WISE – Online SS II 2017

Taught by Laura Marcial

marcial@unc.edu

**Course Description:**

The course is aimed at exposing students to Electronic Health Record (EHR) systems, with a strong emphasis on the role of EHR systems in healthcare operations. The course will concentrate on the:

* Technological foundations of EHR systems
* Legal and regulatory issues that shape EHR evolution
* Role of the EHR systems in ensuring quality of care and evidence-based practice
* Implementation of the EHR system in clinical practices: workflow analysis and change management
* Meaningful use of EHR systems and healthcare data

**The course is organized into 5 self-paced lessons, details for each lesson are provided below.**

**Readings:**

Each lesson will have several required and optional readings selected from high quality journal articles and government reports pertinent to the lesson topics. The list of readings is provided in the *Resources* section of the Sakai course website.

You may also find it useful to have a copy of this for reference: Carter, J.H. (2008). *Electronic health record: A guide for clinicians and administrators.* Philadelphia: ACP Press. (ISBN 1930513976 9781930513976)

**Assignments & Assessments:**

***Readings.*** A list of readings, organized in recommended order is provided for each lesson. Do not be overwhelmed by the length of some of these lists – most readings are only a few pages long and/or only select pages from each reading are required (details will be listed in each course lesson). Readings should be completed prior to the beginning of each week so you are prepared to engage in class discussions. Lists of optional readings are provided for most of the lessons. The optional readings provide more in-depth exploration of topics of interest and/or background to help prepare short papers/presentations.

***Discussion.*** *We will be using the discussion forum as the main form of course interaction*. *You are expected to visit the course site at least five days out of each week (the instructors will be monitoring the forum daily) to post your responses to discussion prompts and to offer thoughtful replies to your classmates’ posts.* We will use the forum for formal discussions of weekly readings, your individual assignments (see below) and to informally discuss any topics/issues that come up during the course. The course is short in duration, so your **active engagement in forum discussions** is the best way to get the most out of the course!

***Virtual Presentation.*** The purpose of this assignment is to allow students to explore a technical and/or policy topic of their choice in more detail surrounding EHRs and to share the results with classmates. You are required to provide a short report in the form of a slide presentation (10 slides not including the title and references slides) on topics relevant to the course. A list of suggested topics is provided in the Resources section of the course site but feel free to choose other topics of interest (pending instructor approval). The presentations should be based on scholarly information sources (make sure to include proper citations). Try to use non-textual materials in your presentation (online videos or examples, tables, charts, diagrams) as a way to synthesize and present the key ideas and themes. If some text is necessary, please limit it to very short paragraphs and bulleted lists. All presentations will be posted on the course website for comments from other class participants. The author is expected to respond to any questions posted by classmates.

***Final Exam.*** *In lieu of a final exam, you will be given two brief essay response questions for each lesson. These questions will be due on the closing date for each lesson.*

**Grading:**

* *Discussion participation - 50%*
* Presentation assignment - 20%
* Final Exam - 30%

**Lesson 1 – Introduction to EHR concepts and context. (June 26 – July 3)**

***Topics:***

Definition of an EHR

Forces that shape EHR development and implementation

EHR components and functionality

The Legal and regulatory context for EHRs

Implications of EHR for healthcare in the US

***Required Readings:***

Campos-Castillo C, Anthony DL. The double-edged sword of electronic health records: implications for patient disclosure. J Am Med Inform Assoc. 2015 Apr;22(e1):e130-40. doi: 10.1136/amiajnl-2014-002804. Epub 2014 Jul 24. PubMed PMID: 25059953.

Carter (2008). Chapter 1, pp. 3-7 *[scan this one]*

Detmer, D.E. (2003). Building the national health information infrastructure for personal health, health care services, public health and research*. BMC Medical Informatics and Decision Making 3*(1) *[scan this one]*

Goldschmidt, P.G. (2005). HIT and MIS: implications of health information technology and medical information systems. Communications of the ACM, 48(10), 69-74 *[scan this one]*

Häyrinen K, Saranto K, Nykänen P. Definition, structure, content, use and impacts of electronic health records: a review of the research literature. Int J Med Inform. 2008 May;77(5):291-304. Epub 2007 Oct 22. Review. PubMed PMID: 17951106.

Tang P.H. (Ed). (2003). Key capabilities of an Electronic Health Record System. Washington, DC: National Academies Press *[scan this one]*

*Optional Readings:*

Carter (2008). Chapter 25.

Staggers, N., Thompson, C.B. & Snyder-Halpern, R. (2001). History and trends in clinical information systems in the United States. *Journal of Nursing Scholarship, 33* (1), 75-81

Teich, J. M. (1998).*Clinical information systems for integrated healthcare networks*. In C.G. Chute (Ed.) Proceedings of the AMIA Symposium, 19–28.

President’s Council of Advisors on Science and Technology. (2010). *Realizing the full potential of health information technology to improve healthcare for Americans: The path forward*. Washington, DC: Author. [available at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-health-it-report.pdf>]

**Assignment:** *Complete essay response questions for Lesson 1 due on July 3 and select topic for your virtual presentation*

**Lesson 2 – Supporting Technologies and Standards (July 6\* – July 10)**

***Topics:***

Real-World EHR models

Health Informatics Standards

Databases in Healthcare

***Required Readings:***

Carter (2008). Chapter 1, pp. 7-17 *[scan this one]*

Hripcsak G, Albers DJ. Next-generation phenotyping of electronic health records. J Am Med Inform Assoc. 2013 Jan 1;20(1):117-21. doi: 10.1136/amiajnl-2012-001145. Epub 2012 Sep 6. PubMed PMID: 22955496; PubMed Central PMCID: PMC3555337.

Mandel JC, Kreda DA, Mandl KD, Kohane IS, Ramoni RB. SMART on FHIR: a standards-based, interoperable apps platform for electronic health records. J Am Med Inform Assoc. 2016 Sep;23(5):899-908. doi: 10.1093/jamia/ocv189. Epub 2016 Feb 17. PubMed PMID: 26911829; PubMed Central PMCID: PMC4997036.

Moreno-Conde A, Moner D, Cruz WD, Santos MR, Maldonado JA, Robles M, Kalra D.  Clinical information modeling processes for semantic interoperability of electronic health records: systematic review and inductive analysis. J Am Med Inform Assoc. 2015 Mar 21. pii: ocv008. doi: 10.1093/jamia/ocv008. [Epub ahead of print] PubMed PMID: 25796595.

Section IV - Technology for an Integrated Health IT Ecosystem (pp. 39-44) & illustrative scenarios from Section V – Privacy and Security Considerations (pp. 51-52) from President’s Council of Advisors on Science and Technology. (2010). Realizing the full potential of health information technology to improve healthcare for Americans: The path forward. Washington, DC: Author. [available at <http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-health-it-report.pdf>, *scan this one*]

Sha, S. Understanding electronic health records and thirdparty application databases. 2010 <http://www.ibm.com/developerworks/data/library/techarticle/dm-ind-ehr/dm-ind-ehr-pdf.pdf> AND <http://www.healthcareitnews.com/blog/how-design-next-generation-ehr-data-models?single-page=true>.

*Optional Readings*

Carter (2008). Chapter 6

Carter (2008). Chapter 4, pp. 77-88

Diamond, C., Mostashari, F., & Shirky, C. (2009). Collecting and sharing data for population health: A new paradigm. Health Affairs, 28(2): 454-466

Cimino, J. (2000). From data to knowledge through concept-oriented terminologies: Experience with Medical Entities Dictionary. Journal of the American Medical Informatics Association, 7, 288-297.

Sujansky, W.V., Overhage, J.M., Chang,S., Frohlich, J. & Faus, S.A. (2009). The Development of a highly constrained Health Level 7 implementation guide to facilitate electronic laboratory reporting to ambulatory electronic health record systems. Journal of the American Medical Informatics Association, 16(3), 285-290.

Weber, G.M., Murphy, S.N., McMurry, A.J., Macfadden, D., Nigrin, D.J., Churchill, S. & Kohane, I.S. (2009). The Shared Health Research Information Network (SHRINE): a prototype federated query tool for clinical data repositories. Journal of the American Medical Informatics Association, 16(5), 624-30

**Assignment:** *Complete essay response questions for Lesson 2 due on July 10 and finalize topic for your virtual presentation.*

\**NOTE: this is a shorter week due to the July 4 Holiday. Only 4 days of discussion participation are required.*

**Lesson 3 – EHR integration into the clinical process and workflow. (July 11 – July 17)**

***Topics:***

Business Processes in Clinical Practices

Understanding Clinical Processes

Workflow/policy challenges in EHR implementation

Change Management

***Required Readings:***

Ben-Assuli O. Electronic health records, adoption, quality of care, legal and privacy issues and their implementation in emergency departments. Health Policy. 2015 Mar;119(3):287-97. doi: 10.1016/j.healthpol.2014.11.014. Epub 2014 Nov 29. Review. PubMed PMID: 25483873.

Callen, J.L., Braithwaite, J. & Westbrook, J.A. (2008). Contextual implementation model: A framework for assisting clinical information system implementations. Journal of the American Medical Informatics Association, 15(2), 255-262 (mainly diagram on p. 258) *[scan this one]*

Fernandopulle, R., & Patel, N. (2010). How the Electronic Health Record did not measure up to the demands of our medical home practice. Health Affairs 29 (4), 622-628 *[scan this one]*

Heisey-Grove D, Danehy LN, Consolazio M, Lynch K, Mostashari F. A national study of challenges to electronic health record adoption and meaningful use. Med Care. 2014 Feb;52(2):144-8. doi: 10.1097/MLR.0000000000000038. PubMed PMID: 24309669.

Holroyd-Leduc JM, Lorenzetti D, Straus SE, Sykes L, Quan H. The impact of the electronic medical record on structure, process, and outcomes within primary care: a systematic review of the evidence. J Am Med Inform Assoc. 2011 Nov-Dec;18(6):732-7. doi: 10.1136/amiajnl-2010-000019. Epub 2011 Jun 9. Review. PubMed PMID: 21659445; PubMed Central PMCID: PMC3197985.

Nguyen L, Bellucci E, Nguyen LT. Electronic health records implementation: an evaluation of information system impact and contingency factors. Int J Med Inform. 2014 Nov;83(11):779-96. doi: 10.1016/j.ijmedinf.2014.06.011. Epub 2014 Jul 22. Review. PubMed PMID: 25085286.

Sherer SA, Meyerhoefer CD, Sheinberg M, Levick D. Integrating commercial ambulatory electronic health records with hospital systems: An evolutionary process. Int J Med Inform. 2015 May 22. pii: S1386-5056(15)00103-3. doi: 10.1016/j.ijmedinf.2015.05.010. [Epub ahead of print] PubMed PMID: 26045022.

Seo, D., Boonstra, A., & Offenbeek, M. (2011). Managing IS adoption in ambivalent groups. Communications of the ACM, 54(11), 68-73 *[scan this one]*

Tai-Seale M, Olson CW, Li J, Chan AS, Morikawa C, Durbin M, Wang W, Luft HS. Electronic Health Record Logs Indicate That Physicians Split Time Evenly Between Seeing Patients And Desktop Medicine. Health Aff (Millwood). 2017 Apr 1;36(4):655-662. doi: 10.1377/hlthaff.2016.0811. PubMed PMID: 28373331. *[scan this one]*

*Optional Readings:*

Ash, J.S., Sitting, D.F., Poon, E.G., Guappone, K., Campbell, E. & Dykstra, R.H. (2007). The extent and importance of unintended consequences related to computerized provider order entry.  Journal of the American Medical Informatics Association, 14, 415– 423

Carter (2008). Chapter 7

Carter (2008). Chapter 8

Lorenzi, N.M., and Riley, R.T (2000). Managing change: An overview. Journal of the American Medical Informatics Association, 7, 116-124.

Payne, T.H., tenBroek, A.E., Fletcher, G.S. & Labuguen, M.C. (2010).  Transition from paper to electronic inpatient physician notes.  Journal of the American Medical Informatics Association, 17, 108-111.

**Assignment:** *Complete essay response questions for Lesson 3 and post your presentation by July 15.*

**Lesson 4 – EHR and Quality of Care; Clinical Decision Support (July 18 – July 24)**

***Topics:***

Defining QC Problems in Healthcare

Impact of HIT on QC

Clinical Decision Support

***Required Readings:***

Buntin, M.B., Burke, M.F., Hoaglin, M.C. & Blumenthal, D. (2011). The benefits of health information technology: A review of the recent literature shows predominantly positive results. Health Affairs, 30(3), 464-471. *[skim introductory sections, read the Results, pay special attention to Discussion]*

Castaneda C, Nalley K, Mannion C, Bhattacharyya P, Blake P, Pecora A, Goy A, Suh KS. Clinical decision support systems for improving diagnostic accuracy and achieving precision medicine. J Clin Bioinforma. 2015 Mar 26;5:4. doi: 10.1186/s13336-015-0019-3. eCollection 2015. PubMed PMID: 25834725; PubMed Central PMCID: PMC4381462.

Chaudhry, B., Wang, J., Wu, S., et al. (2006). Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. Annals of Internal Medicine, 144, 742-752 *[scan this one]*

Middleton B, Bloomrosen M, Dente MA, Hashmat B, Koppel R, Overhage JM, Payne TH, Rosenbloom ST, Weaver C, Zhang J; American Medical Informatics Association. Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA. J Am Med Inform Assoc. 2013 Jun;20(e1):e2-8. doi: 10.1136/amiajnl-2012-001458. Epub 2013 Jan 25. PubMed PMID: 23355463; PubMed Central PMCID: PMC3715367.

Roukema, J., Styerbert, E.W., van der Lei, J. & Moll, H.A. (2008). Randomized trial of a clinical decision support system: Impact on the management of children with fever without apparent source. Journal of the American Medical Informatics Association, 15 (1), 107-114 *[scan this one]*

Zhou L, Karipineni N, Lewis J, et al. A study of diverse clinical decision support rule authoring environments and requirements for integration. BMC Medical Informatics and Decision Making. 2012;12:128. doi:10.1186/1472-6947-12-128.

*Optional Readings:*

Balas, E.A., Weingarten, S., Garb, C.T., Blumenthal, D., Boren, S.A., & Brown, G.D. (2000). Improving preventive care by prompting physicians. Archives of Internal Medicine, 160, 301-308.

Bates, D.W., Leape, L.L., Cullen, D.J., Laird, N., Peterson, L.A., Teich J.M., et al. (1998). Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. Journal of the American Medical Association, 80, 1311-1316

Bates, D.W. & Gawande, A.A. (2003). Patient safety: improving safety with information technology. New England Journal of Medicine, 348, 2526-2534

Carter (2008). Chapter 9

Chassin MR, Galvin RW. The urgent need to improve health care quality. Institute of Medicine National Roundtable on Health Care Quality. JAMA 1998; 280: 1000–5 (just pp 102-103)

Ferranti, J.M., Langman, M.K., Tanaka, D., McCall. J., & Ahmad, A. (2010). Bridging the gap: leveraging business intelligence tools in support of patient safety and financial effectiveness. Journal of the American Medical Informatics Association, 17, 136-143

Goldzweig, C.L., Towfigh, A., Maglione, M. & Shekelle, G. (2009). Cost and benefits of health information technology: New trends from the literature. Health Affairs, 28(2), 282-293 (skim the paper, focus on discussion section on pp. 291-292)

Kuperman, G.J. 7 Gibson, R.F. (2003). Computer physician order entry: benefits, costs, and issues. Annals of Internal Medicine, 139, 31-39

Osheroff, J.A., Teich, J.M., Middleton, B., Steen, E.B., Wright, A. & Detmer, D.E. (2007). A roadmap for national action on clinical decision support. Journal of the American Medical Informatics Association, 14(2), 141–145

Zhou L. et al. (2009). The Relationship between Electronic Health Record use and quality of care over time. Journal of the American Medical Informatics Association, 16, 457– 464

**Assignment:** *Complete essay response questions for Lesson 4 and provide comments on your classmates’ presentations and reply to any comments on your presentation by July 24.*

**Lesson 5 – EHR Implementation/Evaluation and Meaningful Use (July 25 – July 31)**

***Topics:***

Defining Meaningful Use

Evaluation of EHR Features

***Required Readings:***

Blumenthal, D. & Tavenner, M. (2010). The “meaningful use” regulation for electronic health records. The New England Journal of Medicine, 363(6), 501–504. *[scan this one]*

Cresswell KM, Worth A, Sheikh A. Integration of a nationally procured electronic health record system into user work practices. BMC Med Inform Decis Mak. 2012 Mar 8;12:15. doi: 10.1186/1472-6947-12-15. PubMed PMID: 22400978; PubMed Central PMCID: PMC3313868.

Davidson, S.M. & Heineke, J. (2007). Toward an effective strategy for the diffusion and use of clinical information systems. Journal of the American Medical Informatics Association, 14(3), 361–367. *[scan this one]*

Halamka, J.D. (2010). Making the most of federal health information technology regulations. Health Affairs, 29 (4), 596–600. *[scan this one]*

Ornstein SM, Nemeth LS, Nietert PJ, Jenkins RG, Wessell AM, Litvin CB. Learning from primary care meaningful use exemplars. J Am Board Fam Med. 2015 May-Jun;28(3):360-70. doi: 10.3122/jabfm.2015.03.140219. PubMed PMID: 25957369.

*Optional Readings:*

Carter (2008). Chapter 17

Section IX – Recommendations (pp. 77-79) from President’s Council of Advisors on Science and Technology. (2010). Realizing the full potential of health information technology to improve healthcare for Americans: The path forward

Simon et al. (2009). Physicians’ use of key functions in Electronic Health Records from 2005 to 2007: A statewide survey. Journal of the American Medical Informatics Association, 16, 465-470

**Assignment:** *Complete essay response questions for Lesson 5 by 5PM EST July 31.*

**All final materials are due July 31st at 5PM EST**