Transforming Health & Care with the Power of Actionable Information

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Objectives

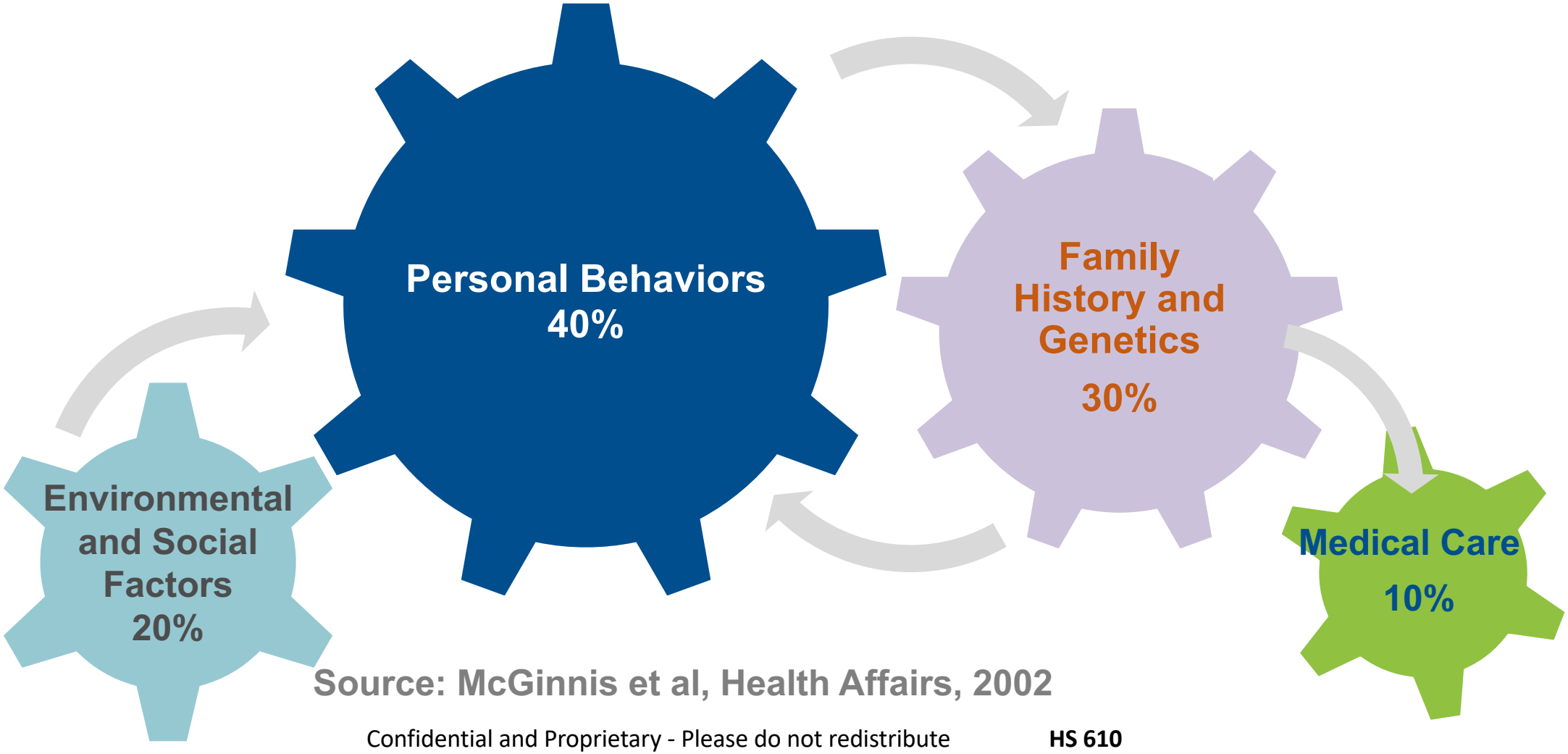
- ❖ Articulate current trends in clinical informatics.
- ❖ Describe the challenges and opportunities related to EHRs and enabling technologies.
- ❖ Discuss opportunities for elevating the contributions. and value proposition of Nursing Informatics leadership.

Health & Healthcare Trends

- Health of the U.S. and implications for Healthcare
- Quadruple Aim and EHR Documentation
- Big Data / Analytics / AI
- High Reliability / Systemness
- Inter-Professional Teaming

Many Factors Shape Health

…of which medical care is one component.



Source: McGinnis et al, Health Affairs, 2002

What about chronic disease?

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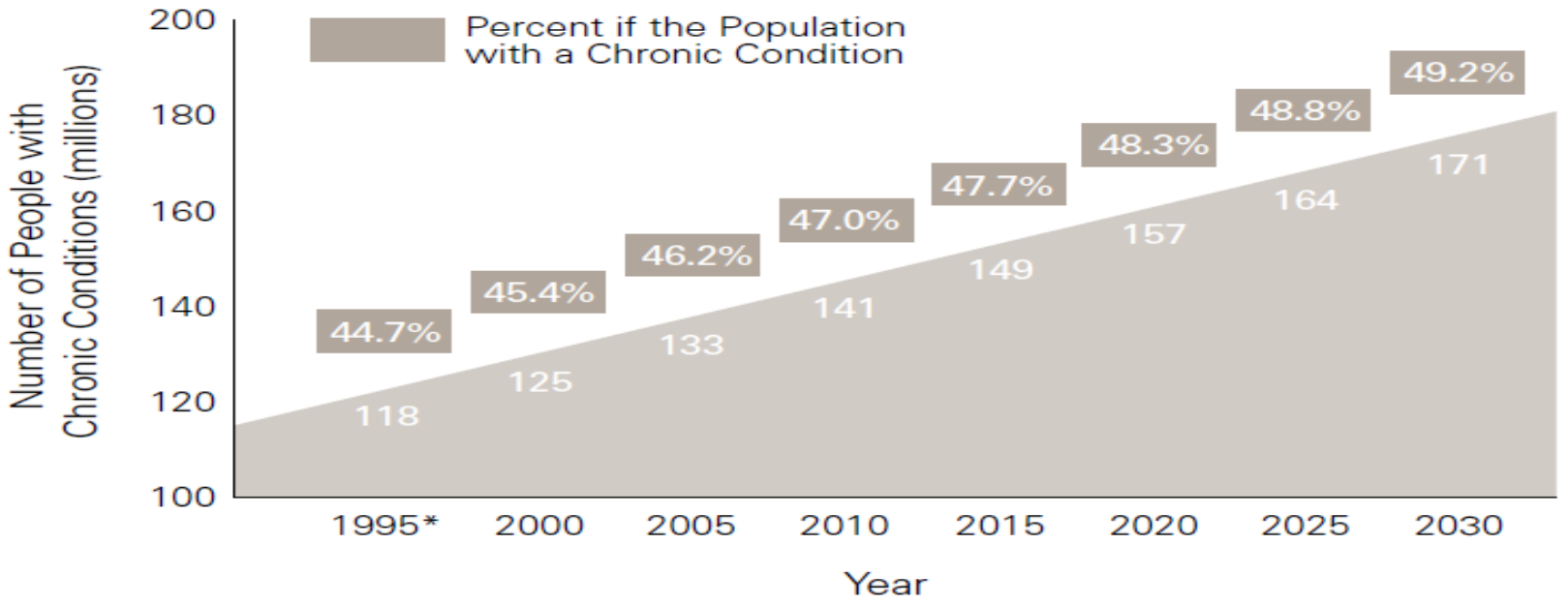
Chart 1: The Number of People with Chronic Conditions is Rapidly Increasing



Source: Wu, Shin-Yi, and Green, Anthony. *Projection of Chronic Illness Prevalence and Cost Inflation.* RAND Corporation, October 2000.

July 2017. RAND
60% of American Adults now live with least 1 chronic condition and 42% have more than one.

What about Alzheimer's Disease?

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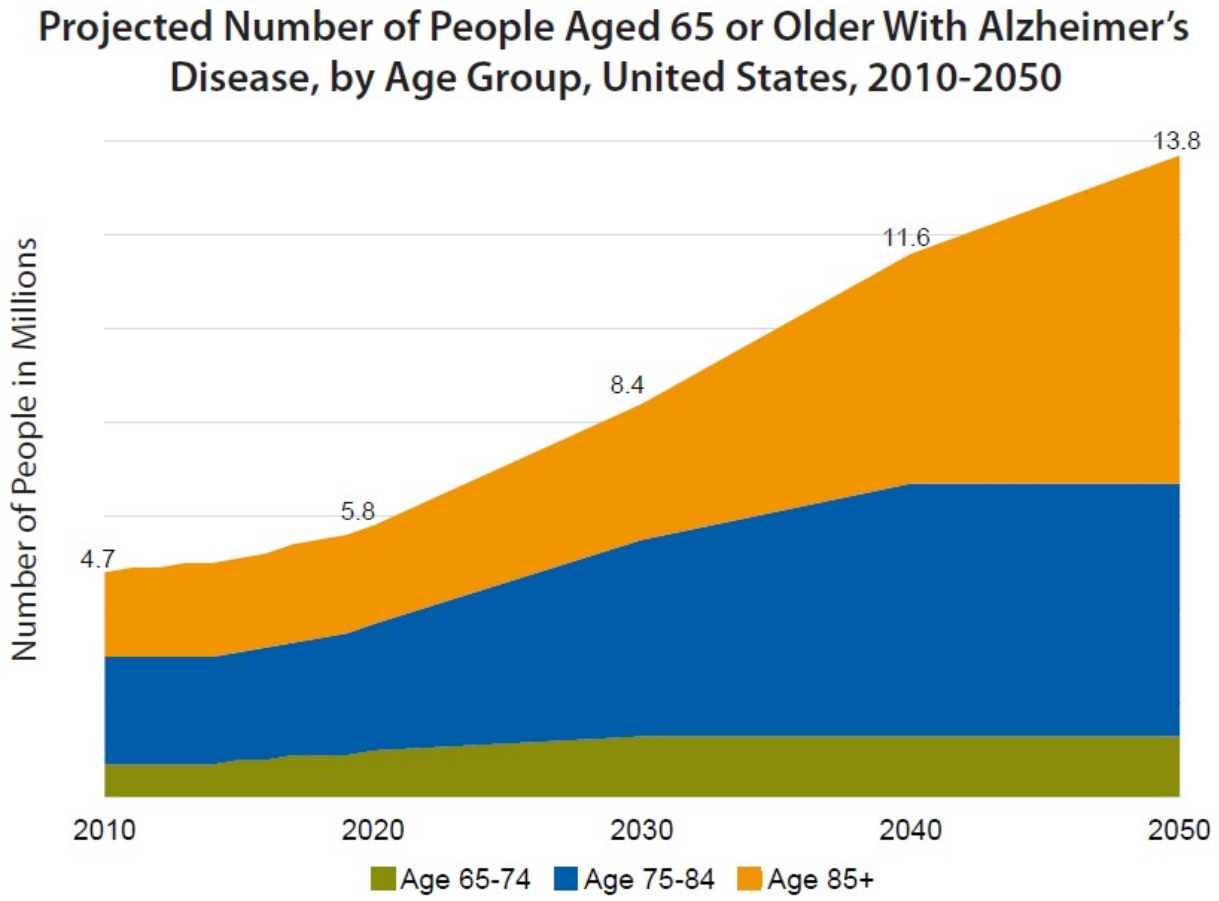
AD increased 50% 1999 to 2014

6th leading cause of death



Source: Created from data in Hebert LE, Weuve J, Scherr PA, Evans DA. Alzheimer disease in the United States (2010-2050) estimated using the 2010 Census. *Neurology* 2013;80(19):1778-83.

The Quadruple Aim

- The **Triple** Aim – Enhancing patient experience, improving population health and reducing costs is widely accepted as a compass to optimize health system performance.
- However **Burnout** among the health care team threatens clinical outcomes.
- Examples: **workload** may cause a nurse to miss changes in patient condition, MD burnout associated with lower patient satisfaction, reduced adherence to treatment plans or physicians leaving practice.
- The 4th aim – Improving the work life, satisfaction & efficiency of MD, RNs & caregivers.

AMIA EHR 2020 Taskforce

Key **Recommendations**:

1. Simplify & Speed documentation
2. Reduce data entry and focus on Patient Outcomes
3. Refocus Regulation: Simplify certification, improve interoperability
4. Increase transparency and streamline certification of EHRs.
5. Foster innovation; Use public standards to support research
6. Support person-centered care delivery- Support the integration of social context of care including home care, long term care, patient generated data social, emotional contexts of care

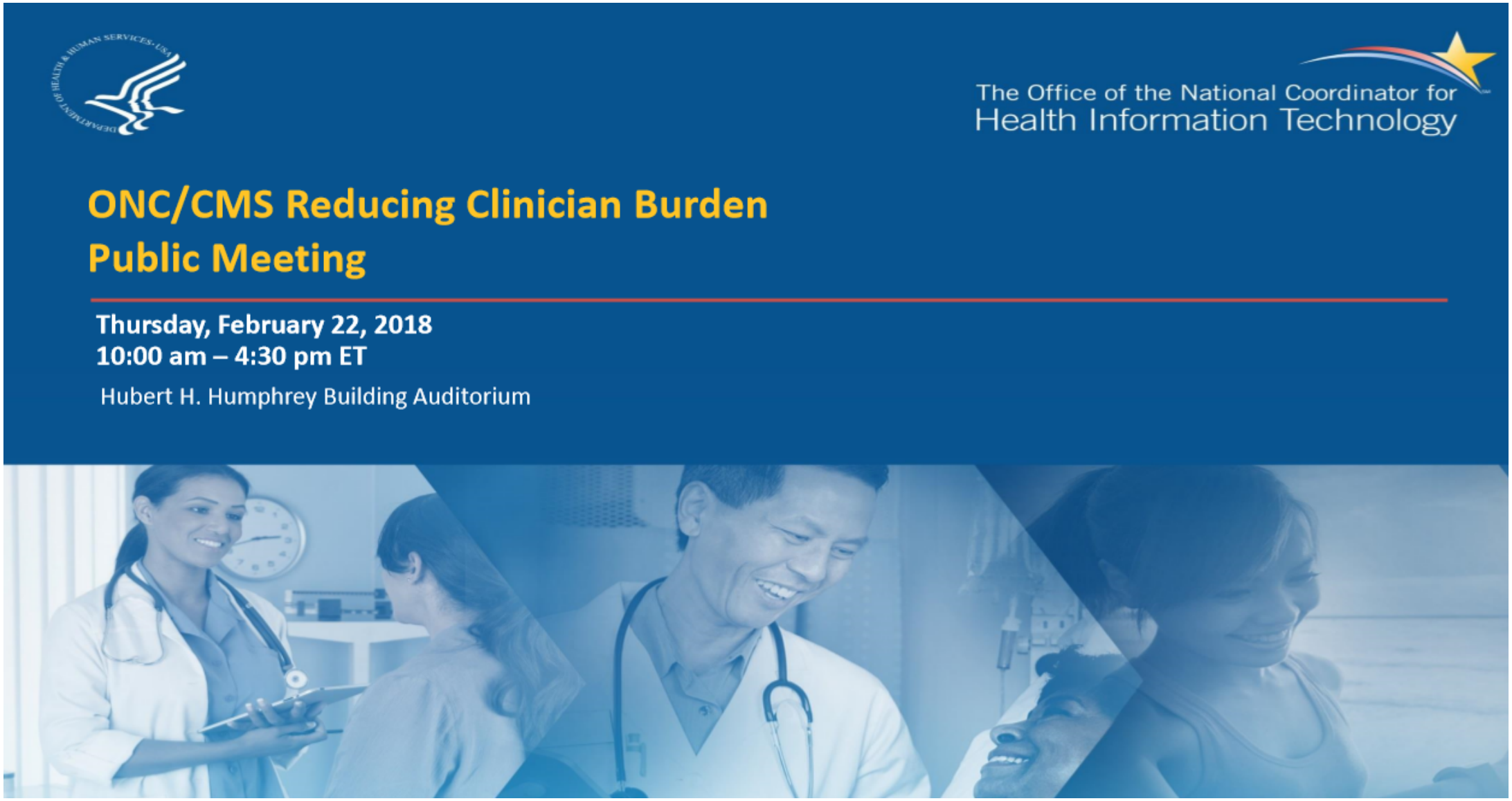
JAMIA Vol 22, Sept. 2015

Medical Virtualists: Creating Capability

- The current model of disease management relies on **isolated** data points from **periodic** patient interactions at times when they are the sickest or at greatest risk
- How will healthcare meet the demands of **digitally empowered** patients?
- Will clinicians require specific training in the best approaches for managing the care of patients using virtual tools; directly monitoring, managing, promoting and restoring the health of patients?
- Defining actionable intelligence from **continuous** data streams will require interpretation based on an understanding of the patient's unique social, environmental and genetic background.
- "Interpretation and application of **population-driven**, **individually** relevant, **predictive** algorithms will be the defining province of clinical virtualists."

Beyond The Medical Virtualists: Creating Capability in the Health Care Team" Health Affairs. Kevin Fickenscher, Joseph Kvendar, Joseph Nichols. 3/22/2018

ONC / CMS Reducing Clinician Burden 2018



ONC/CMS Reducing Clinician Burden

Source: Handout from ONC/CMS Meeting on Clinician Burden, February 22, 2018, Hubert Humphrey Building Auditorium, Washington, DC 20201.
http://365.himss.org/sites/himss365/files/365/handouts/550400239/handout-137.pdf

National Academy of Medicine (IOM) 2018

DISCUSSION PAPER

Care-Centered Clinical Documentation in the Digital Environment: Solutions to Alleviate Burnout

Alexander K. Ommaya, DSc, MA, Association of American Medical Colleges; **Pamela F. Cipriano, PhD, RN, NEA-BC, FAAN,** American Nurses Association; **David B. Hoyt, MD, FACS,** American College of Surgeons; **Keith A Horvath, MD,** Association of American Medical Colleges; **Paul Tang, MD, MS,** IBM Watson Health; **Harold L. Paz, MD, MS,** Aetna; **Mark S. DeFrancesco, MD, MBA, FACOG,** American College of Obstetricians and Gynecologists; **Susan T. Hingle, MD,** American College of Physicians; **Sam Butler, MD,** Epic; **Christine A. Sinsky, MD,** American Medical Association

January 29, 2018

Source: https://nam.edu/wp-content/uploads/2018/01/Care-Centered-Clinical-Documentation.pdf

National Academy of Medicine (IOM) 2018

Box 1 | Recommendations

- Clinicians should be responsible only for essential primary data entry that is required to support the care of a patient.
- EHR developers should increase the development of capabilities that allow clinicians to understand the previous medical, health, and social history of the patient.
- CMS should deemphasize documentation requirements as a condition of payment for health care services.
- CMS should clarify that elements of the HPI drafted by an assistant, and confirmed with the patient by the provider, should count for reimbursement.
- An authoritative body, such as the NAM, should initiate a study focused on redesigning clinical documentation suited to the modern digital age, with a primary focus on informing clinical management and improving patient outcomes and health.

SOURCE: Ommaya et al., "Care-Centered Clinical Documentation in the Digital Environment: Solutions to Alleviate Burnout," National Academy of Medicine.

https://nam.edu/wp-content/uploads/2018/01/Care-Centered-Clinical-Documentation.pdf

Nursing Knowledge Big Data Science

2018 Nursing Knowledge: Big Data Science Conferenc

Recommendations
2015

Spread best practices for EHR documentation, decision support & data visualization

- Provide knowledge at the point of care to support evidence based practice
- Design clinical content with dynamic links that update with new evidence
- Demonstrate patient's condition in real time using all data collected
- Address care gaps across the continuum
- Build care plans that are patient centered, inter-disciplinary, dynamic & transparent
- Utilize predictive analytics tools to present changes in patient status
- Provide links to knowledge sources, calculators, libraries, protocols in real time
- Display information across disciplines, encounters of care to show trends, risks, progress toward goals
- Eliminate duplicate documentation
- Personalize care based on evidence based practice, patient needs, preferences and shared decision making
- Make information actionable to improve efficiency / usability

June 13, 2018

ne 14-15, 2018

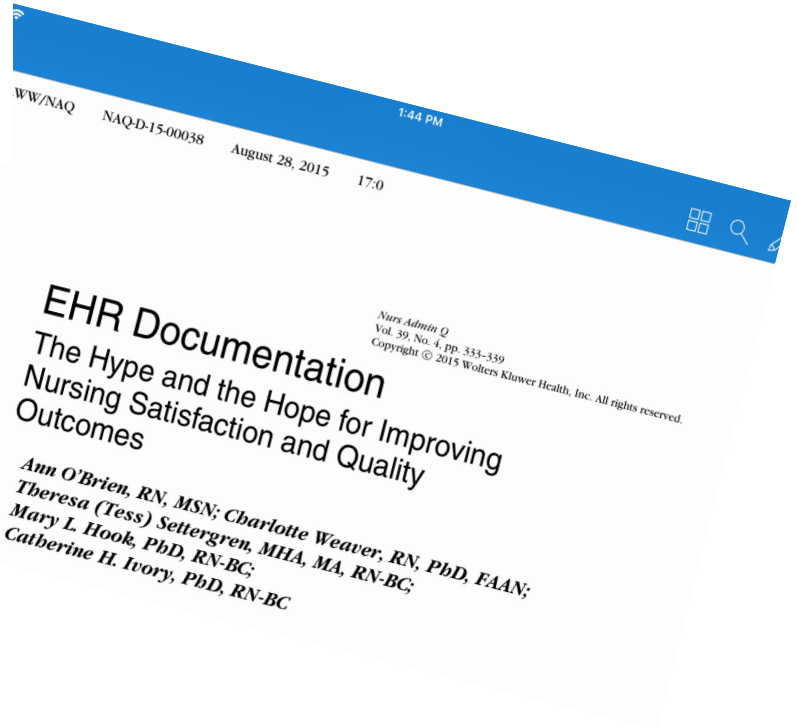
Conference Information

Tweet to #NursingandBigData

2017 Proceedings

Conference app

2017 Conference

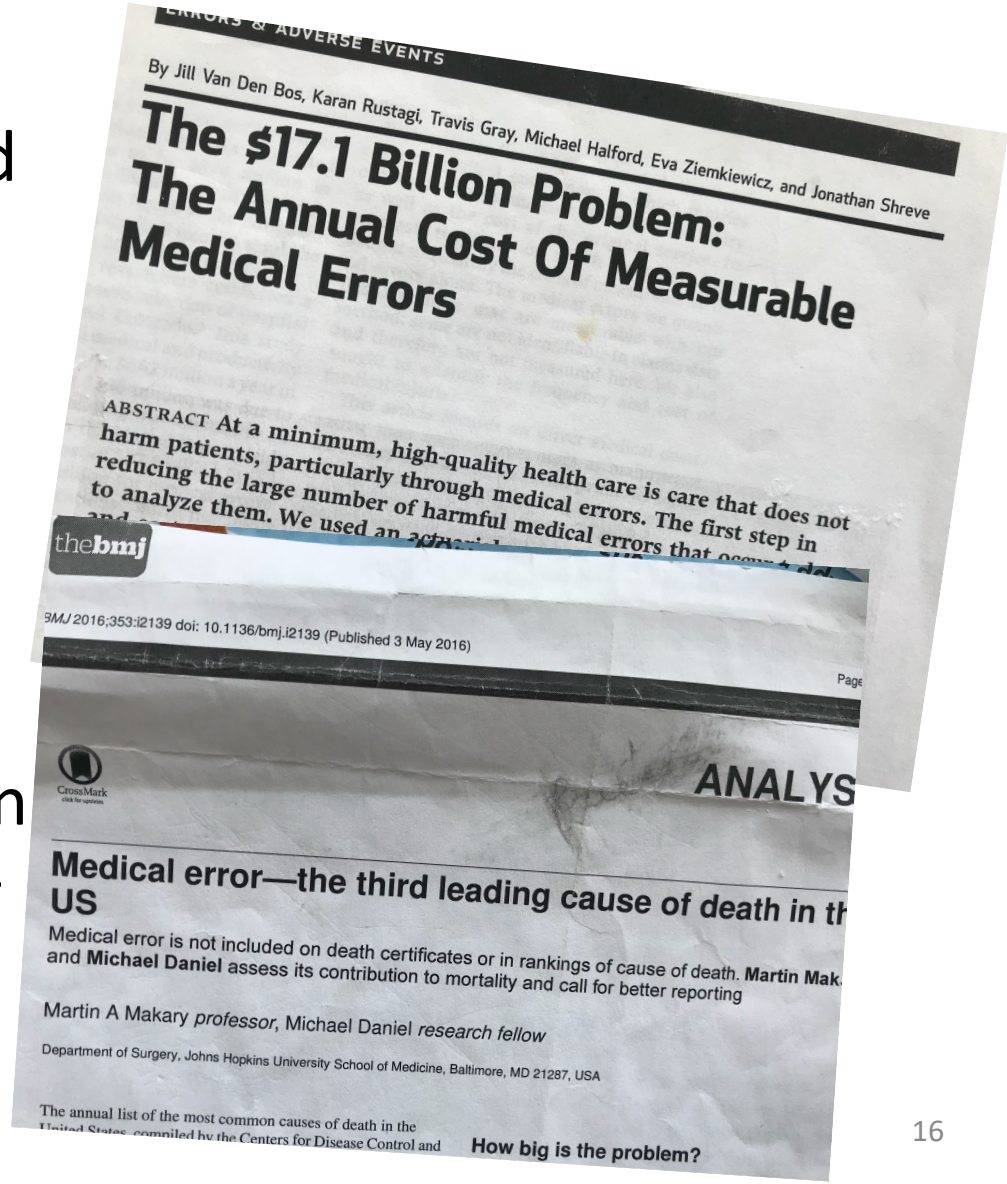


Challenges in the Current Inpatient Ecosystem

- Clinical communication is not coordinated.
- Environment is noisy with multiple sources of audible alarms.
- Nurses carry multiple communication devices but care gaps, interruptions and lack of knowledge are pervasive.
- Nurses are the 'information integrators'.
- There is huge memory load on the nurse; need for real time contextual information at the point of care.
- The environment does not support efficiency.
- There is a lack of actionable information.
- Technology is not fully integrated.
- EHRs do not support inter-professional collaboration
- Lack of appropriate infrastructure to support unified clinical communication.

Nurses are the Error Detector System

- 1999 IOM released To Err is Human: Building a Safer Health System. It estimated 98,000 deaths from medical errors.
- 2011 Health Affairs estimated that the annual cost of measurable medical errors $17.1 billion in 2018 with pressure ulcers most common.
- 2016 BMJ: Medical error is not included in death certificates or in rankings of cause of death. Estimate ~ 400,000 deaths a year more than 4 times the IOM estimate.



Dashboards, Analytics, Predictive Models..Oh My

Pediatric Early Warning Score (PEWS)

	0	1	2	3	Score
Behavior	Playing/ Appropriate	Sleeping	Irritable	• Lethargic/confused **OR** • Reduced response to pain	
Cardiovascular	Pink **OR** capillary refill 1-2 seconds	Pale **or** dusky **OR** capillary refill 3 seconds	• Grey **or** cyanotic **OR** • Capillary refill 4 seconds **OR** • Tachycardia of 20 above normal rate	• Grey **or** cyanotic **AND** mottled **OR** • Capillary refill 5 seconds **or** above **OR** • Tachycardia of 30 above normal rate **OR** • Bradycardia	
Respiratory	Within normal parameters, no retractions	• >10 above normal parameters **OR** • using accessory muscles **OR** • 30+%Fi02 **or** 3+liters/min.	• >20 above normal parameters **OR** • Retractions **OR** • 40+%Fi02 **or** 6+liters/min.	• ≥5 below normal parameters with retractions **or** grunting **OR** • 50+%Fi02 **or** 8+liters/min.	

***Score by starting with the most severe parameters first.**
***Score 2 extra for every 15-minute nebs (includes continuous nebs) or persistent post-op vomiting.**
***Use "liters/minute" to score regular nasal cannula.**
***Use "Fi02" to score a high flow nasal cannula.**

Monaghan, A. (2005) Detecting and managing deterioration in children. *Paediatric Nursing, 17,* 32-35. Adapted for use at Children's of Minnesota.

	Heart Rate at rest	Respiratory Rate at rest
Newborn (birth – 1 month)	100-180	40-60
Infant (1 – 12 months)	100-180	35-40
Toddler (13 months – 3 years)	70-110	25-30
Preschool (4 – 6 years)	70-110	21-23
School Age (7 – 12 years)	70-110	19-21
Adolescent (13 – 19 years)	55-90	16-18

The sensitivity of PEWS is 85.5%

One study shows 73% of patients with critical PEWS score just before RRT or code event[2].

Median time interval between PEWS and RRT/code is 30 minutes[2].

Use Cases for Machine Learning

Patient Flow

Streamline operations

Happy Physicians

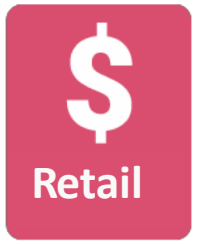
real-time guidance and recommendations

Engaged patients

Power of the community

Genomics

large datasets reevaluated with new info



Data Scientist IDE

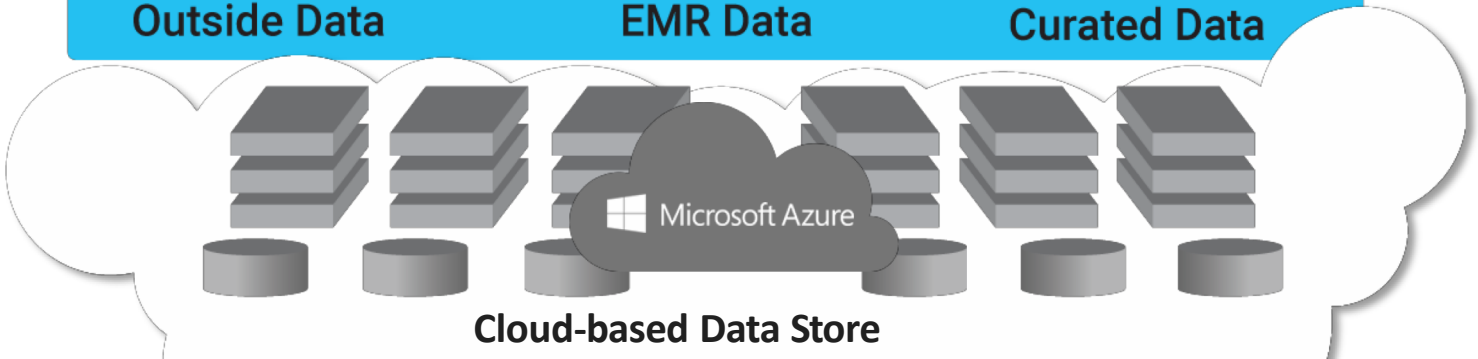
Predictive Model Library

Machine Learning Libraries

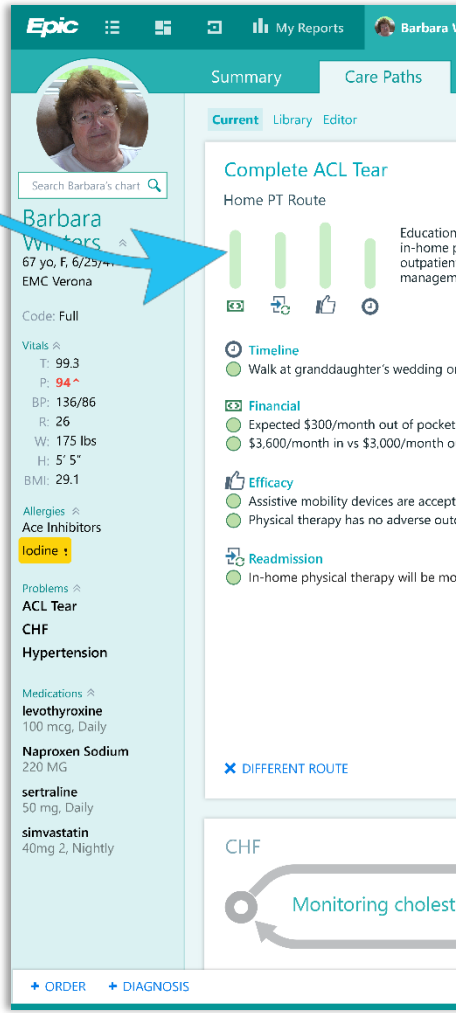
Outside Data

EMR Data

Curated Data



Cloud-based Data Store



High Reliability Organizations (HRO)

- Have nearly error-free operations in contexts that are extremely
  - Complex
  - Dynamic
  - Interdependent
  - Time-pressured

Tim Vogus Vanderbilt University School of Management

What Produces High Reliability?

- Safety culture (Bierly & Spender, 1995; Roberts, et al., 1993; Schulman, 2004; Weick, 1987)
- A “safety culture is the product of the **shared values**, **attitudes**, and patterns of behavior that determine the observable degree of effort with which all organizational members direct their attention and actions towards minimizing patient harm that may result from the process of care delivery.”

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Principles of High Reliability?

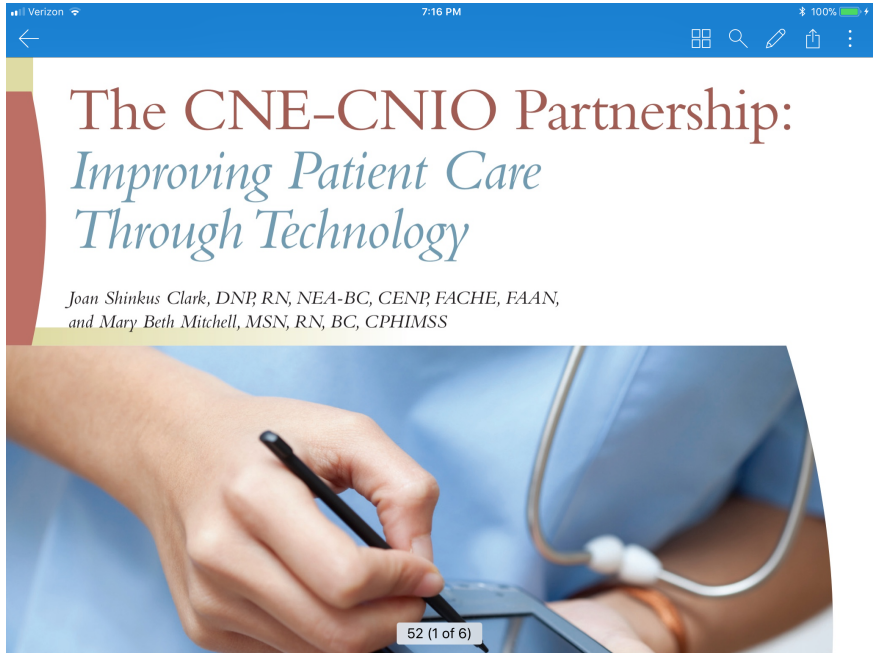
❖Preoccupation with failure
- Chronic wariness of the unexpected
❖ Reluctance to simplify interpretations
- Questioning assumptions
❖Sensitivity to operations
- Up-to-date knowledge of where expertise\resides
❖**Deference to expertise**
- Migrating decision-making to person with most expertise**, not** most authority

Tim Vogus Vanderbilt University School of Management

Systemness: The Next Frontier

- The desired state of complex healthcare delivery systems delivering patient-focused, seamless and high quality care; a single **integrated** organization and operating model across the patients' life cycle.
- Many organizations are still making the shift hospital and ambulatory to an integrated continuum of care, virtual care and community health while maximizing the effectiveness of clinical operations.
- Reducing variation and eliminating waste are key themes.
- Creating an integrated delivery system, **alignment** of leadership and physicians, IT infrastructure and synergistic care delivery model that maximizes customer value and addresses the health of populations.
- Repeatable, reliable services that are consistent across facilities provide a seamless patient experience and safety benefits.

Nursing Informatics Leadership



- CNE – CNIO Partnership Article 2014

However the role and impact of the CNIO and Nursing Informatics Value & Impact remain ‘inconsistent’.

- How might we demonstrate the Impact?
  - Nursing Executive Team
  - Integration of People, Process & Technology
  - Clinical Transformation Initiatives
  - High Reliability Initiatives
  - Quality, Safety, Efficiency & Cost

CNIO: Strategic Partner

- Advocates for the largest group of health care workers and provides strategic direction, knowledge & skills for successful clinical and operational outcomes.
- Partners with CNE and CMIO to drive evidence-based improvements through optimization of the EHR, business processes and integration of research.
- Utilizes the knowledge and skills of clinical practice; aligns people, process and technology to enable the delivery of efficient nursing care across the organization.
- Educates executives on informatics concepts and value proposition.
- Evaluates organizational infrastructure and makes recommendations to support system improvement and care coordination.
- Manages complexities of data, analytics and outcomes improvements.
- Advises C-suite on clinical mobile, remote and emerging technologies.

Patty Sengstack DNP, RN. Chief Nursing Informatics Officer: Strategic Partner for Health Care Organizations

Voice of Nursing Leadership. November 2014

NI: Diverse skill set for providing value

- Partner with CNE, CMIO, CIO on strategic priorities for transformation
- Design systems to meet clinical needs and decrease non-value added tasks
- Transform care delivery processes with workflow redesign
- Provide enterprise level clinical and technical expertise
- Integrate evidence into practice
- Optimize the EHR to improve outcomes and clinical efficiency
- Utilize performance improvement methods to analyze clinical data
- Support evidence based practice with real time actionable information
- Collaborate with inter-professional teams on intelligent standardization
- Implement data to knowledge translation for safer care
- Optimize IT assessment, design, implementation, metrics evaluation

What is Delirium? How Big is the Problem?

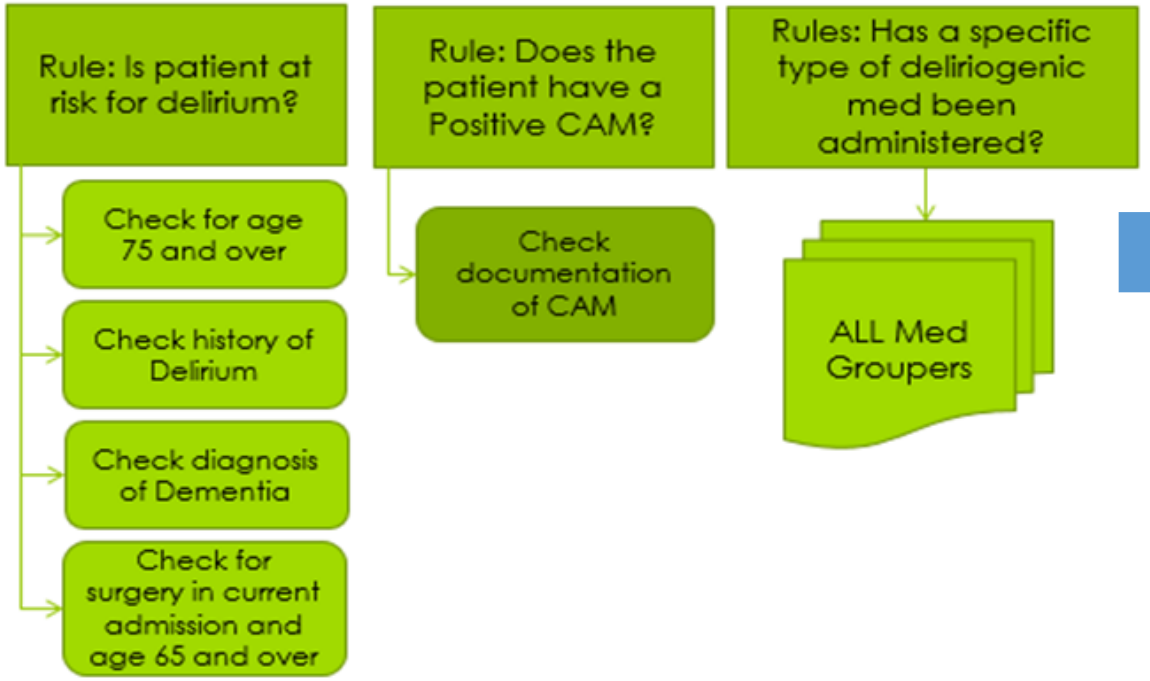
Delirium is an **acute confusional state.**

More than **7 million** Americans suffer from delirium each year.

Delirium affects up to 50% of elderly people in the hospital and costs more than $164 billion per year in the U.S.

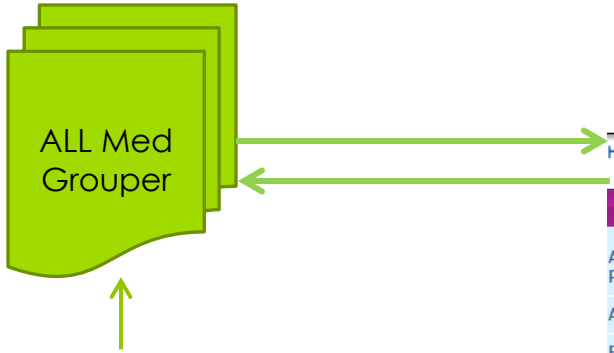
Sources:
Inouye SK. Delirium in Older Persons. N Engl J Med 2006; 354:1157-1165. March 16, 2006. http://www.nejm.org/doi/full/10.1056/NEJMra052321#t=article
American Delirium Society; https://www.americandeliriumsociety.org/about-delirium/healthcare-professionals
Inouye SK, Westendorp RGJ, Saczynski JS. Delirium in Elderly People. www.thelancet.com Published online August 28, 2013 http://dx.doi.org/10.1016/S0140-6736(13)60688-1

Delirium Risk Score



Patient Name/Age/Sex	Delirium Risk Level
Dashboard, R (41 year old F)	4
DSSC, J (68 year old M)	3
Dssc, W (80 year old F)	2
Dashboard, C (77 year old F)	2
Test, B (73 year old U)	1

Proposing Alternative Medications



(Includes Benzodiazepines, Opioids, and Anticholinergics)

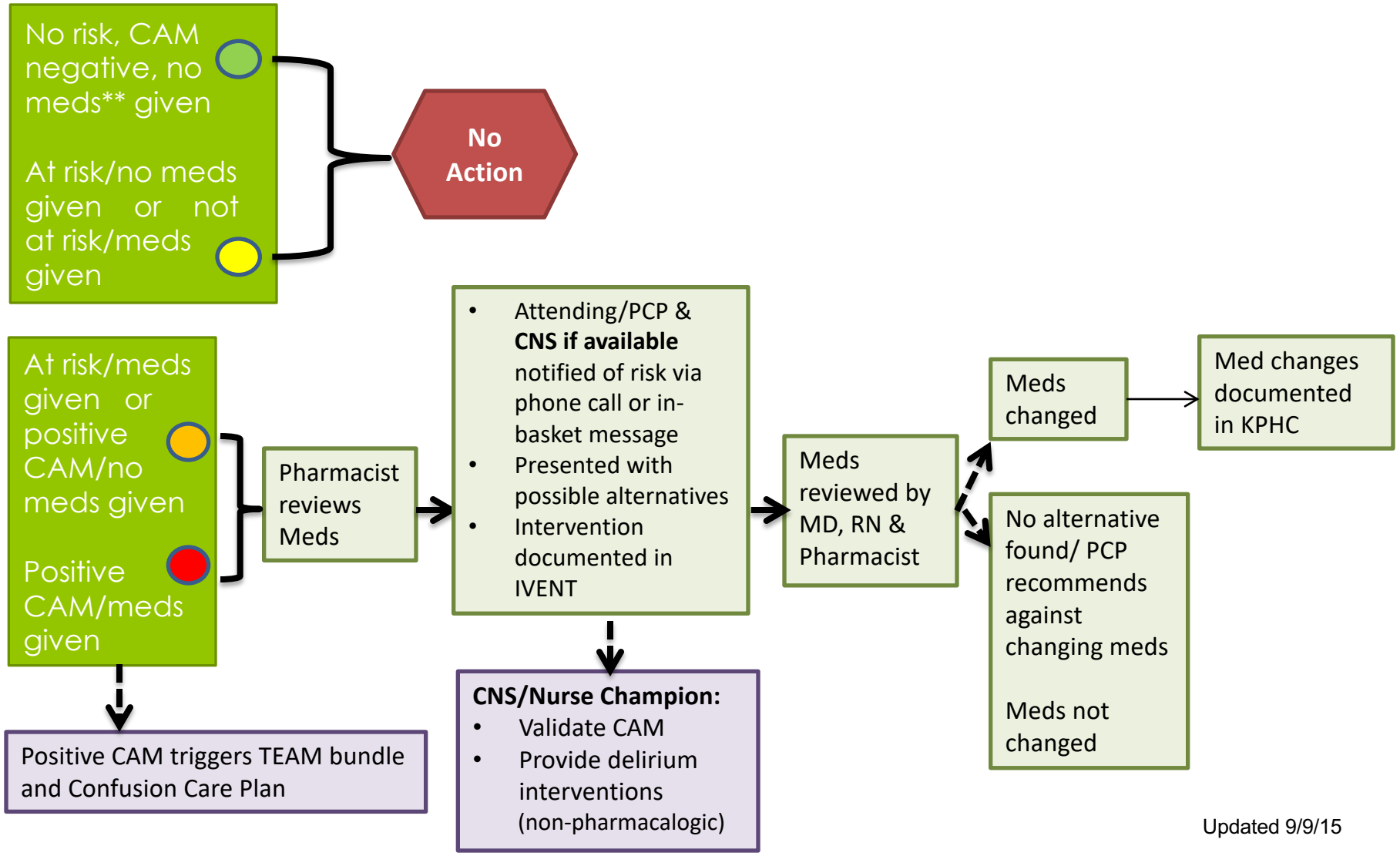
Amitriptyline	Doxylamine	Oxazepam
Amoxapine	Famotidine	Oxybutynin
Atropine	Fentanyl patch	Oxycodone
Benztropine	Fesoterodine	Paroxetine
Brompheniramine	Flavoxate	Pentazocine
Carbinoxamine	Flurazepam	Perphenazeine
Carisoprodol	Hydrocortisone	Prednisone
Chlordiazepoxide	Hydromorphone	Promethazine
Chlorpheniramine	Hydroxyzine	Propantheline
Chlorpromazine	Hyoscyamine	Propiverine
Chlorzoxaone	Imipramine	Ranitadine
Cimetidine	Levofloxacin	Scopolamine
Ciprofloxacin	Lorazepam	Solifenacin
Clemastine	Meclizine	Temazepam
Clomipramine	Meperidine	Thioridazine
Clonazepam	Metaxalone	Tizanidine
Darifenacin	Methocarbamol	Tolterodine
Desipramine	Methylprednisolone	Trifluoperazine
Dicyclomine	Metoclopramide	Trihexyphenidyl
Dimenhydrinate	Morphine	Trimipramine
Diphenhydramine	Nortriptyline	Trospium
Doxepin	Orphenadrine	Zolpidem

Description

The American Geriatrics Society (AGS) released its second updated and expanded Beers Criteria - lists of potentially inappropriate medications for older adults - and one of the most frequently cited reference tools in the field of geriatrics. The Society also unveiled a suite of new companion resources - including a list of alternative therapies for potentially inappropriate medications and more detailed guidance on best practices for implementing AGS recommendations - all published FREE on http://geriatricscareonline.org/

Delirium Prevention

Goal: Reduce delirium risk through pharmacy, nursing, and physician intervention and partnership.

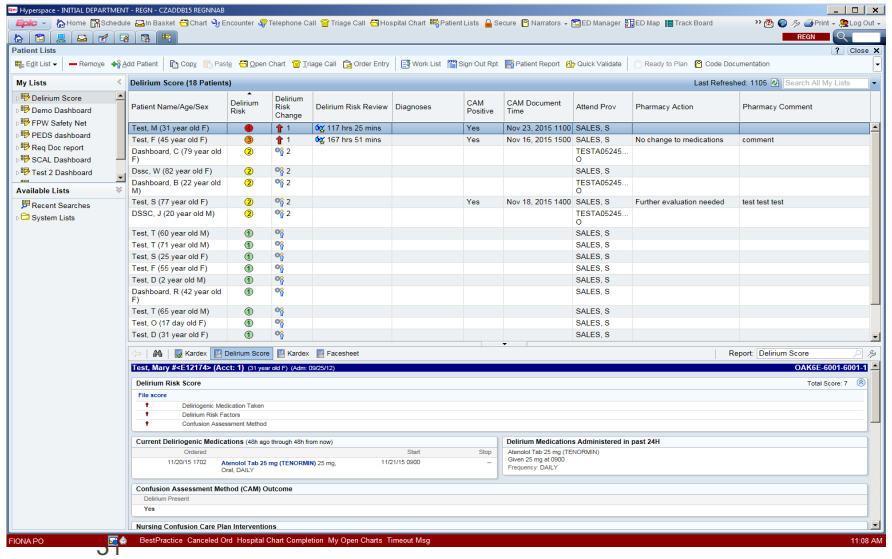


Updated 9/9/15

Interprofessional Delirium Joint System List

The Delirium project utilizes a criteria set to determine the patient's preliminary risk disposition and suggest a plan of care for the patient.

Patient risk factors (from various EHR locations), **Nursing** CAM Flowsheet documentation and **Physician**'s medication orders (deliriogenic) are all integrated into a visual risk scoring tool that is used by the **Pharmacists** to make interventions to prevent deliriogenic medications from reaching the patient.



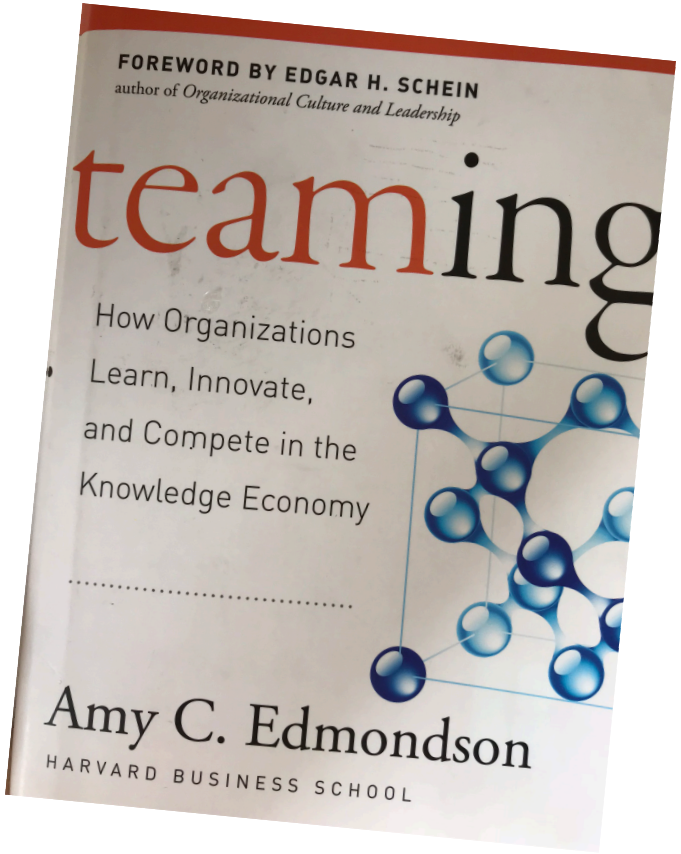
The Clinical Informatics Team provided thought process leadership in ensuring: an effective solution that removes the data silos in the EHR among different disciplines and integrating them to allow a comprehensive stratification for an accurate risk tool.

Final Thoughts; the What

- The new mandate is **VALUE**
- We must deliver care that is: Better, Safer, Less expensive
- More accessible / across the continuum of care
- More integrated, decrease data silos and continuum silos (IP, Amb, Home)
- More preventive
- Smarter: Use data already in the EHR
- More equitable
- More Inter-professional
- **ANSWER**: Inter-disciplinary, knowledge enabled, personalized care through informatics

Final Thoughts; the HOW

- In a knowledge economy, **teams** are the principle by which work gets done.
- ***Teaming*** is an active process that involves coordination, collaboration & flexibility.
- The Highly Reliable Organizations are resilient, adjust on the fly and leaders must trust those they lead in a *learning* frame.
- Fast-moving environments need people who know how to *team;* the skills & flexibility to act in moments of potential collaboration.



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