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Health and Digital Literacy

SHTM

Hants Williams, PhD, RN

Overview

- What is health literacy
- Why is health literacy important - Why Care
- How can we improve health literacy - technology? people?

Health Literacy Defined

Health Literacy

Definitions

ACA: "…the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions"

At least two levels…

Personal health literacy is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.

Organizational health literacy is the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.

What the define translates into…

- Emphasize people's ability to ***use*** health information rather than just understand it
- Focus on the ability to make "well-informed" **decisions** rather than "appropriate" ones
- Incorporate a public health perspective
- Acknowledge that **organizations have a responsibility** to address health literacy

Why care

Why Care

Health Literacy

1. Healthcare is complicated…

- Adults **with proficient health literacy skills** can perform complex and challenging literacy activities—such as integrating, synthesizing, and analyzing multiple pieces of information in a complex document.

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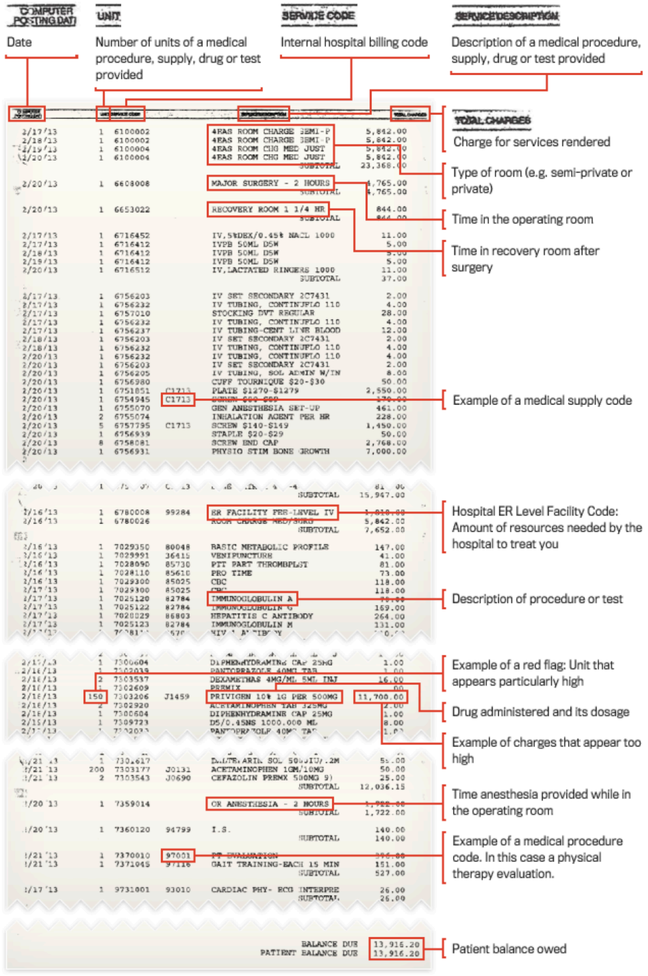
Why Care

Health Literacy



...the medical bill

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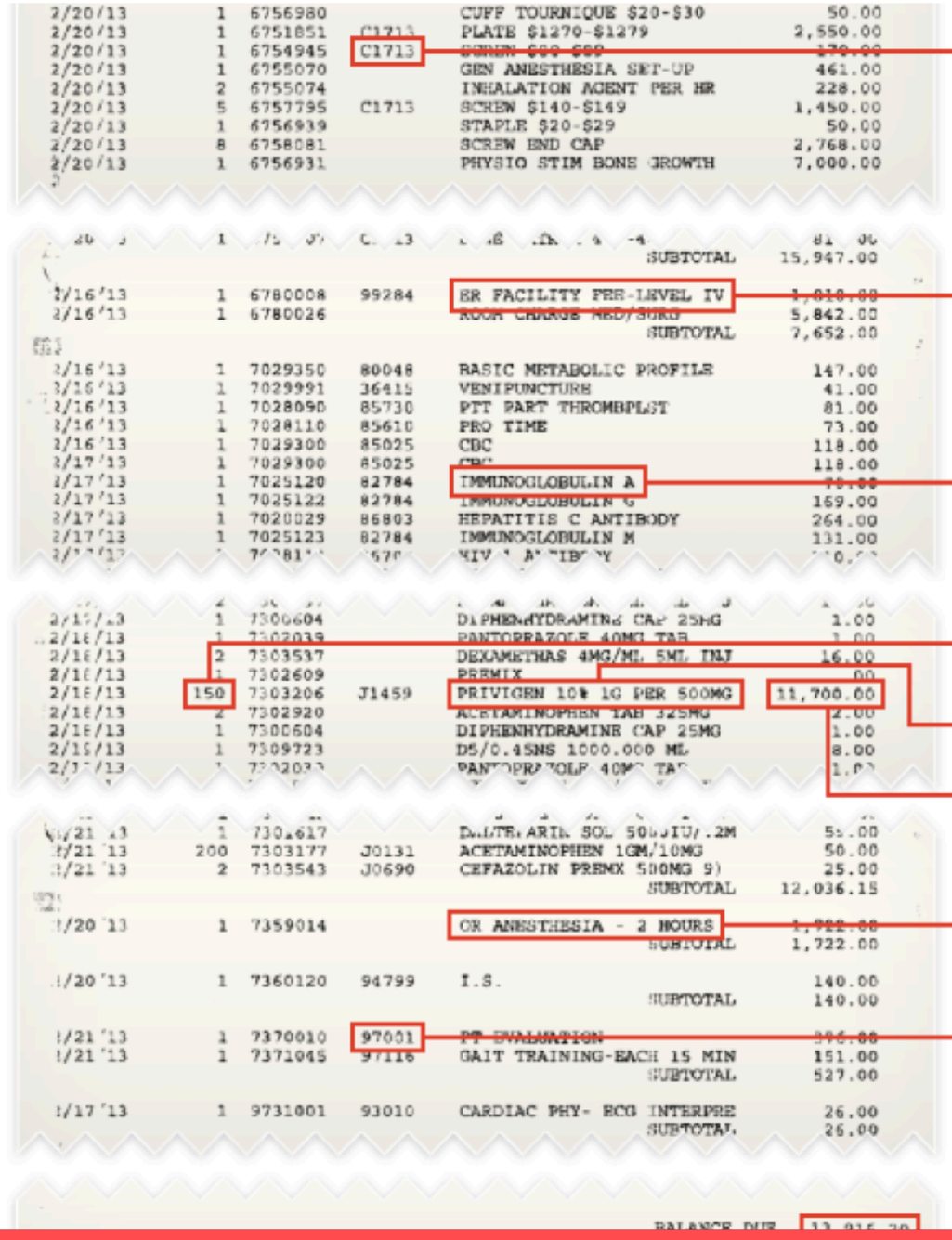

2/20/13	1	6756980		CUFF TOURNIQUE $20-$30	50.00
2/20/13	1	6751851	C1713	PLATE $1270-$1279	2,550.00
2/20/13	1	6754945	C1713	SCREW $80-$89	170.00
2/20/13	1	6755070		GEN ANESTHESIA SET-UP	461.00
2/20/13	2	6755074		INHALATION AGENT PER HR	228.00
2/20/13	5	6757795	C1713	SCREW $140-$149	1,450.00
2/20/13	1	6756939		STAPLE $20-$29	50.00
2/20/13	8	6758081		SCREW END CAP	2,768.00
2/20/13	1	6756931		PHYSIO STIM BONE GROWTH	7,000.00
				SUBTOTAL	15,947.00
2/16/13	1	6780008	99284	ER FACILITY PER-LEVEL IV	1,810.00
2/16/13	1	6780026		ROOM CHARGE MED/SURG	5,842.00
				SUBTOTAL	7,652.00
2/16/13	1	7029350	80048	BASIC METABOLIC PROFILE	147.00
2/16/13	1	7029991	36415	VENIPUNCTURE	41.00
2/16/13	1	7028090	85730	PTT PART THROMBPLST	81.00
2/16/13	1	7028110	85610	PRO TIME	73.00
2/16/13	1	7029300	85025	CBC	118.00
2/17/13	1	7029300	85025	CBC	118.00
2/17/13	1	7025120	82784	IMMUNOGLOBULIN A	79.00
2/17/13	1	7025122	82784	IMMUNOGLOBULIN G	169.00
2/17/13	1	7020029	86803	HEPATITIS C ANTIBODY	264.00
2/17/13	1	7025123	82784	IMMUNOGLOBULIN M	131.00
2/17/13	1	7300604		DIPHENHYDRAMINE CAP 25MG	1.00
2/18/13	1	7302039		PANTOPRAZOLE 40MG TAB	1.00
2/18/13	2	7303537		DEXAMETHAS 4MG/ML 5ML INJ	16.00
2/18/13	1	7302609		PREMIX	00
2/18/13	150	7303206	J1459	PRIVIGEN 10% 1G PER 500MG	11,700.00
2/18/13	2	7302920		ACETAMINOPHEN TAB 325MG	2.00
2/18/13	1	7300604		DIPHENHYDRAMINE CAP 25MG	1.00
2/19/13	1	7309723		D5/0.45NS 1000.000 ML	8.00
2/19/13	1	7302033		PANTOPRAZOLE 40MG TAB	1.00
2/21/13	1	730.617		D.LTR.ARIA SOL 500JIU/.2M	55.00
2/21/13	200	7303177	J0131	ACETAMINOPHEN 1GM/10MG	50.00
2/21/13	2	7303543	J0690	CEFAZOLIN PREMX 500MG 9)	25.00
				SUBTOTAL	12,036.15
2/20/13	1	7359014		OR ANESTHESIA - 2 HOURS	1,722.00
				SUBTOTAL	1,722.00
2/20/13	1	7360120	94799	I.S.	140.00
				SUBTOTAL	140.00
2/21/13	1	7370010	97001	PT EVALUATION	376.00
2/21/13	1	7371045	97116	GAIT TRAINING-EACH 15 MIN	151.00
				SUBTOTAL	527.00
2/17/13	1	9731001	93010	CARDIAC PHY- ECG INTERPRE	26.00
				SUBTOTAL	26.00
				BALANCE DUE	13,015.30

Example of a medical supply code

Hospital ER Level Facility Code: Amount of resources needed by the hospital to treat you

Description of procedure or test

Example of a red flag: Unit that appears particularly high

Drug administered and its dosage

Example of charges that appear too high

Time anesthesia provided while in the operating room

Example of a medical procedure code. In this case a physical therapy evaluation.

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Why Care

Health Literacy

…reading health literature

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Gaze path of a reader who **does not have limited literacy** skills skimming a page.

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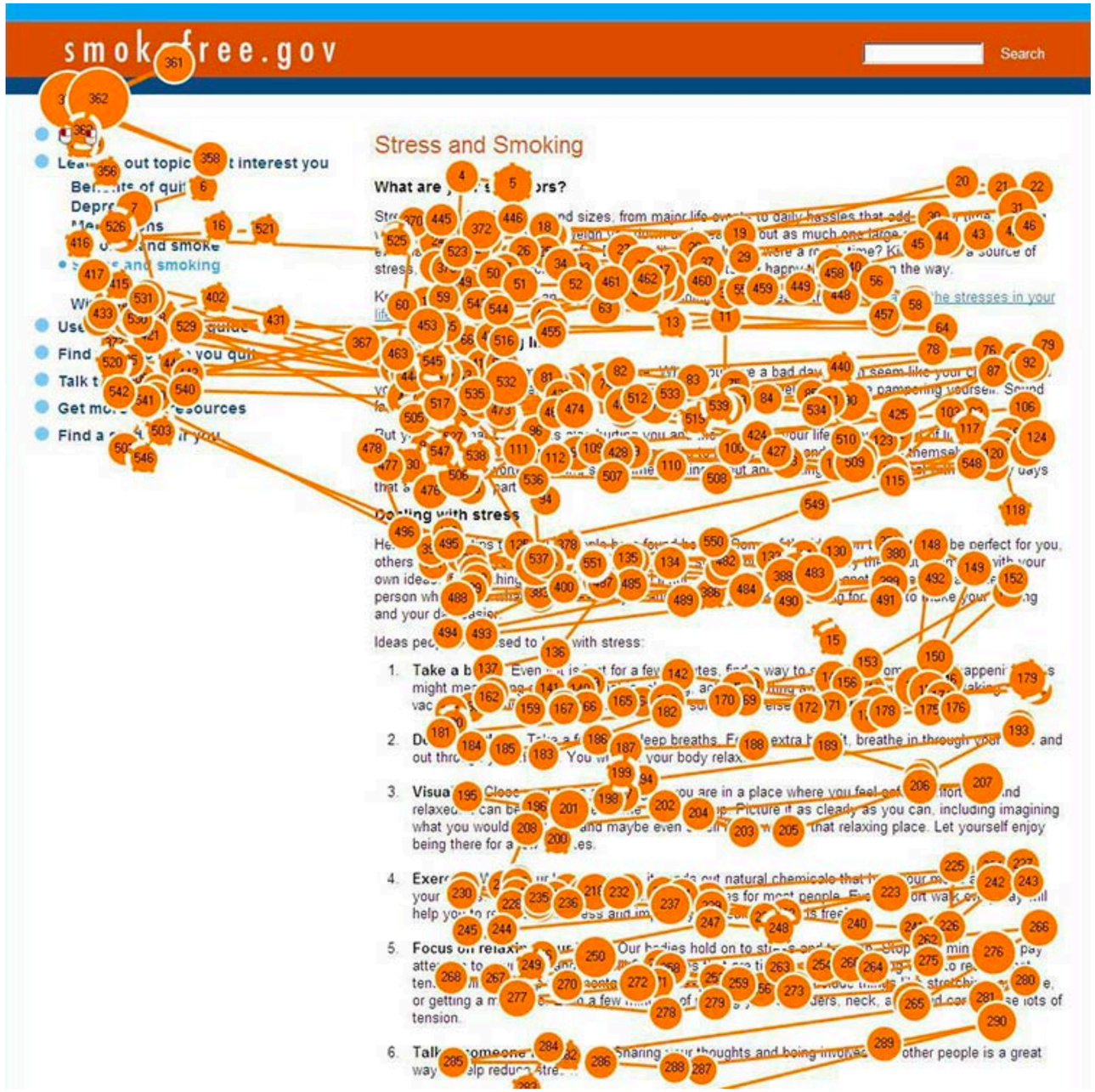
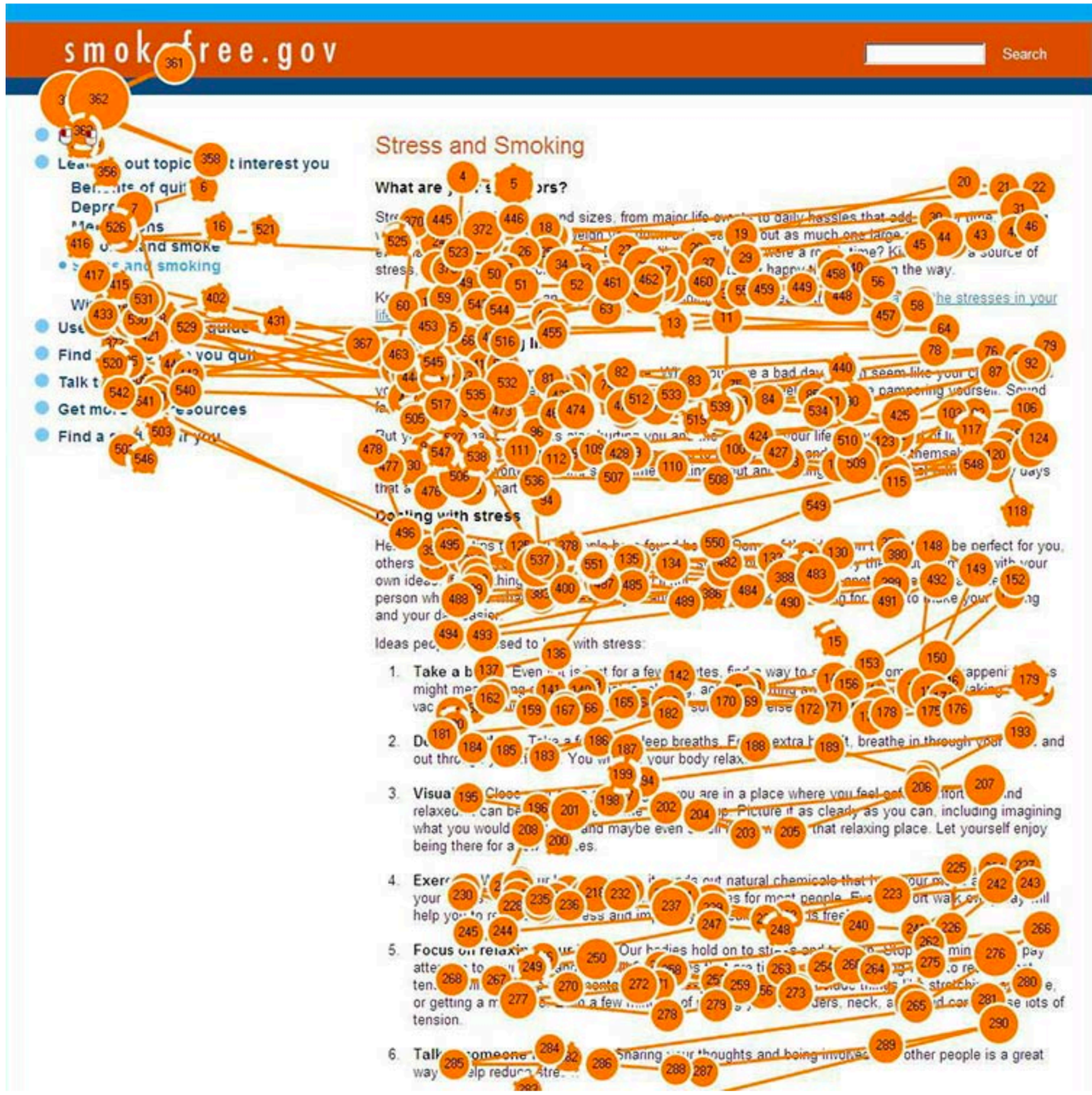
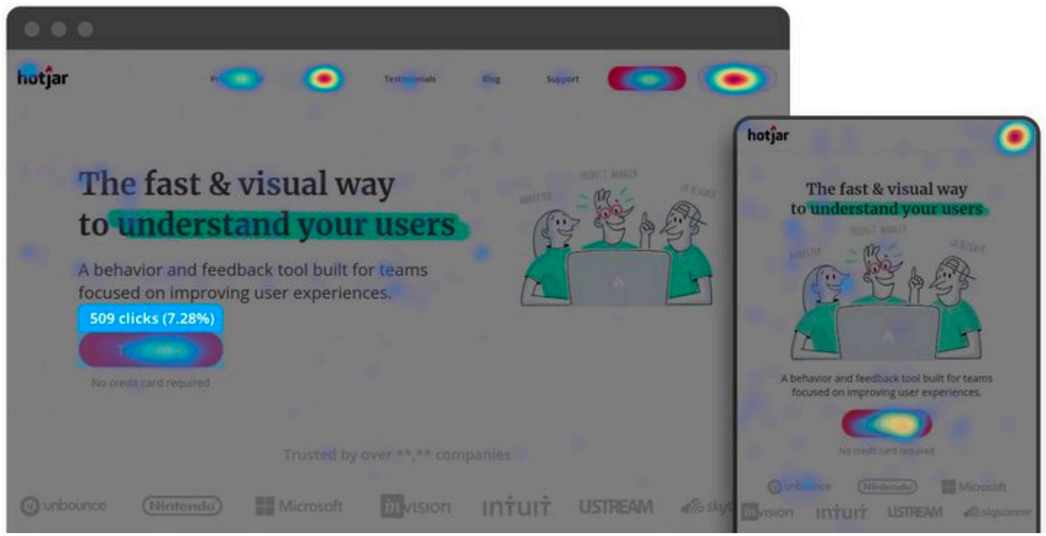


Gaze path of a user who has **limited literacy skills reading (and re-reading) every word.**

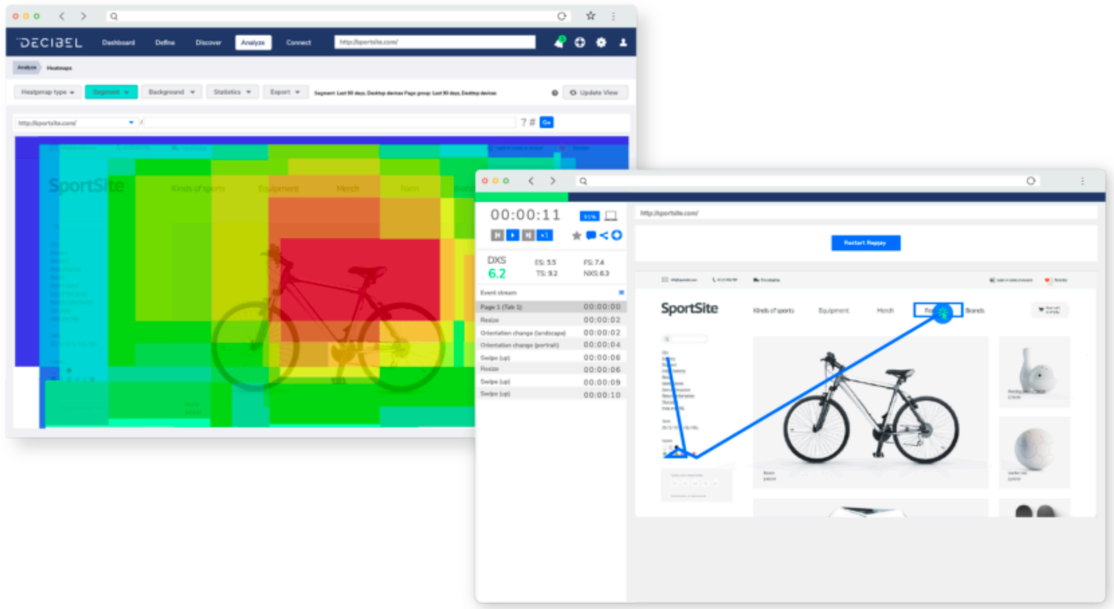

smokefree.gov
search
SmokefreeWomen
Home
Learn about topics that interest you
Benefits of quitting
Depression
Pregnancy
Relationships and smoking
Relationships Quiz
Medications
Secondhand smoke
Stress and smoking
Weight management
Withdrawal
Use the quit guide
Find tools to help you quit
Talk to an expert
Get more free resources
Relationships and Smoking
Relationships Quiz
Try all the Smokefree Women quizzes...
Depression
Relationships
Medications
Stress
Weight
Withdrawal
Quit Smoking


smokefree.gov
Search
Stress and Smoking
What are your stressors?
Dealing with stress
Ideas people used to deal with stress:
1. Take a break
2. Deep breaths
3. Visualize
4. Exercise
5. Focus on relaxing your muscles
6. Talk to someone

How we do this in AHI….



https://www.hotjar.com/



https://decibel.com/

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Consumer of health care services

Medicare?

Medicaid?

Part B
Advantage
LTSS
Medi-Cal
NDC
CPT
MLTSS
Advanced Medical Home
Part C
HCPCS
Part A
Part D

Part B

Advantage

LTSS

Medi-Cal

NDC

MLTSS

CPT

Advanced Medical Home

Part C

HCPCS

Part A

Part D

Medicare?

Medicaid?

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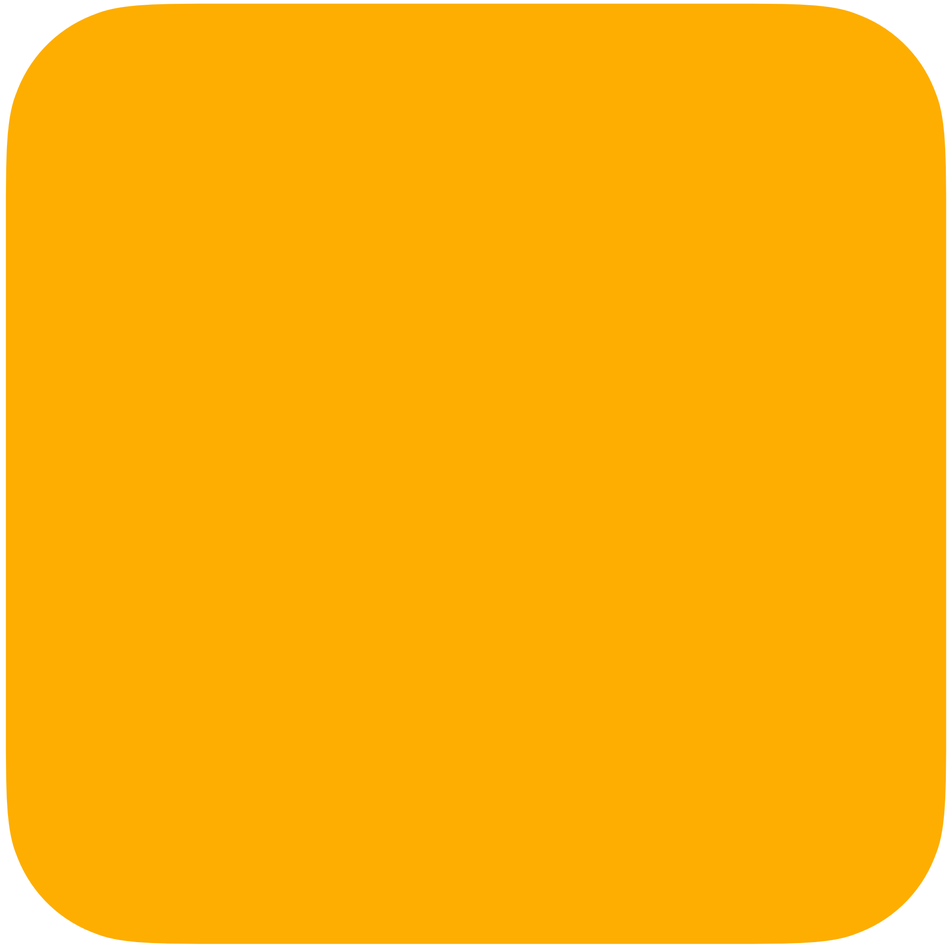


Medicare?

Part A
Part B
Part C
Part D
Advantage

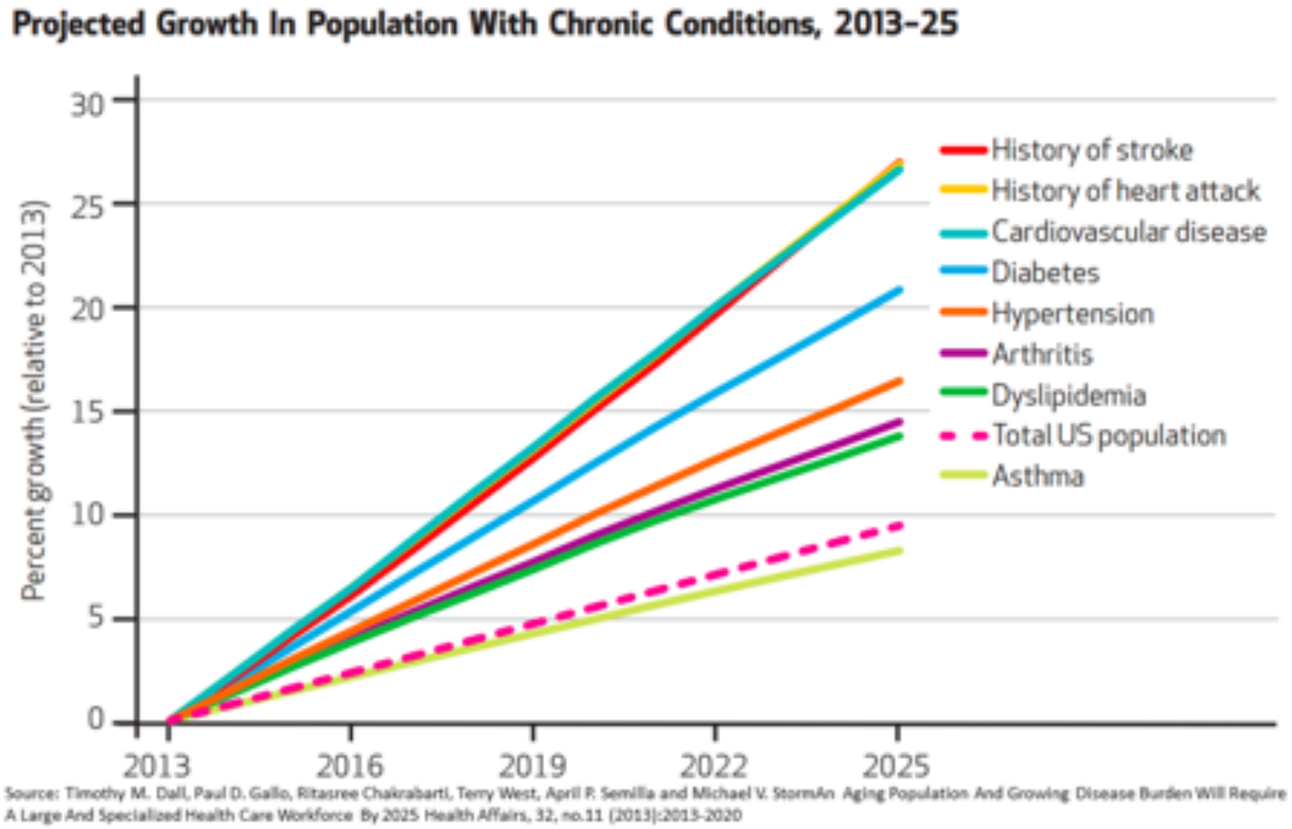
NDC
CPT
HCPCS

Medicaid?

Medi-Cal
Advanced Medical Home
LTSS
MLTSS

NDC
CPT
HCPCS

Combine this with potential physical and cognitive disabilities…



Source: Timothy M. Dall, Paul D. Gallo, Ritasree Chakrabarti, Terry West, April P. Semilla and Michael V. StormAn Aging Population And Growing Disease Burden Will Require A Large And Specialized Health Care Workforce By 2025 Health Affairs, 32, no.11 (2013):2013-2020

Pre-covid estimates:

2030 estimate made in 2000: 49.2%

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

2030 estimate made in 2016: 80.0%

(http://www.fightchronicdisease.org/sites/default/files/IHS_Technical_Report.pdf)

- This estimate is 30% higher than the model in 2000
- This new model means that over the next 10 years, chronic diseases will increase by 2% year over year

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Combine this with care provider shortage

physicians in the US: **950,000** (citation)

nurses in the US: **3.8 million** (citation)

physical therapists in the US: 200,000 (citation)

respiratory therapists in the US: 100,000 (citation)

…serving 330+ million patients

- Lack of coordination among health care providers
- Confusing forms and instructions
- Limited use of multimedia to convey information
- Insufficient time and incentives for patient education
- Differences in language and cultural preferences and expectations between doctors and patients
- Overuse of medical and technical terms to explain vital information

Why Care

Health Literacy

2. The general population is NOT HEALTH LITERATE

- Current population data on literacy and health literacy skills in the United States come from the 2003 National Assessment of Adult Literacy (NAAL)

- From the more than 19,000 adults surveyed, **only 12 percent demonstrated Proficient health literacy** = effecting nearly 9/10 adults in the United States

Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy (NCES 2006-483). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

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Assume **9 out of 10 people** will not understand what you tell them the first time you tell them…

Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). The health literacy of America's adults: Results from the 2003 National Assessment of Adult Literacy (NCES 2006-483). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

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Why Care

Health Literacy

3. Leads to POOR OUTCOMES

Negatively associated with…

- the use of preventive services (e.g., mammograms or flu shots),
- management of chronic conditions (e.g., diabetes, high blood pressure, asthma, and HIV/AIDS)
- self-reported health.

Positively associated with…

- preventable hospital visits
- preventable hospital admissions
- medication errors
- mortality

Davis, T. C., Wolf, M. S., Bass, P. F. III, Middlebrooks, M., Kennen, E., Baker, D. W., et al. (2006). Low literacy impairs comprehension of prescription drug warning labels. Journal of General Internal Medicine, 21(8), 847–851.

Davis, T. C., Wolf, M. S., Bass, P. F. III, Thompson, J. A., Tilson, H. H., Neuberger, M., et al. (2006). Literacy and misunderstanding prescription drug labels. Annals of Internal Medicine, 145(12), 887– 894.

Wolf, M. S., Davis, T. S., Tilson, H. H., Bass, P. F., & Parker, R. M. (2006). Misunderstanding of prescription drug warning labels among patients with low literacy. American Journal of HealthSystem Pharmacy, 63, 1048–1055.

Juzych, M. S., Randhawa, S., Shukairy, A., Kaushal, P., Gupta, A., & Shalauta, N. (2008). Functional health literacy in patients with glaucoma in urban settings. Archives of Ophthalmology, 126(5), 718–724.

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Why care

COVID-19 - not wearing them

Why care

Vaccines - not taking them

Why care

Medications - improper use

Anyone think of other examples?

Present Issues

Health and Digital Literacy Levels

There **3 P's**

…what are they?

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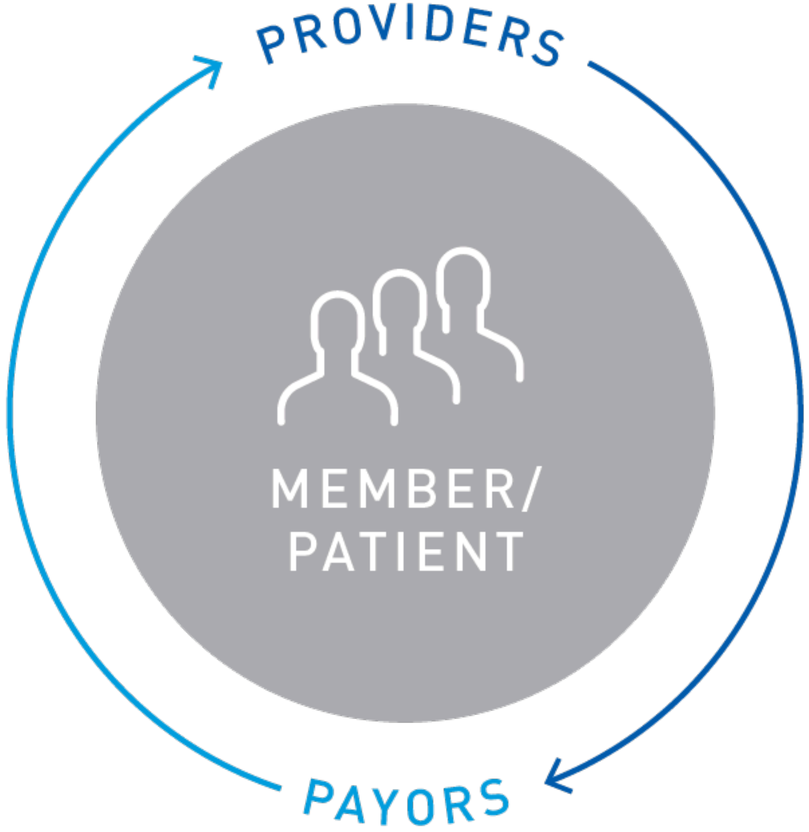
Health and Digital Literacy Levels

There 3 P's



Key Issues

Health literacy

Individual level:

- those that are impoverished

- technologies to provide health information to the public and to patients and their potential for improving patient outcomes

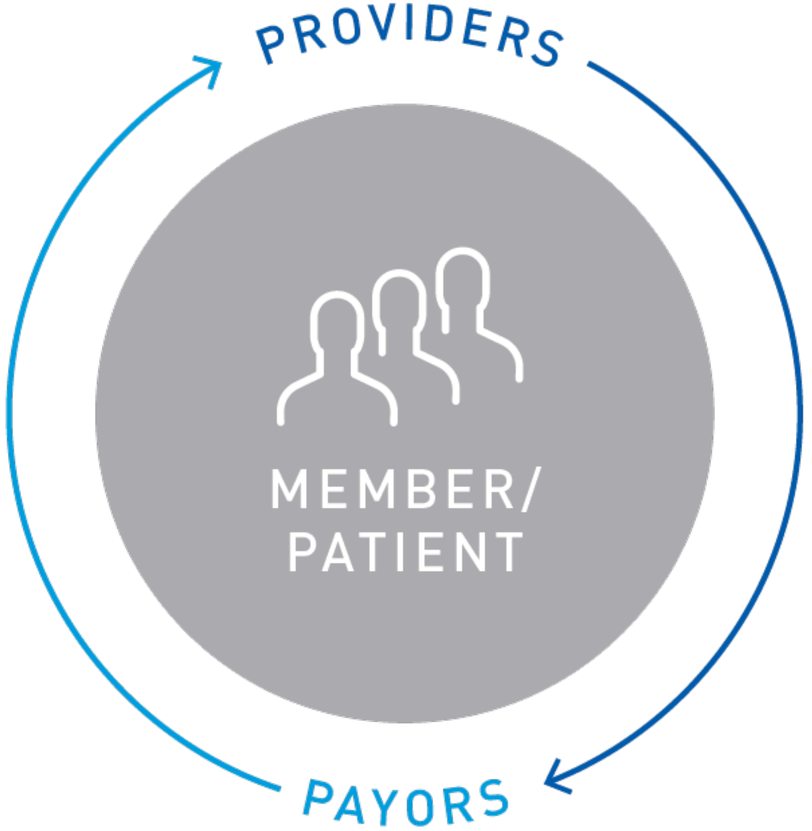
- people have access to their health information when and where they need it (e.g., creation of user-friendly health apps)

Organizational level:

- reducing the complexity of health information and systems

Health and Digital Literacy Levels

1. **Individual** - Patient
2. **Individual** - Patient Family
3. **Individual** - Provider
4. **Group** - Medical Center
5. **Group** - Payer Organization
6. **State** Level - New York
7. **Country Level** - United States

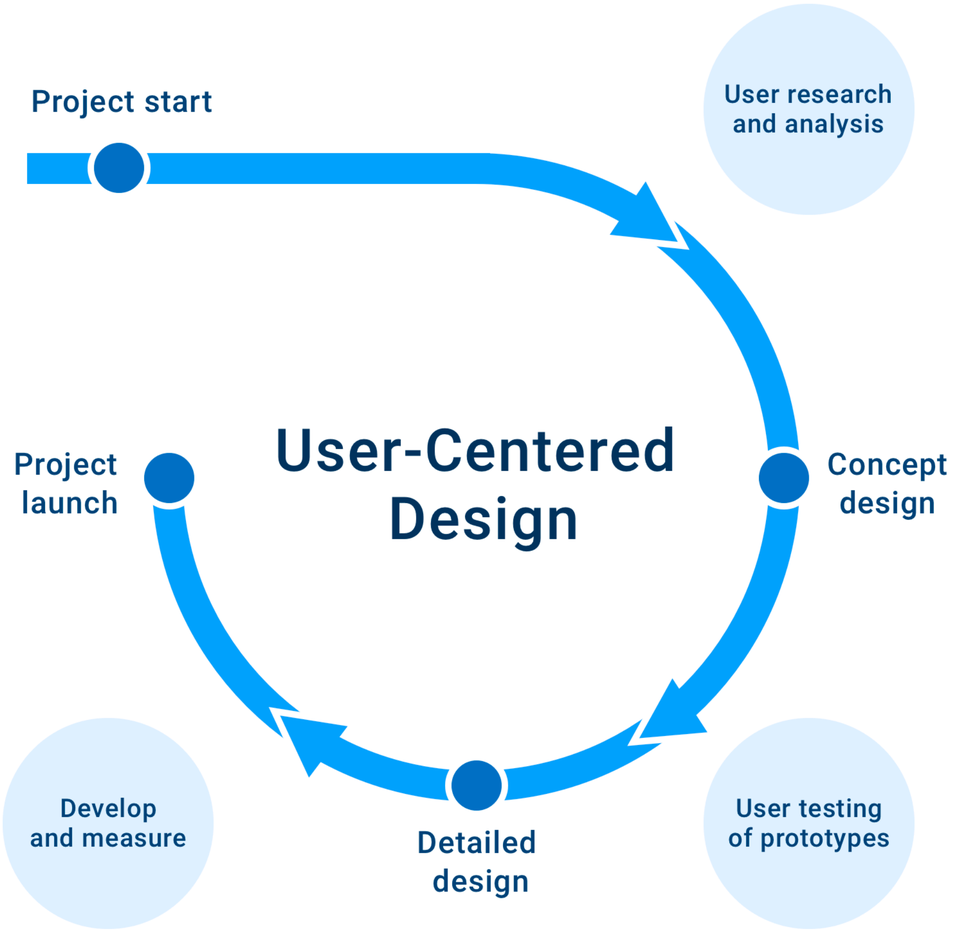


Interventions

Interventions: **user centered design**

User-centered Design

- Involving members of the target audience in the design and testing of communication products



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2818536/

Table 4

Mean PSSUQ Scores After the Field Study (N=6)

Items	M± SD
1.Easy to use system	1± 0
2. Simple to use system	1± 0
3. Effectively complete tasks &scenarios	1± 0
4. Quickly complete tasks & scenarios	1± 0
5. Efficiently complete tasks & scenarios	1± 0
6. Comfort using system	1± 0
7. Easy to learn to use system	1± 0
8. Believe could become productive using system	1± 0
9. Error messages were clear	2.0 + 1.7
10. Easily recover from mistakes	1± 0
11. Information about system was clear	1± 0
12. Easy to find needed information	1± 0
13. Easy to understand information	1± 0
14. Information helped complete the task	1± 0
15. Information was clearly organized	1± 0
16. Interface was pleasant	1± 0
17. Enjoyed using interface	1± 0
PSSUQ Overall	1.05 +.10

PSSUQ, Post-Study System Usability Questionnaire, PSSUQ scores range from 1-7 (lower scores = higher satisfaction).

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2818536/

Interventions: **universal approach**

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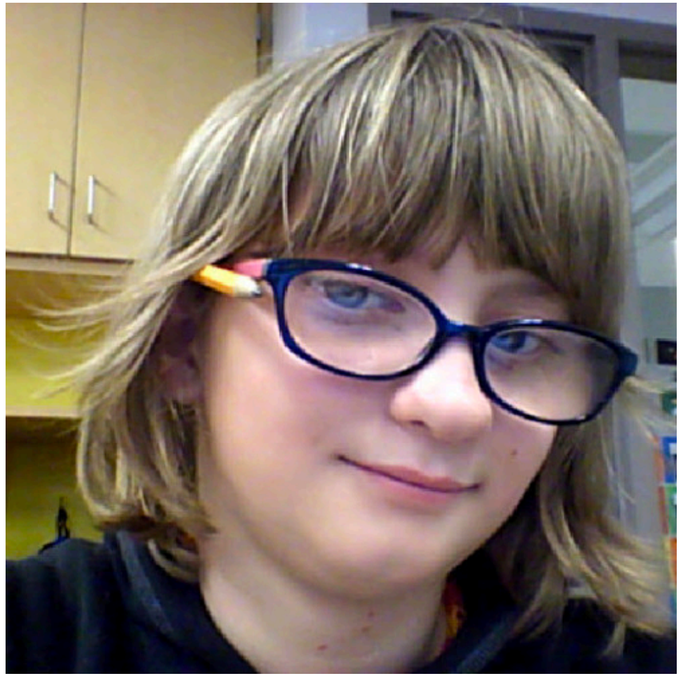

Universal Precautions

Duh….

- adopted the idea of “universal precautions” from infectious disease

- because it is **impossible to tell by looking who is affected by limited health literacy**

- if 9 of 10 English-speaking adults have less than proficient health literacy skills, it is an issue that affects everyone

Interventions: **tailoring and targeting**

Tailoring and Targeting

- Meeting a patient where they are at in their journal

- Acute vs Chronic
- Old vs Young
- Inpatient vs Outpatient
- Culture
- Education
- Device types: mobile, iOS, and/or

—> Phenotype generation

Interventions: **organizational changes**

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Institute of Medicine (IOM)

10 traits of a health literate organization:
https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf

https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf

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The 10

10 traits of a health literate organization:
https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf

1. Has leadership that makes health literacy integral to its mission, structure, and operations.

2. Integrates health literacy into planning, evaluation measures, patient safety, and quality improvement.

3. Prepares the workforce to be health literate and monitors progress.

4. Includes populations served in the design, implementation, and evaluation of health information and services.

5. Meets the needs of populations with a range of health literacy skills while avoiding stigmatization.

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The 10

10 traits of a health literate organization:
https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf

5. Meets the needs of populations with a range of health literacy skills while avoiding stigmatization.

6. Uses health literacy strategies in interpersonal communications and confirms understanding at all points of contact.

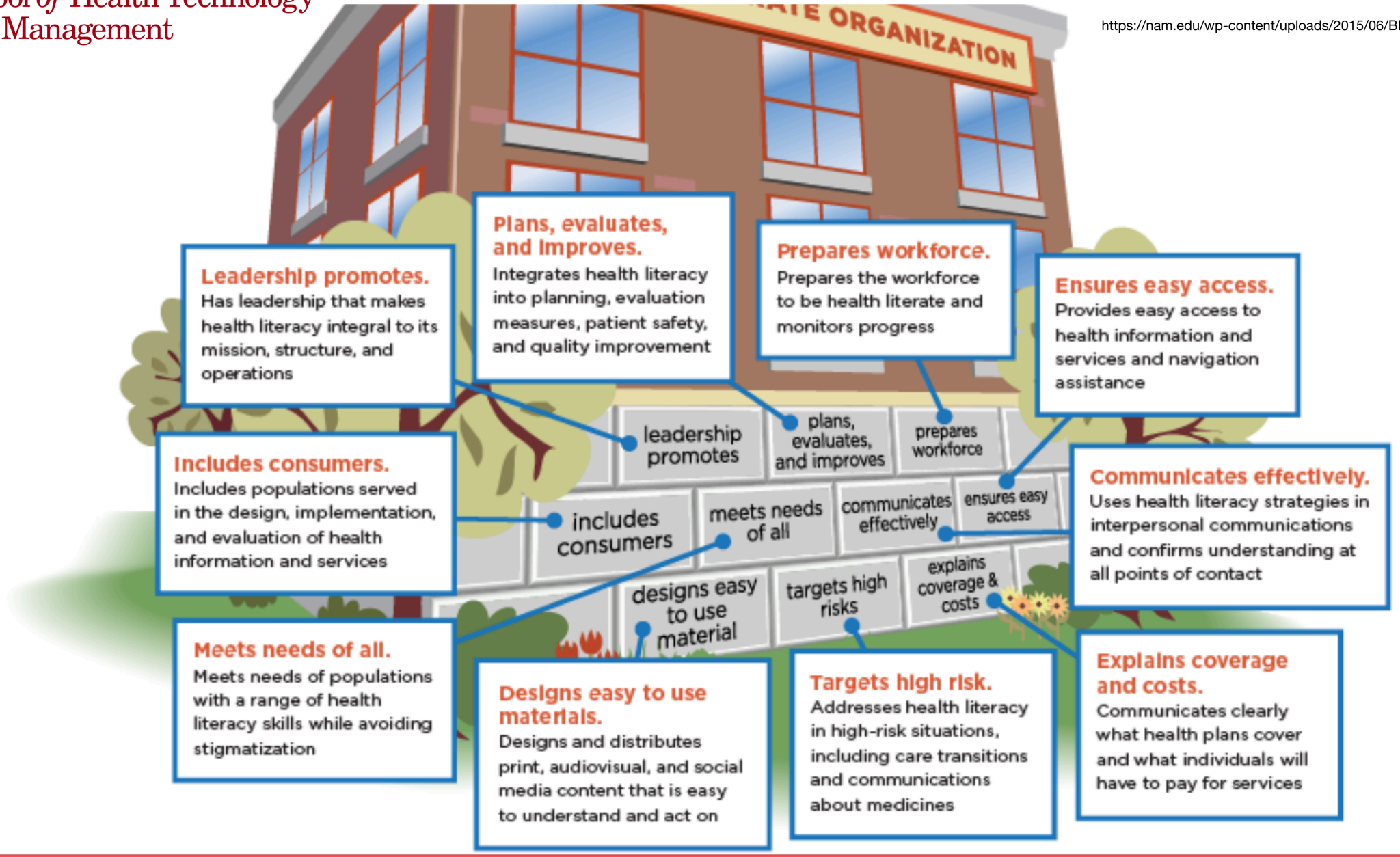
7. Provides easy access to health information and services and navigation assistance.

8. Designs and distributes print, audiovisual, and social media content that is easy to understand and act on.

9. Addresses health literacy in high-risk situations, including care transitions and communications about medicines.

10. Communicates clearly what health plans cover and what individuals will have to pay for services.

https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf



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Healthy People 2030

Literacy:
https://health.gov/healthypeople/about/workgroups/health-communication-and-health-information-technology-workgroup

Health Communication and Health Information Technology Workgroup Objectives (19)

Increase the proportion of adults whose health care provider checked their understanding — HC/HIT-01

Increase the proportion of adults whose health care providers involved them in decisions as much as they wanted — HC/HIT-03

Increase the proportion of adults with broadband internet — HC/HIT-05

Increase the proportion of hospitals that exchange and use outside electronic health information — HC/HIT-D05

Increase the proportion of doctors who exchange and use outside electronic health information — HC/HIT-D08

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Problems related to my perspective

Applied Health Informatics

AI and ML - black box problem

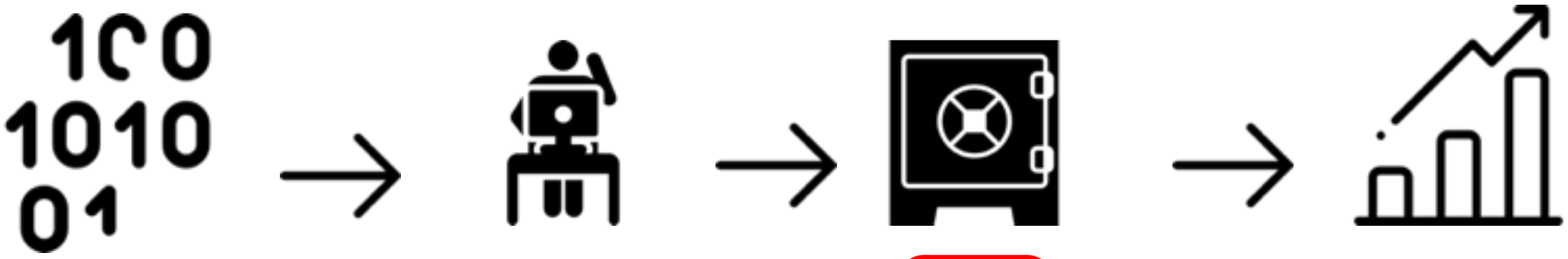
Deployment (web, iOS, android) - equality / equity to access

General **Adoption** (care providers, patients) - engagement problem / NPS of user systems like EMRs, ERPs, etc…

Data → ? → Outcome

Data → ML/Ai → Outcome

"Data Scientist Stuff"



Data **ML/Ai** **?** **⇧ Outcome**

Translate into action

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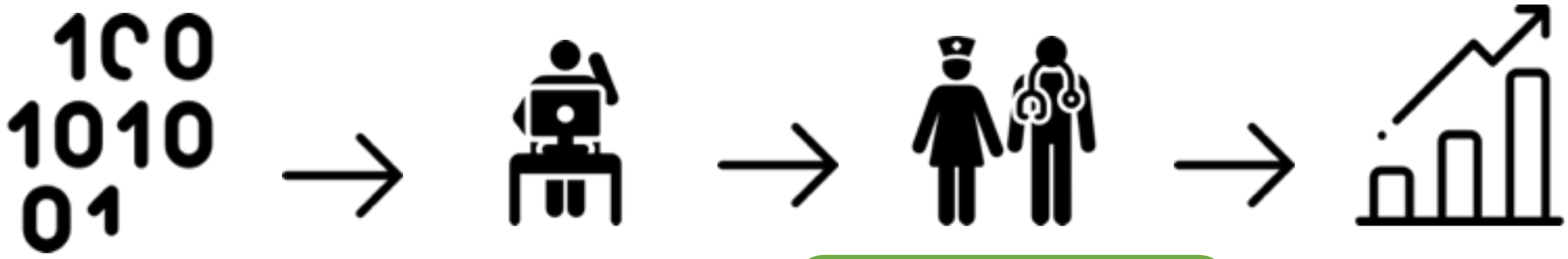

Data **ML/Ai** **Informaticists** **Outcome**

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Data

Intervention with
Metric

Problem

Model Translation

ML/Ai Model

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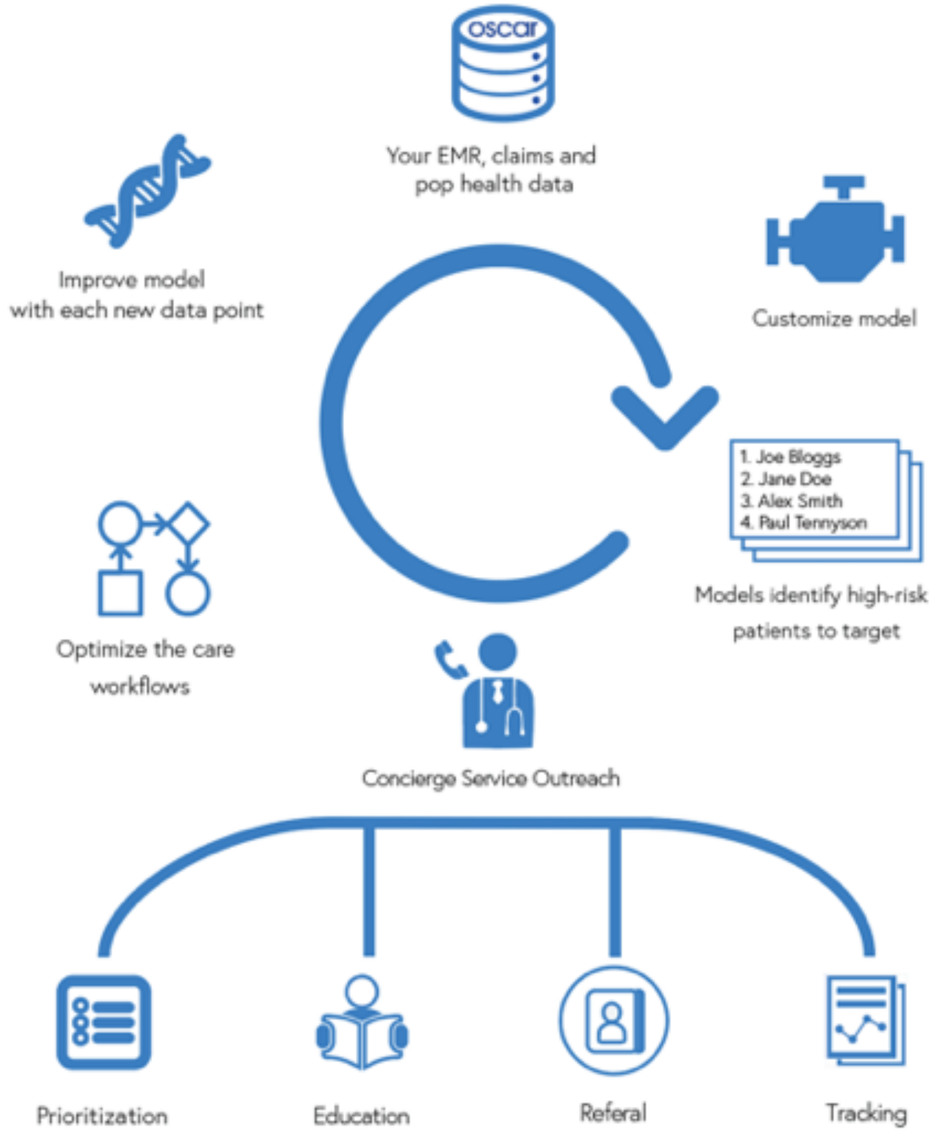
pulseData

PARTNERING TO ELIMINATE PREVENTABLE SICKNESS



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pulseData

ORDERED BY: Dr. Francis Jones
NYC Medical Center
fjones@nycmed.com
343-232-1294

COLLECTED: 09/13/2017
RECEIVED: 09/14/2017

End-Stage Renal Disease (ESRD) Risk Score

About

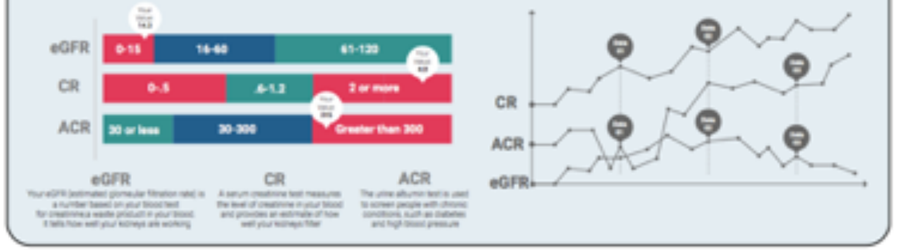
End stage renal disease (ESRD) is the final stage of chronic kidney disease (CKD), and occurs when the kidneys are no longer able to perform the primary functions of filtering out waste products and maintaining homeostasis.

Often, the signs and symptoms of ESRD occur rapidly, and with very little notice. It is common for persons with chronic kidney disease to be completely unaware that they have the disease.

This report provides a risk score for the likelihood of converting from CKD to ESRD in the next 12 months.

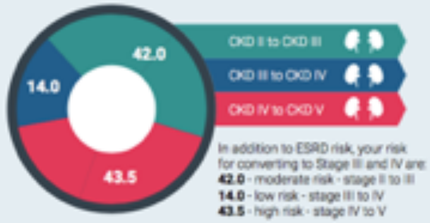
Patient
First: John
Last: Doe
MRN: #343532325
Gender: Male
Birthdate: 04/13/1980
Address: 121 S. Alexa Drive.
City: New York
State: New York
Telephone:

Results



Risk Scores

Your risk score for converting to ESRD disease in the next 12 months is 43.5 [out of 100]. A lower score is interpretated as decreased risk for converting to ESRD in the next 12 months, while a higher score is interpretated as increased risk for converting to ESRD. This prediction is based on your lab results and other electronic medical encounter data over the past five years.



In addition to ESRD risk, your risk for converting to Stage III and IV are:
42.0 - moderate risk - stage II to III
14.0 - low risk - stage III to IV
43.5 - high risk - stage IV to V

Recommendations

In order to decrease your risk of converting to ESRD in the next 12 months, these are some recommendations (based on your current ESRD risk score), that we suggest you implement and take immediate action on:

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Do speech pathologists need to become experts in ML/Ai?

No

Do speech pathologists need to understand basics of ML/Ai?

Yes

Data scientists are not trained in:

- Anatomy
- Disease/pathology
- Pharmacogenetics
- Acute Health
- Hospital Operations/Management

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Data scientists' are mathematicians/visualization experts that should be **agnostic** to the context or scenario

Speech pathologists are focused on improving **patient reported outcomes**/metrics through delivery of evidenced-based care

Can create ML/Ai models, but not healthcare professionals, and are **not trained to translate** their findings into improved patient outcomes

SP are trained and knowledgeable of healthcare **interventions** that could be delivered, and what may be most effective

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School *of* Health Technology
and Management

Resources

Health Literacy

https://health.gov/sites/default/files/2019-09/Health_Literacy_Action_Plan.pdf

https://nnlm.gov/initiatives/topics/health-literacy

https://www.ncbi.nlm.nih.gov/books/NBK379016/

https://health.gov/healthliteracyonline/