Designing for Change

Financial Disclosures: NONE

Submitted for Publication (or will be very soon)

Reproduced with permission (AND terminology)

Agenda

1. Choice Architecture + Nudge
2. Design Thinking

------------------------- Break -------------------------

3. User-Centered Design
4. Pre-Mortem Analysis

Learning Objectives

1. Explain the hierarchy of intervention effectiveness.
2. Define choice architecture.
3. Identify behavioral nudges.
4. Explain Design Thinking.
5. Recognize the importance of user-empathy in good design.
6. Describe the process of user-centered design.
7. Explain the purpose and process of a pre-mortem analysis.

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

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

(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

THE FORGETTING CURVE

100%
80%
60%
40%
20%

Retention

1 2 3 4 5 6 7

Days

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

FORCING FUNCTIONS

AUTOMATION & COMPUTERIZATION

SIMPLIFICATION & STANDARDIZATION

REMINDERS, CHECKLISTS & DOUBLE CHECKS

RULES & POLICIES

EDUCATION & TRAINING

MORE EFFECTIVE

LESS EFFECTIVE

System-focused

People-focused

WHO Surgical Safety Checklist
(adapted for England and Wales)

SIGN IN (To be read out loud)

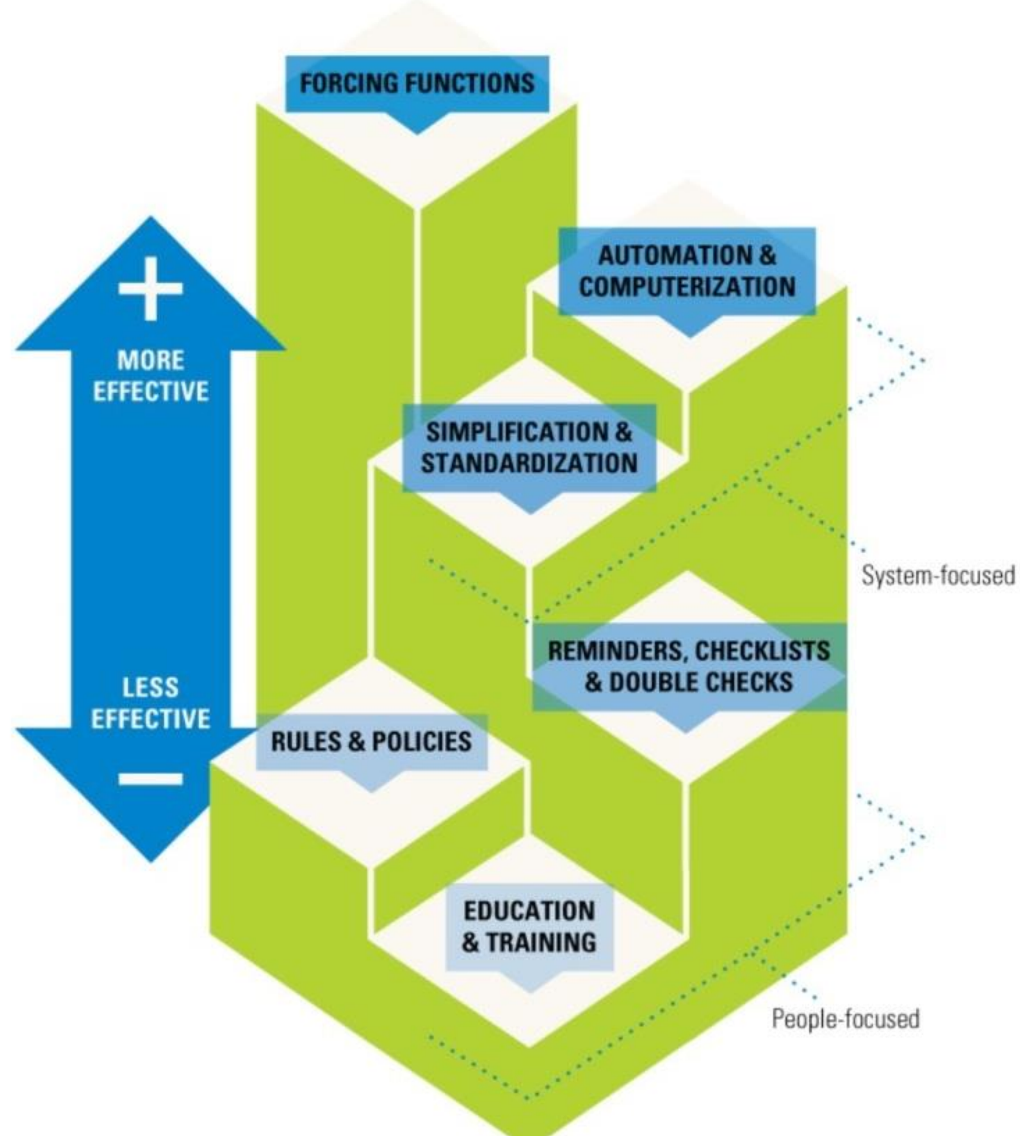
TIME OUT (To be read out loud)

SIGN OUT (To be read out loud)

This checklist contains the core content for England and Wales

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

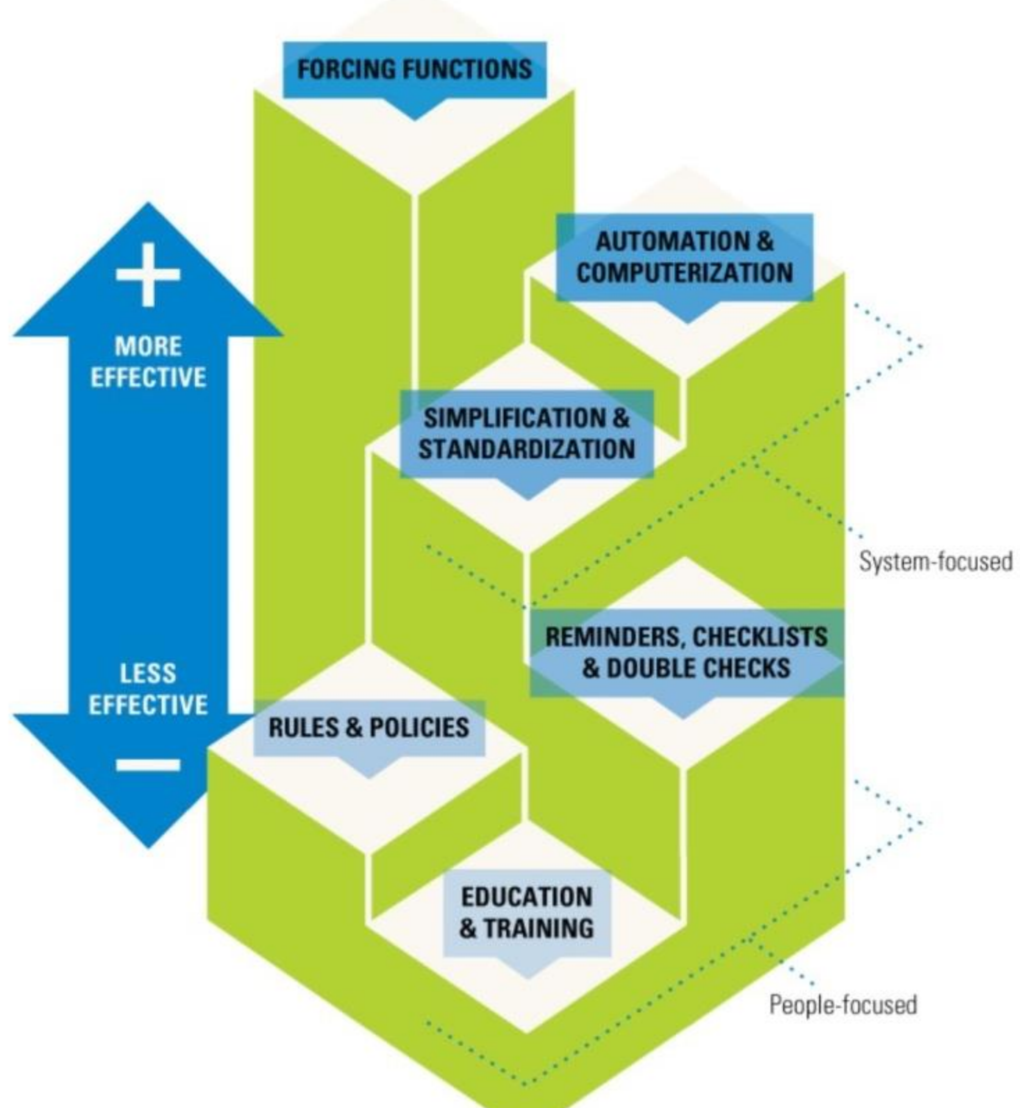
https://cassiemcdaniel.com/Design

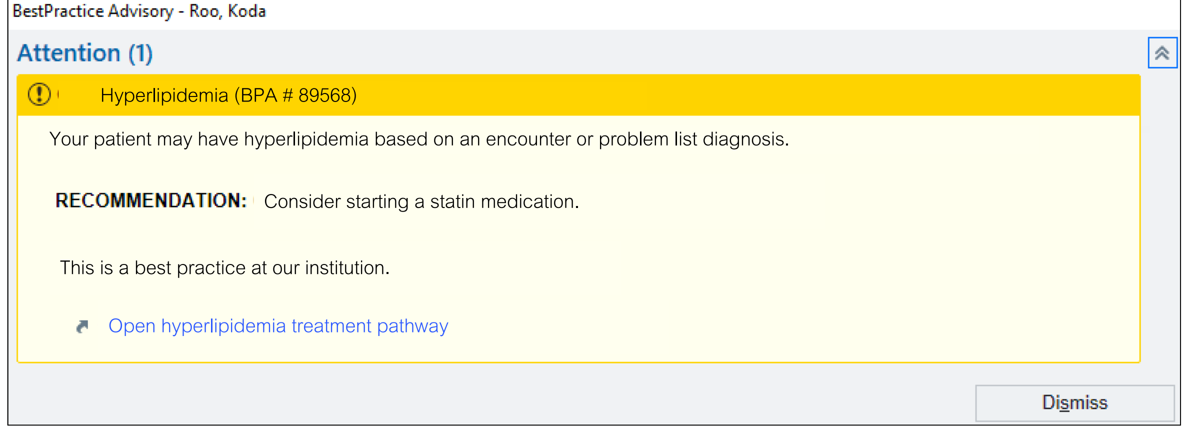


What about electronic alerts?

https://cassiemcdaniel.com/Design

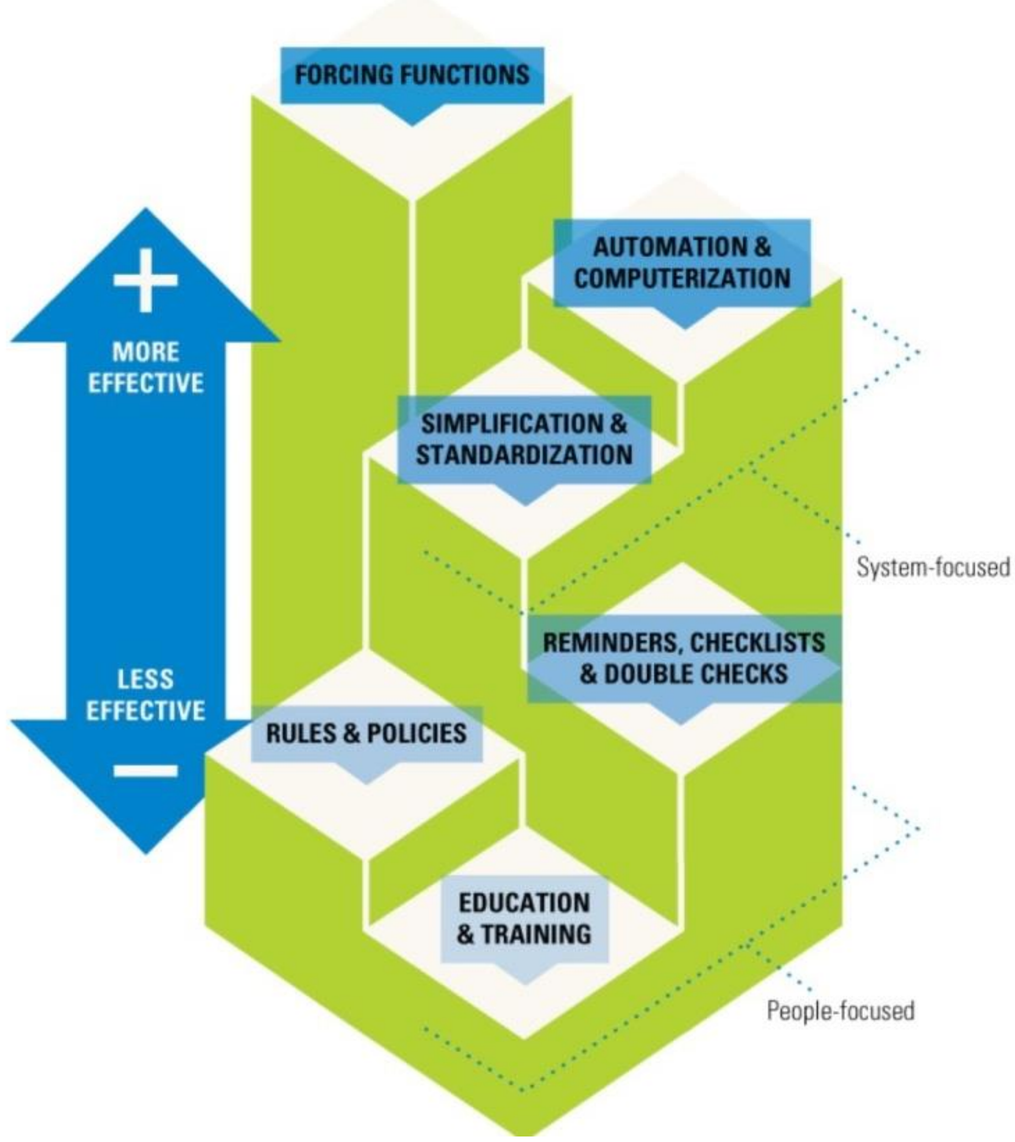
The Hierarchy of Intervention Effectiveness





https://cassiemcdaniel.com/Design

The Hierarchy of Intervention Effectiveness



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

Status: Normal | Standing | Future

Expected Date: [blank] — 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

The Hierarchy of Intervention Effectiveness

+ MORE EFFECTIVE

LESS EFFECTIVE −

FORCING FUNCTIONS

AUTOMATION & COMPUTERIZATION

SIMPLIFICATION & STANDARDIZATION

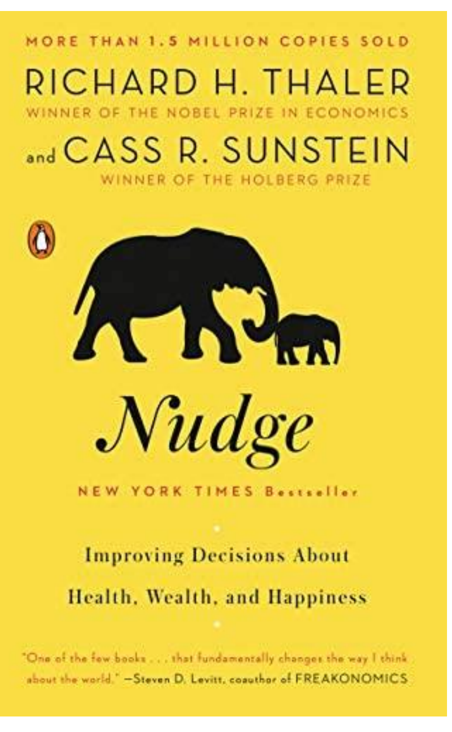
REMINDERS, CHECKLISTS & DOUBLE CHECKS

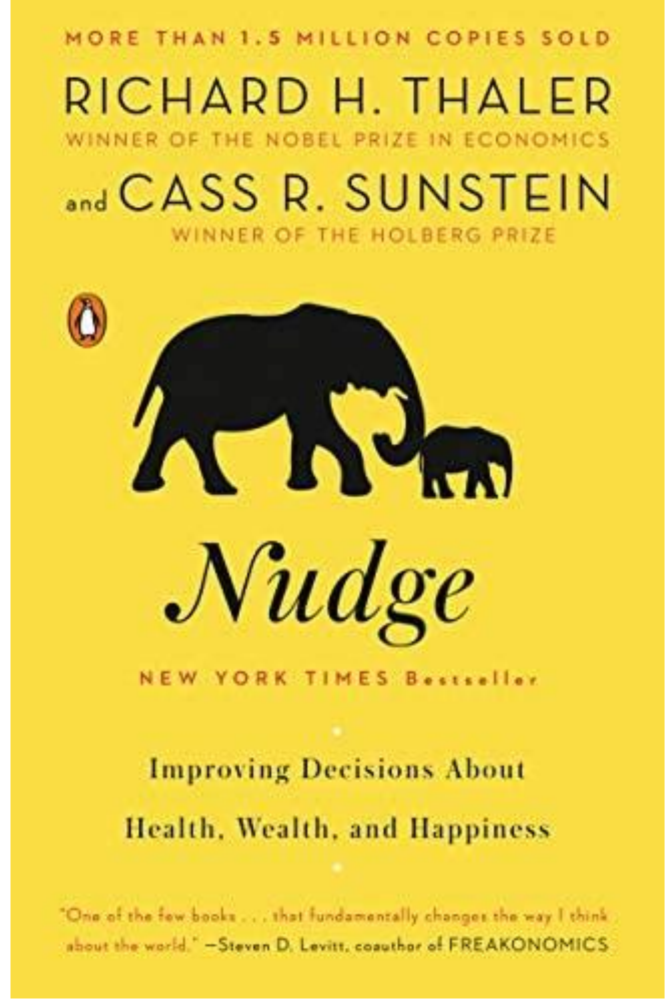
RULES & POLICIES

EDUCATION & TRAINING

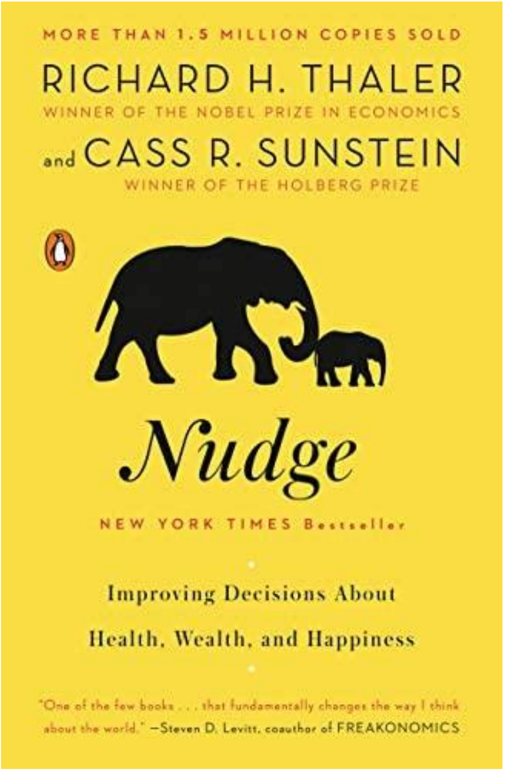
System-focused

People-focused





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.**

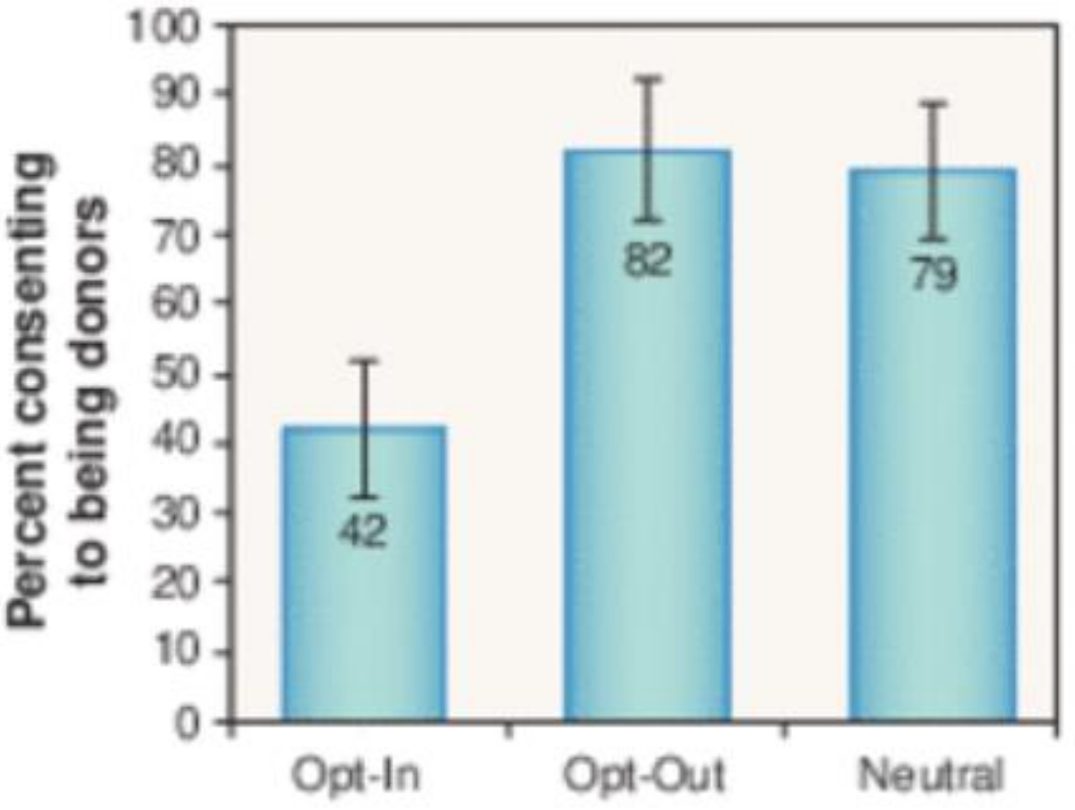
To count as a mere nudge, the intervention **must be easy and cheap to avoid**. Nudges are NOT mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not.

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

Choice architecture is the **design of different ways in which choices can be presented** to decision makers, and the impact of that presentation on decision-making.

https://en.wikipedia.org/wiki/Choice_architecture#Background

Sphinx



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 percentage

100
90
80
70
60
50
40
30
20
10
0

4.25
27.5
17.17
12
99.98
98
99.91
99.97
99.5
99.64
85.9

Denmark
Netherlands
United Kingdom
Germany
Austria
Belgium
France
Hungary
Poland
Portugal
Sweden

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)

Superior vena cava
Heart
PICC
Vein
PICC
Intravenous line

© 2015 Terese Winslow LLC
U.S. Govt. has certain rights

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.

Insert PICC line by IV Team

✔ Accept ✖ Cancel

Priority: Routine | Routine

Frequency: ONCE

At 10/6/2022 | Today | Tomorrow | 1521

Comments:

Insert SmartText | 100%

Type of PICC line: PICC LINES . Confirmation of placement, care and maintenance per Infusion Nurses Society Infusion Standards of Practice.

- Single Lumen Groshon
- Double Lumen Groshon
- Triple Lumen PICC
- PowerPICC

The Comments field contains u... artLists.

Recreation of baseline PICC order (without any guidance)

Order Sets

UCH Adult Midline - PICC Placement and Care

Always use a midline if appropriate.
If PICC line needed, minimize number of lumens.
Multiple lumen catheters = greater risk of infection and thrombosis.
INR must be < 3.0 and platelets > 50,000.
If CKD/dialysis patient, order Hohn catheter instead.

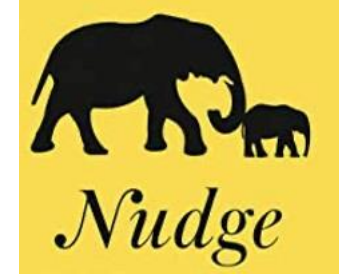
Please call the PICC team with specific requests.

General

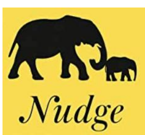
Main Indication for IV Access

- Discharging with a Line
- Short-Term IV Access (Less Than 15 Days)
- Long-Term IV Access (Greater Than 15 Days)
- Frequent Phlebotomy
- Medication(s) requiring central access (e.g. vasopressors, chemo, TPN...)

Intervention order-set



Decision Information



Decision Structure

General

Main Indication for IV Access

Discharging with a Line

Short-Term IV Access (Less Than 15 Days)

Is patient discharging with a line or needing access for vasopressors, chemotherapy, or TPN?

Yes

Your patient likely requires a PICC line based on your response to the previous question.

IR PICC line

Sign

No

Long-Term IV Access (Greater Than 15 Days)

Frequent Phlebotomy

Medication(s) requiring central access (e.g. vasopressors, chemo, TPN...)

Central/Midline Line Approved for Use and for Blood Draws

Central line approved for use

Routine, UNTIL DISCONTINUED starting Today at 1912 Until Specified

PICC RN to Release, Sign & Hold

IV access Placement and Care

NS Flush (Heparin Contraindicated)

Decision Information

General

Main Indication for IV Access

Discharging with a Line

Short-Term IV Access (Less Than 15 Days)

Long-Term IV Access (Greater Than 15 Days)

Frequent Phlebotomy

IR Midline (Consider for LESS THAN 6 days)

IR PICC line (Preferred for 6 days or More)

Medication(s) requiring central access (e.g. vasopressors, chemo, TPN...)

Central/Midline Line Approved for Use and for Blood Draws

Central line approved for use

Routine, UNTIL DISCONTINUED starting Today at 1912 Until Specified

PICC RN to Release, Sign & Hold

IV access Placement and Care

NS Flush (Heparin Contraindicated)

NS injection flush 10 mL

10 mL, Intra-catheter, EVERY MORNING, First Dose Tomorrow at 0600, PICC RN to Re

And

NS injection flush 10 mL

Intervention order-set (cont.)

Nudge

IR PICC line

Decision Information

✔ Accept ✘ Cancel

Priority: Routine | Today | ASAP

New line or Replacement: New line | Replacement | Comments

Desired number of lumens: Single Lumen PICC (Preferred) | Double Lumen PICC (Incompatible Infusions) | Triple Lumen PICC (Restricted)

If patient to be discharged with PICC line, Physician/Ordering Clinic/Dept is aware of their responsibility to order patient's supplies, make arrangements for home health care and education prior to placement of PICC Line:

Agree | Patient not discharged with PICC line

Responsible provider pager number and after hours or weekend pager (if applicable):

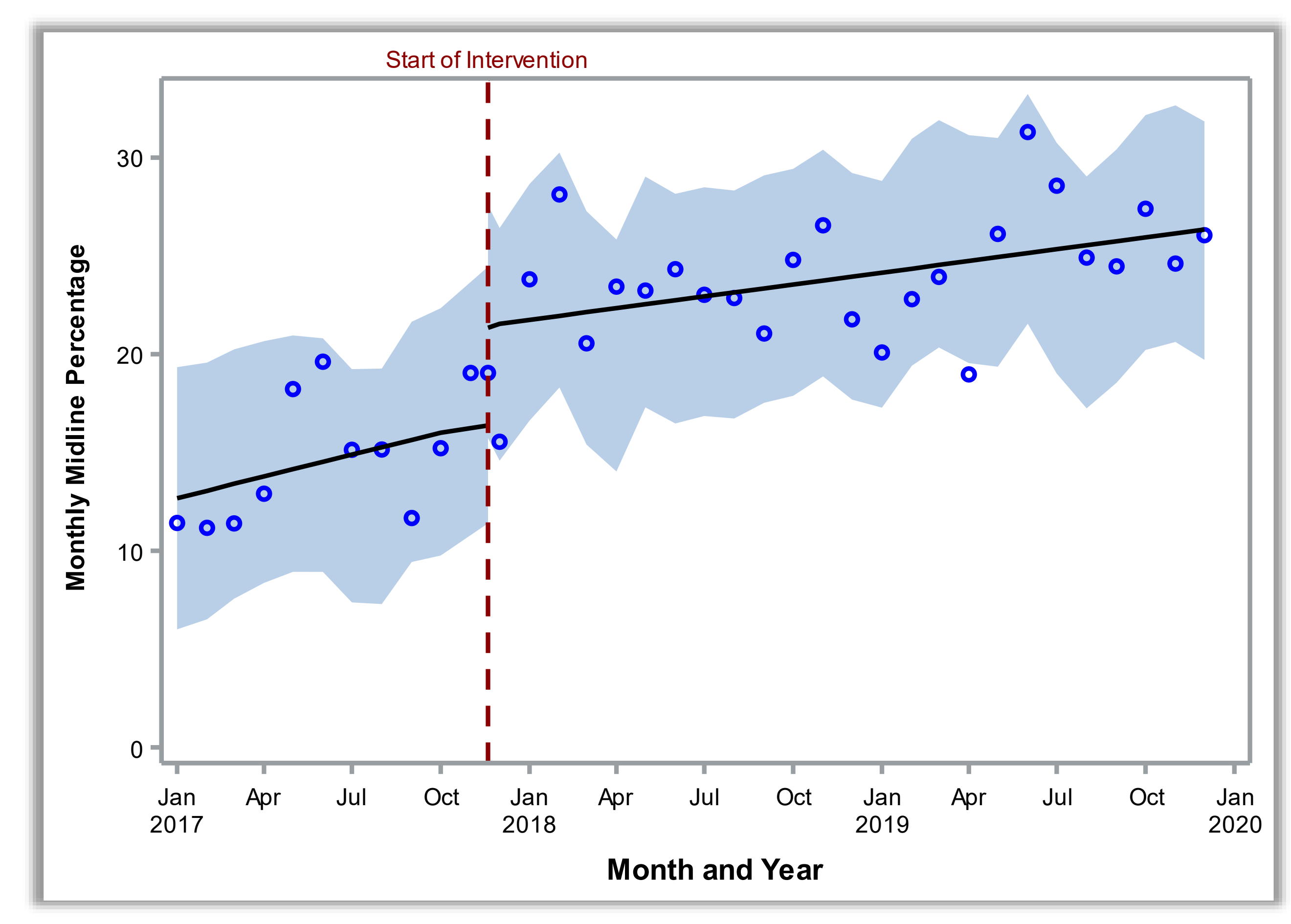
Intervention PICC order

Increase midline usage as a proportion of all lines

Binomial linked mixed model with a random intercept for patient MRN.

Mixed model to account for patients who had multiple encounters with midline or PICC line procedures performed during the time frame.

The odds of having a midline were 3.1 times higher after November 19, 2017 as compared to before (p = 0.000001).

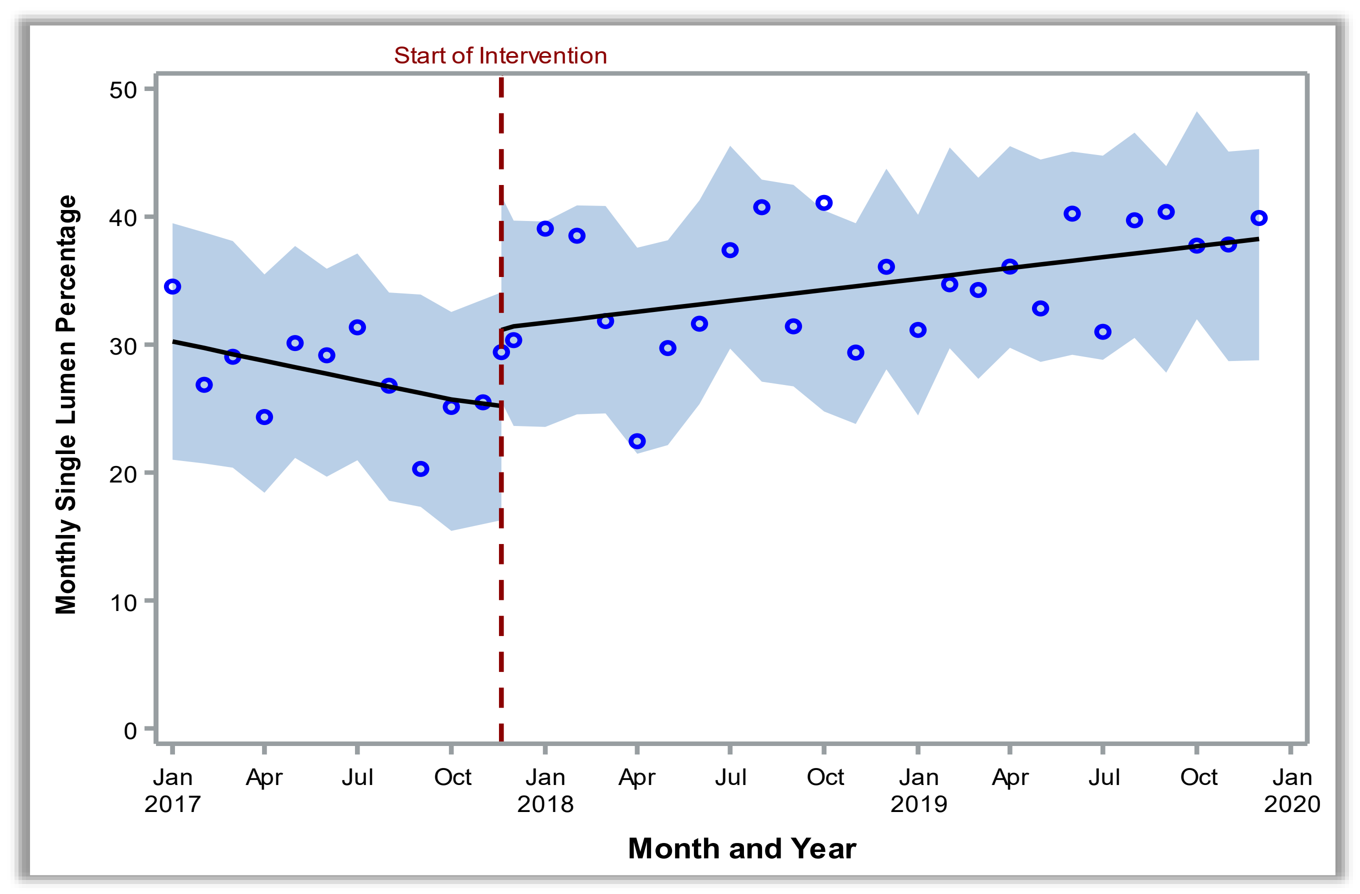


Bredenberg E, et al. Promoting appropriate midline catheter and PICC placement through implementation of an EHR-based clinical decision support tool: An interrupted time-series analysis. *J Hosp Med.* 2023;18(6):483-490.

Increase proportion of single lumen PICCs as a proportion of all PICCs

Significant immediate increase at intervention (p-value: 0.0184), and the post-intervention slope was significantly greater than the pre-intervention slope (p-value: 0.0203).

There was an estimated immediate one-time increase in the proportion of single lumen PICC line procedures of 5.7% at the time of the intervention.



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

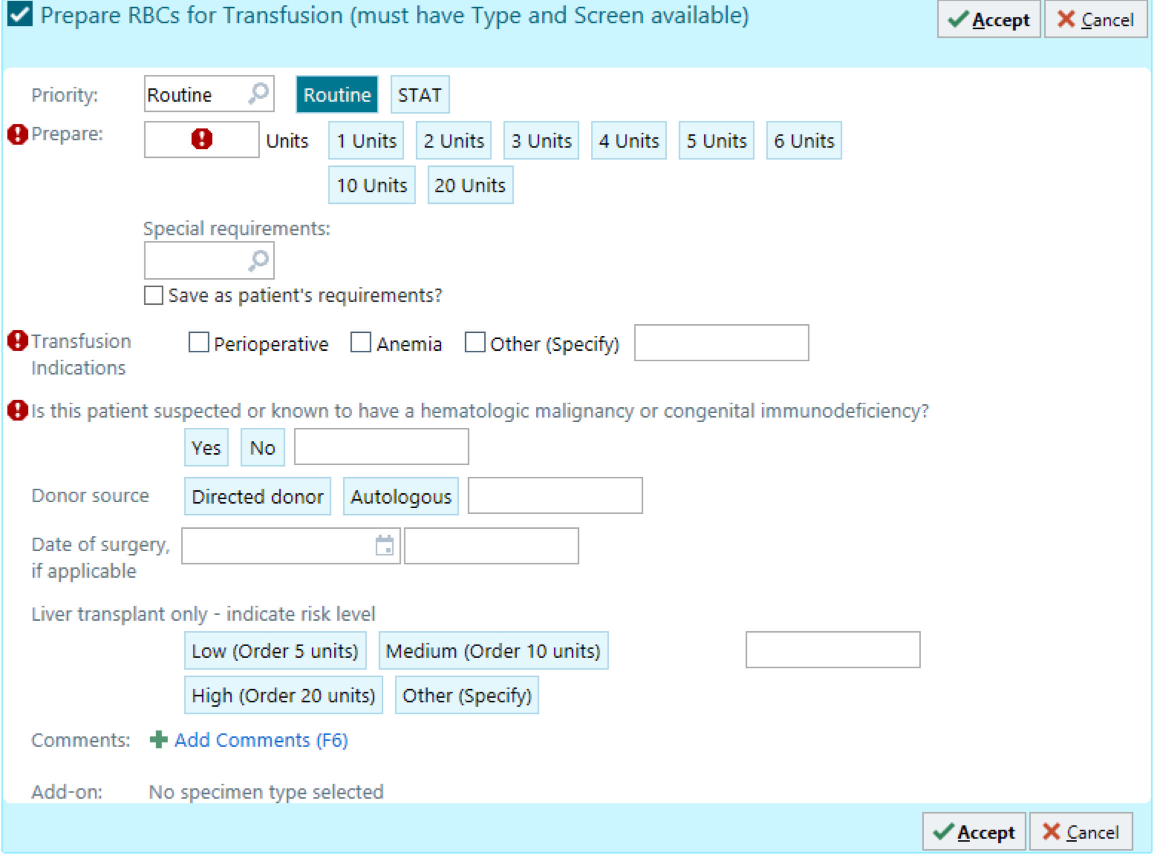
Red Blood Cell (pRBC) Transfusion Recommendations
pRBCs are most likely APPROPRIATE in the following clinical scenarios:
• Hgb < 7 g/dL OR Hgb < 8 with CV disease AND symptoms
• Hemodynamically unstable patient with an acute bleed
• Perioperative acute blood loss anemia with expected Hgb < 7
• Cytotoxic 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

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

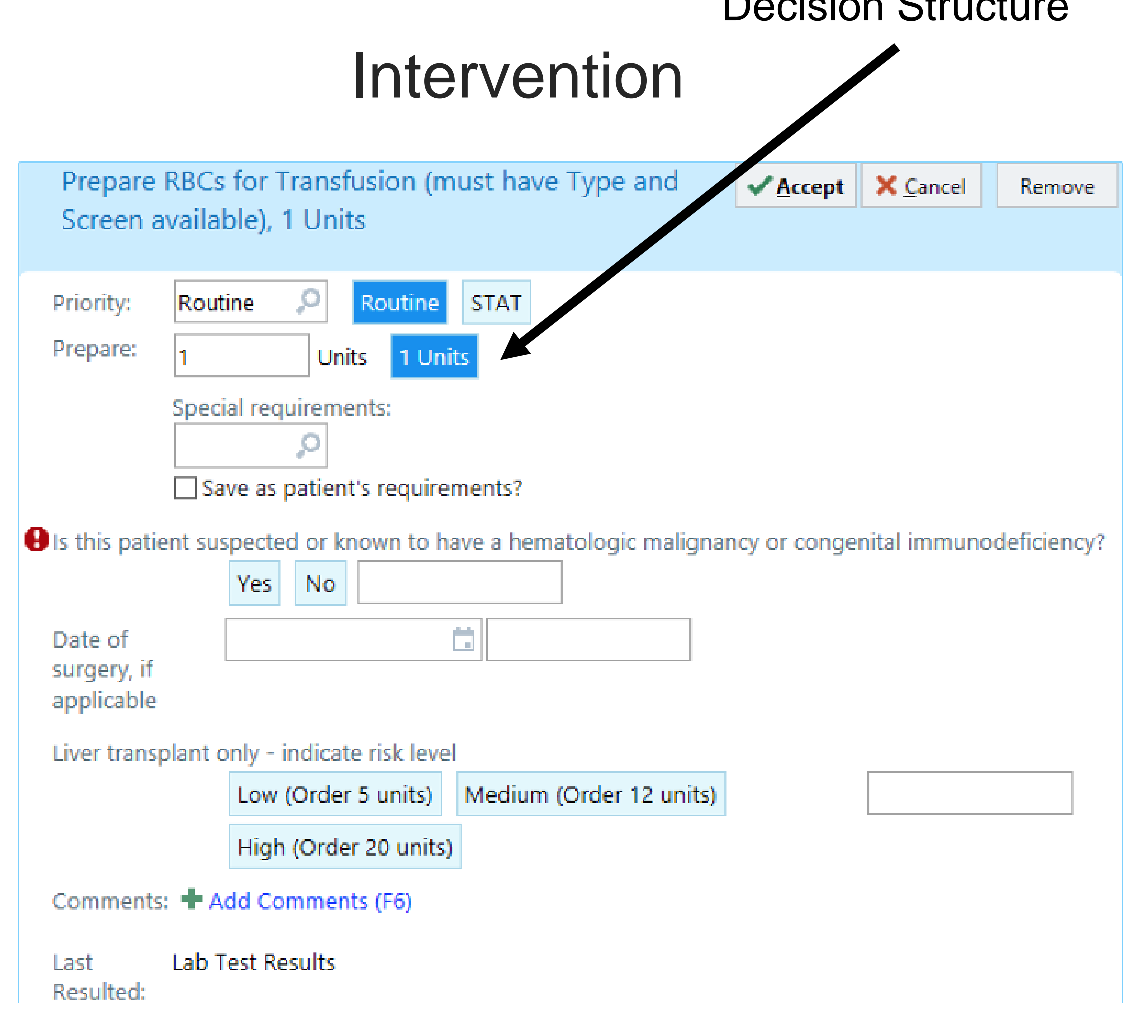
Prepare Order

Decision Structure

Original



Intervention

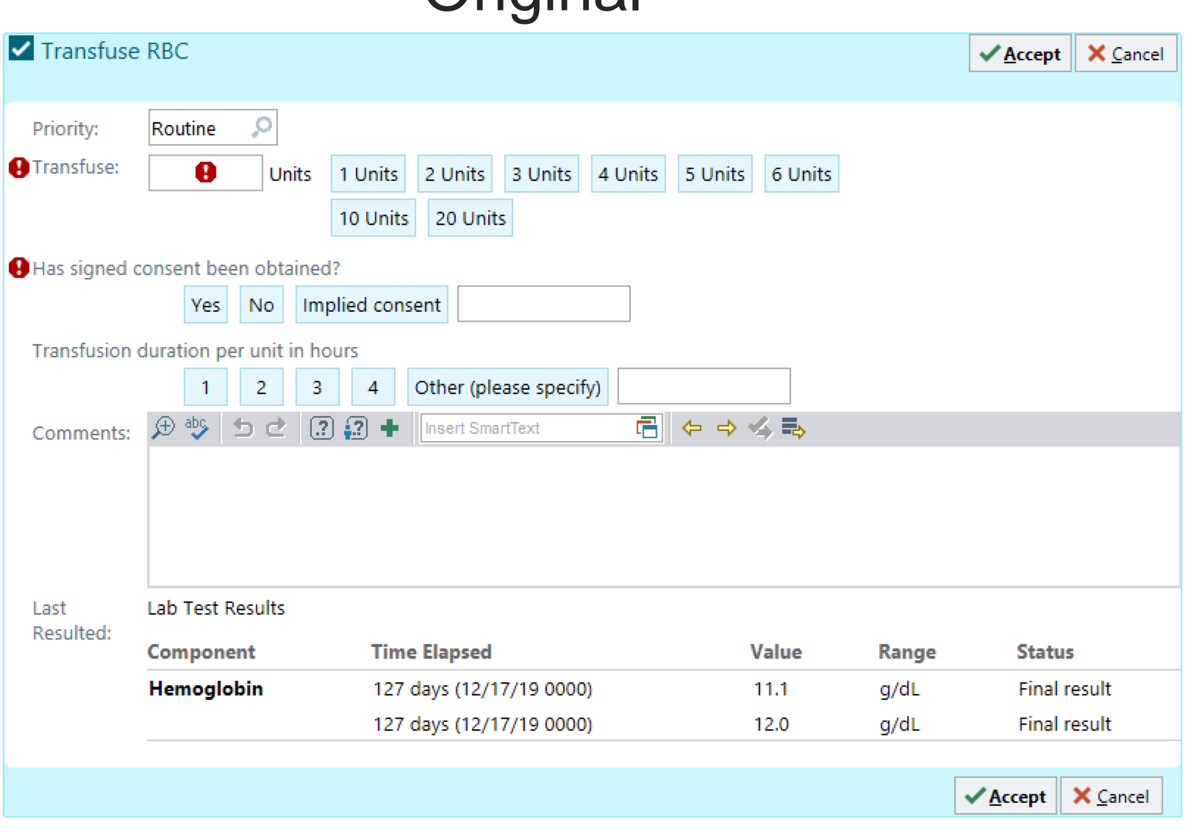


Transfuse Order

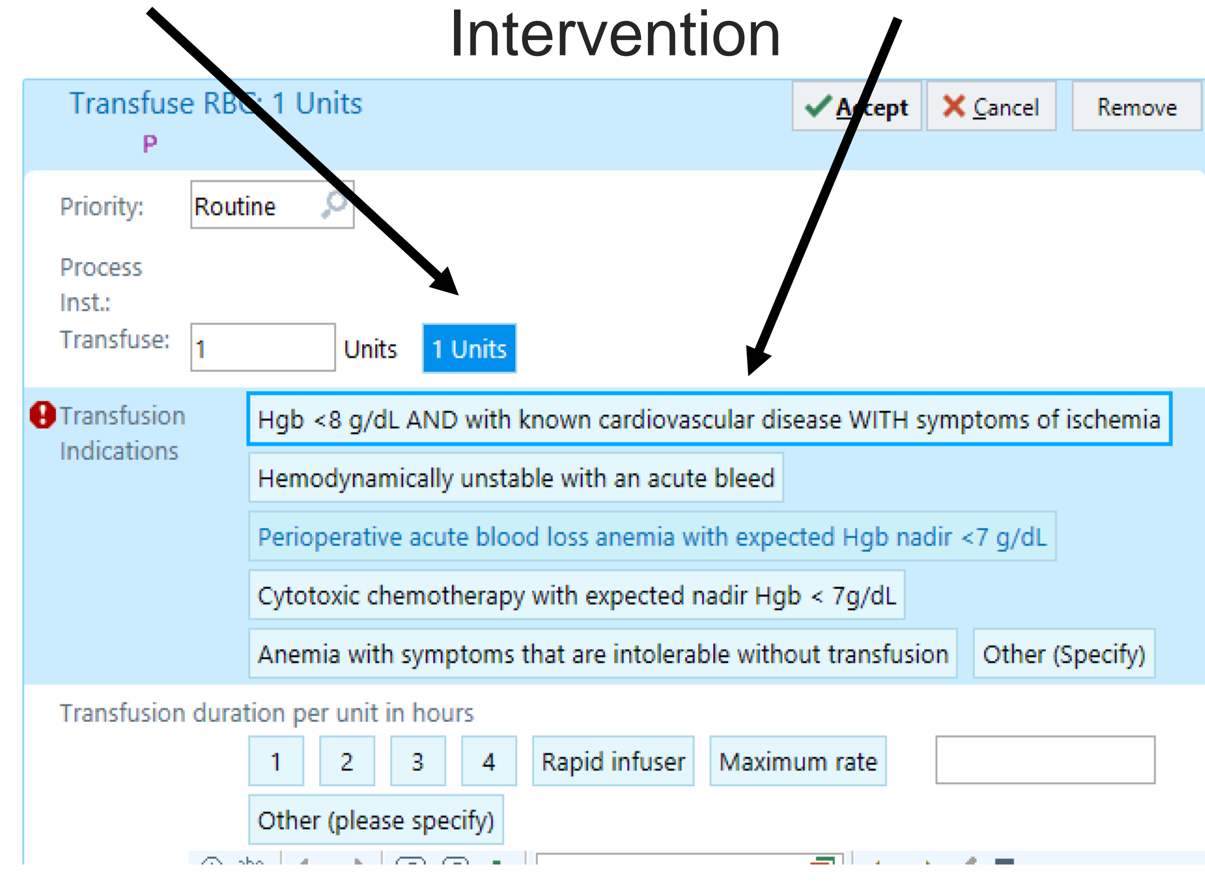
Decision Structure

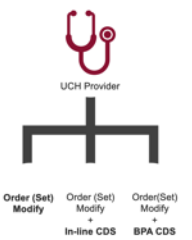
Decision Structure + Information

Original



Intervention





Transfuse RBC: 1 Units

P

Accept | Cancel | Remove

Priority: Routine

Process Inst.:

Transfuse: 1 Units | 1 Units

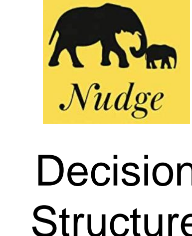
Transfusion Indications

If Hgb 6.9 g/dL or less – indications not displayed

Transfusion duration per unit in hours

1 | 2 | 3 | 4 | Rapid infuser | Maximum rate

Other (please specify)

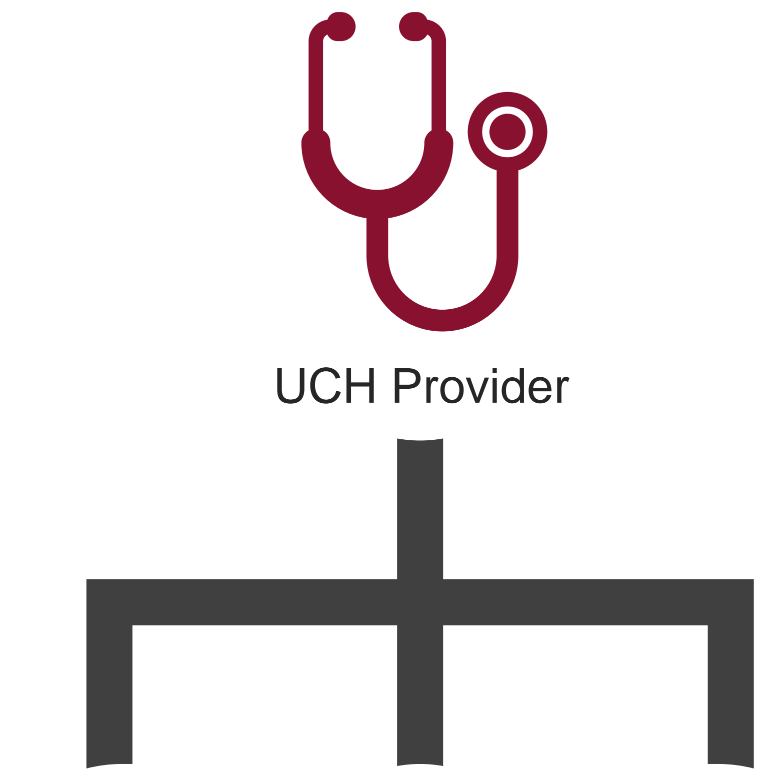


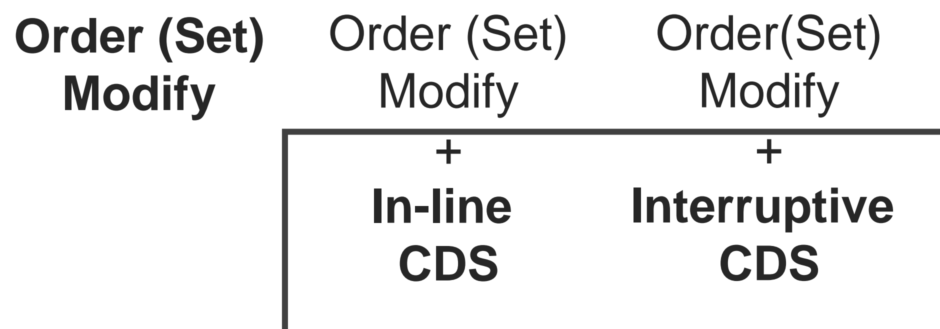
Decision Structure

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?





Non-Interruptive Conditional Alert

Decision Information

▾ Red Blood Cells

! Potential Patient Harm - Consider Restrictive Transfusion Strategy

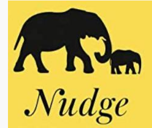
Lab Results Last 3 days.

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



Decision Assistance

Transfusing 1 Unit at a time is preferred

The prepare order notifies the Blood Bank of the quantity of blood products needed as well as any special requirements. The transfuse order goes to the nursing staff. It provides transfusion instructions, includes hyperlinks that allow the nurse to notify the Blood Bank when the ordered product needs to be released, and launches administration documentation groups in flowsheets.

Interruptive (BPA) Conditional Alert

Decision Information

BestPractice Advisory - Bruce, Stella

Attention (1)

Potential Patient Harm (#8010)

Consider Restrictive Transfusion Strategy

Hemoglobin

Date	Value	Ref Range	Status
04/18/2021	7.5 (A)	12.1 - 16.3 g/dL	Corrected

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

Transfusing 1 unit at a time is preferred

Remove the following orders?

Remove | Keep

Transfuse RBC: 1 Units
Routine, Transfuse 1 Units

Acknowledge Reason

- Hgb <8 g/dL AND with known cardiovascula...
- Hemodynamically unstable with an acute b...
- Perioperative acute blood loss anemia wi...
- Cytotoxic chemotherapy with expected nad...
- Anemia with symptoms that are intolerabl...
- Other (Specify)

Accept

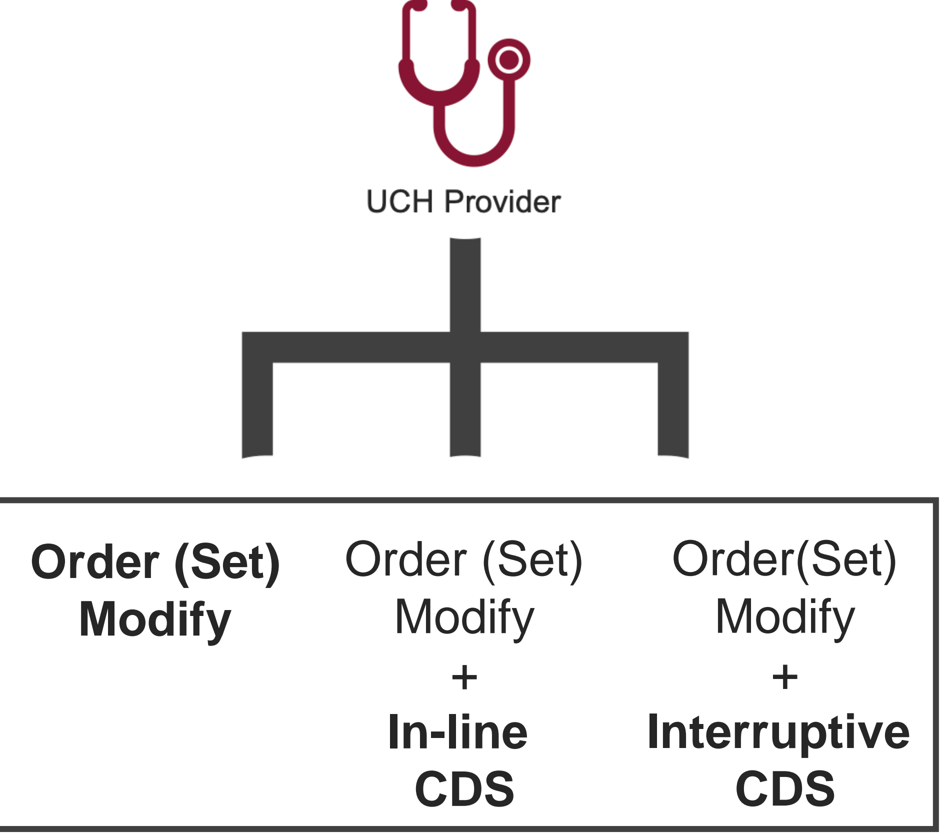
Nudge

Decision Structure

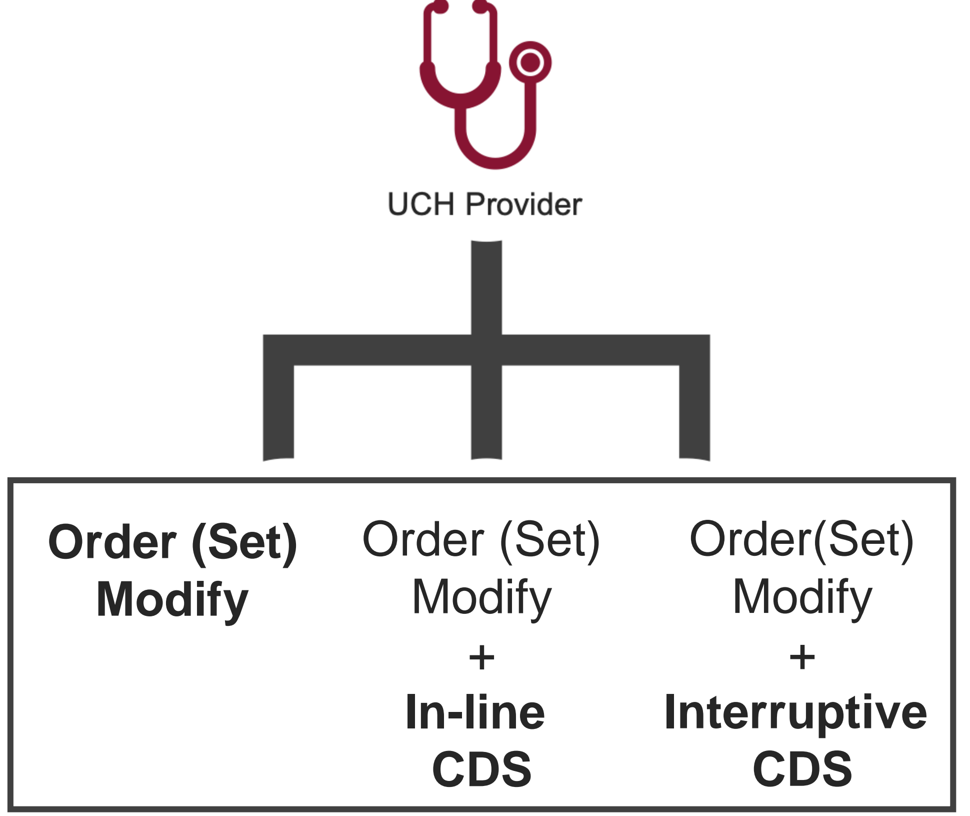
Nudge

Decision Assistance

Results



Results

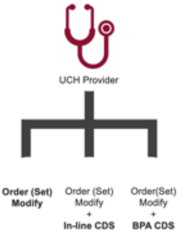


Characteristic	Overall, N = 10,451[1]	Group 1, N = 3,254[1]	Group 2, N = 3,675[1]	Group 3, N = 3,522[1]
compliant_type				
compliant	5,239 (50.2%)	1,599 (49.2%)	1,743 (47.5%)	1,897 (53.9%
non-compliant_hgb	4,682 (44.8%)	1,503 (46.2%)	1,740 (47.4%)	1,439 (40.9%
non-compliant_units	520 (5.0%)	150 (4.6%)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

[1]n (%)

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

NO difference between groups



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

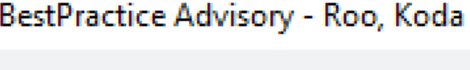
Results

Estimated number of units “saved” in one-year

1827

Nudge

?



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

Decision Information

Provide access to relevant information.

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

Nudge

Decision Structure?

Dismiss

Ride

Morning Ride
22 hours ago by Jille Duffy

Add friends who didn't record or aren't on Strava yet.

Add Friend

15:20 MOVING TIME

3 MI DISTANCE

11.9 MPH AVG SPEED

87 FT ELEVATION GAIN

70 CALORIES

THIS WEEK

0 / 10 mi

M T W T F S S

0h0m

0 ft

THIS YEAR

5 / 350 mi

TODAY

149 mi behind pace

Manage Your Goals

Ride

Morning Ride
22 hours ago by Jill

Add friends who didn't recor
aren't on Strava yet.

15:20
MOVING TIME

11.9 MPH
AVG SPEED

87 F
ELEVATION

THIS WEEK
0 / 10 mi

M T W T F S S

0h0m | 0 ft

THIS YEAR
5 / 350 mi

TODAY

149 mi behind pace

Manage Your Goals

Decision Assistance

Facilitate commitment: Encourage self and/or public commitment

15%
$2.45

20%
$3.26

25%
$4.08

Custom Tip Amount

No Tip

15%	20%	25%
$2.45	$3.26	$4.08

Custom Tip Amount

No Tip

Decision Information

Provide social reference point.

Decision Structure

Chronic Opioid Patients

Data as of: 10/31/2014

Go Back

	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

15

$2

Information

ial reference point.

Chronic Opioid Patients

Provider 1

	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

cture

Nudge

?

Decision Structure

Changing the salience of certain options.

Breakout #1

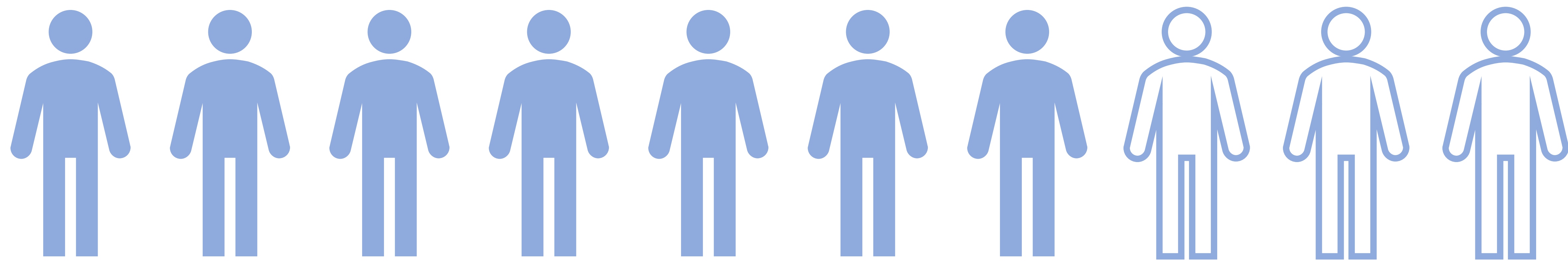
15 minutes

Design a Nudge for your problem/project!

Making Human-Centered Solutions with Design Thinking

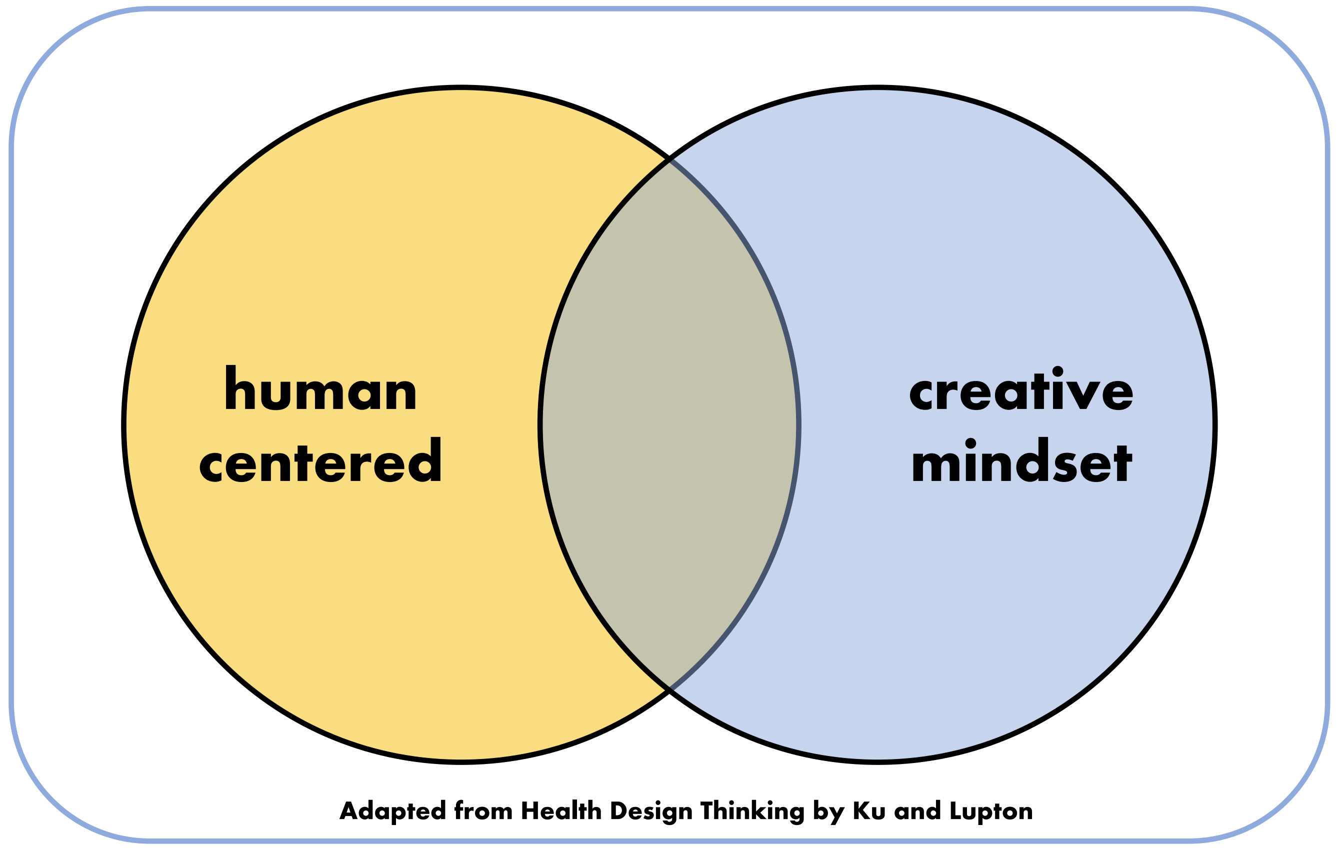
Sam Porter, MD

"more than seven out of ten adults believe the U.S. health system needs fundamental change or complete rebuilding."

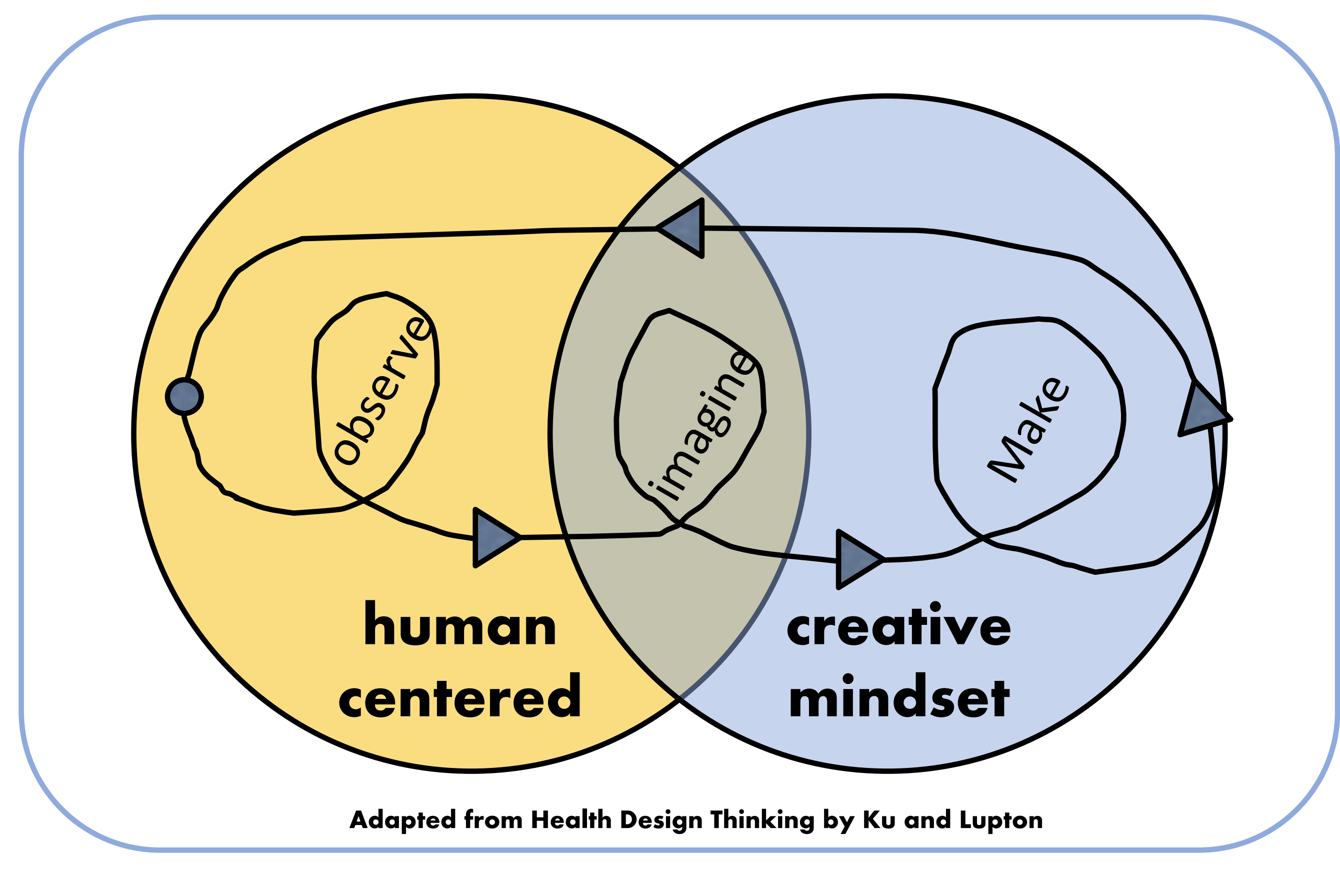


Stremikis K, Schoen C, Fryer A.K. A call for change: the 2011 Commonwealth Fund Survey of Public Views of the U.S. Health System. Issue brief. April 2011;6:1–23.

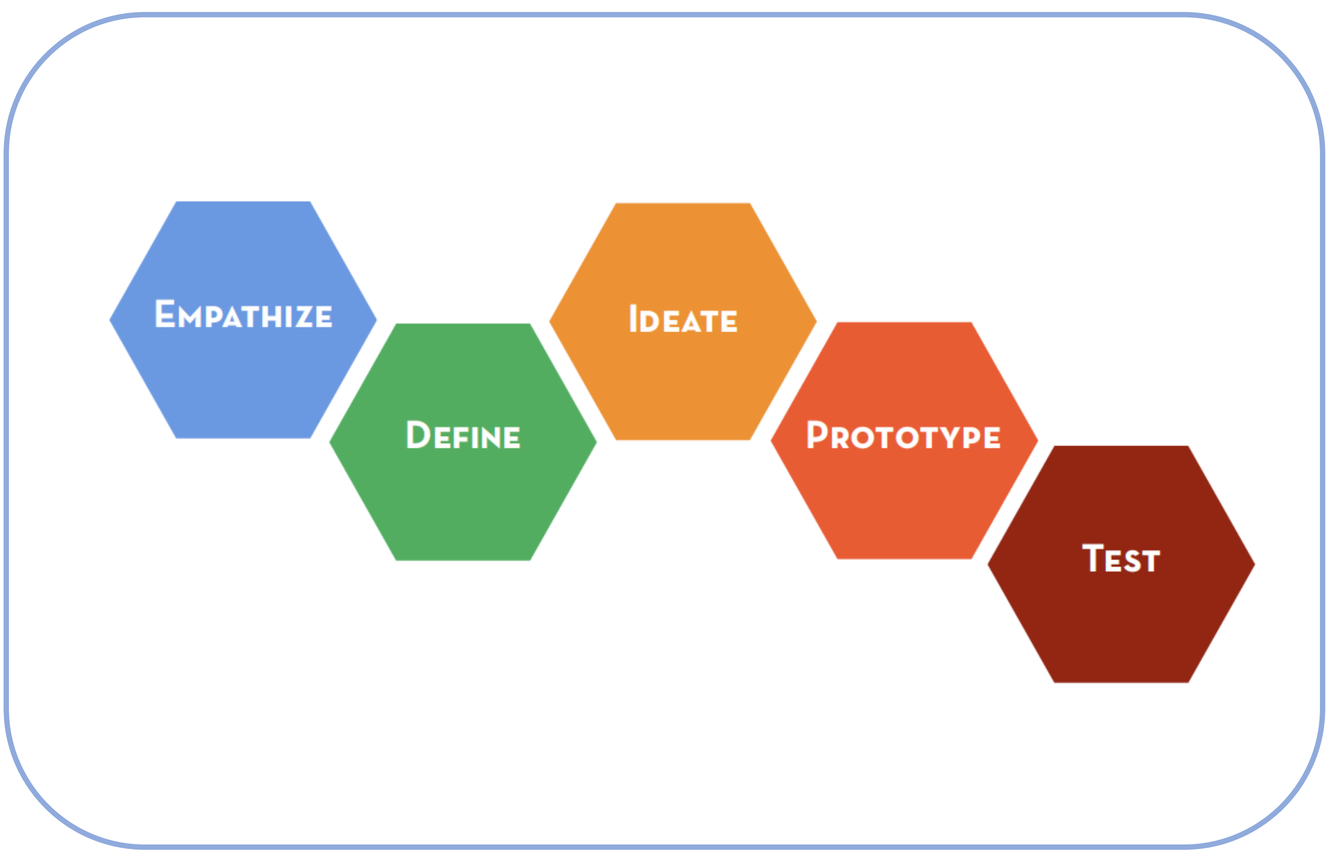
What is Design Thinking?



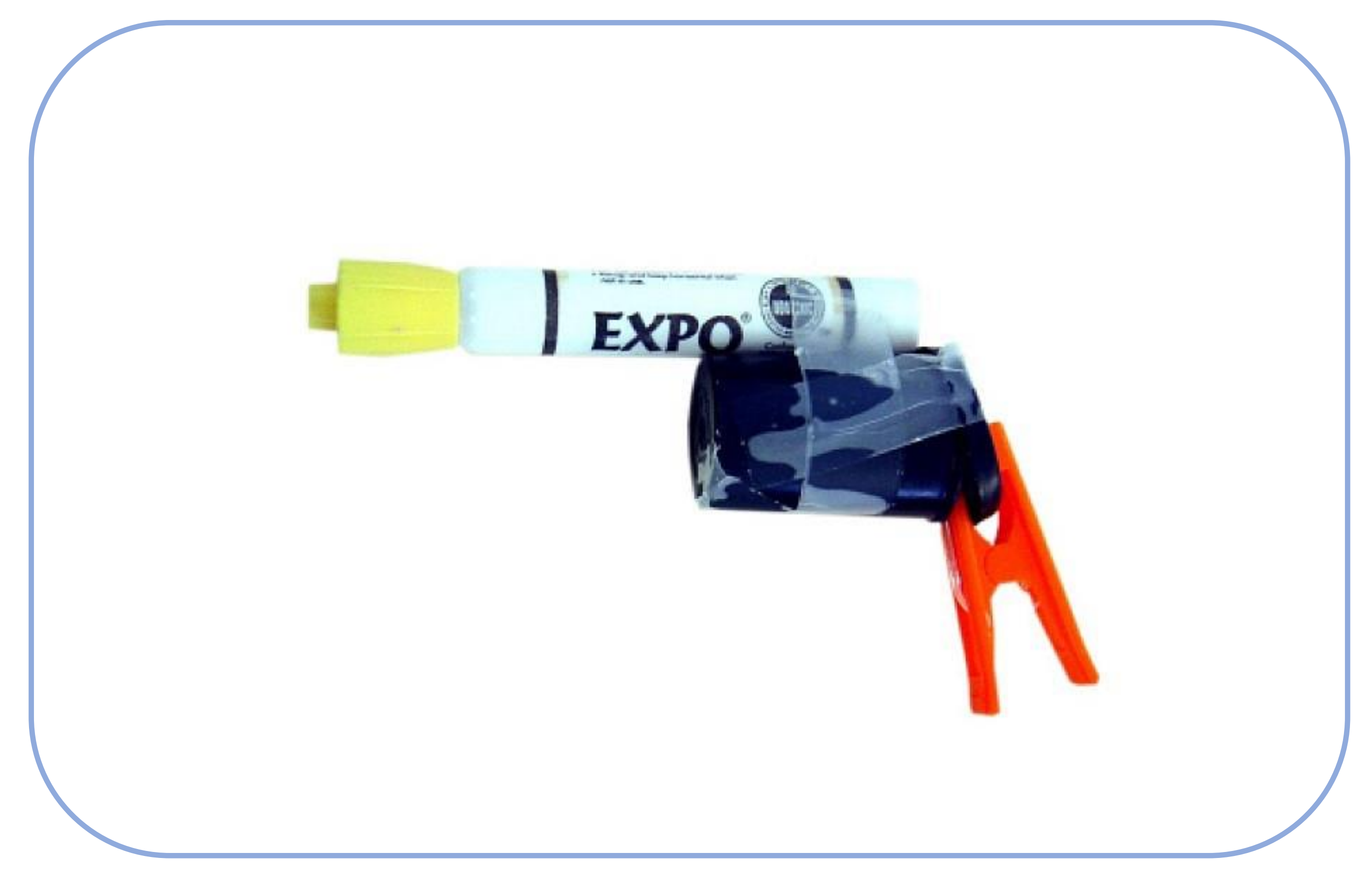
What is Design Thinking?



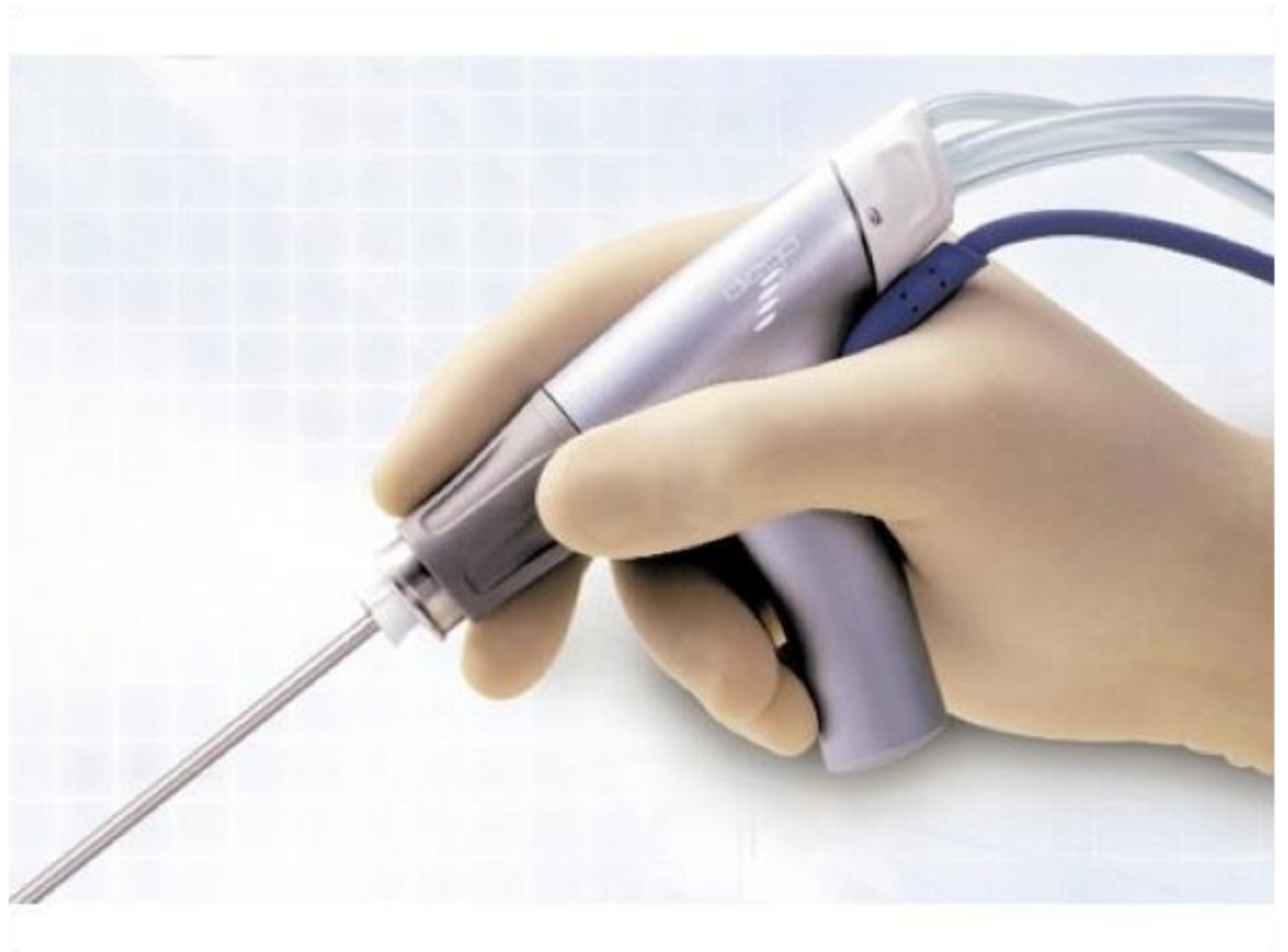
What is Design Thinking?



Is Design Thinking effective?



Is Design Thinking effective?



Is Design Thinking effective?

TILT

Is Design Thinking effective?

Journey map

Diagnosed · Pre-treatment · Treatment · Post-treatment · Alumni Status

Diagnosis

Where to find information about my disease?

Didn't realize parking is free

Unexpected mask

1st day of treatment completed

Feeling side effects

Recovering

Unable to swallow Frustrated

Hospitalization for dehydration

Search binder Overwhelmed by info

Low energy Feel isolated from friends

Complete treatment

Low energy level continues

Missed "personal care"

1 month visit: Doing well

Caregiver doesn't understand low energy

Excited to join alumni

Diagnosed with CHF

Someone else in alumni group has CHF & helps pts feel better

Introduction | **Research** | Insights | Ideation & Prototypes | Next Steps

Source: Laura Ceccacci, Paige Kennedy, Alex Wan, University of Pennsylvania

Solution workflow

Diagnosed · Pre-treatment · Treatment · Post-treatment · Alumni Status

Introduction · Research · Insights · Ideation & Prototypes · Next Steps

Source: Laura Ceccacci, Paige Kennedy, Alex Wan, University of Pennsylvania

1 DESIGN THE RIGHT THING

2 DESIGN THINGS RIGHT

PROBLEM

PROBLEM DEFINTION

SOLUTION

RESEARCH

DISCOVER

EXPLORE
DEFINE

DESIGN

DEVELOP
TEST

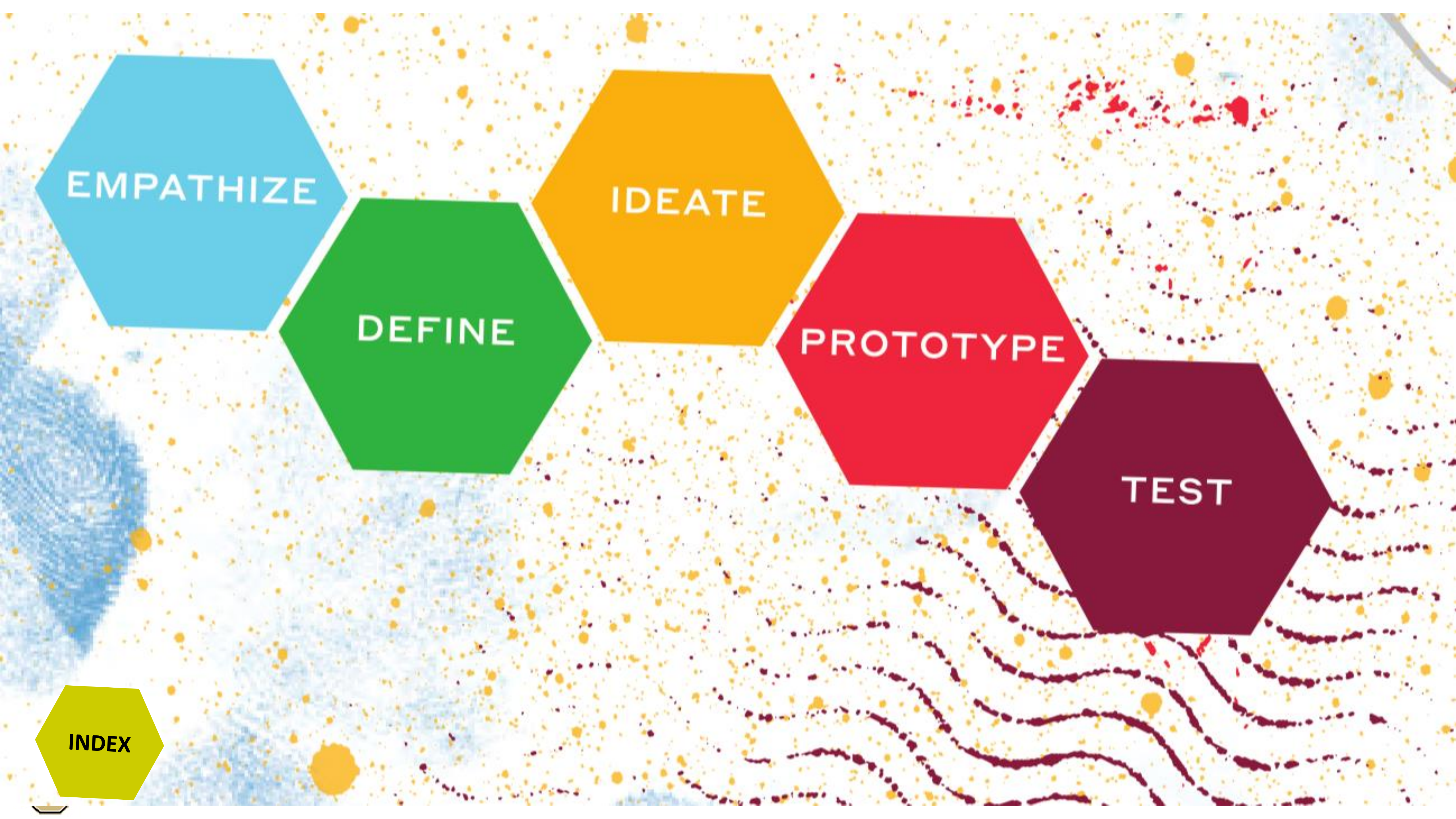
DELIVER
LISTEN

Insight into
the Problem

Scope down
the Focus

Potential
Solutions

Solutions that Work
& Receive Feedback



EMPATHIZE
DEFINE
IDEATE
PROTOTYPE
TEST
INDEX

EMPATHIZE

Build **empathy** for your audience by learning their **values**

DEFINE

Unpacking the findings from empathizing into **needs** and **insights** to develop a **point of view**

IDEATE

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**

PROTOTYPE

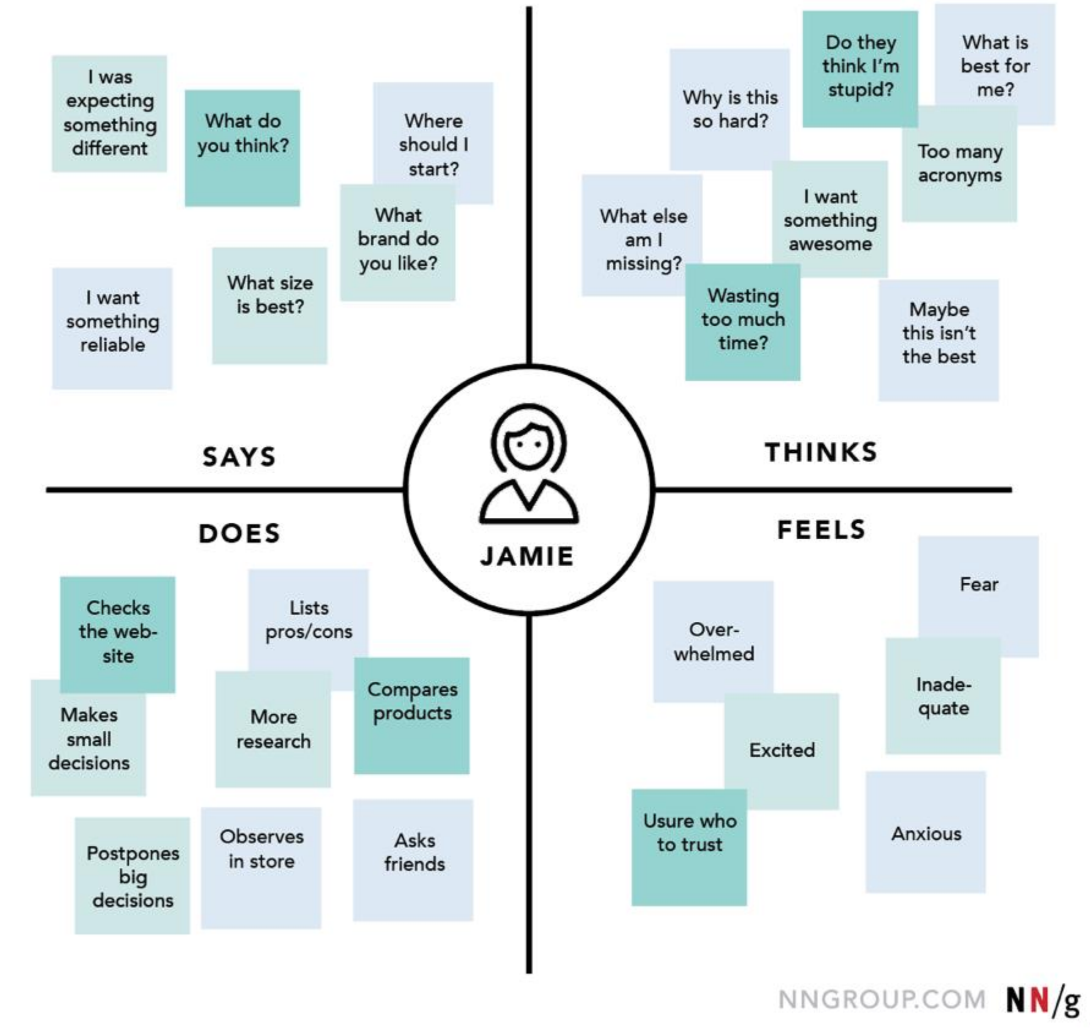
Prototyping is getting projects **out of your head** and **into the world**

TEST

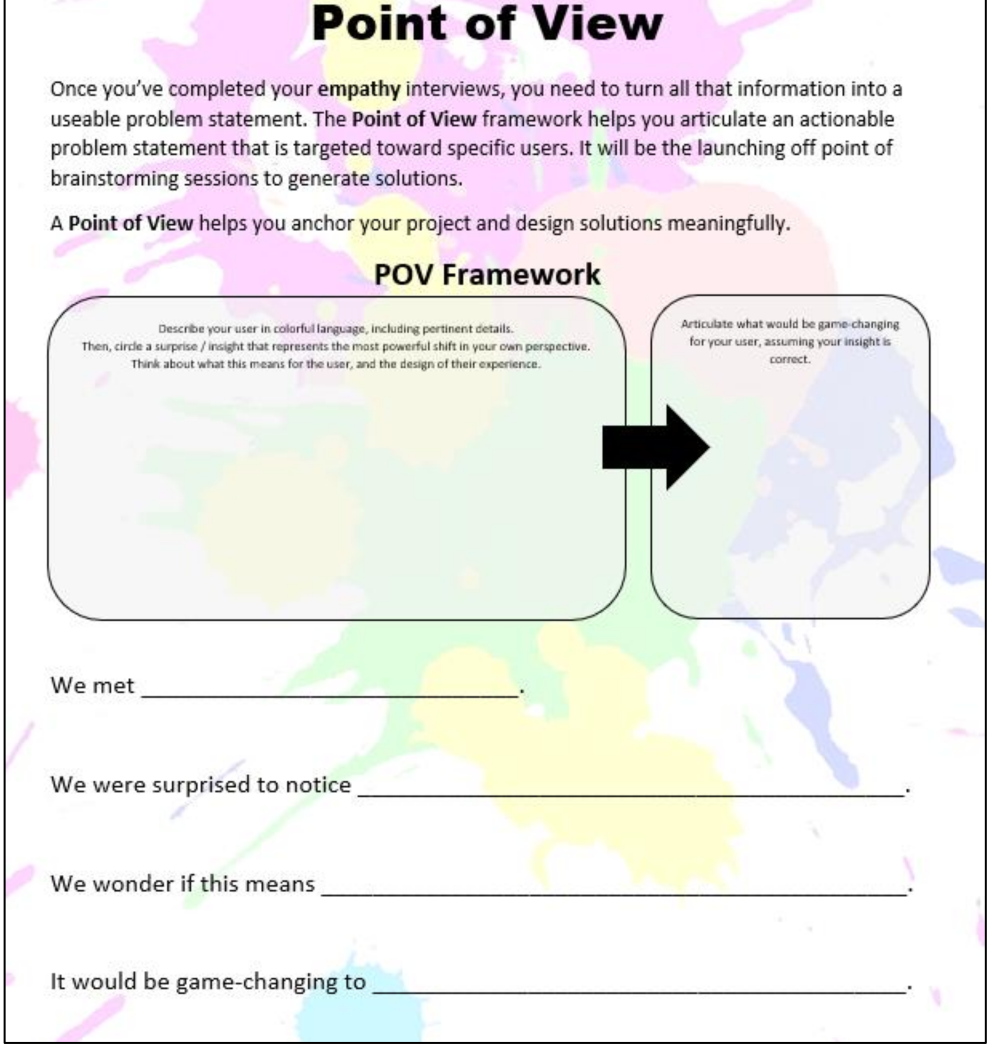
Testing is how to gather feedback, **refine solutions**, and continue to **learn** about your users.

Empathy Mapping

- Structured archetype of an individual
- Representative of a group of people with common experiences, emotions and needs
- Solving for a persona solves for many individuals
- Empathy maps help generate understanding of personas



Point of View



Point of View

Once you've completed your **empathy** interviews, you need to turn all that information into a useable problem statement. The **Point of View** framework helps you articulate an actionable problem statement that is targeted toward specific users. It will be the launching off point of brainstorming sessions to generate solutions.

A **Point of View** helps you anchor your project and design solutions meaningfully.

POV Framework

Describe your user in colorful language, including pertinent details.
Then, circle a surprise / insight that represents the most powerful shift in your own perspective.
Think about what this means for the user, and the design of their experience.

Articulate what would be game-changing for your user, assuming your insight is correct.

We met ______________________________.

We were surprised to notice ____.

We wonder if this means ____.

It would be game-changing to ____.

Ideation, Prototyping, and Testing

1 DESIGN THE RIGHT THING

2 DESIGN THINGS RIGHT

PROBLEM

RESEARCH

DISCOVER

EXPLORE
DEFINE

PROBLEM DEFINTION

DESIGN

DEVELOP
TEST

DELIVER
LISTEN

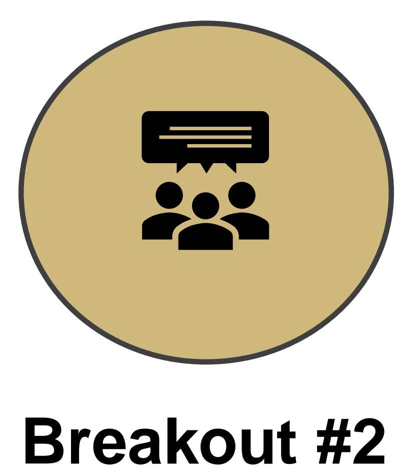
SOLUTION

Insight into
the Problem

Scope down
the Focus

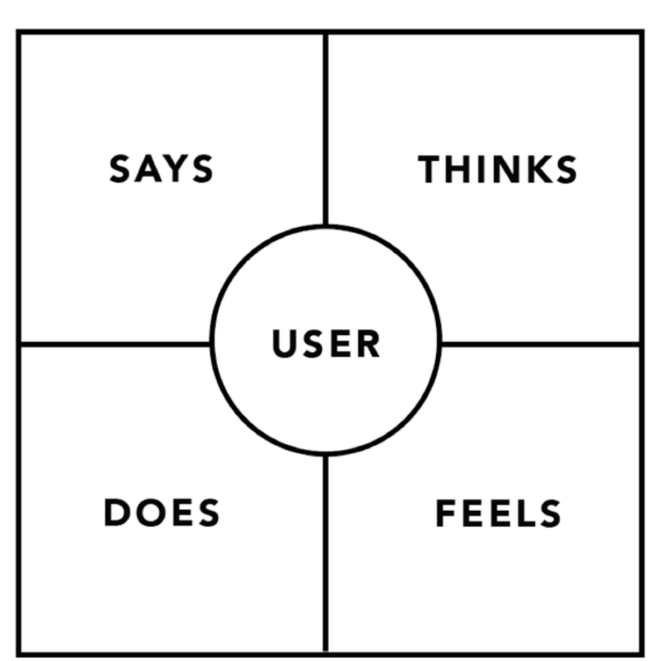
Potential
Solutions

Solutions that Work
& Receive Feedback



Breakout #2

Define a Problem Using Empathy Mapping!



20 minutes

Part 1: Full Group (10 min)

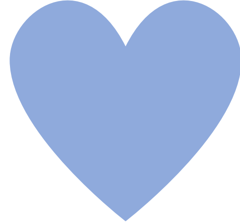
Take notes while we interview a provider about their experience prescribing opioids. Note **phrases, thoughts, and feelings** as well as the **things they say they do**.

Part 2: Breakouts (10 min)

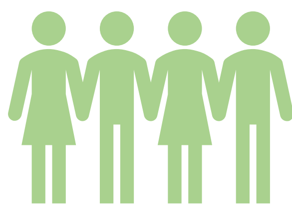
Each breakout group will be assigned a different section of the **Empathy Map** to fill out. Then, we'll come together and discuss our insights and put them together into a Point of View.

Why choose design thinking?

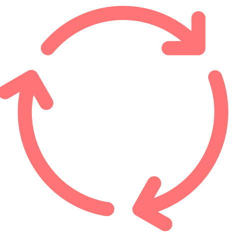
It is an applied research and innovation framework that:



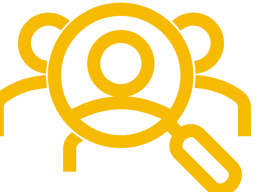
prioritizes empathy



involves highly diverse and collaborative teams



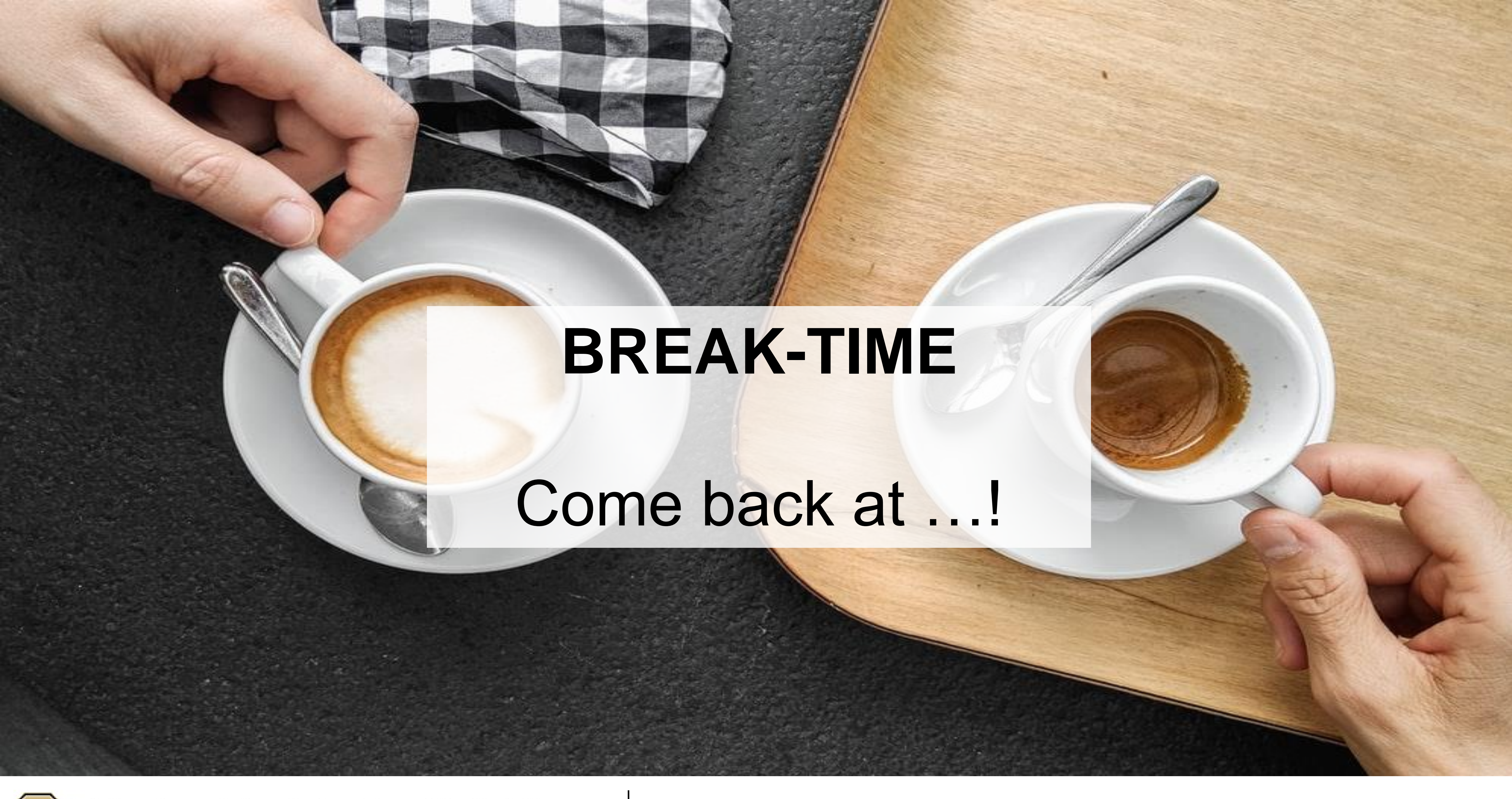
encourages action-oriented rapid prototyping



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.

Thank You


BREAK-TIME
Come back at ...!

User-centered design

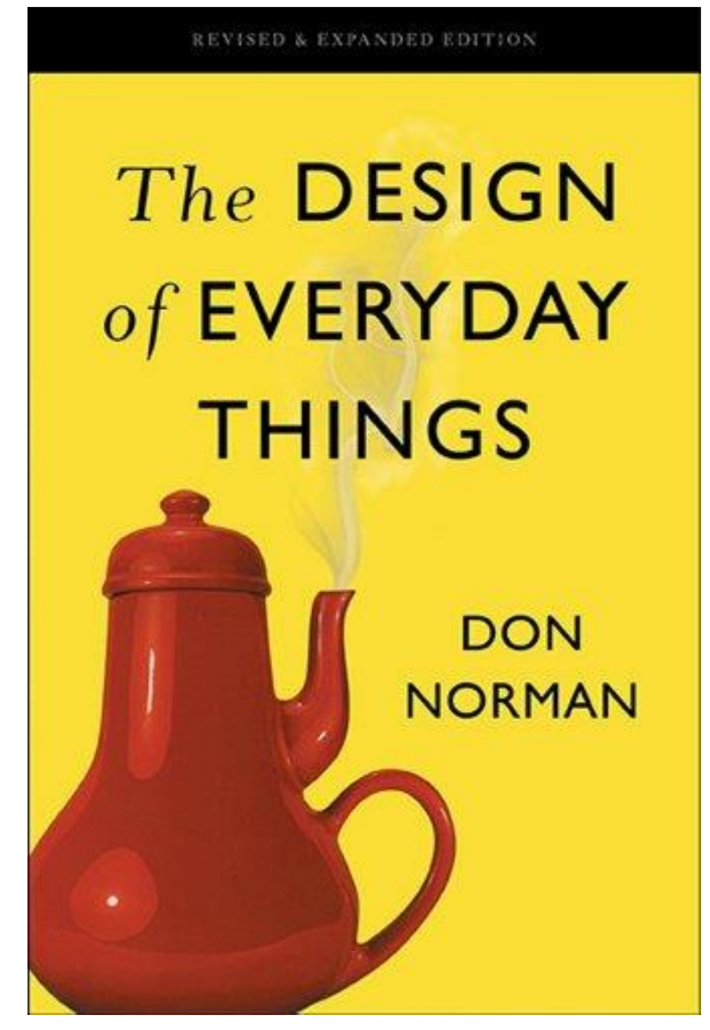
Brad Morse, PhD, MA
brad.morse@cuanschutz.edu

Objectives

- Define User-centered design [UCD]
- Provide rational for using UCD
- Clarify UCD principles
- Illustrate the UCD process
- Usability testing
- Breakout

Origins

- The term was coined in 1977 by Rob Kling who was working in the domain of software design. The term was popularized by Don Norman who incorporated the idea in his work on improving how people experience the use of items.



Kling, R. (1977). The organizational context of user-centered software designs. MIS quarterly, 41-52.

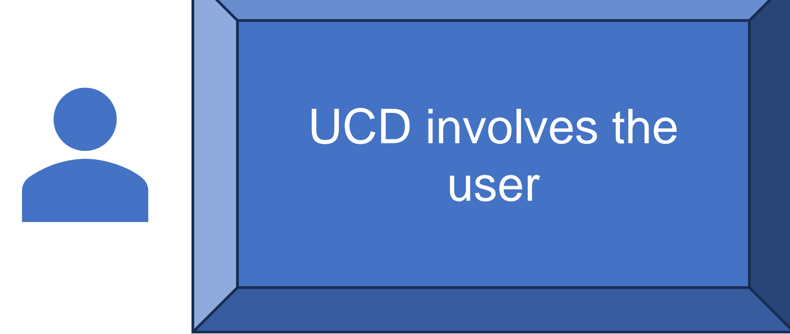
Origins

- Good design is possible!
- Make things visible
- Exploit natural relationships that marry function & control
- Use constraints strategically
- GOAL: guide the user to the right action, on the right control, at the right time

Kling, R. (1977). The organizational context of user-centered software designs. MIS quarterly, 41-52.

Definition

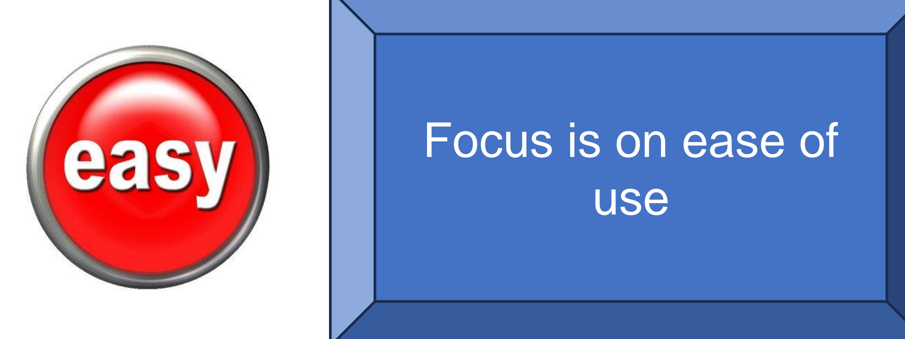
- UCD is an iterative design process in which designers focus on the users and their needs in each phase of the design process
- Design teams involve users throughout the design process via a variety of research and design techniques, to create highly usable and accessible products for them



https://www.interaction-design.org/literature/topics/user-centered-design

Definition

- Human-centered design is an approach to interactive system development that focuses specifically in making systems usable
- It is a multi-disciplinary activity



Human centered design processes for interactive systems, ISO 13407 (1999)

How Design Thinking and UCD are related:

Design Thinking

- Focused on desirability, feasability, and viability
- Good for identifying and solving "wicked" or complex problems

Empathy

Problem-solving

Iteration

Collaboration

User-centered Design

- Focused on user needs and feedback
- Good for designing highly desirable products for a specific population

- Design thinking utilizes abductive reasoning to identify and solve complex problems that may affect product design or organizational policies, processes, and function.
- User-centered design focuses on fostering deep empathy with the population you are designing for. The goal is to create solutions with users' needs and feedback at the forefront of all design decisions.

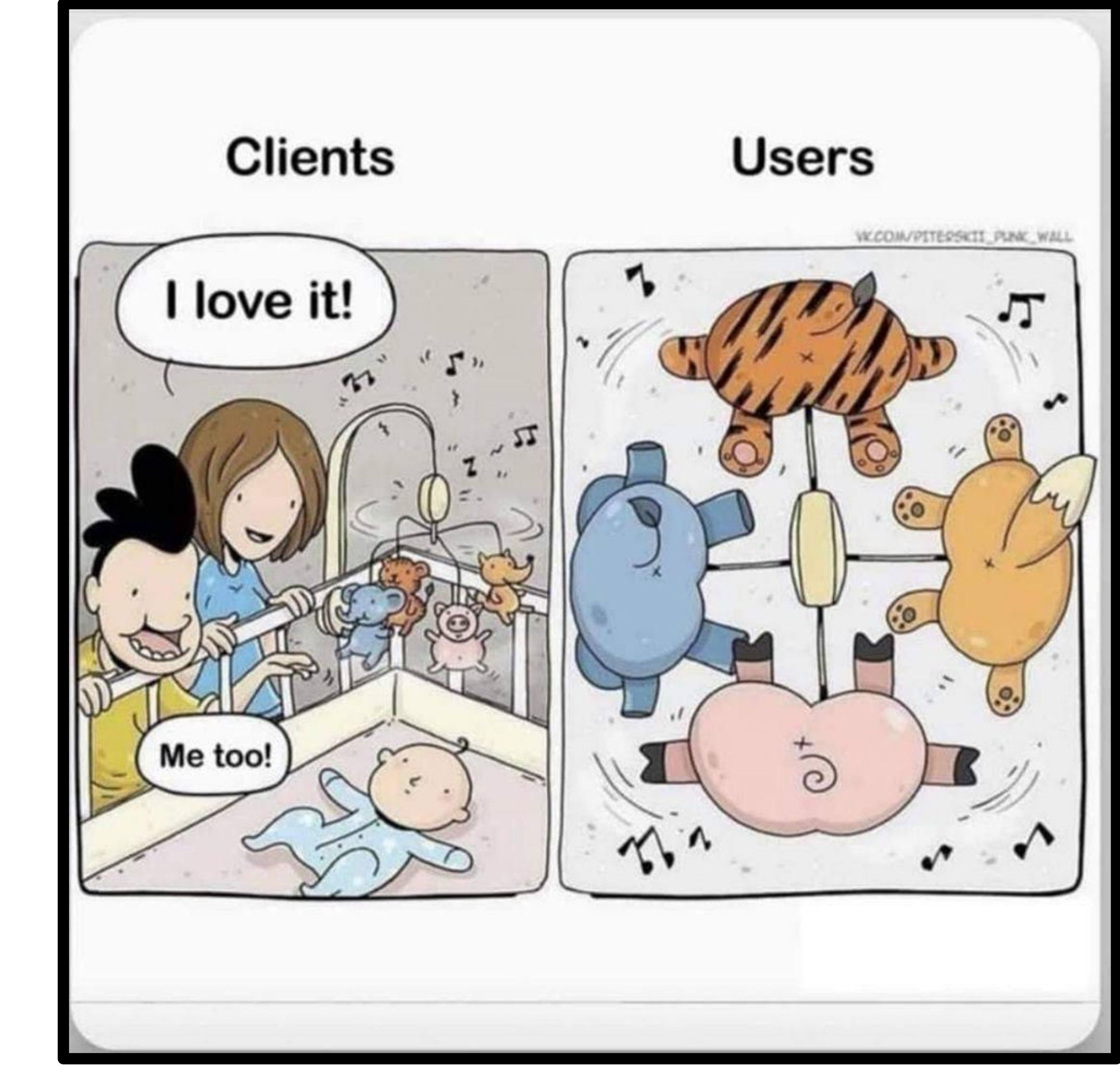
Definition: Users/Clients/Designers

Designers are NOT users

- Difference in orientation to the solution

If designers adopt the user identity, they must...

- Acknowledge biases
- Avoid designing for themselves
- Limit allowing their own experiences with proposed solutions to sway opinions



Rational:

The goal of UCD is to see problems from the perspective of users, and then design delightful solutions

Rational: UCD seeks to answer

- User needs
- Task details: frequency & order
- Context in which happens
- Constraints
- Expectations of functionality
- Output required and its form
- FACILITATE the USERS COGNITIVE PROCESS

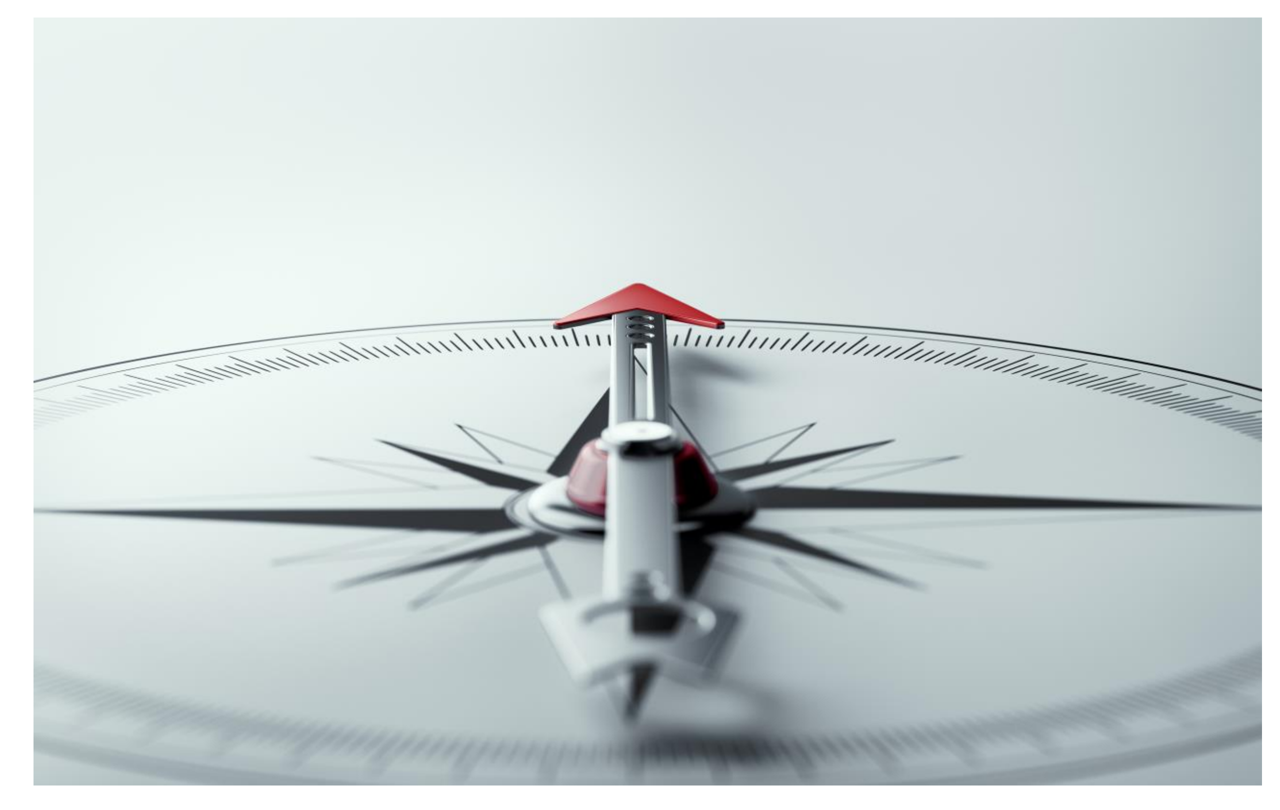
UCD Principles

1. User focus
2. Active user involvement
3. Evolutionary systems development
4. Simple design representation
5. Prototyping
6. Evaluate use in context

Gulliksen, J., et al. Key principles for user-centred systems design. Behaviour and Information Technology, 22(6), 397-409.

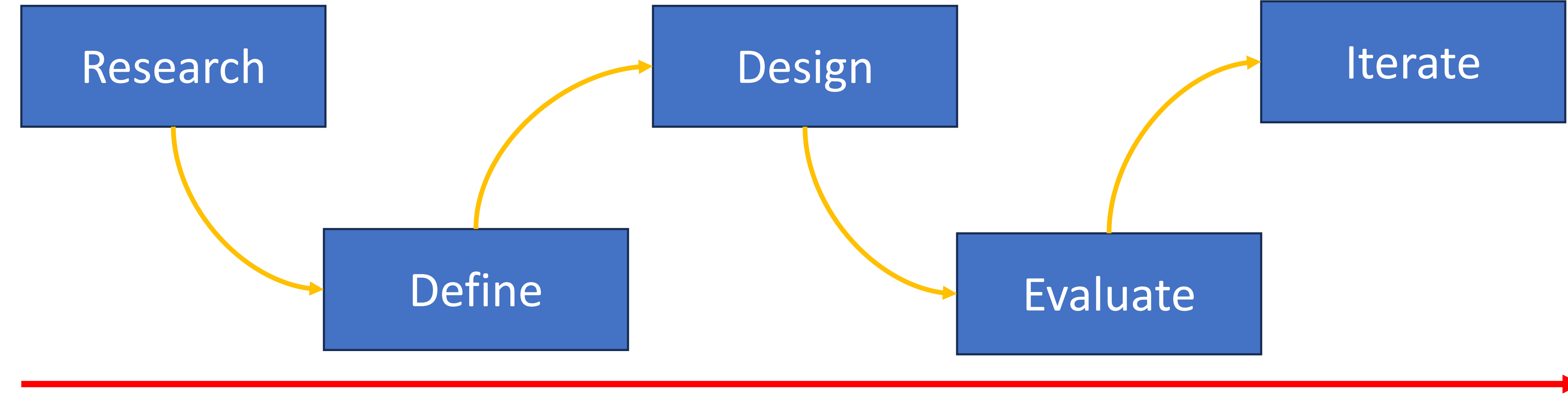
UCD Principles

7. Explicit and conscious design activities
8. A professional attitude
9. Usability champion
10. Holistic design
11. Processes customization
12. A user-centered attitude



Gulliksen, J., et al. Key principles for user-centred systems design. Behaviour and Information Technology, 22(6), 397-409.

UCD Process



https://www.reveall.co/guides/user-centered-design

UCD Process: Alternate Process Map

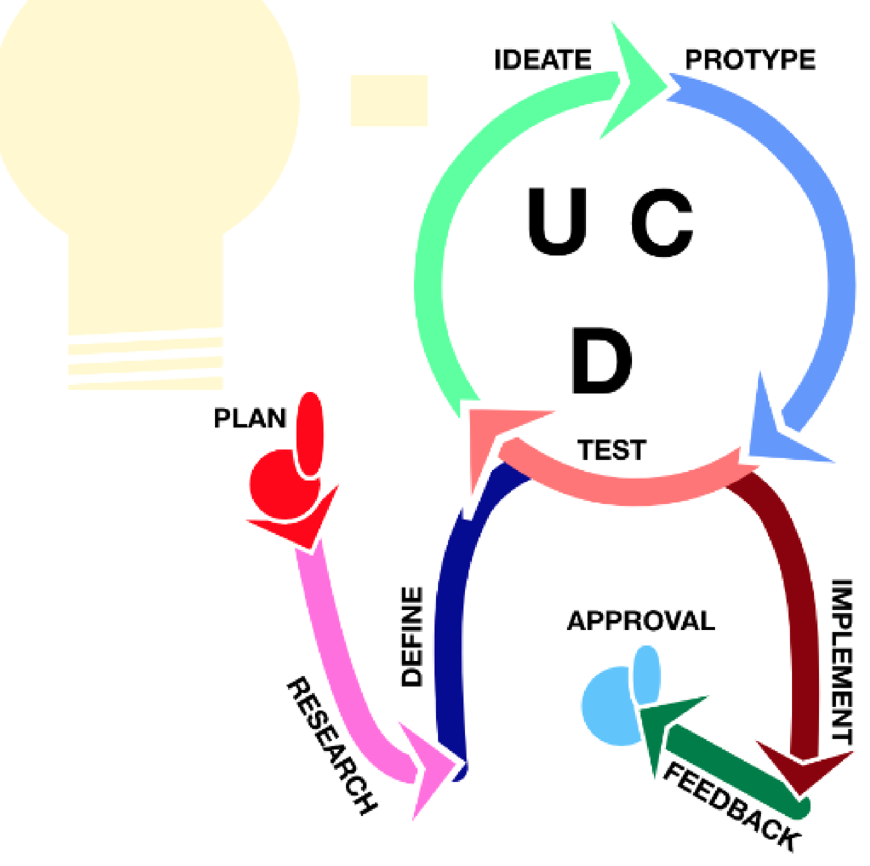


Image created by Omar Corona, September 18, 2019

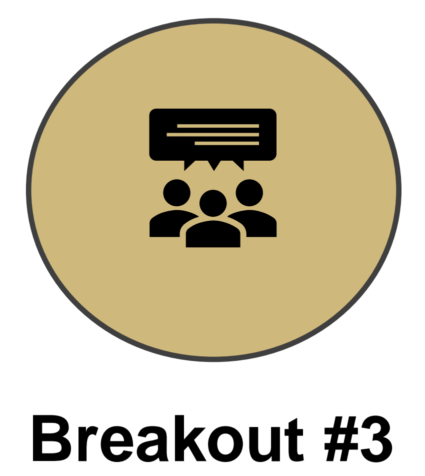
Usability testing: Think aloud

Lewis, Clayton. *Using the "thinking-aloud" method in cognitive interface design.* Yorktown Heights: IBM TJ Watson Research Center.

Think aloud: Implementation details

Usability testing must be context-rich and accurate. The data you collect should reflect actual world parameters where the work organically happens.

1. Virtual
2. In-person
3. Contextual analysis
4. Data collection forms



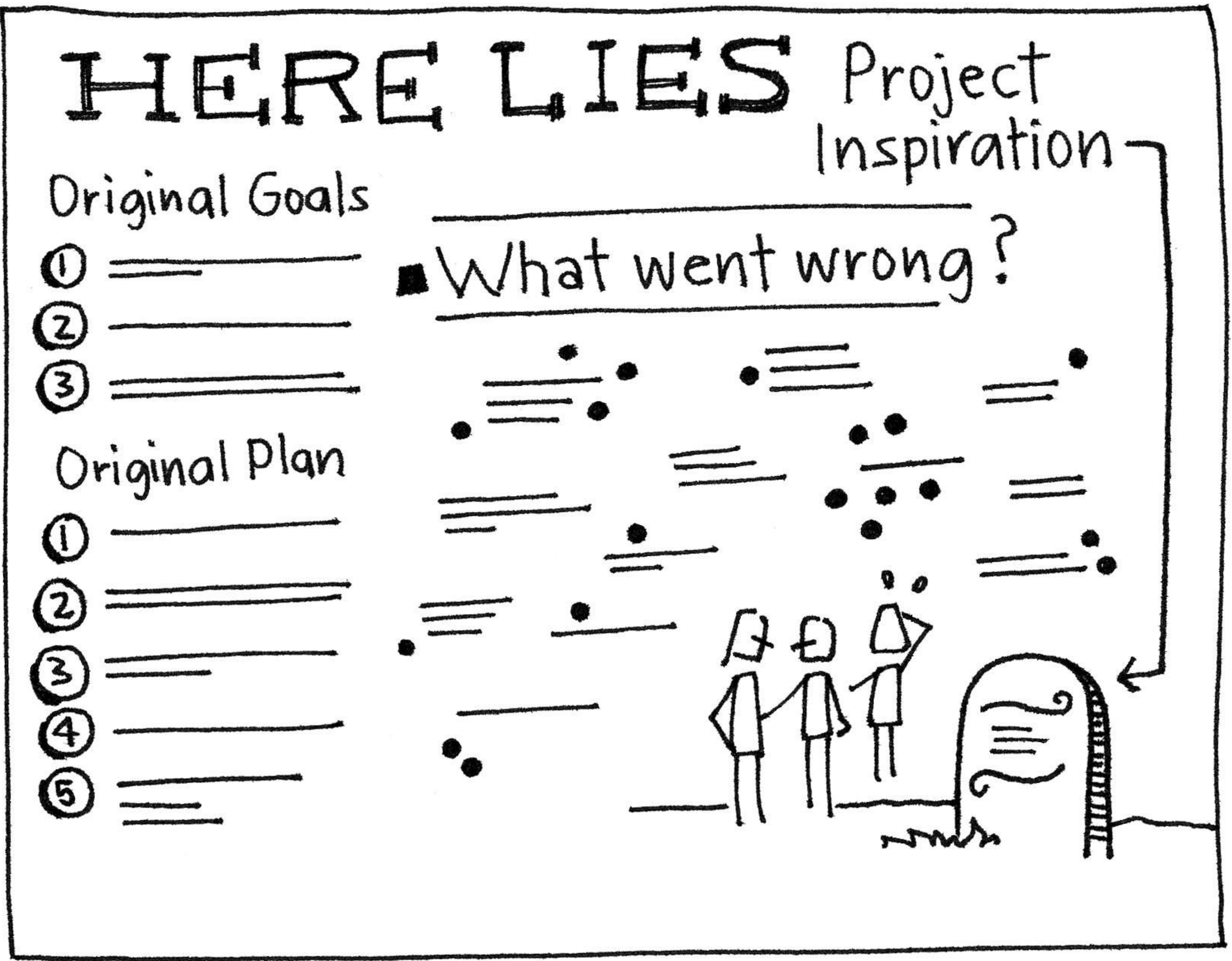
Breakout #3

10 minutes

Usability Testing Planning

1. Where does the test take place?
2. What time does the test happen?
3. How will you simulate the real world?
4. What data will you collect?

Pre-Mortem Analysis



Pre-Mortem Analysis

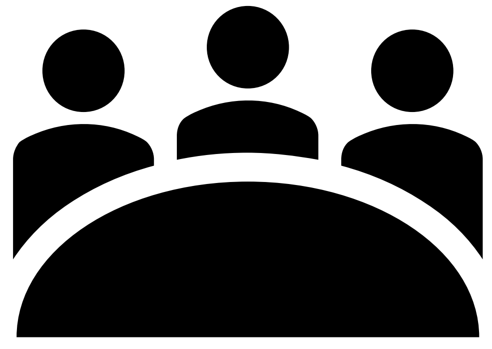
- Comes at the beginning of a project rather than the end
- Unlike a typical problem identification session in which stakeholders are asked what might go wrong, the premortem assumes that the project has been implemented and failed, and asks what did go wrong.

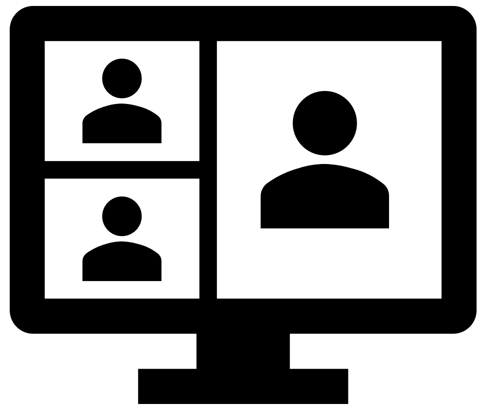
https://www.perinatalqi.org/page/BrainwritingPremorte

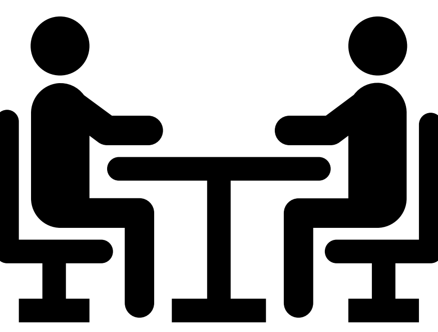
Pre-Mortem Analysis

- quickly engages QI stakeholders
- 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.

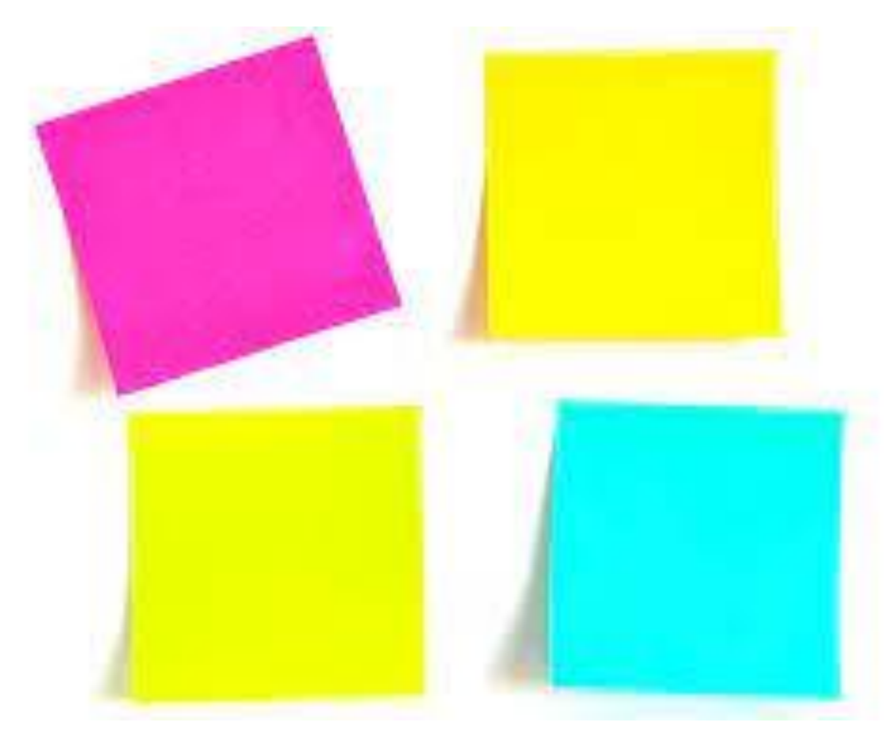
Pre-Mortem Analysis

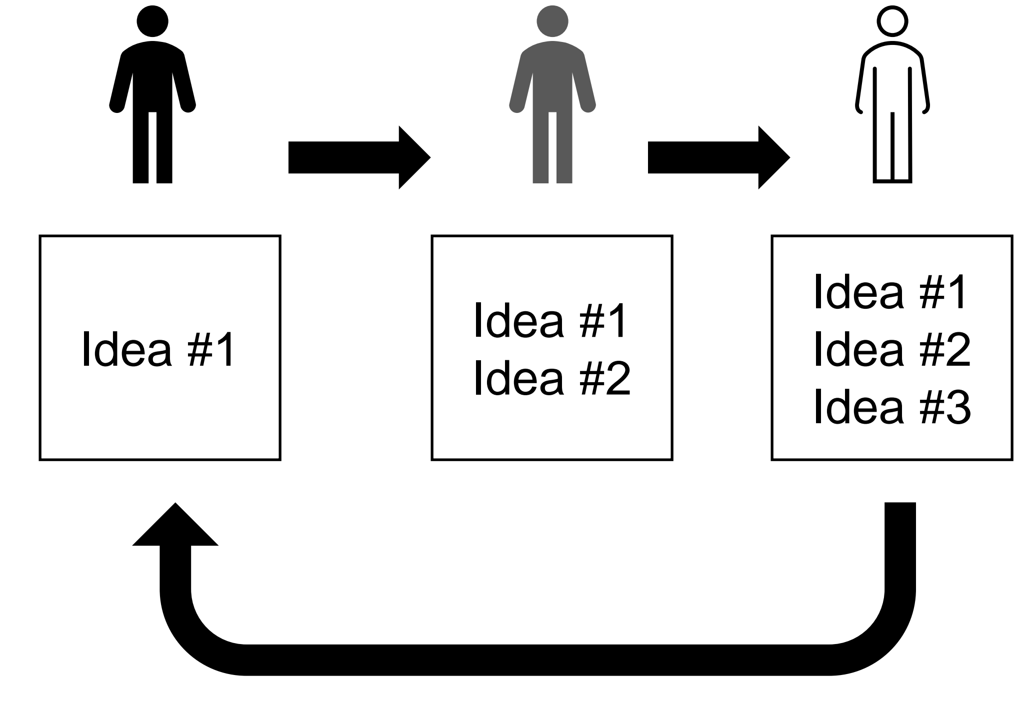






Pre-Mortem Analysis: Brain Writing





6 participants
3 ideas / participant
5 times passing ideas

Anschutz

IHQSE