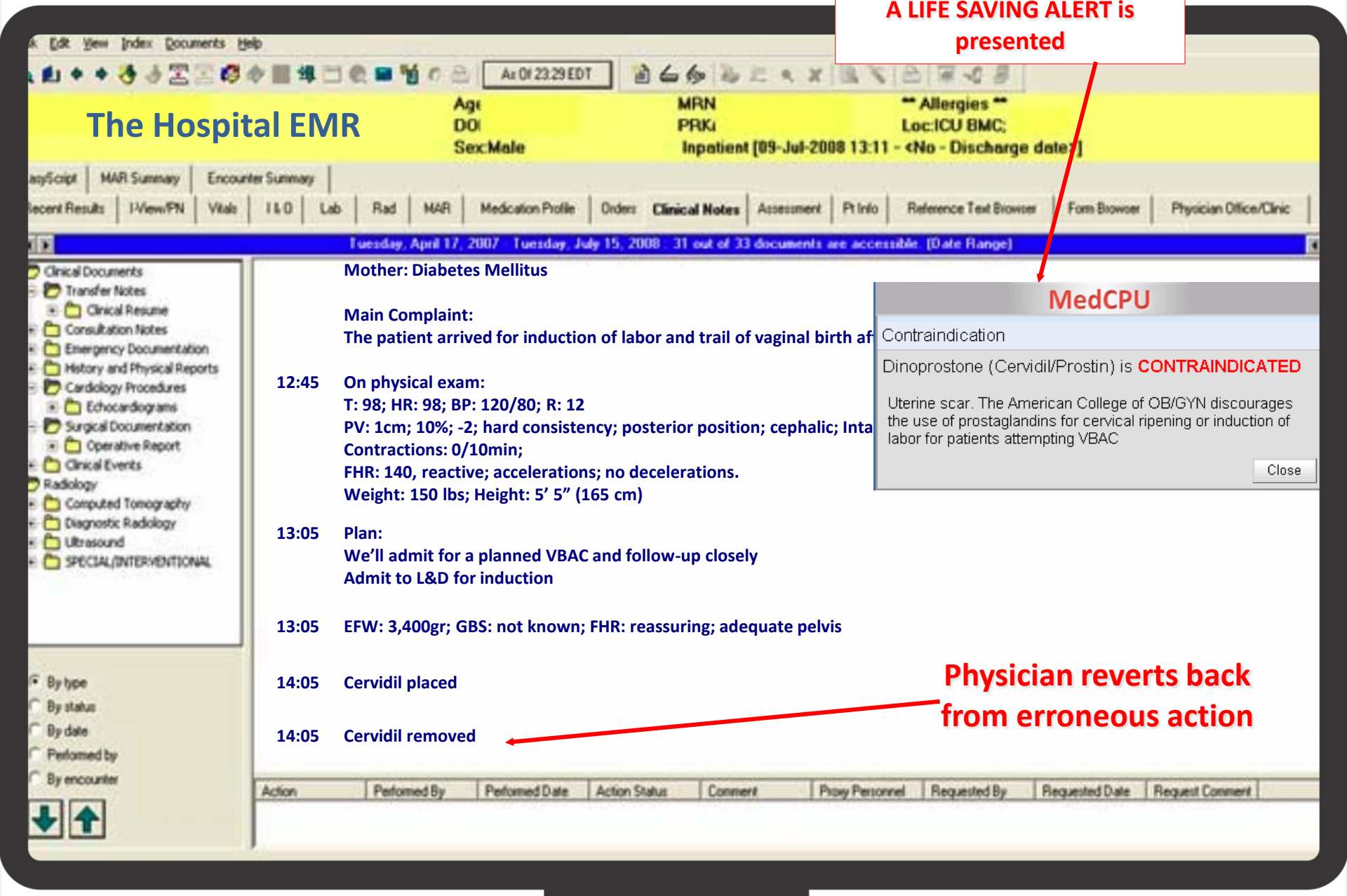
Contractions: 0/10min;
FHR: 140, reactive; accelerations; no decelerations.
Weight: 150 lbs; Height: 5' 5" (165 cm)
13:05 Plan:
We'll admit for a planned VBAC and follow-up closely
Admit to L&D for induction
13:05 EFW: 3,400gr; GBS: not known; FHR: reassuring; adequate pelvis
14:05 Cervidil placed
MedCPU
Contraindication
Dinoprostone (Cervidil/Prostin) is CONTRAINDICATED
Uterine scar. The American College of OB/GYN discourages the use of prostaglandins for cervical ripening or induction of labor for patients attempting VBAC
Close
A
LIFE THREATENING ERROR
is made
Action
Performed By
Performed Date
Action Status
Comment
Proxy Personnel
Requested By
Requested Date
Request Comment


A LIFE SAVING ALERT is presented
The Hospital EMR
Edit View Index Documents Help
Sex:Male
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
MAR Summary
Encounter Summary
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By encounter
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Main Complaint:
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FHR: 140, reactive; accelerations; no decelerations.
Weight: 150 lbs; Height: 5' 5" (165 cm)
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Admit to L&D for induction
13:05 EFW: 3,400gr; GBS: not known; FHR: reassuring; adequate pelvis
14:05 Cervidil placed
14:05 Cervidil removed
MedCPU
Contraindication
Dinoprostone (Cervidil/Prostin) is CONTRAINDICATED
Uterine scar. The American College of OB/GYN discourages the use of prostaglandins for cervical ripening or induction of labor for patients attempting VBAC
Close
Physician reverts back from erroneous action
Action
Performed By
Performed Date
Action Status
Comment
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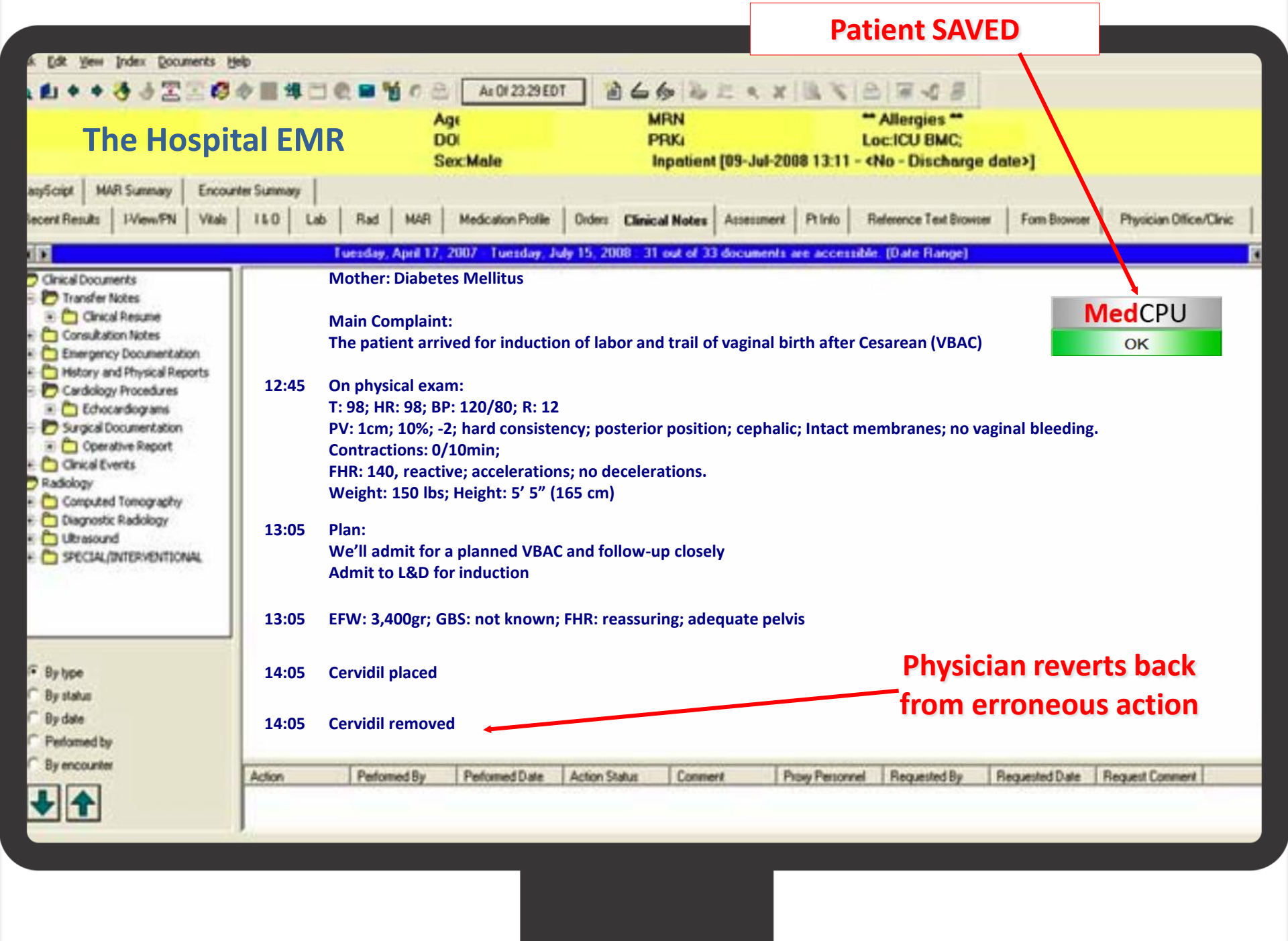
Requested By
Requested Date
Request Comment


Patient SAVED
The Hospital EMR
Edit View Index Documents Help
As Of 23:29 EDT
Age
DOI
Sex:Male
MRN
PRK
** Allergies **
Loc:ICU BMC;
Inpatient [09-Jul-2008 13:11 - <No - Discharge date>]
MAR Summary
Encounter Summary
Recent Results
I/View/PN
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SPECIAL/INTERVENTIONAL
By type
By status
By date
Performed by
By encounter
Mother: Diabetes Mellitus
Main Complaint:
The patient arrived for induction of labor and trail of vaginal birth after Cesarean (VBAC)
MedCPU
OK
12:45 On physical exam:
T: 98; HR: 98; BP: 120/80; R: 12
PV: 1cm; 10%; -2; hard consistency; posterior position; cephalic; Intact membranes; no vaginal bleeding.
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