

MICHIGAN STATE  
UNIVERSITY

College of  
Human Medicine

# HOST – A Health Record Online Submission Tool

Steven Roskos, MD, Robin Demuth, MD,  
Dianne Wagner, MD



■ **Advancing Knowledge.** Transforming Lives.

# Purpose:



- This presentation describes a mechanism that we created for second year students in the Clinical Skills Curriculum at Michigan State University, College of Human Medicine, to practice writing health records and receive feedback online.

# Why teach health record writing?



- Quality Health Records are critical to Quality Health Care.
- Health records allow for the evaluation of the thought process of a physician (or medical student)<sup>1</sup>
- AAMC: Preclinical students should learn:
  - Record health information
  - Use an EHR (advanced beginner level)
- USMLE Step II - Clinical Skills

# Literature Review



- Weed (1968)<sup>1</sup> – Problem Oriented Medical Record
- Clinical students receive more feedback and perform better if using an EHR<sup>2</sup>
- McCarty et. al.<sup>3</sup> developed a web based EHR like system for clinical students
- Naeymi-Rad<sup>4</sup> et. al. developed a web based EHR like system for preclinical students
  - Drop down menus
  - Many prompts for History and PE steps
  - Creates an H&P from student input (minimal typing)

1. Weed L, N Engl J Med. 1968 Mar 4;278(11):593-600.
2. Rouf E, Chumley HS, Dobbie AE. BMC Med Educ. 2008 Mar 31;8:13.
3. McCarty T et. al. Acad Med. 2005 Oct;80(10 Suppl):S67-70.
4. Naeymi-Rad F et. al. Top Health Inform Manage, 1994, 14(4), 44-50

# Context



- Michigan State University, College of Human Medicine
  - 7 clinical campuses
  - 2 pre-clinical campuses
  - Expanding class size (from 106 to 200, now at 150)
  - Two year pre-clinical Clinical Skills curriculum
    - (Five courses)
  - 2<sup>nd</sup> year – write 17 health records

# Goals of the Innovation



1. Conserve administrative staff time.
2. Standardize Health Record assignment grading.
3. Allow graduate assistants (GAs, usually third or fourth year medical students) to grade submissions from any of seven clinical campuses.

# Goals of the Innovation



4. Prepare students for the use of electronic health records (EHRs).
  - Include some features of EHRs
    - Secure login/password
    - Text box entries
    - Master problem list
  - But not others
    - Drop down menus
    - Check boxes
    - Decision support prompts

# Methods: Development



- 2003
  - converted the “Written Record Protocol” to an online version
  - Developed an electronic submission tool
- 2007
  - Rewrote the system, creating HOST

# Description: How it works



**MSU COLLEGE OF HUMAN MEDICINE** **HOST System** [Login](#)

You are not logged in. [Home](#)

---

## Welcome to the Health record Online Submission Tool (HOST)

Your **MSU NetID** is your User Name.

**\*\*\* Please change your password after logging in the first time. \*\*\***

Log In

User Name:

Password:

Remember me next time.

[Forgot Password?](#)

---

Developed and maintained by HIT - Educational Technology

[Questions?](#)

# Description: How it works



**MSU** COLLEGE OF HUMAN MEDICINE **HOST Administration** [Logout](#)

---

Home	<h2>Welcome to HOST Administration</h2> <p>You have logged in as an administrator of this site and therefore have access to the following:</p> <ul style="list-style-type: none"><li>• Adding and editing experiences (defining the sections and their order)</li><li>• Adding and editing attributes for sections</li><li>• Assigning experiences to students</li><li>• Assigning GAs to students</li><li>• Editing user experiences (changing the GA for that experience)</li><li>• List out users (GAs or students)</li><li>• Looking into password problems or problems with logging in</li><li>• View the system as if logged in as Faculty or GA</li></ul> <p>Choose from the menu on the left.</p> <p><b>Please note:</b> Faculty/GA View will remove the administrative menu until you click on the HRS home button in the upper right corner of the screen.</p>
Users	
Create Users	
List Users	
Assign GA for Student	
Unlock User	
Experiences	
Add New Section	
Add/Edit Attributes	
Add Experience	
Edit/Delete Experiences	
User Experiences	
Assign Users	
Change due date or GA	
Unsubmit	
Reporting	
View Late Submissions	
View Late Grading	

# Description: How it works



**MSU COLLEGE OF HUMAN MEDICINE** **HOST Administration** [Logout](#)

---

**Home**

**Users**

Create Users

List Users

Assign GA for Student

Unlock User

**Experiences**

Add New Section

Add/Edit Attributes

Add Experience

Edit/Delete Experiences

**User Experiences**

Assign Users

Change due date or GA

Unsubmit

## Add/Edit Attributes for Section

Choose a section: Master Problem List (MPL)

	Master Problem List (MPL)	
<a href="#">Edit</a> <a href="#">Delete</a>	Identified Chief Complaint	
<a href="#">Edit</a> <a href="#">Delete</a>	Identified History of Present Illness for Undiagnosed Problem	resolution
<a href="#">Edit</a> <a href="#">Delete</a>	Identified History of Present Illness for Established Problem	er applicable) and correctly dated
<a href="#">Edit</a> <a href="#">Delete</a>	Identified History of Present Illness for Health Maintenance	
<a href="#">Edit</a> <a href="#">Delete</a>	Appropri Past Medical History	le data allow)
<b>Insert an attribute</b>		
Description <input style="width: 80%;" type="text"/>		
<a href="#">Insert</a> <a href="#">Cancel</a>		

# Description: How it works



- Home
- Users
  - Create Users
  - List Users
  - Assign GA for Student
  - Unlock User
- Experiences
  - Add New Section
  - Add/Edit Attributes
  - Add Experience
  - Edit/Delete Experiences
- User Experiences
  - Assign Users
  - Change due

### Add/Edit Attributes for Section

Choose a section:

	Description
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #1: Presents chronological account of problem including what was done in response to problem
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #2: Fully characterizes symptom dimensions (PPQRST)
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #3: Is obvious to the reader that hypotheses, though not explicitly stated, have been considered
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #3: Includes pertinent positives based on hypotheses
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #3: Includes pertinent negatives based on hypotheses
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #3: Does not include physical exam data
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #4: Includes impact of problem on patient's life, family, or functioning
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #4: Includes patient's explanatory model
<a href="#">Edit</a> <a href="#">Delete</a>	Paragraph #4: Includes patient's expectations for the visit

Insert an attribute for this section:

Description:

[Insert](#) [Cancel](#)

# Description: How it works



You are logged in as: **test** [click here to change password](#)

[Home](#)

Email address on record: pohlsh@gmail.com Your assigned GA: Test, GA (roskos@msu.edu)

### List of Experiences

List Experiences with status of:

	Experience	Start Date	Due Date	Status	Assigned GA	Date Submitted	Grade
<a href="#">Select</a>	Adult Hospital Visit	09-08-2008	09-28-2009	rewrite needed - unacceptable	GA, Ima	09-09-2008	Rewrite needed
<a href="#">Select</a>	Neurology Exam	09-06-2008	09-06-2009	submitted	GA, Ima	10-06-2008	
<a href="#">Select</a>	Nursing Home Visit	11-25-2008	11-25-2009	in progress	GA, Ima	not submitted	
<a href="#">Select</a>	Urinary Tract PBA	02-03-2009	02-03-2010	in progress	GA, Ima	not submitted	
<a href="#">Select</a>	Male Genitalia Exam Experience	02-03-2009	02-03-2010	submitted	Test, GA	02-05-2009	
<a href="#">Select</a>	Pelvic Exam Experience	01-05-2009	01-05-2010	in progress	Test, GA	not submitted	
<a href="#">Select</a>	Breast Exam Experience	02-11-2009	02-11-2010	submitted	Test, GA	02-12-2009	
<a href="#">Select</a>	Pulmonary Exam Experience	03-10-2009	03-10-2010	rewrite needed - unacceptable	Test, GA	03-10-2009	Rewrite needed
<a href="#">Select</a>	Adult Hospital Visit	03-14-2009	04-01-2009	submitted	Test, GA	03-18-2009	

# Description: How it works



## HOST System

[Logout](#)

You are logged in as: **test** [click here to change password](#)

[Home](#)

Email address on record: pohls@gmail.com Your assigned GA: Test, GA (roskos@msu.edu)

### Start Experience

Experience Name	Adult Hospital Visit
Start Date	03-14-2009
Due Date	04-01-2009
Assigned GA for experience	Test, GA
Status	not started

#### Sections included in this experience

Master Problem List (MPL)

Chief Complaint

History of Present Illness for Undiagnosed Problem

Allergies

Health Maintenance

Review of Systems (Constitutional & Relevant)

Physical Examination

Assessment for an Undiagnosed Problem

**Please click button only one time.**

Developed and maintained by HIT - Educational Technology

[Questions?](#)

# Description: How it works



## Adult Hospital Visit

**Start Date:** 03-14-2009 **Due Date:** 04-01-2009

**Submitted On:** 3/18/2009 3:27:00 PM

**Assigned GA:** Test, GA **Status:** *submitted*

**GA Comment:**

### Overall Grade:

Sections		Grading Info
Master Problem List (MPL)	see list below	<a href="#">see info</a>
Chief Complaint	MG is a 57 year old man who presented to the E.D. with chest pain.	<a href="#">see info</a>
History of Present Illness for Undiagnosed Problem	MG was feeling well and at work until 1 hour prior to coming to the ED when he began experiencing some discomfort in the epigastric area, followed by growing substernal chest discomfort. This was an aching, dull pain that progressed from 2/10 initially to 8/10 when he came to the ED. He initially sat down and stretched without relief, then took some antacids which he initially thought	<a href="#">see info</a>
Allergies	No known drug allergies.	<a href="#">see info</a>

# Description: How it works



Review of Systems (Constitutional & Relevant)	No palpitations, difficulty in breathing, PND, or orthopnea. Occasional heartburn with spicy foods, no nausea, vomiting, constipation, diarrhea, melena, hematochezia.	<a href="#">see info</a>
Physical Examination	VS: P 105 BP 156/93 RR 18 General: Well developed, well nourished man who appears his stated age, in no distress, anxious appearing. HEENT: Eyes: Pupils equal and reactive symmetrically. Fundoscopic exam without hemorrhages or papilledema.	<a href="#">see info</a>
Assessment for an Undiagnosed Problem	1 - Chest pain. Most likely due to myocardial infarction. This is supported by the substernal nature of his pain, his family history of an MI in his father at a similar age, his risk factors of tobacco use and hypertension. Another possibility would be a stomach ulcer. This is supported by the pain starting in his upper abdomen before moving to his chest, his history of heartburn, and by	<a href="#">see info</a>

**Master Problem List**

Order	Description	Onset Date	Status	Resolved Date
1	Chest pain	3/14/09	active	
2	Hypertension	2002	active	
3	Tobacco use	1969	active	
4	Family Hx of CAD	1989	n/a	
5	Appendectomy	1976	resolved	1976

# Description: How it works



Attribute Grades for Section Close

Comment for Section:

Remember to use the patient's own words, and to comment on duration and the source of the history.

Section Grade: Rewrite needed

Grade	Attribute Description
No	Complaints stated briefly in patient's own words
No	Duration included
No	Source and reliability included
Yes	Two or fewer sentences
n/a	Included Reason for Visit (routine visits only)

**Chief Complaint**

MG is a 57 year old man who presented to the E.D. with chest pain.

# Description: How it works



## Grade Experience

**Adult Hospital Visit** Student: Test, Ima Assigned GA: Test, GA

Date Submitted: 3/18/2009 3:27:00 PM Status: submitted

Submit Grade

Cancel

Experience Grade: (choose grade) Due Date: 4/1/2009

Comments:

Refresh

	Grade	Section	Data	
<b>Grade Section</b>		Master Problem List (MPL)		0
<b>Grade Section</b>	Rewrite needed	Chief Complaint	MG is a 57 year old man who presented to the E.D. with chest pain.	0 22842 6 6N2
<b>Grade Section</b>		History of Present Illness for Undiagnosed Problem	MG was feeling well and at work until 1 hour prior to coming to the ED when he began experiencing some discomfort in the epigastric area, followed by growing substernal chest discomfort. This was an aching, dull pain that progressed from 2/10 initially to 8/10 when he came to the ED. He initially sat down and stretched without relief, then took some antacids which he initially thought	0
<b>Grade Section</b>		Allergies	No known drug allergies.	0 22847 8 6N4

# Description: How it works



Grade Attributes for Section - Windows Internet Explorer

http://www.echt.chm.msu.edu/HOST/GA/GradeAttributes.aspx?usdid=22718&ueid=22848&sid=38&stsid=3

Grade Attributes for Section

Comment for Section:

Grade: --not graded--

Save Comments and Grade for Section

### History of Present Illness for Undiagnosed Problem

MG was feeling well and at work until 1 hour prior to coming to the ED when he began experiencing some discomfort in the epigastric area, followed by growling substernal chest discomfort. This was an aching, dull pain that progressed from 2/10 initially to 8/10 when he came to the ED. He initially sat down and stretched without relief, then took some antacids which he initially thought helped a little, but the relief did not last. He began to be anxious about the pain, so he had his co-worker call 911.

Update All Attributes

Done Internet 100%

# Description: How it works



Update All Attributes

**Paragraph #1: Presents chronological account of problem including what was done in response to problem**

Yes  
 No  
 n/a

**Paragraph #2: Fully characterizes symptom dimensions (PPQRST)**

Yes  
 No  
 n/a

**Paragraph #3: Is obvious to the reader that hypotheses, though not explicitly stated, have been considered**

Yes  
 No  
 n/a

**Paragraph #3: Includes pertinent positives based on hypotheses**

Yes  
 No  
 n/a

**Paragraph #3: Includes pertinent negatives based on hypotheses**

Yes  
 No  
 n/a

**Paragraph #3: Does not include physical exam data**

Yes  
 No  
 n/a

# Evaluation Method



- Questions in Course Evaluations
- Survey of Health Record Graders (GAs)
- Survey of Clinical Students
- Solicited comments from current and past course directors and administrators

# Results: Course Evaluations



Year & Semester	2001	2002 Fall	2003 Spring	2003 Fall	2004 Fall	2005 Spring	2005 Fall	2006 Spring	2006 Fall	2007 Spring	2007 Fall	2008 Spring
Can write an acceptable H&P & SOAP note	3.9	3.6	3.8	3.9	4.1	4.2	3.8	3.8	3.9	3.7	4.0	3.9
HOST system was valuable				4.1	4.1	4.2	3.3	3.5	3.6	3.6		3.9

# Results: Course Evaluations



## ■ Student Comments:

- “It is very frustrating . . . Good idea but more of the glitches should have been worked out.” (early system)
- “After the kinks were worked out, the system worked beautifully, and I cannot imagine what it was like before it was available”
- “It was very helpful to get detailed feedback upon submission from our GAs”
- “Much easier than writing by hand”
- GA grading still felt to be inconsistent

# Results: GA survey



Page: Survey of Clinical Skills Graduate Assistants

1. Please select the option that best represents your opinion for each of the statements below.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Rating Average	Response Count
a. Once I got used to it, HOST was easy to use.	0.0% (0)	7.1% (1)	0.0% (0)	<b>57.1% (8)</b>	35.7% (5)	4.21	14
b. I received adequate training to use HOST.	0.0% (0)	7.1% (1)	14.3% (2)	<b>64.3% (9)</b>	14.3% (2)	3.86	14
c. I enjoyed using HOST.	0.0% (0)	14.3% (2)	14.3% (2)	<b>71.4% (10)</b>	0.0% (0)	3.57	14
d. Host made it easy to give feedback to students.	0.0% (0)	7.1% (1)	0.0% (0)	<b>71.4% (10)</b>	21.4% (3)	4.07	14
	<i>answered question</i>						<b>14</b>
	<i>skipped question</i>						<b>0</b>

# Results: Clinical Students Survey



21. How well did the electronic health record submission tool (HOST) used in Block II prepare you to use an EHR?			
		Response Percent	Response Count
Not at all prepared		30.8%	20
A little prepared		32.3%	21
Somewhat prepared		23.1%	15
Fairly prepared		13.8%	9
Very prepared		0.0%	0
Completely prepared		0.0%	0
<i>answered question</i>			65
<i>skipped question</i>			33

# Results: Course Directors



- “Much improved over the incredibly clumsy and limiting paper submission system”
- Better able to monitor specific students and GAs
- “Allows us to give individualized feedback to students who are struggling”
- “Provides excellent opportunity for practice with feedback”

# Results: Staff



- Formerly spent hours of time sorting, copying, and doing other administrative tasks
- Able to use GAs from all campuses, not just Lansing
- “Easier faculty review of GA comments and student submissions”
- Easy tracking of late submissions
- “Technical Glitches!”

# Conclusions: Successes



- Well rated by students and GAs
- Drastic improvements in course management
- Decreased administrative time
- Increased ability for faculty to monitor performance and give feedback
- Greater pool of graders to choose from
- Graders can be at any campus

# Conclusions: Not there yet



- Tolerance for technical problems decreased over time
  - Matches physicians' dissatisfaction with EHR's "ease of use"<sup>1</sup>
  - Would benefit from increased technical support

# Conclusions: Not there yet



- Has not improved students perception of inconsistent grading
  - Has allowed course directors to address inconsistencies when they are brought to their attention
  - Need improved, more objective, grading criteria
  - Need to better train the graders (practice with feedback)

# Conclusions: Not there yet



- Students don't feel well prepared for EHR
  - Students use several different EHRs in clinical years
  - Expectations vary for degree of EHR use
  - Considering an adaptation of an actual EHR for preclinical student training

MICHIGAN STATE  
UNIVERSITY

College of  
Human Medicine

# Questions?



■ **Advancing Knowledge.** Transforming Lives.