

Using the electronic health record (EHR) to enhance student learning

Department of Family and
Community Medicine

Alison E. Dobbie, MD, MRCGP
Jay B. Morrow, DVM, MS

3 ways to use EHR to enhance learning

1. Enhancing doctor-patient communication skills
2. Increasing just-in-time learning
3. Improving clinical performance



Literature Review

- ▶ Exam room computers have positive effects on physician-patient interactions (Hsu et al.¹)
 - ▶ Kaiser Permanente primary care, patient questionnaires (n = 313)
 - ▶ M-2, M and M+7 after introduction of exam room computers
 - ▶ Patients: EHR helped run the visit in timely manner
 - ▶ Patients satisfied with communication about psychosocial concerns

Literature Review

- ▶ Observational study of Israeli primary care encounters (Margalit et al²)
 - ▶ *“The computer has become a third party in medical visits, one that demands a significant portion of visit time.”*
- ▶ Physicians spend 25% visit time gazing at computer screen
 - ▶ Inversely related to psychosocial questions, emotional exchange
- ▶ Keyboarding associated with lower levels of dialogue



Literature Review

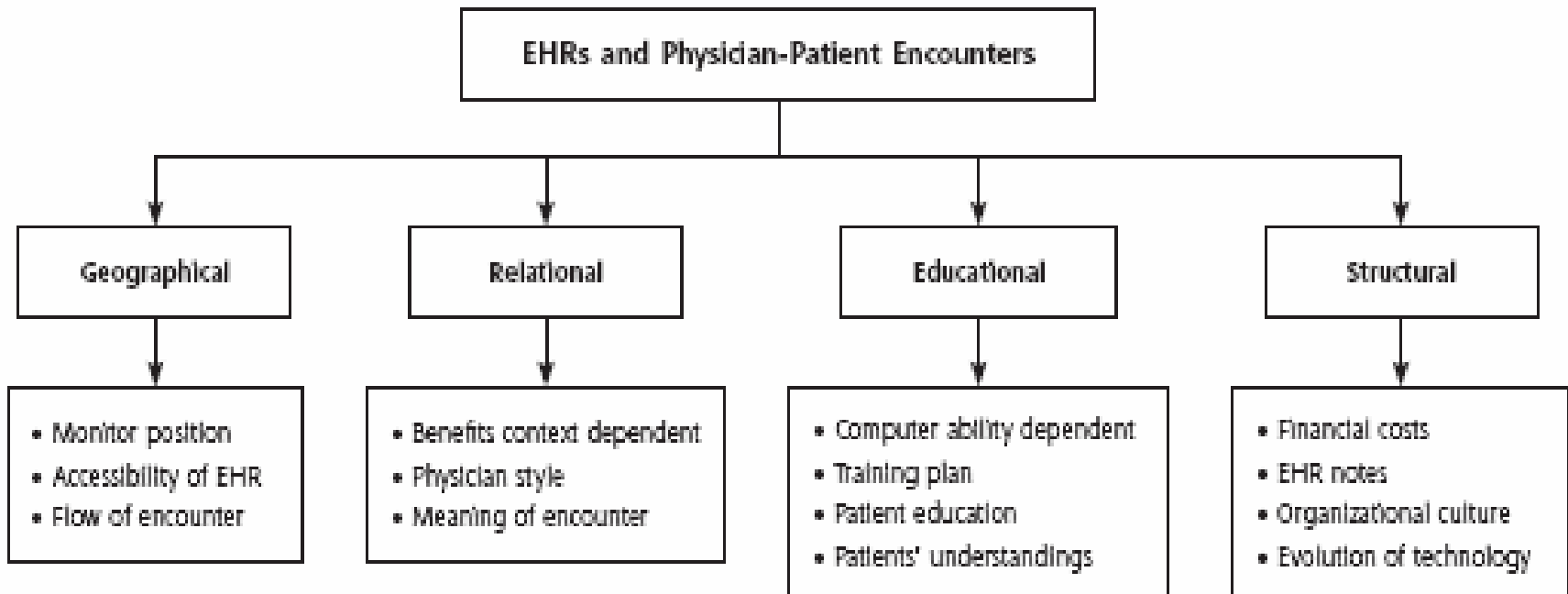
- ▶ *EHRs alone don't improve quality of care* (Linder et al.³)
 - ▶ 1.8 billion office visits reviewed
 - ▶ 17 quality measures assessed
 - ▶ EHR made no difference in 14 measures



Literature Review

- ▶ *Four thematic areas of EHR communication* (Ventres et al.⁴)
Geographical, Relational, Educational and Structural

Figure 1. Themes and factors influencing electronic health record (EHR) use and physician-patient encounters.



Literature Review

- ▶ Exam room computing & clinician-patient communication; a video qualitative analysis of introduction of computers (Frankel et al.⁵)
 - ▶ *“The visual and cognitive attention required for a clinician to enter and retrieve data while maintaining the flow of the visit can be complex.”*
- ▶ Clinicians communicate with patients
 - ▶ Verbally
 - ▶ Visually
 - ▶ Posturally



Literature Review

- ▶ Differences in physician-patient interaction may be due to *physician experience* (Rouf et al.⁶)
- ▶ *Medical students are concerned* about impact of EHR on doctor-patient relationship [UMKC MS3 survey] (Rouf, Chumley and Dobbie⁷)
 - ▶ 64% satisfied with doctor-patient communication with EHR
 - ▶ 48% stated they spent less time looking at the patient
 - ▶ 39% responded that they received more feedback on EHR notes



Problem / Gap in literature

- All graduating medical students will practice using EHRs (Shine^{8,9})
- No published curricula guiding EHR-specific communication for students

1. Enhancing doctor-patient communication skills

UT Southwestern Fall 2007 MS1 pilot study

MS1 pilot study

- ▶ “Embracing the Elephant in the Room...”
(Morrow et al.¹⁰)
- ▶ Purpose
 - ▶ Establish the feasibility and practicality of teaching EHR-specific communication skills to early first year medical students.

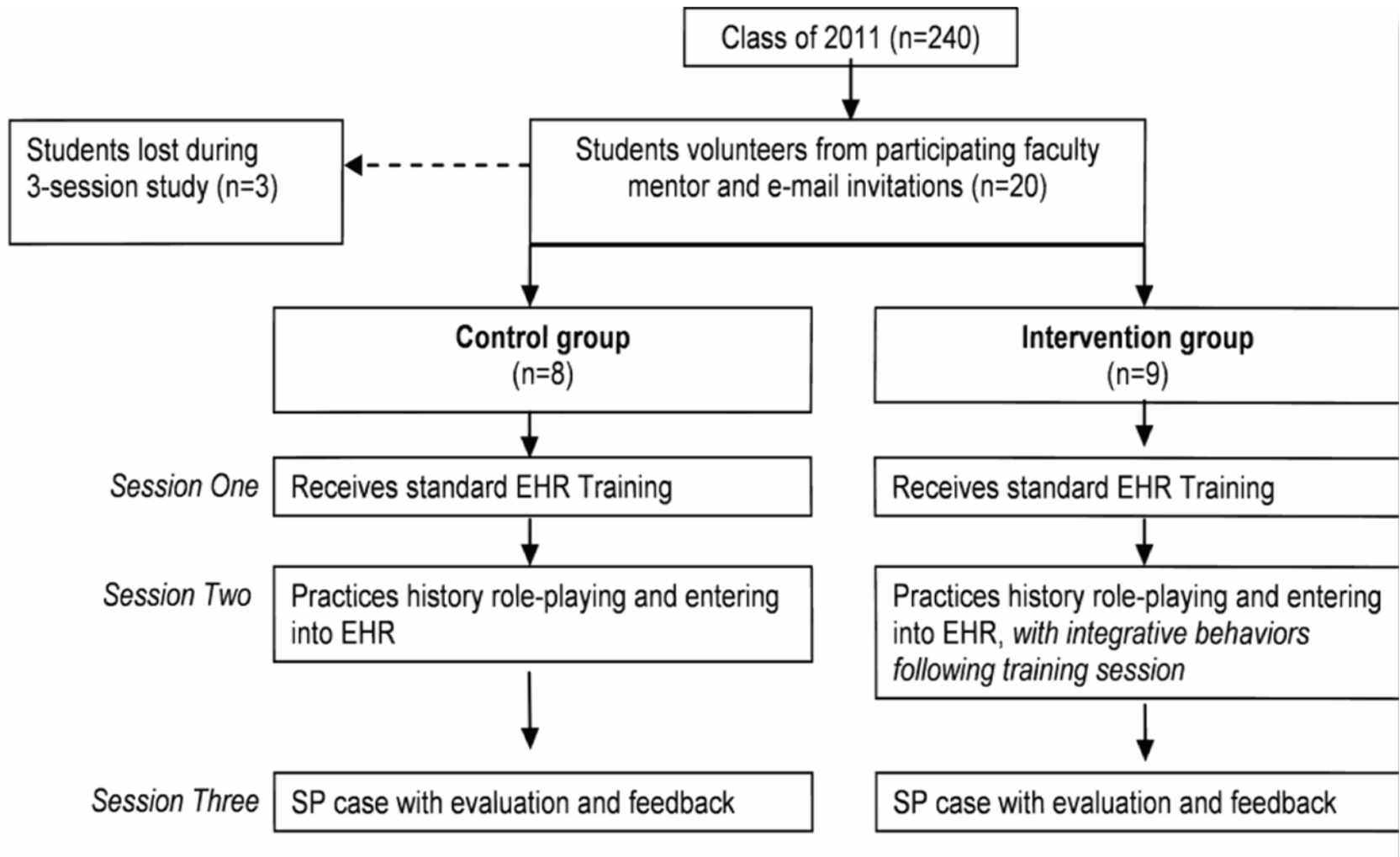


Research Questions

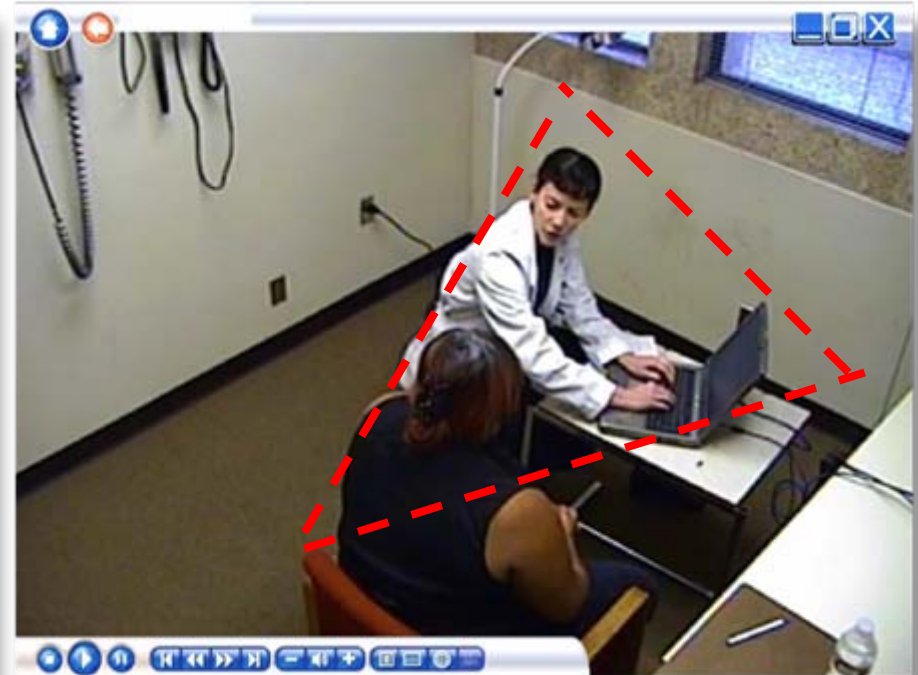
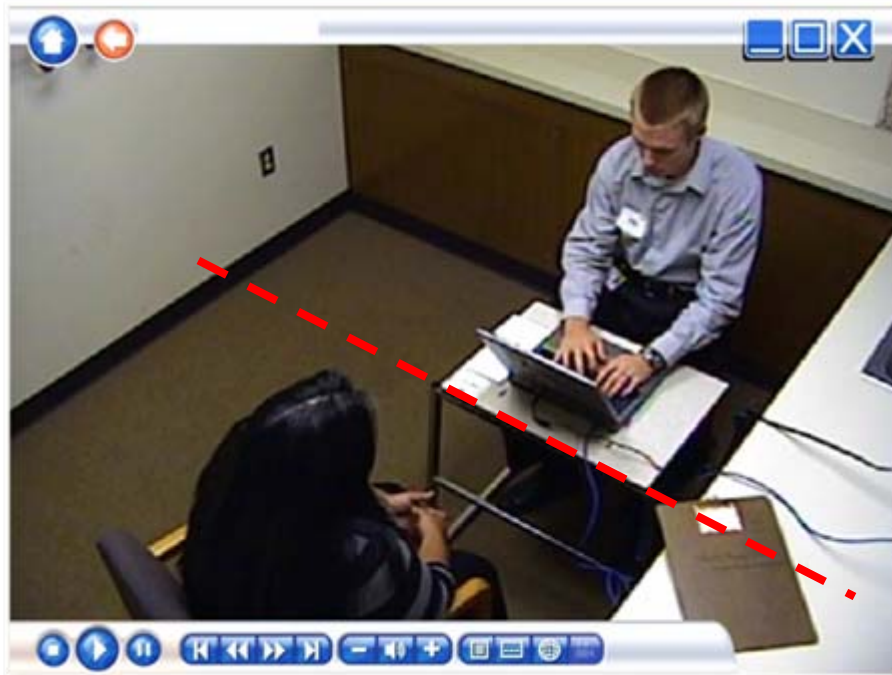
- 1) Do first year medical students spontaneously demonstrate EHR-specific communication skills? and
- 2) If not, can they be taught such skills in the first semester of their medical training?



Methods



Video Evaluation of MS1 EHR communication skills

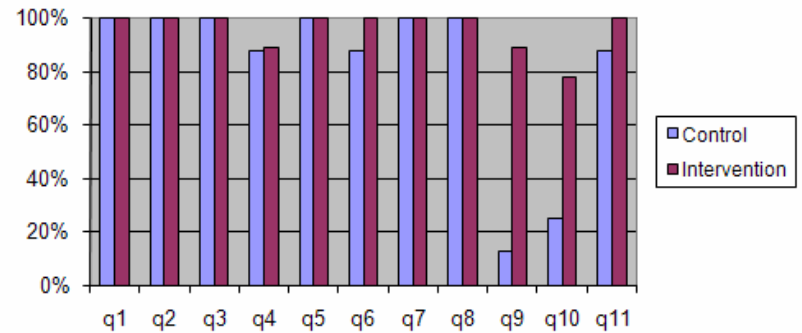


Results

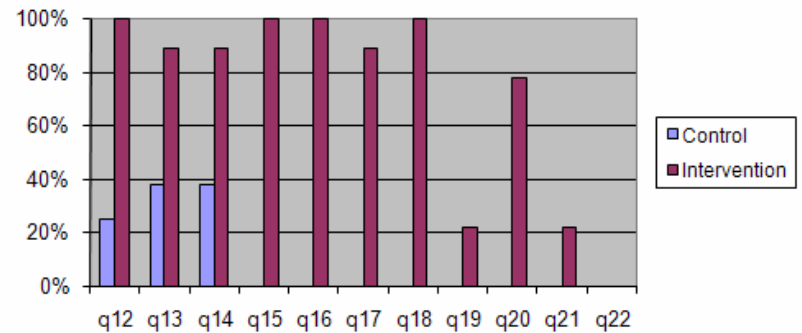
➤ In 9 of 11 items, there was *no difference in general communication skills* performance between groups.

➤ Intervention group students performed significantly better ($p < .05$) than control on 6 of 10 EHR communication skill items.

Exhibition of General Communication Skills as Evaluated by SP's



Exhibition of EHR Communication Skills as Evaluated by SP's



Pilot Conclusions

1. First year medical students can demonstrate EHR communication skills early in their medical training.
2. In our setting *students did not spontaneously demonstrate the EHR skills without instruction*
3. *EHR-specific skills bore no relation to students' general communication skills.*

Study limitations

- Small sample size
- Self-selected student population
- SP training for new EHR communication skills assessment may have presented blinding issue.
- Generalizable to advanced students? Residents? Clinicians?
- Patient satisfaction?



2. Increasing just-in-time learning

Using technology to optimize encounter quality

Increasing just-in-time learning

- ▶ Teach students which tools to use in context of a visit:
 - ▶ ePocrates, 5-minute consult, Google (excellent patient education)
 - ▶ CDC's US Electronic Preventive Services Selector
 - ▶ <http://epss.ahrq.gov/ePSS/search.jsp> (e.g., 50 YO female non-smoker)
- ▶ And which tools not to use:
 - ▶ Cochrane, Pubmed



Increasing just-in-time learning

- ▶ And how to empower patients with timely information
 - ▶ Only 36% of MS3's reported accessing clinical guidelines and online patient info when using the EHR (Rouf, Chumley and Dobbie⁷)
 - ▶ *We must link tools within the EHR*
- ▶ Case-based exercises failed to improve medical students' information management skills at the point of care (Chumley, Dobbie, and Delzell¹¹)
 - ▶ *Even when questioned directly about medication interactions by a standardized patient, only 38% consulted their PDAs to investigate*



3. Improving clinical performance

Enhance training, decrease medical error, increase patient safety

Improving clinical performance

- ▶ **Students/attendings use templates to document better:**
 - ▶ Students create notes that are easily reviewed by attendings
 - ▶ ↑ feedback from attendings; takes 1 minute
 - ▶ Real-time feedback/editing with attendings → Dup Note function
 - ▶ Potential to ↓ medical error (prompts to record information)
 - ▶ Attendings can send students system message for feedback

- ▶ **Templates provide systematic approach to each patient**
 - ▶ Students documented more pain if used EHR compared to group who did not (Chumley et al ^{12\})



Medical student note

The screenshot displays the Epic Production System interface. At the top, the window title is "Epic Production System - Hyperspace - FAMILY MEDICINE". Below the title bar is a navigation menu with options like "Desktop", "Action", "Patient Care", "Scheduling", "HIM", "Reg", "Surgery", "Referrals", "Reports", "Tools", and "Admin Help". A secondary navigation bar includes "Back", "Forward", "Home", "Schedule", "In Basket", "Chart", "Encounter", "Tel Enc", "Secure", "Dept Appts", "MC Signup", and "Patient Lists".

The patient information bar shows: Age: 48 year old, Sex: Female, DOB: 6/27/1960, Allergies: No Known Allergies, Alerts: MyChart: Active, Ins: AETNA U.S. *

The "Visit Report" window is open, displaying "Progress Notes" for "ANGELA H YU Wed Sep 17, 2008 9:51 AM Signed". The notes are as follows:

Progress Notes ANGELA H YU Wed Sep 17, 2008 9:51 AM Signed
Patient 48 yo WF with h/o of HTN and HLD who is here for her visit to establish PCP because recently moved here Arizona.
HTN: At home, average BP 140/80. Occasionally misses medicine on the weekend. Denies dizziness, HA, or changes in vision.

Depressed mood since she moved here in March from Arizona. She feels apathetic and lazy since moving here. Reports being very active in the past. Sister has melanoma and is concerned and feels guilty she is no longer at home. Sleeps excessively on the weekends. No friends here. All of her family lives in Arizona. Eats excessively with 30 lb weight gain over past year. Has been taking Zoloft for many years when she previously was depressed. She is interested in counseling.

HM: Does not remember when last tetanus shot was.
OB/GYN: G1P0A1. Last mammogram 5 years ago - wnl. Last pap 2005 - wnl. One abnormal pap in 20s and resolved. No STDs. LMP when 42 yo. Previous hx of normal, regular periods. Experiences occasional hot flashes but not very bothersome.

Recent Labs (8/23/08) :TG:189, LDL 132, total 205, glucose 110
ROS: Weight gain 30 lbs over past year. In 2000, weighted 160 with slow weight gain but more progressive in past year.
PMHx: HTN x 2000, HLD x 2000, Depression since July 2008
Surgeries: None

PFHx: sister melanoma (49)
Aunt: Breast Cancer (38)
Family has had hysterectomies (problems with period)
Dad: HLD

SH: 1ppd smoke x 30 years, 2-3 drinks/day, no IVDU
Occupation: works for Aetna
Family - no relationship, no kids
Diet- eats a lot of fried foods, biscuits and gravy, lots of pasta
Exercise- None

The interface also includes a sidebar with "Report Viewer" and "Allergies" sections, and a Windows taskbar at the bottom with the Start button and several open applications.

Medical student note

Epic Production System - Hyperspace - FAMILY MEDICINE

Desktop Action Patient Care Scheduling HIM Reg Surgery Referrals Reports Tools Admin Help

Back Forward Home Schedule In Basket Chart Encounter Tel Enc Secure Dept Appts MC Signup Patient Lists Print Log Out

Epic Home

Age: 48 year old DOB: 6/27/1960 Allergies: No Known Allergies Alerts: MyChart: Active
Sex: Female PCP: (None) Ins: AETNA U.S. *

Visit Report [Close X]

HCIX 25 mg PO daily
Atenolol 100mg daily
Atorvastatin 10mg daily

PE: 138/72, 62,
GEN: A&Ox3, appropriate mood and affect
HEENT: fundoscopic WNL, PERRLA,
Neck: supple, no thyromegaly, no bruits
CV: RRR, nl S1S1, no m/r/g
Chest: clear bilaterally, no adventitious sounds
Abd: soft, NTND, no HSM, +BS, large girth
Ext: no edema, 2+ DP pulses bilaterally

A/P: 48 yo with HTN, HLD, and depression

Encounter Diagnoses

| Code | Name | Primary? | Qualifier |
|--------|---|----------|-----------|
| 401.1 | Essential Hypertension, Benign - Borderline, will continue current medications and reassess at next visit | | |
| | <i>Plan:</i> HYDROCHLOROTHIAZIDE 25 MG TAB, ATENOLOL 100 MG TAB, COMPREHENSIVE METABOLIC PANEL | | |
| 272.2 | Mixed Hyperlipidemia - Borderline LDL goal of 130, Increase Atorvastatin does from 10mg to 20mg | | |
| | <i>Plan:</i> ATORVASTATIN 20 MG TAB | | |
| 311 | Depressive Disorder, not Elsewhere Classified | | |
| | <i>Plan:</i> SERTRALINE 50 MG TAB | | |
| | Will refer her to CO-MED trial and see if she is a candidate. If not a candidate, then she will contact us with possibility of change in medications. Also given contact information for counseling services at UTSW. | | |
| | Check TSH. | | |
| V70.0A | Routine General Medical Examination at Health Care Facility | | |
| | <i>Plan:</i> TETANUS AND DIPHTHERIA TOXOIDS (TD) ADSORBED WHEN ADMINISTERED TO 7 YEARS OR OLDER, FOR INTRAMUSCULA | | |
| | OBGYN: Has appointment in October for check up. | | |

Hotkey List

Exit Workspace

Back Links Copy Refresh Print

start 2 Novell G... students el... Hepatitis B [... Presentations ETS teachin... iTunes Epic Product... 12:21 PM

Attending's review & attestation

Epic Production System - Hyperspace - FAMILY MEDICINE

Desktop Action Patient Care Scheduling HIM Reg Surgery Referrals Reports Tools Admin Help

Back Forward Home Schedule In Basket Chart Encounter Tel Enc Secure Dept Appts MC Signup Patient Lists

Epic Home

Age: 48 year old DOB: 6/27/1960 Allergies: No Known Allergies Alerts: MyChart: Active
Sex: Female PCP: (None) Ins: AETNA U.S. *

Visit Report Close X

Dan Sepdham, MD Wed Sep 17, 2008 1:14 PM Signed

The history and physical above have been reviewed by me and confirmed in the presence of the patient. Key portions of the physical exam have been repeated. I agree with the assessment and plan noted above.

Will need to address her depression first as she is not motivated to treat any of her other chronic medical issues due to this problem.

If patient is ineligible for the Co-Med study, I will probably adjust her anti-depressant medication regimen.

Dan Sepdham MD, 9/17/2008 1:14 PM

[Patient Health Questionnaire Scan on: 09/18/2008 9:16 AM by GONZALEZ, JULIE \[JGONZ2\]](#)

| Prescriptions | Prescriptions | Disp | Refills | Start | End |
|---------------------|--|------|---------|-----------|-----|
| Ordered This | ATORVASTATIN 20 MG TAB | 30 | 3 | 9/17/2008 | |
| Encounter: | Sig: Take 1 Tab by mouth daily. Class: Auto Fax Route: Oral | | | | |

| Encounter Orders | Order | Ordered on | Order # |
|------------------|--|------------|-----------|
| | COMPREHENSIVE METABOLIC PANEL | 9/17/08 | 212478389 |
| | THYROID STIMULATING HORMONE | 9/17/08 | 212490046 |
| | TETANUS AND DIPHTHERIA TOXOIDS (TD) ADSORBED WHEN ADMINISTERED TO 7 YEARS OR OLDER, FOR INTRAMUSCULA | 9/17/08 | 212479721 |

| Immunization/Med Administration: | Date | Drug Name | Dose | Route | Site | Given By |
|----------------------------------|---------|------------|------|-------|------|----------------------|
| | 9/17/08 | DT/Tetanus | .5cc | IM | LD | SMITH, MISTIE L., RN |

Diagnoses [Visit Diagnoses](#)

Hotkey List

Exit Workspace

Back Links Copy Refresh Print

start 2 Novell G... students el... Hepatitis B [... Presentations ETS teachin... iTunes Epic Product... 12:22 PM

Current recommendations

- ▶ Teach students EHR-specific communication skills
- ▶ Increase students' Just-In-Time learning
- ▶ Use the EHR to improve students' clinical performance



References

1. Hsu J, Huang J, Fung V, Robertson N, Jimison H, Frankel R. [Health information technology and physician-patient interactions: impact of computers on communication during outpatient primary care visits.](#) J Am Med Inform Assoc. 2005 Jul-Aug;12(4):474-80
2. Margalit RS, Roter D, Dunevant MA, Larson S, Reis S. [Electronic medical record use and physician-patient communication: an observational study of Israeli primary care encounters.](#) Patient Educ Couns. 2006 Apr;61(1):134-41.
3. Linder JA, Ma J, Bates DW, Middleton B, Stafford RS. [Electronic health record use and the quality of ambulatory care in the United States.](#) Arch Intern Med. 2007 Jul 9;167(13):1400-5.
4. Ventres W, Kooienga S, Vuckovic N, Marlin R, Nygren P, Stewart V. [Physicians, patients, and the electronic health record: an ethnographic analysis.](#) Ann Fam Med. 2006 Mar-Apr;4(2):124-31.
5. Frankel R, Alschuler A, George S, Kinsman J, Jimison H, Robertson NR, et al. [Effects of exam-room computing on clinician-patient communication: a longitudinal qualitative study.](#) J Gen Intern Med. 2005 Aug;20(8):677-82.
6. Rouf E, Whittle J, Lu N, Schwartz MD. [Computers in the exam room: differences in physician-patient interaction may be due to physician experience.](#) J Gen Intern Med. 2007 Jan;22(1):43-8.

References

7. Rouf E, Chumley HS, Dobbie AE. [Electronic health records in outpatient clinics: perspectives of third year medical students.](#) BMC Med Educ. 2008;8:13.
8. Shine KI. [Health care quality and how to achieve it.](#) Acad Med. 2002 Jan;77(1):91-9.
9. Shine KI. [Crossing the quality chasm: the role of postgraduate training.](#) Am J Med. 2002 Aug 15;113(3):265-7.
10. Morrow JB, Dobbie AE, Jenkins C, Long R, Mihalic A, Sadler J, Wagner J. [First-year medical students can integrate the EHR into doctor-patient communication.](#) Fam Med. 2008 (in press).
11. Chumley HS, Dobbie AE, Delzell JE, Jr. [Case-based exercises fail to improve medical students' information management skills: a controlled trial.](#) BMC Med Educ. 2006;6:14.



Questions?

