

The Realities and Challenges of Primary Care: Implications for Redesign

John W. Beasley, M.D.

Professor Emeritus, UW School of Medicine and Public Health

Honorary Associate, Department of Industrial and Systems Engineering

Usual Disclosures

- Unfortunately, I have no financial relationship with any tech company – I wish I did.
- Supported by
 - AHRQ: Beasley J, (PI) Carayon P. Improving Primary Care Through Industrial and Systems Engineering (I-PrACTISE) Grant number: 1R13HS022170-01 January 2013
 - AHRQ: Wetterneck T, (PI) Karsh BT, (former-PI), Beasley JW, (Co-I) "A human factors intervention to reduce risk in primary care of the elderly," \$850,714 10/30/2008
 - AHRQ: Karsh BT, Wetterneck TB, (Co-I) Beasley JW, (Co-PI) Proactive Risk Assessment of Primary Care of the Elderly. AHRQ \$199,147 9/1/07
 - AHRQ Wetterneck TB (PI) Carayon P (Co-I) Understanding Primary Care Teamwork in Context: Implications for HIT design" Agency for Healthcare Research and Quality R01 HSO22505 Funded. 12/1/2014 – 11/30/2019 (0.9 CM) \$2,500,000. Co-I

WREN Supported by the University of Wisconsin Institute for Clinical and Translational Research (UW ICTR), funded through an NIH Clinical and Translational Science Award (CTSA), grant number 1 UL1 RR025011.

David Hahn, MD, MS, WREN Director.

Not funded by Epic





- Primary Care is:
 - the provision of integrated, accessible health care,
 - by clinicians who are accountable for addressing a <u>large</u> <u>majority of personal health care needs</u>,
 - who develop a sustained partnership with patients,
 - and practice in the context of family and the community.

Donaldson, M., Yordy, K., & Lohr, K. (1996). Primary Care --America's Health in a New Era. Washington, D.C.: National Academy Press.



Mrs. A, a 76 year old married woman comes in to discuss "dizziness."

- Recent hospital discharge, No record in EHR
- Kidney failure on dialysis
- Diabetes
- Limited vision
- Coronary artery disease
- Arthritis
- Depression
- Nurse tells me that's she's tearful that may have to leave her home

(continued)

- I'm running 30 minutes behind schedule for this 15 minute appointment
- Eight different medications
- Unclear when or why dosages were changed
- When I reorder a medication, an allergy alert fires but she is already taking it without problems
- When I'm leaving the room, she mentions that her husband has memory loss – he angrily denies this.

EXHIBIT 8 Relationship Between Provider Workforce And Quality: General Practitioners Per 10,000 And Quality Rank In 2000

Quality rank



More Primary Care gives better quality

SOURCES: Medicare claims data; and Area Resource File, 2003.

NOTES: For quality ranking, smaller values equal higher quality. Total physicians held constant.

EXHIBIT 9

Relationship Between Provider Workforce And Medicare Spending: General Practitioners Per 10,000 And Spending Per Beneficiary In 2000



...and lower costs

SOURCES: Medicare claims data; and Area Resource File, 2003. NOTE: Total physicians held constant.

- Primary care realities:
 - Multiple co-morbidities
 - Coordination with many people/places/organizations
 - Competing agendas (patient, clinician, organization, government)
 - No linear workflow because we are patient centered
 - Information chaos

Beasley JW, Hamilton K, Karsh BT. Human factors and ergonomics in primary care. Chapter 50 in Carayon P (ed.) Handbook of Human Factors and Ergonomics in Healthcare and Patient Safety, Lawrence Erlbaum Associates publishers, 2007.
Wetterneck TB, Lapin JA, Karsh BT, Beasley JW. Human Factors and Ergonomics in Primary Care. Chapter 44 in Carayon P., (Ed) Handbook of Human Factors and Ergonomics in Health Care and Patient Safety 2nd edition. 2012. Pages 763-775. CRC Press, Boca Raton, USA



Fortin, M., G. Bravo, et al. (2005). "Prevalence of multimorbidity among adults seen in family practice." <u>Ann Fam Med</u> **3**(3): 223-228.



Beasley JW, Hankey TH, Erickson R, Stange K, Mundt M, Elliott M, Wiesen P, Bobula J. How many problems do family physicians manage at each encounter? A WReN study. <u>Annals of Family Medicine</u> 2004;2(5):405-410.

- ...and the complexity is increasing
- From 1997 to 2005 (NAMCS Data, Adults)
 - Number of clinical items increased
 - 5.4/encounter to 7.1/encounter
 - Time did increase 18 to 21 minutes
 - Decrease in time/item from 4.4 to 3.8 min

Abbo ED, Zhang Q, Zelder M, Huang ES. The Increasing Number of Clinical Items Addressed During the Time of Adult Primary Care Visits. *J. Gen Intern Med* 2008;23:2058-65

- Primary care requires lots of coordination
- Many people and places
- For their Medicare patients the average primary care clinician in 2005 had to coordinate care with a total of:
 - 229 other physicians
 - 117 other practices

Pham HH, O'Malley AS, Bach PB, Saiontz-Martinez C, Schrag D. Primary care physicians' links to other physicians through Medicare patients: the scope of care coordination. *Ann Intern Med.* 2009;150(4):236-242.

- Competing agendas
 - Preventive health guidelines would take 7.4 hours per day.
 - Following guidelines for chronic diseases, if realistic, 10.6 hours.
 - That totals 18 hours per day!
 - Plus whatever it is the patient wants...



Yarnell, K.S., Pollak, K.I., Ostbye, T., Krause, K.M., Nichner, J.L. (2003) Primary Care: Is There Enough Time For Prevention? *American Journal of Public Health*. 93:635-41

Ostbye, T., Yarnall, K. S., Krause, K. M., et. al. Is there time for management of patients with chronic diseases in primary care? *Ann Fam Med* 2005;3:209-14

Workflow? Schmerkflow!!

- There is no consistent, predictable workflow in primary care encounters.
 - Visits are iterative processes driven by patient needs and the interaction between clinician and patient.
 - This is true both for clinics using EHRs and not using EHRs.
- Conclusion:
 - HIT and related support systems must be designed taking into account the variable and unpredictable nature of workflow

Wetterneck TB, Lapin JA, Krueger DJ, Holman GT, Beasley JW, Karsh BT. Development of a Primary Care Physician Task List to Evaluate Workflow and EHR Use. *BMJ Qual Saf* doi:10.1136/bmjqs-2011-000067 Holman GT, Beasley JW, Stone JA, Smith PD, Wetterneck TB. The Myth of Workflow During the Primary Care Visit and Why it Matters for Electronic Health Record Design and Implementation. *J Am Med Inform Assoc* 2015;0:1–10.

Information Chaos: a Source of Hazards and Errors

- Elements of some or all of:
 - Information overload
 - Patient, others in room, chart, nurse, EHR, prior knowledge
 - Information underload
 - Information not available
 - Information scatter
 - Information in multiple places
 - Information uncertainty
 - Which med list (or patient) is correct?
 - Information error
 - Just plain wrong (e.g. Hx of cancer is wrong!)

Beasley JW, Wetterneck T, Temte J, et al. Information Chaos in Primary Care: Implications for Physician Performance and Patient Safety. *Jr Am Board Fam Med* 2011;24:745-51

Memory, Information Processing Demands are High

- Primary care = intensive cognitive activity
 - Memory usage is very high
 - long term memory
 - Working memory
 - Knowledge-based problem solving
 - Attention and memory resources divided
 - Need to "multi-task" Which we don't really do!
 - Multi-tasking = Distracted
 - Human relationships are critical

Karsh, B-T and others.

Personal communications



We Establish Situation Awareness During The Visit

- What's going on?
- What does it mean?
- Where is it headed?
- If we change something, what will happen?

We need the EHR to help us do this



Hi! I'm the EHR and I'm here to help YOU!



www.cs.tcd.ie/~fitzpaal/glinne/IT_images/

Are More EHR Functions Better?

- Physicians working with highly functioning EMR... (are)
 - challenged when the time allotted is not equal to the time perceived as necessary to provide quality care.
 - have more burnout, dissatisfaction and intent to leave practice in the "High Functionality" EMR Cluster
 - ...EMR systems may not match workplace processes and flow

Babbott, S., Baier-Manwell, L., et al. Electronic Medical Records and Physician Stress in Primary Care: Results from the MEMO Study. *J Am Med Inform Assoc*. Doi:10.1136/amiajnl-2013-001875.

Redesign to Reduce Cognitive Clutter

- 4 pages of boiler plate from consultant
- Last line:
 - "Arthroscopy on Thursday."
- Buried in middle of 3rd page:
 - "Patient will discuss new-onset chest pain with Dr. Russo."
- "High Fiber Medical Records!"

Paul Russo, MD, Personal Communication, 2009





Redesign to Support Cognition

- EHR may reduce clinicians' need to recall info from memory/handwriting
 - May decrease cognitive workload,
- But we need to reduce the Information Chaos
 - All information easily available at any time
 - Workflow? Schmerkflow!
 - Reduce interruptions (e.g. Break-in-Task due to CPOE, CDS and Best Practice Alerts)
 - Help establish Situation Awareness

Shachak A, Hadas-Dayagi M, Ziv A, Reis S. Primary Care Physicians' Use of an Electronic Medical Records System: A Cognitive Task Analysis. *J Gen. Intern Med* 2008;24:341-8

Redesign to Maintain Flow



Slide courtesy of Mark Marnocha, Ph.D., Mosaic Family Health, Appleton, WI REF: Csikszentmihalyi 1989. *J Pers Soc Psychol* 1989 815-22

Current Use of Technology

- So far, no <u>consistent</u> evidence of improvements in:
 - Quality of care
 - Safety of care
 - Subtle hazards
 - Efficiency of care
 - Increased clinician workload and risk of burnout
- We need to push ahead on all fronts
 - Policy, technology, implementation and how we use it

The Mismatch Between the Potential of HIT to Help and Actual Results

- Meaningful use was intended to help physicians provide better care
- AAFP funded study of "Meaningful Use: Benefits and Burdens"
- Survey of US Family Docs
- Focus on face-to-face care

Holman GT, Waldren SE, Beasley JW, et al. Meaningful use's benefits and burdens for US family physicians. *J Am Med Inform Assoc.* 2018;25:694-701



Redesign: Purpose and Policy

- From a national conference March 2009
 - "The purpose of the EHR is to document care."
 - Anon....
 - Our view is that the purpose of the EHR must be to communicate and improve care!

Karsh, BT, Beasley JW, Wetterneck T, Lapin J, Temte J, Smith P, AHRQ grant group. Also MetaStar and the I-PrACTISE group



Improving PrimAry Care Through Industrial and Systems Engineering

Redesign to Decrease Errors in Primary Care

- Using NAMCS data, (N=3,467), Clinicians had only 75% of base rate of depression Rx for patients with 3 or more chronic conditions when using EHRs.
- Conclusion: EMR use can impair the diagnosis and treatment of depression in primary care in patients with multimorbidity. (And that's most of them!)
- Missing a diagnosis is a type of error.

Harman JS, et al. Electronic Medical Record Availability and Primary Care Depression Treatment . *J Gen Intern Med* 2012;27:962-7

Redesign to Improve Access to Care

- Concerns about confidentiality and security
 - 29.2 million records breached since 2009
- Concerns about what's "in the record"
- How many patients will not come at all?

Johnson ME. Data Hemorrhages in the Health-Care Sector. *Financial Cryptography and Data Security*, Feb 22-25, 2009

Mitchell E, Sullivan F. A descriptive feast but an evaluative famine: A systematic review of published articles on primary care computing during 1980-1997. <u>BMJ</u> 2001;322:279-82.

Medical Economics, April 25, 2014, pg 34

Redesign to Improve Access to Care

- Might patient attitudes re EHRs influence access to care?
- Only 26% of patients want digital records
 - 85% concerned re privacy!
 - 51% concerned information could be misused
 - 26% feel EHRs have improved interactions with the office
 - 14% think "my doctor is savvy enough" to use an EHR.

http://www.ama-assn.org/amednews/2012/08/20/bisb0820.htm (Courtesy Mark Marnocha, Ph.D.) Study by Xerox of 2,100 patients.

Redesign to Reduce Keyboarding

- Keyboarding reduces dialogue between physicians and patients.
- Communication less patient centered when physician looks at screen and does keyboarding
- Phys Gaze Computer = Patient Gaze Other
- Greater physician gaze at patient -> greater patient satisfaction

Margalit TS, Roter D, Dunevant MA, et al. Electronic medical use and physician patient communication : An observational study of Israeli primary care encounters. *Patient Education and Counseling* 2006;61:134-141.

Montague E, Xu J, Asan O, Chewning B, Barrett B. Modeling Eye Gaze Patterns in Clinician-Patient Interaction with Lag Sequential Analysis. *Hum Factors.* 2011; 53:502–516.

Farber NJ, Liu L, Chen Y, et al. EHR Use and Patient Satisfaction. *JFP* 2015;64:687-695

Redesign to Support Better Inter-professional communication

- Issues of readability
 - Loss of narrative
 - Templates: redundancy, low information density.
 - Results from emphasis on documentation rather than communication!
- Assumption that information has been received
 - Plaintiff's attorneys may come to love this one.
- Loss of personal contact and relationship ("John, we never talk anymore!")

Redesign to Reduce Hazards for Clinicians

- Why Care?
 - Clear correlations between workforce satisfaction and patient outcomes (and decreased malpractice liability)
- Job satisfaction decrease relates to EHR use, especially if physicians see EHR as interfering with the quality and efficiency of care
- May increase workload and burnout

Friedberg, MW. Quality of Patient Care Drives Physician Satisfaction; Doctors Have Concerns About Electronic Health Records. <u>http://www.rand.org/news/press/2013/10</u> /09.html

Coleman M, Dexter D, Nankivil N., Factors Affecting Physician Satisfaction and Wisconsin Medical Society Strategies to Drive Change. WMJ 2015;114:135-42



Redesign to Decrease Workload Issues

- From a physician assistant:
 - "I've about had it. I've cut my work time to 80% just so that I have one day to catch up on all the stuff in my in-box and don't have to do it on weekends."
- From a family doc:
 - "Every hour I spend seeing patients costs me another hour."
- Spouse: "You're on the damn computer every night!"
- One hour Face-to-Face = 2 Hours additional time

Sinsky C, Colligan L, Prgomet M, et al. Allocation of Physician Time in Ambulatory Practice: A Time and Motion Study in 4 Specialties. Ann Int Med. Sept. 2016; doi:10.7326/M16-0961

Arndt BG, Beasley JW, Watkinson MD, et al. Tethered to the EHR: Primary Care Physician Workload Assessment Using EHR Event Log Data and Time-Motion Observations. Ann Fam Med. 2017;15(5):419-426.

Young RA, Burge SK, Kaparaboyna KA, Wilson JJ, Ortiz DF. A Time-Motion Study of Primary Care Physicians' Work in the Electronic Health Record Era. Family Medicine. 2018;50(2):91-99



Changes in Burnout and Satisfaction With Work-Life **Balance** in Physicians. Mayo Clin Proc. 2015;90:1600-13 Shanafelt TD. **Dyrbe LN, Sinsky** CA, et al. Relationship **Between Clerical** Burden and **Characteristics** of the Electronic Environment With Physician **Burnout and** Professional Satisfaction. Mayo Clin Proc. 2016: 91:836-848

Shanafelt TD.

LN, et al.

Hasan O, Dyrbye

FIGURE 1. Burnout (A) and satisfaction with WLB (B) by specialty 2014 vs 2011. For 1A and 1B, specialty discipline is shown on the y axis and burnout (A) and satisfaction with WLB (B) are shown on the x axis. For 1C, satisfaction with WLB is shown on the y axis and burnout on the x axis. GIM = general internal medicine; OBGYN = obstetrics and gynecology; PM&R = physical medicine and rehabilitation; Prev = Preventive medicine, occupational medicine, or environmental medicine; WLB = work-life balance. ^aP<.05 from comparison 2014 to 2011.

Redesign to Reduce Workload:

- Time for tasks
 - "For 5 patients I first did the admission orders on paper and next uploaded the orders electronically. The difference? <u>73</u> <u>seconds vs 17 min per patient."</u>
 - "In a particularly perverse mood, I did a study of the time required to electronically sign charts...it took 25 minutes to provide 23 signatures. The average signature took 8 clicks and 33 seconds...
 - "...it takes <u>6 seconds</u> to write "RTC 1 wk w/ CBC, K+" and <u>121 seconds</u> to do this in our EHR."
- We have 370 tasks/actions per patient encounter.
- Average of 192 Clicks and scrolls per encounter.

Christine Sinsky, MD. GIM, Dubuque, IA. and AMA. Personal Communication, 2010

Adler-Milstein J, Huckman RS. The Impact of electronic Health Record Use on Physician Productivity. *Am J Manag Care* 2013;19:11 (Spec No. 10):SP345-SP52

Farber NJ, Liu L, Chen Y, et al. EHR Use and Patient Satisfaction. JFP 2015;64:687-695

Redesign to Reduce Computer Physician Order Entry

- Order sheet
 - 3 sec/pt
 - 100 pt/week
 - 5 minutes per week
- CPOE
 - 2 min/pt
 - 100 pt/wk
 - 3.3 hours per week



Slide courtesy Tom Sinsky, MD and Christine Sinsky, MD, 2013

Redesign to ReducenWork After Clinic – WAC!



Arndt BG, Beasley JW, Watkinson MD, Temte JL, Tuan, W-J, Sinsky CA, Gilchrist VJ. Tethered to the EHR: Primary Care Physician Work-load Assessment Using EHR Event Log Data and Time-Motion Observations. *Ann Fam Med*, 2017;15:419-426

Redesign Organizations for Communication

- Encourage and support "Synchronous Analogue Communication" (i.e. talking with each other!)
 - Understanding is "...hampered by ...a presumption that the ... function of a handoff is one-way information transmission."
 - There is a loss of "...co-construction of the understanding of the patient."
 - Good care depends on accurate, succinct information.

Cohen MD, Hilligoss B, et al. A handoff is not a telegram: an understanding of the patient is co-constructed. *Critical Care.* 2012;6:303

Redesign to Minimize Copy/Paste

- "The VA is a great place to work because with the computers you can just copy and paste your notes, and you don't need to write a new note every day."¹
- The copy-and-paste function "resulted in the propagation of misinformation or even in frank errors".¹
- Copy/paste may decrease quality of care
 - Lifestyle counseling for DM <u>copy/paste worse than no</u> note at all for patient outcomes!

Adapted from talk by Jennifer Frank, MD, Fox Valley Family Medicine

Thielke S, Hammond K, Helbig S. Copying and pasting of examinations within the electronic health record. *Int J Med Informatics* 2007;76S:S122-8.

Turchin A, et al. Copy/Paste Documentation of Lifestyle Counseling. and Glycemic Control in Patients with Diabetes: True to Form? *Archive Intern Med* 2011;171:1393-94

Redesign to Engage the Patient

- Clinicians rated as less effective when they spent more time looking at the computer and when there were more periods of silence in the consultation.
- Clinicians benefit from using communication strategies that maintain the flow of conversation when working with the computer.
- Remember: Phys Gaze Computer = Patient Gaze Other

Street R, Liu L, Farber NJ, et al. Provider interaction with the electronic health record: the effects on patient-centered communication in medical encounters. *Patient Educ Couns.* 2014;96:315-9. doi: 10.1016/j.pec.2014.05.004. Epub 2014 May 14.

Montague E, Xu J, Asan O, Chewning B, Barrett B. Modeling Eye Gaze Patterns in Clinician-Patient Interaction with Lag Sequential Analysis. *Hum Factors.* Oct 2011; 53(5): 502–516.

Farber NJ, Liu L, Chen Y, et al. EHR Use and Patient Satisfaction. JFP 2015;64:687-695

Physician Burnout Is A Public Health Crisis: A Message To Our Fellow Health Care CEOs

John Noseworthy, James Madara, Delos Cosgrove, Mitchell Edgeworth, Ed Ellison, Sarah Krevans, Paul Rothman, Kevin Sowers, Steven Strongwater, David Torchiana, and Dean Harrison

March 28, 2017



"One of the key contributors to burnout ... EHRs [that have] ... radically altered and disrupted established workflows and ...interactions, become a source of interruptions and distraction and are very time intensive. (*Health Affairs Blog*, March 28, 2017)



A Call to Action



[&]quot;Uncle Sam I Want You - by DonkeyHotey is licensed under CC BY 2.0

"Clinicians need to take back ownership of the medical record as a tool for improving patient care..."

Schiff GD, Bates DW. Can electronic Clinical Documentation Help Prevent Diagnostic Errors? *N Engl J Med* 2010;362:1066-69