



# Appendix

## Secondary research

### Patient Portal Information

#### Goals

Our team recognized that we were lacking basic knowledge within the healthcare industry. We decided to look into existing research in order to:

- Discover, through blogs and other conversations, existing pain points of patient portals and
- Identify common issues in the broad genre of healthcare and consider problem spaces that may intersect with patient portals through academic writings

#### Method

Each group member was tasked with conducting secondary research with the goal of answering a question. These answers were found through various sources such as health blogs, Reddit.com, and academic articles. We then grouped the insights we found into overlapping categories. This diagram helped us analyze the data we found and create actionable takeaways.

View the whole diagram here to better see intersections > [Cerner Patient Portal Research.pdf](#)

#### Overall Takeaways

The categories we found most pertinent to the current problems in healthcare and patient portals are broken down on the following pages. Our key general takeaways were as follows:

- Information in patient portals should be easy to locate and clear to understand
- Patient engagement with portals can be increased through both healthcare company personalization as well as through simplicity

#### Categorical Takeaways



According to several Reddit.com users, there is a struggle to receive crucial information regarding their personal health in a timely manner, due to the breakdown of communication between providers and patients.



Patient engagement is a crucial step to a good experience using a portal. This can be accomplished best through simplicity and personable connection with patient providers.



Current main user issues with patient portals include **loss of features** due to difficult navigation processes and confusing content layouts.



An increase in the lack of trust the population has for the healthcare industry causes users to not want to use their portals and have better experiences with in-person visits.

Portals with more personable language and with user personalized information clearly provided by their specific practitioners are more likely to be used by patients.



Healthcare is becoming a less desirable profession due to burnout, and mental health is becoming a growing concern. The **lack of trust of technology combined with the increase of telehealth** causes an interesting dichotomy. How might we be able to address these issues?

## Caregivers

### Goals

Our team recognized that we wanted to better understand the needs of our chosen users. We decided to look into existing research in order to:

- Better understand some pain points and stressors that caregivers endure and
- Locate possible areas of opportunity to mitigate these stressors for caregivers through patient portal access

### Method

Our research into caregivers was found through resources such as health blogs and academic articles. Each team member was tasked with finding a relevant article and writing some key takeaways from the article. The full diagram can be found here > [Cerner Caregiver Research.pdf](#)

### Overall Takeaways

Caregivers have specific needs that could be addressed with patient portals. These pain points and needs are listed below, with possible ways we could address them when redesigning a patient portal. The majority of caregivers experience role conflict and inadequate stress management: caregivers who have the least amount of outside assistance reported the highest levels of health problems and burden (Bialon & Coke, 2012). Bialon & Coke (2012) suggest that one possible way to address this is by increasing the amount of formal, personalized assistance that caregivers have access to.



Personalized information based on their caregiver's needs could help mitigate the stress that comes with the "unknown" of the medical illness. This could include things like what constitutes an emergency and reminders to take medications.



A more autonomy-supportive health care climate is moderately associated with greater exercise or physical activity (Martire & Helgeson, 2017). Much more research could be conducted to fully understand how we might be able encourage more autonomy for caregivers through patient portals.



Lastly, providing more efficient, clearer communication with doctors can take some of the stress off the shoulders of caregivers. Caregivers tend to be overprotective of their caregivee- they get used to refusing extra help out of the idea that only they know how to properly provide care to the person (Caregiver Burnout, 2021). Through things like secure and *quick* messaging, personalization to the caregivee's condition can give caregivers more comfort in accepting help.

## Interviews

### Goals

Once we completed our competitive analysis and synthesis, we wanted to cross reference the quantitative data we had collected with qualitative data from user interviews before moving forward. To gather the user data we needed, we decided to conduct interviews and ask people about their experience using portals as well as their general online medical experiences. With these interviews we wanted to:

- Confirm the insights we found regarding the most common patient portal features and
- Fill in any possible gaps in our research in order to **locate any new opportunity areas**

### Method

Our team split up into 3 groups and went around Purdue University campus to interview people. We also interviewed relatives and friends. We wanted a wide range of insights from multiple user groups, because of the possibility to find new, exciting opportunities within the space. Thus, we did not have a specific user in mind. The only criteria that would constitute an interview was that the interviewee must have used a patient portal before.

### Overall Takeaways

After completing our interviews, we created an interview analysis list of the answers that were populated from our interviewees. You can view the full analysis here > [Interview Analysis.pdf](#)  
**Our interviews helped us have a better understanding of the problem space of patient portals and how patient portals are utilized by patients, as well as the timeline for a common doctor's visit.**

## Competitive analysis

### Goals

After conducting research into existing issues within patient portals, our team wanted to understand the most important features and functionalities of patient portals. Our team conducted a competitive analysis with 7 patient portal providers in order to:

- Familiarize ourselves with common features of patient portals and their interconnectivity
- Identify both positive and negative trends among patient portals layouts, navigation, and content and
- Compare portals in order to locate the most crucial functionalities that all patient portals offer

### Method

The competitor portals we analyzed were chosen based on what our team had access to, whether through personal patient portals or online video walkthroughs. The competitor portals we analyzed were:



Kaiser



PUSH



Epic (MyChart)



NextGen



Kareo



California Speciality Pharmacy

Each group member was tasked with analyzing one competitor portal. Since we wanted to have a very broad view of the competitor's portals, the criteria for our analyses were as follows:

- How does the user navigate through the site? How easy or difficult is this method of navigation?
- How does the user schedule an appointment? Is this workflow easy or difficult for the user, and why?
- How does the user contact their providers? Keeping in mind a user's lack of trust, how secure does messaging feel?
- How does the user view medical documents? Is the information regarding these reports clear and easy to understand? Why or why not?
- What are the other features that the portal offers to users?
- Are any of those features unique?
- What are the portal's overall strengths and weaknesses?

### Actionable Takeaways

Our full competitive analysis with images can be found [here](#) >

[Competitive Analysis Patient Portals.pdf](#) (*if you're using chrome web browser, it does not allow infinite zoom on vector pdfs- try opening in a different browser or adobe pdf viewer*)

After completing our competitive analysis, we shared insights amongst the team to create actionable takeaways.



### Shared features

There were three main shared features between all the patient portals we analyzed. These are

- **messaging** with healthcare providers,
- **scheduling** a new appointment, and
- **accessing medical records**.



### Mistakes to avoid

Common issues we personally encountered when using the patient portals were:

- Complex online check-in processes
- Overuse of icons in navigation
- Lack of navigational context throughout the sites
- Overuse of complex medical terminology
- Clunky, long navigation lists



### Actionable Items

These issues led us to our main actionable items. In order to increase engagement and trust, we wanted to ensure that our portal:

- Minimizes the medical terminology barrier
- Utilizes more personable language
- Formats messaging as an email and
- Offers personalized education materials along with patient diagnoses

## Ecosystem mapping

### Agenda and Planning

#### Review Workshop Objectives

The main objective of this workshop is to align our team on the context of our project, within the field of healthcare. Understanding the ecosystem of healthcare will help our team understand where patient portals fall, and what importance they hold in the lives of both clients and healthcare providers. We hope through sharing perspectives we can recognize what we already know and what we still need to learn.

#### Review Key Concepts

Identify Cerner's experience ecosystem, these are:

- Actors
  - The people who participate in our product or service experience.
  - Ex: Customers, internal stakeholders, the product or service
- Roles
  - Roles are the niches that actors fill.
  - Ex: A caretaker, a Provider, An organizer
- Artifacts
  - Digital or analog products with different capabilities that exist outside of an experience, but can affect the experience
  - Artifacts are not customer touchpoints
  - Ex: watch, tablet, computer, laptop, smart watches
- Factors
  - Things that shape the user's behavior and experience
  - Ex: Culture, trends, environmental changes
- Places
  - The location in which many of these processes take place.
  - Ex: Location where a company is located, A place where customers reside.
- Interactions
  - How each of these roles interact with each other.
  - Ex: Customer using a company's website, a developer adding new features to the website, a customer calling customer support.
- Relationships
  - There are multiple types of relationships that can exist between users, products, and people and these relationships are constantly changing
  - Mapping out these relationships can help understand the climate around a design, even though these relationships are constantly changing

- Types of relationships: competitive, cooperative, supportive, transactional, regulatory, complementary, influencers, emotional
- Boundaries
  - Exploring the ecosystem to discover where it begins and where it ends.
  - Ex: For a place like Cerner, the beginning would be something like a self diagnosis or drug companies. The outer layers would be things like the FDA or insurance.

These definitions will also be provided to the participants for reference during mapmaking.

#### Create Maps

Team 1 - Focus on the patient as the center of the map. Focus on patient contexts and relationships. Cerner, Cerner products, and services are a small subset of the ecosystem.

Team 2- Focus on healthcare as the center of the map. Most entities are channels, touchpoints, the healthcare professionals that must interact with the portals in some way, as well as competitors and external forces.

- Split into two teams (With one co-facilitator helping each team) \*
- Each participant will be given five minutes to write down as many entities (one per sticky) as possible for their respective ecosystem map.
- Each team will then share their sticky notes with the team with any relevant explanations, and more can be added during this discussion. 10 minutes
- Finally, they have the rest of the time to organize their sticky notes into a model in order to show relationships between the entities.

#### Share Out Maps

- Each team will walk through their map, highlighting entities and relationships that could have important strategy or design implications. We will then facilitate a discussion about connections across the two views and what it could mean for your work. Possible Questions:
  - What is part of its service ecosystem and what are its boundaries?
  - What do we know about our customers and what influences their choices?
  - Who are we competing with? What is their relationship to the customers we are targeting?
  - What potential connections and relationships are ripe for innovation?
  - What don't we need to worry about? What things seem to be in play but are outside of the boundaries useful to our service strategy and design?
  - What do we need to learn more about? Do we need to conduct research?
  - Do we have everyone involved in our effort who is required in order to improve the service?
  - Where do we begin to make change?

#### Reflect and Next Steps

Possibly create a map, and use the reflections within the end of this activity to drive the project toward our next goals.

### Workshop Notes

#### Before Workshop

- Made the decision to do this workshop physically with a board and sticky notes as opposed to using a tool like Miro online to help immersion into this activity

- (10:11) we got coffee to help boost energy and start comfortable conversation between people within a group
- We realized that we could not drink coffee in the classroom, so we took over a workspace to do this workshop



### Beginning of Workshop

1. Sarah P. asked for a three sentence agenda/ overview for this activity so that the team could understand what was going on
  - a. Our main objective of this is to align our team within the concept of our project; understanding the ecosystem of healthcare and where patient portals lie within this ecosystem.
2. Jared starts to explain the key concepts listed within our workshop planning document to help the team define the key concepts and think about the different aspects of the healthcare environment.
  - a. Without defining these key terms, it would be difficult to think about all of the different factors included in the environment



**During Workshop**

3. (10:23) Team splits into two groups; one team will take Cerner as the center of the map, while the other team takes the Patient as the center of the map
  - a. Team chooses where to make each map, and decides who is on each team
4. Teams sit down to write down as many factors that they can think of within the ecosystem
5. At the center of each of the two maps is Cerner and the Patients respectively
  - a. 15 minute timer is set to help space out time and keep the team on track
  - b. First 15 minutes were devoted to exploring the space, and writing sticky notes on factors of the environment
  - c. (10:41) The second 15 minutes were devoted to placing sticky notes and creating the map physically on the wall.
  - d. We played a song to finish out the last 3 minutes of this workshop to help the groups wrap up and understand how to share out their information

**Presenting Findings**

6. Teams present gained information to documentarian and other team
  - a. Cerner Team
    - i. In left bottom direction, it talks about the patient portal and the lead up into making an appointment
    - ii. Part of this map branches out into Electric Documentation, Hippa
    - iii. Factors : Covid and convenience to finding health information online
  - b. Patient/User Team
    - i. Customers, primary points of contact: portal, family members, prescriptions, primary care positions
    - ii. All of these factors affect how people interact with a Patient Portal and the healthcare ecosystem
    - iii. Insurance and monetary constraints are important that affect/impact how people interact with this ecosystem
    - iv. Customer Service and IT workers could influence these ecosystems as well
7. Team decided that it would be more helpful to combine both of the different Ecosystem Maps to see how
  - a. Communication between this team is incredible, they are all speaking and listening to each other, and collaborating perfectly as a team. This is incredible. They are really learning a lot within this workshop.



### Reflection

- This activity helped the team discover different pathways and aspects that affect the experience
- Helped the team recognize the importance of scoping down for the project or focusing on specific aspects of the project
- Creating a list of entities that exist within the Cerner ecosystem will help the team understand who to interview
- It might be important to learn more about Hospital's connection with their client and how the two communicate through the portal
- Multiple Project Questions were generated throughout this session:
  - How do hospitals share the patient information?
  - Do they share the portal or do they share the document information?
  - How are records shared between hospitals/doctors/pharmacies?
  - How do hospitals share information with each other?
  - Is there a large database of this information shared from hospital to hospital?
  - How do immediate care facilities or ERs communicate with the primary care provider's database?
  - How do hospitals communicate with each other regarding patients, do they go through patient portals?

### Specific Next Steps

Our next steps with Cerner are interviews, competitive analysis, and then we're off to start wireframes. With these in mind, we are hoping the entities we identified will help inform our interview recruitment. There are many different actors and roles within Cerner's portal, and understanding the people and processes that reside within it will be extremely helpful. We'll not only be able to identify the people closest to the portal, but also the constraints and roles that they interact with. Understanding these relationships in-depth is essential to finding the right people to interview and identifying key questions to ask them. Moving forward, the information we got from this workshop will give us a more holistic view of how Cerner and our users interact with each other. We hope that this new perspective will guide our furniture design decisions and inform any questions moving forward.

## All Ideation

Sketches > [MIRO](#)

Wireframes > [WHIMSICAL](#)

Lo & Mid Fidelity mockups > [FIGMA](#)

## Testing

### Goals

Going into our testing we knew that we needed some way to know if our designs were actually useful to our user or not. Previously, most of the features we included were based on thorough research, interviews, and iteration. Our mockups were designed to target the pain points we found collecting data, and we needed a way to test if they actually solved these pain points. With that being said, we figured a lesser form of desirability testing would help us answer some of these

questions. As a base measurement of success, we created a number of questions that we hoped to answer with this round of testing.

- Do the designs that we talk our participants through make sense?
- Does each part of the portal succeed in what we set out to do with it?
- Do the features help reduce the time spent in the portal?
- Do the features visualize only the most relevant information to our users?
- Do the values and metrics we focused on match that of our user's?

### Method

Each group member was tasked with testing our wireframes with one person from our user group.

View our entire testing protocol here >  "desirability" testing

### Overall Takeaways

Our full analysis >  Testing analysis.png

- **Vaccination information is of high interest to our user**
- Calling is more frequent
- Prescription refills are good
- Too much to figure out on their own
- Appointment timeline is useful
- The simplicity is nice

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