**SYLLABUS**

**NMETH 527 – INTRODUCTION TO HEALTH INFORMATICS AND SYSTEMS THINKING**

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Text: None required

**Disability Accommodations:**

If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz, 543-8924 (V/TDD). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need for class.

**WHY WE HAVE THIS COURSE**

This is the first course in the Clinical Informatics and Patient Centered Technologies (CIPCT) graduate program. It is designed to guide the student toward a high-level understanding of the significance of health information technology and informatics in the complex and diverse world of healthcare. To develop this perspective, we review the history, current applications, and the potential futures of information and information technology as it pertains to health care delivery and leadership.

It is often claimed that healthcare is by far the most information dense industry in existence – and yet healthcare organizations have been very slow to adopt advanced health information technology (HIT). With the advent of passage of healthcare reform and the stimulus bill in 2009, healthcare leadership has now begun to focus significant attention and resources toward this transformative adoption. Given the significant capital and organizational costs of HIT and the rather dismal track record of HIT implementations, it is imperative the future healthcare leaders have a deep understanding of - and belief in - HIT.

**WHAT WE WILL LEARN**

There are two concurrent and inter-dependent goals in this course. The first goal is what new knowledge we hope to attain. The second goal is what we hope to be able to do with this new knowledge.

*Content Objectives*

1. Describe various definitions of informatics

2. Explain various definitions of systems and systems thinking

3. Justify their current concept map all of informatics

4. Effectively and efficiently research informatics issues and challenges

5. Critically evaluate past and present efforts in informatics

6. Describe their own personal goals in the field of informatics.

*Additional Areas of Learning*

1. Define and analyze the major issues in healthcare today, including cost, quality and access.

2. Compare and contrast each of these issues at multiple levels, including those of society, the enterprise and the individual.

3. Describe and evaluate the implications of each of these issues in terms of information, information technology and informatics.

4. Apply the foundational principles of biomedical and health informatics to these implications.

5. Summarize and evaluate the current and future biomedical and health informatics research agenda in healthcare.

6. Summarize and evaluate the current and future biomedical and health informatics application challenges in healthcare.

7. Effectively research the content issues using a broad range of skills across a broad range of resources.

8. Effectively contribute to a learning community in our course.

9. Take ownership of your learning and professional growth.

10. Identify and develop your metacognition and implement a life-wide learning strategy.

**WHAT WE’LL EXPLORE…**

The course is divided into 3 segments. These cover clinical topics through parallel perspectives: the societal level (health care policy), the enterprise level (care delivery organizations), and the individual level (patients and providers.)

*Part 1: The Individual*

We begin with a look at the two main actors in clinical care - the patient and the provider. We first consider how health - and lack thereof - is defined, both by the patient and by the provider. We look at the relationships between patients and providers, and the cultural barriers that separate them. We also explore the diagnostic-therapeutic cycle, and as well the education, training of doctors and nurses.

*Part 2: The Enterprise*

In the second segment we move up to the delivery organization level - using hospitals as the prototype. We examine the organizational structures of delivery organizations, the myriad functions they undertake as care is designed and delivered, and the teams of providers engaged in these processes, including people with both clinical and nonclinical roles. We conclude this section with an exploration of the current issues facing healthcare delivery organizations, including medical error, consumer dissatisfaction, evidence-based practice, and access to care.

*Part 3: Society*

In this final segment, we explore health and clinical care from the policy level. Included are modules on the history of health care in the US over the last century, and how health care delivery is structured, regulated, and assessed for quality, access, and outcomes. We also discuss the financing of health care services across the spectrum of health care consumers and the interests of employers and third-party payers. We also define several types of care, including preventive care, acute episodic care, chronic care, mental health care and end-of-life care.

The weekly topics are:

* Introduction to Informatics
* Becoming a Patient: The Experience of Illness
* Becoming a Physician: Above All, Do No Harm
* Becoming a Nurse: Cure or Care?
* The Provider-Patient Relationship: The Heart of Clinical Care
* The Hospital: Abandon All Hope, Ye Who Enter Here
* The Great Thing About Standards is That There Are So Many From Which to Choose…
* Informatics and Leadership: Vision. That sounds cool. Do you know where we can buy one?
* Informatics and Failure: Culture Eats Planning for Lunch
* Confidentiality, Security and Privacy: The Devil is in the Details
* Esemplasy

**HOW WE’LL GET THERE…**

The typical approach to a course with this title is to start with an examination of clinical informatics tools, research questions and application challenges. However, I believe that an effective informatician requires one to have a deep understanding of the core issues in a domain before considering the informatics implications. Therefore, our approach will be in each module to begin with consideration of a current foundational issue and challenge in healthcare - issues and challenges that are vexing and highly complex. Most learners in this course already have a deep experience in health and clinical care, yet may have not had the opportunity to examine these foundational challenges from differing perspectives. In this course, each week we will begin with an exploration of a foundational challenge in clinical care and from there consider how informatics may – or may not – provide solutions.

***Expectations***

My expectations of you:

1. An acknowledgment that your fellow learners are diverse in terms of prior education, experience and knowledge. They are not your competitors, they are your colleagues.

2. A commitment to rigor - I will push each of you to excel, based on your abilities and experiences. At times this may make you feel a bit uncomfortable, but it should never make you feel unsafe.

3. To see me as a mentor, advisor, consultant, and colleague - not as the font of all knowledge.

4. A perspective in that everything you do in this class should be done with two goals in mind. First, to enable you to become a better life-long learner, and second to enable your classmates to become better life-long learners.

What you can expect from me:

1. A stimulating learning environment that creates intellectual curiosity.

2. "Just enough" structure yet plenty of support. This may mean that at times the problems and challenges I provide are ambiguous - just like the real world.

3. A learning environment that facilitates interaction and collaboration between all of us in the course. You will learn as much from each other as you will from me.

4. Serving as your cognitive coach as well as content coach. This means I will spend equal time discussing what we know and how we come to know it.

***Logistics***

Over the ten weeks of the course we will explore a range of topics, generally speaking in overlapping modules of about twelve days each. We will use three student teams throughout the course.

1. Each module begins on Monday. By 8 AM I will post by to the website a “Challenge” – a current and core issue in clinical care for which there may be implications for informatics. I will also assign one of the teams to take the lead for the module. After reading the Challenge, each team member of the assigned team will post their individual response to the Challenge. Anyone else may also post a response to the Challenge if they so desire – but only the assigned team members are required to posts. The posts are due by Tuesday, 5 PM. The Challenges are brief – generally taking no more than 5 minutes to read. The responses you post are also brief – they are informal and they do NOT require you to do any research or reading. The objective is simply for you to respond with your existing thoughts, opinions and ideas. And because the posts are in a discussion forum, I encourage all of you to respond to your classmates’ postings.
2. After the Challenge responses are in on Tuesday, I will post my summary thoughts and as well one or more foundational informatics questions for you to explore over the rest of the module. Generally speaking, these questions will take the form of:
3. What are the critical elements of the issue(s) important to informaticians?
4. What do we know about past and current informatics interventions that have been designed/implemented for these issues?
5. Is this a fruitful area for new informatics research or application?
6. Do these issues highlight or embody any foundational informatics principles?
7. I will also provide you with a set of seed readings and resources with which you can start your exploration of these issues. The resources should hopefully answer some of the core questions – and as well lead you to new questions. Part of your charge for the week is to seek out additional resources that may also shed light on the core questions. The course website will have a discussion forum where you can share with the rest of us your research findings, ideas you may have had, or any burning questions that have arisen.
8. By Sunday the assigned team will post five “Issue Summaries” to the course website – due at 12:00 noon. The form of the deliverable is up to you, deciding what might be best suited for our time constraints and for optimal learning. Examples might be executive memos, issue briefs, interview transcripts, position papers, presentations, or video files among others. In general, these should be concise – meaning no more than two single-spaced pages (or the equivalent). Your teams will which five team members create the Issue Summaries – this way each of you will have at least two opportunities during the quarter to create Issue Summaries.
9. All of you can then review the five issue summaries after they are posted and comment on them in the discussion forum if you feel so compelled.
10. The final task you complete in the module is a posting to your personal reflective learning journal – due Tuesdays, 5:00 PM. Everyone completes this deliverable. Details for this are in the Assessment section below.

 Here is a calendar summary of this module design: 

**HOW WE’LL ASSESS...**

The University requires numeric grades and so we will use them, despite the limitations from which this method suffers. Grading at UW is numeric. The highest possible grade is a 4.0. A passing grade is 2.7 or above. The UW Graduate School requires students to maintain a GPA of 3.0 GPA and at least a grade of 2.7 in each course to remain in good standing. The Department of Health Services Grading guidelines are:

Grade Subjective Description

3.9 - 4.0 Exceptional

3.6 - 3.8 Excellent

3.3 - 3.5 Expected

3.0 - 3.2 Adequate

2.7 - 2.9 Inadequate, may require rework

<2.7 Fail

0 Violation of academic integrity rules (it is your responsibility to know these)

Course grades will be based on your personal reflective learning journal.

***The Reflective Learning Journal***

*General concepts*

You will have one graded deliverable for the course – a reflective learning journal that you develop over the course of the quarter. A reflective learning journal is a specific form of writing designed to encourage and support critical reflective learning. Your posts in your journal should convey your own thinking and opinions relating the relevance, meaning or significance of the issues and concepts we cover in each module, as opposed to a simple recitation of facts or concepts or theories you read about or discuss. Reflective writing is neither right nor wrong. It represents your personal interaction with the foundational ideas in the course, and it may vary from that of your peers or instructors. Your journal posts should take into consideration your own professional interests and career direction. My role is less as an evaluator and more as a facilitator to guide and promote critical reflective thinking.

*Logistics* At the end of each module you’ll have the opportunity to post a journal entry reflecting on the core topics in the module. Journal postings should be no more that one page, single-spaced. The final journal posting, due the last week of the course, will be a summary of your core learning experience over the quarter. This final post should be no more than two pages, single-spaced. The specific style and structure of the writing is open – this does not have to be traditional academic writing. Citations and references are not required, although they may be useful. You will have a private journal space in the course Moodle. You have the option to make your journal confidential or to share it with your peers. Finally, along with each journal posting please also post your completed self-assessment rubric (see below).

*What to put into your journal*

These questions might help guide you towards a reflective learning:

1. What aspects of the issues stood out as being significant to you?

2. Were there concepts or issues not covered that you think are worth noting?

3. Have you had “real world” experiences in which these issues or ideas played out in practice?

4. What prior knowledge, opinion or bias did you bring to this topic? Did the readings or discussion cause you to modify your previous knowledge/opinion/bias?

5. Do you have disagreements with any of the authors’ assertions? Those of your fellow learners in the class?

6. In what specific ways might the ideas and concepts we explore be used in your continuing professional development?

7. What remaining questions do you have about the ideas we read about and discussed?

8. What areas do you plan to investigate further to enhance your professional expertise?

9. How do you evaluate your thinking and learning processes as we move through this module?

*Assessment*

I will ask you to self-evaluate your reflective journal as a part of the course. As long as your evaluation is consistent with the evidence supported by the rubric (below), I will agree with the grade noted in the rubric.

There are a several elements that can make for an effective reflective journal posting:

* 1. Element 1: Description.

Learners should describe the learning context (whether this is a completed reading or other assignment, an in-class discussion or and out-of-class experience). Learners record what they know already, what they have observed, and what data and information they have gathered.

* 1. Element 2: Analysis and Interpretation.

Learners should examine reasons behind the context of the learning situation. How do they interpret the learning situation? They also record their personal reactions, feelings, thoughts, and choices, including their hunches. They analyze potential factors and contextual aspects.

* 1. Element 3: Meaning and Application.

Learners think deeply about possible meanings. Why did this seem like a significant event to reflect on? What have they learned and how have they improved? How might future thinking, behaving, and interactions change? What questions remain?

* 1. Element 4: Implications for Action. Learners now make future plans for action. What can happen differently next time and how can different conditions increase the likelihood of more productive learning and interactions? Learners can consider implications for their future behavior and implications for their career paths.

This set of self-assessment questions may also guide your journal writing and self-assessment:

* + 1. Engagement with the topic presented in the seminar/reading.

To what extent did you demonstrate you were deeply engaged in the topic? For example, did you present a critical analysis or a sharp synthesis of the main ideas presented? Did you explain how the discussion/readings helped you to see things from a different perspective?

* + 1. Transfer of meaning from the topic to another context.

To what extent did you transfer an aspect of the topic or readings and relate it to your own educational or professional context? Did you transfer theoretical ideas from the discussion/readings into a practical context?

* + 1. Extension of thinking/development of knowledge. Were you able to go beyond the ideas presented in the topic/reading/discussion by posing probing questions, extrapolating ideas or demonstrating learning of new concepts and theories?
		2. Developing a learning community.

Did you share ideas with others in our learning community and carefully listen to the opinions and perspectives of other people? Did you search for related information from other sources?

*Course Grades*

I will ask you to self-evaluate your reflective journal based on the evaluation rubric below. As long as your evaluation is consistent with the evidence supported by the rubric, I will agree with the grade noted in the rubric.

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**SCHEDULE:**

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| **Week** | **Topic** | **Readings** |
| Week 1 | Introduction to Informatics  |  |
| Week 2 | Becoming a Patient: The Experience of Illness  | * [Diabetes](https://moodle.washington.edu/file.php/22988/documents/Dickey.pdf)[,](http://www.moodle.org/0.4367509957344956) Dickey (1969) (Poem)
* Boyd KM. Disease, illness, sickness, health, healing and wholeness: Exploring some elusive concepts. Med Humanit 2000, Jun;26(1):9-17. PMID: 12484312
* Detmer D, Bloomrosen M, Raymond B, Tang P. Integrated personal health records: transformative tools for consumer-centric care. BMC Med Inform Decis Mak. 2008; Vol. 8,:45. PMID: 18837999
* Kaelber DC, Jha AK, Johnston D, Middleton B, Bates DW. A research agenda for personal health records (phrs). J Am Med Inform Assoc 2008;15(6):729-36. PMID: 18756002
* Tang PC, Ash JS, Bates DW, Overhage JM, Sands DZ. Personal health records: Definitions, benefits, and strategies for overcoming barriers to adoption. J Am Med Inform Assoc 2006;13(2):121-6. PMID: 16357345
* Pratt W. [Personal Health Information Management.](http://faculty.washington.edu/wpratt/Publications/CACMp51-pratt.pdf) Communications of the ACM. 2006. Vol 49, Iss 1. 51-55
 |
| Week 3 | Becoming a Physician: Above All, Do No Harm  | * Strauss, ["The Culture of Medicine"](https://moodle.washington.edu/file.php/22988/documents/strauss.pdf)
* Groopman, "[How Doctor's Think](http://books.google.com/books?id=RjY2iwqIuIwC&pg=PA27&lpg=PA27&dq=groopman+how+doctors+think+%22chapter+1%22&source=bl&ots=rN5VEiV-fj&sig=ma-UVhMdym5jnCNrchCe9oktpXk&hl=en&ei=0A-tTNilI4WqsAOlkaGdDA&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBIQ6AEwAA#v=onepage&q&f=false)"
* Gawande, "[The Learning Curve](http://archives.newyorker.com/?i=2002-01-28#folio=052)"
* Woo B. Primary care--the best job in medicine? N Engl J Med. 2006; Vol. 355, Iss. 9:864-866. PMID: 16943397
* Sittig DF, Wright A, Osheroff JA, et al. Grand challenges in clinical decision support. J Biomed Inform. 2008; Vol. 41, Iss. 2:387-392. PMID: 18029232
* Blumenthal D, Glaser JP. Information technology comes to medicine. N Engl J Med. 2007; Vol. 356, Iss. 24:2527-2534. PMID: 17568035
 |
| Week 4 | Becoming a Nurse: Cure or Care?  | * Malpas P. Florence Nightingale: Appreciating our legacy, envisioning our future. Gastroenterol Nurs. 2006; Vol. 29, Iss. 6:447-452. PMID: 17273011
* Black N. Rise and demise of the hospital: a reappraisal of nursing. BMJ. 2005; Vol. 331, Iss. 7529:1394-1396. PMID: 16339253
* Adams B. Accountable but powerless. Health Aff (Millwood). 2002; Vol. 21, Iss. 1:218-223. PMID: 11900080
* Buerhaus PI. Current and future state of the US nursing workforce. JAMA. 2008; Vol. 300, Iss. 20:2422-2424. PMID: 19033594
* Rosenstein AH, O'Daniel M. A survey of the impact of disruptive behaviors and communication defects on patient safety. Jt Comm J Qual Patient Saf. 2008; Vol. 34, Iss. 8:464-471. PMID: 18714748
* McCormick KA, Delaney CJ, Brennan PF, et al. Guideposts to the future--an agenda for nursing informatics. J Am Med Inform Assoc. 2007; Vol. 14, Iss. 1:19-24. PMID: 17068358
* Masys DR, Brennan PF, Ozbolt JG, Corn M, Shortliffe EH. Are medical informatics and nursing informatics distinct disciplines? The 1999 ACMI debate. J Am Med Inform Assoc. 2000 May-Jun;7(3):304-12. PMID: 10833168
 |
| Week 5 | The Provider-Patient Relationship: The Heart of Clinical Care  | * Frank – [The Cost of Appearances](https://moodle.washington.edu/file.php/22988/frank.pdf)
* Szasz - [The Basic Model of the Doctor-Patient Relationship](https://moodle.washington.edu/file.php/22988/szasz.pdf)
* Guthrie B, Saultz JW, Freeman GK, Haggerty JL. Continuity of care matters. BMJ. 2008; Vol. 337,:a867. PMID: 18687724
* Ralston JD, Martin DP, Anderson ML, et al. Group health cooperative's transformation toward patient-centered access. Med Care Res Rev. 2009; Vol. 66, Iss. 6:703-724. PMID: 19549993
* Reid RJ, Fishman PA, Yu O, et al. Patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. Am J Manag Care. 2009; Vol. 15, Iss. 9:e71-e87. PMID: 19728768
* Nace. [Meaningful Connections: A resource guide for using HIT to support the PCMH](http://www.pcpcc.net/content/meaningful-connections). 2010.
* Nutting PA, Miller WL, Crabtree BF, Jaen CR, Stewart EE, Stange KC. Initial lessons from the first national demonstration project on practice transformation to a patient-centered medical home. Ann Fam Med. 2009; Vol. 7, Iss. 3:254-260. PMID: 19433844
 |
| Week 6 | The Hospital: Abandon All Hope, Ye Who Enter Here  | * McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. N Engl J Med. 2003; Vol. 348, Iss. 26:2635-2645. PMID: 12826639
* Goldman, D, McGlynn E. [U.S. Health Care. Facts about Cost, Access and Quality](http://www.rand.org/pubs/corporate_pubs/2005/RAND_CP484.1.pdf). Rand Health and the Communications Institute.

Optional:* Friedman D, Lies, [Damned Lies, and Medical Science](http://www.theatlantic.com/magazine/archive/2010/11/lies-damned-lies-and-medical-science/8269). The Atlantic Monthly, November 2011
* Ioannidis JP. Contradicted and initially stronger effects in highly cited clinical research. JAMA. 2005; Vol. 294, Iss. 2:218-228. PMID: 16014596
* Ioannidis JP. Why most published research findings are false. PLoS Med. 2005; Vol. 2, Iss. 8:e124. PMID: 16060722
* QUALITY
	+ Recommended
		- Miser WF. An introduction to evidence-based medicine. Prim Care. 2006; Vol. 33, Iss. 4:811-829. PMID: 17169668
		- Chassin MR, Loeb JM, Schmaltz SP, Wachter RM. Accountability measures-using measurement to promote quality improvement. N Engl J Med. 2010; Vol. 363, Iss. 7:683-688. PMID: 20573915
	+ Suggested
		- Sox HC, Greenfield S. Quality of care--how good is good enough? JAMA. 2010; Vol. 303, Iss. 23:2403-2404. PMID: 20551411
		- Orszag PO. [The Overuse, Underuse, and Misuse of Health Care](http://www.cbo.gov/ftpdocs/95xx/doc9567/07-17-HealthCare_Testimony.pdf). CBO. 2009.
		- [National Health Care Quality Report](http://www.ahrq.gov/qual/qrdr09.htm). 2009.
		- Davis KD. [Mirror, Mirror on the Wall](http://www.commonwealthfund.org/~/media/Files/Publications/Fund%20Report/2010/Jun/1400_Davis_Mirror_Mirror_on_the_wall_2010.pdf). 2010.
		- Wachter RM. Patient safety at ten: unmistakable progress, troubling gaps. Health Aff (Millwood). 2010; Vol. 29, Iss. 1:165-173. PMID: 19952010
* INFORMATICS
	+ Recommended
		- Wachter RM. Expected and unanticipated consequences of the quality and information technology revolutions. JAMA. 2006; Vol. 295, Iss. 23:2780-2783. PMID: 16788133
		- Parente ST, McCullough JS. Health information technology and patient safety: evidence from panel data. Health Aff (Millwood). 2009; Vol. 28, Iss. 2:357-360. PMID: 19275990
		- Walker JM, Carayon P. From tasks to processes: the case for changing health information technology to improve health care. Health Aff (Millwood). 2009; Vol. 28, Iss. 2:467-477. PMID: 19276006
		- Bates DW. The effects of health information technology on inpatient care. Arch Intern Med. 2009; Vol. 169, Iss. 2:105-107. PMID: 19171804
		- Chaudhry B, Wang J, Wu S, et al. Systematic review: impact of health information technology on quality, efficiency, and costs of medical care. Ann Intern Med. 2006; Vol. 144, Iss. 10:742-752. PMID: 16702590
	+ Suggested
		- Amarasingham R, Plantinga L, Diener-West M, Gaskin DJ, Powe NR. Clinical information technologies and inpatient outcomes: a multiple hospital study. Arch Intern Med. 2009; Vol. 169, Iss. 2:108-114. PMID: 19171805
		- Devine EB, Hansen RN, Wilson-Norton JL, et al. The impact of computerized provider order entry on medication errors in a multispecialty group practice. J Am Med Inform Assoc. 2010; Vol. 17, Iss. 1:78-84. PMID: 20064806
 |
| Week 7 | The Great Thing About Standards is That There Are So Many From Which to Choose… | * Hammond WE. The making and adoption of health data standards. Health Aff (Millwood). 2005; Vol. 24, Iss. 5:1205-1213. PMID: 16162564
* Kim. [Clinical Data Standards in Healthcare: Five Case Studies](http://www.chcf.org/publications/2005/07/clinical-data-standards-in-health-care-five-case-studies). California Health Care Foundation. 2005.
* Ferranti JM, Musser RC, Kawamoto K, Hammond WE. The clinical document architecture and the continuity of care record: a critical analysis. J Am Med Inform Assoc. 2006; Vol. 13, Iss. 3:245-252. PMID: 16501180
* [The Office of the National Coordinator for Health Information Technology](http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__home/1204)
* This last link is to ONCHIT - the agency that directs nearly all of the federal efforts on HIT. They are/will be a major player in developing and mandating the standards we'll be using in HIT. What I'd recommend you do on this site is look around for resources on standards.
 |
| Week 8 | Informatics and Leadership: Vision. That sounds cool. Do you know where we can buy one? | The readings and resources this week diverge a little from previous weeks in the sense that several of these come from less academically-oriented sources - important in that it is these types of more professionally oriented journals are what practitioners in the field tend to read. Also, some of these are not indexed n PubMed and therefore do not have PMID numbers. In those cases I have embedded a link to the article in the library, but I am not sure the link will work for you. I am looking into whether or not you can use the DOI number to get to these (will update you as soon as the library experts get back to me). The papers are available - I've downloaded them all, but is may take a bit of navigation to get to them...In addition I am putting up a longer list this week - which should give you greater depth of information for creating your MSMC case solution. I don;t expect every one of you to read every single resource (unless you *really* love this stuff winkand so you might consider this extensive list more as potential resources to complete the case. And by all means please feel free to go beyond this list for information gathering to help you solve the case. For example, the last two resources are beief interviews with two local CIOs - which might prompt you to try to interview your own CIO...* Wager K, et al. [Organizing Information Technology Services](https://moodle.washington.edu/file.php/22988/documents/wager11.pdf). Chapter 11 in Managing Health Care Information Systems: A Practical Approach for Health Care Executives, 2009.
* Hagland M. Nursing first. Smart CIOs are partnering with nurse executives for IT implementation success. Healthc Inform. 2008; Vol. 25, Iss. 11:48-53. PMID: 19024079
* Glaser J, Kirby J. Evolution of the healthcare CIO. Healthc Financ Manage. 2009; Vol. 63, Iss. 11:38-41. PMID: 19891396
* Runy LA. [The changing role of the CMIO](http://web.ebscohost.com.offcampus.lib.washington.edu/ehost/viewarticle?data=dGJyMPPp44rp2%2fdV0%2bnjisfk5Ie46bFMsaixTrSk63nn5Kx95uXxjL6nr0evrK1KrqeuOLews0u4qrA4v8OkjPDX7Ivf2fKB7eTnfLunskuurbdNtqu0PurX7H%2b72%2bw%2b4ti7frPepIzf3btZzJzfhruprki1p7dPtpzkh%2fDj34y75uJ%2bxOvqhNLb9owA&hid=8). Hosp Health Netw. 2008; Vol. 82, Iss. 2:37.
* Wilson ML. [Nursing Informatics: From First Use to Meaningful Use](http://ovidsp.tx.ovid.com.offcampus.lib.washington.edu/sp-3.2.4b/ovidweb.cgi?&S=IBOIFPEGGMDDNBJHNCDLEBOBMPFNAA00&Link+Set=S.sh.15.17.22.31%7c14%7csl_10). Comput Inform Nurs. 2010; Vol. 28, Iss. 5:311. DOI: 10.1097/NCN.0b013e3181f2eebf
* Staggers N, Lasome CE. RN, CIO: an executive informatics career. Comput Inform Nurs. 2005; Vol. 23, Iss. 4:201-206. PMID: 16027535
* Simpson RL. Chief nurse executives: creating nursing's future with IT. Nurs Adm Q. 2008; Vol. 32, Iss. 3:253-256. PMID: 18580431
* Stead WW, Searle JR, Fessler HE, Smith JW, Shortliffe EH. Biomedical Informatics: Changing What Physicians Need to Know and How They Learn. Acad Med. 2010. PMID: 20711055
* Leviss J, Kremsdorf R, Mohaideen MF. The CMIO--a new leader for health systems. J Am Med Inform Assoc. 2006; Vol. 13, Iss. 5:573-578. PMID: 16799119
* [The College of Healthcare Information Management Executives (CHIME)](http://www.cio-chime.org/)"An executive organization dedicated to serving chief information officers and other senior health care IT leaders. With more than 1,400 CIO members and 70 health care IT vendors and professional services firms, CHIME provides a highly interactive, trusted environment enabling senior professionals and industry leaders to collaborate; exchange best practices; address professional development needs; and advocate the effective use of information management to improve health and healthcare in the communities they serve."
* [Life as a Healthcare CIO](http://geekdoctor.blogspot.com/) Blog"Every day I experience life in the world of health care IT, supporting 3000 doctors, 18000 faculty, and 3 million patients. In this blog I record my experiences with infrastructure, applications, policies, management, and governance as well as muse on such topics such as reducing our carbon footprint, standardizing data in health care, and living life to its fullest."
* [One-on-One with Florence Chang, SVP & CIO, MultiCare Health System](http://www.healthcare-informatics.com.offcampus.lib.washington.edu/ME2/dirmod.asp?sid=&nm=&type=Publishing&mod=Publications%3A%3AArticle&mid=8F3A7027421841978F18BE895F87F791&tier=4&id=8490F386F4DC4926A362AE4E87967D54)
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