



Sammy Robens-Paradise, Hussein Nagri, Aliya Rajwani, Joshua Wilkinson

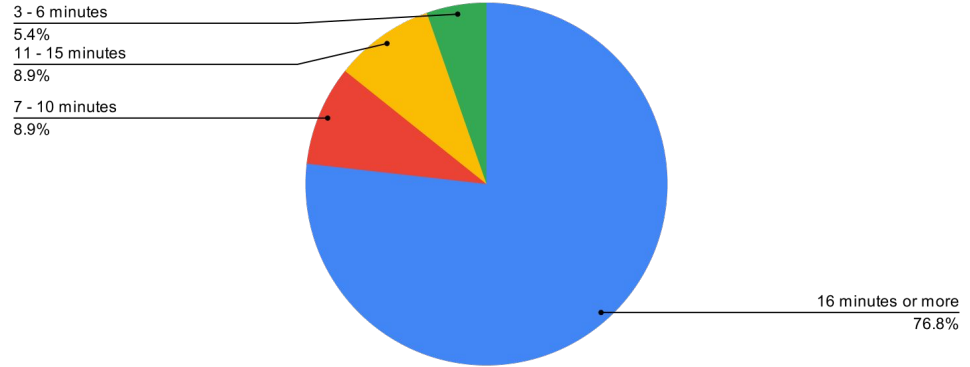
The Problem Space



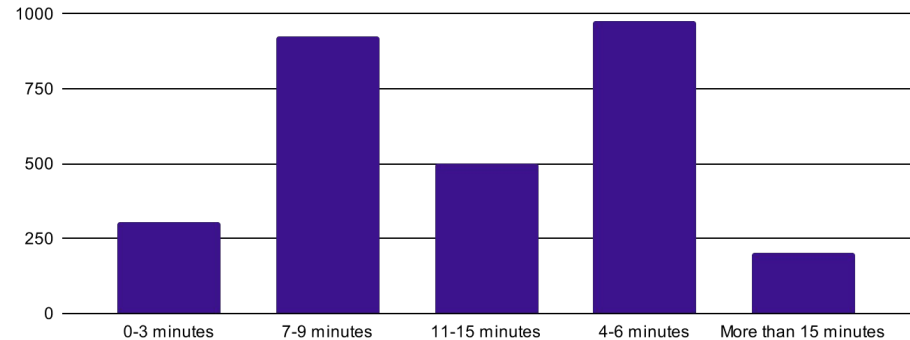
Patients

- Canadians picked up **600 million** prescriptions in 2016, and it's likely more now.
- They often experience long wait times when using pharmacy services, regardless of the type of care they require [2]
- There is often limited accessibility of care for patients. Patients can only pick up prescriptions during pharmacy hours [2]

Count of During peak times, how long does a patient have to wait before being able to pick-up their prescription?



Patients Responses: What do you think is an acceptable amount of time to wait for services at your pharmacy?



Count of What do you think is an acceptable amount of time to wait for services at your pharmacy?

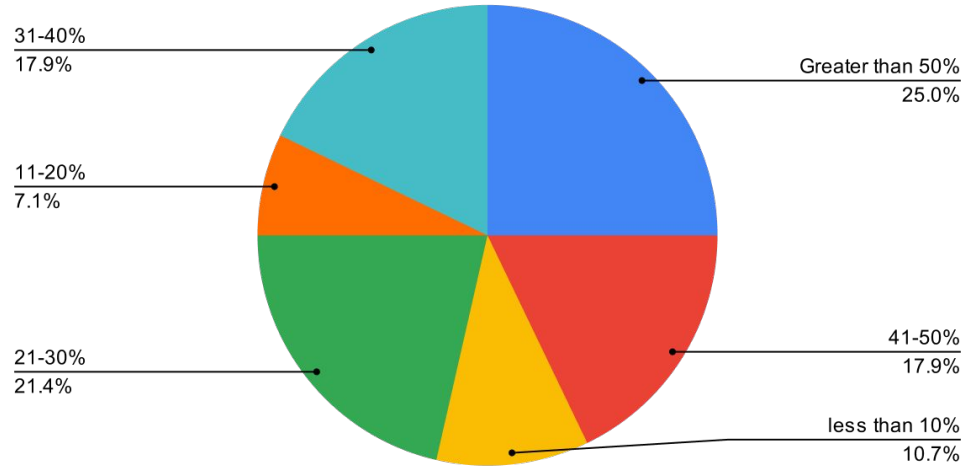
11,814

Pharmacies in Canada according to the *National Association of Pharmacy Regulatory Authorities*

Pharmacies

- There is a national shortage of pharmacists [3]
- Pharmacists are facing increased workloads due to Canadian health policy changes [4]
- Pharmacists and pharmacy staff spend a lot of their time doing non pharmacy-related work

Count of What percent of your time do you think you spend doing customer service/clerical work?



Problem Motivation



Project Motivation: The Problem



Long wait times [2]



Patients are unaware of pharmacy services [1]



Shortage of pharmacists [3]



Increasing workload [4]



Customer service takes time [5]



75% of prescriptions are repeat [7]



Limited accessibility of care for patients [2]

Project Motivation: Existing Solutions

Solution	Challenges
Automated prescription dispenser [9]	<ul style="list-style-type: none">● High touch point rate with pharmacists● Costly● High magnitude of change
Pharmacy Kiosks [10]	<ul style="list-style-type: none">● Unnecessary patient interactions can be further reduced● Poor user experience● Challenging for caregivers to complete prescription pickups● Not available in Canada

Project Objectives



Eliminate unnecessary
patient interactions



Automate prescription
pick-up when safe



Cost-efficient



Easily-adoptable

Intended Project Outcomes



Higher throughput - more customers can be served in a day.



Improve care for patients who require more attention from pharmacists



Pharmacists can take on other responsibilities to reduce the load of other healthcare staff

User Research: Patients

2,905

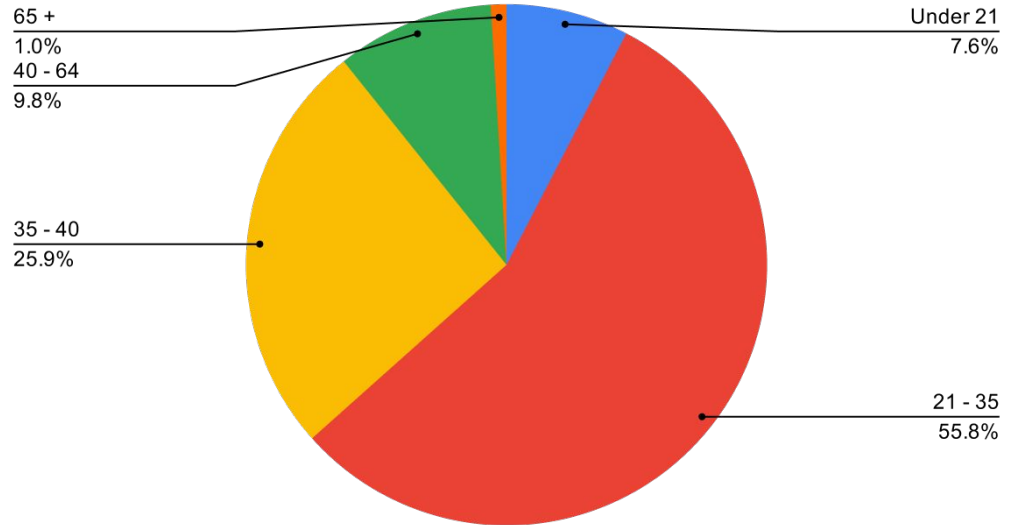
Respondents

Over 1600 respondents between
21-35

Remaining groups over 250+

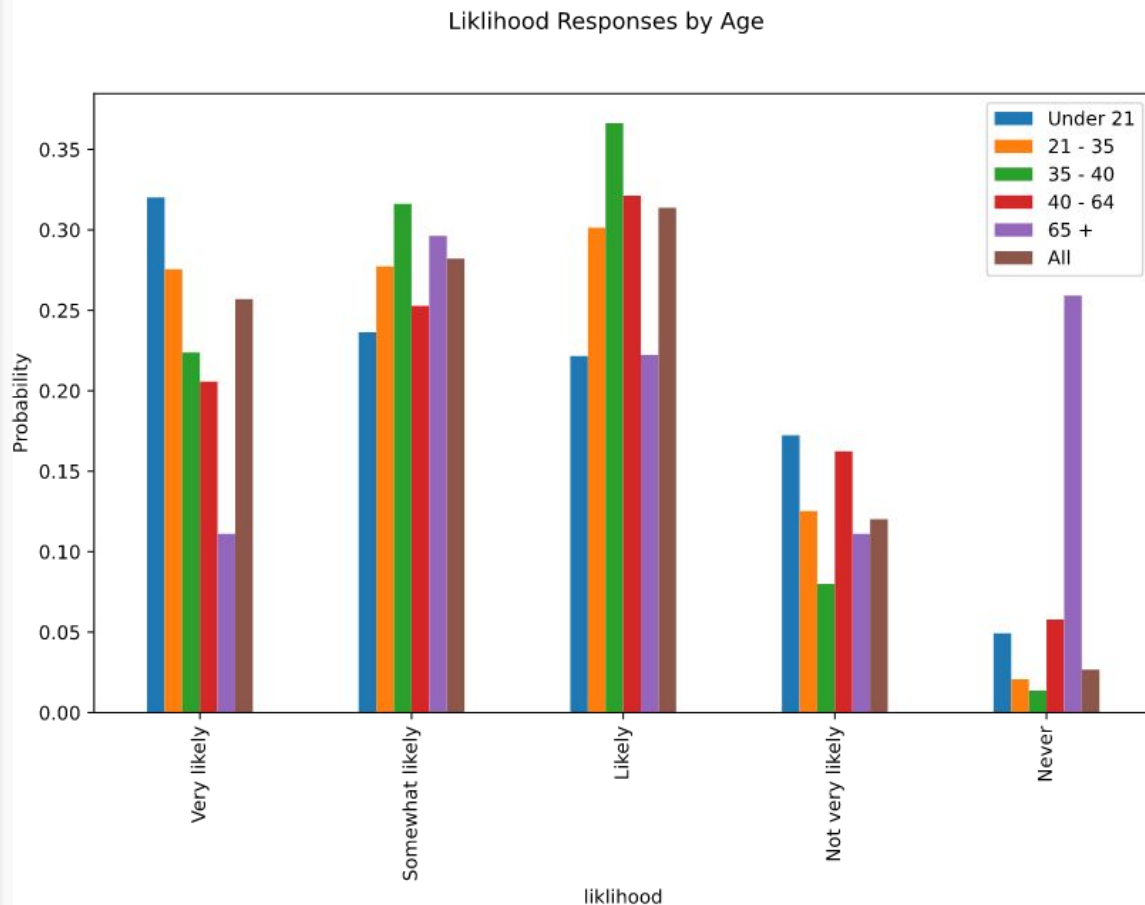
65+ only with 28 respondents

Count of What is your age range?



How Likely Are Patients to Use Automated Prescription Pickup?

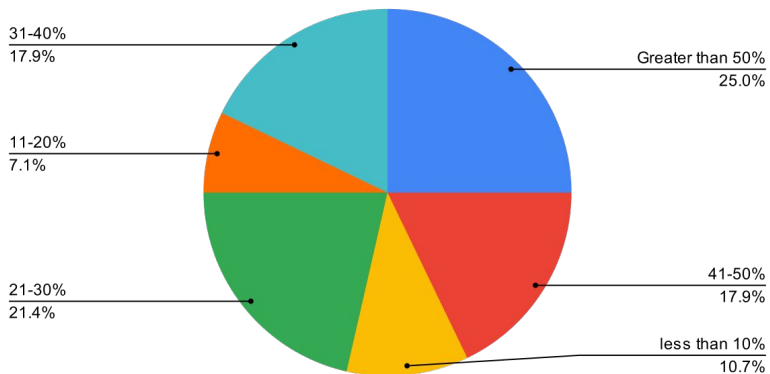
- Across all age groups, more than 50% are at least likely to try automated pickup.
- Only seniors aged 65+ had substantial “never” response
- Age groups below 65 substantially likely to try



User Research: Pharmacy Staff

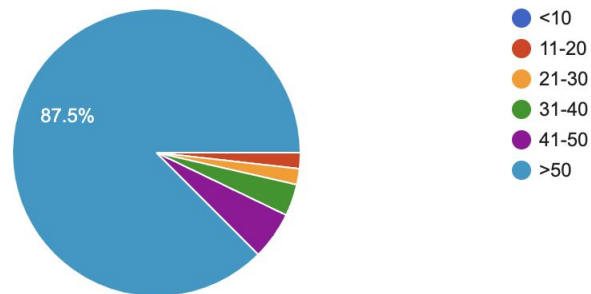
- Over half of Pharmacists spend more than 30% of their time doing clerical work
- Over 50 subscriptions are filled per day

Count of What percent of your time do you think you spend doing customer service/clerical work?



How many refill prescriptions do you estimate servicing in a day?

56 responses

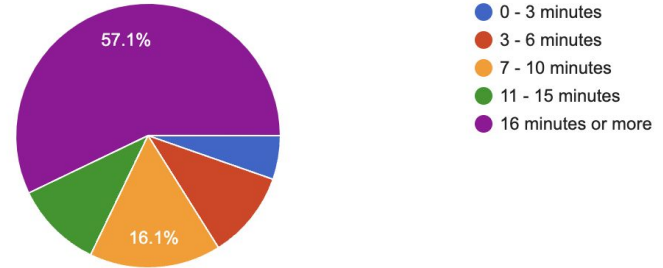


User Research: Pharmacy Staff

- Pharmacists perceive average wait time of 16 minutes or more
- Peak wait time can easily exceed 16 minutes or more

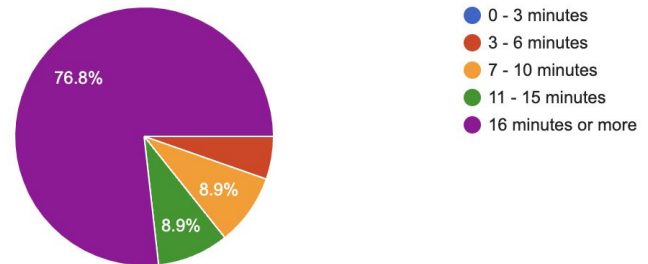
On average, how long does a patient have to wait before being able to pick-up their prescription?

56 responses



During peak times, how long does a patient have to wait before being able to pick-up their prescription?

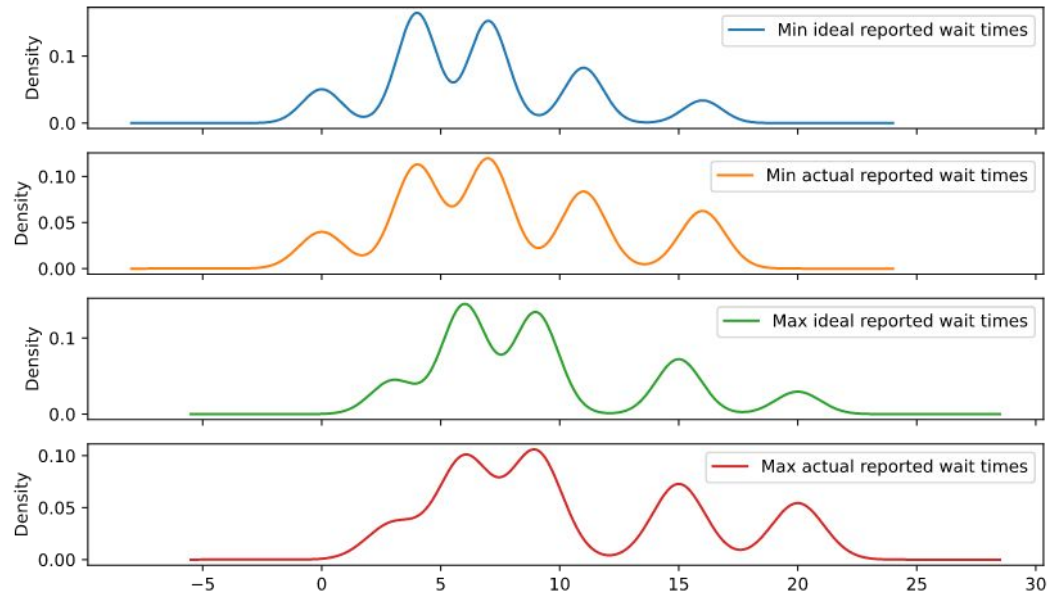
56 responses



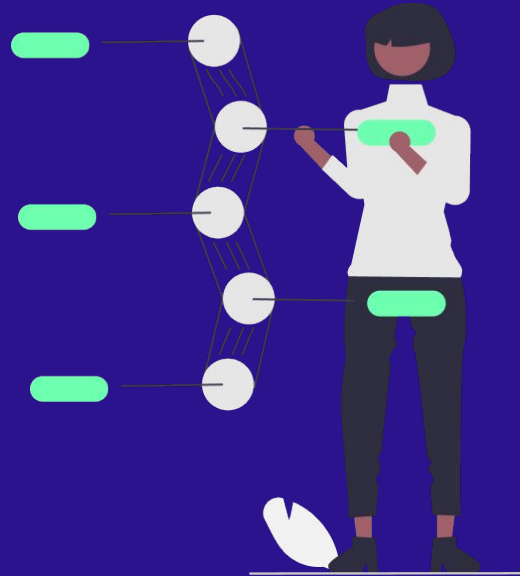
Average Wait Times: Expected Versus Actual Reported

Minutes	μ Min	μ Max
Idea Reported Wait times	6.561	9.146
Actual Reported Wait times	7.695	10.472
Difference	1.114	1.326

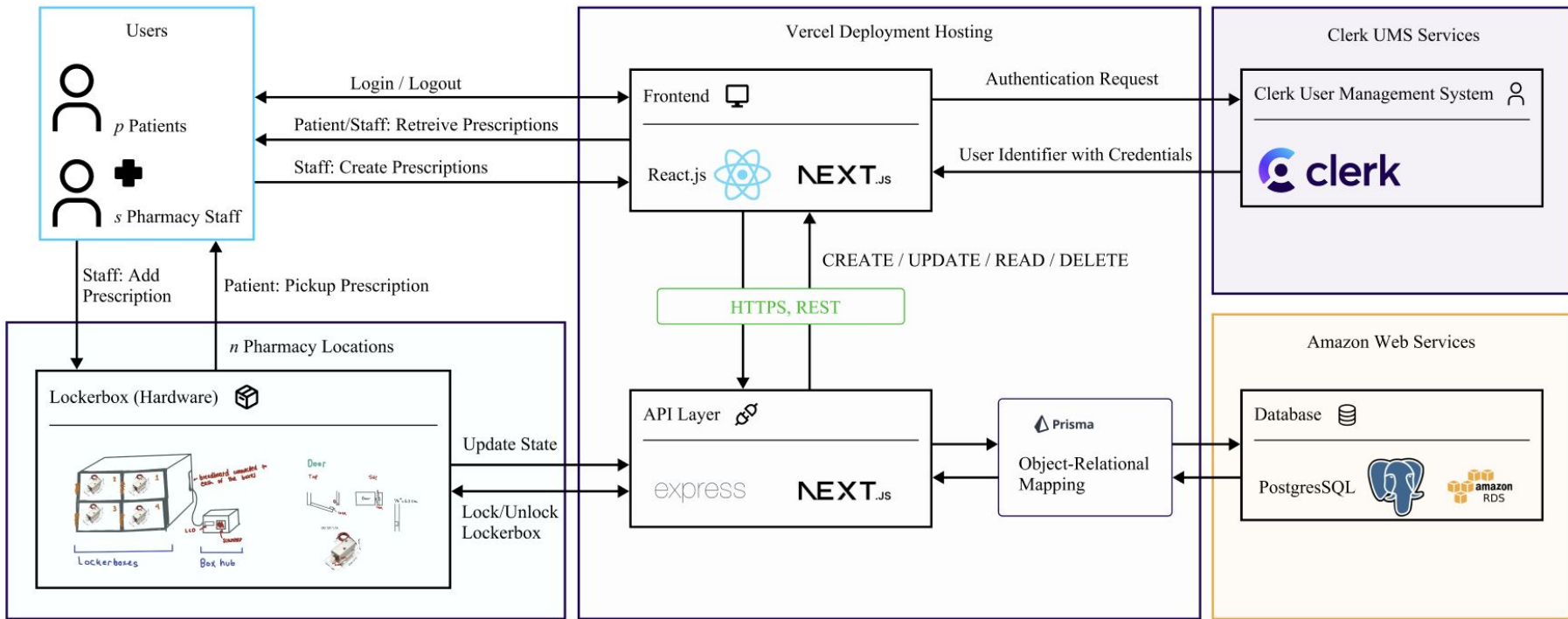
Pharmabox pickup time should be less than 6 minutes



Outcomes



Application Architecture



Pharmacist Dashboard

PharmaBox John

- Dashboard
- Patients
- Workflows
- Team
- Logbook

- Settings
- Logout

Home

Choose Patient Prescription Name Balance Due \$00.00 Choose Locker [Create Prescription](#)

Prescriptions Awaiting Pickup

Tylenol Box: 1

Patient Information

Date of Birth: Mon Oct 16 2000 20

id 40

Locker Status: 3/4 Free

Locker Number: 1
id 5 Status: Full

Locker Number: 2
id 6 Status: Empty

Locker Number: 3
id 7 Status: Empty

Locker Number: 4
id 8 Status: Empty

Demo: Pharmacist Dashboard

The screenshot displays the Pharmacist Dashboard interface. The top navigation bar includes the 'PharmaBox' logo and a user profile icon. A left sidebar contains menu items: Dashboard, Patients, Workflows, Team, and Logout. The main content area is titled 'Home' and features a breadcrumb trail: Home > Prescriptions > Prescriptions Awaiting Pickup. Below the breadcrumb, there are tabs for 'Prescriptions Awaiting Pickup' and 'Locker Status'. The 'Prescriptions Awaiting Pickup' section shows a patient card for 'Tyland, Ben J' with a 'Patient Information' section containing 'Date of Birth: Mon, Jul 09 2000' and '42'. The 'Locker Status: 3/4 Free' section includes a progress bar and a list of four lockers (Locker Number: 1 to 4) with their respective IDs (0 5, 0 6, 0 7, 0 8) and 'Locker Status' buttons.


Locker Number	ID	Locker Status
Locker Number: 1	0 5	Locker Status
Locker Number: 2	0 6	Locker Status
Locker Number: 3	0 7	Locker Status
Locker Number: 4	0 8	Locker Status

Patient Homepage

PharmaBox

Create your account

to continue to pharmabox

 Continue with Google

or

First name


Last name


Email address

Password

CONTINUE

Have an account? [Sign in](#)

Secured by  clerk


Pharmabox © 2022. Made with  by these people

PharmaBox Joshua





Home

[Ready for Pickup](#) [Previous Pickups](#)

Tylenol
330 Phillip Street
123456789
Lockerbox: 1


 Pickup Code

Amount Due: \$0





   

Scan QR Code

Scan the QR Code below at the Pharmabox.
Then retrieve your prescription from Locker 1





Close

PharmaBox Joshua

Settings


 Settings


 Profile





Pickup Status

Prescription Pickup Active

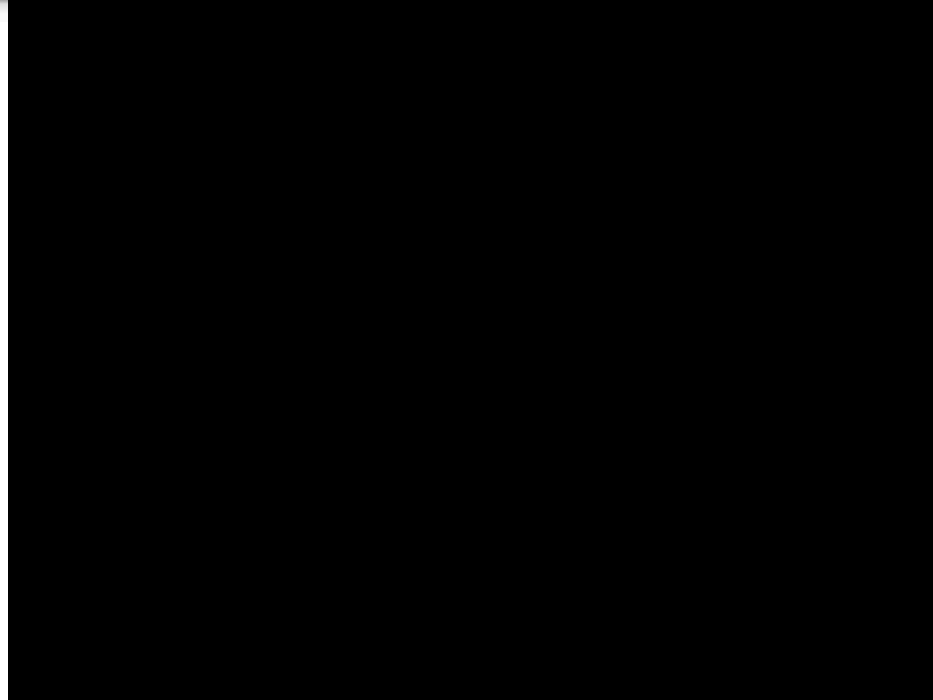
Date Of Birth

10/16/2000 

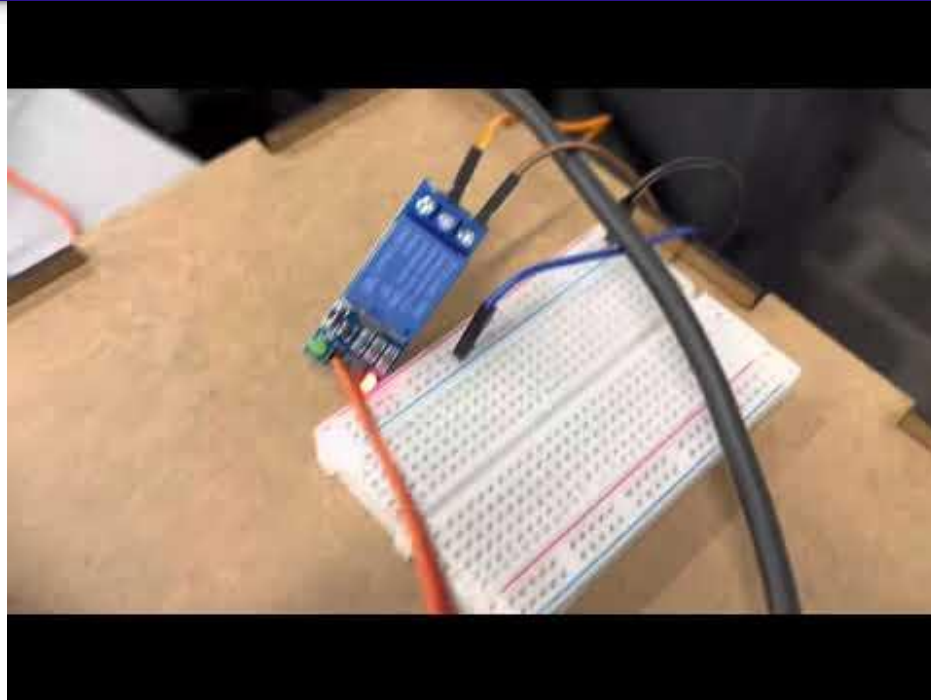
 Logout

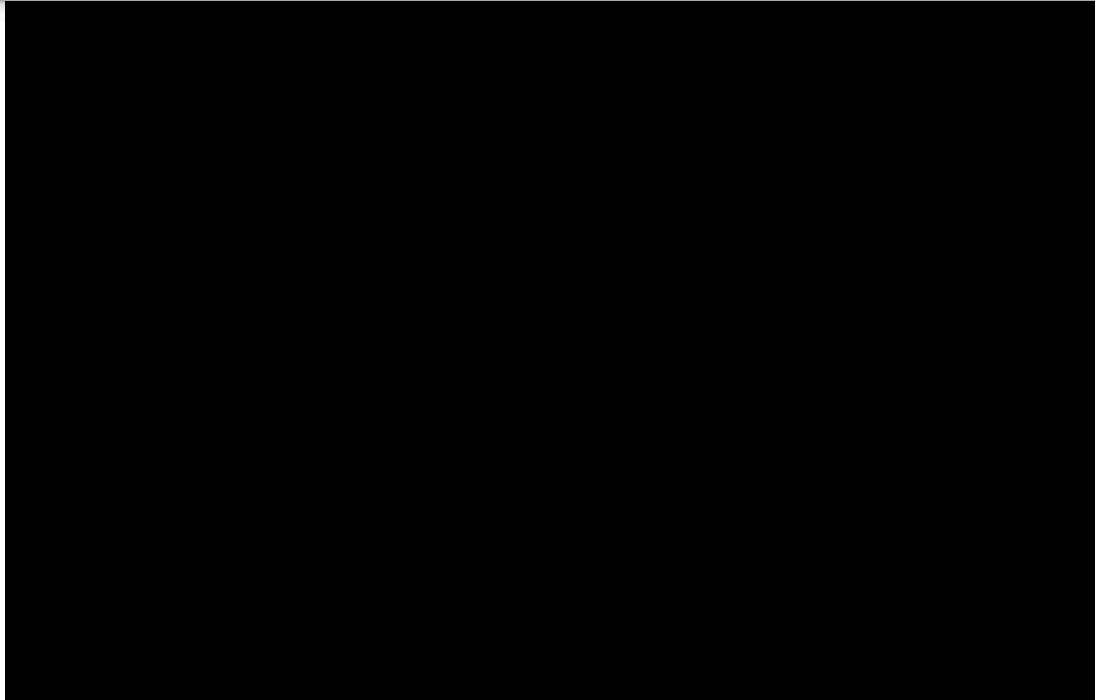
Demo: Patient Homepage



Hardware Components



Full Demo



Patient Testing Outcomes



15 Second Average Unlock
Time



More instructions for scanning
QR code are required

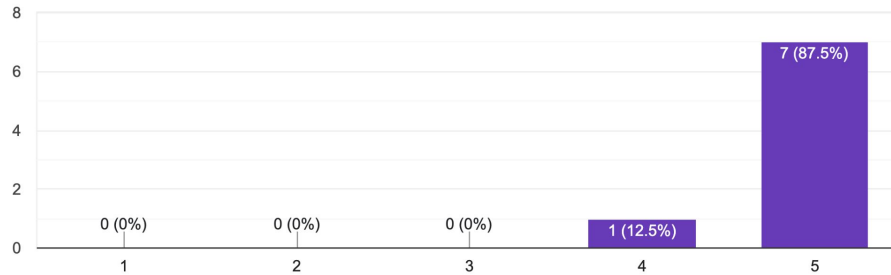


Explicit directions needed on the
Lockerbox

Patient Testing Outcomes

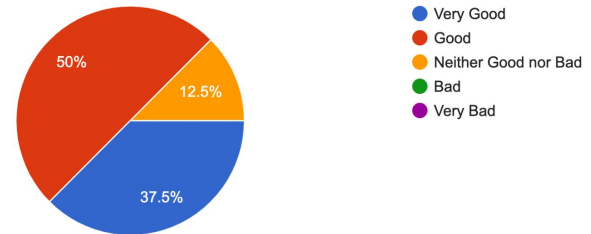
On a scale of 1 to 5, how likely is it that you would use a production-level product that matches the workflow you experienced

8 responses



How would you describe the overall experience of using the prototype?

8 responses



Pharmacist Testing Plan



Understand Ideal Pharmacist
Prescription Flow



Test full pharmacist/patient
flow with Campus Pharmacy



Improve web platform and
hardware for next prototype

Thank you

Question Period

1. A Review of Pharmacy Services in Canada and the Health and Economic Evidence. Pharmacists.ca. (2022). Retrieved 18 September 2022, from <https://www.pharmacists.ca/cpha-ca/assets/File/cpha-on-the-issues/Pharmacy%20Services%20Report%201.pdf>.
2. Alam, S., Osama, M., Iqbal, F. and Sawar, I. (2018), "Reducing pharmacy patient waiting time", *International Journal of Health Care Quality Assurance*, Vol. 31 No. 7, pp. 834-844. <https://doi.org/10.1108/IJHCQA-08-2017-0144>
3. Pharmacist shortage throughout Canada, Saskatchewan: Health experts | Watch News Videos Online. Global News. (2022). Retrieved 18 September 2022, from <https://globalnews.ca/video/8932196/pharmacist-shortage-throughout-canada-saskatchewan-health-experts>.
4. Weidner, J. (2019). University of Waterloo study finds pharmacists could help alleviate overcrowded ERs. *therecord.com*. Retrieved 18 September 2022, from <https://www.therecord.com/news/waterloo-region/2019/01/13/university-of-waterloo-study-finds-pharmacists-could-help-alleviate-overcrowded-ers.html>.
5. Alodan, A., Alalshaikh, G., Alqasabi, H., Alomran, S., Abdelhadi, A., & Alkhayyal, B. (2020). Studying the Efficiency of Waiting Time in Outpatient Pharmacy. *Methodsx*, 7, 100913. <https://doi.org/10.1016/j.mex.2020.100913>
6. Alghadeer, S., Althunayan, S., Alghamdi, B., Bintaleb, D., & Alnaim, L. (2021). Evaluation and pharmacists perspective of repeat prescribing process in refill clinics. *Saudi Pharmaceutical Journal*, 29(11), 1336-1342. <https://doi.org/10.1016/j.jsps.2021.09.009>
7. Price, J. (2013). Risk alert: Repeat prescribing. *Articles*. Retrieved 18 September 2022, from <https://www.medicalprotection.org/uk/articles/risk-alert-repeat-prescribing>.
8. IBISWorld - Industry Market Research, Reports, and Statistics. *ibisworld.com*. (2022). Retrieved 18 September 2022, from <https://www.ibisworld.com/canada/market-size/pharmacies-drug-stores/>.
9. Do automated dispensing machines improve patient safety? (2009, November). Retrieved September 18, 2022, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827025/>
10. Home. (2022, August 08). Retrieved September 18, 2022, from https://asteres.com/?fbclid=IwAR2RtFqkZ09YPVCUQvex5yeLZLt2GeJHCtp90nIMbzHcy7R10JWNOZ90M_o

11. Qudini. (June 24, 2021). How long were U.S. consumers willing to wait in lines for service or entry at pharmacies and drugstores? [Graph]. In Statista. Retrieved September 19, 2022, from <https://www-statista-com.proxy.lib.uwaterloo.ca/statistics/1259110/lenght-of-time-shoppers-were-willing-to-wait-at-pharmacies-and-d-rug-stores-in-the-us/>