

Human Centered Design in Radiology

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Disclosures:

- ▶ NIH/NINDS NS103824
- ▶ NIH/NINDS/NIA NS117643
- ▶ NIH/NINDS NS100417
- ▶ NIH/NINDS NS 069763
- ▶ NIH/NINDS NS120493
- ▶ NIH/NINDS U01 NS120910
- ▶ NIH/NINDS U01NS100699
- ▶ NIH/NINDS U01NS110772
- ▶ NIH/NINDS U01NS117450
- ▶ NIH/NIA AG077497
- ▶ PI, Imaging Core Lab, ENDOLOW Trial, Cerenovus
- ▶ Consultant, Nervive, Inc
- ▶ Consultant, Viz.ai, Inc

What is Human Centered Design?

Design is the act of changing existing situations into preferred ones.

- Herb Simon



**Creative problem
solving**



Empathy



**Feasible, holistic
solutions**



Story telling



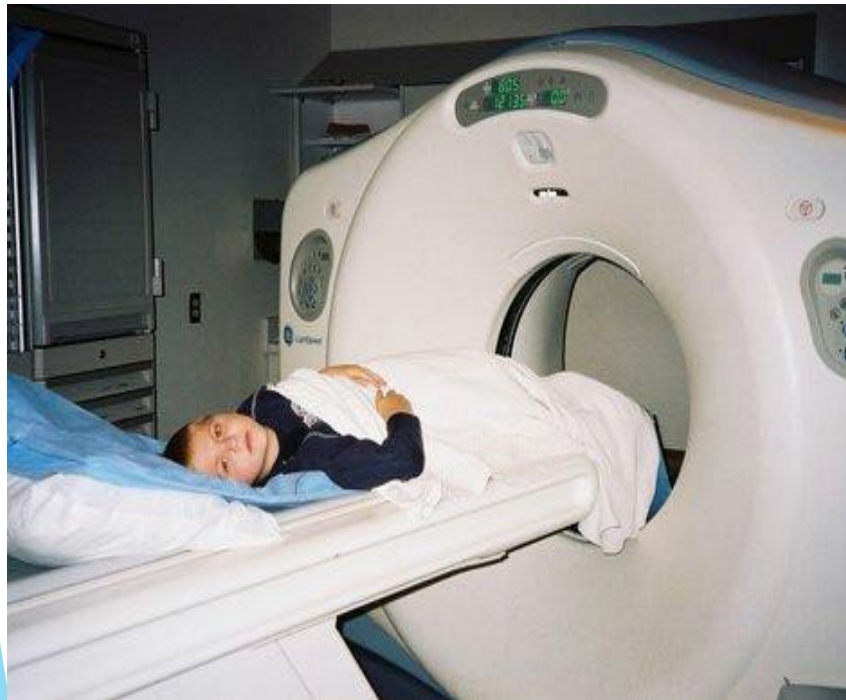
**Rapid prototyping
and testing**

ESSENTIAL
SOLUTIONS
ARE VERY OFTEN
SIMPLE
USUALLY HUMAN-CENTERED



LISTEN TO
YOUR USERS..

The Adventure Series



The Submarine Adventure



The Coral Adventure



The Cozy Camper



Human centered design applications

- ▶ Bridging gaps that occur during the patient's healthcare journey.
- ▶ More than designing equipment and spaces
- ▶ Designing systems and operations

Why it matters?

- ▶ Greatest challenges in healthcare are centered at the human level.
- ▶ Focusing on the patient rather than the patient's condition
- ▶ Consumer experience matters
- ▶ Deeper engagements of ALL users (designing “with” and not “for”)
- ▶ Meaningful innovation

Design Thinking Methodology



Design Thinking Frameworks - IDEO

INSPIRATION

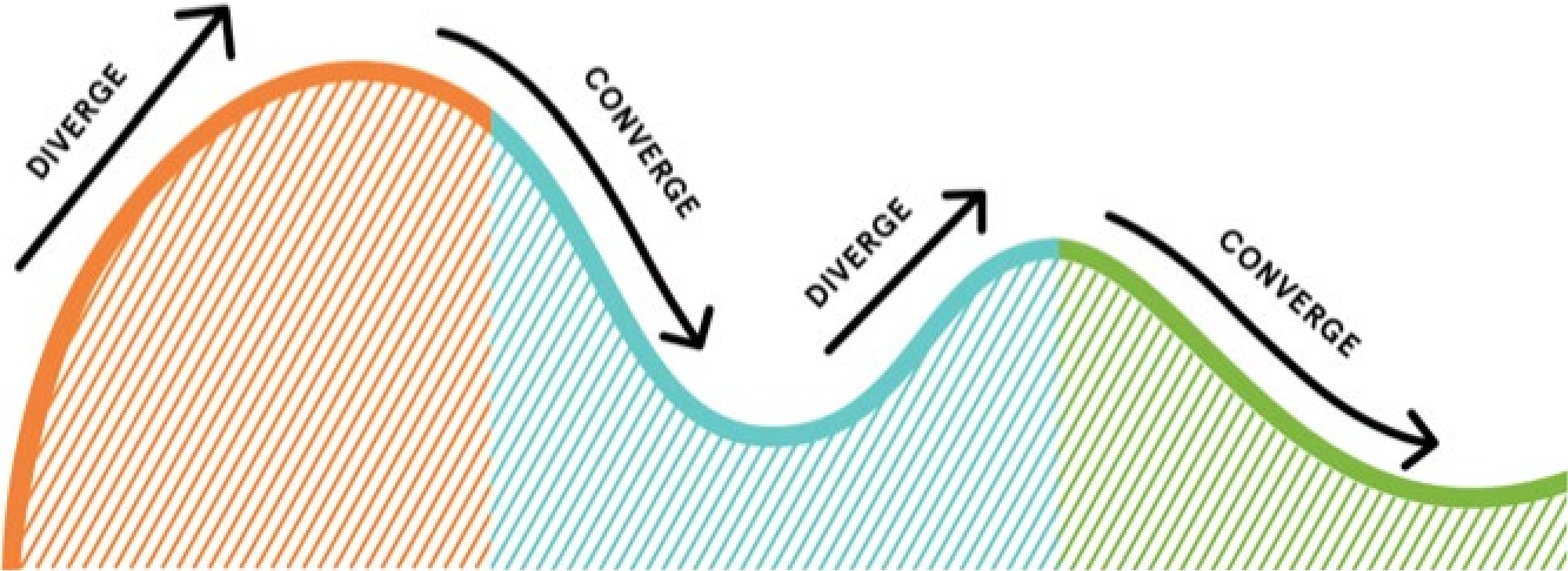
I have a design challenge.
How do I get started?
How do I conduct an interview?
How do I stay human-centered?

IDEATION

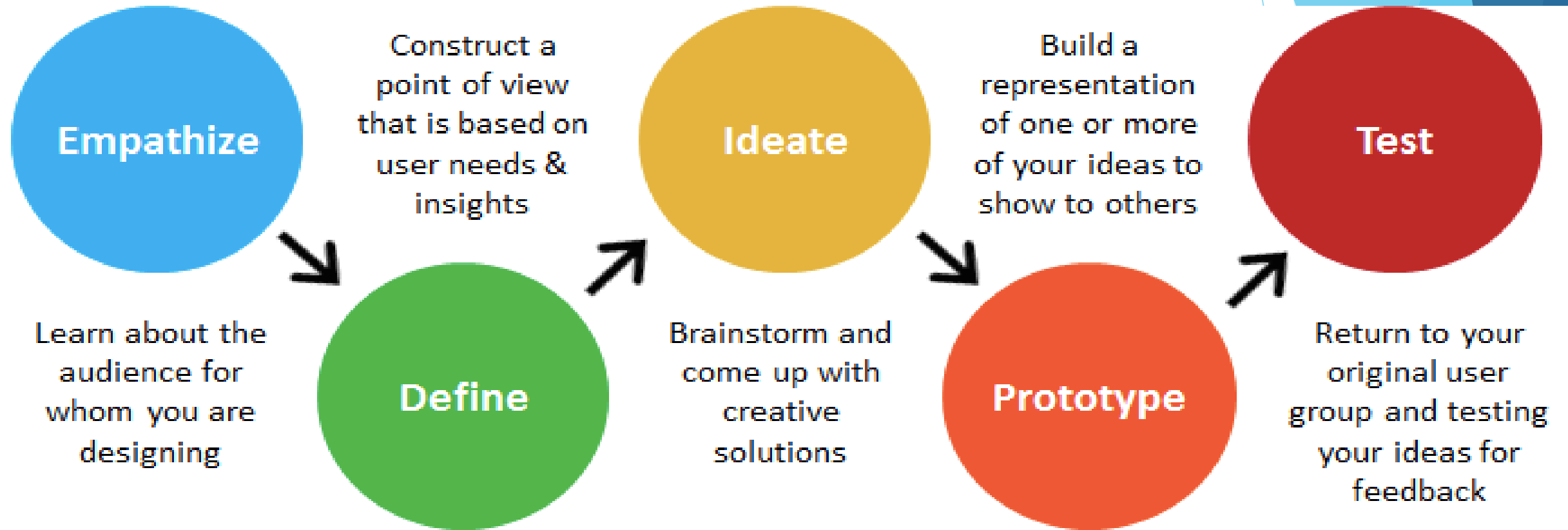
I have an opportunity for design.
How do I interpret what I've learned?
How do I turn my insights into tangible ideas?
How do I make a prototype?

IMPLEMENTATION

I have an innovative solution.
How do I make my concept real?
How do I assess if it's working?
How do I plan for sustainability?



Design Thinking Frameworks – Stanford D School



Our Design Thinking Journey at University of Cincinnati

Collaboration - UC Radiology

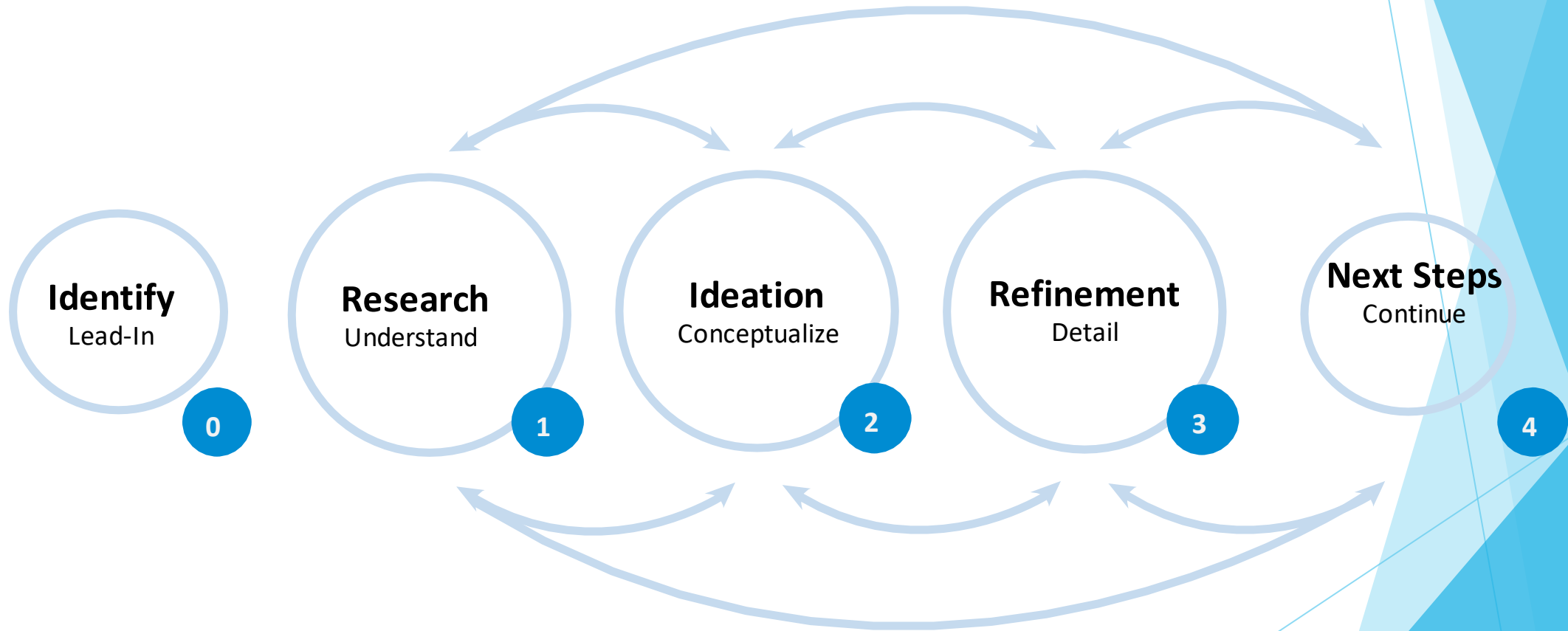
UC DAAP (College of Design)

Live Well Collaborative

GE Global design



Design Thinking Process



Vagal et al, Human-Centered Design Thinking in Radiology. JACR. May 2020



Goal: To understanding the optimal outpatient experience

Research

Stakeholder interviews

Patient journey maps

Influencers and drivers for positive and negative experiences

Ideation

Insights from Research

Functional prototype solutions

Co-creation Sessions to identify "Top 10" areas of opportunity

Refinement

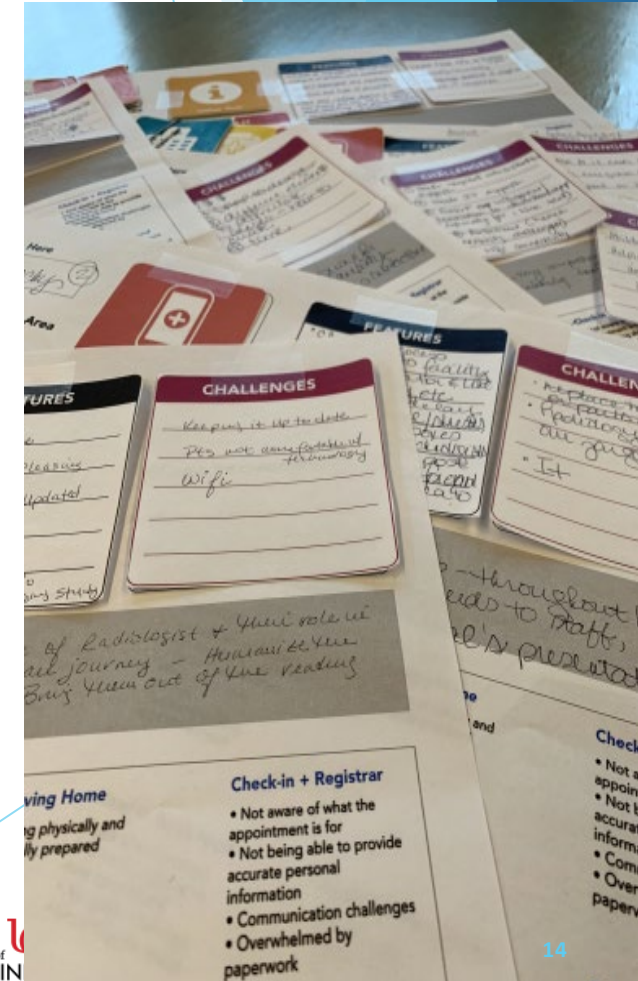
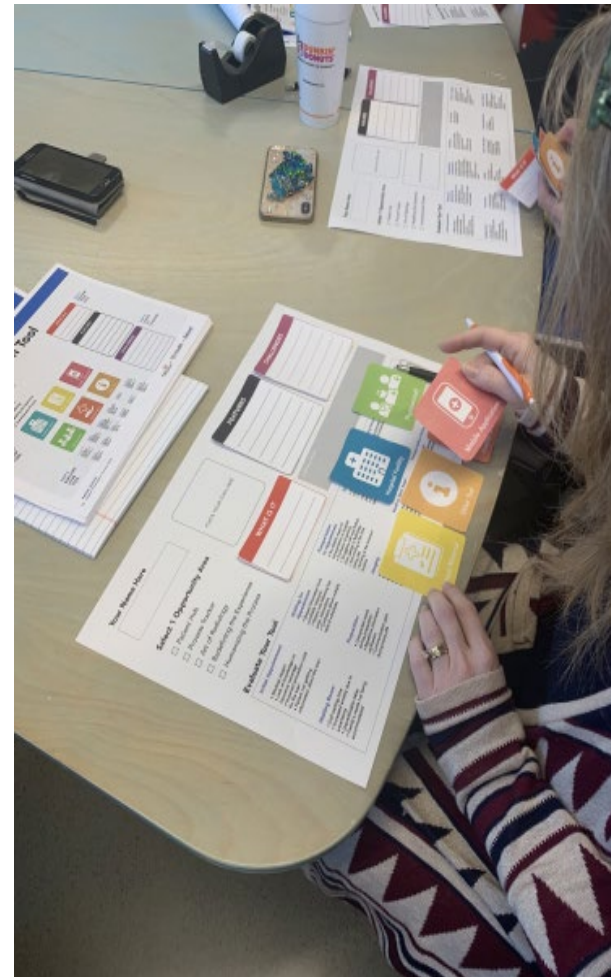
Test Concepts with Stakeholders

Present Ideal Patient Journey

Create Project Pipeline

Ideation Workshop in Action

Create a tool that addresses patient challenges and identify its features



Co-creation: Involvement of all stakeholders



Team enabling process

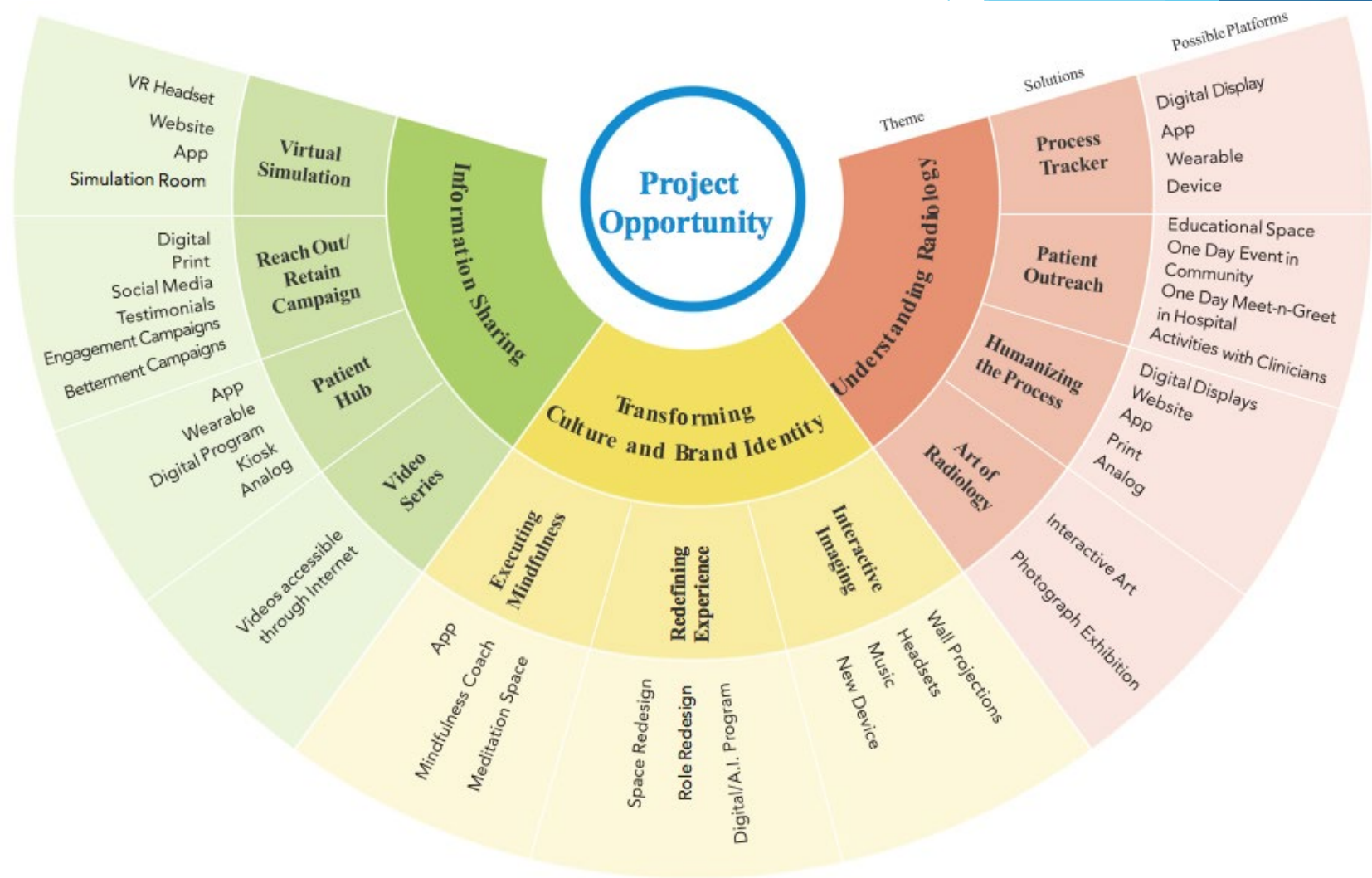


Top project pipeline themes that emerged

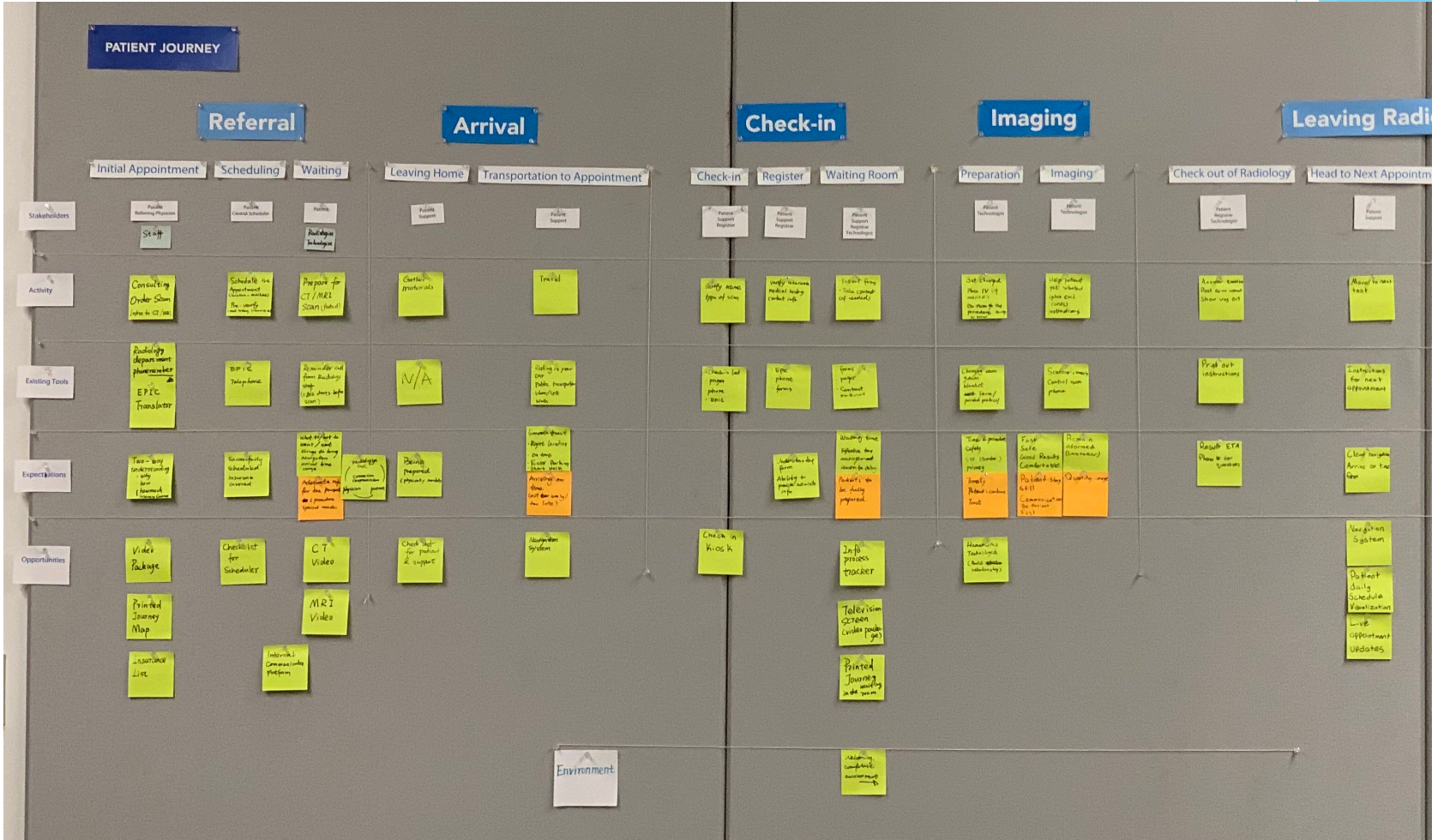
1. Humanizing Radiology

2. Transform Brand and Culture

3. Information Sharing



Case study: Pamphlet Development Process

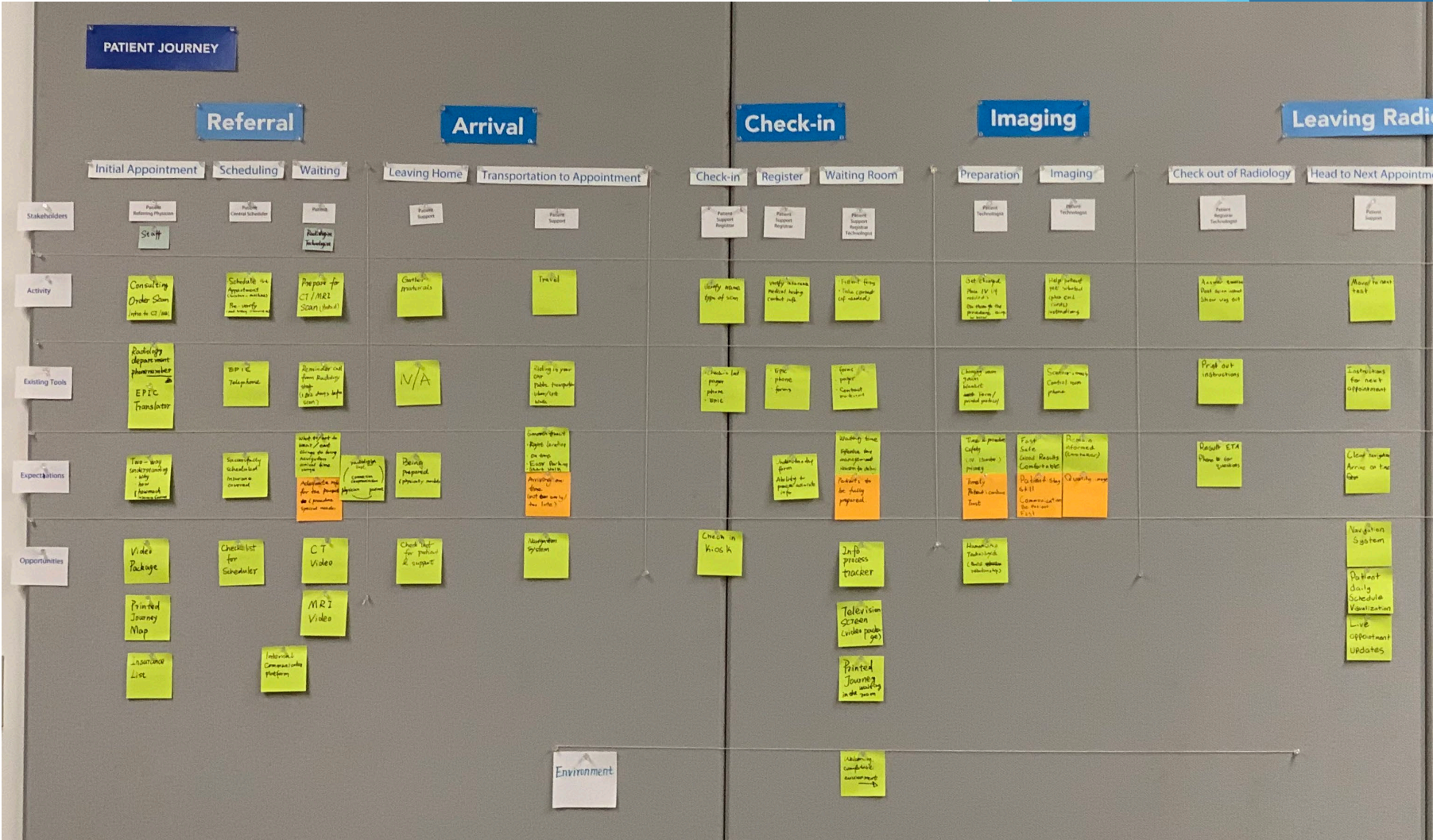


Wahab.. Butcher..Vagal. Humanizing Radiology Appointment Education to Improve Patient Experience. JACR 2022

Case study: Pamphlet Development Process

Research

- Information Integration
- Journey Visual Benchmarking
- Map Style Benchmarking
- Illustration Style
- Journey I
- Map I
- Journey II
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- Pamphlet Benchmarking
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- Marketing Branding Standards
- Cover I II III IV
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- Pamphlet Content Re-design



Pamphlet Development Process

Research

Information Integration

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Map Style Benchmarking

Illustration Style

Journey I

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Journey II

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Journey III

Map III

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Pamphlet Formal Prototype

Marketing Branding Standards

Cover I II III IV

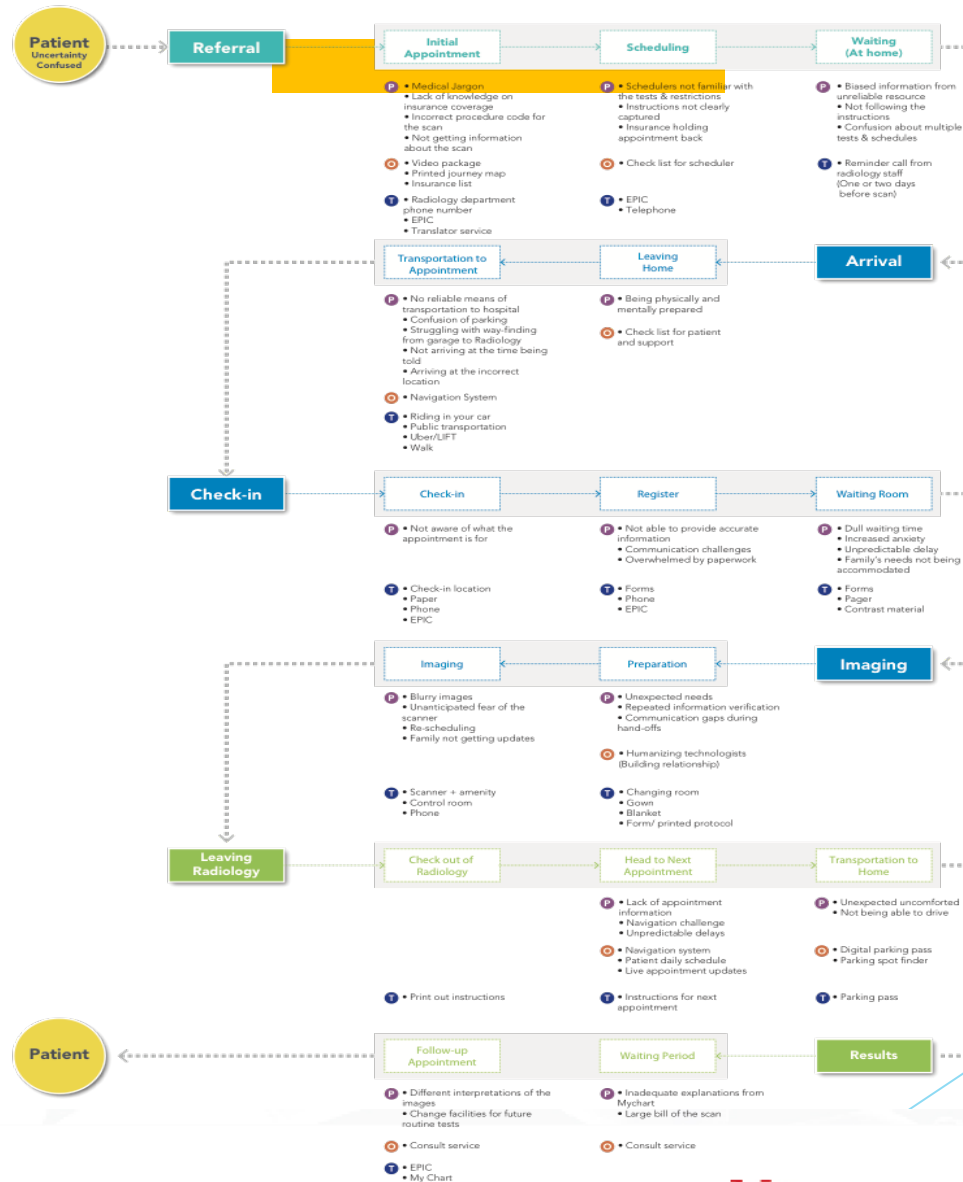
Pamphlet Formal Test Version

Pamphlet Content Re-design

	Referral			Arrival		Check-in			Imaging	
	Initial Appointment	Scheduling	Waiting	Leaving Home	Transportation to Appointment	Check-in	Register	Waiting Room	Preparation	Imaging
Stakeholders	Patient Referring Physician Staff	Patient Central Scheduler	Patient Radiologist Technologist	Patient Support	Patient Support	Patient Support Receptionist /Registrar	Patient Support Receptionist /Registrar	Patient Support Receptionist /Registrar Technologist	Patient Technologist	Patient Technologist
Activity	Consulting Order scan Introduction to CT/MRI	Schedule the appointment (location - scanner machine) Pre-verify (medical history insurance, etc)	Prepare for CT/MRI scan (protocol)	Gather materials	Travel	Verify name, date of birth type of scan	Verify insurance, medical history contact information	Fill out forms Take contrast (if needed)	Get changed Place IV (if needed) Go through the procedure things to know	Help patient get situated (place coil, cords) Instructions
Existing Tools	Radiology department phone number EPIC Translator service	EPIC Telephone	Reminder call from radiology staff (one or two days before scan)	N/A	Riding in your car Public transportation Uber/LIFT Walk	Check-in location Paper Phone EPIC	Forms Phone EPIC	Forms Pager Contrast material	Changing room Gown Blanket Form/ printed protocol	Scanner + amenity Control room Phone
Expectations	Two-way understanding Why How Insurance coverage	Successfully scheduled Insurance covered	Patient: To do/ Not to do things (wear/ eat) Things to bring Navigation Arrival time range Radiology/Technologist: Adequate info for the patient (procedures, special needs) Connection and communication between radiology department, physician, and patient	Being prepared (physically, Mentally)	Smooth transit Right location On time		Understanding form Ability to practice accurate information	Patient: Effective waiting time management Reason for delay Technologist: Patients to be fully prepared	Patient: Time & procedure Safety (IV, claustrophobia) Privacy Technologist: Timely patient's calmness Trust	Patient: Fast Safe Good Results Comfortable Remain informed (care taker) Technologist: Patient stay still Communication Be patient Fast Quality image
Opportunities	Video package Printed journey map Insurance list	Check list for scheduler	Video package • General introduction • CT video • MRI video	Check list for patient and support	Navigation System			Information process tracker Television Screen (vodeo package) Printed journey (waiting room)	Humanizing technologists (Building relationship)	
	Internal communication platform									

Patient Centered Radiology Journey

P Expectation/Pain points O Potential Opportunities T Existing Tools



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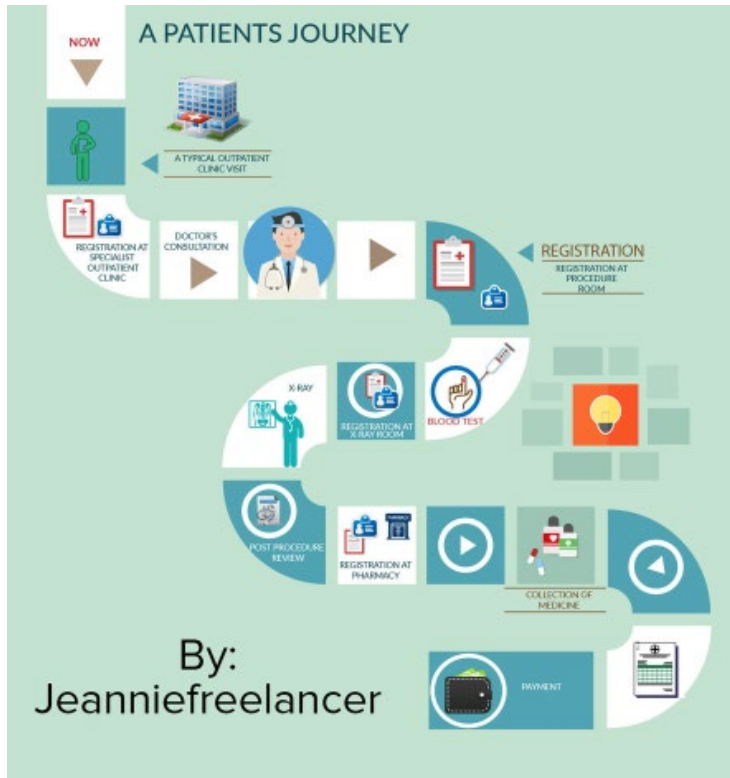
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Marketing Branding Standards

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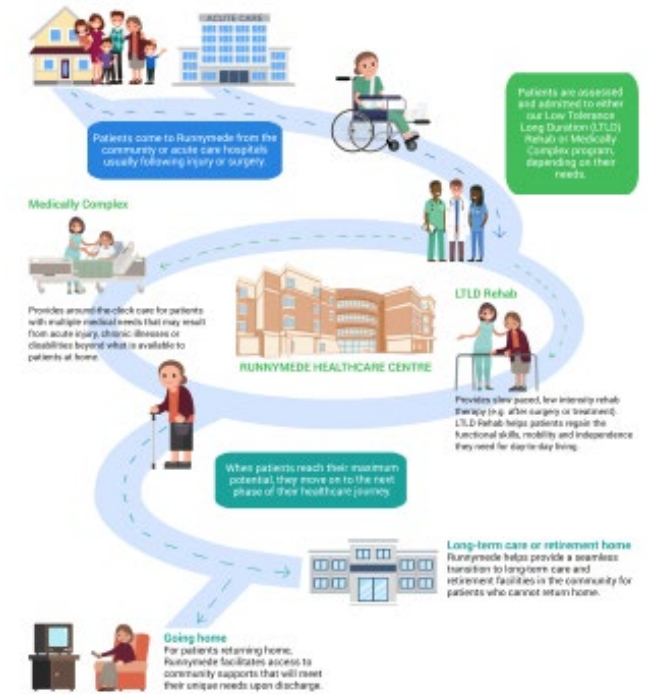
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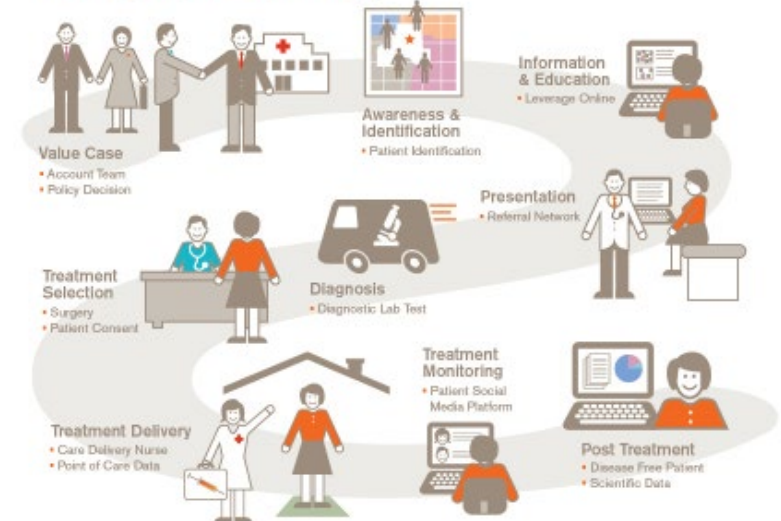


The patient journey and Runnymede

Runnymede Healthcare Centre is a 200-bed rehabilitation hospital with a proven track record of success in providing patient-centred care to those whose treatment needs are too complex to be met at home or in the community.



The Patient Pathway



Pamphlet Development Process

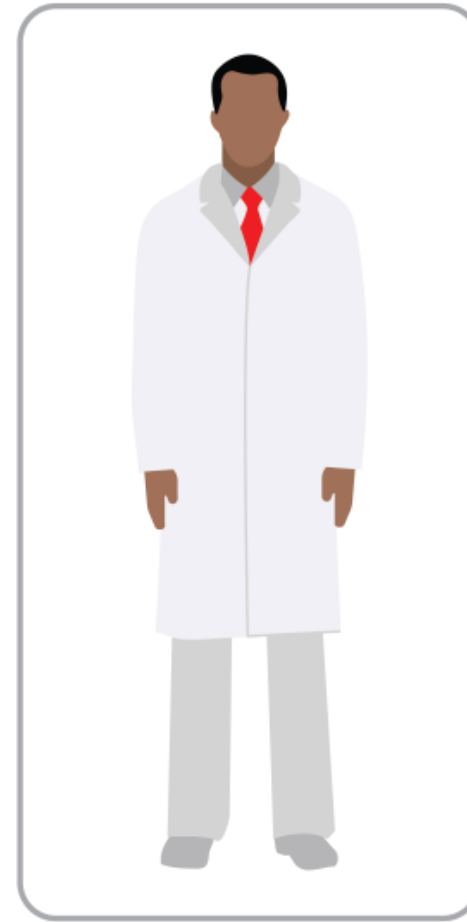
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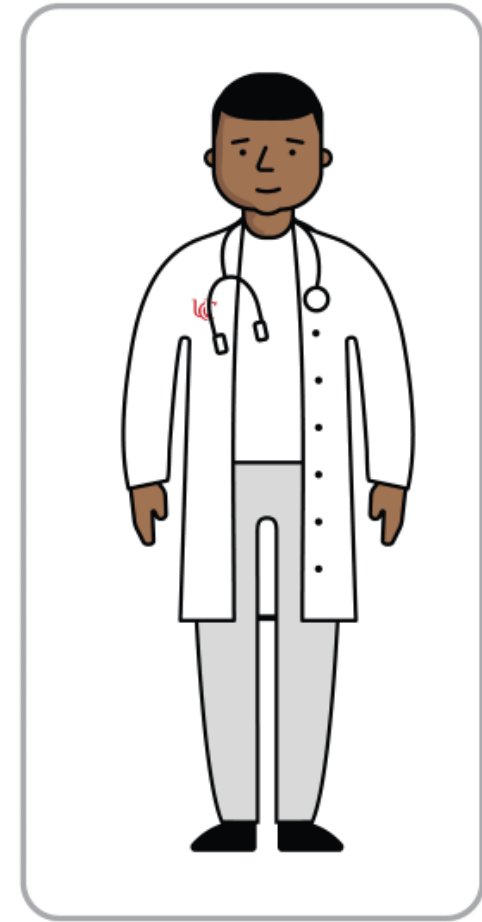
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Draft 1
• Too childish
• Does not match brand



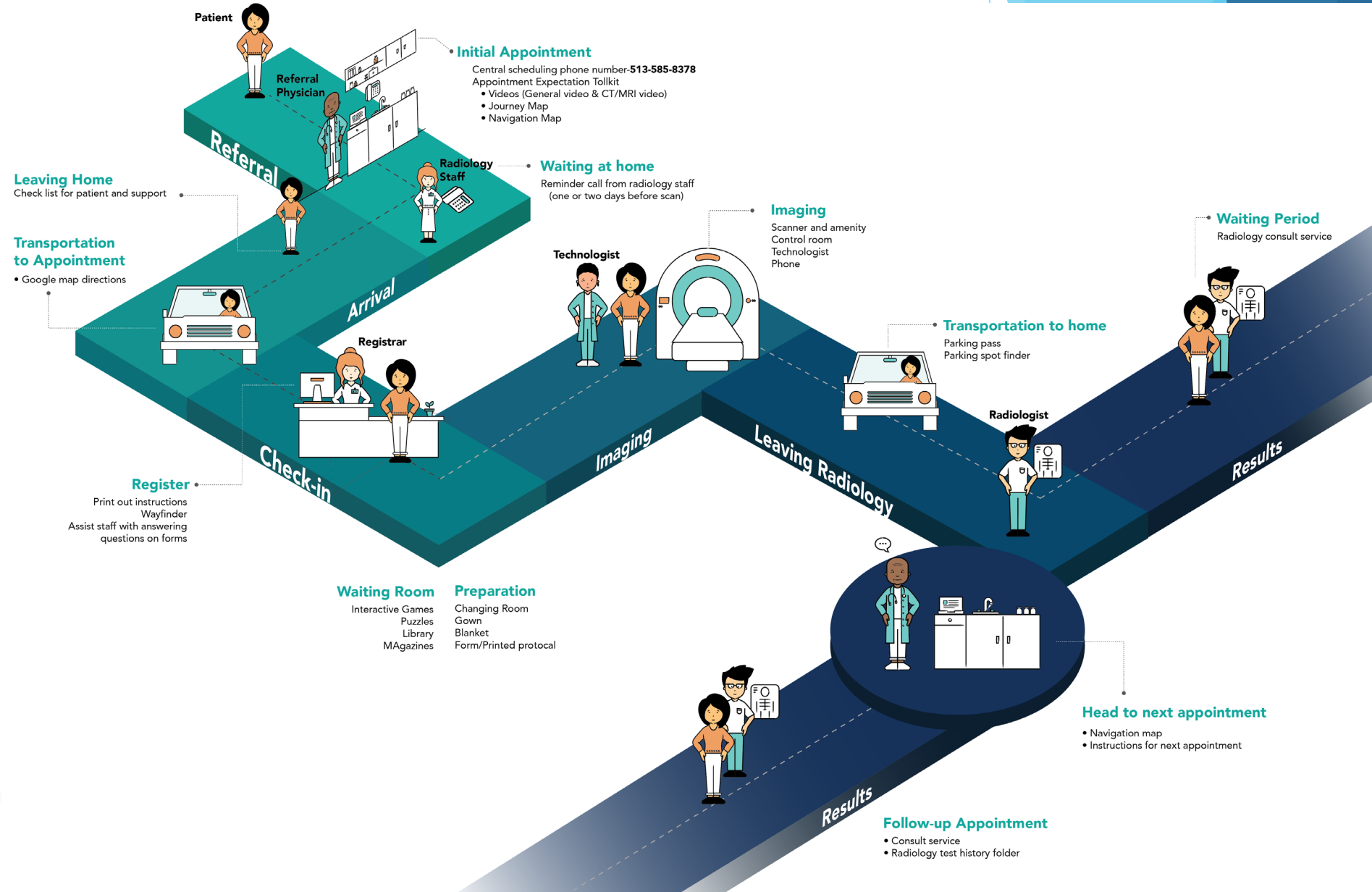
Draft 2
• Less childish but too clinical



Draft 3
• Approachable and comforting without being overly childish
• Avoids clinical feel
• Matches brand

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UC MEDICAL CAMPUS MAP



- Scheduling # (513)-585-8378
- Radiology # (513)-584-5396 (call if lost)
- If going to the **Outpatient Center** park is available in front of center.
- If going to the **Main Hospital** park in **Goodman Street Garage**. Look for the red **Gate A** elevator and follow to the Main Hospital.
- If going to the **MAB** park under the MAB building.



1 Goodman Street Garage
2 Goodman Street Garage
3 Goodman Street Garage
4 Main Hospital
5 Main Hospital
6 Main CT Entrance
7 Emergency
8 Gate B
9 Outpatient Center

CT, MRI Scan Journey

Meet Your Care Team



Ordering Physician

The ordering physician is who works with Radiology to get the proper scan ordered. They will also be the ones to talk to you about your results and next steps...



Registrar

The Registrar is who you will meet at the department front desk where they check you in, collect your information and verify insurance detail on behalf of Radiology.



Technologist

A Technologist is a specialist who explains procedures to patients, positions patients for imaging procedures and performs the scans.



Radiologist

A radiologist is a doctor who uses their knowledge of scans to build a map of your body. They act as the consultant for your doctor in regards to the scan.

Pre-Scan



Initial Appointment

- Your ordering physician orders a scan
- Schedule your appointment by calling [513-585-8378]
- Your ordering physician provide you links of three videos and print out supporting materials including journey map and navigation map.



- Radiologist receives and reviews your scan order and your previous scan history
- Radiologist prepares your scan protocol



Patient Waiting at Home

- Receive your appointment reminder call from Radiology
- Get your detail preparation instructions
- Make sure you know the arrival time of your scan day
- Questions or special needs please call Radiology Department at [513-584-4396]



Leaving Home

- Follow your preparation instructions (diet or clothing restrictions)
- Bring your photo ID, insurance card
- Bring your implant card (if applicable to you)



Transportation to Radiology Appointment

- Make sure you know the correct appointment location
- Plan ahead for your social support if needed
- Arrive at the time being told
- Call Radiology if you expect a more-than-15 min delay



Radiology front desk

- Registrar greets you
- Verify personal information (ID, insurance card, address etc)
- Learn detail of your scan process by watching the video below



Technologist



- Wait to be picked up by your Technologist
- MRI scan requires patient changing into a hospital gown
- Remove all metal parts from your body

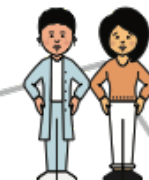


- Head to the scan room
- Pass the Technologist control room where they will view you during the scan



Scan Room

- Stay relaxed during the scan
- Follow Technologist's breathing instructions
- Stay still for better image quality
- Squeeze the safety ball if you are overly anxious

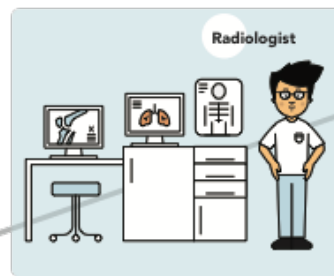


- Good to go back and get changed if needed
- Eat and drink as normal
- Take a good rest

Post Scan



Next Step Physician



Radiologist

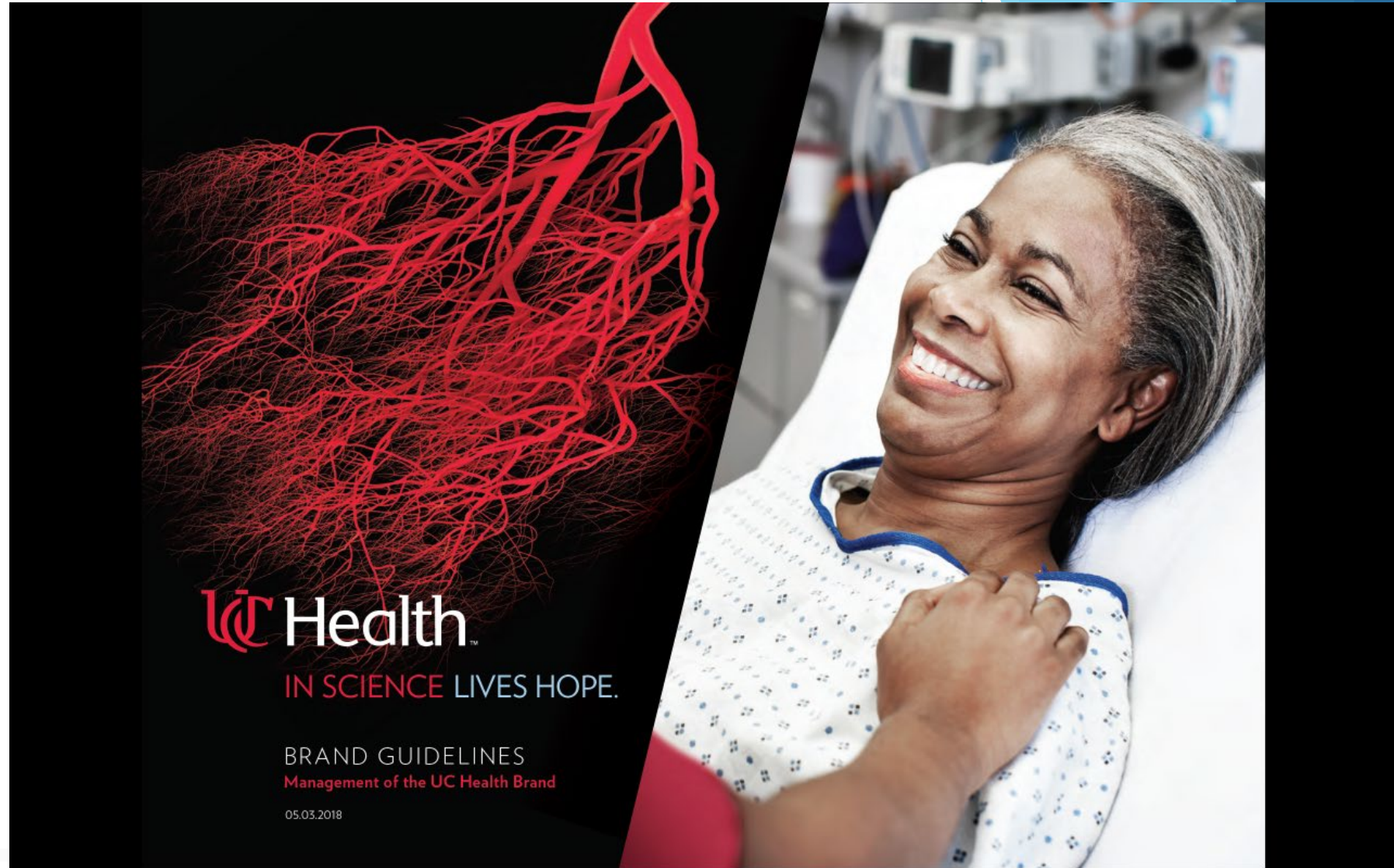
- Images sent to your Radiologist
- Radiologist interprets your scan
- Radiologists work together with your doctor to provide a best next-step plan
- Expect follow-up from your doctor
- Radiology report will be available on MyChart after 24-48 hours.

Prototyping – Multiple iterations



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Survey – Care team and Patients

Feedback on emotional support, communication and education

Key Insight

Patients feel they get a better understanding of the role of their care team with the support of the toolkit and are more informed before the scan day.

It provides a very clear picture of what to expect.

--Repeat patient

Made me less nervous about the procedure and reduce anxiety.

-- First time patient

People would like the pamphlet because it is something, they can have with them when they come to the appt.
--Technologist

The pamphlet is better for older patients.

-- Repeat patient

The MRI tests are so different from other testing that these videos can really help with anxiety from the unknown.
--Technologist

The pamphlet is very informative, I like the map has picture on.

--First time patient

The videos & pamphlets give patients an extra layer of visual understanding of what to expect.
-- Front Desk Registrar

The pamphlet is simple and understandable.

--Repeat patient

I think giving an overview of how a radiologist reads a patient's scan is helpful.
-- Radiologist

I like the map. The phone number is also helpful.

--Repeat patient

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Meet Your Care Team

- 1. Ordering Physician**
The ordering physician connects you with UC Health Radiology by ordering scans. They will also talk to you about your results and next steps.
- 2. Radiologist**
A radiologist is a medical doctor who is an imaging expert. They read and interpret your scans and report their results to your ordering physician.
- 3. Technologist**
A technologist is a specialist who explains procedures to patients, positions patients for imaging procedures and performs the scans.
- 4. Registrar**
The registrar will meet you at the radiology front desk where they check you in and collect your information.

Day of Scan

Before Your Scan Tips
Be sure to follow your preparation instructions. If you expect more than a 15-minute delay in arrival for your appointment, please call Radiology. Make sure you know the correct appointment location. Plan ahead for your social support (such as transportation, child care arrangements) if needed. If you have a disability or need help, please call this number: 915-985-2910.

- 4. Radiology Front Desk**
A registrar will greet you and verify your personal information. Please make sure to bring your photo ID and insurance card. At the time of your scan, a technologist will guide you through the scan process.
- 5. Before the Scan**
If you are receiving an MRI, you will be required to change into a gown for your scan. All metal objects must be removed for an MRI. For a CT scan, you may be asked to drink a contrast fluid or have the contrast given through an IV.
- 6. During Scan**
For MRI and CT Scans, it is important to remain still. An MRI may last 30 minutes to one hour. A CT scan is usually completed within 20 minutes unless contrast is given.

Pre-Scan

- 1. Appointment at Physician's Office**
During an appointment with your physician, they will determine if you need imaging from UC Health Radiology. You can schedule this appointment by calling Central Scheduling at **915-985-8378**.

Learn more about your scan process by scanning QR codes on the right with your phone camera or through the links below.
MRI: <https://ucmeds.com/342314749>
CT: <https://ucmeds.com/342315101>
#UCHealth

- 2. Radiologist Reviews Order**
A radiologist receives and reviews your scan order and your previous scan history. The radiologist decides the best way to perform the scan.
- 3. Before Your Scan**
You will receive an appointment reminder call from Radiology with your preparation instructions. If you have questions, please call Central Scheduling **915-985-8378**.

After-Scan

Your scan is now completed. You may go home, eat and drink as usual unless directed otherwise by your care team.

- 7. Radiologist Reads The Scan**
Your scan will be sent to a radiologist who will work with your care team to make a diagnosis. Your result will also be available in My UC Health (MyChart).
- 8. Next Step**
Your physician will discuss the results with you during your next appointment.

Challenges

- ▶ Time and effort intensive
- ▶ Needs champions at all levels
- ▶ “Design Doing” vs “Design Thinking”
- ▶ Shifting culture
- ▶ Measuring success and outcomes
- ▶ Evidence for long term success

COVID-19: The ultimate design thinking platform



Design thinking in our departments



Human Centered Design: *Key Takeaways*

- ▶ Empathy and understanding the user is critical
- ▶ Co-creation
- ▶ Redesigning the healthcare experience
- ▶ Creative confidence
- ▶ We are all designers!

