

Engaging Patients in Post Hospitalization Self Care: Methods for a Novel use for Standardized Data in Nursing Plans of Care

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Power of Team Science

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- *MyPHA: Automatically generating personalized accounts of in-patient hospitalizations*

- Di Eugenio B. (PI) R01 CA225446-01



Today's Objectives

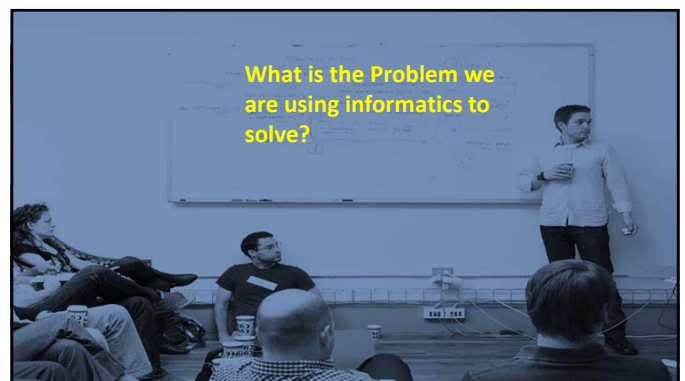
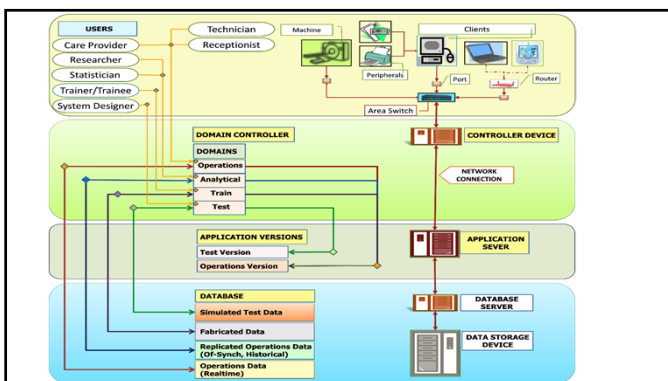
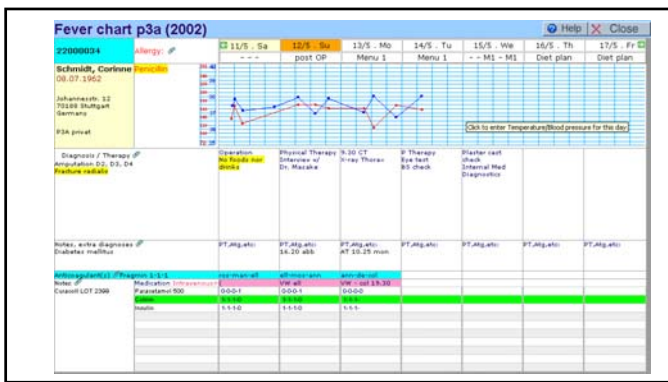
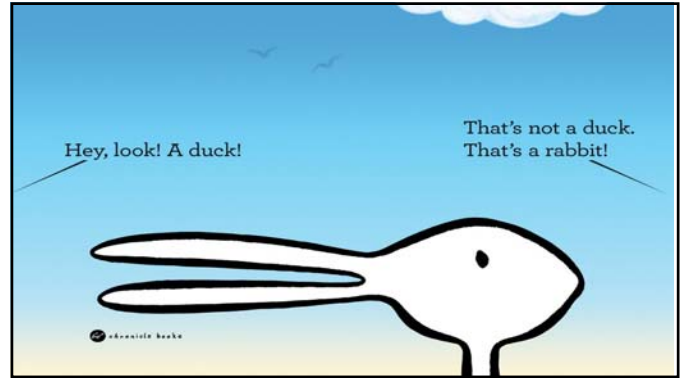
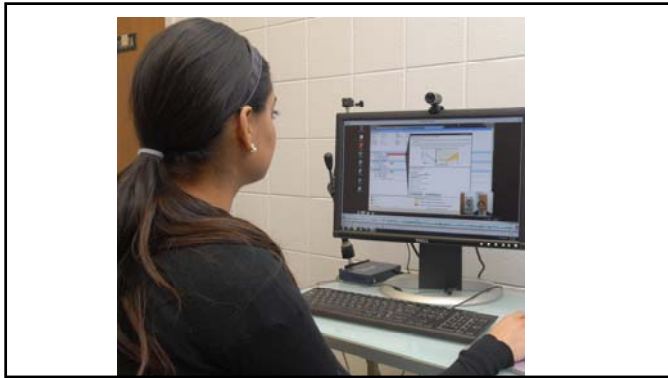
- To articulate a need for new approaches to optimize post-hospitalization self-care
- In the context of this problem, describe novel application for nursing documentation data
- To discuss methods for tailoring patient education



Conflicts

- I have no conflicts of interest to report related to this presentation





Heart failure (HF) is a prevalent, costly chronic illness for patients and hospitals

50% of Americans suffer from at least one chronic illness and these numbers are growing

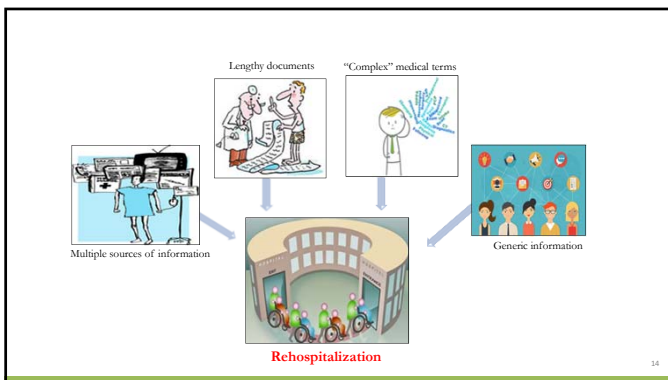
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Heart Failure (HF) has the highest readmission rate for patients age 65+

Low Health Literacy Compounds Communication Challenges

- “Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”

-U.S. Department of Health and Human Services. 2000. *Healthy People 2010*.



Low Health Literacy is alarmingly common & associated with poor outcomes

- Only 12% of adults have proficient health literacy
- 14% of adults have < basic health literacy

Patients with low health literacy

- Rate their health as poor
- Higher rates of hospitalization
- Less knowledge of how to manage their illness
- Sense of shame ,may hide their difficulties

<https://health.gov/communication/literacy/quickguide/factsliteracy.htm>

Problems with Hospital Discharge Summaries

- Use complex language
- Different clinical professions, use different terms in the clinic
- Fail to take into consideration patient-specific factors
- Do not consider what a patient can comprehend

Patient Activation also plays a role in self-care

Patient Activation

- Knowledge
- Skills
- Willingness to self manage

Patient Engagement

Patient activation + interventions to promote positive health behaviors

James, 2013 Health Affairs

For patients with chronic illness, activation is significantly associated with behavior & outcomes

High Activation Patients are:

More likely to:

- Adhere to treatment
- Engage in preventive behavior
- Self monitor their illness
- Have favorable biometrics (e.g. HA1c)

Less Likely to

- avoid health-damaging behavior such as smoking and illegal drug use

Low activation patients are:

More likely to have

- Unmet medical needs
- Delayed care
- Have less favorable biometrics (e.g. HA1c)

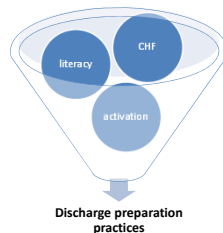
Hibbard & Greene, 2013

MD Discharge Summaries Requirements

1. Reason for hospitalization.
2. Significant findings.
3. Procedures and treatment provided.
4. Patient's discharge condition.
5. Patient and family instructions (as appropriate).
6. Attending physician's signature



Combined Effect



Problems with Current Methods

- The period following hospitalization is a vulnerable time for patients
- Post hospitalization exhaustion- patients are unable to memorize verbal instructions.
- Health knowledge of the patient is over-estimated by health professionals
- Despite the shared responsibility for educating patients, communication between the doctors and nurses is very low.

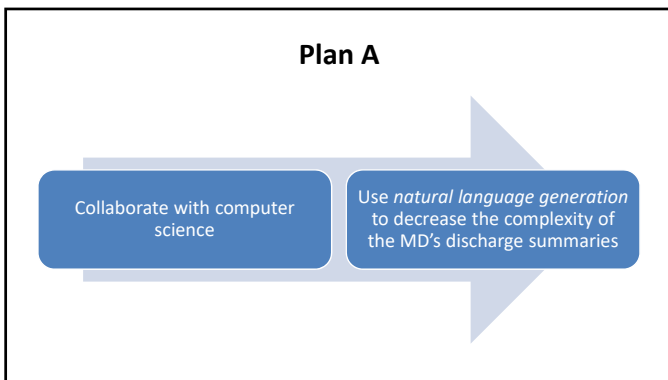
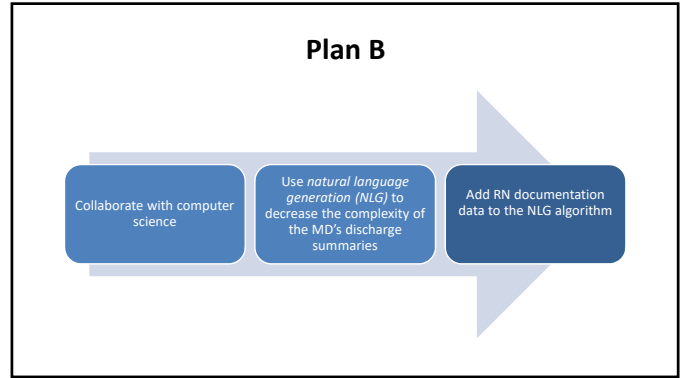
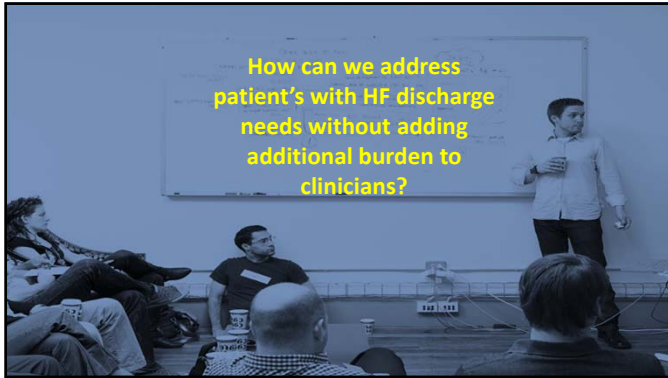
Both RNs and MDs play a role discharge preparation

- **Nurses**
 - Have a major curricular emphasis on behavior change
 - Play an important role in patient education
 - Discharge planning begins on admission
- **Physicians**
 - Have less curricular emphasis on behavior change
 - Play an important role in decided when to discharge
 - Discharge summaries requirement by TJC and CMS

Rather than a tool to help patients...

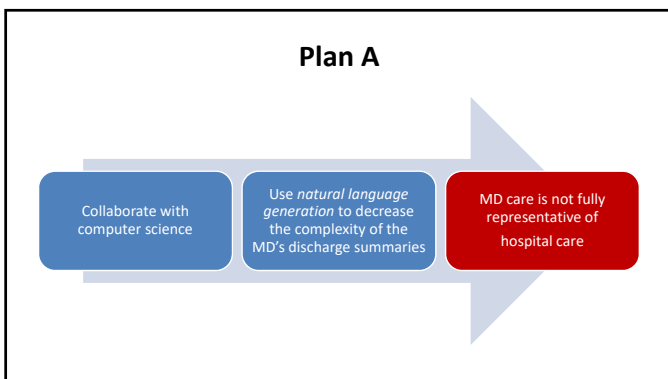
"In the world of discharge summaries, patients are almost thought of as messengers in the transport of documents from hospital to primary care provider, a practice previously performed by fax machines."

- Hahn-Goldberg et al. (2016)



Before acting on Plan B, need to discover difference between RN and MD documentation what nursing data is in the EHR

- **Chart 1-** Patient oriented to plan of care. Verbalized understanding
- **Chart 2-** Patient oriented to plan of care. Verbalized understanding
- **Chart 3-** Patient oriented to plan of care. Verbalized understanding
- **Chart 4-** Patient oriented to plan of care. Verbalized understanding...



Workaround to address lack of meaningful EHR RN data

- Created "Synthetic" Nursing Plans of Care (NPOCs)
 - Nursing Informatics Graduate students
 - Read medical documentation
 - Created idealized NPOCs

Unified Medical Language System (UMLS) is a set of software that brings together biomedical vocabularies

- Includes >3 million concepts from over 200 health and biomedical vocabularies
- Links similar names for the same concept
- Maintained by the National Library of Medicine
- Free to license

UMLS

Preferred name: Myocardial Infarction
CUI: C0027051
Semantic type: Disease or Syndrome

Term: Heart attack

Definitions:
Source/Definition:
CSP | gross necrosis of the myocardium, as a result of interruption of the blood supply to the area.
HPO | Necrosis of the myocardium caused by an obstruction of the blood supply...

Concept Relations:
Relation[Sting/CUI]
RO|Myocardial ischemia | C015744
RO|Arteriosclerosis | C0003850
RO|Cardiac embolism | C0443840

UIC

Both RN, MD & Patients Perspectives are needed

- Very little overlap
- Discharge summary required
- Nursing documentation, progress towards meeting goals and information from hospitalization is often not shared with patients
- Patient perspectives and characteristics are missing

General Idea

Medical Plans of Care (RVS) and **Physician Discharge Summaries** (MYD) are processed through **Natural Language Processing** to generate **Physician Discharge Summaries**. The process involves **Identifying and extracting concepts** and **Identifying relationships**. The final output is **Data analysis for categories and relationships**.

Plan B

Collaborate with computer science leads to **Use natural language generation (NLG) to decrease the complexity of the MD's discharge summaries**, which then leads to **Add RN POCs to the NLG algorithm**.

Identifying RN and MD synergy using documentation

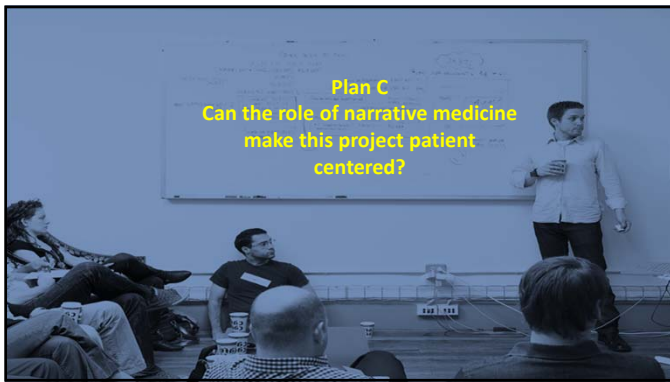
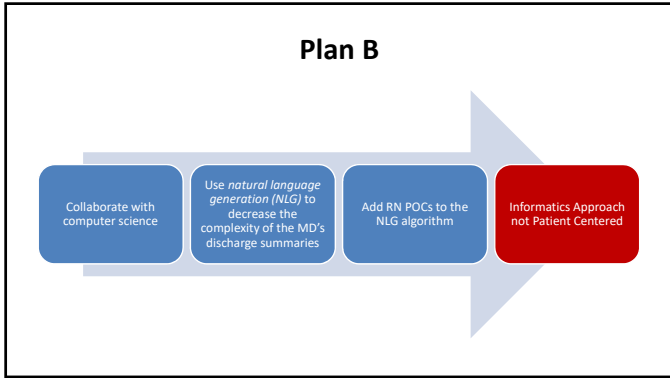
- Only 26% of patients had synonyms for the other professions terms
- On average only 4 terms related (distance of 2) per patient record

Physician nurse care: A new use of UMLS to measure professional contribution
Are we talking about the same patient a new graph matching algorithm?
Andrea B. Boff*, Kaiti Devi Lopez†, Carolina Laguarda†, Tamara Macklin*, Vanessa Sosa*, Sabita Acharya*, Shikha Balasubramanian*, Khawfiah Hussain*, Gal M. Korman*, Vera A. Lomon*, Shannon "Shir" Li*, Michel Rimeau*, Barbara DA Eggert*

Data

Physician documentation: discharge note

Nursing documentation: HANDS



Measured Health Literacy Assessment REALM-SF®

REALM-SF Score Sheet

Patient ID #: _____ Date: _____ Exam: _____

Behavior _____

Exercise _____

Menopause _____

Rectal _____

Antibiotics _____

Anemia _____

Jaundice _____

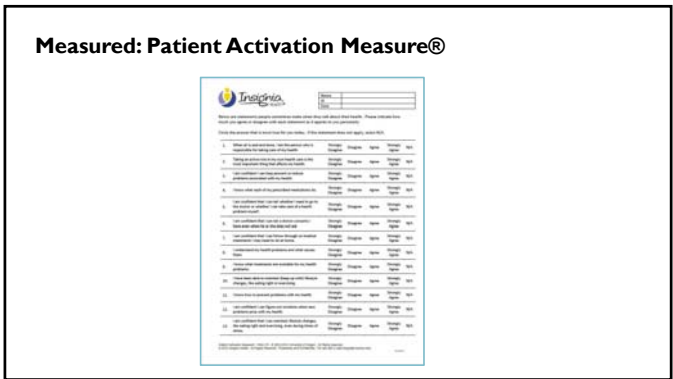
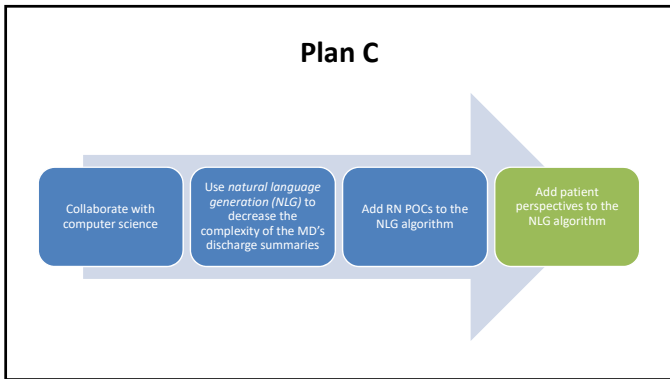
TOTAL SCORE _____

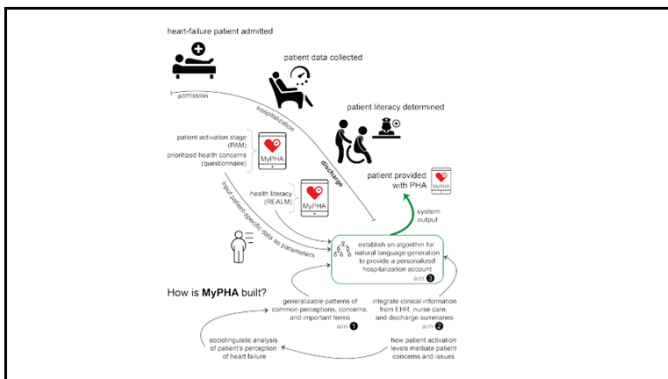
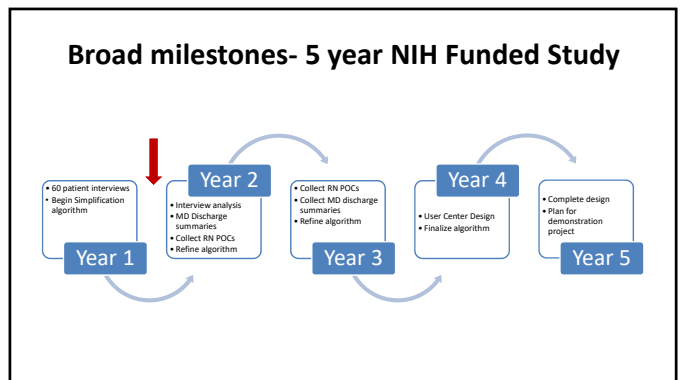
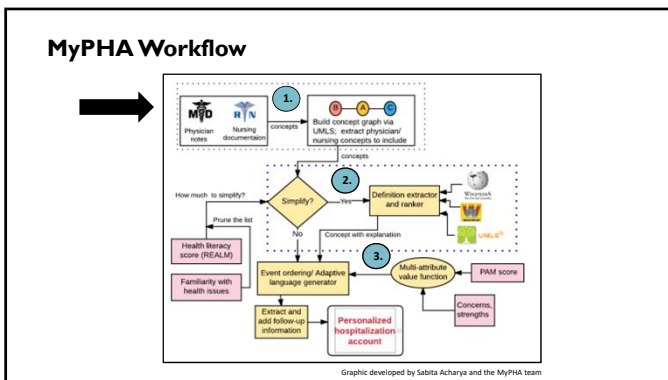
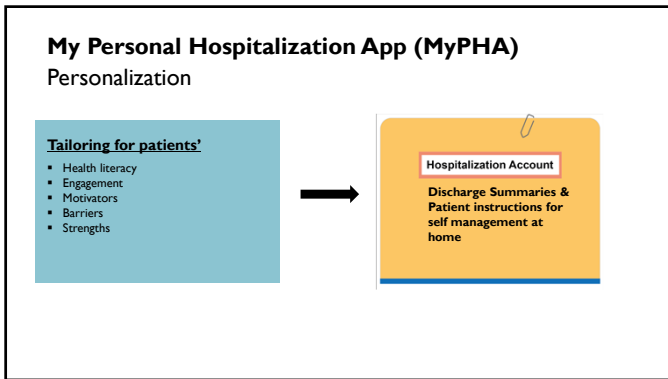
Scores and Grade Equivalents for the REALM-SF

Score	Grade Range	Description
0	Third grade and below	will not be able to read most low-literacy materials; will need repeated oral instructions, materials composed primarily of illustrations, or audio or video tapes
1-3	Fourth to sixth grade	will need low-literacy materials, may not be able to read prescription labels
4-6	Seventh to eighth grade	will struggle with most patient education materials, will not be offended by low-literacy materials
7	High school	will be able to read most patient education materials

My PHA maps patient's REALM scores to three literacy levels:

- Third grade or below (Level 1)
- Fourth to eighth grade (Level 2)
- High school (Level 3)





Dear Patient 149, we are sorry to know that you were admitted for **acute subarachnoid hemorrhage/aneurysm/accident**. Cerebrovascular accident is a medical condition in which poor blood flow to the brain results in cell death. During your hospitalization, we provided treatment for **difficulty walking** and risk for **ineffective cerebral tissue perfusion**, **risk for falls**, problem in verbal communication and walking.

We treated **difficulty walking** related to **musculoskeletal disorder** with **body mechanics, promotion**. We provided treatment for **risk for ineffective cerebral tissue perfusion** with **medication management** and medication administration. We worked to improve **social interaction** related to **communication impairment** with **speech therapy**. We treated **risk for falls** by managing environment to provide safety.

As a result of these interventions, **mobility** has improved appreciably. Risk related to cardiovascular health has reduced slightly. On the other hand, **communication** and **fall prevention** behavior have improved slightly. With your nurse and doctors, you learned about disease process, medication and fall prevention.

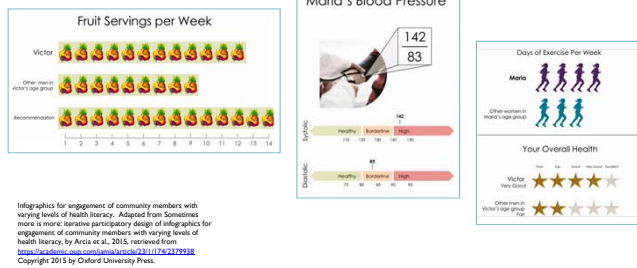
We appreciate your efforts in making changes in your way of living, diet and physical activity for maintaining your health. Keep up the good work. We are very glad to know that you have sources to support you. We hope you feel better so that you can spend time with your family and friends and get more involved in religious activities.

Follow-up: Can follow-up with General Neurology clinic and Medicine clinic as outpatient if desired.

For more information on cerebrovascular accident, please refer to the following website:
<https://www.healthline.com/health/cerebrovascular-accident>

Figure: Automatic summary generated for Patient 149

Previous Work in Tailoring Visuals for Healthcare Education



Key takeaways

- ❖ Poor discharge preparation and lack of patient centered-ness can lead to poor patient outcomes
- ❖ RN, MD and patient perspectives have limited overlap and are important sources for discharge preparation
- ❖ One size fits all is not the best approach to discharge preparation
- ❖ Computer sciences techniques including natural language generation can be leveraged to make patient education tailored to patient characteristics

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