Designing for Change

Institute for Healthcare Quality,
Safety and Efficiency
SCHOOL OF MEDICINE
UNIVERSITY OF COLORADO **ANSCHUTZ MEDICAL CAMPUS**

Financial Disclosures: NONE

Submitted for Publication (or will be very soon)

Epic

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Agenda

1. Choice Architecture + Nudge
2. Design Thinking
3. User-Centered Design
4. Pre-Mortem Analysis

Learning Objectives

1. Describe different approaches for influencing behavior
2. Explain Design Thinking.
3. Recognize the importance of user-empathy in good design.
4. List the steps of a user-centered design process.
5. Explain the purpose and process of a pre-mortem analysis.
6. Recognize the importance of ensuring healthcare interventions are safe.

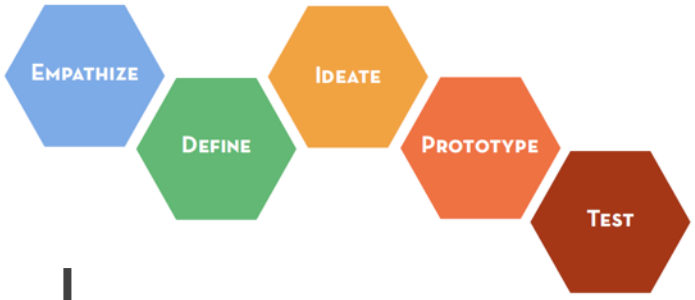
YOU ARE HERE

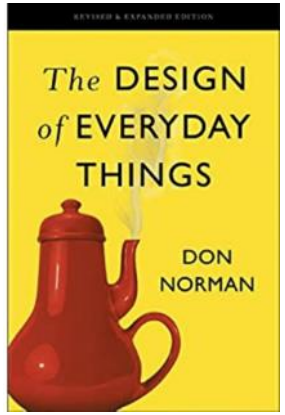
Session	Session Overview
Quality Improvement & Change Management	• Basics of Quality Improvement • Step-wise, practical implementation guide • Change Management framework overview for driving change
Applied Patient Safety	• Guide the development and participation in a systems-based case review conference.
Designing for Change	• Understanding the problem and the people involved • Design thinking and choice architecture • User-centered design methodology • Pre-mortem analysis to identify the right solutions for the right problem
Acquiring Data to Drive Change	• Data sources to track improvement • Data analysis and organization • Data visualization
Spreading Change Locally and Nationally	• Diffusion of innovation framework • QI vs. research • Strategies for dissemination and publication • Grant opportunities
Coaching and Teaching Quality Improvement	• How to coach QI teams • Identifying and troubleshooting common QI missteps


zoom

You don't know the best solutions…but your users do!

You must talk to them to find out.





There are methods for how to get the best out of your users.

It is critical to ensure your interventions are safe *before* implemented.

user noun

us·er 'yü-zər

a person who uses a product or service

https://www.merriam-webster.com/dictionary/user

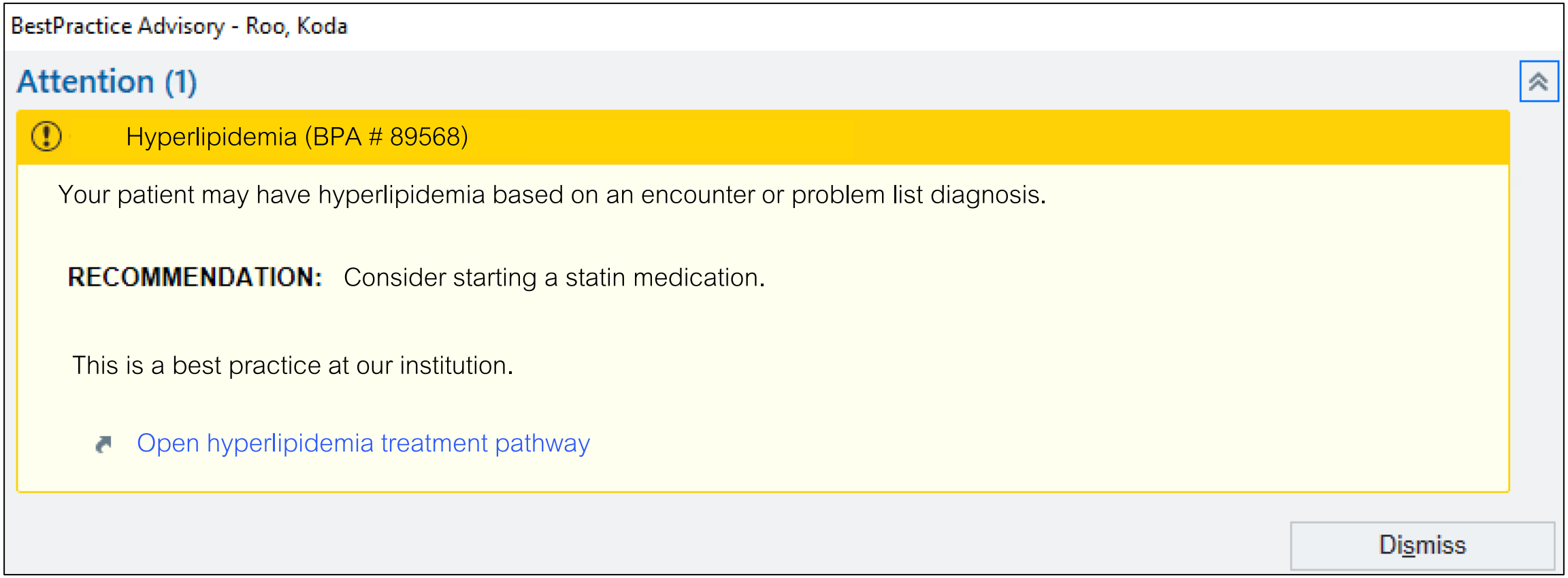
Photo Credit: https://twitter.com/mkheck/status/1020149647665491970

YOU ≠ USER

False-consensus effect: people's tendency to assume that others share their beliefs and will behave similarly in a given context.

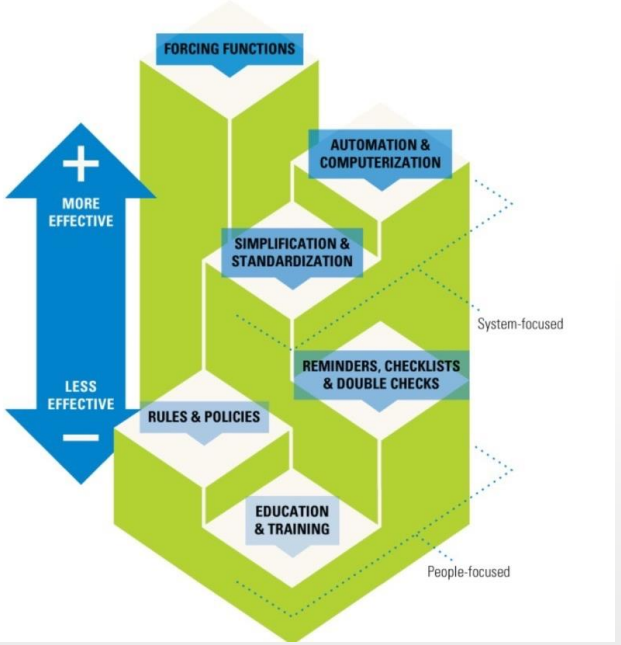
https://www.nngroup.com/articles/false-consensus/

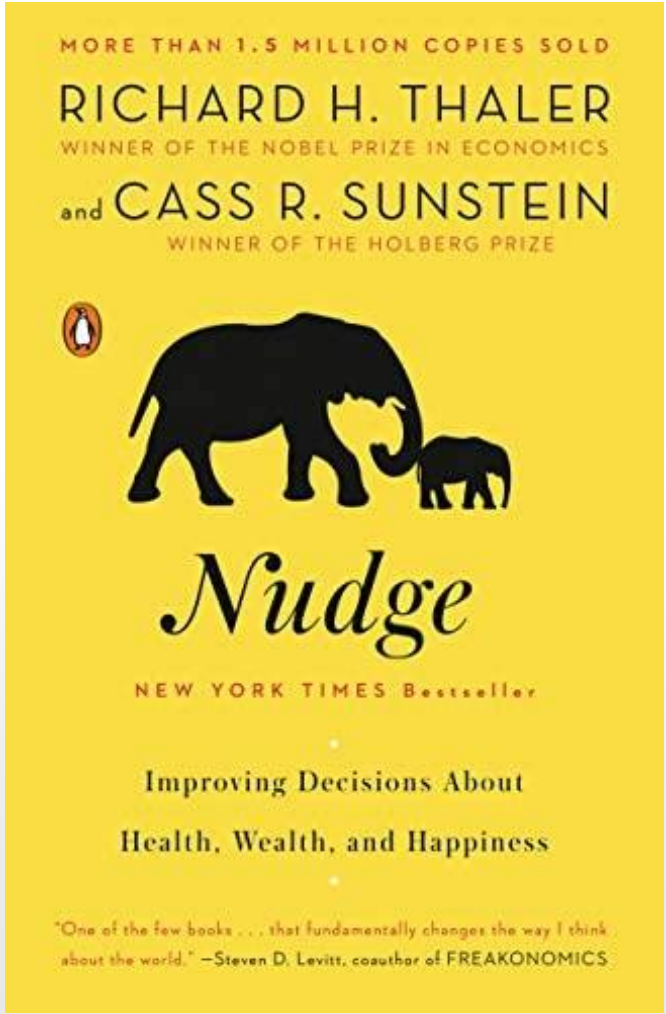
Ross, Lee; Greene, David; House, Pamela (May 1977). "The 'false consensus effect': An egocentric bias in social perception and attribution processes". *Journal of Experimental Social Psychology*. **13** (3): 279–301.


BestPractice Advisory - Roo, Koda
Attention (1)
Hyperlipidemia (BPA # 89568)
Your patient may have hyperlipidemia based on an encounter or problem list diagnosis.
RECOMMENDATION: Consider starting a statin medication.
This is a best practice at our institution.
Open hyperlipidemia treatment pathway
Dismiss

Basic Principles for Effective* Design

*Effective = changes usual behavior


FORCING FUNCTIONS
AUTOMATION & COMPUTERIZATION
SIMPLIFICATION & STANDARDIZATION
REMINDERS, CHECKLISTS & DOUBLE CHECKS
RULES & POLICIES
EDUCATION & TRAINING
+
MORE EFFECTIVE
LESS EFFECTIVE
−
System-focused
People-focused


MORE THAN 1.5 MILLION COPIES SOLD
RICHARD H. THALER
WINNER OF THE NOBEL PRIZE IN ECONOMICS
and CASS R. SUNSTEIN
WINNER OF THE HOLBERG PRIZE
Nudge
NEW YORK TIMES Bestseller
Improving Decisions About
Health, Wealth, and Happiness
"One of the few books . . . that fundamentally changes the way I think about the world." —Steven D. Levitt, coauthor of FREAKONOMICS

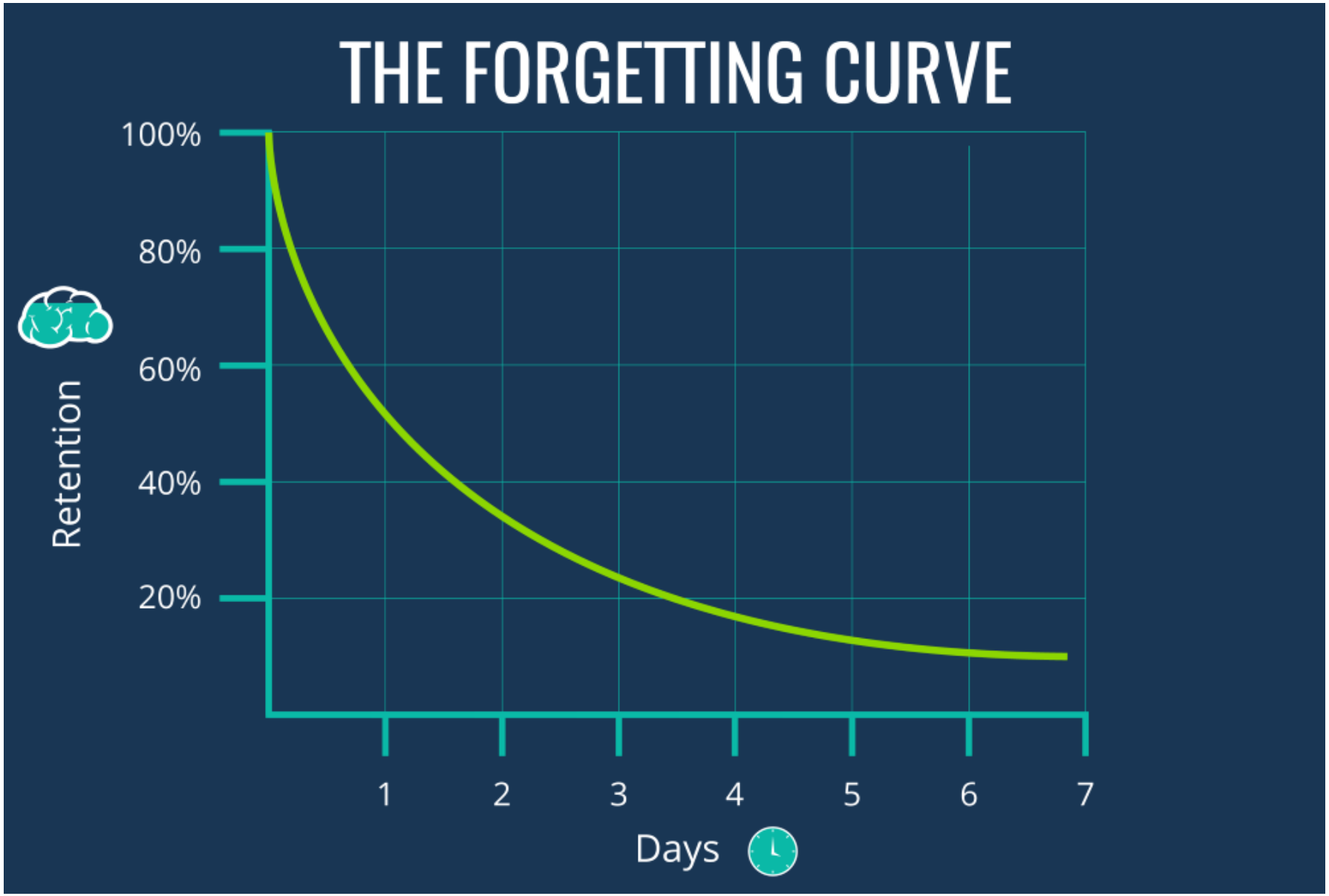
(Humans are)
Lazy, Forgetful Creatures of Habit

Being a lazy, forgetful creature of habit is completely rational. We only have so much energy and attention, and we have ever increasing demands on it. Why should you do anything that requires more work? Why should you go out of your way? Or commit something to memory, when Google will remember it for you?

Erika Hall
Author of Conversational Design and Just Enough Research

https://medium.com/research-things/lazy-forgetful-creatures-of-habit-2758e6976d4

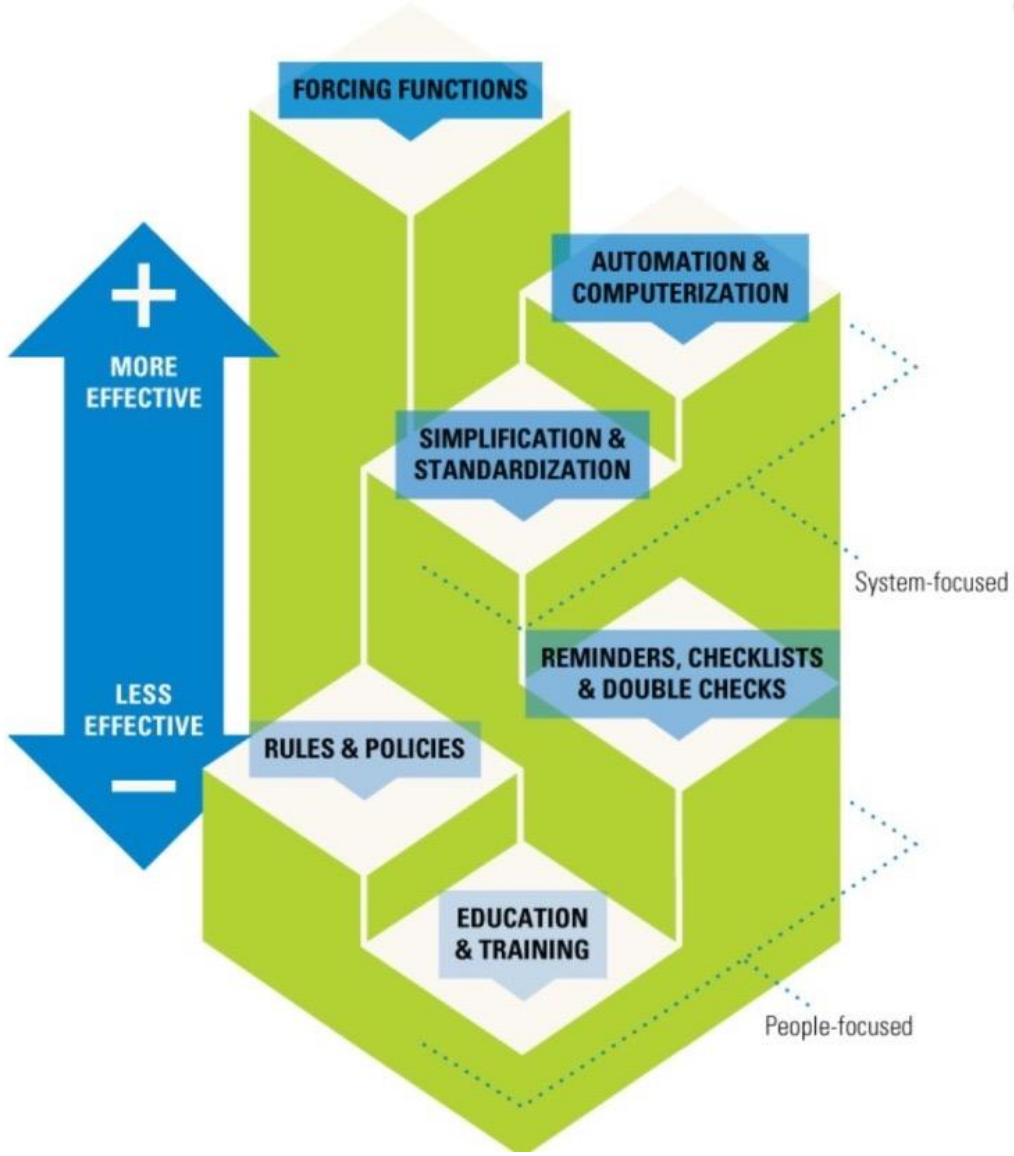
https://unsplash.com/photos/GTXvpZ2eTdA

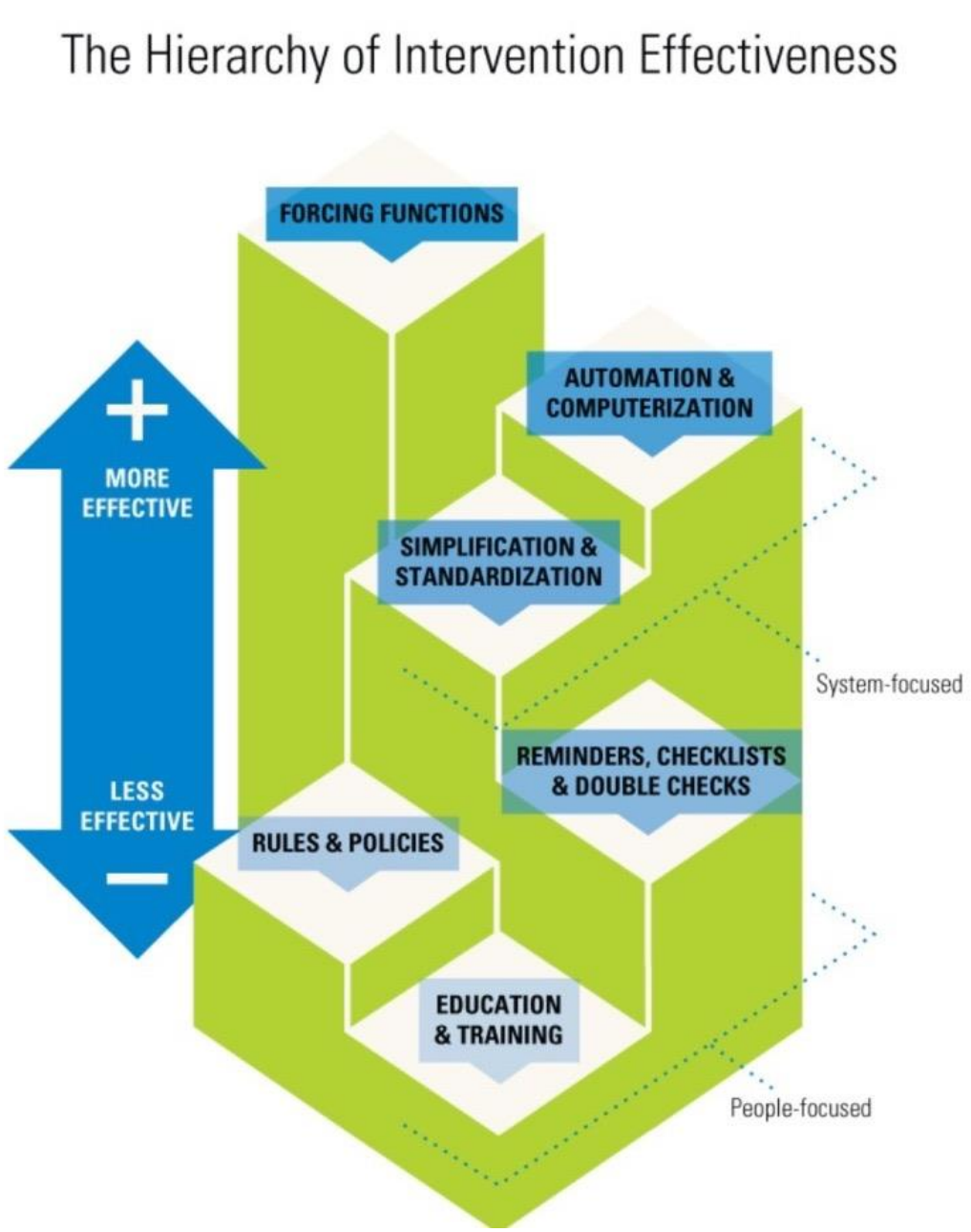


Ebbinghaus, Hermann (1913). *Memory: A Contribution to Experimental Psychology.* Translated by Ruger, Henry; Bussenius, Clara. New York city, Teachers college, Columbia university.

https://elearningindustry.com/forgetting-curve-combat

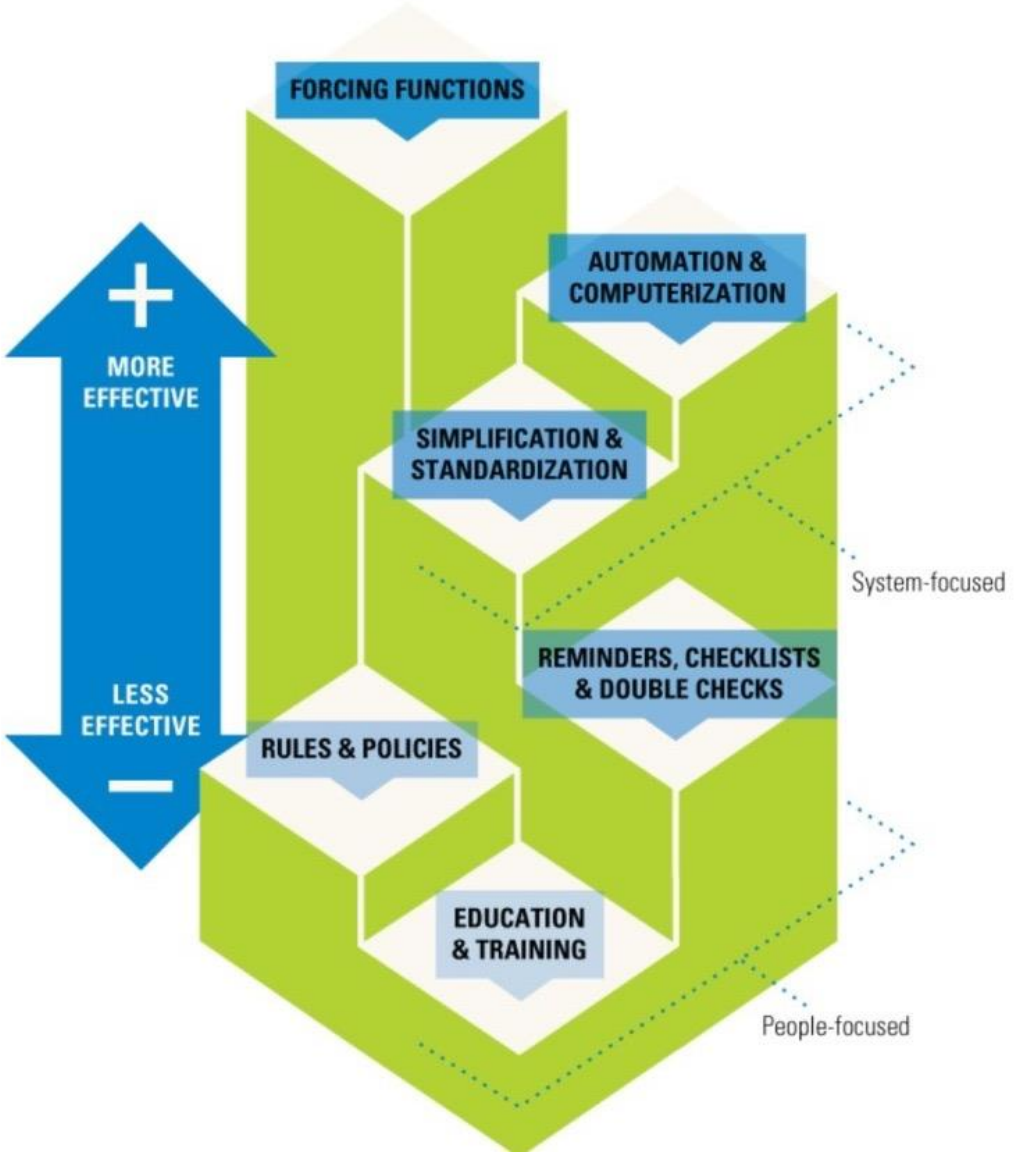
The Hierarchy of Intervention Effectiveness

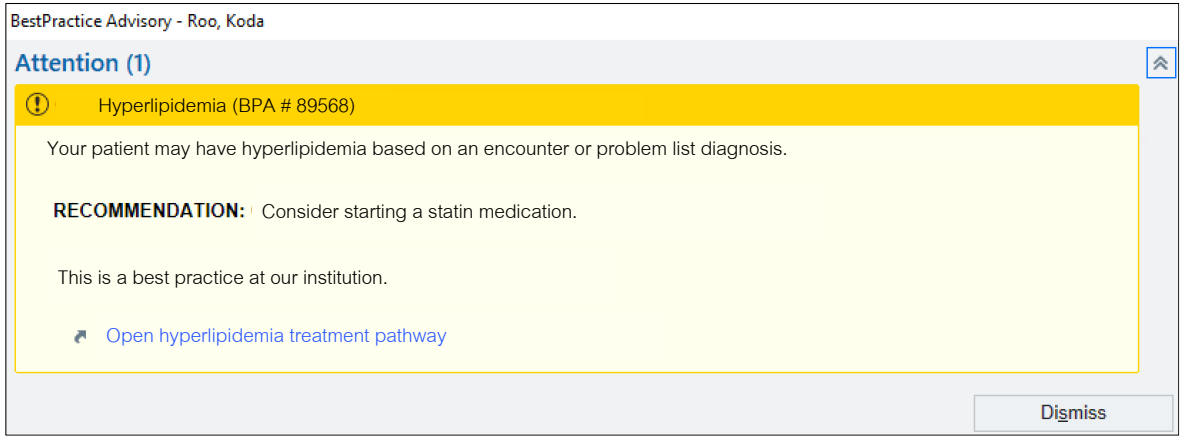




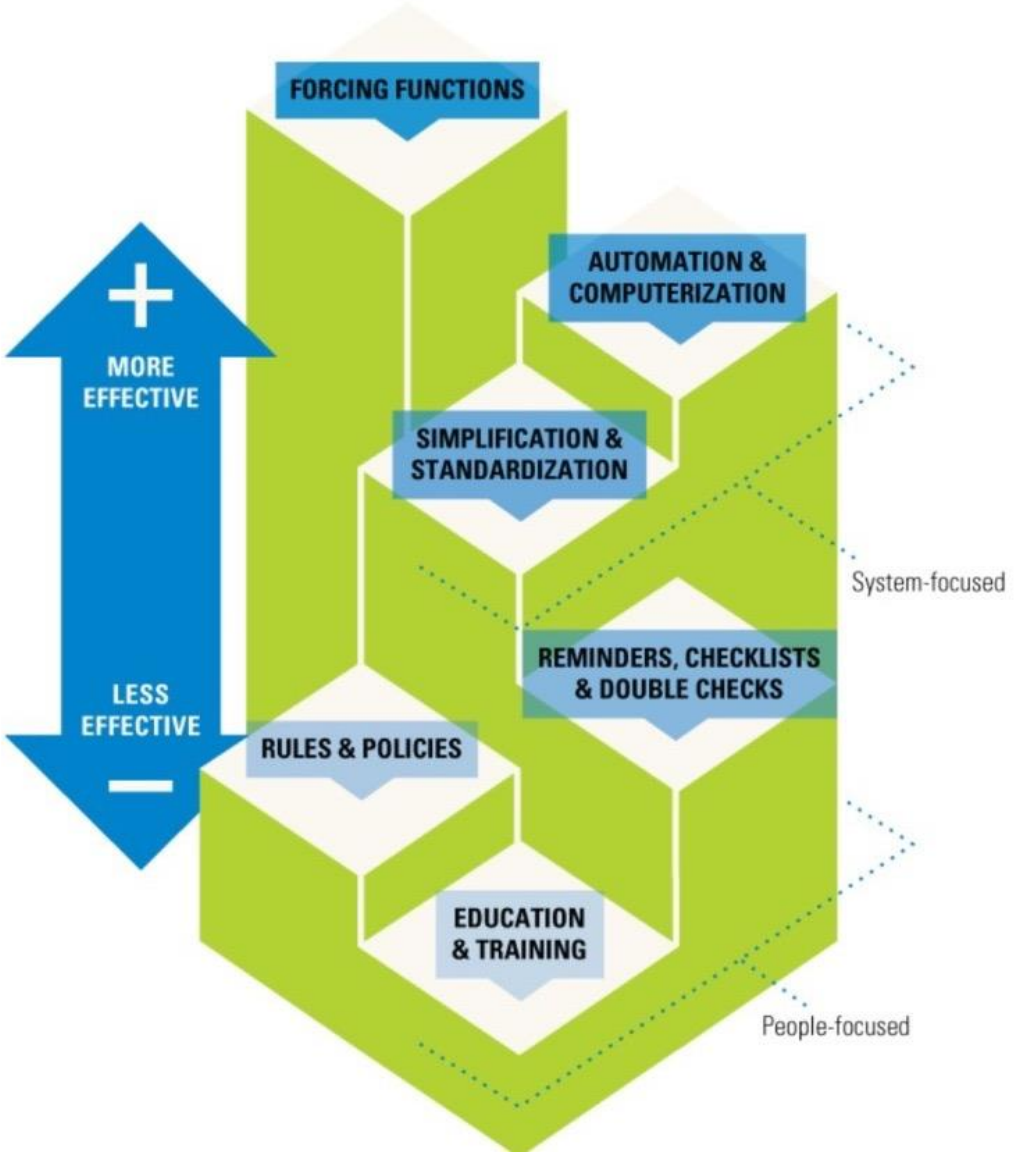
What about electronic alerts?

The Hierarchy of Intervention Effectiveness





The Hierarchy of Intervention Effectiveness



CT Low Dose Chest CT For Annual Lung Cancer Screening — Accept | Cancel

Status: Normal | Standing | Future

Expected Date: [ ] Today | Tomorrow | 1 Week | 2 Weeks | 1 Month | 3 Months | 6 Months | Approx.

Expires: 9/13/2023 — 1 Month | 2 Months | 3 Months | 4 Months | 6 Months | 1 Year | 18 Months

Priority: Routine — Routine | STAT

Class: Ancillary Performed — Ancillary Performed | Hospital Performed | External

Reason for Exam:

- [ ] Lung cancer screening, < 20 pk-yr smoking history (Age >= 50y)
- [ ] Lung cancer screening, >= 20 pk-yr smoking history (Age >= 50y)
- [ ] Lung nodule, < 6mm, high cancer risk
- [ ] Lung nodule, < 6mm, high cancer risk, stable on prior exam
- [ ] Lung nodule, < 6mm, low cancer risk
- [ ] Lung nodule, > 8mm
- [ ] Lung nodule, 6-8mm
- [ ] Lung nodules, multiple
- [ ] Lung nodules, multiple < 6mm, stable on prior exam
- [ ] Non-small cell lung cancer (NSCLC), metastatic, assess treatment response
- [ ] Non-small cell lung cancer (NSCLC), monitor
- [ ] Non-small cell lung cancer (NSCLC), non-metastatic, assess treatment response
- [ ] Non-small cell lung cancer (NSCLC), recurrence

Is the patient an asymptomatic adult between 50 and 77 years old (or up to 80 yo if Medicaid patient)? Yes | No

Is the patient completely free of any signs or symptoms of lung cancer? Yes | No

Is this the first (baseline) CT or an annual exam? Annual | Baseline

Is the patient a current smoker or did they quit < 15 years ago? Current smoker | Quit <15 years ago

Was there a shared-decision making conversation that involved the use of one or more decision aids? Yes | No

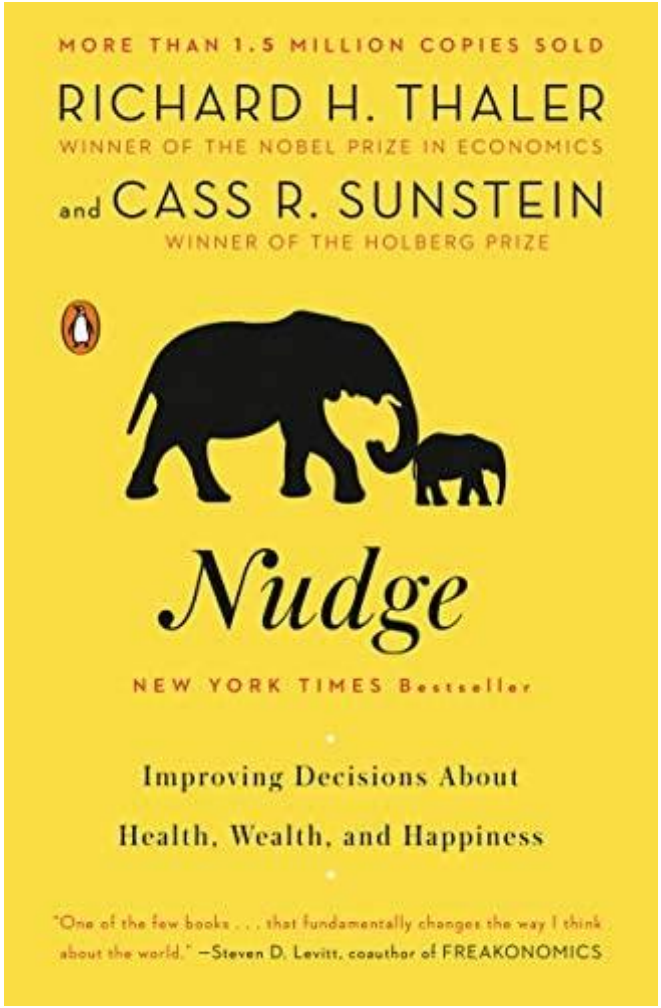
Did the conversation/aid(s) describe the benefits and harms of screening? Yes | No

Did the conversation/aid(s) describe possible follow up diagnostic testing? Yes | No

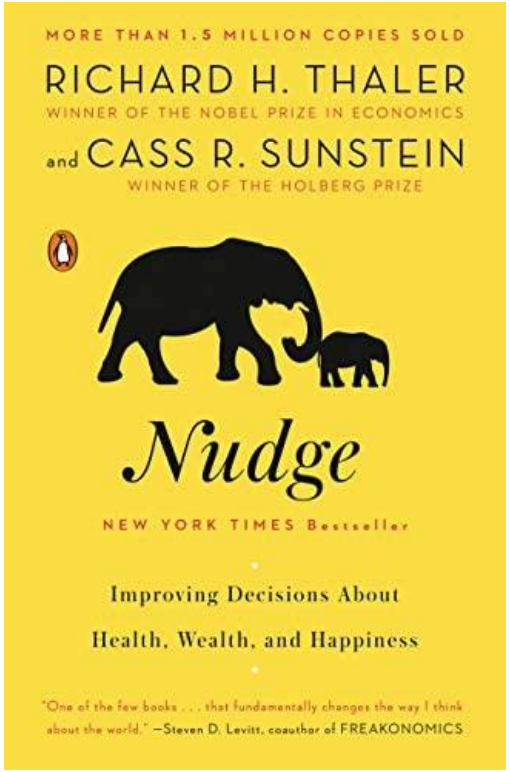
Did the conversation/aid(s) describe the risk of "over diagnosis"? Yes | No

Did the conversation/aid(s) describe the risk of false positives?

Next Required — Accept | Cancel



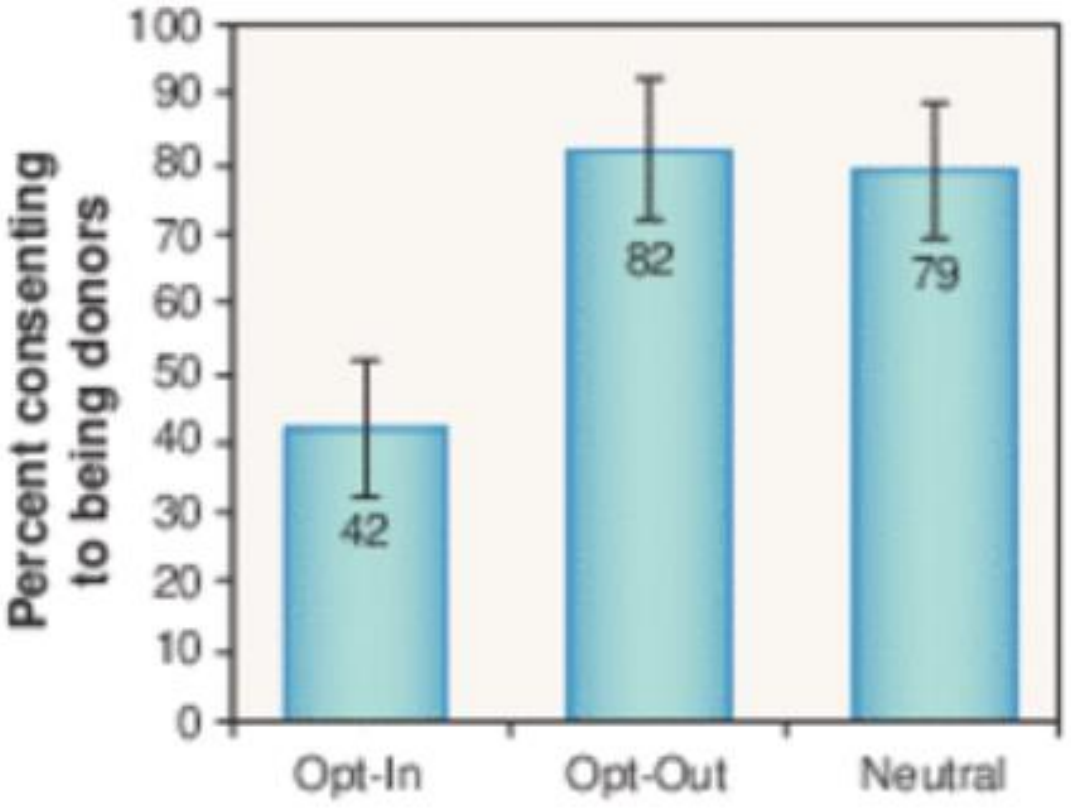
Nudge and Choice Architecture



A nudge…is any aspect of the choice architecture that **alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives.**

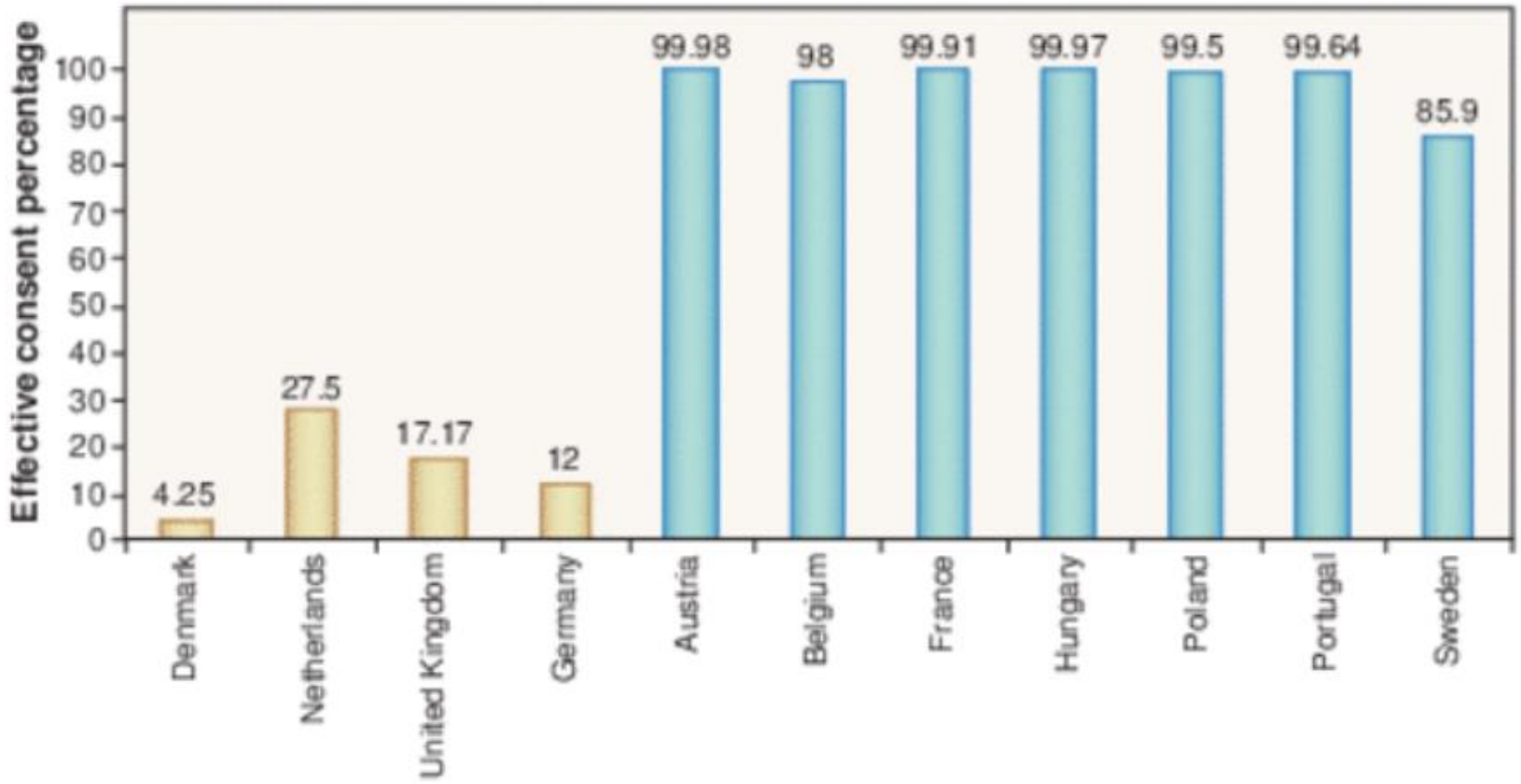
To count as a mere nudge, the intervention **must be easy and cheap to avoid**. Nudges are NOT mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not.

Thaler, Richard, and Cass Sunstein (2008). Nudge: Improving Decisions About Health, Wealth, and Happiness. Penguin Books.



Effective consent rates, online experiment, as a function of default.

Johnson, EJ, Goldstein, D. Do Defaults Save Lives?, SCIENCE. 21 Nov 2003,, Vol 302, Issue 5649, pp. 1338-1339.



Effective consent rates, by country. Explicit consent (opt-in, gold) and presumed consent (opt-out, blue).

Johnson, EJ, Goldstein, D. Do Defaults Save Lives?, SCIENCE. 21 Nov 2003,, Vol 302, Issue 5649, pp. 1338-1339.

Choice Architecture (Nudge): Categories

Decision structure: alter the utility of choice options through their arrangement in the decision

Decision information: increase the availability, comprehensibility, and/or personal relevance of information

Decision assistance: facilitate self-regulation

Mertens S, Herberz M, Hahnel UJJ, Brosch T. The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. Proc Natl Acad Sci USA. 2022;119(1):e2107346118.

Choice Architecture (Nudge): Categories

Decision structure

- Setting a default option.
- Changing the ease of choosing certain options: either making a good option easier to choose, or a bad option harder to choose.
- Changing the salience of certain options: either making a good option more noticeable, or a bad option less noticeable.

Mertens S, Herberz M, Hahnel UJJ, Brosch T. The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. Proc Natl Acad Sci USA. 2022;119(1):e2107346118.

Choice Architecture (Nudge): Categories

Decision information

Provide social reference point. Initial piece of information that people rely on strongly when making subsequent judgments and decisions.

For example, a charity soliciting donations can tell donors that “most people donate $20”, in order to nudge people to donate more money than they would otherwise.

Make information visible

Provide access to relevant information.

Mertens S, Herberz M, Hahnel UJJ, Brosch T. The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. Proc Natl Acad Sci USA. 2022;119(1):e2107346118.

Choice Architecture (Nudge): Categories

Decision assistance

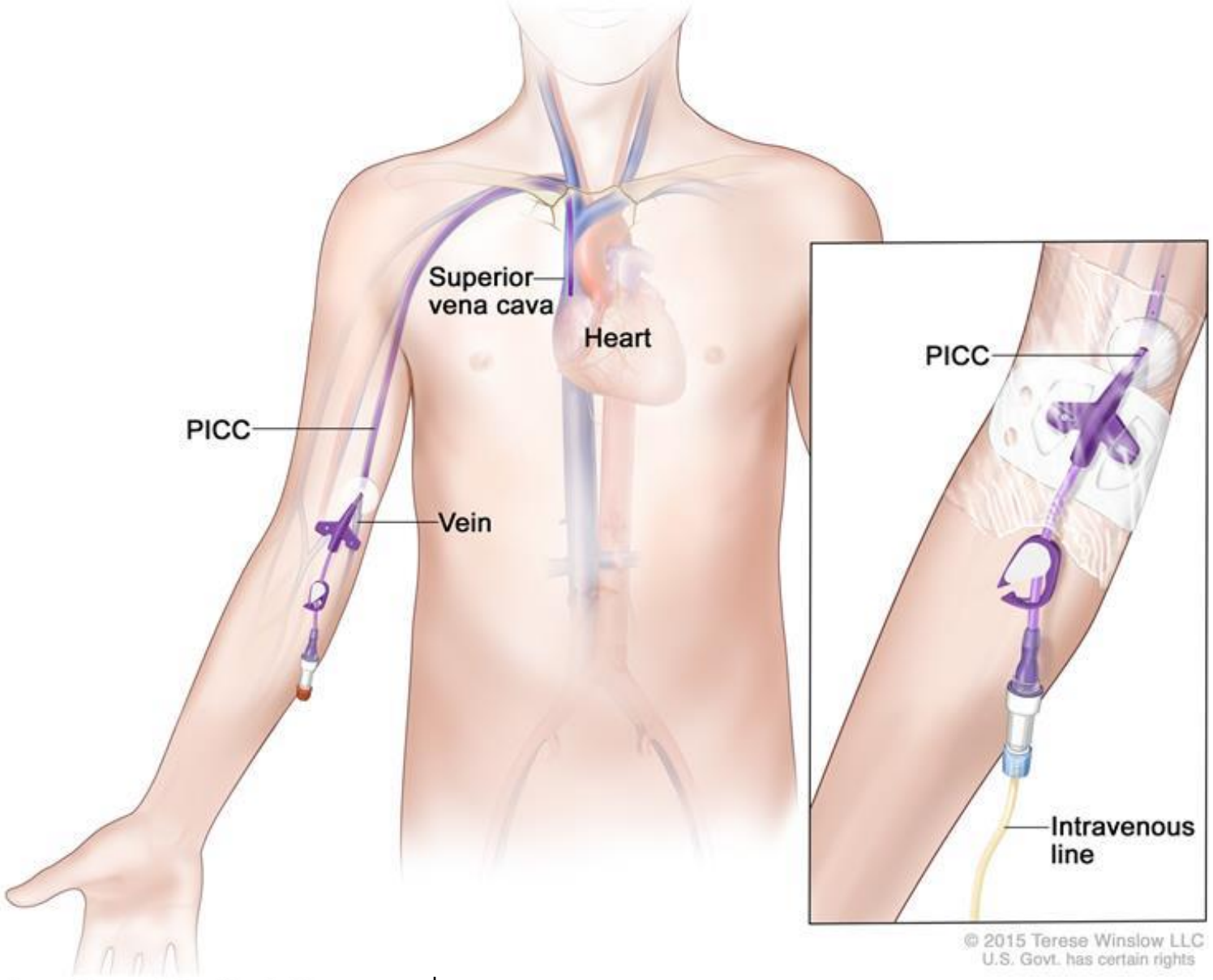
Reminding people to do something.

Change option consequences: adjusting incentives or consequences of a specific behavior.

Facilitate commitment: Encourage self or public commitment to counteract failures of self-control.

Mertens S, Herberz M, Hahnel UJJ, Brosch T. The effectiveness of nudging: A meta-analysis of choice architecture interventions across behavioral domains. Proc Natl Acad Sci USA. 2022;119(1):e2107346118.

Peripherally Inserted Central Catheter (PICC)



Annals of Internal Medicine

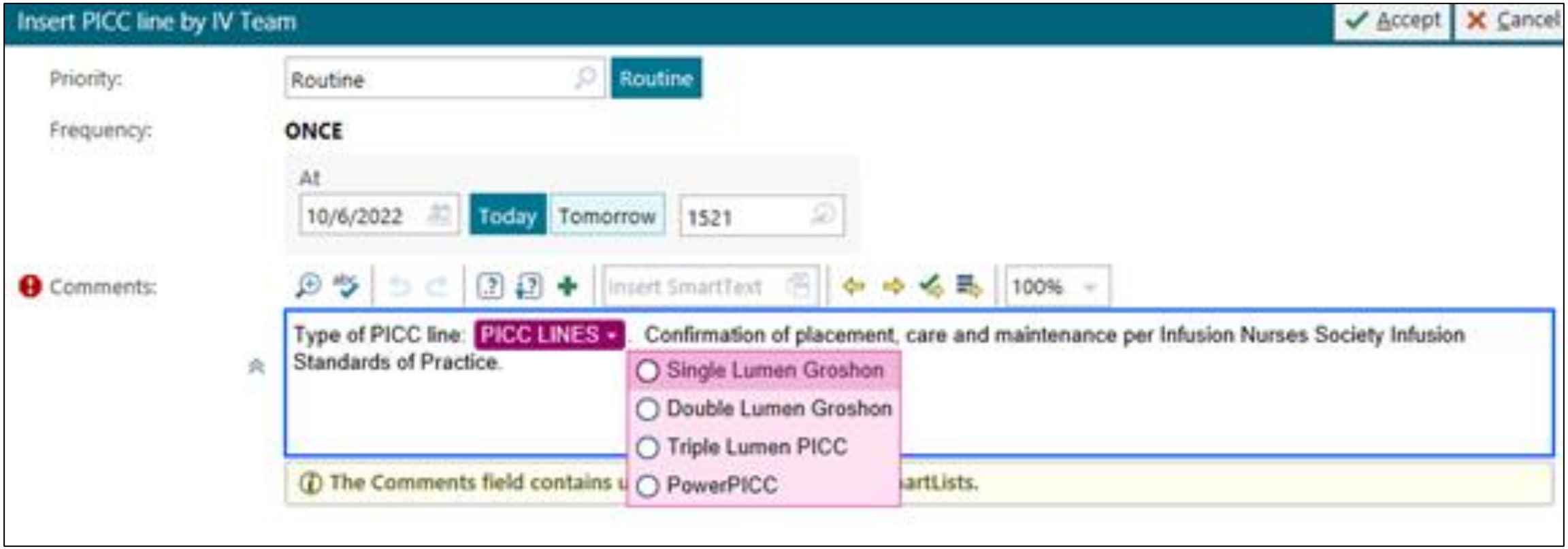
The Michigan Appropriateness Guide for Intravenous Catheters (MAGIC): Results From a Multispecialty Panel Using the RAND/UCLA Appropriateness Method

Vineet Chopra, MD, MSc; Scott A. Flanders, MD; Sanjay Saint, MD, MPH; Scott C. Woller, MD; Naomi P. O'Grady, MD; Nasia Safdar, MD, PhD; Scott O. Trerotola, MD; Rajiv Saran, MD, PhD; Nancy Moureau, BSN, RN; Stephen Wiseman, PharmD; Mauro Pittiruti, MD; Elie A. Akl, MD, MPH, PhD; Agnes Y. Lee, MD, MSc; Anthony Courey, MD; Lakshmi Swaminathan, MD; Jack LeDonne, MD; Carol Becker, MHSA; Sarah L. Krein, PhD, RN; and Steven J. Bernstein, MD, MPH

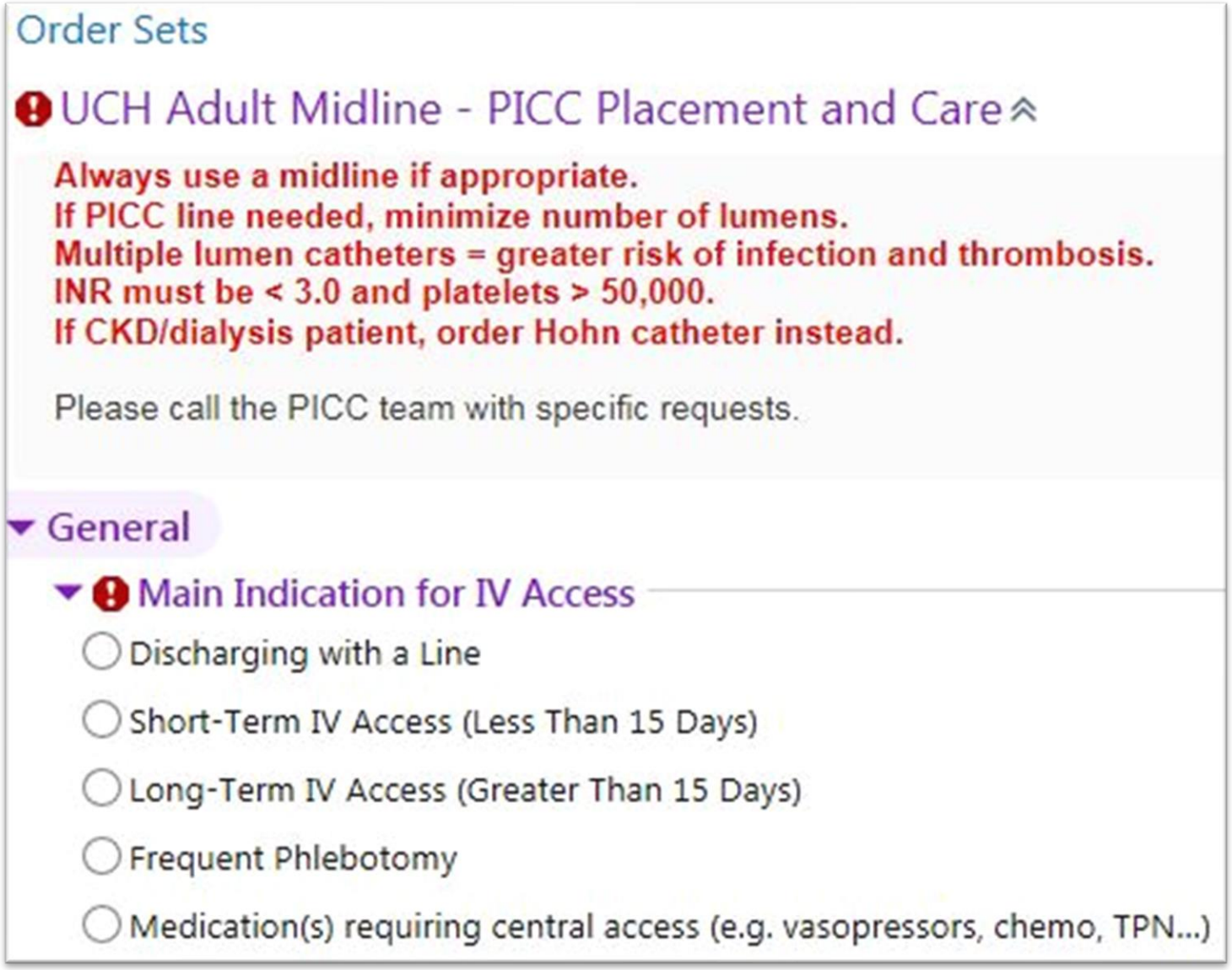
Project Goals

1. increase proportion of midline catheters
2. decrease lumens of PICCs

Chopra V, Flanders SA, Saint S, et al. The michigan appropriateness guide for intravenous catheters (Magic): results from a multispecialty panel using the rand/ucla appropriateness method. Ann Intern Med. 2015;163(6 Suppl):S1-40.



Recreation of baseline PICC order (without any guidance)



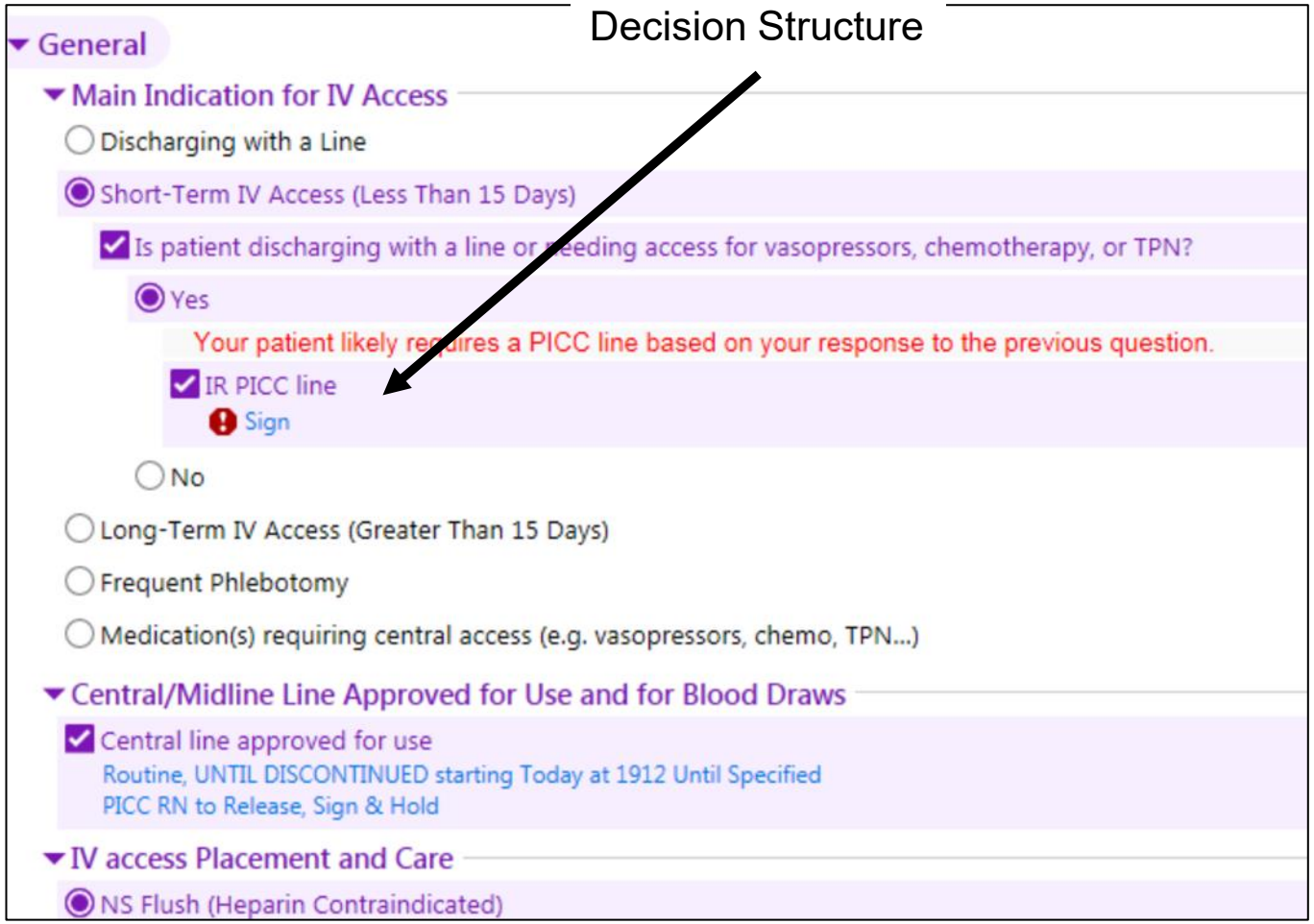
Intervention order-set

Nudge

Decision Information

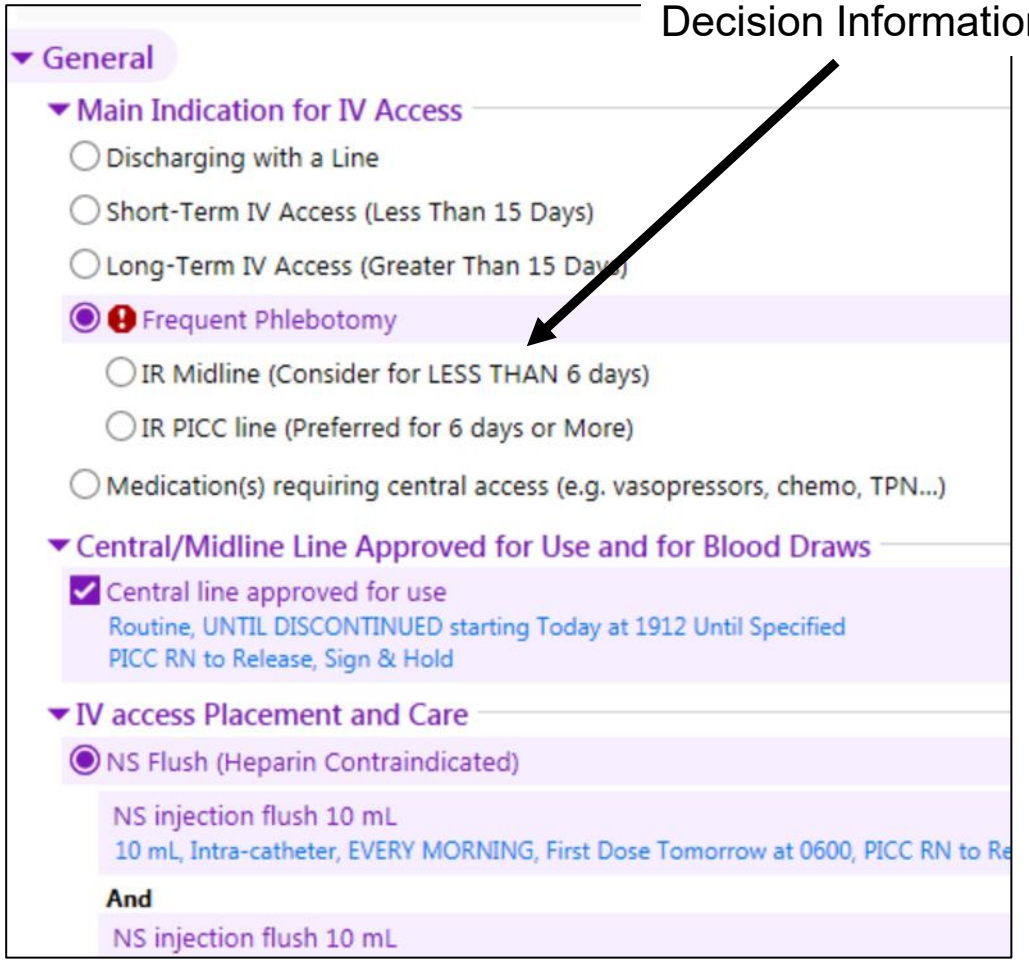
Nudge

Decision Structure

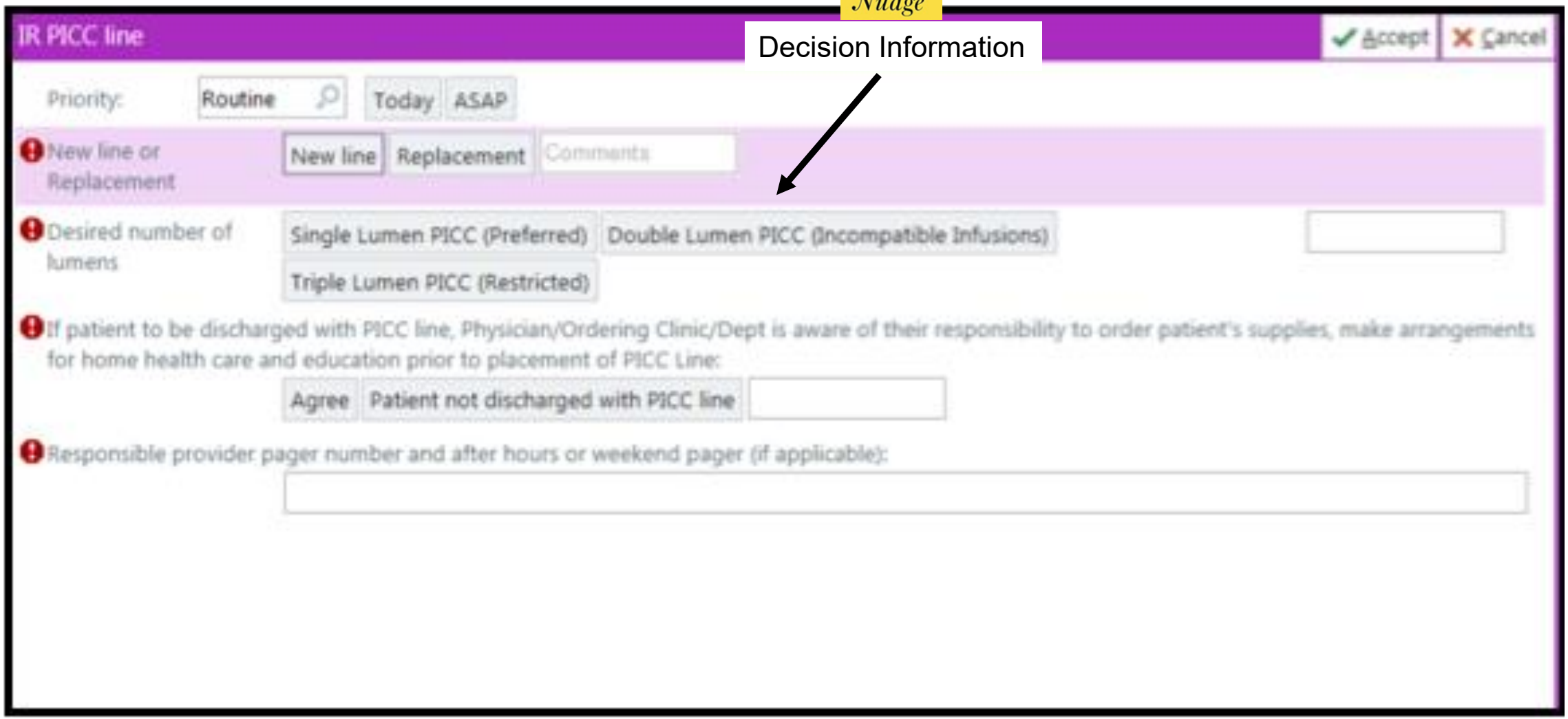


Nudge

Decision Information

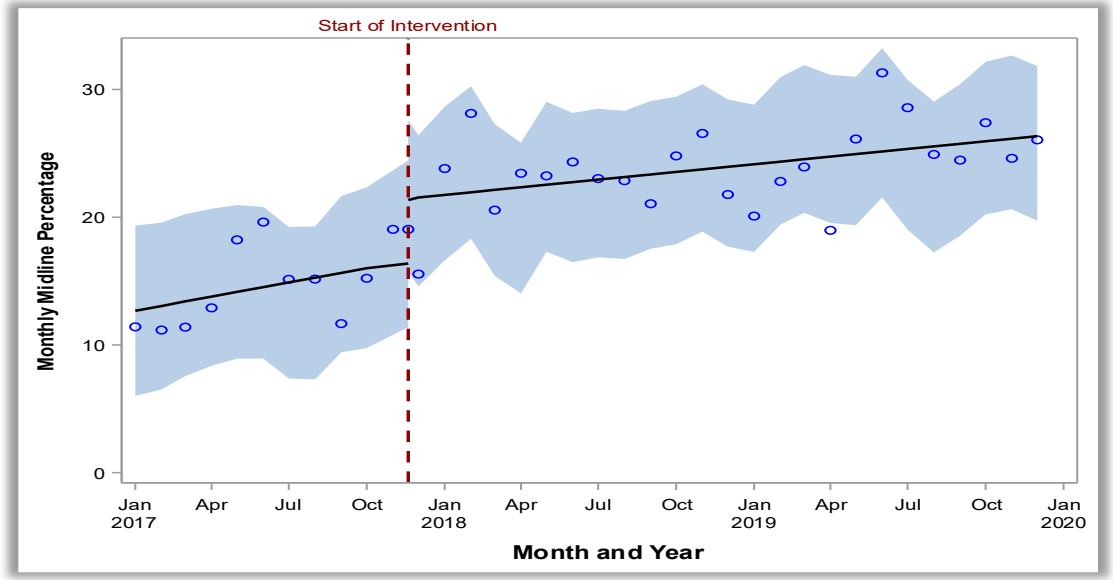


Intervention order-set (cont.)

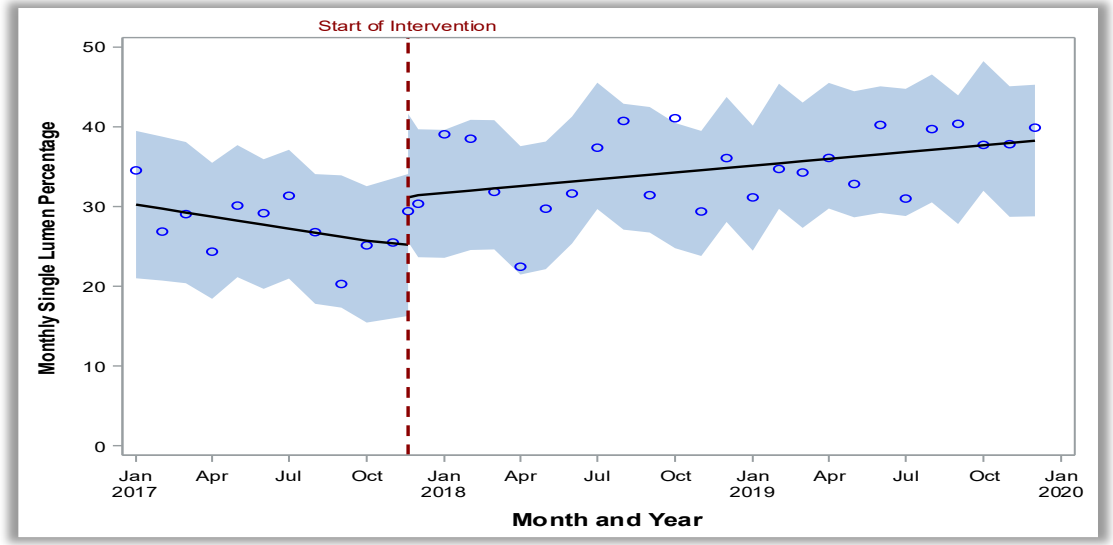


Intervention PICC order

Increased midline usage as a proportion of all lines.



Increased proportion of single lumen PICCs as a proportion of all PICCs.



Bredenberg E, et al. Promoting appropriate midline catheter and PICC placement through implementation of an EHR-based clinical decision support tool: An interrupted time-series analysis. *J Hosp Med*. 2023;18(6):483-490.


O
Rh POSITIVE
A
Rh POSITIVE
B
Rh POSITIVE
AB
Rh POSITIVE

Red Blood Cell (pRBC) Transfusion Recommendations
pRBCs are most likely APPROPRIATE in the following clinical scenarios:
• Hgb < 7 g/dL OR Hgb < 8 with CV disease AND symptoms
• Hemodynamically unstable patient with an acute bleed
• Perioperative acute blood loss anemia with expected Hgb < 7
• Cytotoxic chemotherapy with expected Hgb < 7
• Anemia with symptoms that are intolerable without transfusion
Transfuse 1 unit at a time unless Hgb <6.0 or bleeding out

COST = **~$700**
Per Unit

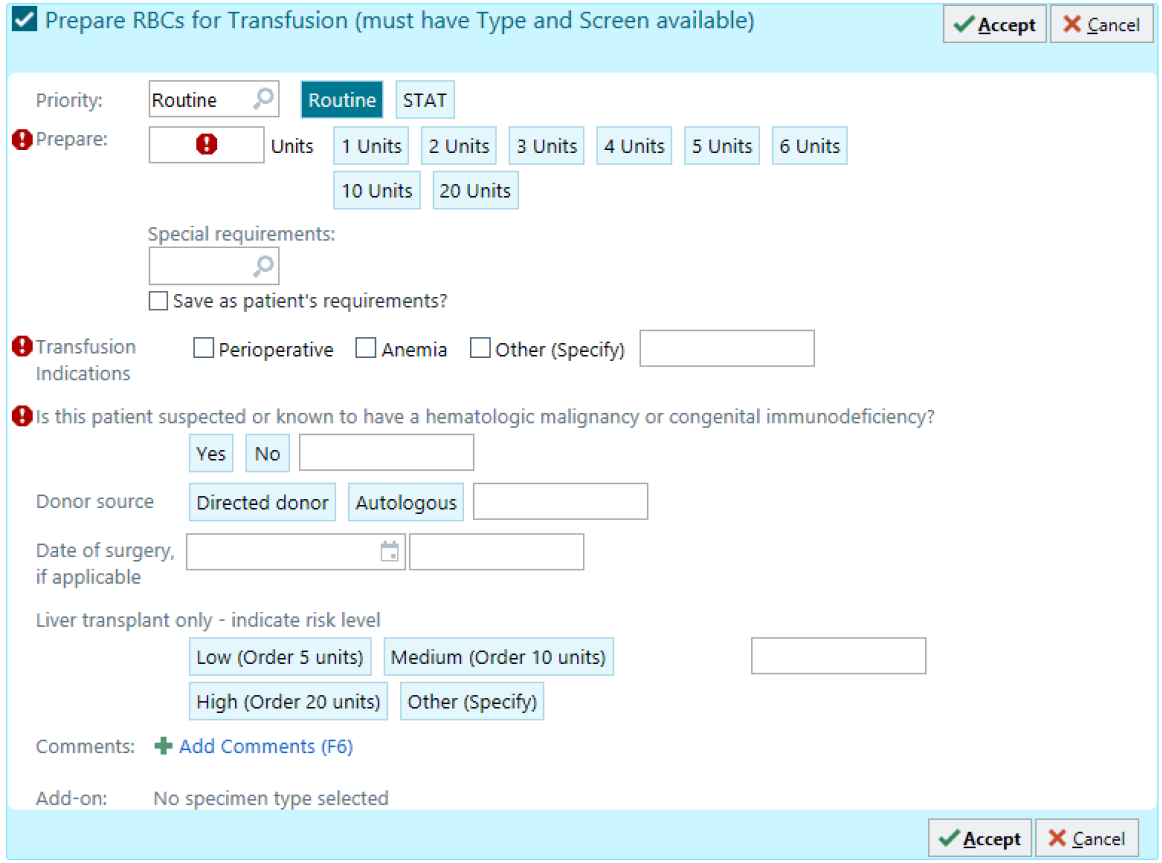
50% of non-OR, non-MTP, inpatient transfusions DID NOT meet guidelines

Prepare Order

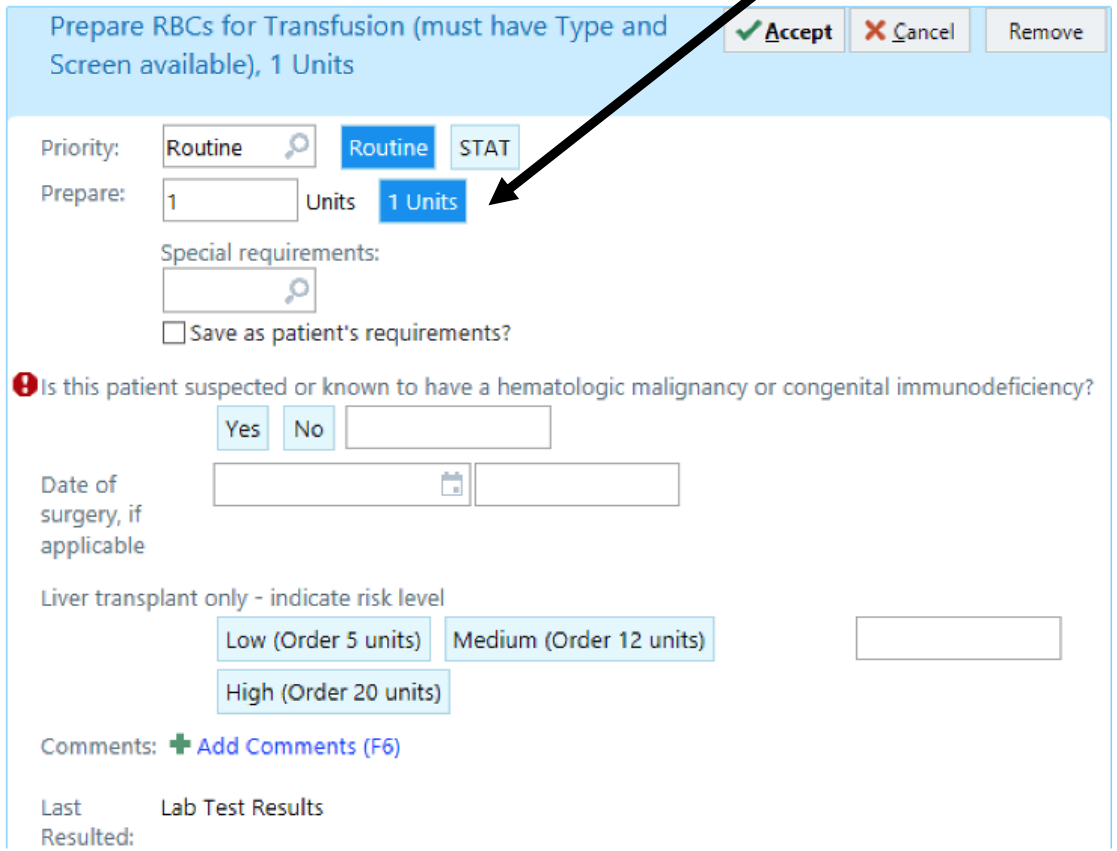
Nudge

Decision Structure

Original



Intervention

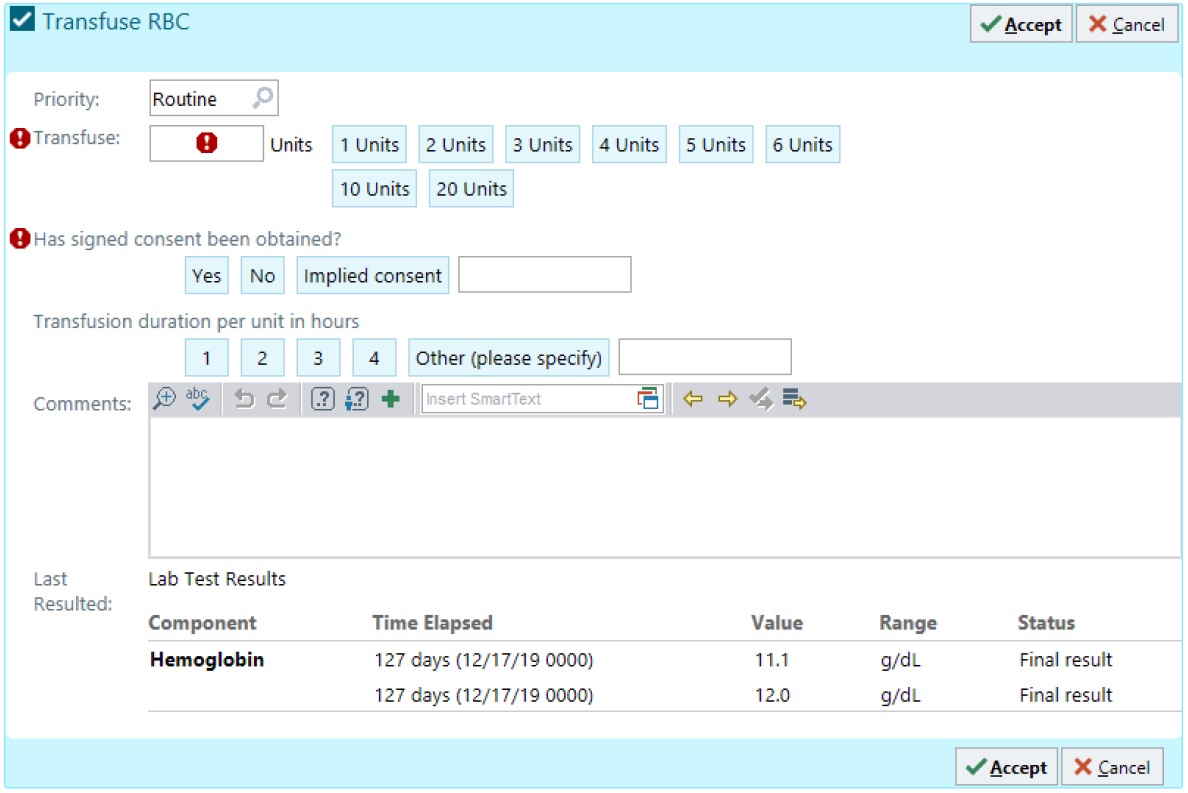


Transfuse Order

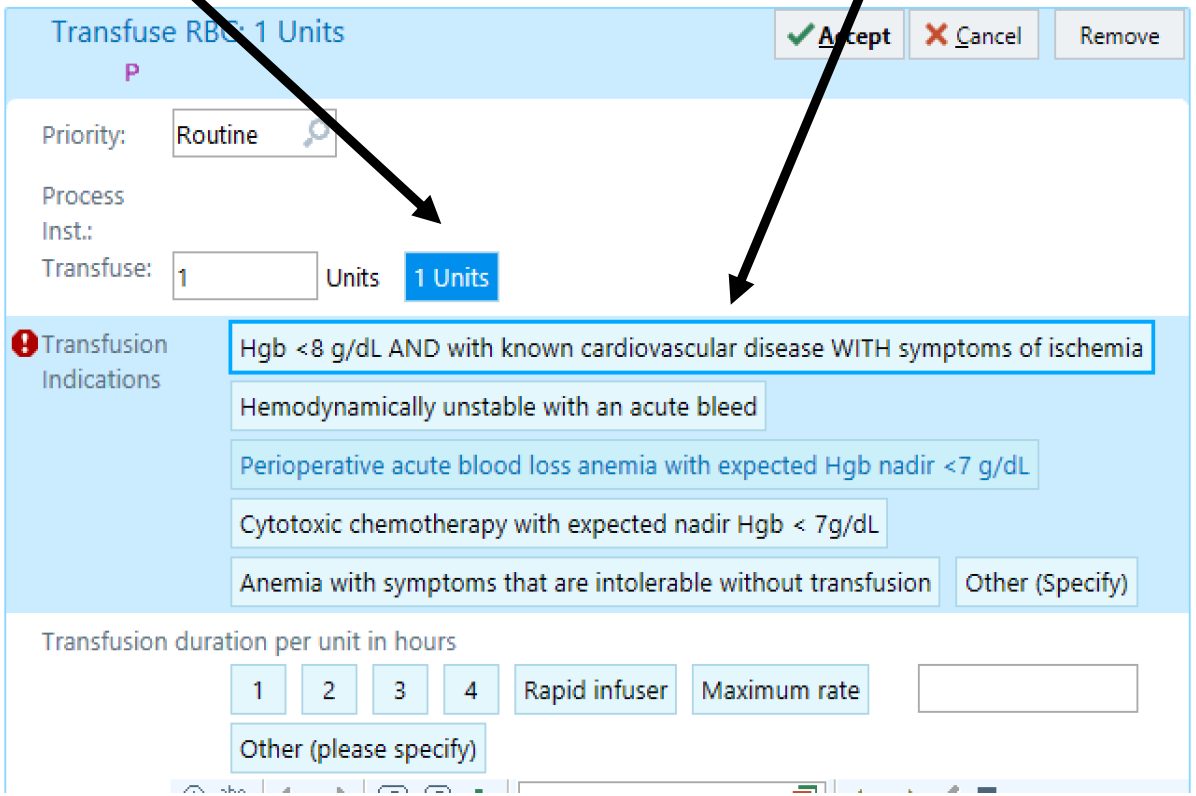
Decision Structure

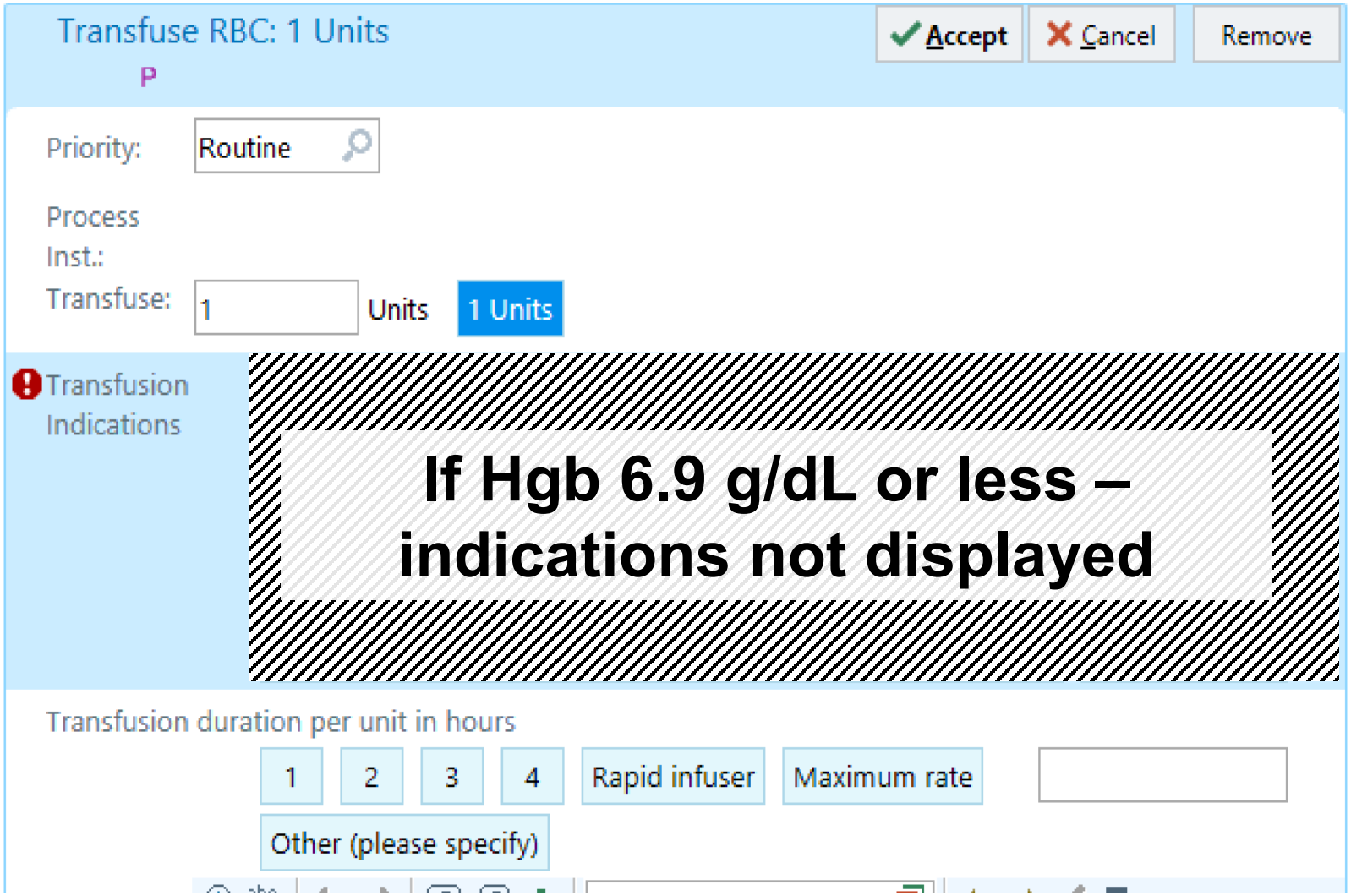
Decision Structure + Information

Original



Intervention





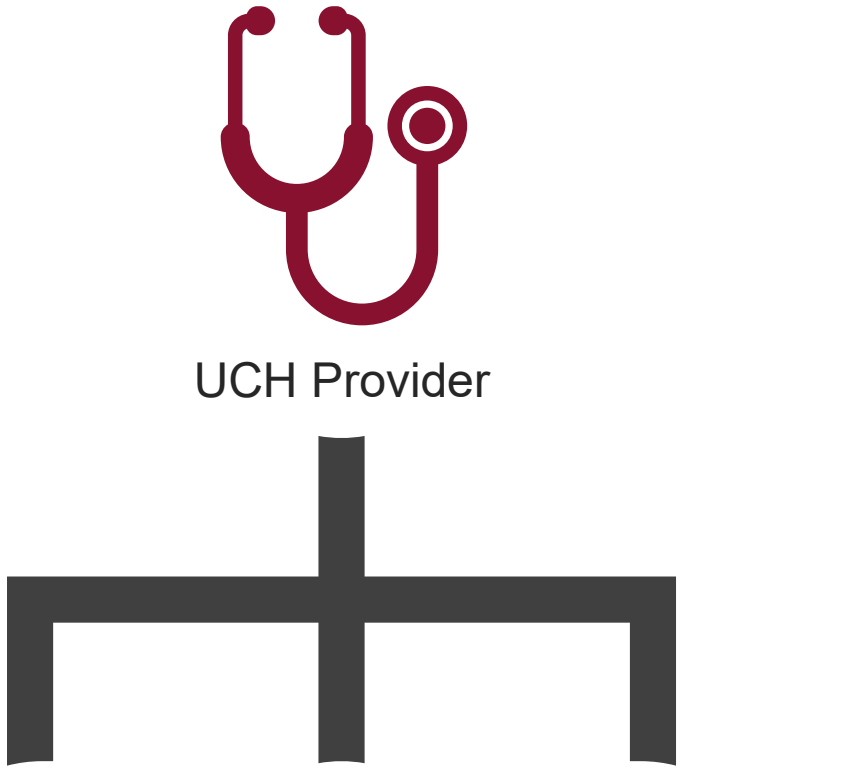
Nudge

Decision Structure

Morse B, Anstett T, et al. User-Centered Design to Reduce Inappropriate Blood Transfusion Orders. Appl Clin Inform. 2023 Jan;14(1):28-36. Epub 2023 Jan 11. PMID: 36630999

Does *overt* clinical-decision support (CDS) change provider behavior?

If so, how should it be displayed?



Order (Set) Modify	Order (Set) Modify	Order(Set) Modify
	+ **In-line CDS**	+ **Interruptive CDS**

Red Blood Cells

! Potential Patient Harm - Consider Restrictive Transfusion Strategy

Lab Results Last 3 days.

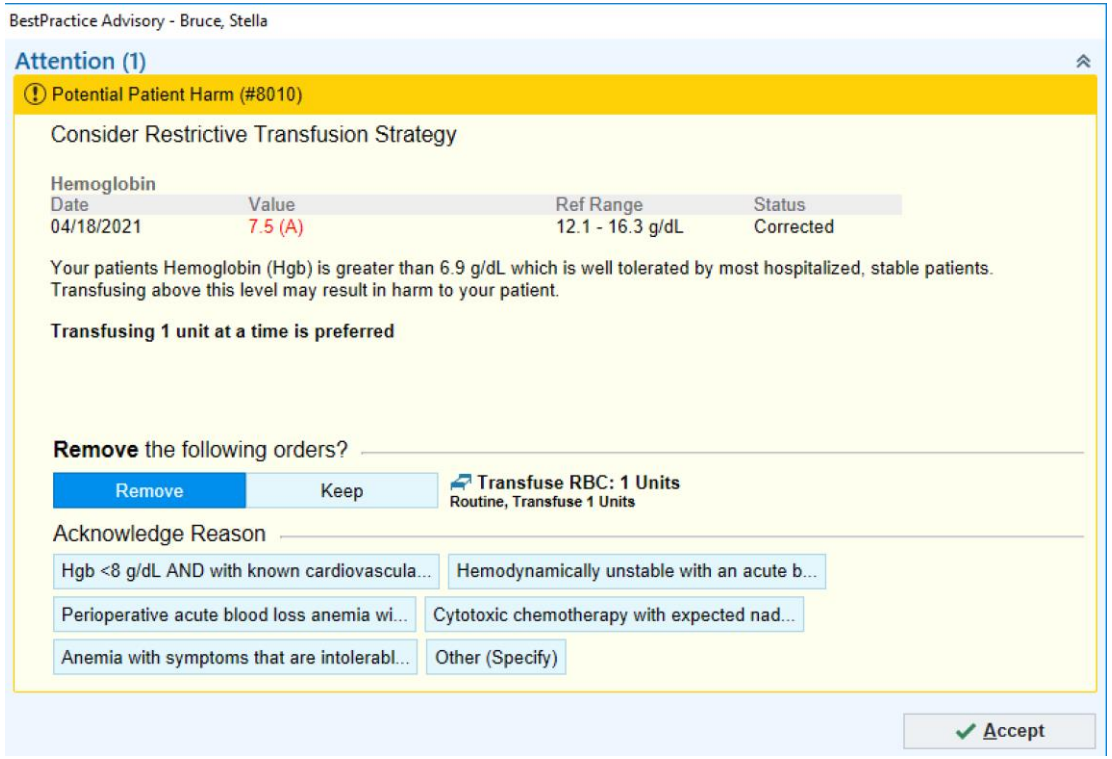
Component	Value	Date/Time
Hemoglobin	7.5 (A)	05/12/2021 2246

The Hemoglobin (Hgb) is greater than 6.9 g/dL which is tolerated by most hospitalized, stable patients. Transfusion above this level may result in harm to your patient.

Limit transfusions to patients:

1. Hgb <7 g/dL
2. Hgb <8 g/dL AND with known cardiovascular disease WITH symptom of ischemia
3. Hemodynamically unstable with an acute bleed
4. Preoperative acute blood loss anemia with expected Hgb nadir < 7 g/dL
5. Cytotoxic chemotherapy with expected nadir Hgb < 7g/dL
6. Anemia with symptoms that are intolerable without transfusion

Transfusing 1 Unit at a time is preferred



Non-Interruptive Conditional Alert

Interruptive Conditional Alert "BPA"

Results

Order (Set) Modify	Order (Set) Modify + **In-line CDS**	Order(Set) Modify + **Interruptive CDS**

Characteristic	**Overall, N = 10,451[1]**	**Group 1, N = 3,254[1]**	**Group 2, N = 3,675[1]**	**Group 3, N = 3,522[1]**
compliant_type				
compliant	5,239 (50.2%)	1,599 (49.2%)	1,743 (47.5%)	1,897 (53.9%
non-compliant_hgb	4,682 (44.8%)	1,503 (46.2%)	1,740 (47.4%)	1,439 (40.9%
non-compliant_units	520 (5.0%)	150 (4.6%)	189 (5.1%)	181 (5.1%)
missing	10	2	3	5

[1]n (%)

NO difference between groups

pre-intervention = 2/1/2019-4/5/2021
post-intervention = 4/6/2021-4/5/2022
NOTE: early COVID pandemic period (3/3/2020 - 8/24/2020) were removed

Results

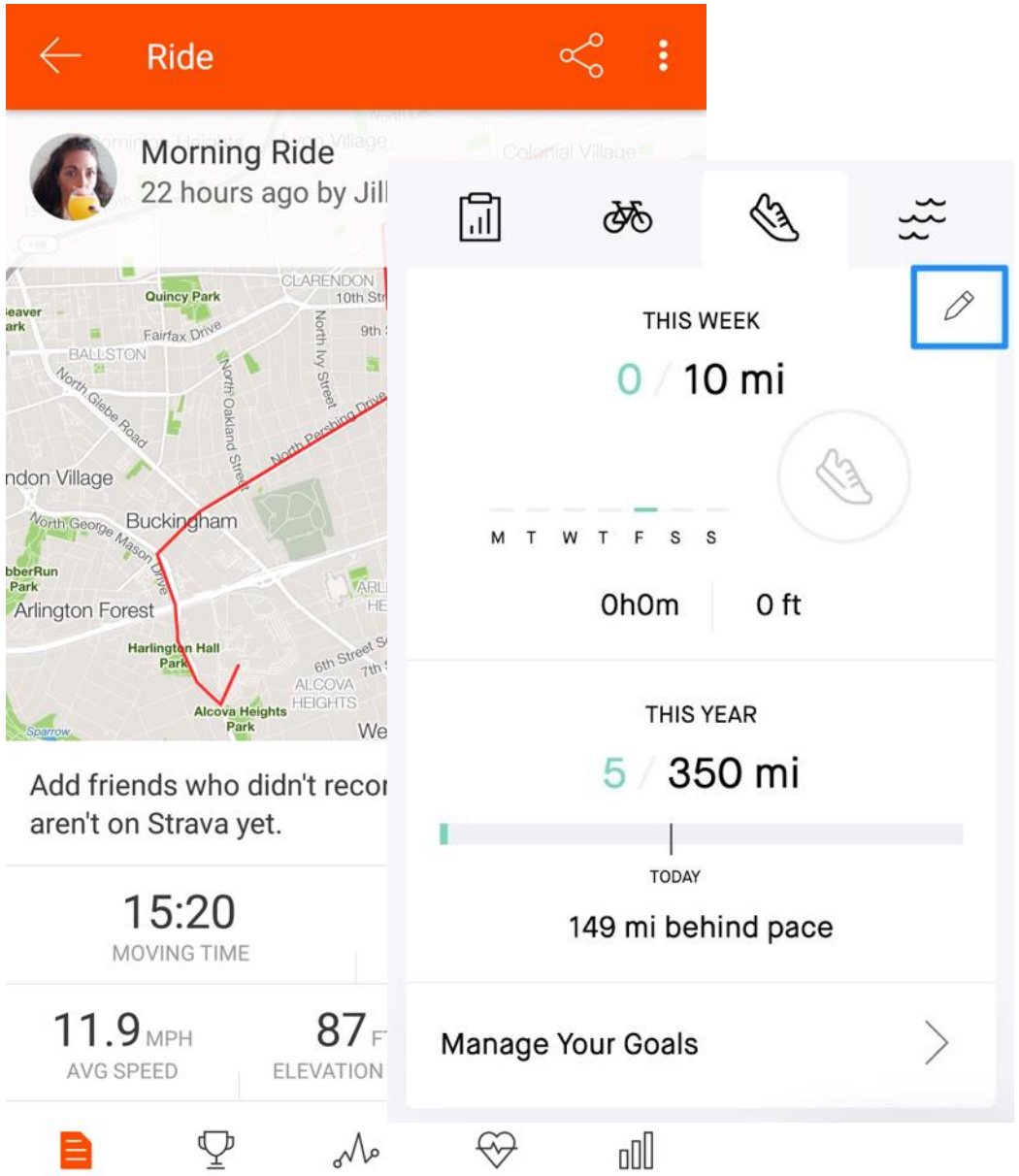
Characteristic	Overall, N = 32,032[1]	pre, N = 21,580[1]	post, N = 10,452[1]
compliant	15,055 (47.0%)	9,816 (45.5%)	5,239 (50.2%)
missing	33	23	10

[1] n (%)

Model results indicate a significant difference ($p < 0.001$) in compliance between the pre period and the post period, after accounting for linear time and provider.

Estimated number of units “saved” in one-year

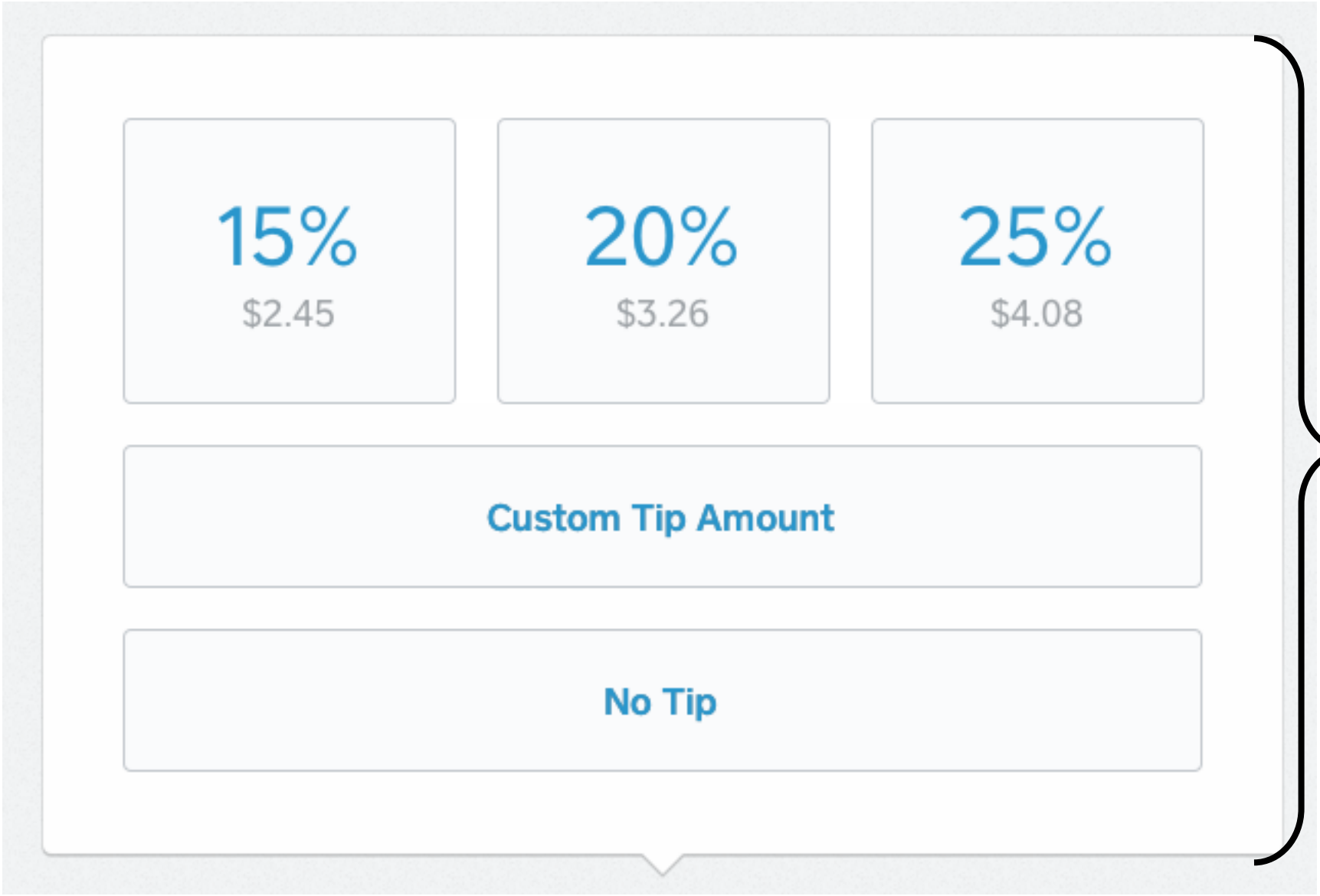
1827



Nudge

Decision Assistance

Facilitate commitment: Encourage self and/or public commitment



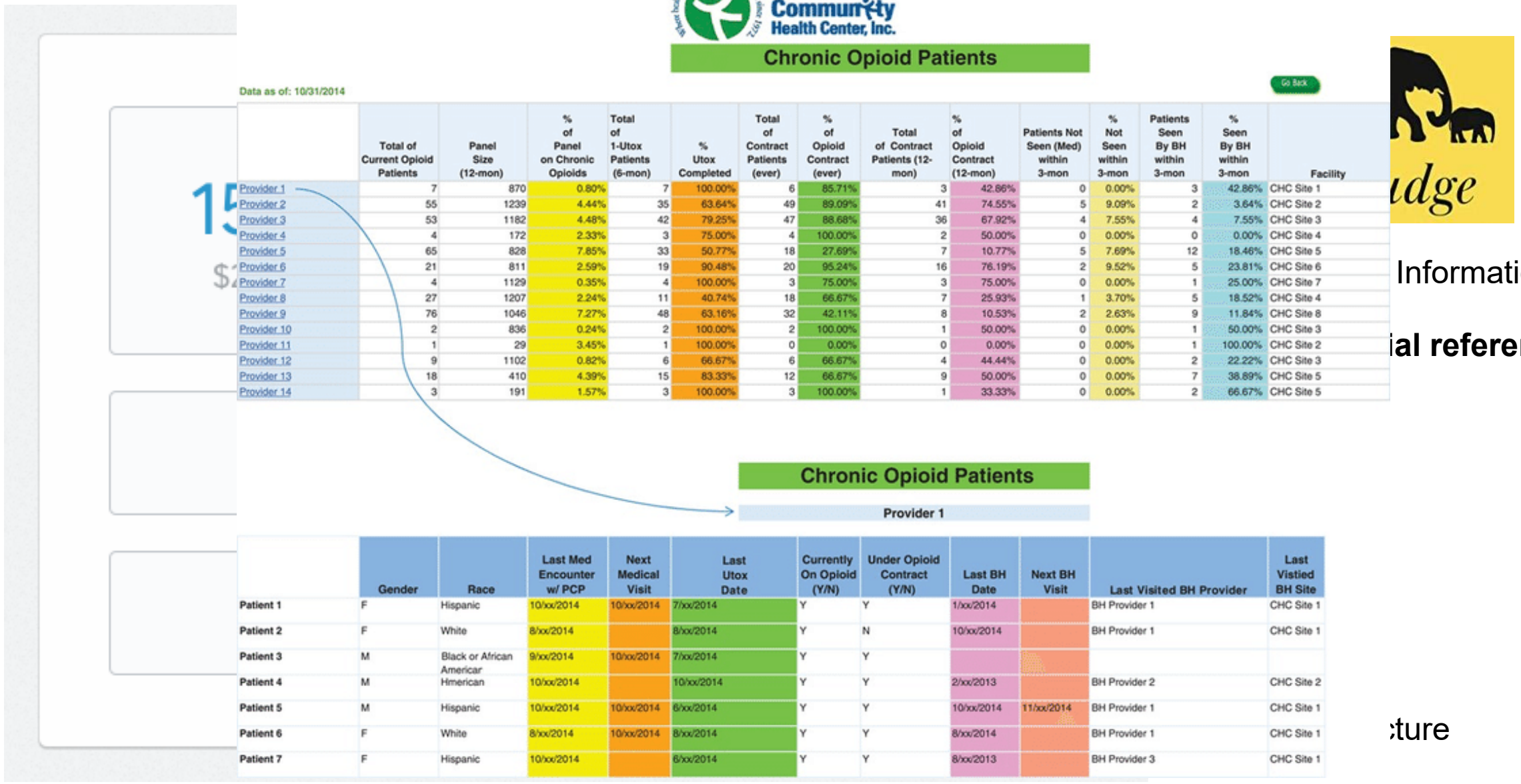
Nudge

Decision Information

Provide social reference point.

Nudge

Decision Structure



	Total of Current Opioid Patients	Panel Size (12-mon)	% of Panel on Chronic Opioids	Total of 1-Utox Patients (6-mon)	% Utox Completed	Total of Contract Patients (ever)	% of Opioid Contract (ever)	Total of Contract Patients (12-mon)	% of Opioid Contract (12-mon)	Patients Not Seen (Med) within 3-mon	% Not Seen within 3-mon	Patients Seen By BH within 3-mon	% Seen By BH within 3-mon	Facility
Provider 1	7	870	0.80%	7	100.00%	6	85.71%	3	42.86%	0	0.00%	3	42.86%	CHC Site 1
Provider 2	55	1239	4.44%	35	63.64%	49	89.09%	41	74.55%	5	9.09%	2	3.64%	CHC Site 2
Provider 3	53	1182	4.48%	42	79.25%	47	88.68%	36	67.92%	4	7.55%	4	7.55%	CHC Site 3
Provider 4	4	172	2.33%	3	75.00%	4	100.00%	2	50.00%	0	0.00%	0	0.00%	CHC Site 4
Provider 5	65	828	7.85%	33	50.77%	18	27.69%	7	10.77%	5	7.69%	12	18.46%	CHC Site 5
Provider 6	21	811	2.59%	19	90.48%	20	95.24%	16	76.19%	2	9.52%	5	23.81%	CHC Site 6
Provider 7	4	1129	0.35%	4	100.00%	3	75.00%	3	75.00%	0	0.00%	1	25.00%	CHC Site 7
Provider 8	27	1207	2.24%	11	40.74%	18	66.67%	7	25.93%	1	3.70%	5	18.52%	CHC Site 4
Provider 9	76	1046	7.27%	48	63.16%	32	42.11%	8	10.53%	2	2.63%	9	11.84%	CHC Site 8
Provider 10	2	836	0.24%	2	100.00%	2	100.00%	1	50.00%	0	0.00%	1	50.00%	CHC Site 3
Provider 11	1	29	3.45%	1	100.00%	0	0.00%	0	0.00%	0	0.00%	1	100.00%	CHC Site 2
Provider 12	9	1102	0.82%	6	66.67%	6	66.67%	4	44.44%	0	0.00%	2	22.22%	CHC Site 3
Provider 13	18	410	4.39%	15	83.33%	12	66.67%	9	50.00%	0	0.00%	7	38.89%	CHC Site 5
Provider 14	3	191	1.57%	3	100.00%	3	100.00%	1	33.33%	0	0.00%	2	66.67%	CHC Site 5

	Gender	Race	Last Med Encounter w/ PCP	Next Medical Visit	Last Utox Date	Currently On Opioid (Y/N)	Under Opioid Contract (Y/N)	Last BH Date	Next BH Visit	Last Visited BH Provider	Last Vistied BH Site
Patient 1	F	Hispanic	10/xx/2014	10/xx/2014	7/xx/2014	Y	Y	1/xx/2014		BH Provider 1	CHC Site 1
Patient 2	F	White	8/xx/2014		8/xx/2014	Y	N	10/xx/2014		BH Provider 1	CHC Site 1
Patient 3	M	Black or African Americar	9/xx/2014	10/xx/2014	7/xx/2014	Y	Y				
Patient 4	M	Hmerican	10/xx/2014		10/xx/2014	Y	Y	2/xx/2013		BH Provider 2	CHC Site 2
Patient 5	M	Hispanic	10/xx/2014	10/xx/2014	6/xx/2014	Y	Y	10/xx/2014	11/xx/2014	BH Provider 1	CHC Site 1
Patient 6	F	White	8/xx/2014	10/xx/2014	8/xx/2014	Y	Y	8/xx/2014		BH Provider 1	CHC Site 1
Patient 7	F	Hispanic	10/xx/2014		6/xx/2014	Y	Y	8/xx/2013		BH Provider 3	CHC Site 1

Information

ial reference point.

cture

Nudge

Decision Structure

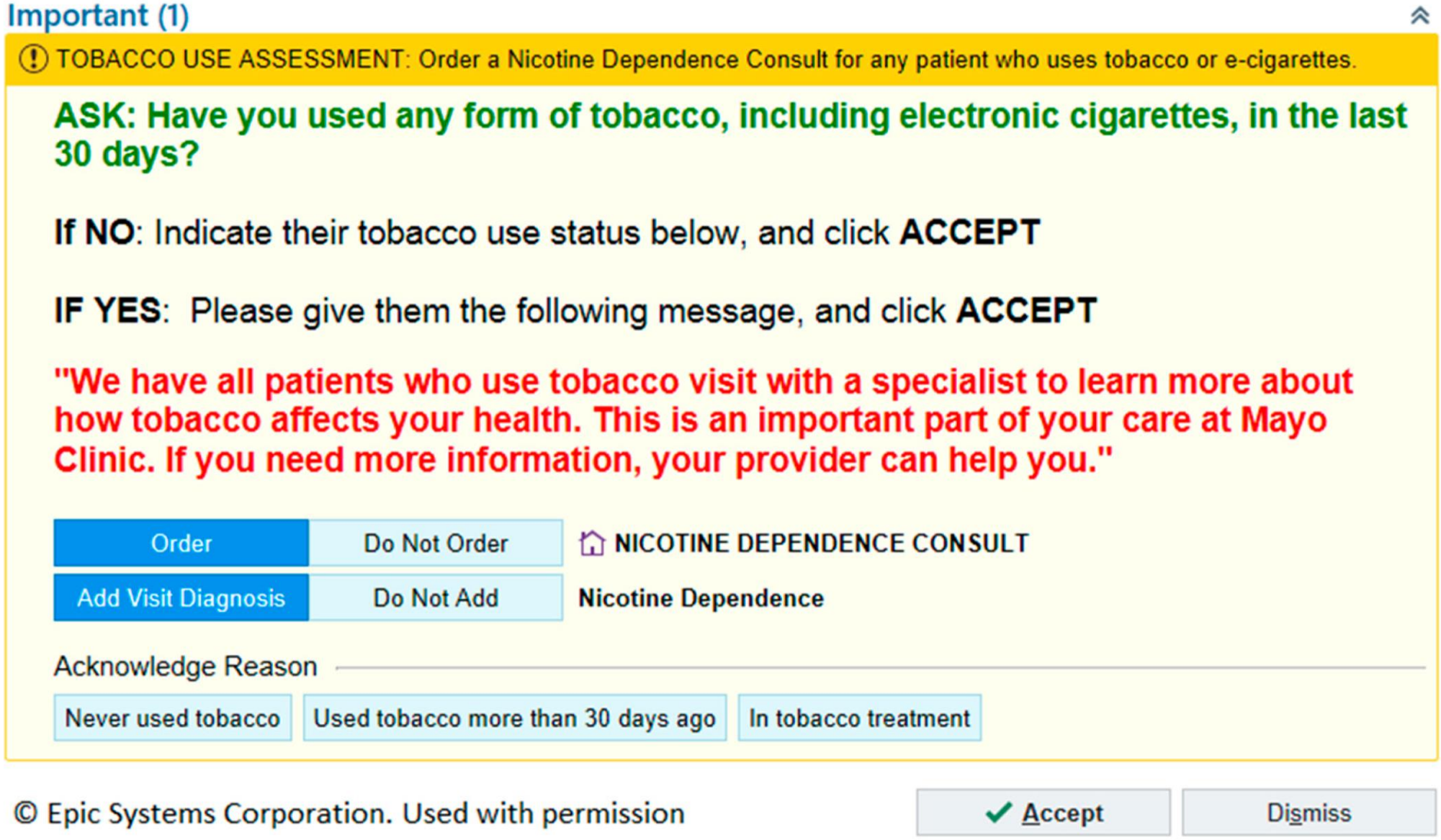
Changing the salience of certain options.


VANMOOF
ELECTRIFIED S
OUTSMART THE CITY

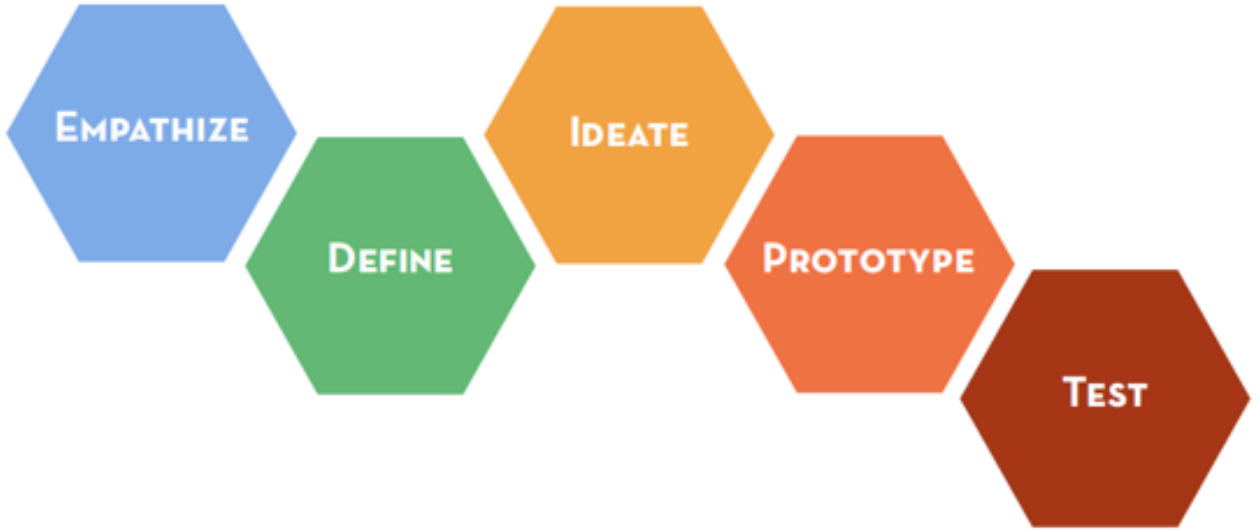
The FIVE **"Rights"** of Clinical Decision Support

The Right **Information**
…to the Right **(Person)**…
…in the Right **Format**…
…through the Right **Channel**…
…at the Right **Point in the Workflow**.

Osheroff et al. *Improving Outcomes with Clinical Decision Support: An Implementer's Guide.* HIMSS Publication. 2005



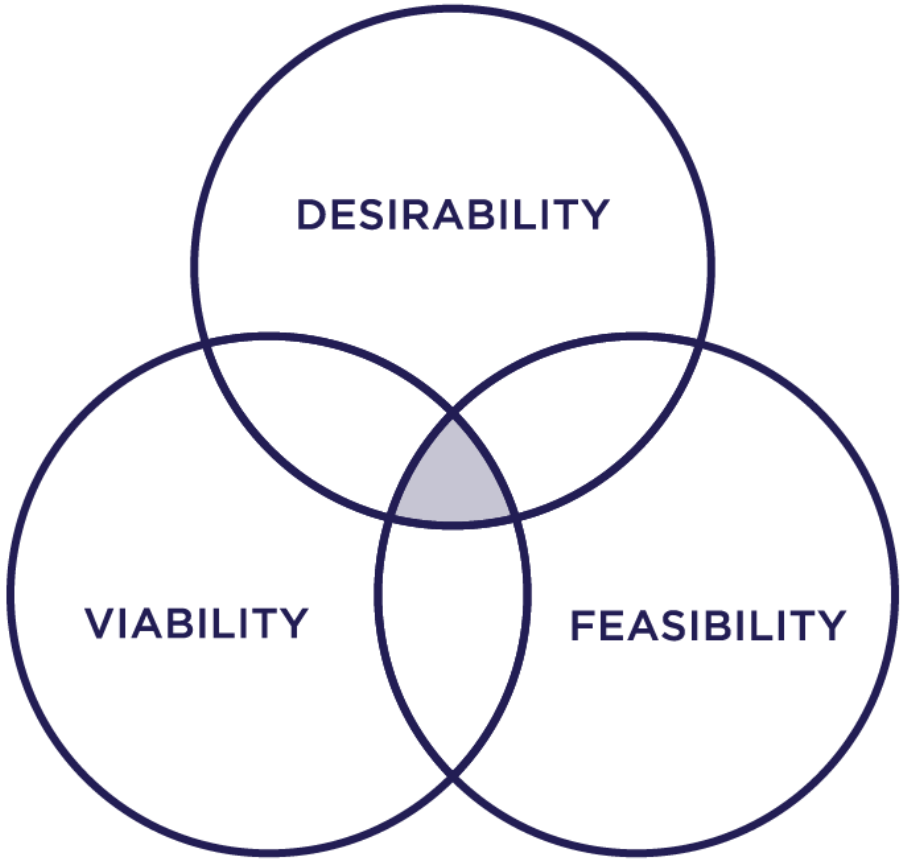
Jose T, et al. Design and Pilot Implementation of an Electronic Health Record-Based System to Automatically Refer Cancer Patients to Tobacco Use Treatment. *International Journal of Environmental Research and Public Health*. 2020; 17(11):4054.



Design Thinking

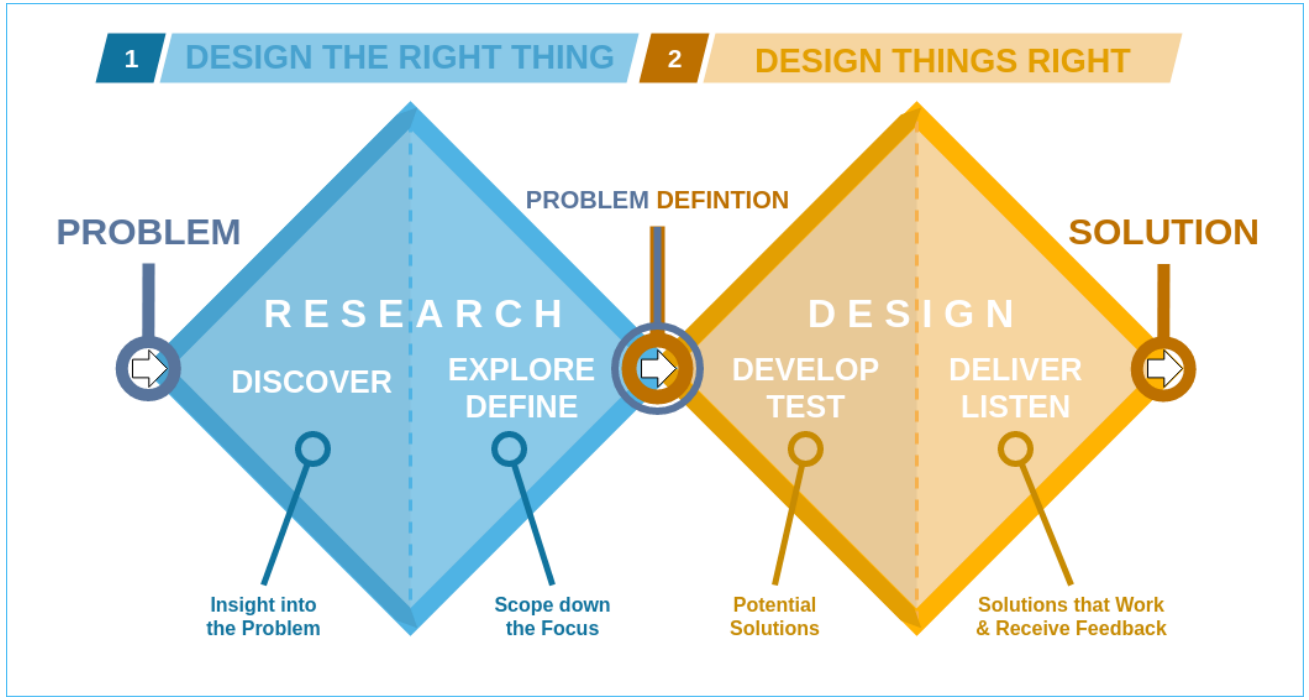
Producing the best design *with* your users.

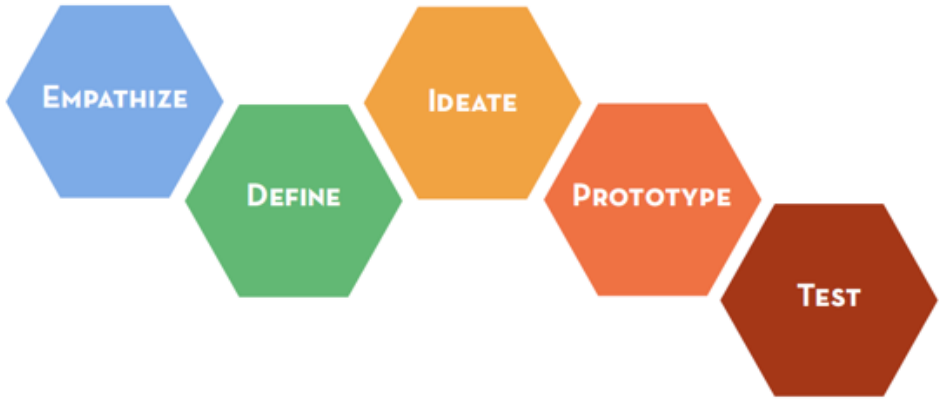
Slides adapted from Sam Porter, MD

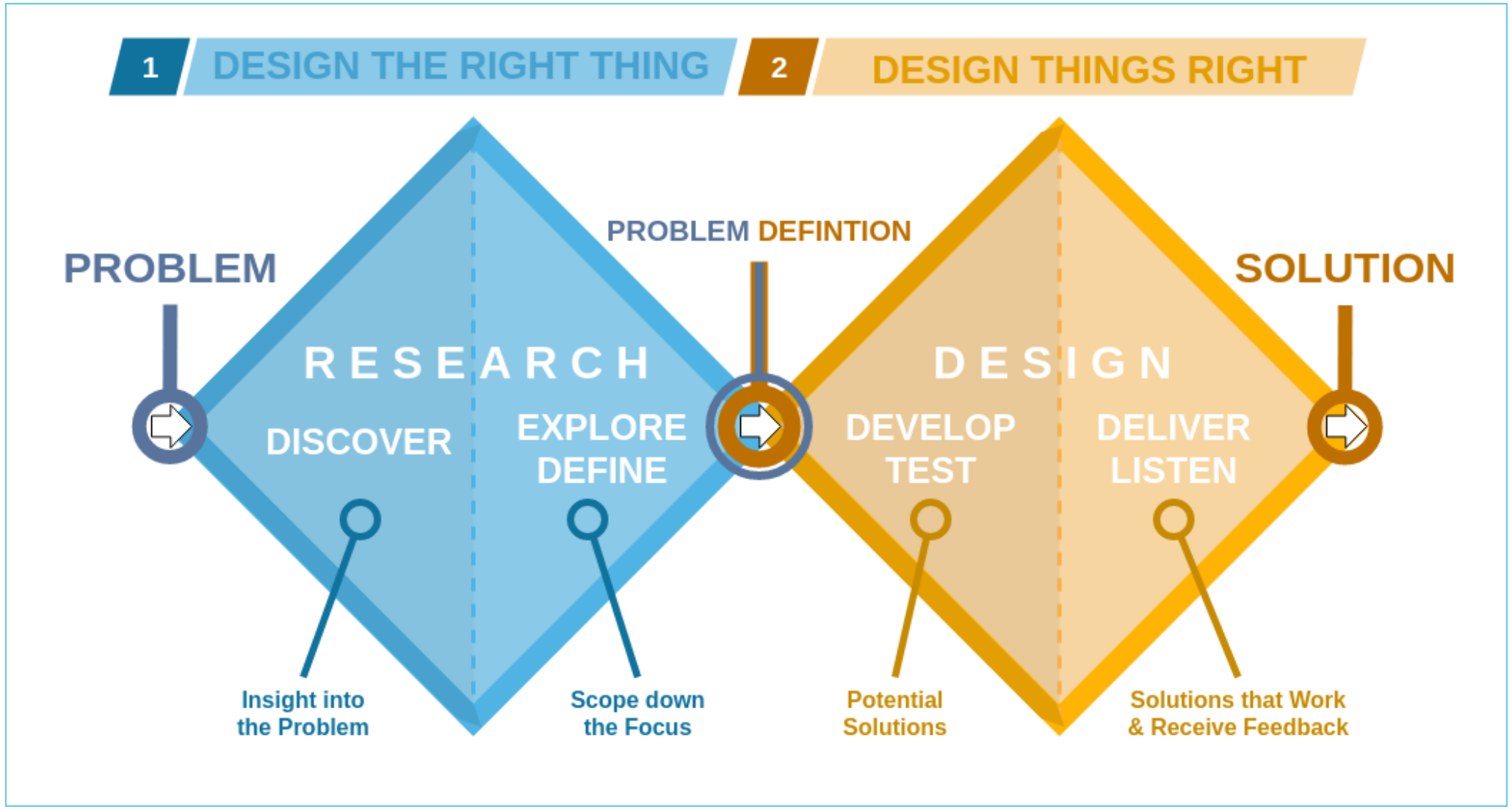


Design thinking brings together what is **desirable** from a human point of view with what is technologically **feasible** and economically **viable**.

https://www.ideou.com/pages/design-thinking


1
DESIGN THE RIGHT THING
2
DESIGN THINGS RIGHT
PROBLEM
PROBLEM DEFINTION
SOLUTION
RESEARCH
DESIGN
DISCOVER
EXPLORE
DEFINE
DEVELOP
TEST
DELIVER
LISTEN
Insight into the Problem
Scope down the Focus
Potential Solutions
Solutions that Work & Receive Feedback


EMPATHIZE
DEFINE
IDEATE
PROTOTYPE
TEST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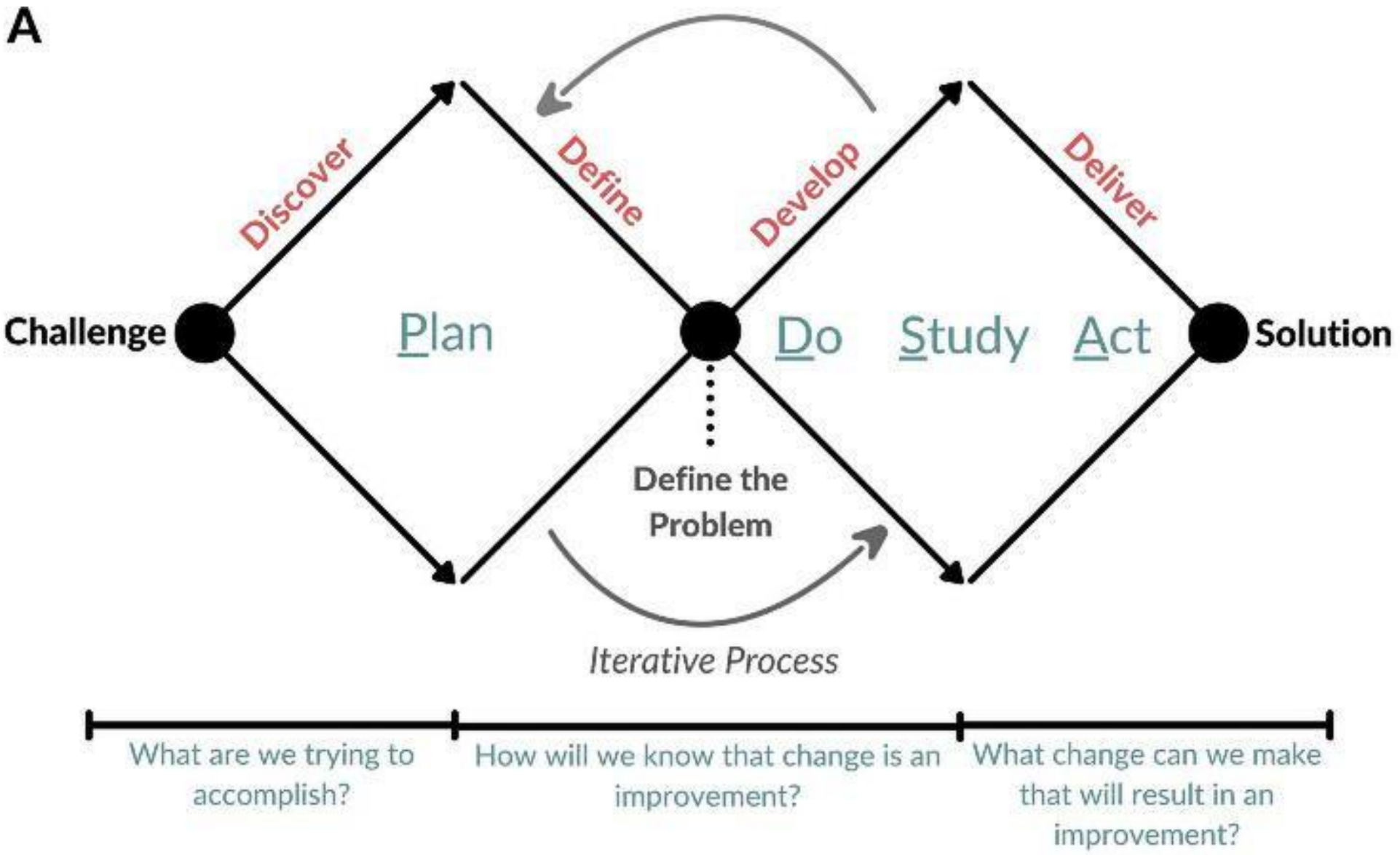
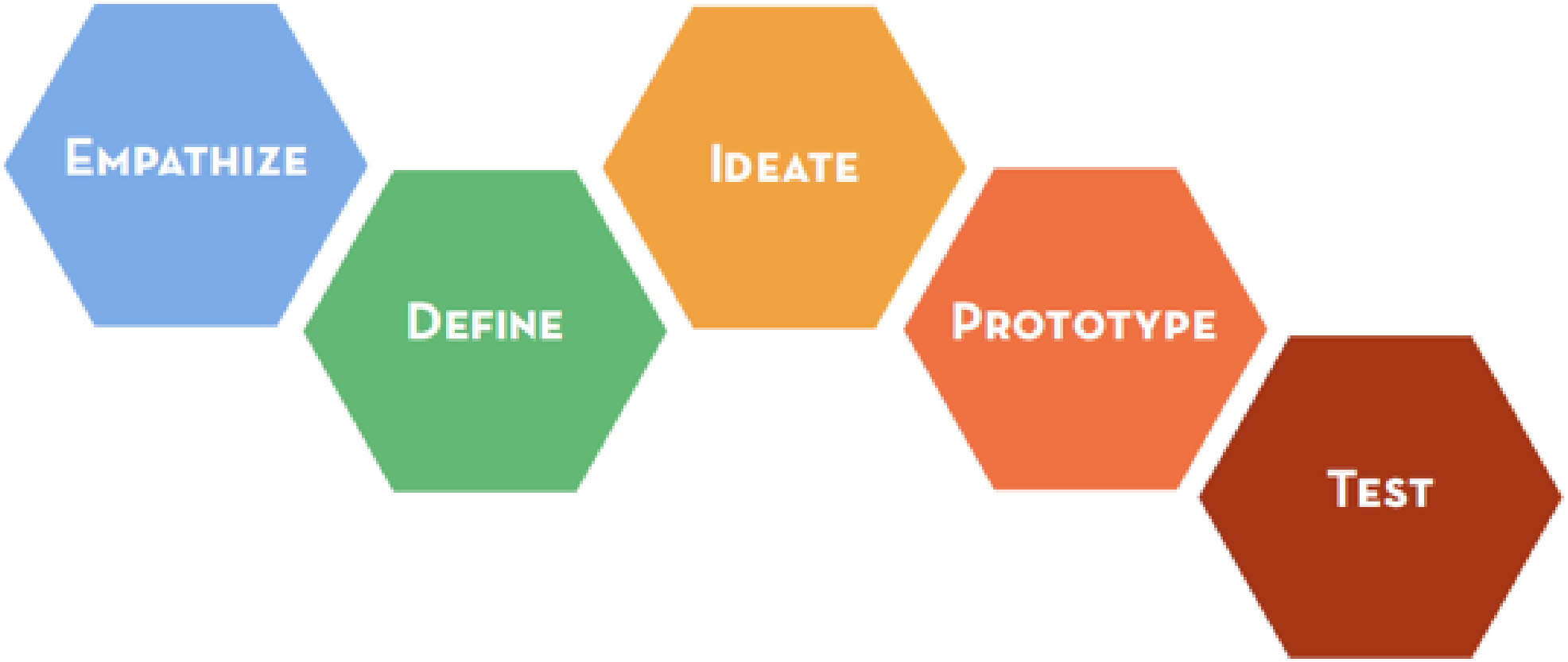


Crowe B, et al. To improve quality, leverage design. BMJ Qual Saf. 2022 Jan;31(1):70-74. PMID: 34510018;

The Design Thinking process…

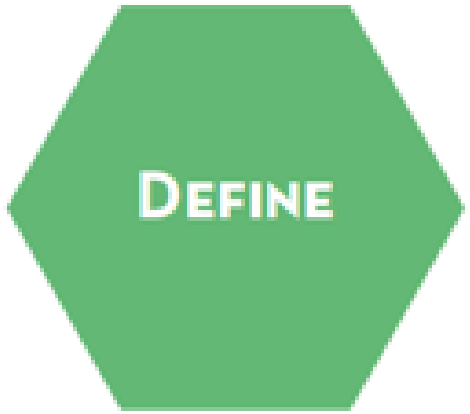


https://www.ideo.com/works/this-startup-revolutionized-an-industry-through-design

EMPATHIZE

"Standing in long lines at the pharmacy, keeping up with expiration dates, making sure you take this medicine with food and that one on an empty stomach—it can be overwhelming."

https://www.cnbc.com/2019/09/21/amazon-pillpack-empathy-training-shows-employees-what-customers-feel.html



The World Health Organization estimates that roughly 50 percent of patients in the US with chronic illnesses don't take that medication exactly as prescribed—mistakes that can be deadly.

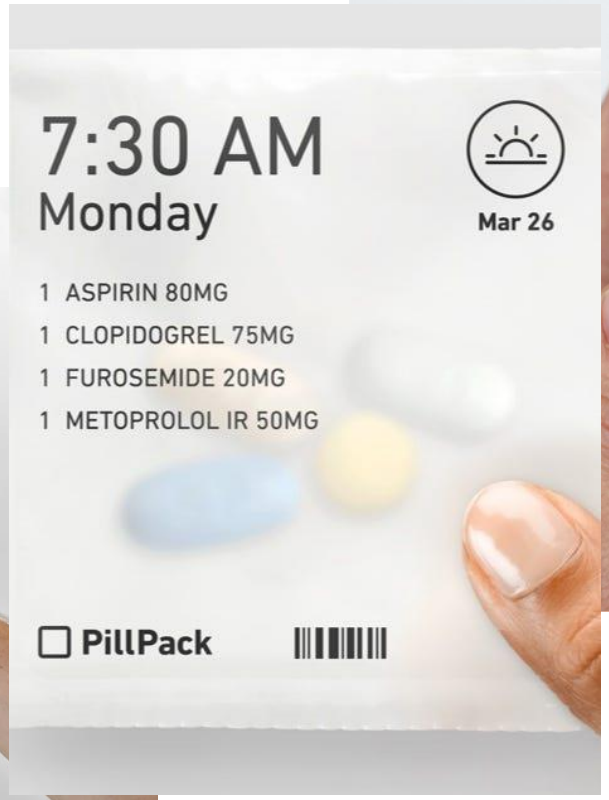
- Patients often are confused about medication dosing and timing.
- Patients are frustrated with their current prescription management.

https://www.wired.com/story/pillpack-pharmacy-of-the-future-is-ready-for-your-bathroom/

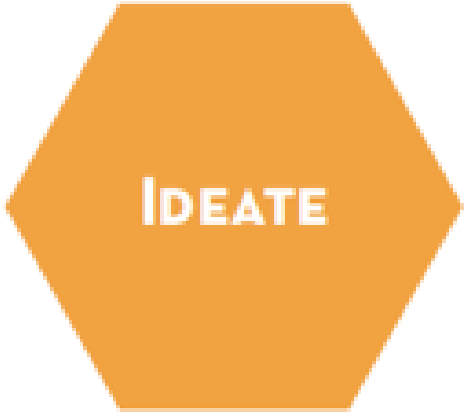
IDEATE

PROTOTYPE

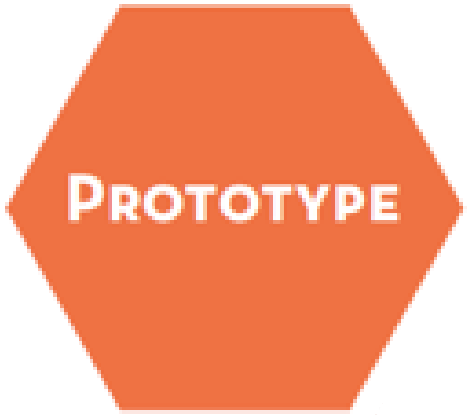
TEST



https://www.ideo.com/works/this-startup-revolutionized-an-industry-through-design



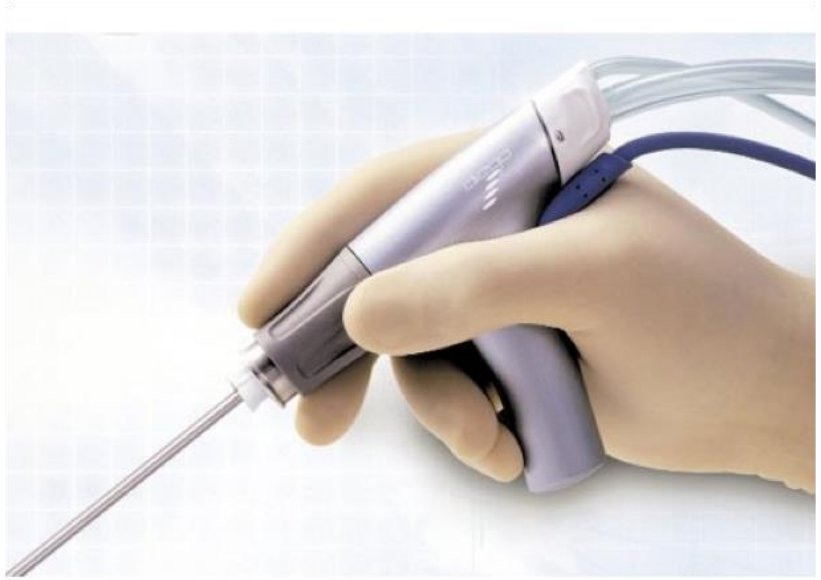
Ideation is a process of “going wide” in terms of concepts and outcomes to explore a wide solution space – both a **large quantity and broad diversity of ideas.**

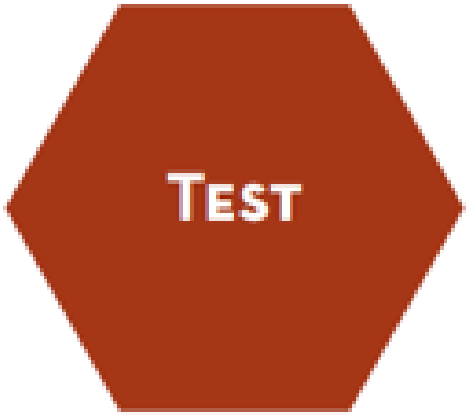


Prototyping is getting projects out of your head and into the world – allowing your users to interact and give feedback.

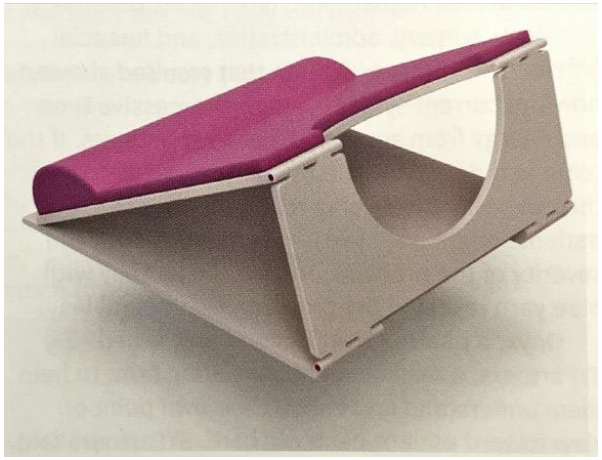
Done with low budget, interactive, tangible items.

PROTOTYPE





Testing allows gathering feedback and refining the solutions.



Breakout #1

15 minutes

IDEATE

1. Introduce yourself and the problem you are trying to solve.

2. Brainstorm at least THREE possible interventions.

- Based on your problem understanding.
- One must ”defy gravity”
- One must be a nudge.

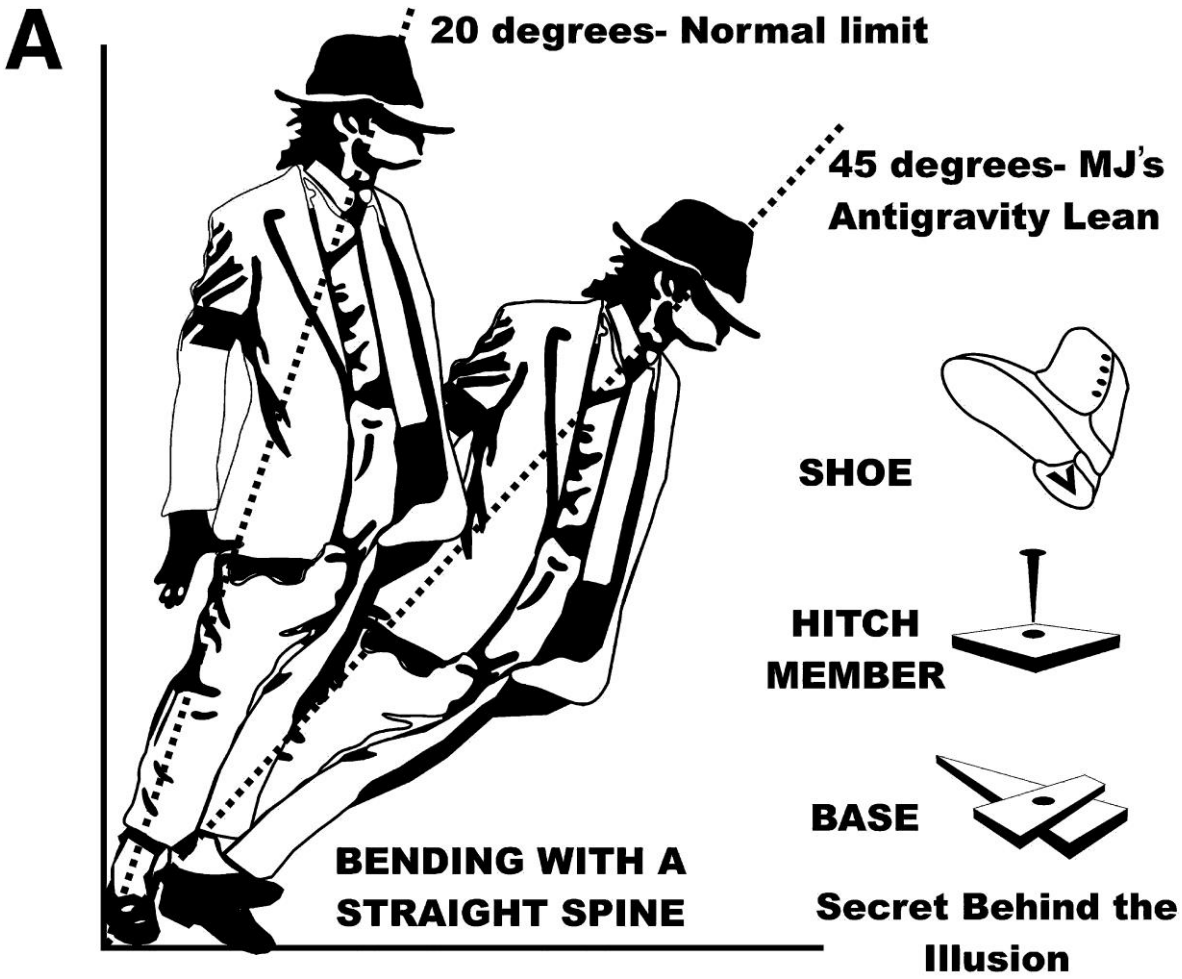


Photo Source: https://www.npr.org/sections/therecord/2018/05/22/613306407/michael-jacksons-gravity-defying-lean-continues-to-fascinate

What if I could draw blood without poking the patient?

Breakout #1

15 minutes

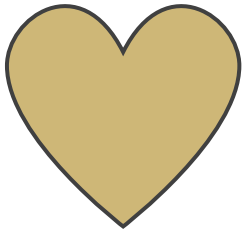
IDEATE

1. Introduce yourself and the problem you are trying to solve.

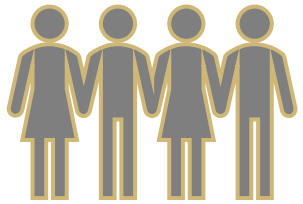
2. Brainstorm at least THREE possible interventions.

- Based on your problem understanding.
- One must ”defy gravity”
- One must be a nudge.

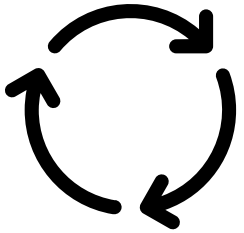
Why design thinking…?



prioritizes empathy



involves highly diverse and collaborative teams



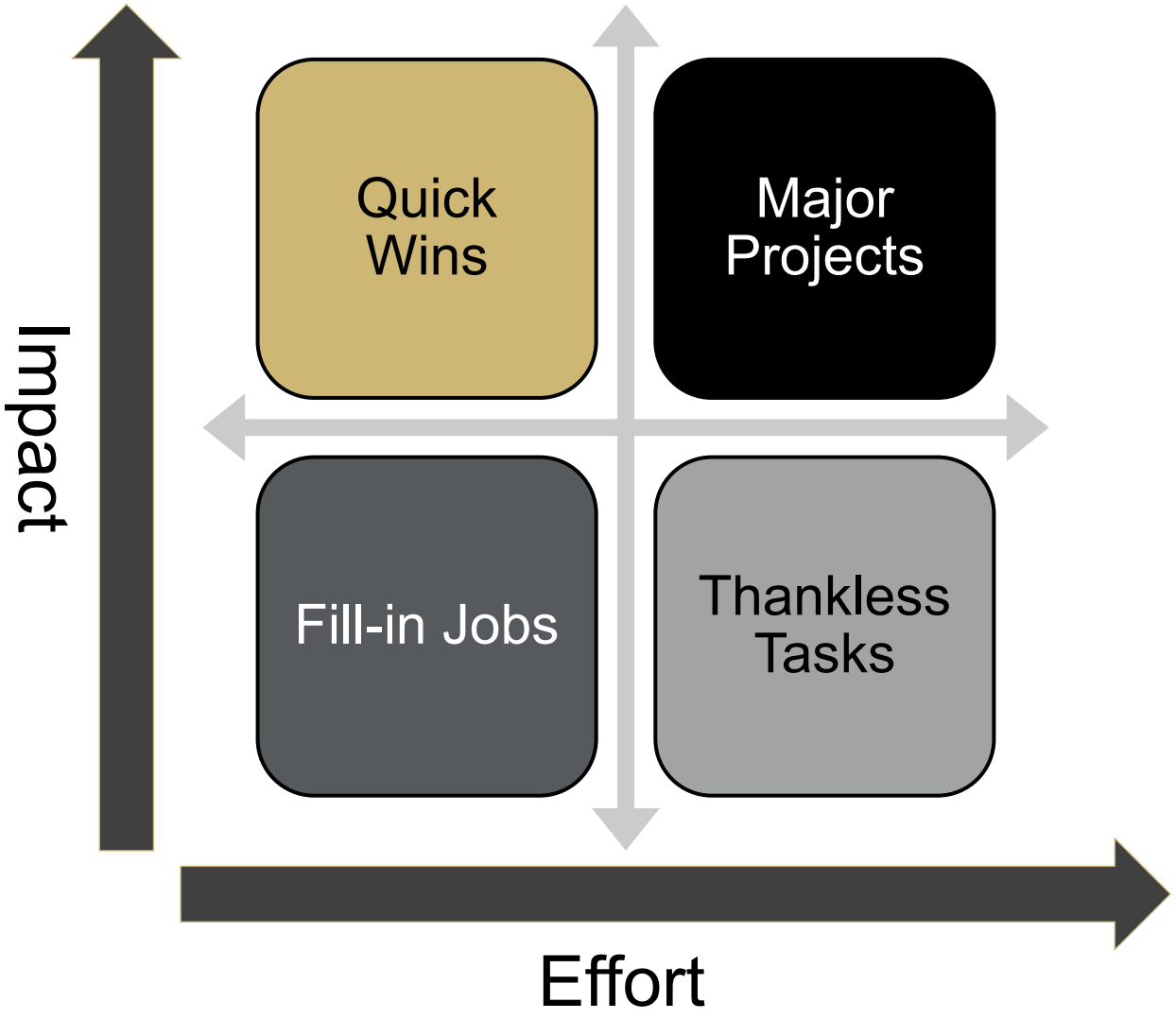
encourages action-oriented rapid prototyping

user-derived insights rather than top-down hypotheses

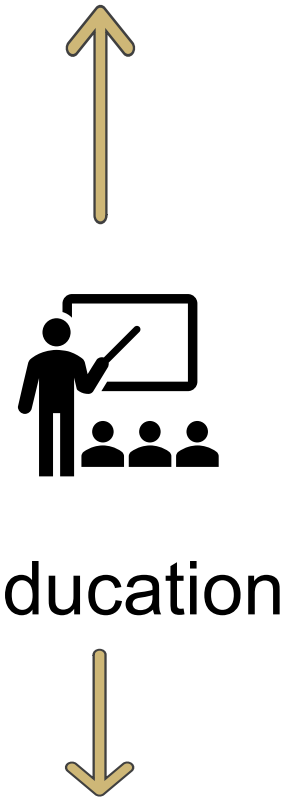
Roberts JP, Fisher TR, Trowbridge MJ, Bent C. A design thinking framework for healthcare management and innovation. Healthc (Amst). 2016 Mar;4(1):11-4.

Bring it back down to earth…

Prioritizing Your Interventions


Quick Wins
Major Projects
Fill-in Jobs
Thankless Tasks
Impact
Effort


Epic



Education

Tracking Your Interventions


HELLO? CAN ANYBODY HEAR ME?

How will you KNOW your intervention is happening?

Inpatient DVT Prophylaxis

OUTCOME

Inpatient DVT rate per 1000 patients

PROCESS

STRUCTURE

- % of patients receiving appropriate prophylaxis
- SCDs and pumps in room
  - and applied to patient?

Intervention = EHR guidance based on risk

- Risk score completion in EHR

BALANCE

Bleeding rates.

Pediatric Vaccination Schedules

OUTCOME

Percentage of patients (in a clinic) vaccinated
(NOTE: actual outcome is disease)

PROCESS

STRUCTURE

% of patients offered vaccine
% of patients declined

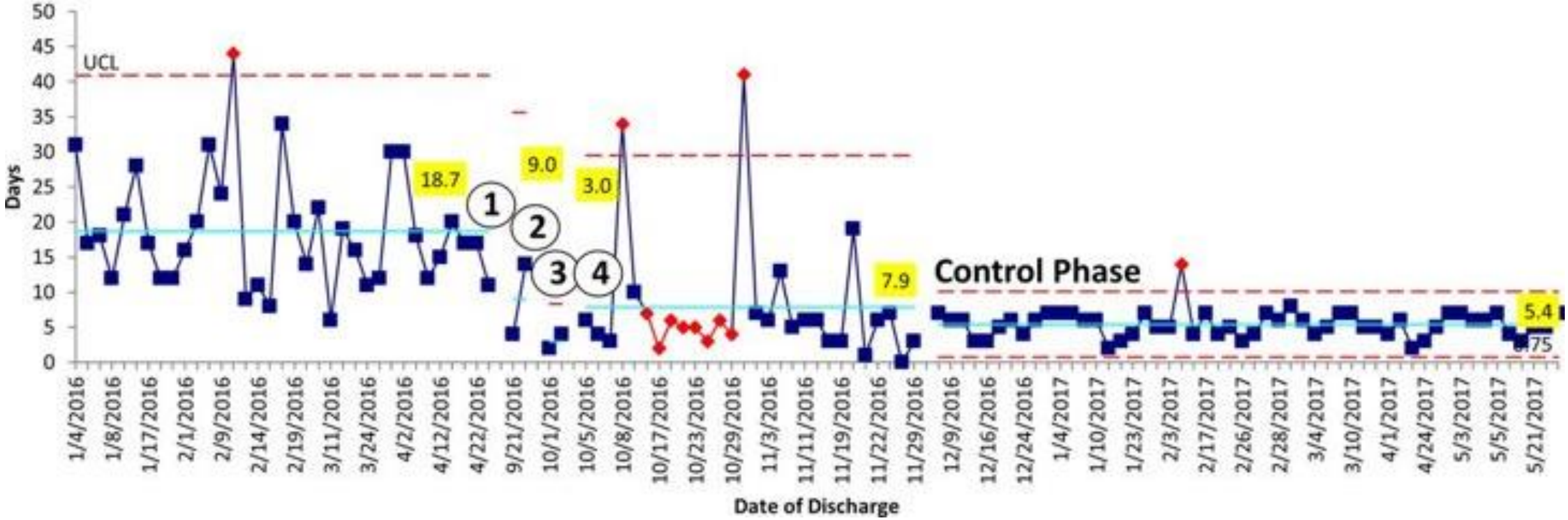
Intervention = pop-up reminder

- % of alerts ignored / followed

BALANCE

Provider alert fatigue
Lower well-child exams for lower SES with a mistrust of vaccines.

How do you KNOW your intervention is working?


UCL
18.7
9.0
3.0
7.9
1
2
3
4
Control Phase
5.4
Days
Date of Discharge

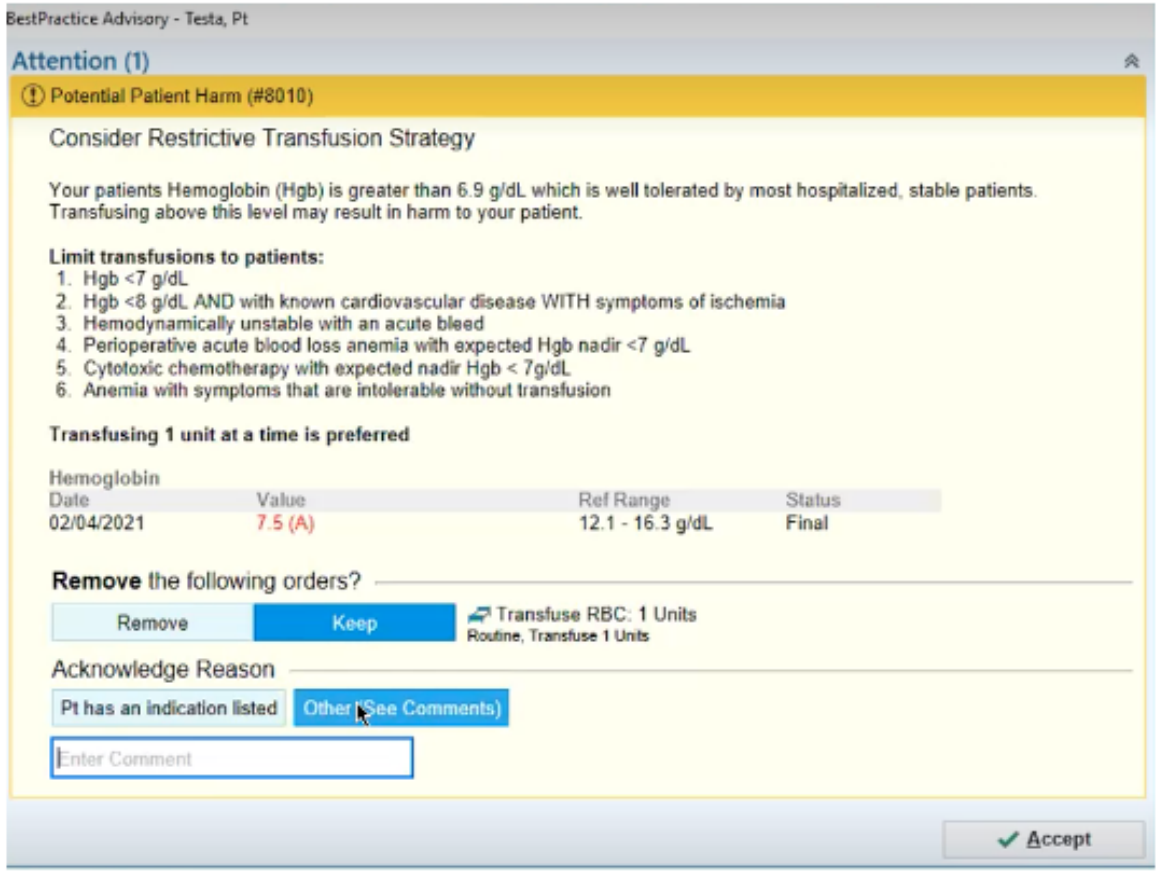
How do you KNOW your intervention is safe?

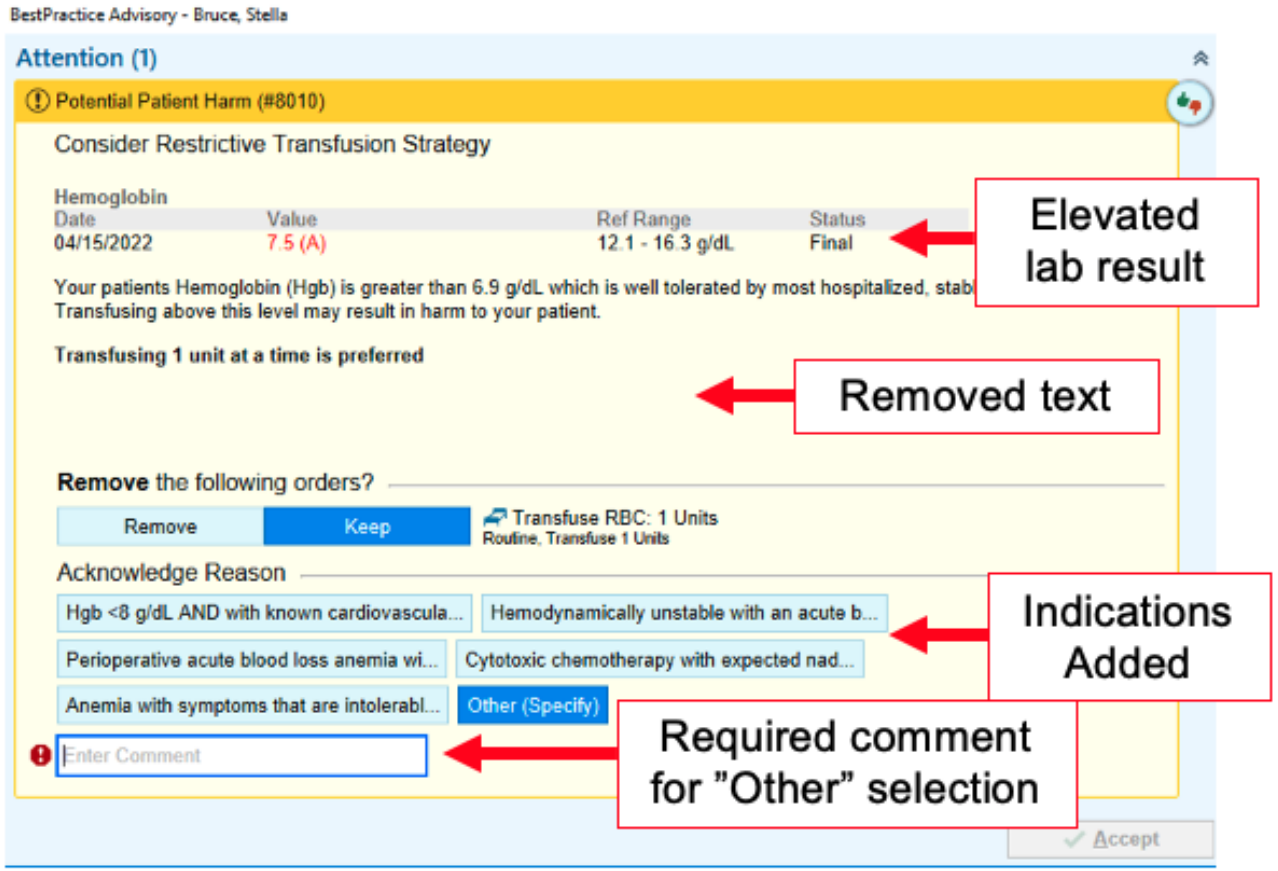

BREAK-TIME
Come back at ***pm MT!

User-centered Design

Slides Credit: Brad Morse, Anusha Raja


O
Rh POSITIVE
A
Rh POSITIVE
B
Rh POSITIVE
AB
Rh POSITIVE



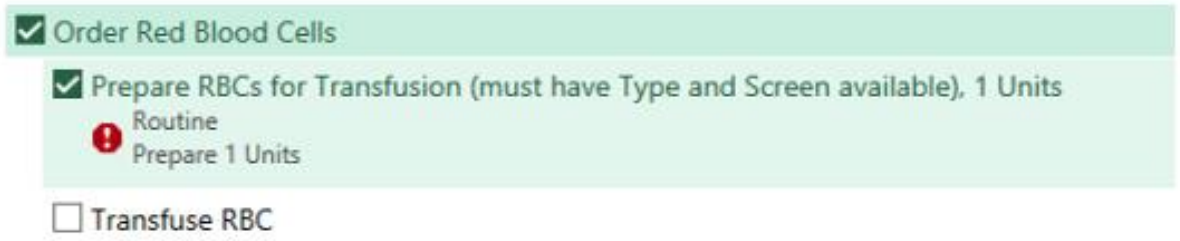


Tested with Users

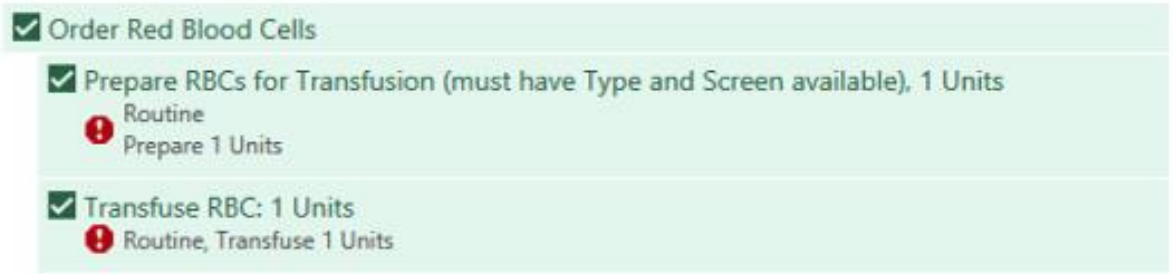
Final Version

University of Colorado **Anschutz Medical Campus** | **IHQSE**

Morse B, Anstett T, Mistry N, et al. User-Centered Design to Reduce Inappropriate Blood Transfusion Orders. Appl Clin Inform. 2023;14(1):28-36.



Tested with Users



Final Version

"If I actually wanted to transfuse them and I was moving fast, I would not see (the transfuse order)...I would ignore it and it wouldn't be until half an hour down the road that somebody would tell me, hey, you don't have the order in for transfuse RBCs."

Morse B, Anstett T, Mistry N, et al. User-Centered Design to Reduce Inappropriate Blood Transfusion Orders. Appl Clin Inform. 2023;14(1):28-36.

Definition

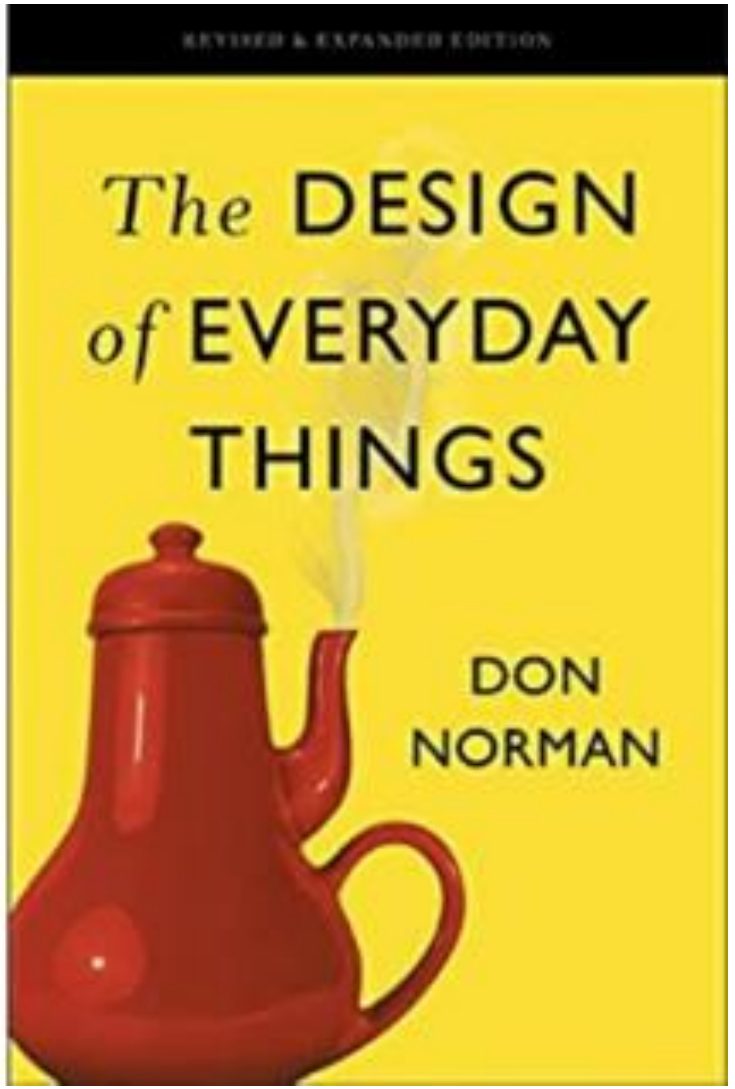
Coined in Donald A. Norman's research laboratory in UCSD

User is FRONT & CENTER

Involve users throughout the design process

An iterative design process

Overlays design thinking



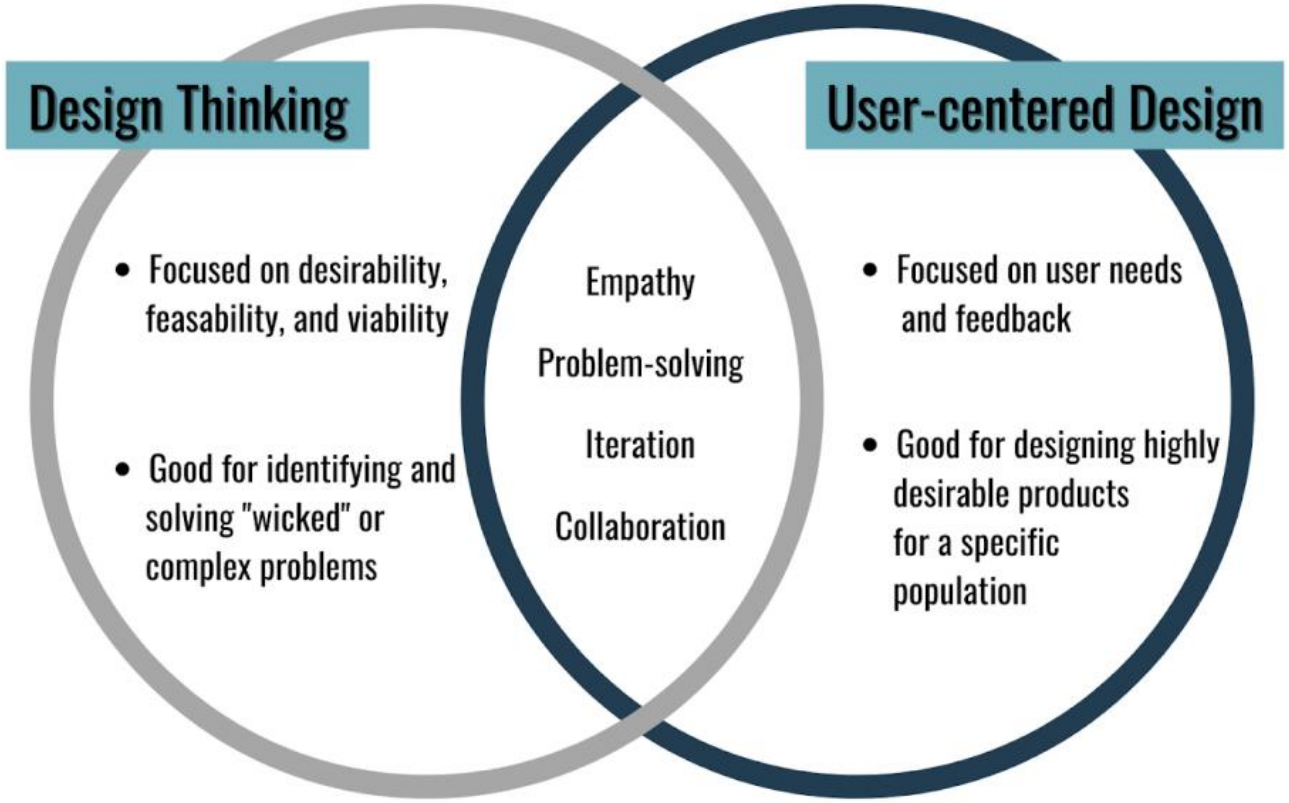
Design Thinking & UCD

User-centered design example:

Transgender Health Information Resource

Design thinking: way of thinking for developing new products, services, solutions for social problems

User-centered design: method for improving usability, user experience of a certain product or service

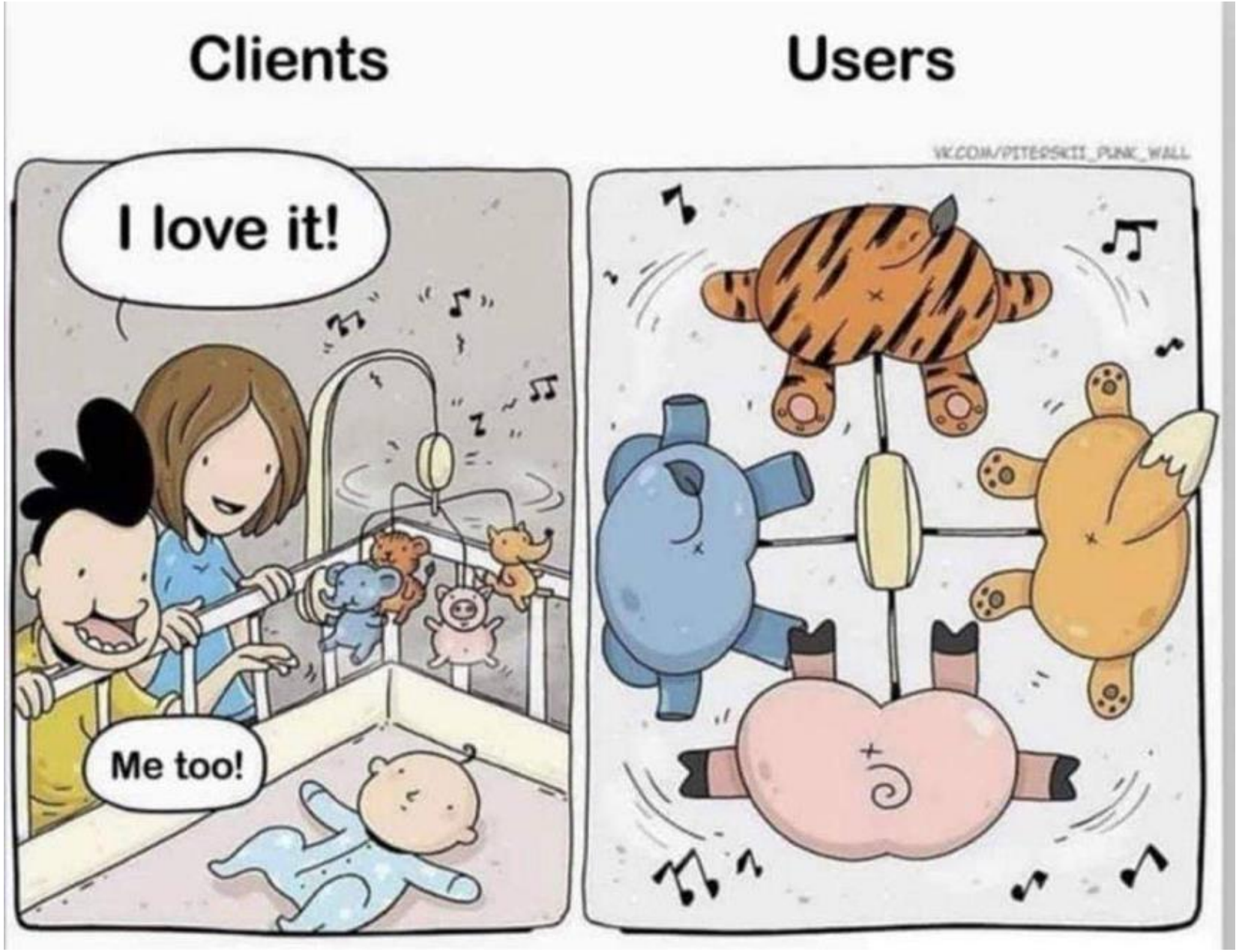


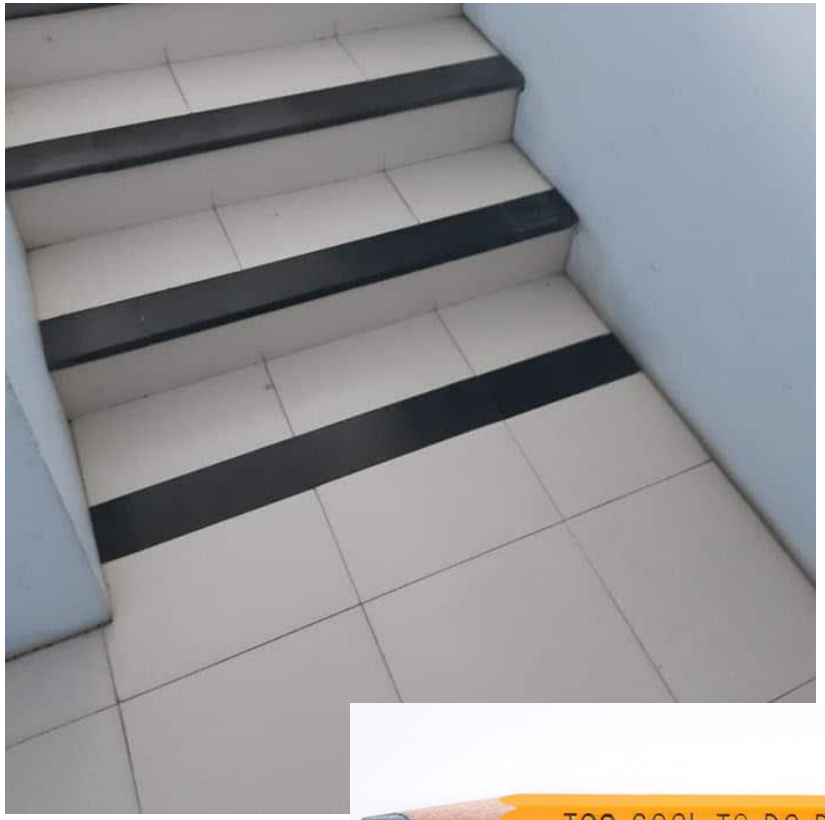
Design thinking example:

New York City Subway Map


BROOKLYN
Greenwich Village
East Village
SoHo
Tribeca
Chinatown
Lower East Side
Little Italy
Williamsburg
Navy Yard
Brooklyn Heights
South Brooklyn
Governors Island
EAST RIVER
EAST RIVER PARK
World Trade Center
South Ferry
Atlantic Av
Prospect Av
York Street
High Street Brooklyn Bridge
Jay Street Borough Hall

The Bronx
Manhattan
Queens
Brooklyn
Staten Island
Key to Colors and Symbols
Restricted Services
Long Island Sound
Eastchester Bay
Flushing Bay
Hudson River
Harlem River
East River
Jamaica Bay
The Narrows
Gravesend Bay
Atlantic Ocean
Maxwell J Roberts, 7/12/2017
TUBE MAP CENTRAL


Clients
Users
I love it!
Me too!




OTIS

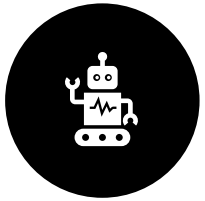

PUSH
PUSH


TOO COOL TO DO DRUGS
COOL TO DO DRUGS
DO DRUGS

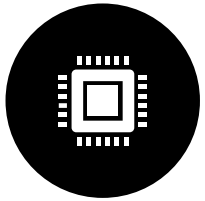
User Testing Methods

“Question Asking Method”

”Task Performance Measurement”



Physiological monitoring technology (ie: BP, HR, head/ eye tracking)

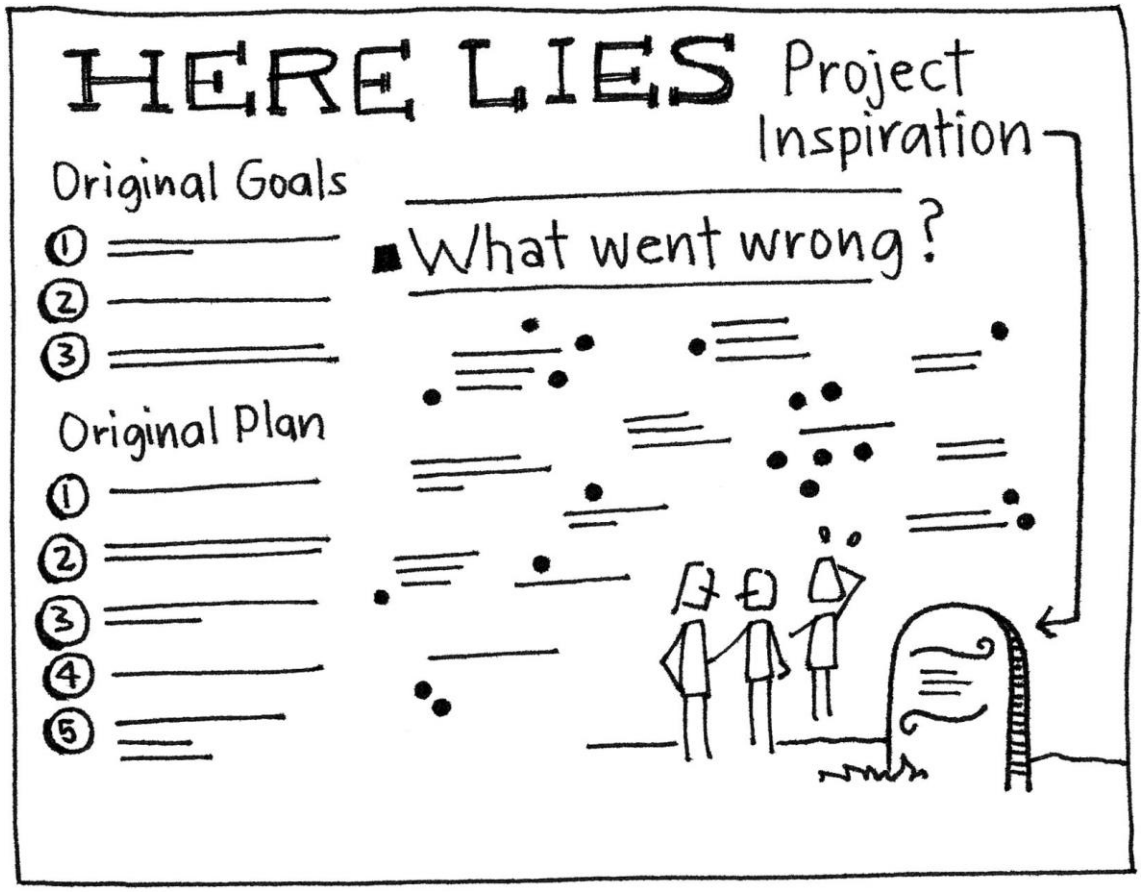


Usability testing in both simulated/ real-time environments

Questionnaires, surveys, observations, focus-group interviews, self-reporting logs, workshops

Interactive process over time

Pre-Mortem Analysis



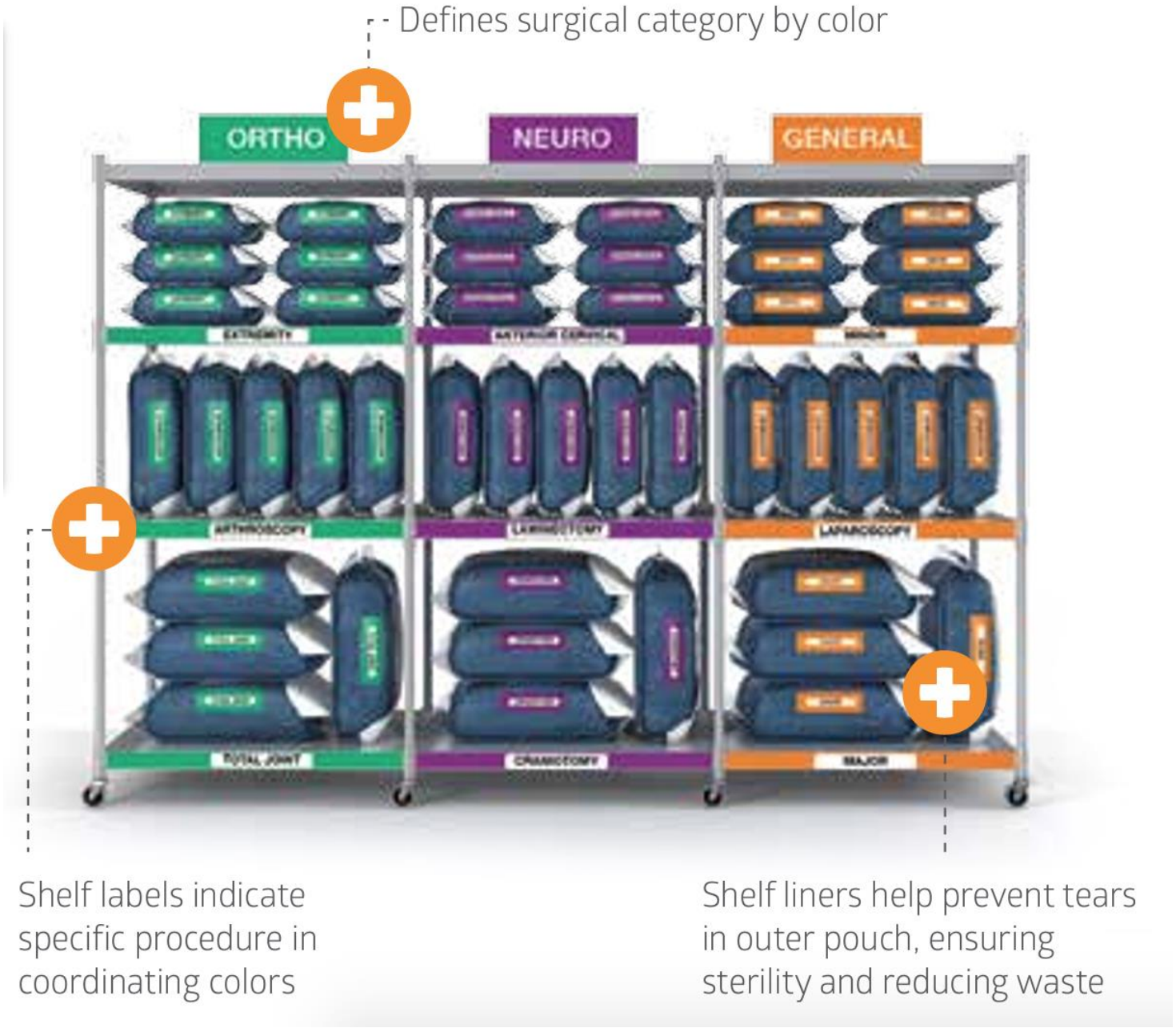
Pre-Mortem Analysis

- Comes at the beginning of a project rather than the end
- Unlike a typical problem identification session in which stakeholders are asked what *might* go wrong.

Assumes that the project has been implemented and failed, then asks "What did go wrong?"

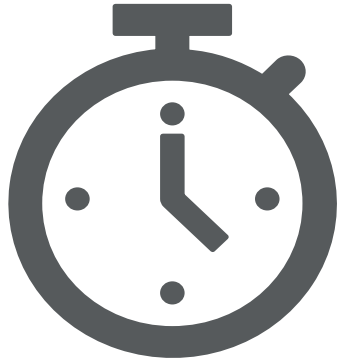
Pre-Mortem Analysis

- quickly engages QI key partners
- creates an environment of psychological safety
- way to gather feedback to maximize the effectiveness of implementing planned QI projects
- vs. user-testing -- allows for a more global assessment of potential failures rather beyond the individual user-level.



https://www.medline.com/capabilities/kitting/custom-procedure-trays/

Breakout #2

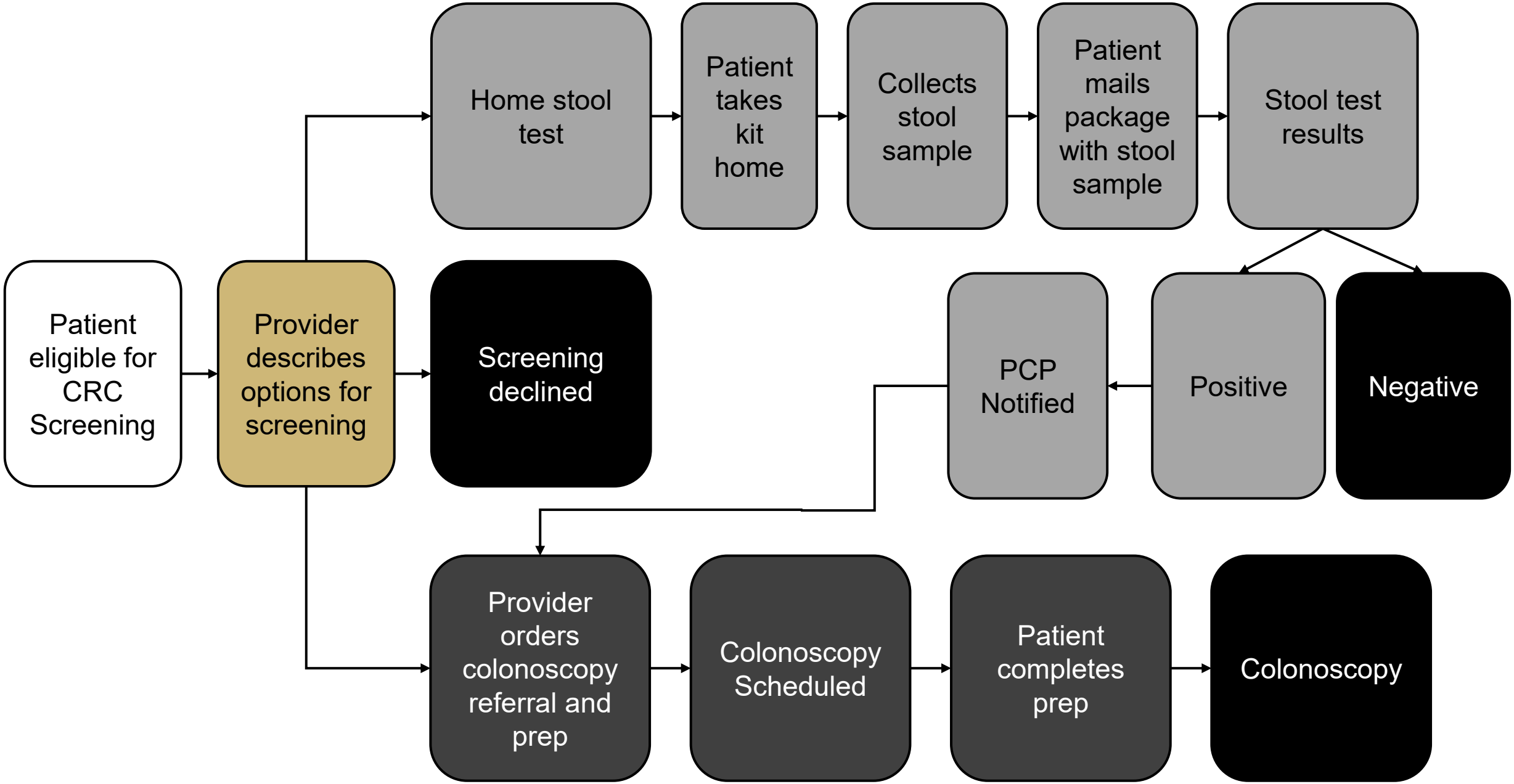


10 minutes

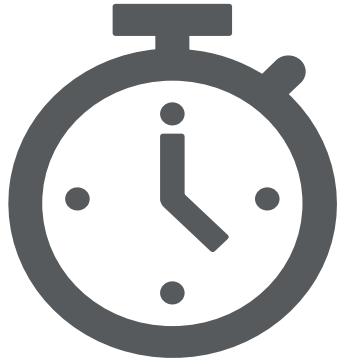
Conduct a Pre-Mortem

Assume this project has been implemented and failed

“What went wrong?” “Why?”


Patient eligible for CRC Screening
Provider describes options for screening
Home stool test
Patient takes kit home
Collects stool sample
Patient mails package with stool sample
Stool test results
Positive
Negative
PCP Notified
Screening declined
Provider orders colonoscopy referral and prep
Colonoscopy Scheduled
Patient completes prep
Colonoscopy

Breakout #2



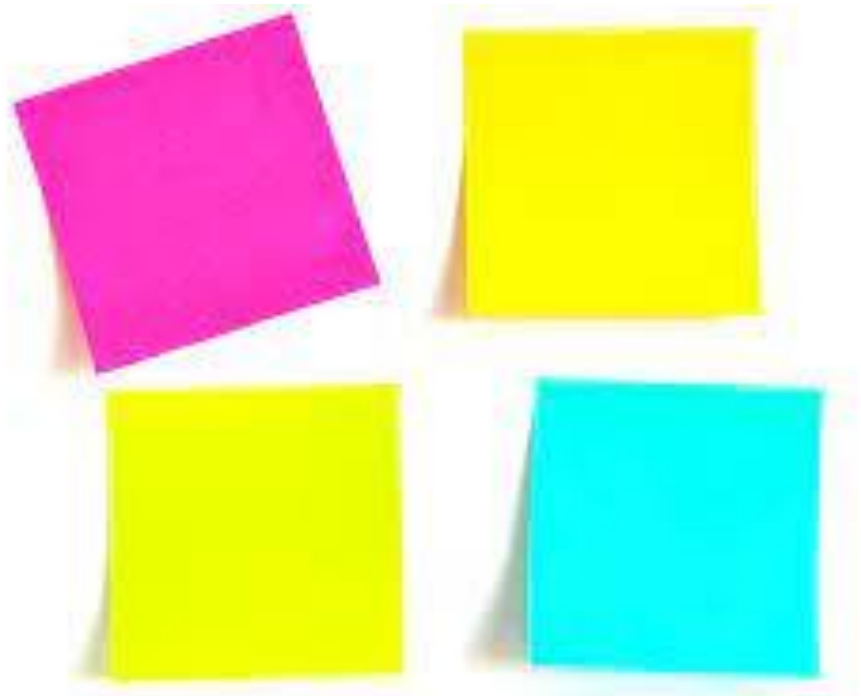
15 minutes

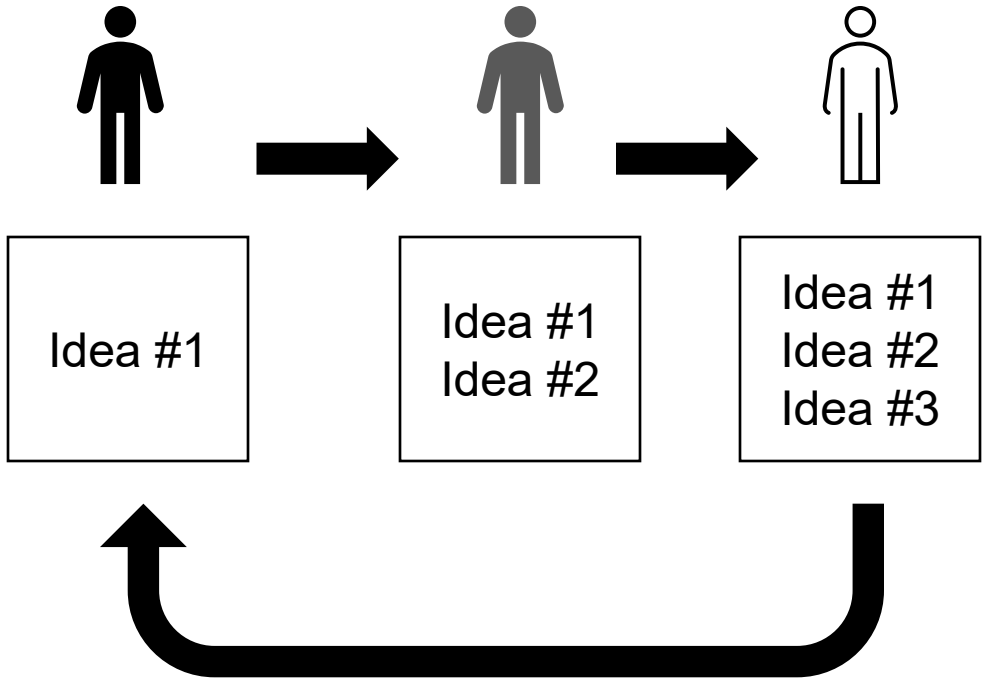
Conduct a Pre-Mortem

Assume this project has been implemented and failed

“What went wrong?” “Why?” “Now what?”

Pre-Mortem Analysis: Brain Writing

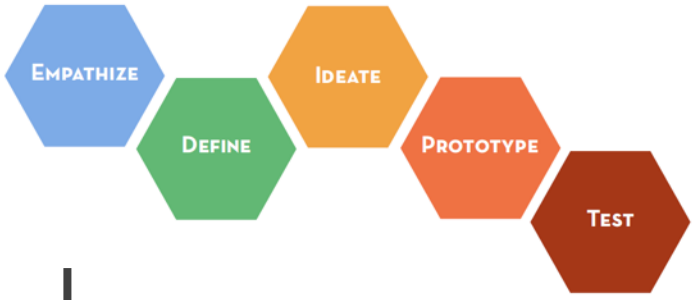


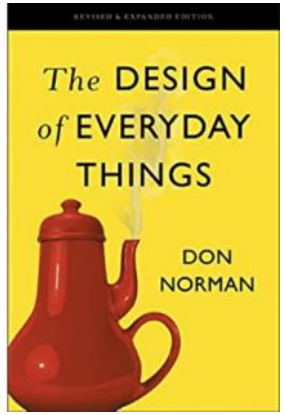


6 participants
3 ideas / participant
5 times passing ideas

You don't know the best solutions…but your users do!

You must talk to them to find out.





There are methods for how to get the best out of your users.

It is critical to ensure your interventions are safe *before* implemented.


Anschutz
IHQSE