**BeAble Chatbot/App Design & Development Blueprint**

(work in progress draft)

**note**: has research that will adapt into the paper

**References**

[Donabedian Model: A model for measuring quality care](https://www.med.unc.edu/ihqi/wp-content/uploads/sites/463/2021/01/A-Model-for-Measuring-Quality-Care-NHS-Improvement-brief.pdf)

[Equity-centered design: design and development](https://cfpb.github.io/design-system/guidelines/design-and-development)

[World Wide Web Consortium - Making Content Usable for People with Cognitive and Learning Disabilities | W3C](https://www.w3.org/TR/coga-usable/)

[Users Stories | Web Accessibility Initiative (WAI) | W3C](https://www.w3.org/WAI/people-use-web/user-stories/)

[MITRE Chatbot Accessibility Playbook](https://mitre.github.io/chatbot-accessibility-playbook/front_matter.pdf#nameddest=Introduction)

[Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/)

[Achieving health equity through conversational AI: A roadmap for design and implementation of inclusive chatbots in healthcare | PLOS Digital Health](https://journals.plos.org/digitalhealth/article?id=10.1371/journal.pdig.0000492)

[A systematic review of chatbots in inclusive healthcare](https://link.springer.com/article/10.1007/s10209-024-01118-x)

-reveals a lack of accessibility-focused designs, calling for an “accessibility-by-design” approach to make healthcare chatbots more inclusive

[Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum](https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2804309)

**BeAble**

*AI abilities for BC disabilities*

# Mission and Purpose

BeAble is an evidence-based, equity-centered application designed to improve access and outcomes for individuals navigating the healthcare and disability support system in British Columbia, Canada. By acting as a nexus for a wide range of resources, services, records, and recommendations, BeAble is tailored to address the unique needs of this marginilized and diverse population.

At the center of BeAble is Nexus, a chatbot that serves as an intermediary for all of the application's functions. Integral to the design of this chatbot is adaptability to a wide variety of different disabilities or communication preferences in order to remove barriers and allow a seamless user experience. As well as direct interaction, Nexus' integration with existing patient databases and predictive analytics allow it to play a proactive role in understanding and adapting to user needs.

Nexus is as much a chatbot as it is a customizable companion, allowing the user to feel allied in their pursuit to find ability within their disability. As a health ally, Nexus is envisioned to remove barriers for users in connecting to health services, employment, accessibility, and community support. Moreover, future app developments are projected to include elements of motiviation psychology and principles of gamification to make the process as enjoyable as it is effective. ----.----- Preictive data. health API connection.

# Why BeAble?

[Notion Steven's PP](https://www.notion.so/Steven-s-Pain-Points-with-PWD-BeAble-as-a-Solution-49c7a20979b34fc1871116cf47d18ee9?pvs=4)

Steven's story - leveraging AI has been helpful in my disabilities, ReHabit dev, chatbot dev

disability advocacies & NGOs fill in the gaps

support groups : UBC group

diverse population

buraeucracy

& other PP from personal experience & interviews:

• **Long Health Roadmaps**: The difficulty of committing to health pathways without clear timelines, outcomes, or markers of progress.

• **Isolation**: A lack of community support for individuals with disabilities.

• **Resource Segmentation**: Fragmented resources and bureaucratic barriers in accessing healthcare.

• **Limited Interim Support**: The need for proactive support while waiting for appointments.

• **Emotionally Detached Diagnoses**: Healthcare interactions that often lack empathy for the individual experience.

• **Feeling Labeled**: Users seek care that recognizes their unique identities beyond diagnoses.

• **Community Connection**: A desire for a space where individuals feel understood and supported in their experiences.

[A systematic review of chatbots in inclusive healthcare](https://link.springer.com/article/10.1007/s10209-024-01118-x)

-reveals a lack of accessibility-focused designs, calling for an “accessibility-by-design” approach to make healthcare chatbots more inclusive

[Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum](https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2804309)

**"Further exploration of this [chatbot] technology is warranted in clinical settings, such as using chatbot to draft responses that physicians could then edit. Randomized trials could assess further if using AI assistants might improve responses, lower clinician burnout, and improve patient outcomes."**

# Competitors

**JaneApp**

**Be My Eyes**

Connects visually impaired users with sighted volunteers through live video calls for assistance with tasks like reading labels or navigating new environments. ([The Mighty](https://themighty.com/topic/disability/apps-for-people-with-disabilities/))

**Wheelmap**

Allows users to find and rate wheelchair-accessible places globally, providing valuable insights into the accessibility of public spaces. ([Inclusive City Maker](https://www.inclusivecitymaker.com/apps-people-physical-disabilities/))

# Design Guidelines

[MITRE Chatbot Accessibility Playbook](https://mitre.github.io/chatbot-accessibility-playbook/front_matter.pdf#nameddest=Introduction)

[Donabedian Model: A model for measuring quality care](https://www.med.unc.edu/ihqi/wp-content/uploads/sites/463/2021/01/A-Model-for-Measuring-Quality-Care-NHS-Improvement-brief.pdf)

**Process measures**: these reflect the way your systems and processes work to deliver the desired outcome. For example, the length of time a patient waits for a senior clinical review, if a patient receives certain standards of care or not, if staff wash their hands, recording of incidents and acting on the findings and whether patients are kept informed of the delays when waiting for an appointment.

[Web Content Accessibility Guidelines (WCAG) 2.1](https://www.w3.org/TR/WCAG21/)

Key guidelines include:

1. **Text Alternatives**

• Provide text descriptions for non-text elements (e.g., images, videos) so screen readers can convey information.

2. **Keyboard Accessibility**

• Ensure all functions can be used via keyboard alone, so people with motor impairments can navigate.

3. **Readable and Predictable Content**

• Use clear, simple language, and ensure consistent navigation and functionality for predictability.

4. **Contrast and Visual Clarity**

• Use sufficient color contrast between text and backgrounds to improve readability for users with low vision.

5. **Error Identification and Recovery**

• Offer clear, helpful error messages and instructions so users can easily understand and correct input errors.

[World Wide Web Consortium - Making Content Usable for People with Cognitive and Learning Disabilities | W3C](https://www.w3.org/TR/coga-usable/)

-extensive document on design, testing, user personas

Example Excerpts:

[Help Users Understand What Things are and How to Use Them](https://www.w3.org/TR/coga-usable/#objective-1-help-users-understand-what-things-are-and-how-to-use-them-0)

Users with [cognitive and learning disabilities](https://www.w3.org/TR/coga-usable/#dfn-cognitive-and-learning-disabilities) may have trouble with orientation and learning. This can mean people get disoriented in a site.

Learning new things and remembering new information is especially difficult for people with [cognitive and learning disabilities](https://www.w3.org/TR/coga-usable/#dfn-cognitive-and-learning-disabilities). They can also struggle or be unable to learn new design patterns. Make controls, icons and elements simple and conventional to help.

[Help Users Find What They Need](https://www.w3.org/TR/coga-usable/#objective-2-help-users-find-what-they-need-0)

Users with [cognitive and learning disabilities](https://www.w3.org/TR/coga-usable/#dfn-cognitive-and-learning-disabilities) may have trouble finding the content they need. They may also struggle to orient themselves inside the content or task. Users should be able to quickly and easily locate what they are looking for. Use a clear and easy layout to help users navigate the system easily.

[Achieving health equity through conversational AI: A roadmap for design and implementation of inclusive chatbots in healthcare | PLOS Digital Health](https://journals.plos.org/digitalhealth/article?id=10.1371/journal.pdig.0000492)  
 • **Co-design with Community Input**: Involving patient groups from diverse backgrounds early in the AI design process to ensure relevance and cultural competence.

• **Equity-Centered Development**: Targeting conversational AI to address healthcare disparities and developing culturally sensitive functionalities to support underserved communities.

• **Safety and Bias Mitigation**: Establishing protocols for accuracy, safety, and accessibility, while reducing potential biases in data or algorithmic responses.

• **Implementation Stages**: The framework spans design, pre-implementation, ongoing assessment, and post-deployment, ensuring AI tools evolve with community needs and healthcare standards.

[Equity-centered design: design, development, & research](https://cfpb.github.io/design-system/guidelines/setting-the-foundation#learn-how-power-structures-can-affect-the-people-you-serve)

**Equity-Centered Design** is an approach to creating products, services, or systems that prioritizes fairness, inclusivity, and social impact, ensuring that all voices—especially those historically marginalized—are considered throughout the design process. This approach actively seeks to understand and address systemic inequalities, intentionally engaging diverse perspectives to avoid biases and promote accessibility. Key principles include co-designing with the communities affected, fostering empathy, and continuously questioning and revising assumptions to avoid reinforcing existing inequities. Ultimately, it aims to create solutions that benefit everyone, with particular focus on those who are most impacted by barriers.

[Power Structures](https://cfpb.github.io/design-system/guidelines/setting-the-foundation#identify-lived-experiences-and-biases)

[Bias Examination](https://cfpb.github.io/design-system/guidelines/setting-the-foundation#identify-lived-experiences-and-biases)

[Trauma Informed Principles](https://cfpb.github.io/design-system/guidelines/setting-the-foundation#identify-lived-experiences-and-biases)

[Decision Frames: How Cognitive Biases Affect UX Practitioners](https://www.nngroup.com/articles/decision-framing-cognitive-bias-ux-pros/)

# Features

**Disability Application Support**: Guidance through complex application processes with checklists and personalized steps.

**Resource Referral System**: Suggest resources based on location, needs, and previous user feedback.

**NLU-Based Health Suggestions**: Provide tailored health tips and resource suggestions using natural language processing and predictive analytics.

**Accessibility Customizations**: A variety of options for accessibility, such as visual aids and emoji support.

**Disability Process Map**: Visual representation of the disability support journey, with markers for tracking personal progress.

**Accessibility Heatmaps**

**Health Records API**: Integrate with government health records and e-health portals to simplify document access, make appointments, and offer advanced predictive analytics

**community features**

**gamification** - rewards, badges, disability points

**BeAble-mini** - direct integration into common messenging apps (as a scaled-down version of the chatbot without users having to access the BeAble app directly

**virtual assistant integrations**

# Target Population / User Stories

BeAble is designed with personas that reflect diverse accessibility needs, inspired by the W3’s disabled user stories:

• **Cognitive Accessibility**: Users needing simplified, visual interactions (e.g., emoji support) for understanding health information.

• **Physical Disabilities**: Users requiring hands-free or voice-assisted interactions to navigate the app.

• **Emotional Support Seekers**: Individuals who need empathetic, community-focused features to reduce isolation.

[Users Stories | Web Accessibility Initiative (WAI) | W3C](https://www.w3.org/WAI/people-use-web/user-stories/)

# Success Metrics

**User feedback & testing**

Section 5 from [World Wide Web Consortium - Making Content Usable for People with Cognitive and Learning Disabilities | W3C](https://www.w3.org/TR/coga-usable/)

**User Outcomes**

[Donabedian Model: A model for measuring quality care](https://www.med.unc.edu/ihqi/wp-content/uploads/sites/463/2021/01/A-Model-for-Measuring-Quality-Care-NHS-Improvement-brief.pdf)

- Outcome measures, measure from app's data-tracking (ethical & encrypted)

Track user satisfaction with features like “thumbs up” feedback when accessing resources.

Monitor accessibility feature usage, especially among users with specific accessibility needs.

**Engagement and Retention**

• Measure engagement with the disability process map, resource referrals, and accessibility options.

• Track retention rates to assess long-term user satisfaction.

# Development Forecast

service options - AWS, GCS, Azure

Key Technologies: AI agents, text-to-speech capabilities, cloud storage, database storage, machine learning, NLU, RAG, API integration, Medical LLMs, ethical data & data encyption

App interface: swiftUI, reactnative, Flutter?

-cross OS compatibility, potential for web app?

-integration into Siri-type system on device?

app testing - perform user testing on representative population

([Achieving health equity through conversational AI: A roadmap for design and implementation of inclusive chatbots in healthcare | PLOS Digital Health](https://journals.plos.org/digitalhealth/article?id=10.1371/journal.pdig.0000492))

**Development Roadmap**

• **Phase 1**: MVP Development - Core features such as disability applications aid, resource referral, HandyDART disability process map, and several accessibility options.

• **Phase 2**: Enhanced Features - Integration of health records API, expanded NLU capabilities & predictive analytics, more detailed disability process map (more heatmaps), appointment setting capabilities

• **Phase 3**: Community, Support, & Integration Features - Advanced gamification elements (badges? profiles? "ability points"?). Development of social and community features (to address isolation pain points), integration with messenging apps (as form of scaled down chatbot interface), integration with virtual assistants

Virtual assistant example:

(speaking to Siri): "Hey Nexus, help me fill out my application form"

Siri/Nexus: "Okay, would you like me to start from the beginning or are you in need of other ways we can be able together?"

"I have comprehension difficulties and sight impairment"

"Let's make this happen together! I'll simplify each line out loud for you. I'll also be a second set of eyes, so feel free to point your camera at any section of the form for specific help!"

# Wireframes

Figma!

# Datasets

**BC Data Catalogue API**

<https://catalogue.data.gov.bc.ca/dataset/bc-data-catalogue-api>

The BC Data Catalogue is the place to find B.C. Government data, applications and web services. Government ministries and many broader public sector agencies publish their data resources in the Catalogue. This data can be used to make informed decisions and create opportunities for the benefit of all British Columbians.

**Common Document Generation Service (CDOGS) API:**

<https://catalogue.data.gov.bc.ca/dataset/common-document-generation-service-api>

Integrating the Common Document Generation Service (CDOGS) API into BeAble’s chatbot can streamline the completion of disability forms through the following steps:

1. **Data Collection**: The chatbot interacts with users to gather necessary information for disability applications, such as personal details and medical history.

2. **Template Integration**: CDOGS merges the collected data with predefined templates of disability forms, generating complete documents ready for submission.

3. **Accessibility Features:** The chatbot provides step-by-step guidance and generates accessible document formats (e.g., large print, screen reader-friendly PDFs) to accommodate different user needs.

4. **Efficiency and Accuracy:** Automating the document generation process reduces the time required to complete forms and ensures all required fields are present and correctly formatted, minimizing errors.

**BC Community Health Atlas**

<https://catalogue.data.gov.bc.ca/dataset/bc-community-health-atlas>

Interactive mapping tool that provides visual representations of various health indicators across British Columbia. Includes data on population health, demographics as well as developmental, socio-economic, and environmental determinants of health.