



# Do they help or hinder teaching of longitudinal learners in the outpatient setting?

Joseph Jackson, MD FAAP Bruce Peyser, MD FACP Duke University Medical Center CLIC International Conference, Montana September 30, 2013

## Disclosures

• No financial disclosures



Case:

 24 year old MSIII w/ an iPhone, ipad, and no pen who presents with a 10 year history of extreme electronic prowess and technologic independence

Case:

 64 year old faculty pediatrician w/ a flip phone, no texting capabilities, and computer phobia, who presents with a 2 year history of technology fatigue and declining passion for medical student education



**FACT** Medical education is undergoing monumental transformation as a result of technology

**FACT** The Electronic Medical Record improves healthcare delivery and coordination of care

**FACT** The Electronic Medical Record creates unique challenges in medical student education

FACT There is no unified consensus on how to adequately incorporate learners into a technologically dependent profession



# EMR + Medical Students = Angst?



### - No barriers to student access of records

### **PRESENT**

### - increasingly impenetrable barriers



### **FUTURE**

- It remains to be seen...



# Objectives

- 1) Articulate the importance of electronic health records in medical student education
- Review the benefits of integrating medical students into the outpatient electronic health record
- 3) Discuss the challenges of integrating medical students into the outpatient electronic health record
- Highlight current efforts at Duke University to incorporate medical students into the electronic Health record





Articulate the importance of electronic health records in medical student education

## **OBJECTIVE #1:**

 "Curriculum must prepare medical students for entry into graduate medical education and include specific instruction in communication skills... including communication with patient and their families, colleagues, and other health professionals"

- Liaison Committee on Medical Education

Hammoud et al. Medical Student Documentation in EHR. Teaching and Learning in Medicine, 2012.



 "Each medical school must ensure that before graduation a student will have demonstrated the ability to communicate effectively, both orally and in writing, with patients, patients' families, colleagues, and others with whom physicians must exchange information in carrying out their responsibilities"

Association of American Medical Colleges

Friedman et al. Taking note of the perceived value of MS chart documentation on Education. Academic Medicine, 2010





Medical Student Documentation in Electronic Health Records: A Collaborative Statement From the Alliance for Clinical Education

#### TABLE 3

#### EHR skills expected of a medical school graduate

- Mastery of key elements of traditional patient encounter documentation (H&P, SOAP note), including familiarity with use of templates and checklists
- Comprehensive understanding of key/critical elements of order entry, including familiarity with use of order sets and pharmacy/prescription entries
- Familiarity with medication reconciliation and how/when it must be done
- Familiarity with how to access basic laboratory and radiologic data
- Familiarity with how to locate and interpret ancillary staff entries including vital signs, inputs/outputs, and nursing/allied health documentation
- Ability to locate and review historical data from prior hospitalizations or ambulatory visits including progress notes, admission H&P, consultation reports, procedure notes, and discharge summaries
- Familiarity with how to identify patient demographics including contact information



# ACE Statement on Electronic Health Records

- Summary Statements are applicable to Longitudinal Integrated Clerkships
  - Every student should document in patient's chart & notes should be reviewed
  - Every student should have opportunity to practice order entry
  - Students should have exposure to clinical decision aids
  - Programs should develop competencies for student involvement and establish evaluation tools to track progress



- ~64% of programs in the US allow students to use the EMR
- Few schools have written policies for student documentation in the EMR
- The opportunities for LIC students to benefit from EMR integration are greater given their enhanced continuity experiences





Review the benefits of integrating medical students into the outpatient electronic health record

## **OBJECTIVE #2**

### Benefits of Student Integration in EMR



### Medical Education in the Electronic Medical Record (EMR) Era: Benefits, Challenges, and Future Directions

Michael J. Tierney, MD, Natalie M. Pageler, MD, Madelyn Kahana, MD, Julie L. Pantaleoni, MD, and Christopher A. Longhurst, MD, MS



### Benefits of Student Integration in EMR

Core competency	Benefits	Challenges	Future directions
Medical Knowledge	Point-of-care clinical decision support (CDS) allows for context- relevant education <sup>7</sup>	Volume of online information may be overwhelming or underused <sup>15</sup>	Assess impact of CDS on fund of knowledge and identify most useful elements of CDS for learners
Practice-Based Learning and Improvement	<ul> <li>CDS provides opportunities to teach students and residents best practices?</li> </ul>	<ul> <li>CDS may be inappropriate to workflow, and/ or promote alert fatigue<sup>15</sup></li> </ul>	<ul> <li>Well-planned implementation of CDS may improve teaching opportunities</li> </ul>
	<ul> <li>EMRs offer opportunities in research and quality improvement education<sup>6</sup></li> </ul>	<ul> <li>Functional tools for registry tracking are still nascent<sup>44</sup></li> </ul>	<ul> <li>Further development of patient-tracking tools will allow greater use in quality improvement</li> </ul>
Patient Care	EMRs can reduce time spent in data gathering <sup>6,19</sup> and allow for efficient profiling and tracking of trainee clinical experiences and milestones <sup>6</sup>	EMRs may also introduce workflow inefficiencies <sup>17,19,22</sup> and may dull or stunt critical thinking skills <sup>27,28</sup>	Evaluate optimal computerized provider order entry implementation to maximize workflow efficiencies, and preserve critical clinical thinking
Interpersonal and Communication Skills	Learners may spend less time gathering and more time synthesizing clinical data <sup>6,19</sup>	Restrictions imposed on use of order entry on charting may limit EVIR skill acquisition and documentation proficiency <sup>31</sup>	Modify documentation systems to promote EMR usage by trainees. Evaluate use of EMR as a tool for mobile, real-time clinical presentations.
Professionalism	Dedicated computer skill teaching can improve patient– provider interaction <sup>43</sup>	Computer-provider interaction may displace or degrade provider-patient interaction <sup>19,40</sup>	Determine how and when EMR-specific patient encounter skills should be introduced and assessed
Systems-Based Practice	EMRs offer potential for teaching effective integration of a network of care providers <sup>64,47</sup>	EMR systems have not reached maturity to support full multidisciplinary collaboration <sup>44</sup>	EMR technology needs to advance to fulfill needs of learners to operate effectively in the realm of the patient-centered medical home



#### Medical Education in the Electronic Medical Record (EMR) Era: Benefits, Challenges, and Future Directions

Michael J. Tierney, MD, Natalie M. Pageler, MD, Madelyn Kahana, MD, Julie L. Pantaleoni, MD, and Christopher A. Longhurst, MD, MS

### **Benefits of Student Integration in EMR**

• Most frequently sited benefits include:

- Increased legibility
- More complete access to patient data
- Improved remote access
- Ability to have templates that allow for standardized care
- Point of care teaching

Hammoud et al. Opportunities and Challenges in Integrating EHR. Teaching and Learning, 2012





Discuss the challenges of integrating medical students into the outpatient electronic health record

### **OBJECTIVE #3**

### Challenges of Student EMR Integration

- Frequently sited Challenges
  - Concerns related to use of templates
  - Concerns related to teaching time
  - Concerns related to student privilege

Hammoud et al. Opportunities and Challenges in Integrating EHR. Teaching and Learning 2012



## **Challenges of Student EMR Integration**

Core competency	Benefits	Challenges	Future directions
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MXESTRO CARE

Highlight current efforts at Duke University to incorporate medical students into the Electronic Health Record

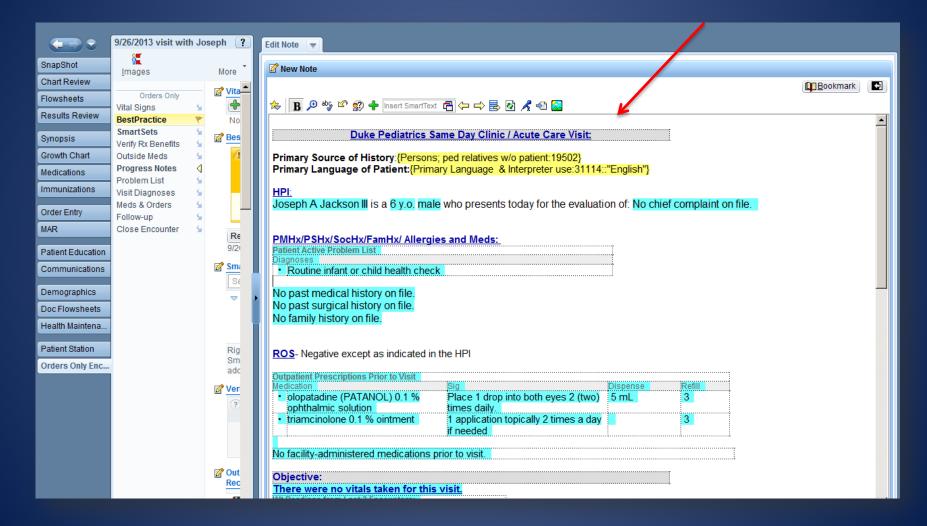
### **OBJECTIVE #4**

# Medical Student EMR use at Duke

- Examples from Duke's Longitudinal Integrated Clerkship in Pediatrics
  - Use of Templates (To Use or Not to Use)
  - Use of Clinical Decision Making Supports
  - Use of Developmental Prompts
  - Use of Patient Instruction Functionality
  - Use of Disease specific Order Sets

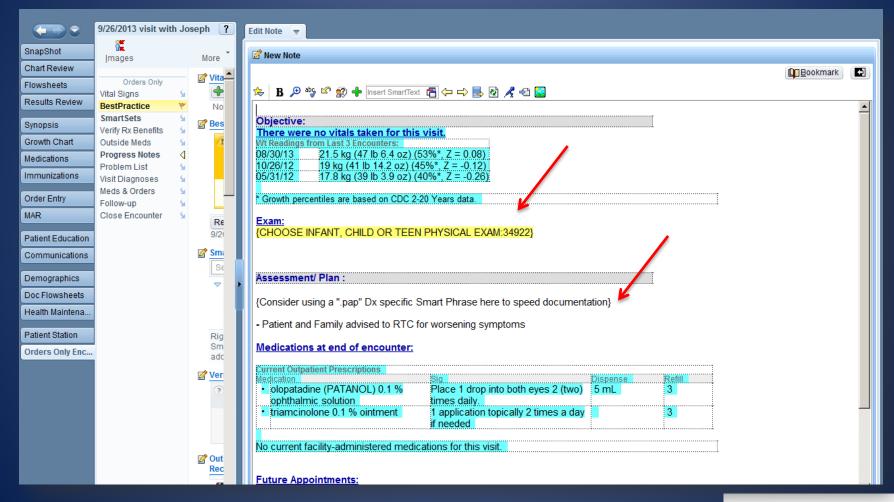


# Incorporating Templates in LIC



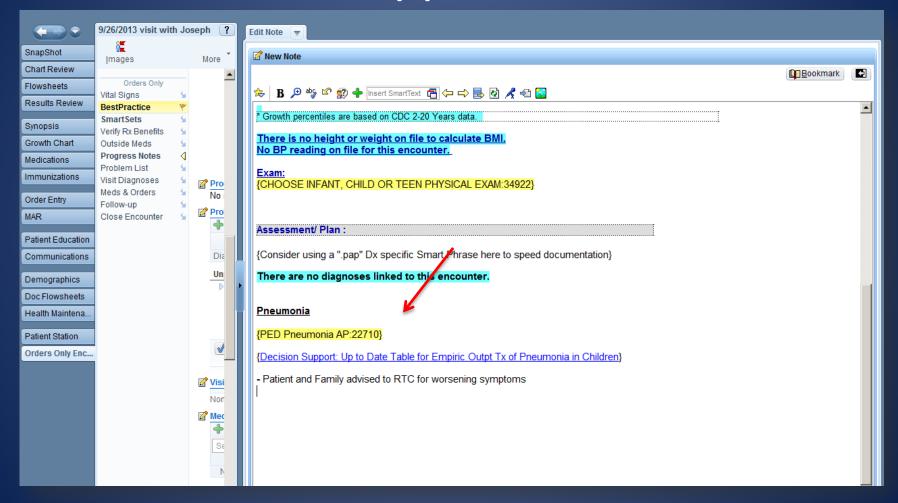


### Student Template vs. Faculty Template



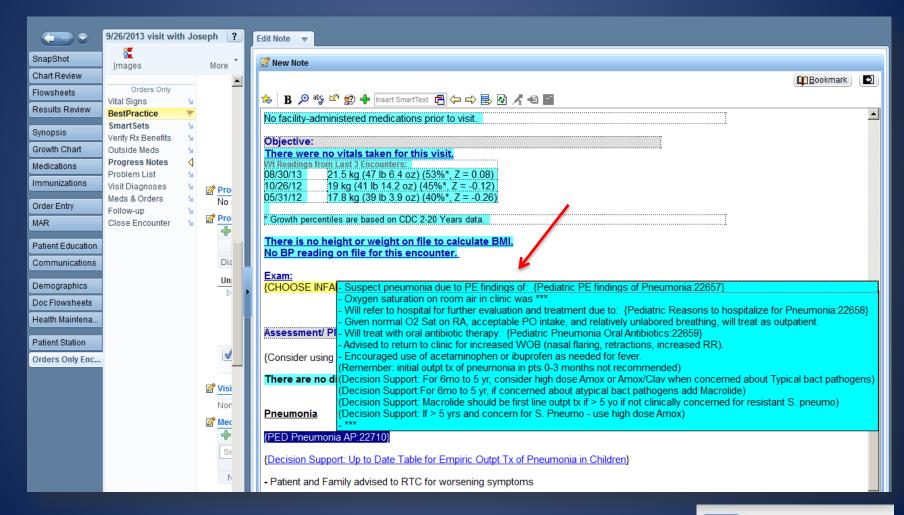


# Incorporating Clinical Decision Supports





# **Clinical Decision Tools**





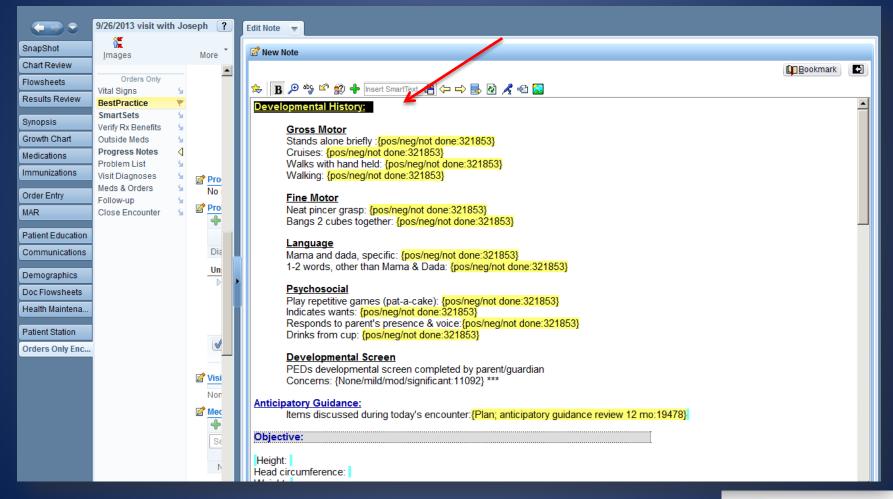
# Clinical Decision Tools (hyperlinks)

#### Initial oral empiric antibiotics for outpatient treatment of pediatric community-acquired pneumonia

Age group	Empiric regimen						
1 to 6 months							
Bacterial (not Chlamydia trachomatis)	Infants <3 to 6 months of age with suspected bacterial pneumonia should be hospitalized						
Chlamydia trachomatis	See UpToDate topic on Chlamydia trachomatis infections in the newborn						
6 months to 5 years							
Typical bacterial*	Amoxicillin <sup>•</sup> 90 mg/kg per day in 2 or 3 divided doses (MAX 4 g/day), <b>OR</b>						
	Amoxicillin-clavulanate 90 mg/kg per day of the amoxicillin component in 2 or 3 divided doses (MAX 4 g/day amoxicillin component), OF						
	For patients with non type 1 hypersensitivity to penicillins:						
	- Cefdinir 14 mg/kg per day in 2 divided doses (MAX 600 mg/day), <b>OR</b>						
	For patients with type 1 hypersensitivity to penicillins:						
	- Clindamycin 30 to 40 mg/kg per day in 3 or 4 divided doses (MAX 1.8 g/day), <b>OR</b>						
	- Erythromycin 30 to 50 mg/kg per day in 4 divided doses (MAX 2 g/day as base, 3.2 g/day as ethylsuccinate), OR						
	- Azithromycin 10 mg/kg on day 1 followed by 5 mg/kg daily for 4 more days (MAX 500 mg on day 1 and 250 mg thereafter), OR						
	- Clarithromycin 15 mg/kg per day in 2 divided doses (MAX 1 g/day), <b>OR</b>						
	In communities with a high rate of pneumococcal resistance to penicillin:						
	- Linezolid 30 mg/kg per day in 3 divided doses (MAX 1800 mg/day), <b>OR</b>						
	- Levofloxacin 16 to 20 mg/kg per day in 2 divided doses (MAX 750 mg/day)						
≥5 years							
Mycoplasma pneumoniae or Chlamydophila	Erythromycin 40 to 50 mg/kg per day in 4 divided doses (MAX 2 g/day as base, 3.2 g/day as ethylsuccinate), OR						
pneumoniae	Azithromycin 10 mg/kg on day 1 followed by 5 mg/kg daily for 4 more days (MAX 500 mg on day 1 and 250 mg thereafter), OR						
	Clarithromycin 15 mg/kg per day in 2 divided doses (MAX 1 g/day), <b>OR</b>						
	Doxycycline <sup>△</sup> 4 mg/kg per day in 2 divided doses (MAX 200 mg/day), <b>OR</b>						
	For skeletally mature patients:						
	- Levofloxacin <sup>◊</sup> 8 to 10 mg/kg once daily for children 5 to 16 years (MAX 500 mg/day); 500 mg once per day for children for children ≥10 years, <b>OR</b>						

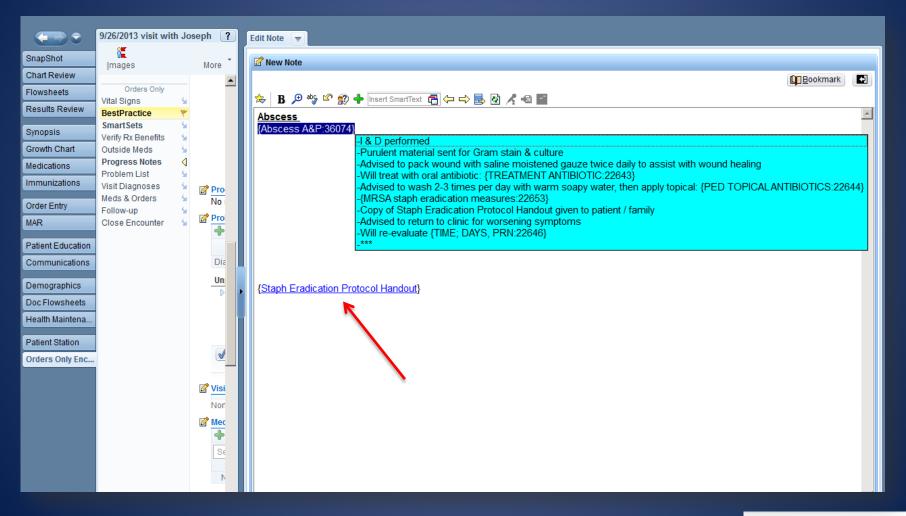


### **Teaching Developmental Milestones**





# **Patient Instruction Prompts**





## **Patient Instruction Prompts**

	9/26/2013 visit with	h Jos	seph ?	Edit Note	
SnapShot	inages		More	☑ New Note	
Chart Review				🖉 🖉 🖉 🖉 🖉	a l
Flowsheets	Orders Only			😓 B 🔎 🍪 🖉 🎲 🖉 hisert SmartText 🖻 🖙 🖘 🔜 🔯 🥂 🗐 📓	1
Results Review	Vital Signs BestPractice	K K			a
Synopsis	SmartSets Verify Rx Benefits	5		Duke Pediatrics Migraine Action Plan for: Joseph A Jackson III Please ask the following questions to determine which plan to follow. If all answers are "NO," follow the directions for "Headache (NOT a	1
Growth Chart	Outside Meds	S.		Migraine)." Otherwise, follow the directions for "MIGRAINE."	
Medications	Progress Notes Problem List	4		Questions to ask:	
Immunizations	Visit Diagnoses	5	📝 Pro	1. Does your headache get worse when you move?	
Order Entry	Meds & Orders Follow-up	5 5	No	2. Does your headache make you very sensitive to sounds or light? 3. Since your headache started do you have nausea (feel like you might throw up)?	
MAR	Close Encounter	5	Pro	4. Since your headache started have you vomited ( thrown up)?	
Patient Education				Migraine Headache         General Headache Management           Management         (NOT a Migraine)	
Communications			Dia	1. Record in Headache Diary 1. Record on Headache Diary	
Demographics			Un	2. Give medications right away: a. For pain: a. For pain: b. Give medication: a. For pain: b. Give medication: b. Give medication	
Doc Flowsheets				{Ped Analgesics:34519} {Ped Analgesics:34519}	
Health Maintena				b. For Nausea and/or vomiting:     3. Take Temperature       4. Call parent to discuss next step	
Patient Station				<pre>{Ped Antiemetics:34518} (home or return to activities). c. Additional: ***</pre>	
Orders Only Enc			Visi Nor Mec Se	3. Offer a non-caffeine drink.     4. Allow Joseph to rest in a quiet, dark place for 30-60 minutes.     5. Offer Comfort Measures:     6. Contact Parent to inform about Migraine and care given.     7. After 60 minutes, if Migraine is resolved, can return to activities. If not, needs to go home.   JOSEPH A JACKSON, MD Health Care Provider	



# Order Entry Opportunities

	9/26/20	)13 visit with Jose	eph Augustu	s Jackson	n Jr., MD for O	orders Only									?
SnapShot	<b>.</b>		2	4	ę	Ø									
Chart Review	Ima	🎅 Preference List I	Browser - Jac	kson,Jose	ph A III										
Flowsheets					Search	]	Browse (F4)	Preference List (F5)	Facility List (	(F6)	Clear Se	lected		🔶 🕆	
Results Review	Vital :	🔍 🦨 During visit	After vi	sit				Only Favorites (☆)			Selected Orders				
	Besti Smai				heck Screens	(Laba)	_				Selected Orders			Options 🛞	
Synopsis	Verify					ental Screening Form	□☆Dental Varnishin	Ig							
Growth Chart	Outsi	Hematolog	ly l		CHAT Screening F										
Medications	Progi Probl	Microbiolo	07 07			cines (Labs) ned vaccine IM (PENTACE	L) 🗆 🏫 MMR vaccine SO	2							-
Immunizations	VisitI	Healthcheo	<u>ck Screens</u> t Peds Vacc	□☆от	TaP HepB IPV com		Varicella vaccine								
Order Entry	Meds		nth Well Sc	(PEDIAF □☆Pn		ugate vaccine 13-valent ll	/ □☆Hepatitis A vacc	ine pediatric / adolescent	2						
MAR	Follo: Close	Adolescent			IAR 13) bliovirus vaccine IF		dose IM	ned vaccine IM (KINRIX)					544-	5 Order Entry	
		Anemia Wo Healthy Life	orkup estyle Scre			gate vaccine 3 dose IM		reater than or equal to 7yc	M					Entry	
Patient Education		Southpoint	Fever Wor	□☆о	laP vaccine less t	han 7yo IM	Meningococcal of (MENACTRA)	conjugate vaccine 4-valer	it IM				Ŧ	Next F8	
Communications		Stool Studi Newborn	ies	□☆Po	liovirus vaccine If	PV SQ/IM (IPOL)	(mElvacina) □☆HPV vaccine qua (GARDASIL)	adrivalent 3 dose IM						click to open	
Demographics		Radiology ▶ Imaging				Screen (Labs)									
Doc Flowsheets		<ul> <li>Imaging</li> <li>Immunization</li> </ul>	n		emoglobin With MC cent Screen		□☆Lead, Blood							click to open	-
Health Maintena		▷ Referrals ▷ Orders		□☆Ch		occus, DNA Amp, Urine	□☆HIV-1 And HIV-2 □☆RPR	2 Antibody, Combined							
Patient Station		Frequent Ord	ders	□☆Ur	inalysis Complete		Cholesterol, Tota	al							
Orders Only Enc					ulture Urine et Prep Panel		□☆свс								
				Anemia	a Workup (La BC anual WBC Differe on And TIBC	ential	☐☆Ferritin ☐☆Reticulocytes								
		•	·		Lifestyle Scr omprehensive Met		□☆Lipid Panel (Calc	culated LDL)		•	Accept C	ancel			
					omprenensive Met						Topohr				



# Summary

- Medical Educators must strive to integrate students into the electronic Health Record
- Numerous benefits and challenges exist when integrating medical students into the outpatient health record
- The LIC at Duke continues to explore and advance medical student exposure to the EHR

