

ASSISTIVE TECHNOLOGY FOR FUNCTIONAL ILLITERATE ADULTS

Team

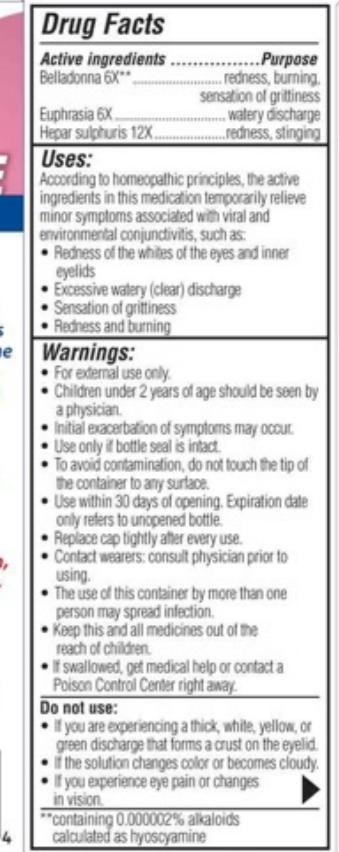
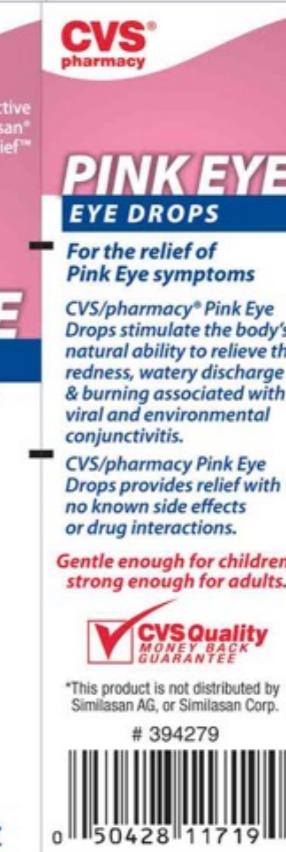
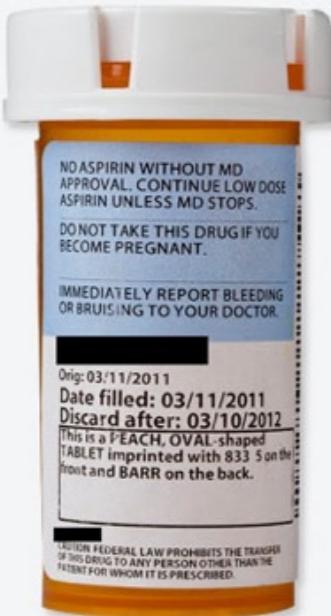
Sarah Kiner

AnnaRose Girvin

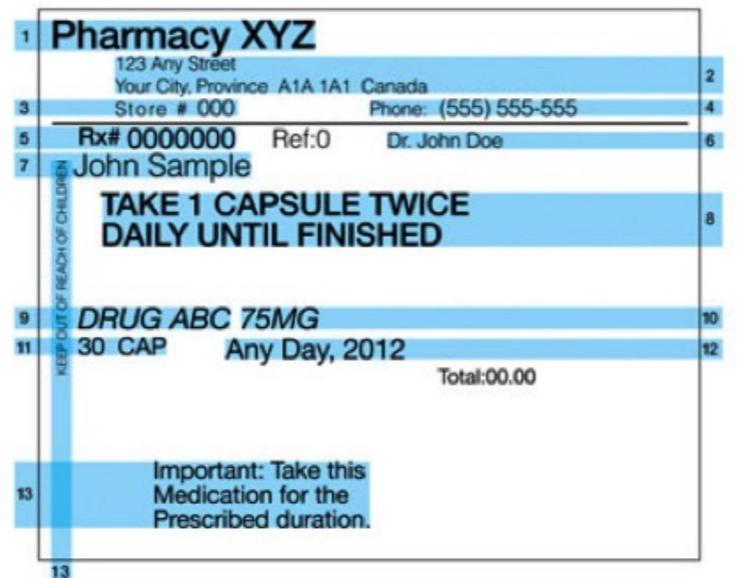
Prashanth Chandrasekar

Rishabh Bhardwaj

Mentor - Tori Rice



	Longs Drugs	Longs
Store#	XXXXXXXX XXXXXXXX XXXXXXXXXXXXXX XXXXXXXXXX	
0000	24 HOUR PHONE: (000) 000-0000	
WATSON, EUGENE MD		
Rx 0000000 • GELOTTE, ANDERS YOUR PRESCRIPTION		
XXXXXX 1 / 35 - 28 TABLET # 56 (XXXXX XXX) NO REFILLS		



Lakemont
Pharmacy

0001143  08/31/2013 DR. TEST/TEST

PATIENT TEST

TAKE ONE CAPSULE BY MOUTH THREE TIMES DAILY

Mfg: San 00781-2613-05
Substitut for Lantid F
NO REFIS
Rph: TEST

Curre

Drug Facts (Sample OTC label)

Active ingredient (in each tablet)	Purpose
Chlorpheniramine maleate 2 mg	Antihistamine

Uses temporarily relieves these symptoms due to hay fever or other upper respiratory allergies:

Warnings

Ask a doctor before use if you have

- glaucoma ■ a breathing problem such as emphysema or chronic bronchitis
- trouble urinating due to an enlarged prostate gland

You may get drowsy • avoid alcoholic drinks

- alcohol, sedatives, and tranquilizers may increase drowsiness

Get the power of a motor **without the cost.**

 [Globe](#)  [Special Offer](#)  [Cart](#)

If pregnant or breast-feeding, ask a health professional before use.

Current Bottles and Prescriptions

Current Bottles and Prescriptions

Screenshot 1: Check Drug Interactions

BUILD YOUR LIST
Scan the barcode of the product... or type in item Example Lipitor or Aspirin

2 ITEMS IN YOUR LIST
Build your list by scanning or typing above.

- Mucinex 1200mg Extended-Release Tablet
- Oxycodone/Aspirin 4.5mg-0.38mg-325mg Tablet

Check for Interactions ▶ Start Over

Screenshot 2: Identify Pills

MARKING/IMPRINT mucinex

COLOR (OPTIONAL) BLACK BLUE BROWN GRAY

SHAPE (OPTIONAL) BULLET CAPSULE CLOVER DIAMOND

Identify Pill ▶

Screenshot 3: Check Drug Interactions

3 INTERACTIONS FOUND

FILTER BY Severity Interaction

- Alcohol AND Oxycodone/Aspirin 4.5mg-0.38mg-325mg Tablet
 - Alcohol Major Interaction
 - Alcohol Major Interaction
 - Grapefruit juice Major Interaction

Screenshot 4: Identify Pills

SEARCH QUERY mucinex

Results 1 - 4 of 4

- Mucinex 600mg Extended-Release...
Reckitt Benckiser Inc. (Formerly Adams RT) (on market)
Guaiifenesin 600mg blue, white, bilayer, oval-shaped, side 1:Mucinex, side 2:600
- Mucinex 600mg Extended-Release...
Reckitt Benckiser Inc. (Formerly Adams RT) (on market)
Guaiifenesin 600mg blue, white, bilayer, oval-shaped, side 1:Mucinex, side 2:600
- Mucinex D 600mg-60mg Extende...
Reckitt Benckiser Inc. (Formerly Adams RT) (on market)

•••• cricket 12:49 PM 77% Sign In

Check Drug Interactions Sign In

3 INTERACTIONS FOUND

FILTER BY Severity Lifestyle

- Alcohol AND Oxycodone/Aspirin 4.5mg-0.38mg-325mg Tablet
 - Alcohol Major Interaction

SEVERITY DEFINITIONS

Side effects from this drug may get worse if you drink alcohol-containing drinks. If you have persistent stomach upset, vomit blood or what looks like coffee grounds, or have black, tarry stools, contact your health care provider immediately. Avoid alcohol containing drinks while taking aspirin. Alcohol intake should be limited even with short term use of aspirin or related pain relievers.

Alcohol AND Oxycodone/Aspirin 4.5mg-0.38mg-325mg Tablet

- Alcohol Major Interaction

SEVERITY DEFINITIONS

Avoid alcohol-containing drinks while taking

•••• cricket 12:49 PM 77% Sign In

Check Drug Interactions Sign In

◀ Pill Reminder 12:30

TODAY REMINDERS MEDICATIONS

Take Morning Meds
Every day of the week
09:00

Take Vitamins
Every day of the week
07:30

•••• Verizon 2:52 PM 98% Sign In

Prescriptions & Health Info

Rx Status & History

Pill Reminder

Contact Lenses

Health Services & Info

Balance Rewards for healthy choices™

Pharmacy Chat

New Feature Live Doctor Consultation

New Feature Submit Rx Insurance Card

Immunizations

Health Information

•••• Verizon 2:53 PM 98% Sign In

Live Doctor Consultation

Commonly used for:

Medical	Mental Health
• sinus/ear infections	• anxiety
• sore throats	• depression
• skin problems	• life changes

Frequently Asked Questions

Is insurance accepted?
We do not accept insurance, but some insurance providers will accept a claim.

Is a HSA/FSA card supported for payment?
Yes.

Can a provider prescribe medication as part of the consultation?
Yes, if the MDLIVE doctor believes medication is warranted, he or she can write a prescription for non-narcotic medications (i.e. no controlled substances).

Start Consultation

App Landscape

**“MANY TIMES
THEY ARE IN AWE
OF DOCTORS.
THEY FEEL IT'S A
BURDEN TO ASK
QUESTIONS.”**

-Jackie Lovings, VITAL Assistant

OUR CORE

Making medical prescriptions and labels
explicit to functional illiterate adults

NOT DESIGNING

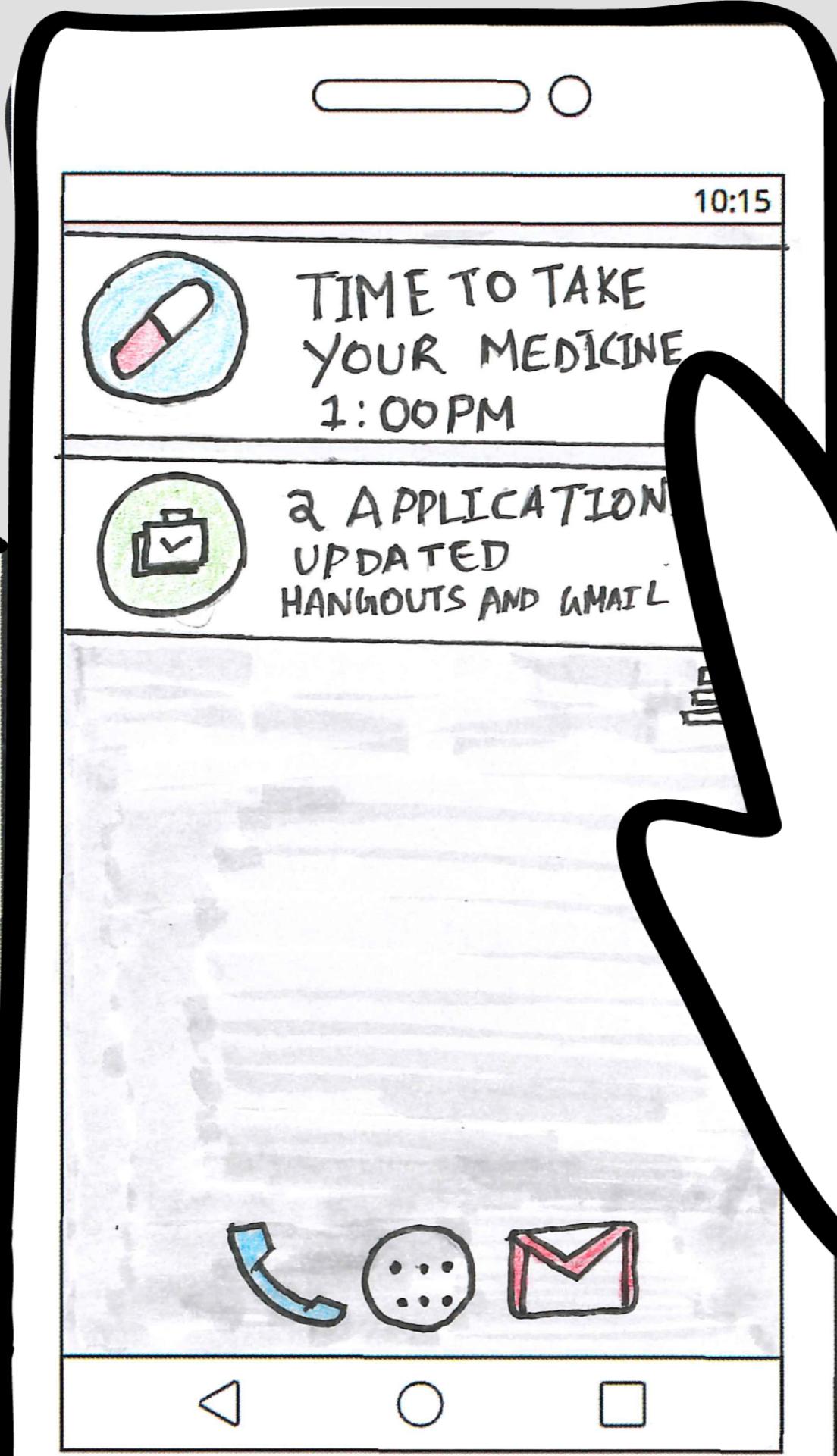
- ✗ Second language speakers
- ✗ Teaching how to read
- ✗ Replace the doctor or pharmacist
- ✗ Monitoring medication intake
- ✗ Identifying bottles outside their prescription

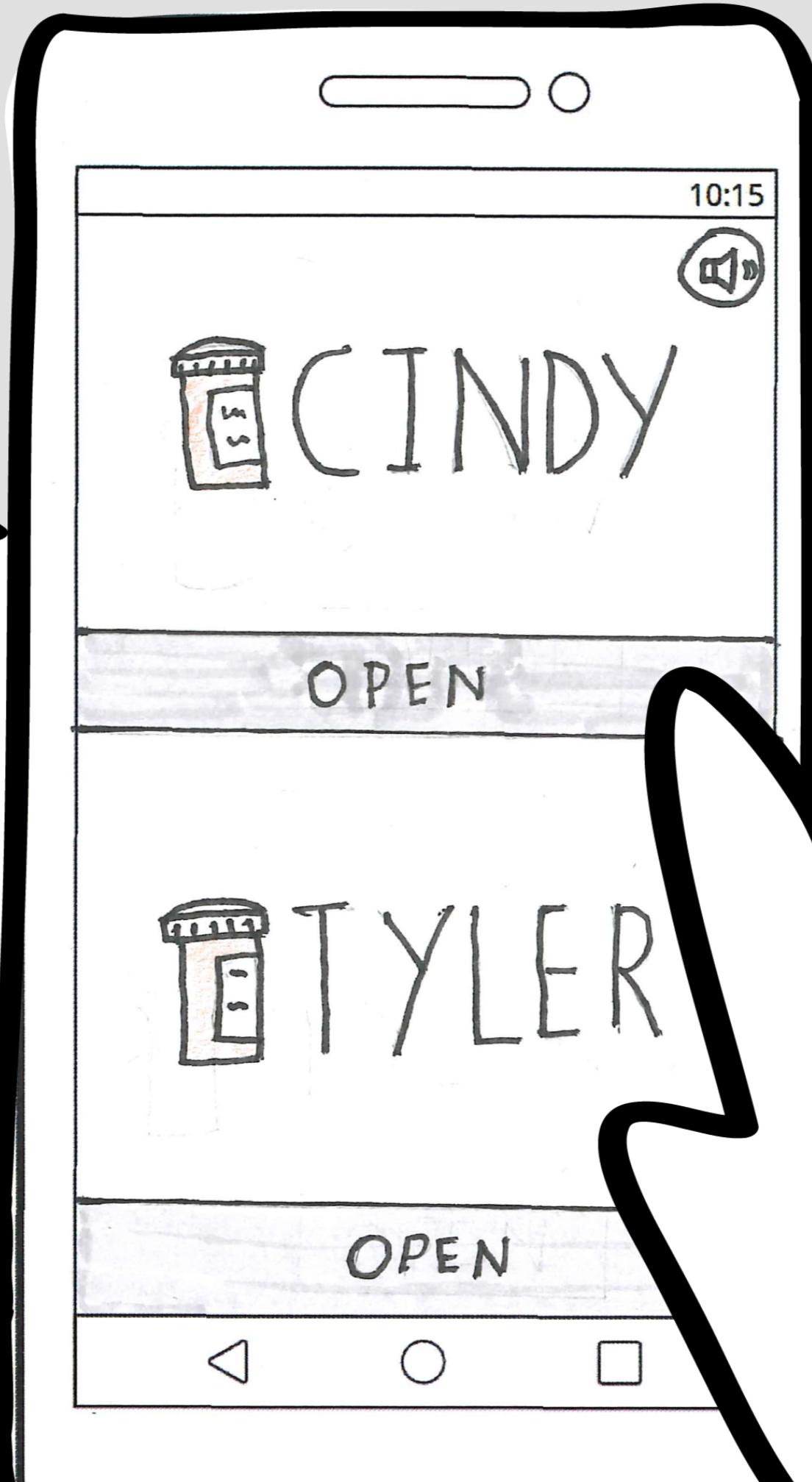
WE ARE DESIGNING

- ✓ Comprehend spoken english
- ✓ Acute illness
- ✓ Adults also responsible for others
- ✓ Information on the medication packaging
- ✓ Have a smartphone





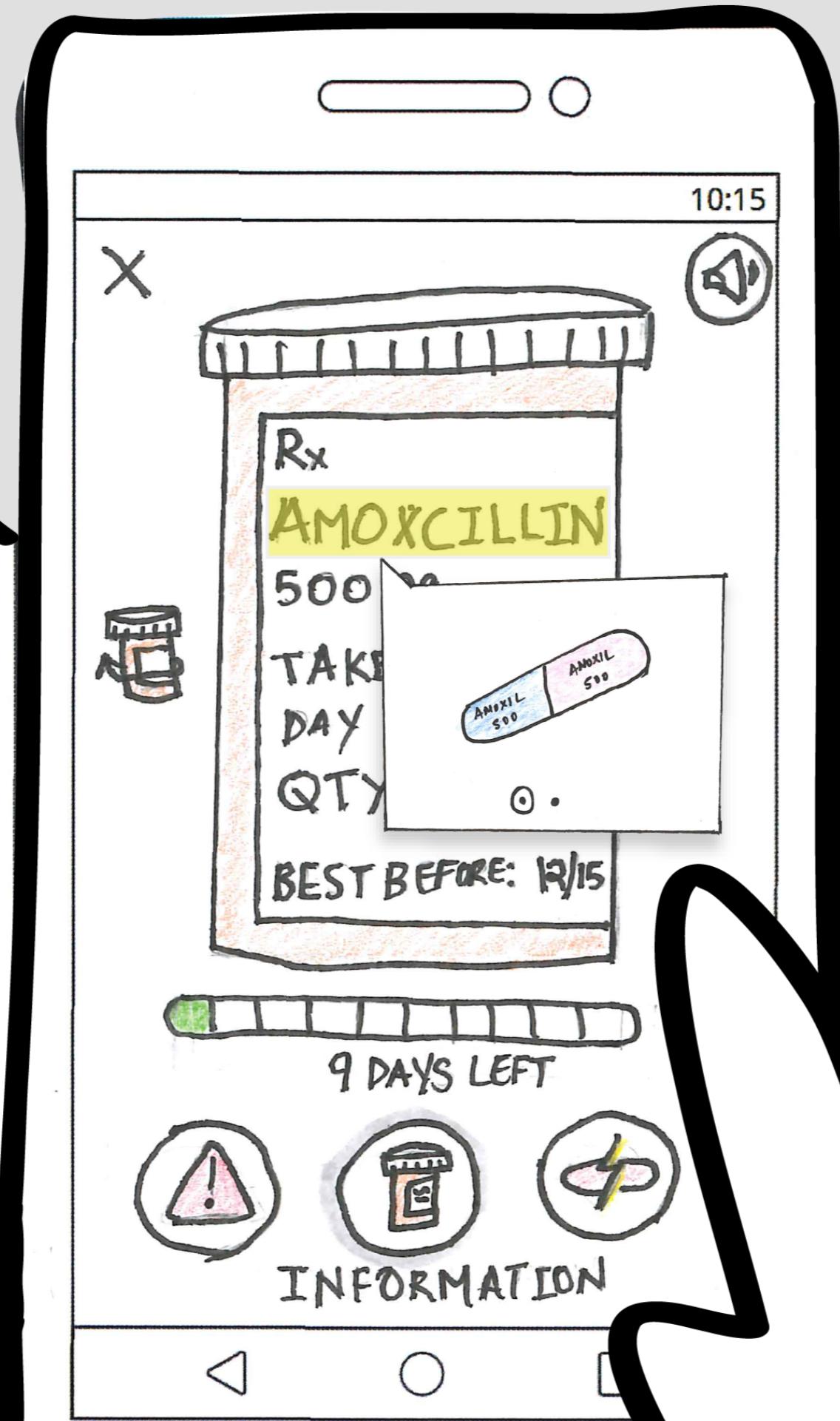














TEAM PROCESS

BRAINSTORMING OFF OF THE PROMPT

Adult Illiteracy

Systemic Racism

National Sleep Crisis

Social Anxiety

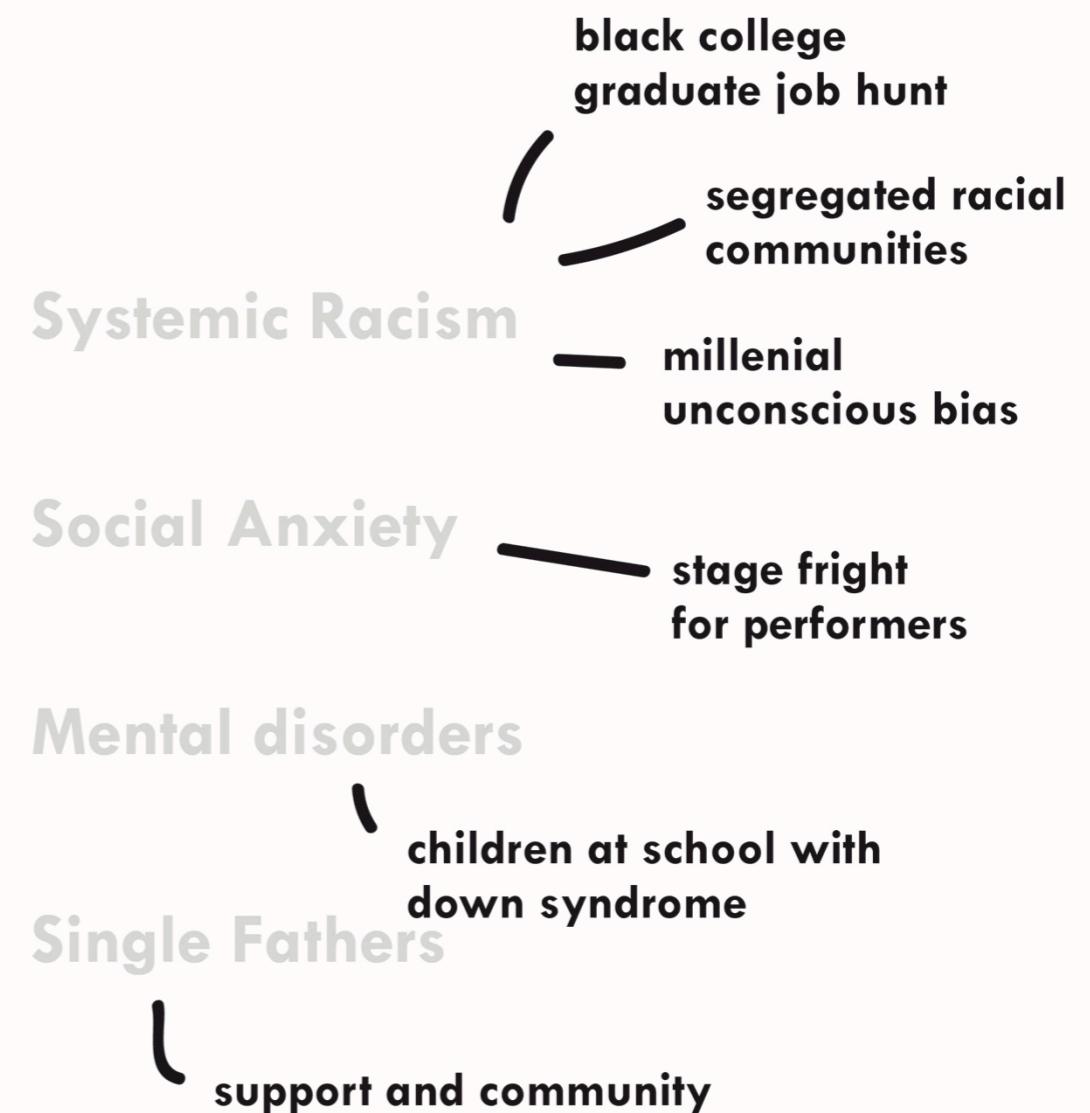
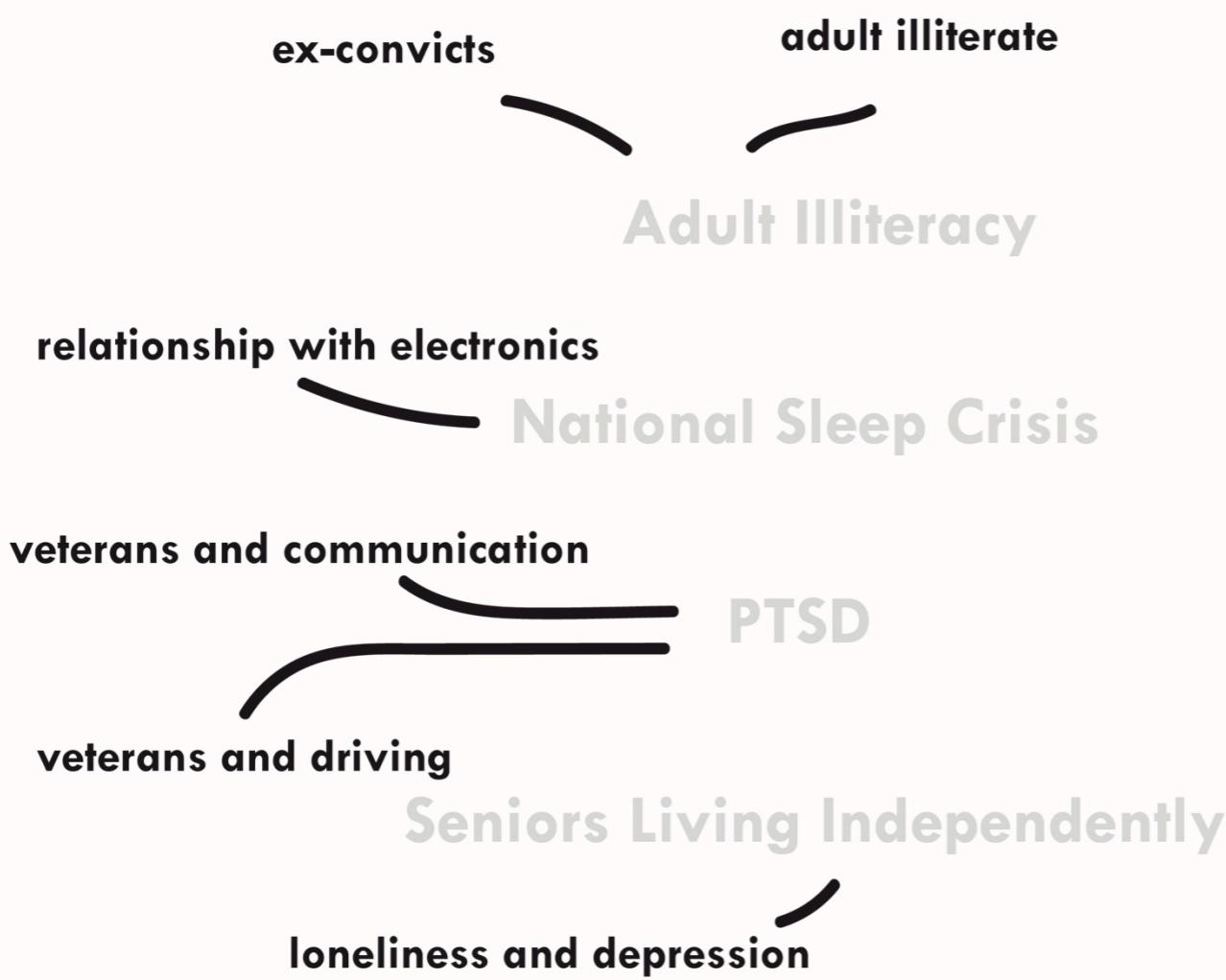
PTSD

Mental disorders

Seniors Living Independently

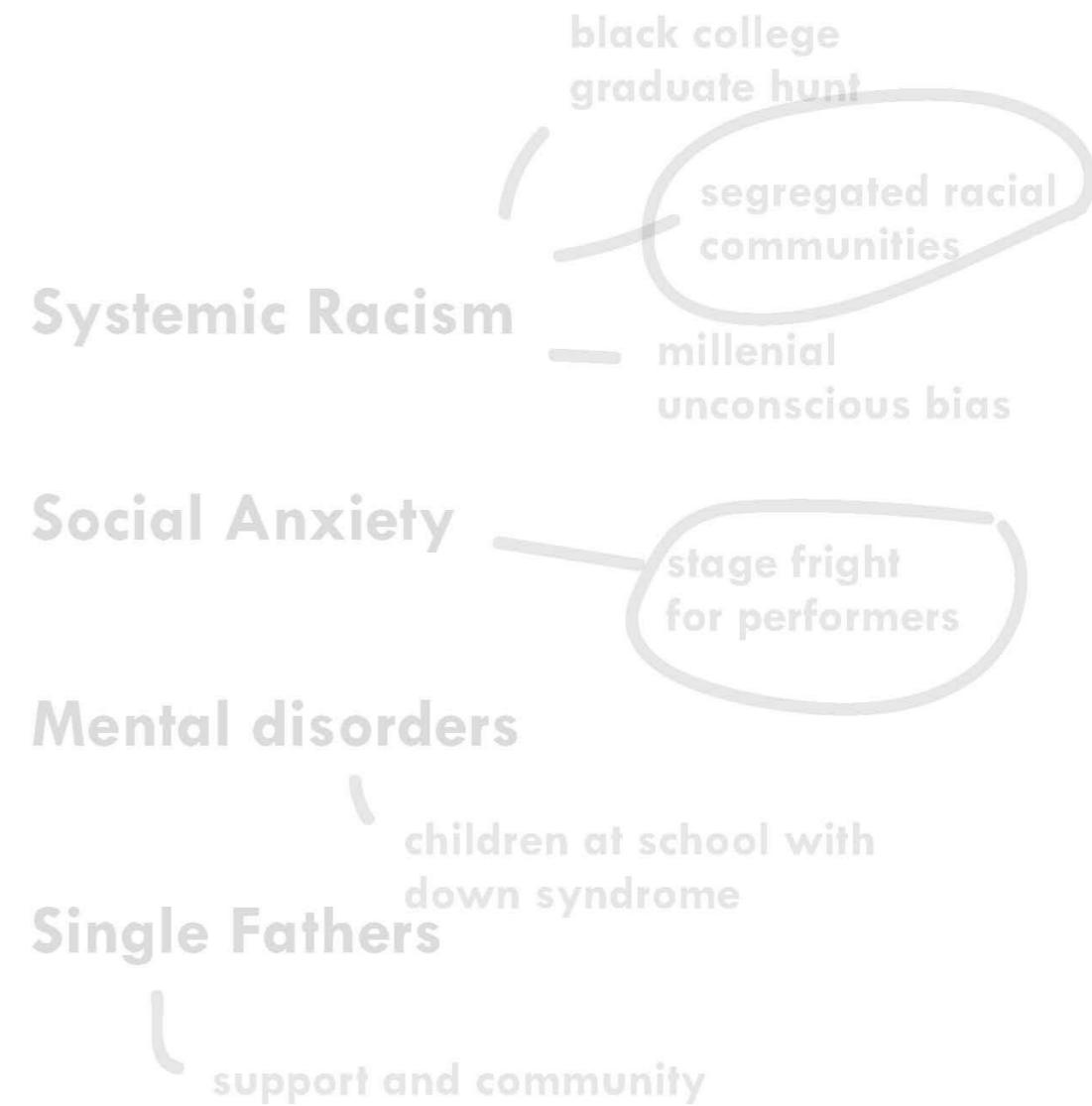
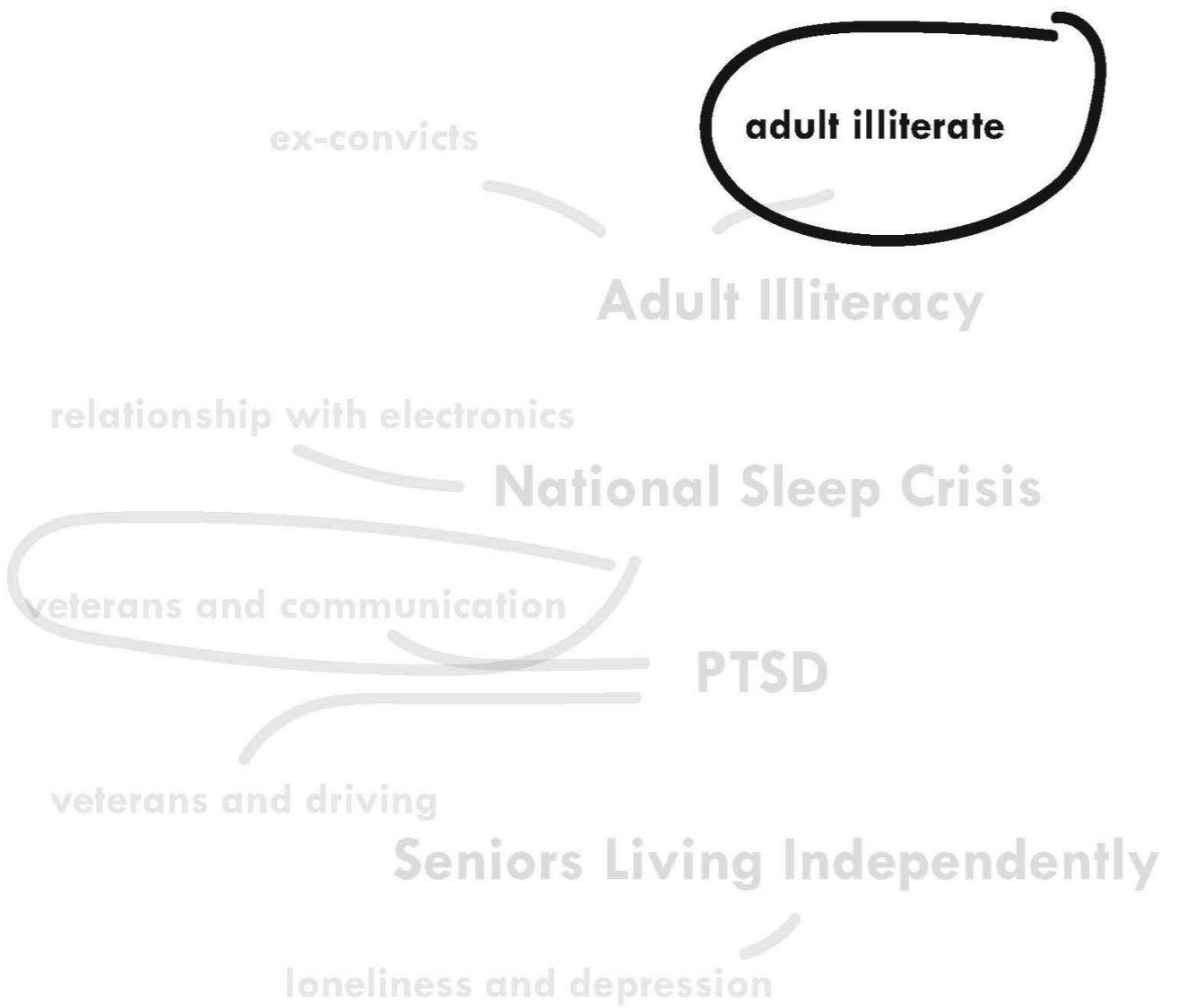
Single Fathers

WE ALL RESEARCHED



LOTS OF DECIDER PROTOCOLS





functional illiterate adults

ex-convicts

relationship with electronics

veterans and communication

veterans and driving

Seniors Living Independently

loneliness and depression

Adult Illiteracy

Systemic Racism

PICD

Mental disorders

Single Fathers

children at school with
down syndrome

support and community

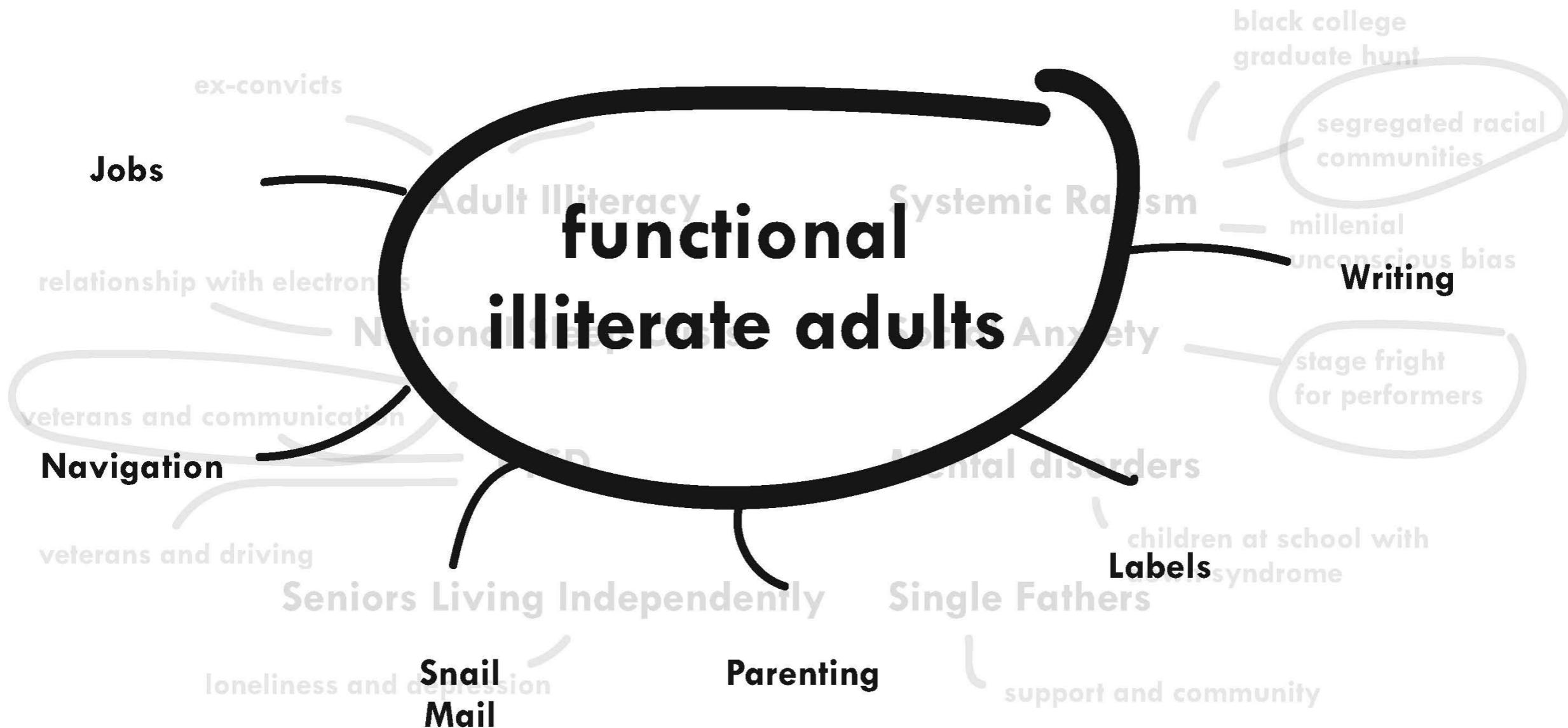
black college
graduate hunt

segregated racial
communities

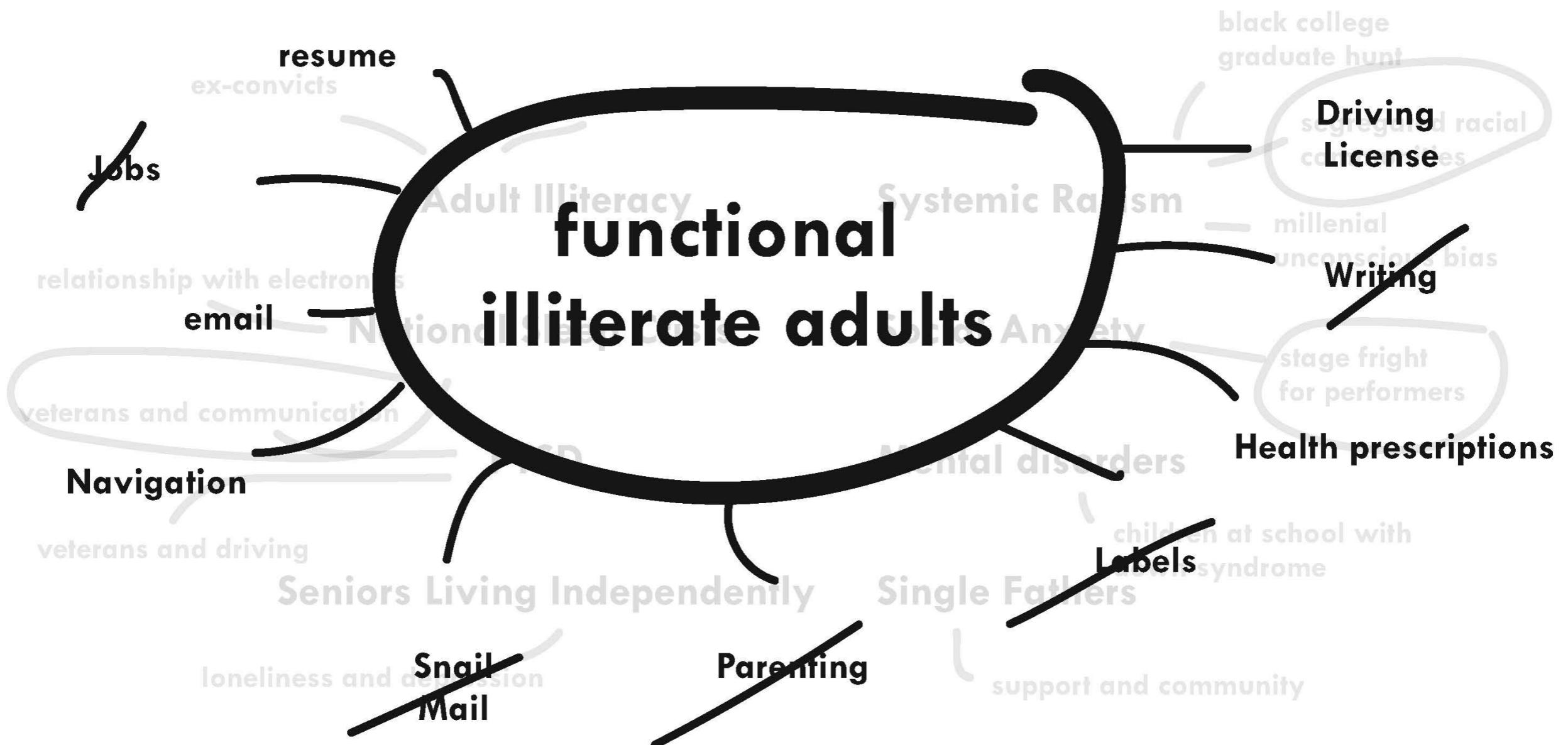
millennial
unconscious bias

stage fright
for performers

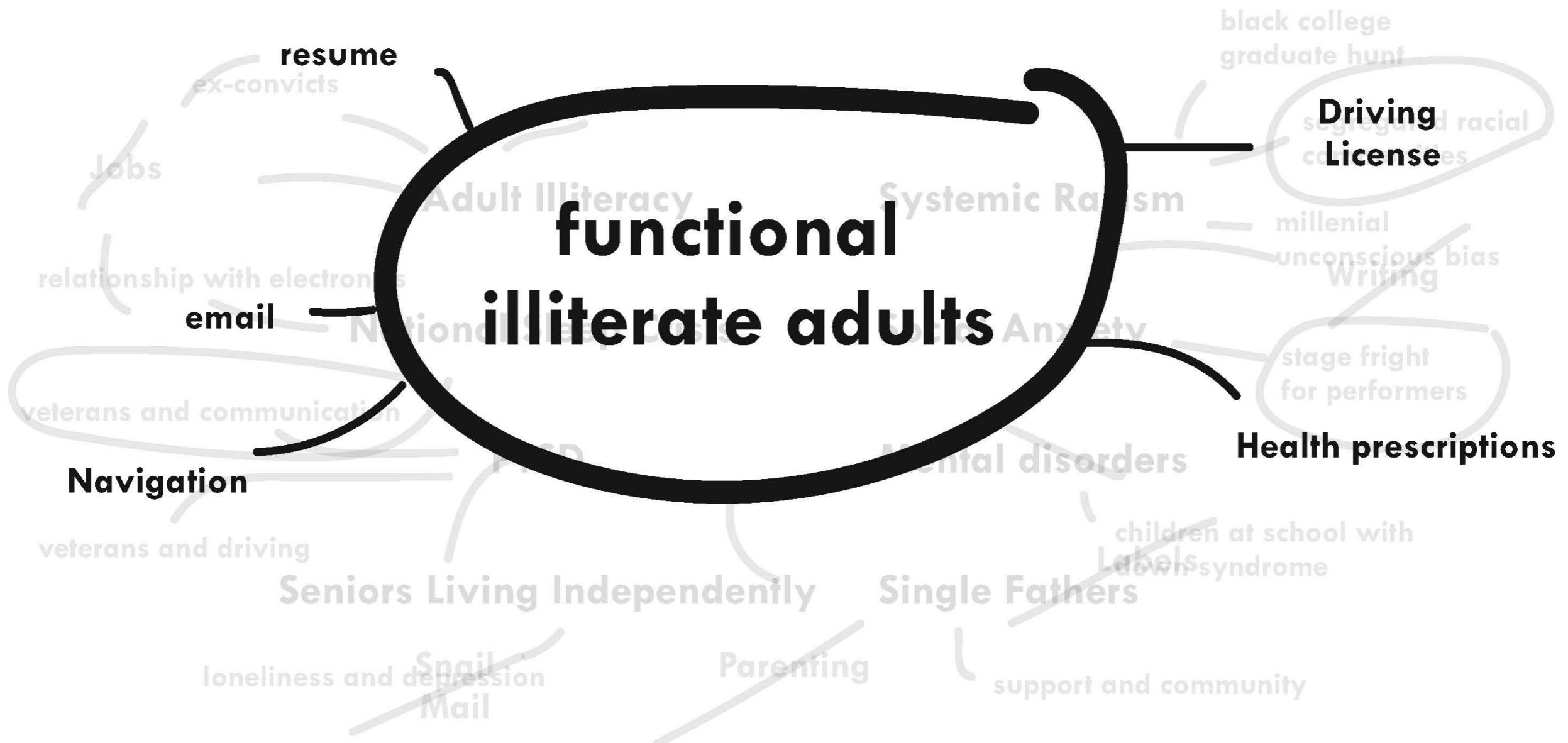
BRAINSTORMING TOGETHER



AFTER MORE PRIMARY RESEARCH



MORE DECIDER PROTOCOLS

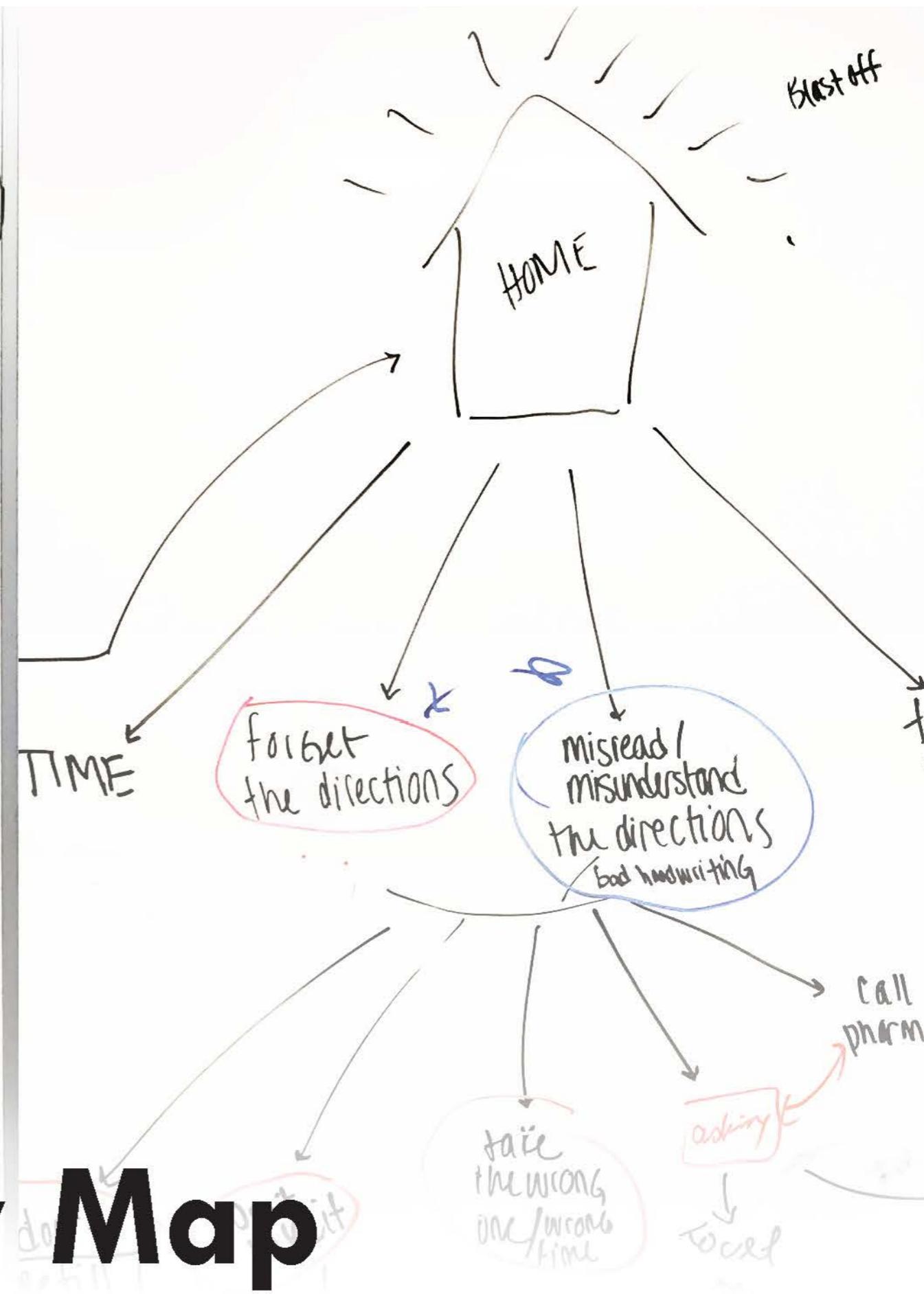
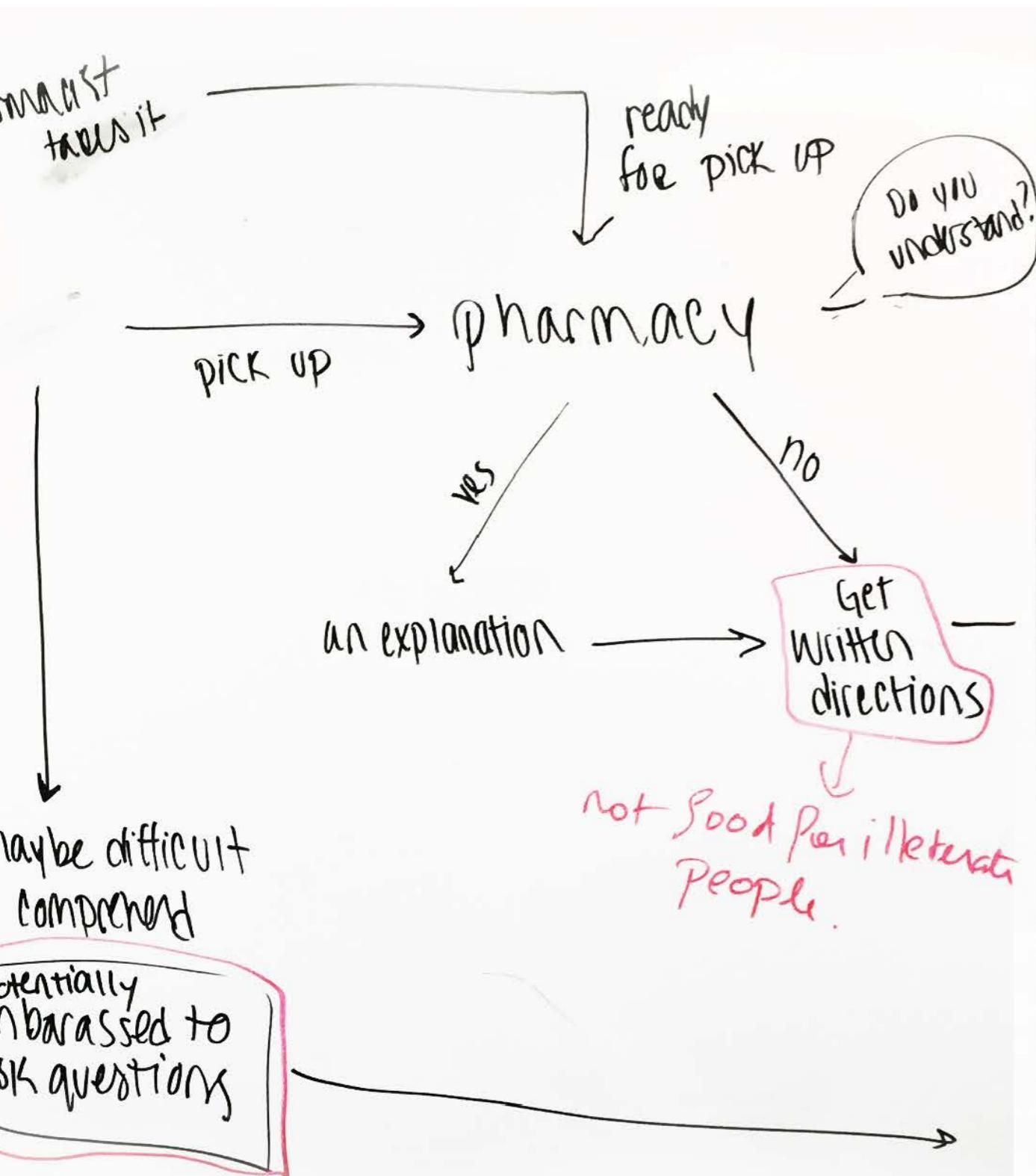


AFTER TALKING WITH MENTORS

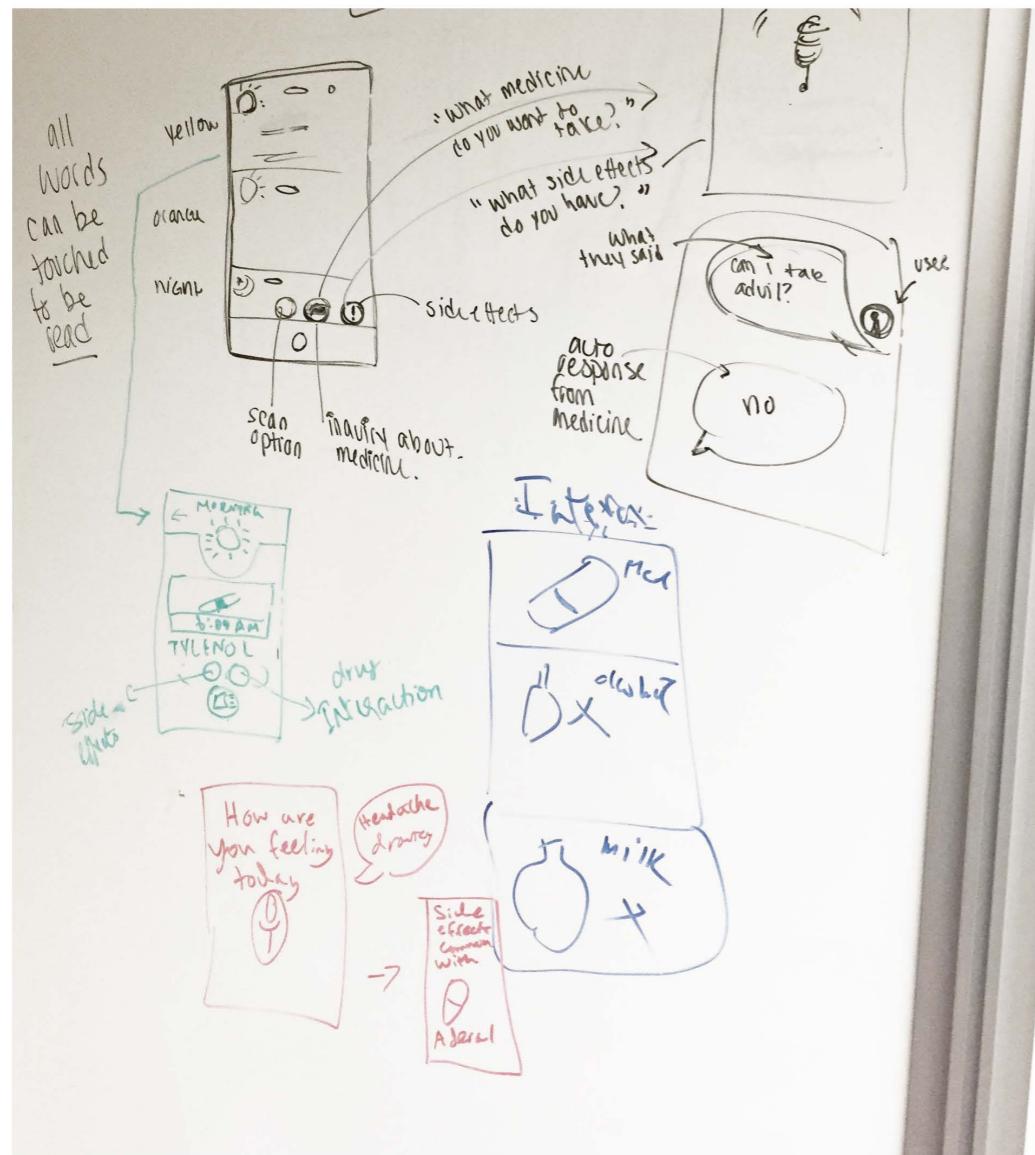


functional illiterate adults

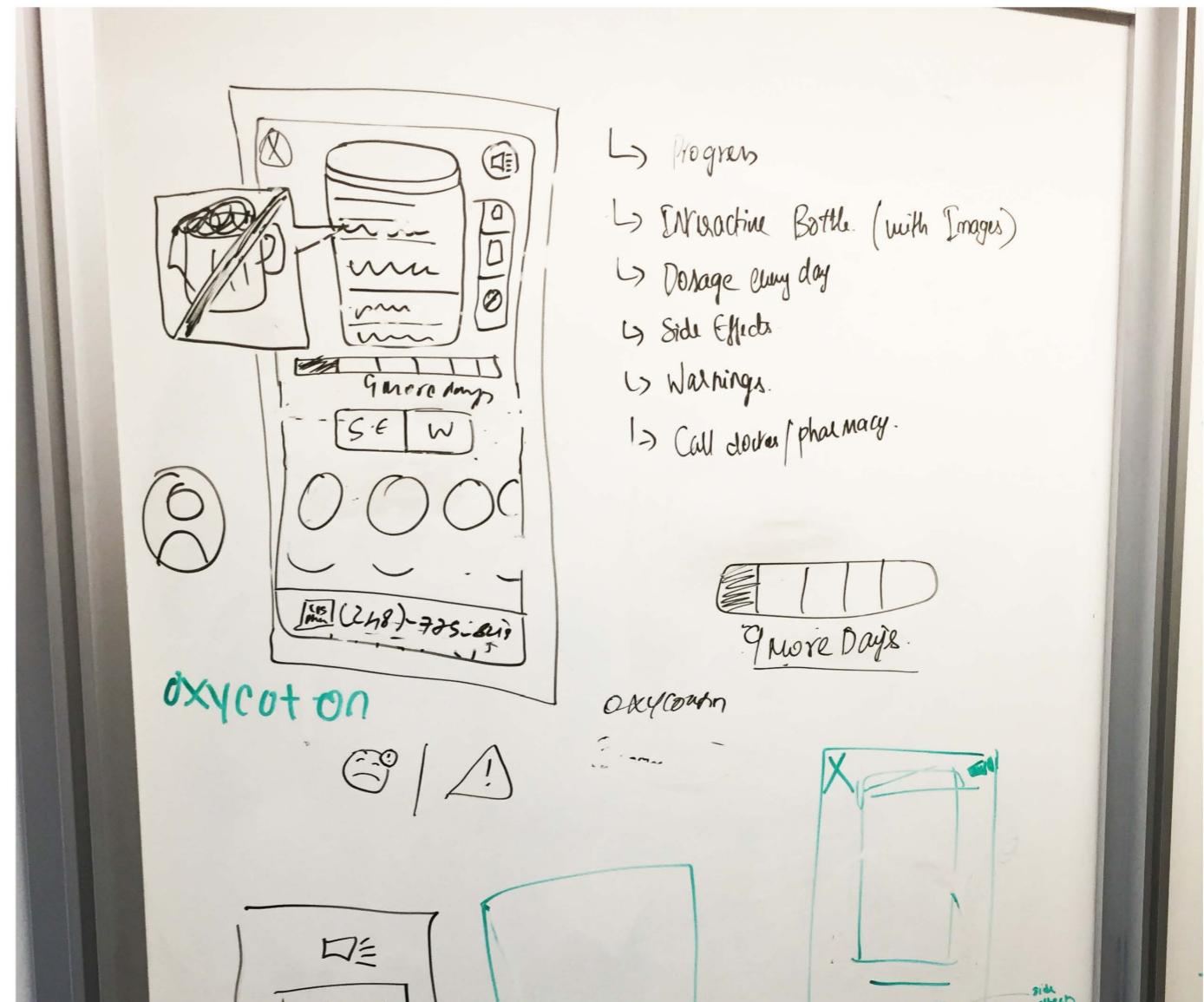
Health prescription



Journey Map



Building on other's ideas



Sketching together

Round Robin Sketching



Rigorous Honesty

INDIVIDUAL REFLECTIONS

QUESTIONS?

thanks!



APPENDIX

App Discovery

Final Sketches

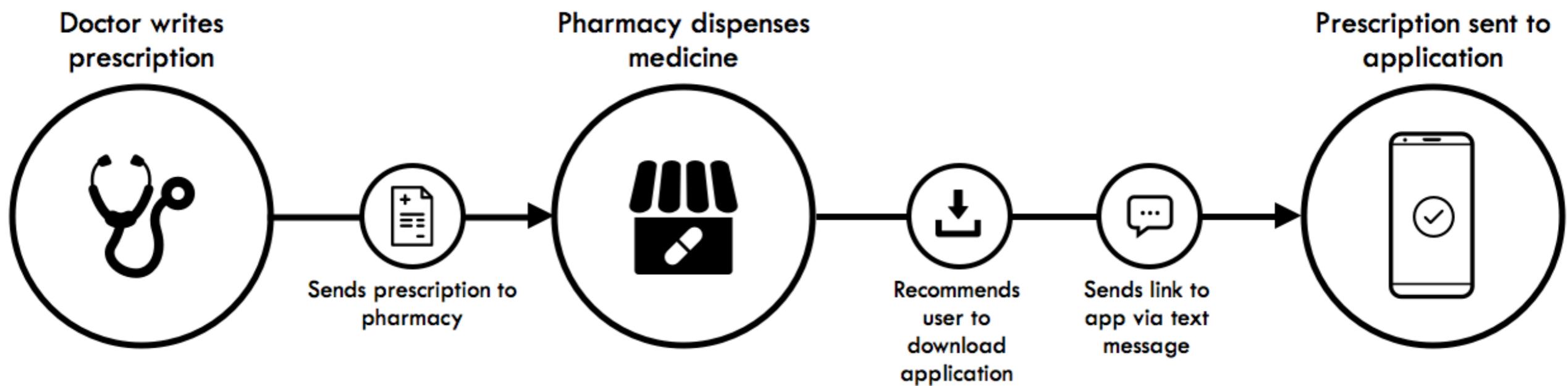
Usability Testing Takeaways

Initial Processes

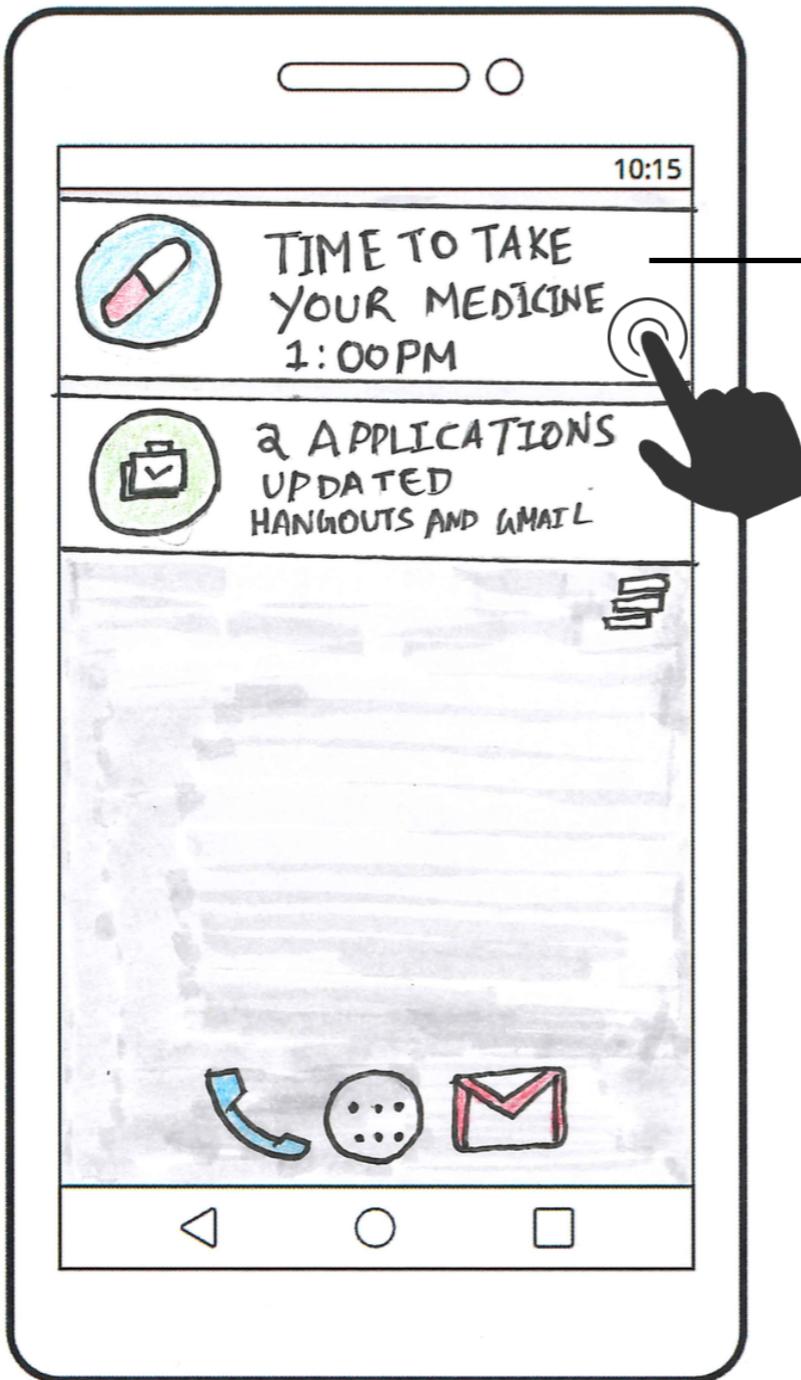
Research

Resources

APP DISCOVERY

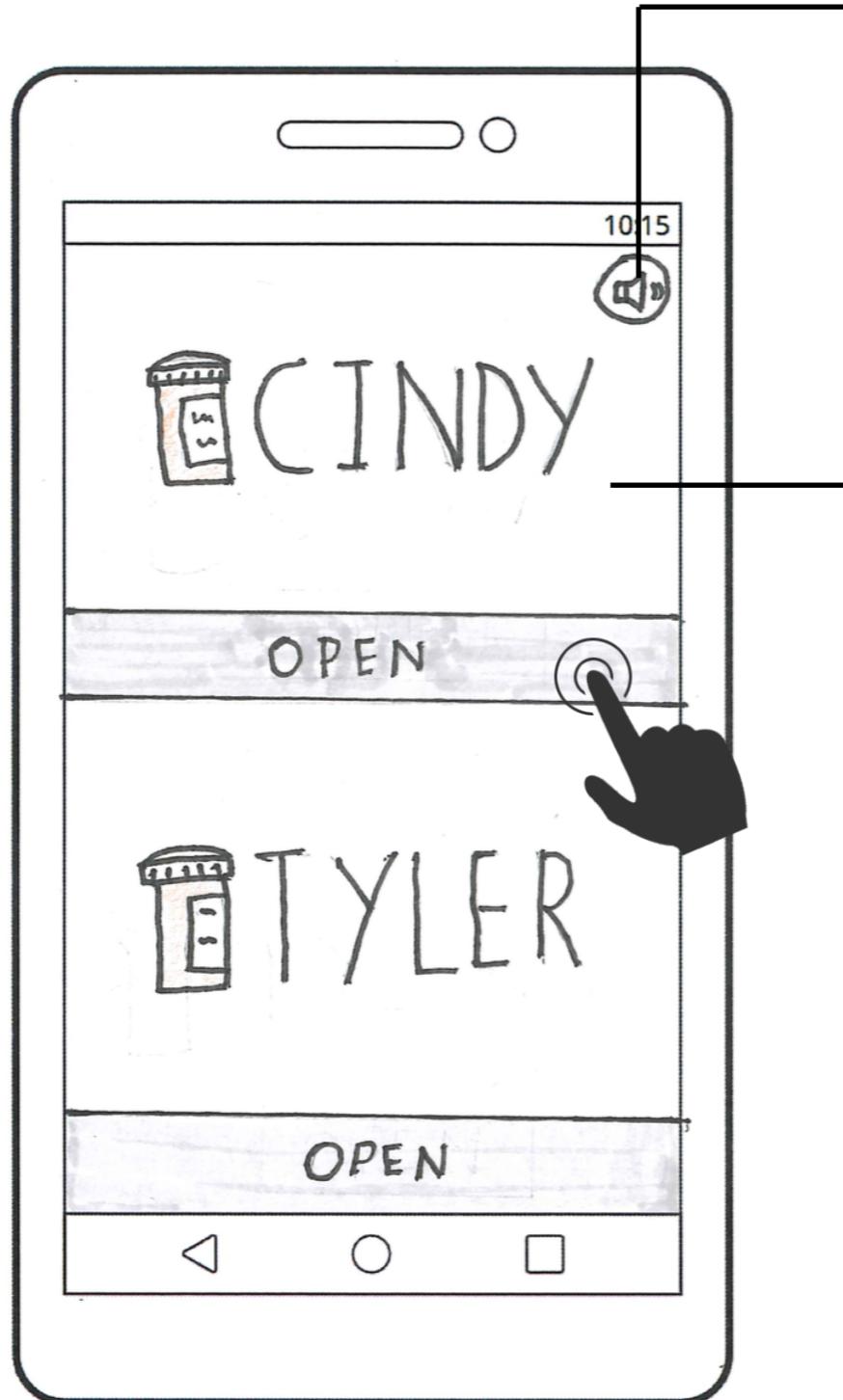


FINAL SKETCHES



User clicks on the notification to open the app.

User receives a notification about the medicine at 1:00PM.



User can hear out instructions for opening specific prescriptions.

The user opens her prescription by clicking on her name or she can click OPEN.

User can access prescriptions from the profile screen of the app.

The background visual shows the time of the day.



User can hear out the details about the dosage at 1:00PM

User can see the dosage and medicine for the time of the day.

User can see the medication for different times of the day by sliding the home screen.

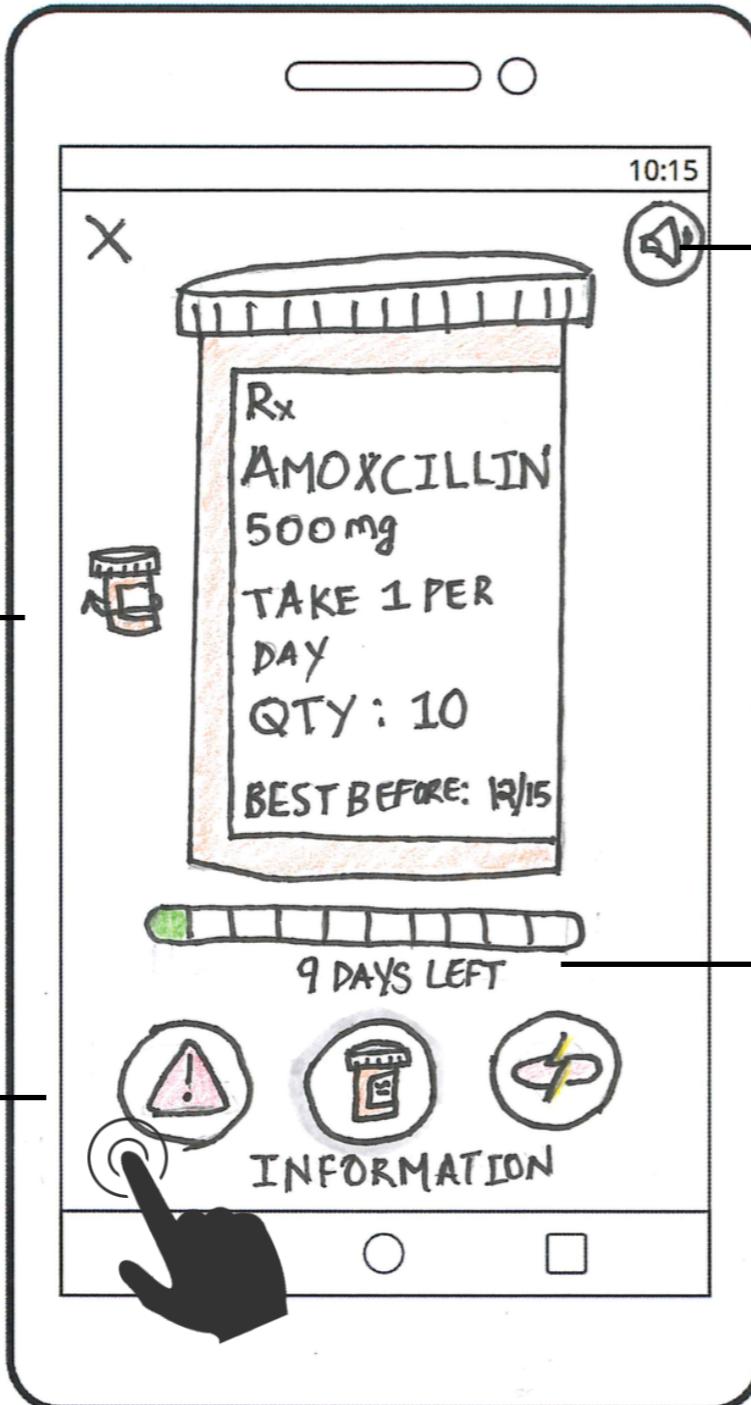


User clicks on the notification to check the details.

User can click on the pill/medicine to see more information about it, which includes reading out bottle information, side effects and warning icons

User can view the other side of the bottle by clicking here.

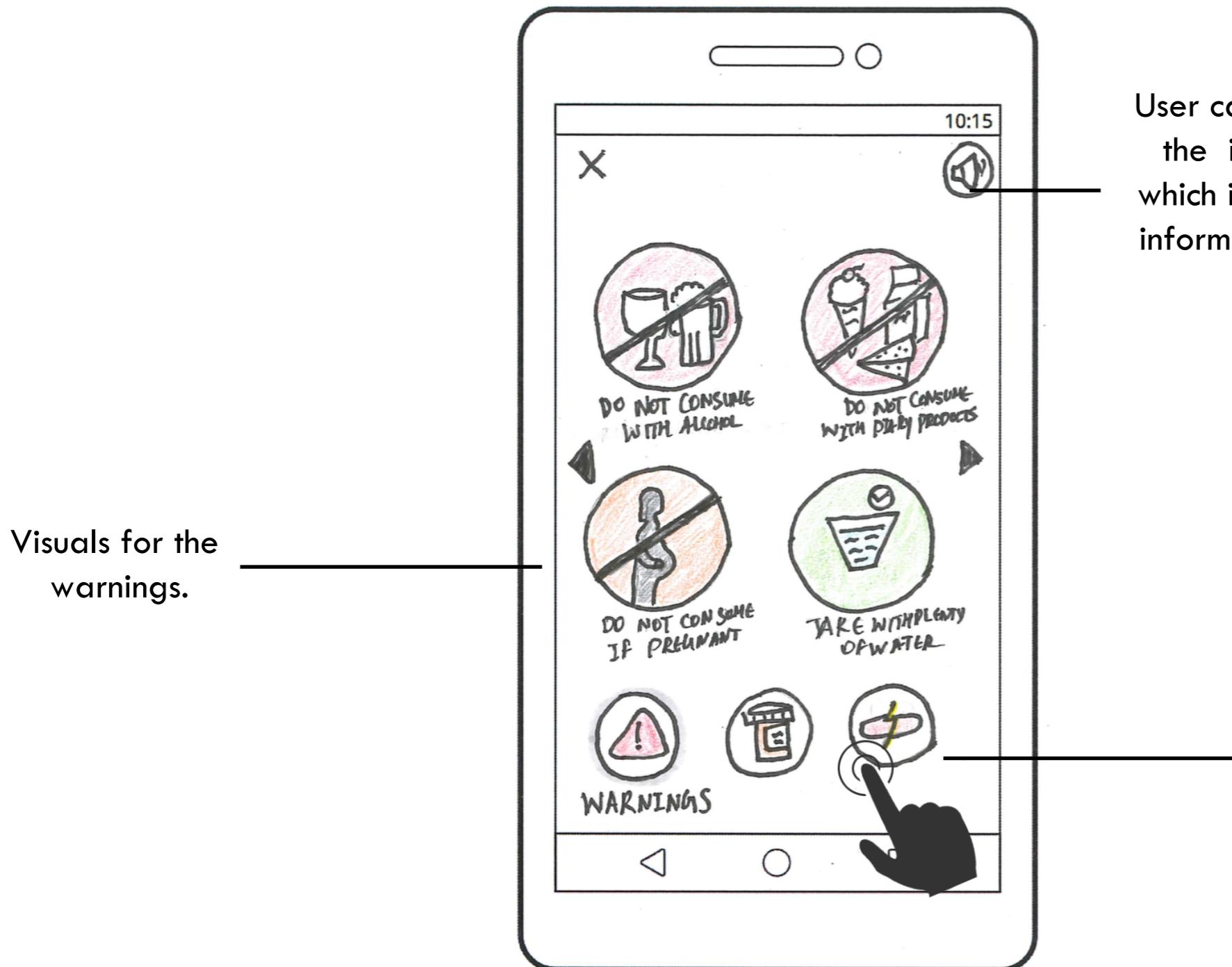
User can see the warnings that come with this medicine.



User can have the app speak out the information on this page, which includes reading out bottle information, side effects and warning icons.

Progress bar re-confirms how many more days the user needs to take the medication.

With the bottle information on this screen, user can also check out its warnings and side effects.



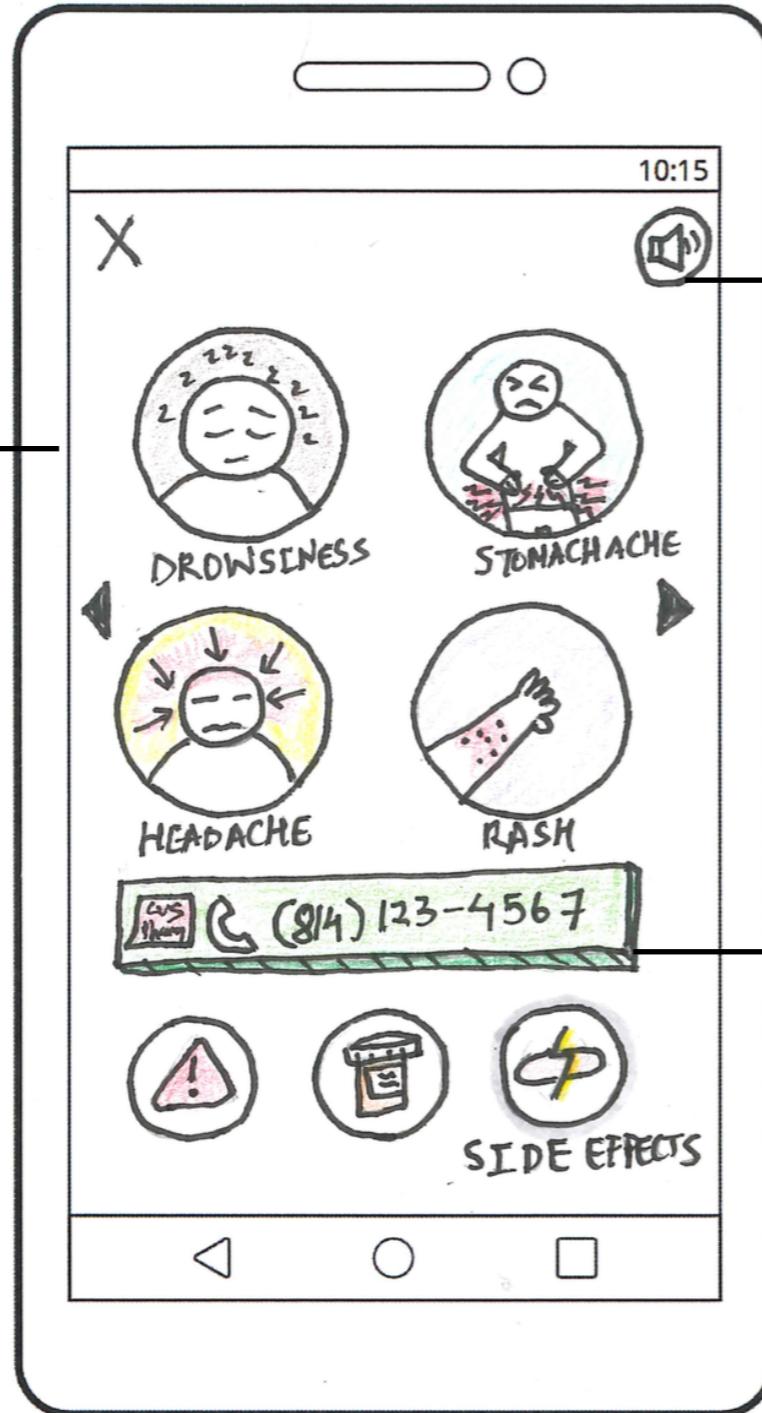
Visuals for the warnings.

User can have the app speak out the information on this page, which includes reading out bottle information and side effects and warning icons.

User can see the side effects that come with this medicine.

User getting information about warnings through easy to understand visuals.

Visuals for the side effects.



Audio to speak out the side effects.

User can call the pharmacy if he/she needs more assistance.

User can see the side effects here. Also, he/she can call the pharmacy if needed.

USABILITY TEST

TAKEAWAYS

The division of shelves in the medical cabinet was misleading. Made our users think that the pills have been put into groups.

Users liked the visual cues for the different times of the day.

Users understood the dosage information.

Half pill information was misleading.

Icons/Images for side effects were not clear.

Warning sign was clear, but side effects visual was not clear.

Users were able to access and understand the medicine bottle information.

Every user liked that we have audio for instruction. They felt the choice to turn it on/off was going to be very helpful.

PRODUCT STRATEGIES

Minimal Viable Product

Single patient profile.

Daily and hourly prescription dosages.

Mid Product

Single patient profile.

Daily and hourly prescription dosages.

Virtual prescription bottle information.

Final Product

Multiple patients profiles.

Daily and hourly prescription dosages

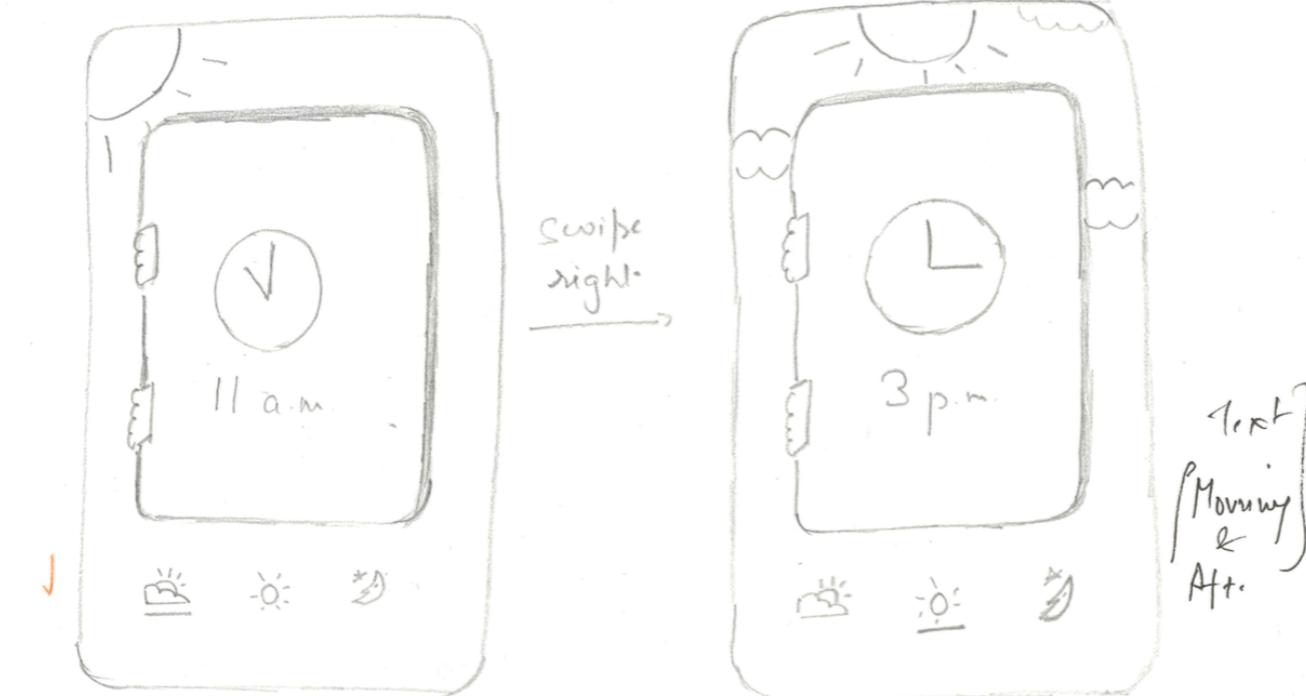
Virtual prescription bottle information.

Side effects and warning screens.

Call the pharmacist.

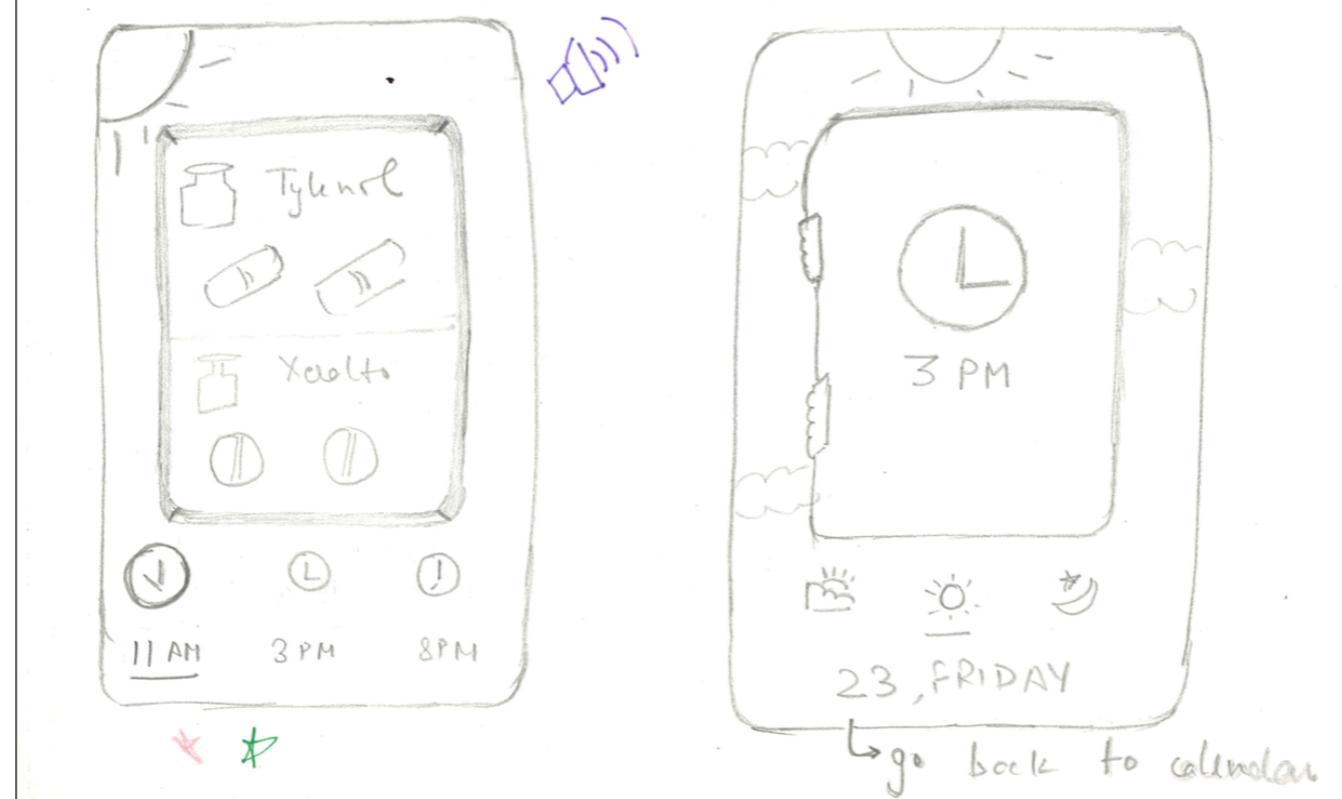
INITIAL SKETCHES

1 Human centered, not machine centered.
— having affordances to take burden of the user.



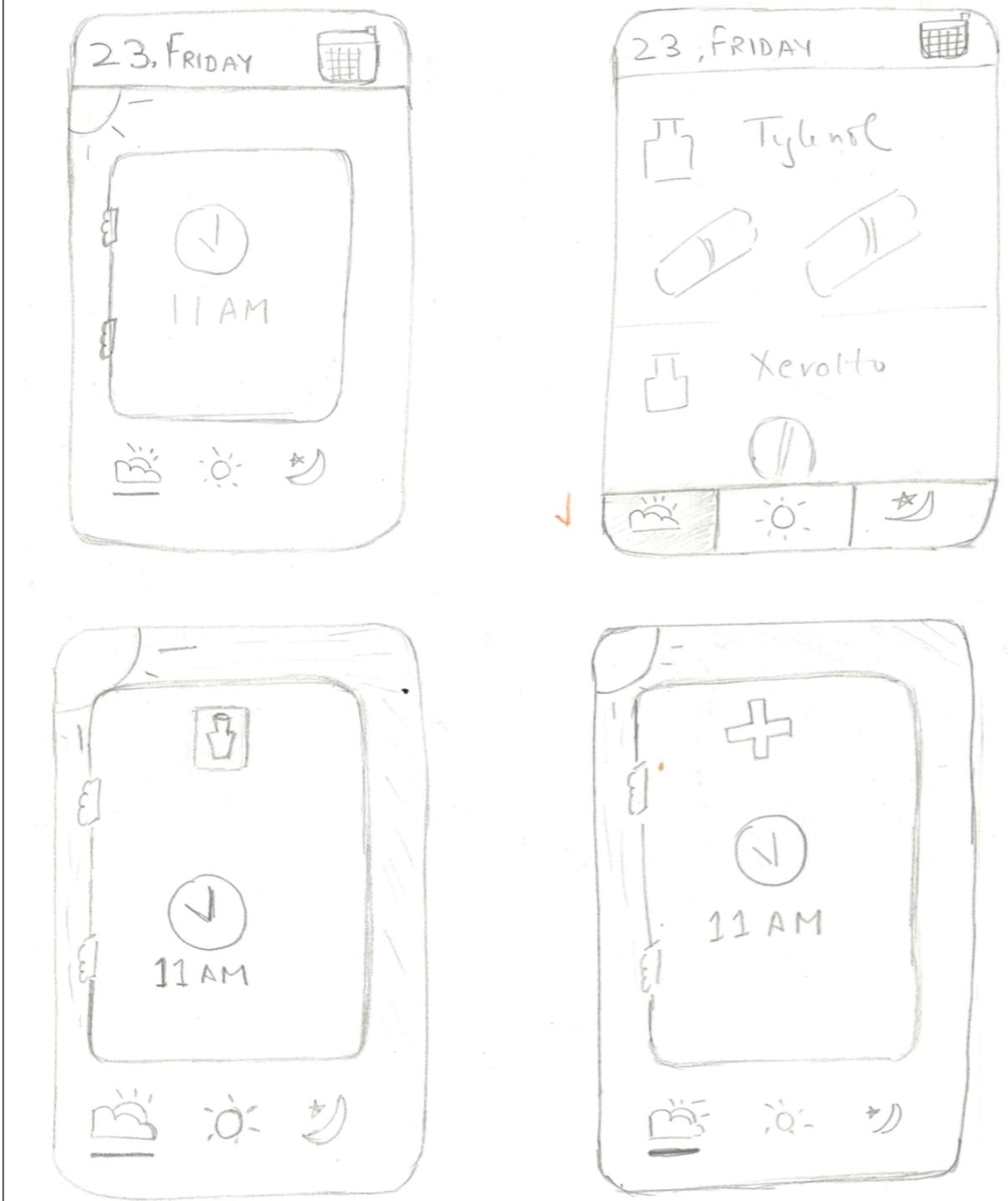
We explored different types of visual cues for the home screen where we had the medicine cabinet.

We iterated using different themes of design



2

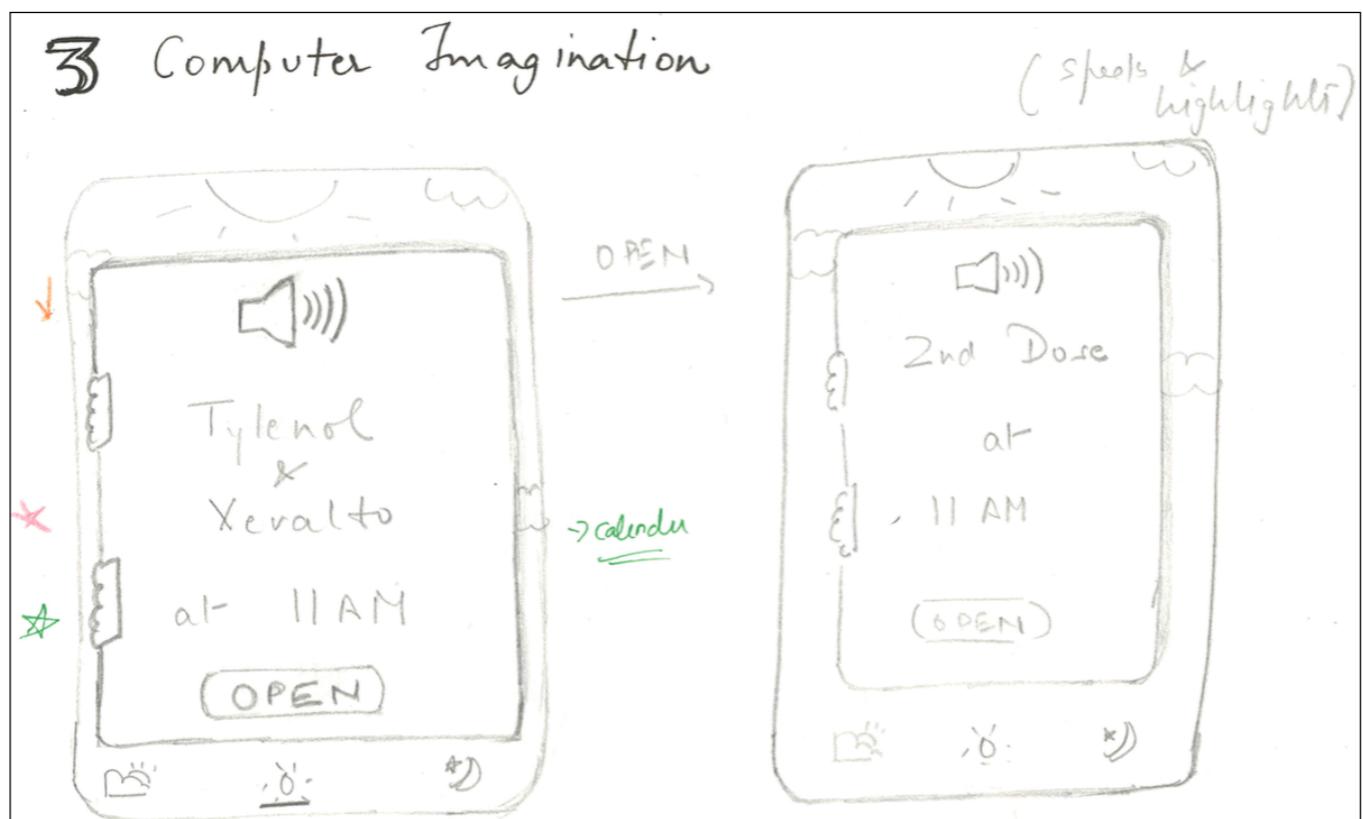
Employs the computer as a transparent medium
— more was for there to understand context



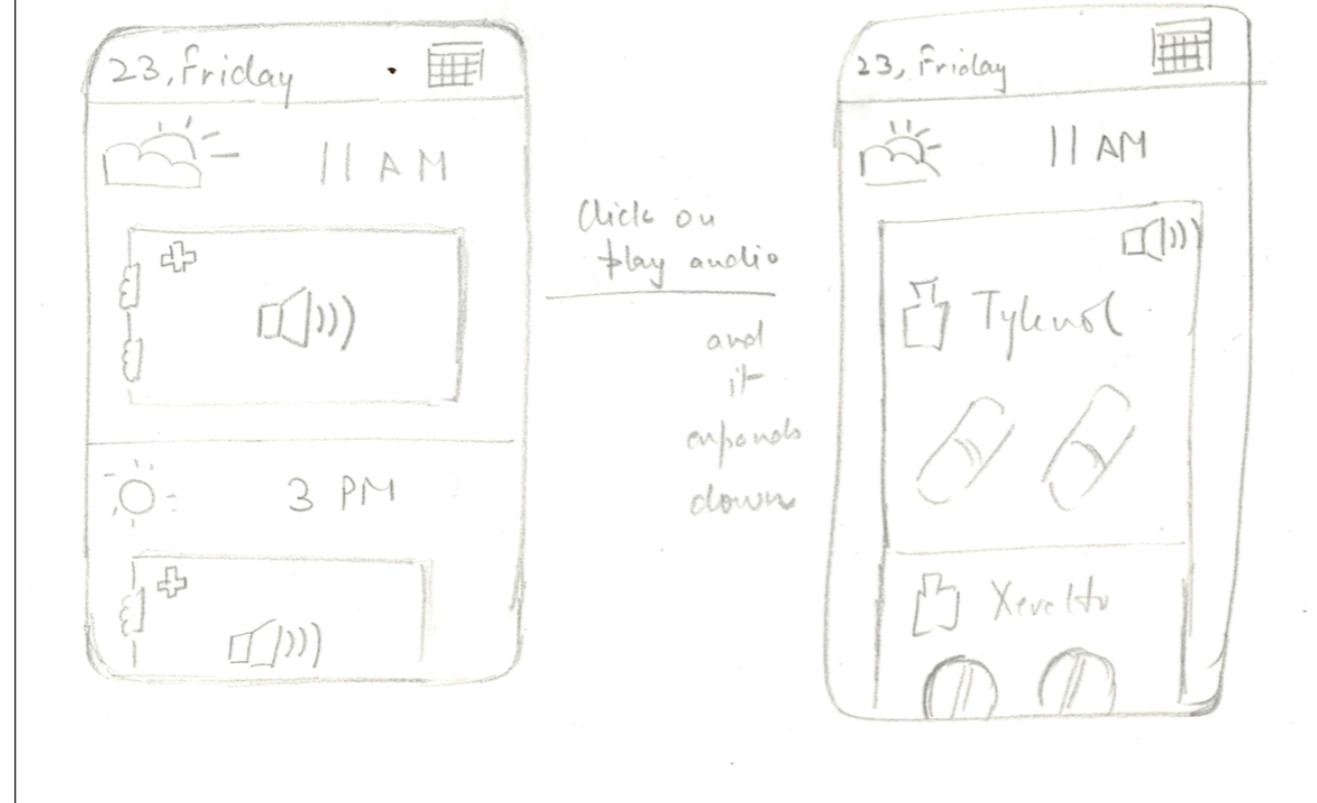
Different ways bottle information could be shown.

We wanted to make the screen less crowded with information after this iteration.

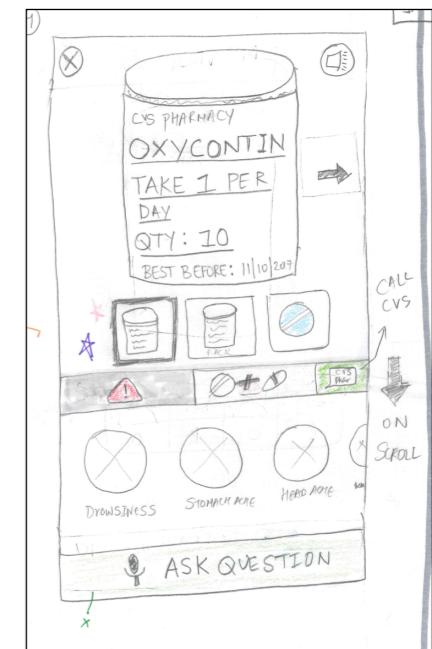
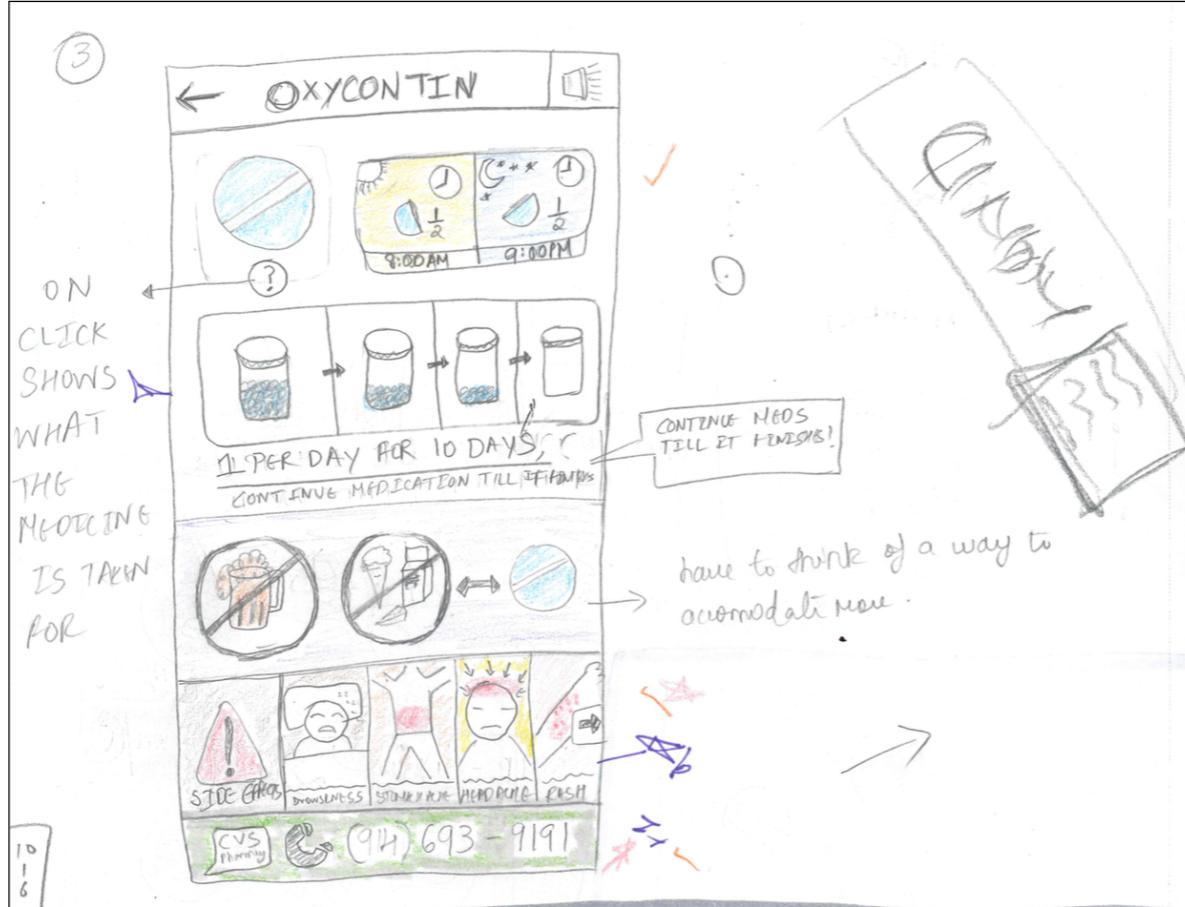
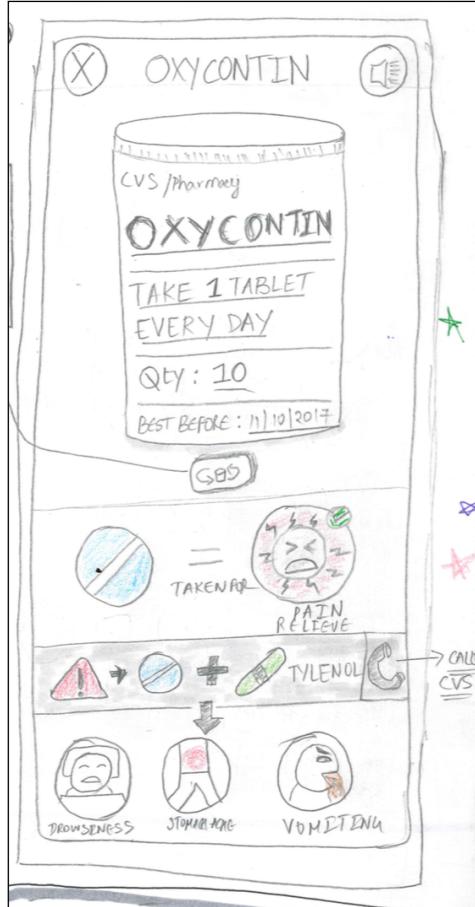
3 Computer Imagination



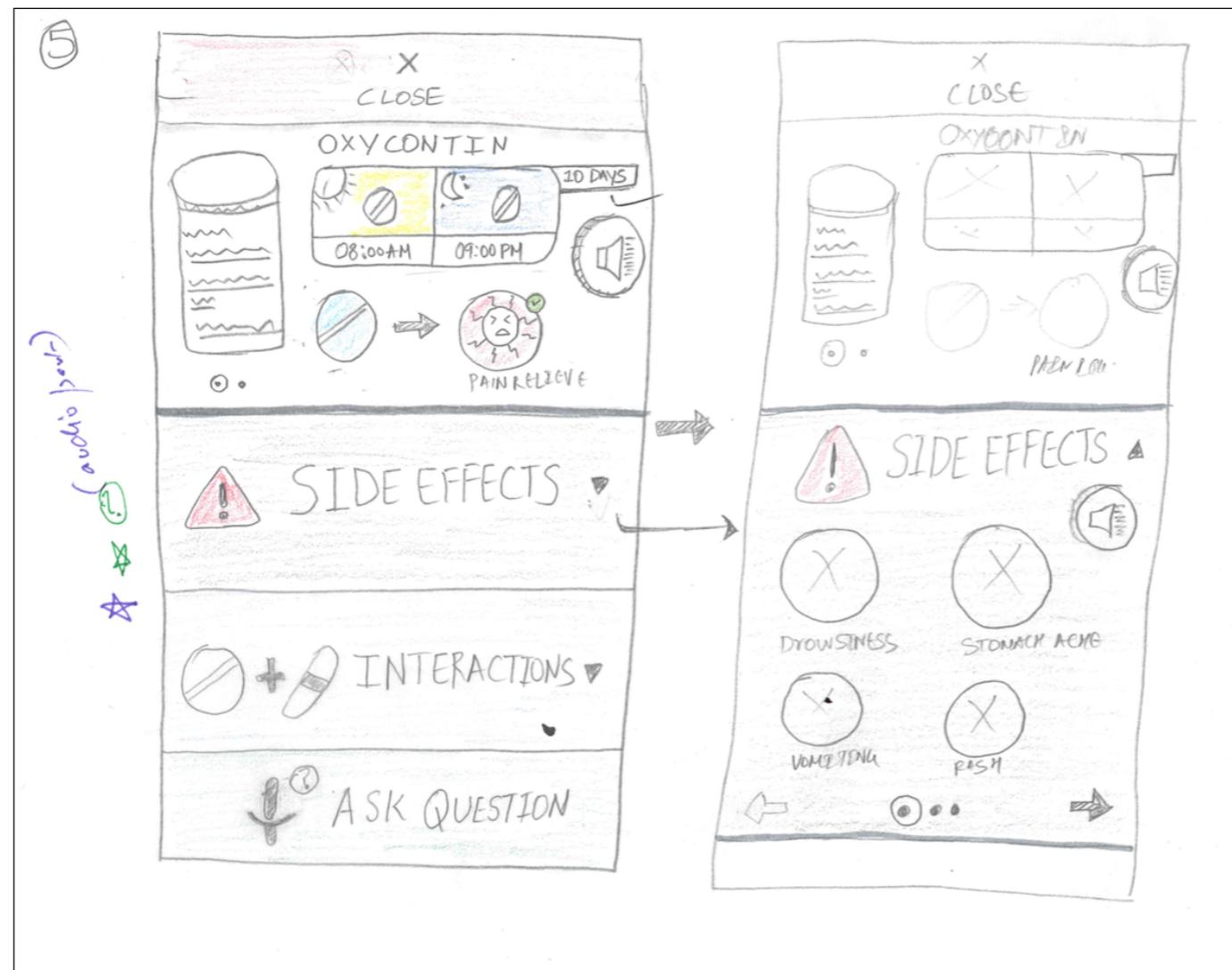
4 Ease of Learning



We tried different ways we can add computer imagination to our design.



Different ways bottle information could be shown.
We figured out that we wanted to keep this screen less loaded with information.



Iterations for side effects and warnings.

Through these iterations, it became clear that we wanted to show information step by step.

FUTURE STRATEGIES

Drugs interaction feature allow users to see how over-the-counter medications will interact with their prescription medications and if it is safe to use.

Share screen with pharmacist/doctor empowers the users to share the exact medications they are on.

Increase the discovery rate of the app by not only having pharmacies to inviting functional illiterate adults to use the app, but doctor's offices, hospitals, community centers and literacy tutoring centers.

CONCEPTS

We explored kiosks as well as other assistive technologies to be placed in a doctor's office or pharmacy. After discussing potential options, we decided on a smartphone so functional illiterate adults would not have to necessarily call unwanted attention to themselves in public. Designs that are created to be placed on pill bottles could be expensive and not as mobile as a smartphone would be.

Concepts our final design includes are:

- Various forms of audio feedback.
- Visual images for symptoms and warnings.
- Break up content into many simple screens.
- Primary focus:presenting correct dosages.
- Secondary focus: understanding package information.

RESEARCH

PRIMARY RESEARCH

Pharmacist Interview #1, Rite Aide Pharmacy, Agoura Hills, California

Main takeaways:

Pharmacists give patients prescriptions after entering data into the computer, filling the prescription and giving a medical consultation.

Medical consultations go over side effects, allergies etc.

Interact with doctors when verifying requests over the phone.

If people take medications wrong and it is severe, the pharmacists will inform the patients to call 911.

People usually understand the consultations and if they do not understand english, there is a translator and a paper printout of instructions in their language.

People rarely have problems with prescription medications. Get one call a month maybe.

Pharmacist Interview #2, CVS Pharmacy, Bloomington, Indiana

Main takeaways:

Know that a patient needs extra help when he/she gets the prescription and are staring at the bottle longer than normal.

By law, a pharmacist has to ask if a patient needs an explanation of the drug.

Problems with prescriptions:

Antibiotics - people take until they feel better

2 daily - get confused or forget when to take medicine or stop early.

Side effects - don't understand or read about side effects (throw medicine packaging out).

Doctor relies on pharmacist to explain perscription farther and pay attention to the prescription combination.

When the prescription is a device, the pharmacist will take it out and show patient how to use it.

Main problem space pharmacist sees is when a person has an acute problem and only has to take medicine for a week or two.

Doctor Interview #1, Arrowhead Medical Center, San Bernardino, California

Main takeaways:

Illiterate patients do not know how or where to get medications or even how to make a follow-up appointment.

Nurses and social workers mostly explain prescriptions.

Patients do not call hospital for prescription medication clarification. Maybe if he worked at a private office, it would be different.

A lot of diabetic patients end up back in hospital if do not understand correct dosages.

Patients overdose when don't know what ½ a pill means or they take 5 instead of 2.

Twice daily instructions are confusing to functional illiterate people.

Many times literate children will care for parents.

Doctor Interview #2, Infectious Disease Doctor from Fishers, IN

Main takeaways:

Generic medications have complicated doctor's abilities to understand medicines

Many people struggle with understanding medications

Nurses frequently separate medication times by morning, afternoon and evening.

Talk back method is observed a lot.

VITAL Director Interview, Bloomington, Indiana

Main takeaways:

Illiteracy has been an issue for a long time, as education has developed, there are higher expectations (more people are left behind).

Large class sizes, learning disabilities (people are not given the opportunity to learn the way they want to learn).

There are many levels of illiteracy:

Complete lack of reading and writing skills (dyslexia)

Nearly 1 in 5 people struggle with dyslexia

Some people are successful and keep jobs. Others without a high school diploma struggle.

Intermediate reading and writing information (reading the classified, they miss a lot in comprehension (follow doctors health orders, read labels, navigation job forms, daily life information)).

Functional illiteracy demographics:

More women than men.

Diverse in employment and school backgrounds.

People are great at hiding it (can you read this for me; I don't have my glasses; I'll come back tomorrow) – build strategies.

VITAL teaching strategies:

Stay away from classroom feeling.

No shame

Focus on relevancy to help them come back.

What types of technology do functional illiterates use?

Smart phones (easy to understand with vivid images)

Public computers and ipad

SECONDARY RESEARCH

Pictorial aids worked best.

Functional illiterate adults associate with simple words.

Audio feedback is essential.

RESOURCES

Doctor Interview #1, Arrowhead Medical Center, San Bernardino, California [Phone interview]. (2015, November 25).

Doctor Interview #2, Methodist Doctor, Fishers, Indiana [Phone interview]. (2015, November 29).

Katz, M., Kripalani, S., & Weiss, B.D. (2006). Use of pictorial aids in medication instructions: A review of the literature. *Am J Health-Syst Pharm*, volume 63. Retrieved from http://healthliteracy.worlded.org/pictorial_med_instructions.pdf.

Phan, S. (2014, Dec, 30). Cell Phone Improve Literacy Rates [Web log post]. Retrieved from <http://borgenproject.org/cell-phones-improve-literacy-rates/>.

Pharmacist Interview #1, Rite Aide Pharmacy, Agoura Hills, California [Personal interview]. (2015, November 25).

Pharmacist Interview #2, CVS Pharmacy, Bloomington, Indiana [Personal interview]. (2015, November 30).

VITAL Director Interview, Bloomington, Indiana [Personal interview]. (2015, November 20).