Exploring Unscheduled Medication Information Challenges

for Chinese Newcomers in Canada

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Abstract

Newcomers in Canada often face a complex adaptation process. During the period, language barriers become the major obstacles to accessing essential health-related information. For Chinese newcomers with limited English or French proficiency, understanding unscheduled over-the-counter medication can be particularly challenging. The challenges include interpreting instructions, understanding unfamiliar medical terms, and navigating limited support. Cultural differences further complicate comprehension of Western self-medication practices.

This research project explores how these linguistic and cultural challenges affect Chinese newcomers' ability to safely use unscheduled medications in Canada. Through two inclusive facilitation sessions and two user testing sessions, this study identifies the challenges Chinese newcomers face and explores inclusive design strategies to address them. By thoughtfully creating visual aids and a user-centred app prototype, the research aims to reduce comprehension barriers and improve medication information accessibility.

This research aims to support health equity and enhance the safety of self-medication practices among linguistically diverse populations in Canada.

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1. Introduction

1.1 Background

Unscheduled medications are a category of over-the-counter drugs that can be purchased without a prescription and without assistance from a pharmacist. They include medications for common conditions such as pain, colds, allergies, and digestive issues. In Canada, unscheduled medications are regulated under specific federal and provincial guidelines. They are widely accessible in pharmacies, grocery stores, and convenience stores. While they are intended to support self-care, using them correctly requires basic health literacy and pharmaceutical terminology knowledge.

For many Chinese newcomers in Canada, using unscheduled medication can be a complex and unfamiliar experience. These challenges often come from language barriers and cultural differences that affect how individuals understand and use medication. Chinese newcomers with limited English or French proficiency may struggle with terminology like “antihistamine”, because there may not be any direct equivalents in their native language or everyday use. Additionally, the layout and design of Canadian medication packaging can differ significantly from what they are used to in China. This leads to confusion or understanding delay.

Cultural influences also shape how medication is perceived. Many Chinese newcomers may have strong familiarity with Traditional Chinese Medicine, which emphasizes holistic treatment. It differs in approach from Western pharmaceutical care. These cultural expectations can sometimes conflict with the use of unscheduled medications in

Canada, particularly when newcomers are uncertain about the intended use or safety of a product.

There has been relatively little research focusing on the intersection of cultural background, language skills, and visual communication in the context of unscheduled medication usage. This Major Research Project intends to fill this gap by investigating how Chinese newcomers engage with and understand unscheduled medication information in Canada. Using qualitative research, this study investigates barriers and explores design-based interventions, such as visual aids and app prototypes. It aims to improve medication literacy and promote safer self-medication practices.

This research contributes to the ongoing efforts to enhance accessibility and health equity for the linguistically and culturally diverse populations in Canada by adopting an inclusive design approach.

1.2 Motivation

This research is grounded in personal experience. As a newcomer living in North America, I encountered significant confusion when navigating healthcare and medication. During my first couple of years in the United States as an international student, I often feared getting sick. Not because of illness itself, but because I didn't understand how the system worked. I was unsure how to book a doctor's appointment, what kind of care my student insurance would cover, or whether the cost of treatment would be affordable. There was one time when I even flew back to China to get a

chalazion removal procedure because I was worried that the same treatment in the U.S. would be expensive.

These fears were reinforced by online discussions on Chinese social media, where Chinese people living in Western countries often shared stories of high medical costs, long wait times, and difficult healthcare access. The stress of seeking help made me anxious, even for minor issues. And I often avoided engaging with the healthcare system altogether.

My experience with unscheduled medication was similarly frustrating. I struggled to understand what medication to take for certain symptoms. Asking questions at pharmacies felt intimidating because of language and cultural barriers. For years, I relied on the medications my parents prepared for me before I left China. It wasn't until I started a full-time job and had a comprehensive health insurance that I began to feel more comfortable seeking care.

When I moved to Canada, I noticed that many of the same challenges still existed, even though the healthcare system is different from the U.S. In some cases, bilingual labeling in Canada made understanding medication information even more difficult.

These experiences motivated me to explore the intersection of language, design, and medication information as the focus of this research project. I wanted to investigate how visual communication and inclusive design could help others who faced similar barriers. My goal is to contribute to more accessible self-medication practices for newcomers, so that others do not have to experience the same fear and confusion that I did.

2. Literature Review

2.1 Challenges Newcomers Face in Healthcare Systems

Understanding the broader challenges newcomers face in healthcare systems is essential to contextualize the need for design interventions. This section outlines the key linguistic, cultural, and systemic barriers that impact immigrants' ability to access and understand health information. These barriers inform the rationale for using visual communication strategies in this study.

2.1.1 Language Barriers as a Primary Obstacle

Language barriers are widely documented as one of the most significant challenges immigrants face in accessing healthcare in host countries. Newcomers with limited host country language proficiency often struggle to communicate with healthcare professionals and follow treatment instructions (Bellamy et al., 2015). This communication gap leads to misdiagnoses and poor adherence to medication regimens.

According to Pandey et al. (2021), language barriers make it harder for immigrants to build trust with healthcare providers and to make informed choices about their treatment, especially when interpreters aren't available. In many cases, patients rely on untrained interpreters like family members, which compromises privacy and increases the risk of misinformation. Without accessible interpretation services or translated

materials, patients with limited language proficiency may avoid seeking care or misunderstand critical health information.

Similarly, van Rosse et al. (2016) found that language barriers in hospitals were often not properly detected or reported, and that the lack of a professional interpreter led to patient safety risks in daily care activities like medication administration and diagnosis. These findings highlight the urgent need for better communication tools and support services to protect the safety of patients with limited language proficiency.

2.1.2 Cultural Beliefs and Health-Seeking Behaviour

Cultural values significantly influence how immigrants perceive illness and interact with healthcare systems. Among Chinese immigrants, Traditional Chinese Medicine remains highly trusted. It is frequently preferred over Western treatments (Zhu et al., 2024). Many newcomers only engage with Western healthcare when their condition gets worse or when traditional remedies prove ineffective.

Zhu et al. (2024) noted that cultural norms such as modesty and fatalism can reduce willingness to participate in preventive screening services among Chinese. Some may resist Western mental health services due to cultural stigma and prefer informal support systems or spiritual practices.

2.1.3 Racism and Systemic Discrimination

Research shows that racialized immigrants often face systemic racism in healthcare settings. It affects their access to medicines and services. Moscou et al. (2023) identified how structural racism and discriminatory policies create barriers, such as pharmacy deserts in racialized communities. Tuyisenge and Goldenberg (2021) also described how structural racism and immigration policies together limit healthcare access for migrants. They lead to greater health risks and distrust toward healthcare systems. These experiences reduce trust and discourage healthcare use over time and deepen inequities for racialized newcomer populations.

2.1.4 Intersecting Barriers in the Newcomer Healthcare Experience

These intersecting barriers, from linguistic, cultural, institutional, to economic, can lead to a decline in health outcomes over time for immigrants in the host country. As Sharma et al. (2025) highlighted, post-migration health was heavily shaped by socioeconomic and community-level factors, including income, education, occupation, housing quality, and access to healthcare services. Immigrants who had lived longer in Canada often faced more health challenges. Those with lower socioeconomic status and certain groups like South Asians were at higher risk for insulin resistance and diabetes. They experienced higher healthcare needs and worse health outcomes. These barriers limit individuals' ability to communicate health concerns and engage with treatment options that align with their cultural beliefs and levels of health literacy.

Initially, newcomers may arrive in host countries with better than average health, known as the “healthy immigrant effect” (Setia et al., 2010). However, this advantage often diminishes over time as immigrants face stress from adjusting to a new system and barriers to accessing healthcare services. Language barriers, low health literacy, and financial limitations make it difficult for newcomers to understand treatment plans or manage chronic conditions like diabetes or hypertension (Pandey et al., 2021).

2.2 Graphic Design and Comprehension

Visual communication is a core function of graphic design, especially when used to translate technical information into accessible formats. In healthcare contexts, graphic designers play a critical role in shaping how information is structured and presented whether through print or digital platforms. This section explores how graphic design strategies, particularly the use of culturally informed visual aids can support comprehension for individuals with limited language proficiency. This study focuses on the use of visual communication to support safe self-medication among Chinese newcomers in Canada. As such, these strategies are relevant and essential.

2.2.1 Visual Communication as a Tool for Enhancing Comprehension

Graphic design plays a critical role in making healthcare communication more accessible for individuals with limited language proficiency. Visual aids can simplify

complex medication instructions and make them easier to understand and follow (Katz et al., 2006; Barros et al., 2014). Research shows that pictorial elements help convey important information such as dosage frequency and method of administration. These visuals are processed faster than text, making them an effective tool for bridging literacy gaps (Barros et al., 2014).

Katz et al. (2006) reported that patients exposed to pictogram-enhanced instructions demonstrated 95% comprehension on average, compared to 70% in a text-only control group. These findings support broader recommendations to supplement physical medication labels with visual aids to improve health communication. As Ng et al. (2017) demonstrated, pharmaceutical pictograms significantly improved comprehension of medication instructions among older adults, particularly those with lower literacy or limited familiarity with English.

2.2.2 Cultural Relevance in Visual Design

While pictograms are generally helpful, their effectiveness depends on cultural appropriateness. Symbols that are intuitive in one cultural context may be confusing or meaningless in another. For instance, Ngoh and Shepherd (1997) designed medication visuals for non-literate patients in rural Cameroon and involved local community members to ensure the images were culturally recognizable. This participatory approach led to significantly better comprehension and adherence compared to

previous versions of the visuals that had not been reviewed or culturally adapted by the local community.

Similarly, Malhotra et al. (2022) tested standard pharmaceutical pictograms among older adults in Singapore with limited English proficiency. Initially, less than 27% were understood. But after redesigning the icons with culturally familiar visuals (e.g., a rice bowl to represent food), comprehension rose to over 55%. These findings underlie the need for community-informed and context-sensitive visual communication in the design and communication process.

2.2.3 Application to Chinese Populations in Healthcare

Chinese immigrants often face challenges understanding medication information presented in English or French. This can create barriers to safe and effective self-medication in Canada. In a study of older Chinese immigrants in Vancouver, nearly 47% reported language barriers, with healthcare professionals' inability to speak their language identified as the most common obstacle to accessing health services (Lai & Chau, 2007). These language gaps can leave newcomers unsure about how to safely use medications or follow treatment instructions.

Visual communication strategies offer a promising way to bridge these gaps across different language and literacy levels. Ng et al. (2017) found that pharmaceutical labels with pictograms significantly improved comprehension among older Chinese adults in Hong Kong, especially those with lower education levels. Participants also expressed a

strong preference for pictograms, stating that they made instructions easier to understand and follow.

While existing studies have shown the benefits of visual aids in helping Chinese-speaking users understand medication information, there is still a need for research that explores how these strategies work for Chinese immigrants using the Canadian healthcare system. This study helps address that gap by focusing on how user-informed visual and digital tools can support safer and more confident self-medication among Chinese newcomers in Canada.

2.3 Health Technology and Digital Tools

Advancements in technology have reshaped how people access and interact with health information. For immigrant populations, digital tools offer new opportunities to overcome traditional language barriers when navigating healthcare. Mobile apps have the potential to deliver accessible and culturally relevant health information. However, the effectiveness of these tools depends on thoughtful design that addresses users' language skills and digital literacy. This section reviews the role of technology in health communication and the barriers limiting equitable access to digital health tools.

2.3.1 The Rise of Consumer-Facing Digital Health Tools

Applying technology to search for and share health information has become increasingly common, especially since the COVID-19 pandemic. The widespread use of smartphones and internet access have transformed how individuals engage with healthcare information, especially those with limited language proficiency. In *Health Literacy and Consumer-Facing Technology*, Alper (2015) emphasized the potential of consumer-facing technologies to improve health literacy by delivering educational content in engaging ways. For instance, the *Fooducate* app allows users to scan barcodes while shopping to receive simplified health ratings and nutrition insights. It supports more informed and health-conscious purchasing decisions.

2.3.2 Designing Inclusive Mobile Health Apps

Mobile health apps increasingly incorporate features designed to meet the needs of low-literacy users. Emerson et al. (2022) reviewed mobile health tools and found a growing trend toward simplified interfaces that use easy navigation and multimedia content (e.g., audio and video) to reduce reliance on reading. These design strategies include replacing long paragraphs with icons and visual cues and personalizing content with culturally relevant imagery. More broadly, Gibbons et al. (2014) emphasized the importance of designing health information technologies that account for cultural and linguistic differences among diverse users to avoid worsening communication barriers.

2.3.3 Barriers to Access: Digital Literacy, Language, and Trust

Hyman et al. (2022) conducted a community-based participatory action study with South Asian immigrants in British Columbia to explore the barriers and facilitators of using digital health tools for chronic disease management. The study found that older age, limited education, and low digital and health literacy posed significant challenges. These difficulties became even more overwhelming when they had to navigate unfamiliar technology or poorly translated content. Participants often described translated content as too academic or poorly localized. They also expressed mistrust of online health sources and preferred to rely on physicians for reliable information. Community engagement emerged as a key facilitator in the study. Using participatory approaches like photovoice helped make the research more culturally relevant and empowered participants. These findings support the importance of involving users in the design of digital tools through focus groups and user testing. These approaches help ensure that the content is culturally appropriate and trusted by the intended audience.

2.4 Regulatory Requirements for Medication Labelling in Canada

In Canada, the Food and Drugs Act and the Food and Drug Regulations govern medication labelling. These regulations aim to ensure medication labels support the safe product use by healthcare providers and consumers. Essential information must be clearly displayed on both the inner and outer labels. They include brand name, common name, dosage instructions, expiration date, and drug identification number. For non-

prescription medications sold in self-selection places, all labelling must be bilingually presented in English and French. The guidance emphasizes using good legibility and appropriate visual hierarchy to support comprehension. These regulations emphasize the importance of user-centred label design to support safe medication use, especially for populations with limited language proficiency, such as newcomers to Canada (Health Canada, 2024).

This study does not aim to change existing unscheduled medication packaging or propose changes to current regulations. Instead, it focuses on using inclusive strategies to develop participant-informed approaches that enhance Chinese newcomers' medication information comprehension and improve accessibility.

3. Methodology

3.1 Research Design

The study adopted a participatory qualitative approach, incorporating inclusive facilitation sessions (focus groups) followed by user testing sessions. Two focus groups were conducted first, each involving four participants. These sessions explored participants' lived experiences, cultural perspectives, and challenges in using unscheduled medication in Canada. After that, two user testing sessions were conducted, each with the same four participants from the corresponding focus group. During the user testing phase, participants tested out an app prototype designed to improve medication comprehension. They then provided feedback on its usability and cultural relevance. This two-phase format helped reveal key barriers and gather user feedback on the proposed design solution. This study received ethics approval from the Research Ethics Board at OCAD University, REB #2025-09.

3.2 Participants

A total of eight participants aged between 21 and 32 were recruited out of the originally planned ten. Recruitment was done through the social media platform Xiao Hong Shu, also known as Red Note (a Chinese social networking app), and through personal connections.

All participants self-identified as Chinese newcomers to Canada who had been living in the country for less than five years. They reported having limited English or French language skills. Each participant had prior experience using unscheduled medications in Canada. They also demonstrated basic digital literacy, including using smartphones, computers, and video conferencing tools. These skills were necessary for participating in the focus groups and user testing sessions.

The participants were divided into two groups of four. All eight participants attended both the focus groups and the user testing sessions.

3.3 Data Collection

Data collection happened between February and March 2025 and consisted of two distinct sessions per participant group: an inclusive facilitation session followed by a user testing session. Each session was 90 minutes in length and conducted remotely using Microsoft Teams. FigJam, a collaborative digital whiteboard platform was used during both sessions to facilitate interaction and document participant input. All sessions were audio-recorded with participant consent. And visual outputs from FigJam were saved for analysis.

3.3.1 Inclusive Facilitation Session (Focus Group)

In this study, the inclusive facilitation session was fundamental to understanding participants' experiences and challenges related to unscheduled medication. During the 90-minute session, participants engaged in open-ended discussions about their difficulties in understanding unscheduled medication information in Canada. They reviewed examples of existing medication packaging and discussed how design elements like typography, layout, and colour palettes impacted their ability to self-medicate safely. Participants then brainstormed and shared ideas for improving medication information access through culturally relevant and visually intuitive design solutions.

3.3.2 User Testing Session

Following the focus group, each participant joined a 90-minute user testing session where they interacted with the app prototype. Participants tested the prototype's usability and explored its key features. They provided feedback on its design and the cultural relevance of the visual aids. Insights from these sessions were used to evaluate how well the design aligned with participant needs and expectations.

3.4 Data Analysis

The study used a thematic analysis approach to analyze the qualitative data collected from the focus groups and user testing sessions. The analysis process involved several steps to ensure a thorough understanding of participant experiences and feedback.

First, all session recordings were transcribed. The researcher read through the transcripts iteratively to become deeply familiar with the data. Then, an open coding process was used to code the data. Codes were generated directly from the data without using a predefined coding structure. After coding, similar codes were grouped together to identify meaningful and recurring themes and sub-themes.

3.5 Prototype

This study involved a mobile app prototype design to address the identified challenges. After analyzing participants' experiences with unscheduled medications in Canada, the researcher created an app prototype to improve medication information understanding. The app includes a QR code scanning feature that allows users to scan a code on the packaging and access a clearer version of the information supported by visual aids. It also has a symptom-based navigation tool that allows users to select their condition and view suggested dosage information.

4. Findings

Through a thematic analysis of the focus group and user testing data, six major themes were identified. They captured participants' challenges, beliefs, and experiences with unscheduled medication information in Canada. The themes reflect linguistic barriers, cultural influences, systemic challenges, valued medication information, perceptions of visual aids, and reactions to digital tools.

Additionally, feedback topics from the user testing sessions showed how participants responded to the initial app prototype. These insights include user experience and navigation, visual aids, dosage instruction visualization, and layout and information hierarchy.

4.1 Key Themes Emerging from Inclusive Facilitation Sessions

4.1.1 Comprehension Challenges

Participants faced significant difficulties understanding medication packaging and labels. Medical terms such as antihistamine or migraine were unfamiliar to many of them. Brand names like Advil or Benadryl also lacked meaning for Chinese newcomers who didn't associate them with specific symptoms or ingredients.

Additionally, the amount of text and the way it was presented created further barriers. Many packages contained long paragraphs of small, dense text. They were hard for participants to quickly identify key information such as dosage or usage instructions.

> *“For the first couple of years of my life living here, I didn’t even know what’s the English brand name for ibuprofen. And I never knew that Advil or Motrin are like the famous brands for ibuprofen here.” (Participant 2)*

> *"The instructions are usually very detailed. They talk about dosage, side effects, warnings, and how to store the medicine. But you know sometimes the text is so small. It’s hard to read. But all the long paragraphs can be overwhelming.” (Participant 7)*

Participants also highlighted frustration with bilingual labeling. The side-by-side or mixed presentation of English and French made it harder to locate the content they could understand. Furthermore, some promotional language overshadowed essential information on the packaging. This further reduced clarity.

> *“Also, I felt it’s just hard to find any information. Because sometimes when I read it, I understand searching for the instruction part, but it’s written in French. I don’t read French and then I need to look for the English version and sometimes I don’t even understand the English version, so it’s just too hard to find any information.” (Participant 1)*

> *“I have experiences with some medication which you need to peel to read the ingredients inside because there is too much information they need to list. And*

even only one side of it couldn't fit in that much information. So they need you to peel off to see the actual ingredients. But outside, they're all kind of promotions. Yeah, it's like promoting their medication and say how good our medication is. But the useful information is hidden inside, which I find pretty annoying." (Participant 2)

4.1.2 Communication Barriers

Linguistic communication difficulties emerged as a major barrier to accessing support in pharmacy settings. Participants expressed low confidence in asking pharmacists questions or explaining symptoms because of limited vocabulary and embarrassment.

"I couldn't really confidently to speak up to a pharmacist about my symptoms. Cause I don't know the words and I don't know what medication I'm looking for. So that was one of the biggest challenges that I met when I'm in this situation." (Participant 4)

"Yeah, it's in a different language. So sometimes it's hard to actually describe what I'm really having. Like, OK. I know there's pain, but sometimes the symptoms is not stomach pain or head pain or headache, but sometimes it's like more like a of a Latin origin kind of word." (Participant 6)

Even when participants attempted to describe symptoms, they struggled to use accurate English medical terminology. This made it harder to accurately communicate

their needs. This resulted in more reliance on self-diagnosis or non-verbal interactions such as showing images.

> *"Yes, like you just mentioned, migraines. Migraine is the name of the sickness. I didn't know until like couple years ago. And I thought that in Chinese that's probably described as something similar to a headache, but in English that's like a totally different thing. So if you don't know the name of the sickness, it'll be really hard to communicate with pharmacists or store attendant in a pharmacy setting." (Participant 2)*

Participants used translation apps frequently to overcome language barriers, although they didn't always trust them because of accuracy concerns. Some participants also reported feeling isolated when they lacked close friends or family members who could help make these decisions.

> *"And when we were in China, we can also just ask our parents or friends. So they can tell us like, what's the best medication to use for certain sickness. But here I'm kind of relying on myself to do the work. I'm just living by myself for most of the time. And that becomes a resource or the help that I couldn't really get from them." (Participant 2)*

4.1.3 Cultural and Systemic Influences

Cultural beliefs shaped participants' approach to self-medication. Some described they were unwilling to take medicine unless it was absolutely necessary. They preferred to

rest and let their body heal. This perspective often differed from the perceived norm in Canada where unscheduled medications are marketed and used more aggressively.

> *"So in Chinese culture, we don't really like to take medicine unless it's really necessary. Like when we have a cold, sometimes we just drink hot water or sleep more and wait for the body to heal itself. But here, everyone takes pills for everything." (Participant 3)*

Participants also noted systemic differences between Canada and China, particularly around medication availability and regulation. In China, antibiotics and other treatments are more accessible. In Canada, the strict regulation of these medications led to feelings of helplessness when familiar options were unavailable.

> *"I mean, I felt like the unscheduled medication is quite different in China and here. I felt like I'm taking more antibiotics in China because it's not considered as a scheduled medication. I don't need to pick up in a hospital. I don't need to see a doctor to get one, but here I felt like it's really hard to get any antibiotics. And also I'm taking more pain relief here than in China. Because it's really easy to get any pain relief medication here." (Participant 1)*

Additionally, the dosage instructions on Canadian packaging often seemed high or unsafe to participants, especially those who were used to more moderate doses or herbal alternatives. This created mistrust in Western medications and hesitancy around self-medication in Canada.

> *"I just feel like not safe, even though the package tells me to do so." (Participant 3)*

4.1.4 Valued Information

When using medication, participants consistently prioritized information related to safety and effectiveness. Through the focus groups and user testing sessions, several key areas emerged as especially important to participants.

Dosage and frequency were critical concerns. Participants emphasized the importance of fully understanding how much medication to take and how often. Some participants were hesitant to follow Canadian dosage recommendations. They felt that the suggested amounts were higher than what they were used to in China. They expressed a strong need for dosage information to be presented clearly. When and how to take the medication was another focus. Participants wanted clear guidance about when to take medication and whether it should be taken with or without food. Side effects and warnings were highly valued as well. They preferred that side effects and warnings be highlighted to ensure quick visibility.

The symptoms the medication was meant to treat were a major source of confusion. Participants had difficulty connecting a product's name or description to their symptoms. For example, they found the term "pain reliever" too vague and were unsure whether it applied to headaches or muscle pain. They wanted symptom information to be made more explicit and accessible.

Active ingredients were important but frequently misunderstood. Participants found ingredient lists overwhelming and filled with technical terms. They suggested that active

ingredient information should be explained in simple language and directly connected to the symptoms it treats.

Overall, participants noted that while much of this information was present on medication packaging, it was difficult to locate and interpret due to poor visual hierarchy and the overwhelming amount of dense text. There was a strong call for simpler and better organized layouts. These layouts would bring essential content to the forefront and support safe and confident self-medication.

4.1.5 Perception of Visual Aids

Visual aids were seen as an effective way to support understanding and reduce reliance on text. Participants responded positively to icons and illustrations that helped identify usage timing (e.g., sun and moon for morning/night) or symptoms (e.g., red dots indicating pain areas on the body).

> *“Yeah, I think it would definitely be really helpful, but I guess it’s kind of also hard for companies to choose which illustration they’re choosing because it’s not only one symptoms they’re targeting, right? So there’s only limited space on the package for the illustration to be shown. So I think having some of the really stand out symptoms illustrating on this package will definitely be helpful. But it’s also hard to choose from which ones.” (Participant 1)*

> *“There’s like illustrated person with some red dots on their body and the red dots are resembling ache and sickness they have on particular parts of their body, and I*

guess they're just trying to express the meaning that this medication is meant to treat these." (Participant 5)

While participants were familiar with visual aids in other contexts, such as road signs and public signage, some mentioned that they had not seen visual aids in the medication context either in Canada or China. They noted that they would need time to become comfortable interpreting health-related visuals accurately.

"I don't think I have ever seen any of these, both in Chinese medicine or the medicine here." (Participant 3)

"I've never seen any visual aids like the one you are showing. Not in medical field I guess. But I know traffic signs." (Participant 8)

Despite these concerns, participants believed that visuals could greatly reduce confusion for users with limited language skills.

4.1.6 Digital App Feedback

Participants had mixed experiences and attitudes toward digital health tools. On one hand, apps were seen as potentially useful for translation and accessing medication information. Some participants had positive experiences using Chinese apps to look for health information. They found these resources culturally relevant and user-friendly. For example, several participants mentioned using Xiao Hong Shu (Red Note), a social media platform popular among Chinese users, where people share personal

experiences and everyday life updates. Because Xiao Hong Shu has a strong user base among Chinese living overseas, many Chinese living in Canada commonly use it to search for and check information. Some participants used it to look up symptoms and see what medications others recommended in Canada.

> *"With some of that, if I can't find them, I will check like Xiao Hong Shu and search what the symptoms are we need here." (Participant 4)*

> *"I think checking before buying is definitely something I did before." (Participant 1)*

However, many participants raised concern about the credibility and safety of online sources. They expressed extra caution when information came from unfamiliar platforms.

> *"Used app to search. But online information can be mixed with right and wrong information. Some say it's good, some say it's bad. So should I take the medicine or not? It's really confusing. I also worry about side effects. If I have to take the medicine, I still hesitate wondering if there will be any long term problems." (Participant 8)*

Translation apps were widely used but not always trusted especially when dealing with health-related content.

Participants appreciated multilingual platforms like the Mayo Clinic's website. It provided professional information in both English and Chinese.

Overall, while apps were not seen as a perfect solution, participants were open to using well-designed and trustworthy tools that prioritized clarity and cultural relevance.

4.2 Feedback Topics from User Testing Sessions

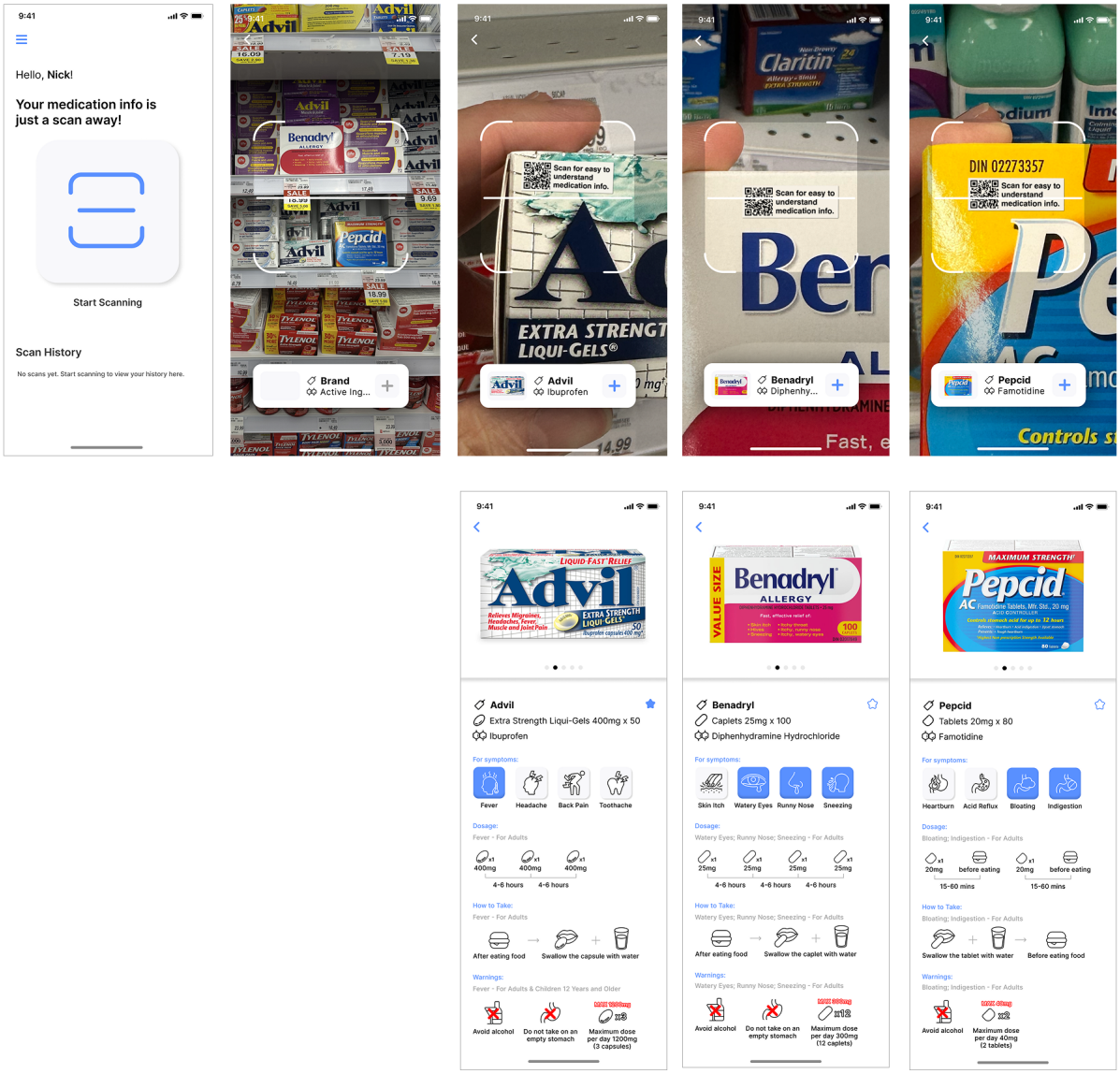


Figure 1. Initial App Prototype Screens Reviewed in User Testing

4.2.1. Feedback Regarding User Experience and Navigation

Overall, participants responded positively to the app's user flow. The process was described as intuitive and purposeful.

> *"First of all, the entire task navigation was quite good to be honest, for scanning and displaying information on the medication package." (Participant 5)*

> *"Overall, I found the user flow pretty clear and simple. I think it's easy to use and serves its purpose. There's just enough information for me to get a sense of what's the major ingredient and how to take the med and what's the recommended dosage." (Participant 3)*

These comments suggested that the prototype effectively balanced clarity with information density. It allowed users to access essential content without being overwhelmed.

However, one participant expressed confusion about how to proceed after scanning a medication. The interactive pop-up lacked clear direction. And the plus sign button may have caused uncertainty about the next step.

> *"When scanned medication was displayed in the camera screen, it is kind of confusing where should I proceed with (plus sign problem maybe)" (Participant 5)*

This feedback highlighted the importance of using understandable visual cues to ensure navigation buttons were clear to follow.

4.2.2. Feedback Regarding Visual Aids

After initially trying out the app prototype, some participants generally appreciated the visual aid design. They particularly liked their straightforwardness and the visually engaging design.

> *“I like the visual icon design.” (Participant 1)*

> *“All of them are pretty straight to the point, awesome visuals!” (Participant 6)*

However, when reviewing individual icons more closely, several participants noted that some visual representations were unclear. They lacked sufficient cues to convey the intended meaning. Specific feedback suggested design refinements.

> *“I get the meaning of the text, but I can’t grasp what the graphic is depicting, a cloud in the stomach? Maybe adding some bubbles in the stomach, or gas?” (Participant 2)*

> *“Not sure about this one (indigestion)… I get it but I think it could be improved somehow. Adding a cross could help?” (Participant 4)*

> *“Food pipe burning from the stomach? So maybe adding a fire on top of the food pipe.” (Participant 3)*

These comments suggested that while the icons were generally well-received, some visual aids could be improved. Particularly, the symptom icons for Pepcid would benefit from more recognizable designs.

Participants also appreciated using medication form icons that visually matched the actual pill form. This alignment helped reinforce understanding and made the icons feel more trustworthy.

> *“I like that the icon of the pill is the same with the actual ones in the package.” (Participant 3)*

4.2.3. Feedback Regarding Dosage Instruction Visualization

Some participants were confused by the dosage timeline layout. The timeline did not clearly represent a full 24-hour cycle. It gave the participants a hard time to interpret how often the medication should be taken.

> *“Does the timeline represents the whole 24 hrs? If not, what does it represents?” (Participant 3)*

> *“I would definitely expect a one day timeline here for better illustration.” (Participant 1)*

The feedback highlighted the need to clearly label and visually structure the timeline to reflect the 24-hour dosing period. This could ensure that users could confidently follow the instructions.

In the Pepcid dosage instructions, participants found the wording and visual for “Swallow the tablet with water before eating food” unclear. Since the “before” part came after the visual aids representing swallowing the tablet with water, they felt the reading

order was confusing. They suggested changing the order of the text and visuals to make it easier to understand.

> *“This before and after illustration might need some change. After looks fine to me but before is kind of not intuitive.” (Participant 3)*

4.2.4. Feedback Regarding Layout and Information Hierarchy

Participants responded positively to the comprehensive information on each medication screen. However, concerns were raised about the information visual structure. When all texts appeared in the same size and weight, they were hard to focus.

> *“This page contains all effective information from the Advil package. However, when all texts are in same size and weight, it is kind of easy to be distracted when browsing.” (Participant 2)*

Other participants suggested visually splitting the layout to create clearer sections and reduce repetitive look.

> “Also, the visual is a bit too similar. I like the cohesiveness, but would be good to have it broken into different section.” (Participant 7)

Legibility was another concern, especially for users who had difficulty reading low-contrast or delicate elements.

“The lines here showing the + is a bit light for me and I did not understand that in the beginning.” (Participant 8)

“I suggest checking the grey font colour under the blue font text “symptoms”, “dosage”, “how to take”, “warnings” for colour contrast with the white background colour.” (Participant 6)

These comments focused on the importance of strong visual hierarchy and layout clarity to support comprehension. It’s crucial to note that the design should be improved to better support users with different levels of vision or comfort with digital tools.

5. Design Recommendations

Based on key insights from focus groups and user testing with Chinese newcomers, this section outlines a set of inclusive design recommendations aimed at improving comprehension and usability of unscheduled medication information in Canada.

The section is organized in two parts:

1. Proposing inclusive strategies focused on visual aids and digital tools to better support Chinese newcomers' understanding and self-medication

2. Showing the design before and after changes based on participant feedback from the user testing sessions

5.1 Solutions Through Inclusive Design

To address the challenges participants faced with unscheduled medication packaging, this study proposes a digital based approach that shifts critical information from the physical package to a mobile app prototype. Instead of redesigning packaging, the proposed solution leverages QR code scanning technology to connect participants directly to an easy-to-understand digital version of the unscheduled medication information. This approach improves both information clarity and visual communication. It also allows for a more personalized experience. These benefits are hard to achieve with traditional packaging.

5.1.1 Shifting Information to a Digital Platform

The app prototype allows participants to scan a QR code on the medication packaging to access an easy-to-read version of the medication information. All of the information shown in the app comes directly from the original unscheduled medication packaging provided by manufacturers. No content is changed. This helps ensure accuracy and consistency with the information already approved and provided by manufacturers.

From the home screen of the app, users can tap the scan button. This brings them to a ready-to-scan screen with a camera function. They then scan a QR code placed on a sticker attached to the medication packaging. This approach keeps the original packaging untouched while still giving participants a way to better access information.

After scanning, a pop-up appears at the bottom of the screen to confirm that the medication has been found. Participants can tap the arrow button to move to the next screen, which shows a well-organized page of medication information. This includes what symptoms the medication is meant to treat, general dosage guidelines, how to take it, warnings, and the maximum dosage limit.

Figure 2. User Experience Flow of the App Prototype

From left to right: Homepage, Ready-to-Scan Screen, QR Code Scan Confirmation, and Medication Information Page. These screens illustrate the process users follow to scan an unscheduled medication and access simplified information.

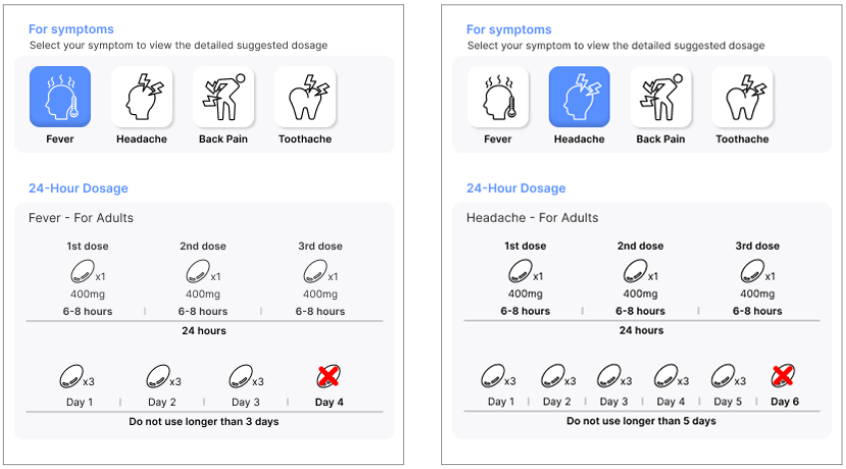
By moving this information into a digital format, the app prototype avoids many problems found on physical packaging, such as small fonts and poor layout. It improves both clarity and user experience. And it offers personalized, easy-to-navigate content that supports safer self-medication.

5.1.2 Symptom-Based Navigation and Simplified Layout

One of the app's key features is its symptom-based navigation. On the medication information screen, participants first see the general dosage information provided for the

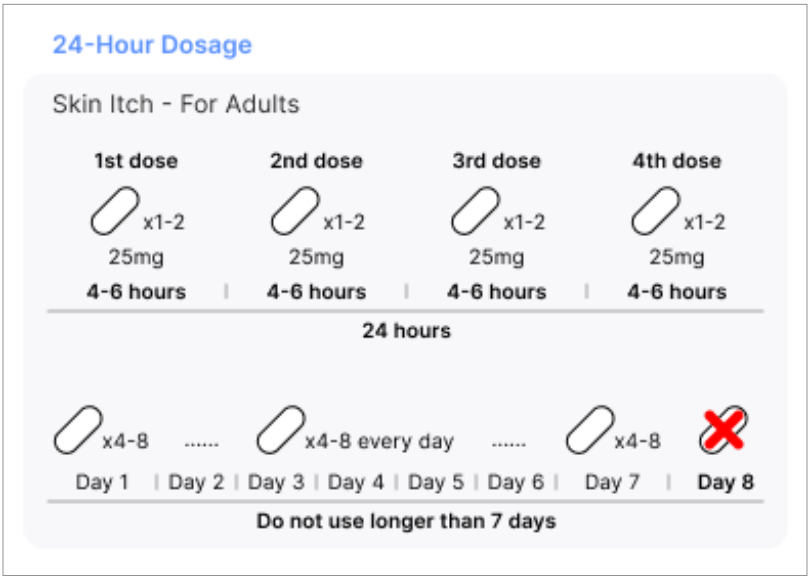
medication. They can then select a specific symptom, such as fever or headache, to view a suggested dosage for that condition, if the suggested dosage is provided by the manufacturer. This feature directly addresses participant feedback as many reported difficulty determining whether a medication was appropriate for their symptoms based on unfamiliar brands or unclear terminology.

Figure 3.
Symptom-Based Navigation



To further improve clarity, a timeline chart is included in each medication profile to visualize dosage frequency. This visual representation helps users understand how often a medication should be taken throughout the day, and the maximum number of days it should be used. This feature reduces confusion and supports safer self-medication practices by making this information visually accessible.

Figure 4.
Dosage Timeline Visualization



The layout throughout the app is designed to be clean and straightforward. Key sections such as symptoms, dosage, and warnings are visually separated and clearly labeled. Content is presented one topic at a time. It helps users avoid information overload which is often experienced with physical labels.

5.1.3 Use of Visual Aids

To reduce reliance on dense text and support users with limited English proficiency, the app incorporates visual aids throughout the interface. These include icons that represent symptoms (e.g., an icon of a head with sweat and a thermometer for fever, a burning stomach for heartburn), medication forms (e.g., a capsule or tablet), and routes of administration (e.g., a pill next to a mouth alongside a glass of water to indicate “swallow and take with water”, a burger icon indicating “take after meal”). These visuals were designed by the researcher using a participatory design approach, with input from

participants during the focus group and review during user testing to ensure they were culturally appropriate and relevant to the intended participant group.

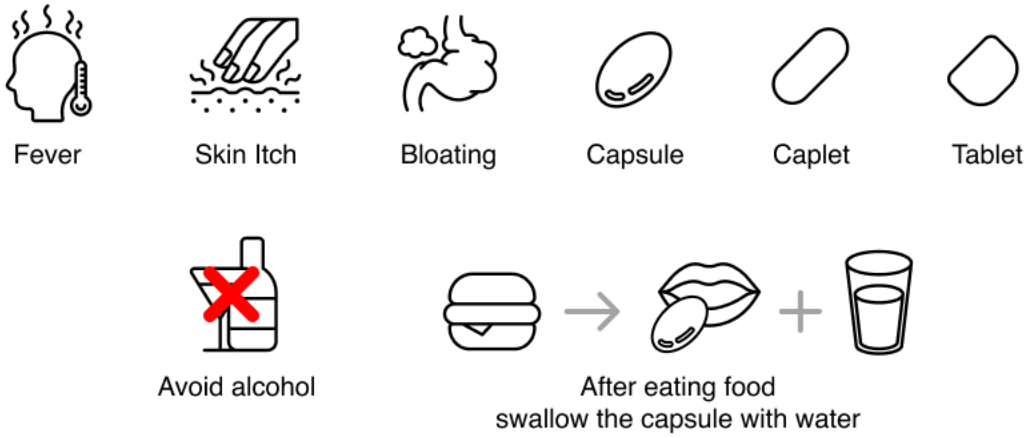


Figure 5. Visual Aids Designed for the App Prototype

Each visual is paired with a short, plain-language explanation in English. And each section is clearly separated to maintain clarity. This layout helps prevent visual clutter and makes the design easy to navigate.

5.1.4 Creating an Inclusive and Accessible Experience

Together, these inclusive design strategies aim to empower Chinese newcomers to make informed and confident decisions when using unscheduled medication. By moving essential information from visually busy packaging to a user-centred app, the design addresses barriers around comprehension and communication. The inclusion of visual aids, symptom-driven navigation, and clean and informative design creates a more

accessible way to safely self medicate. It aligns with the needs and preferences of the community it's designed for.

5.2 Changes Based on Participant Feedback

5.2.1 User Experience and Navigation

While the general user experience was well received by the participants, one participant pointed out the navigation button in the pop-up guiding them to the medication information screen could be changed from a plus sign to an arrow for better clarity. This feedback was addressed by updating the button for a clearer navigation experience.

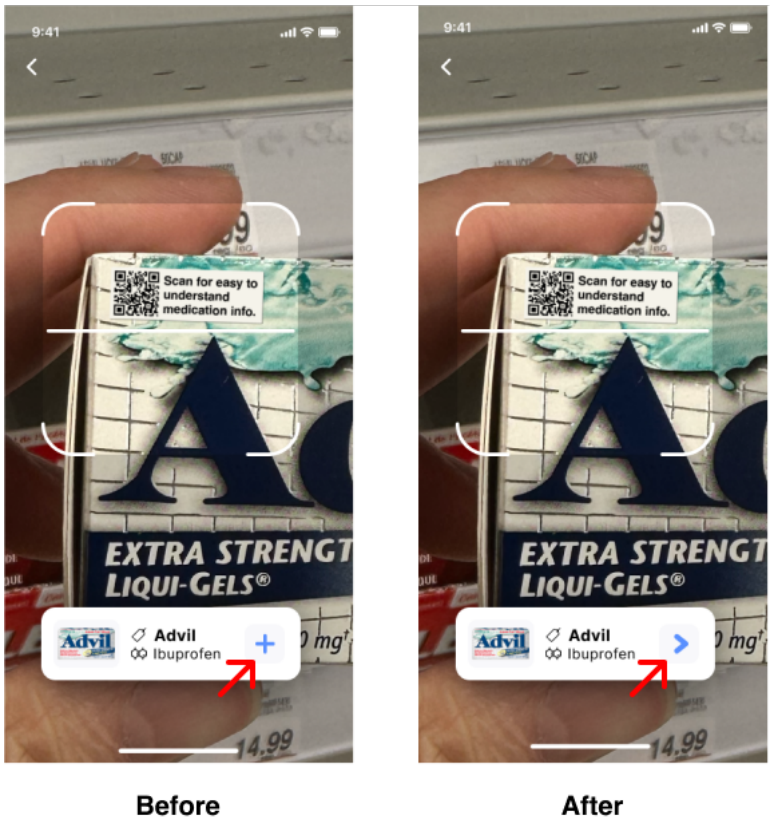


Figure 6.
Before and After Comparison of Navigation Button

5.2.2 Visual Aids

Participants mentioned that some visual aids needed further improvement for better clarity. Specifically, they pointed out the symptom icons for Pepcid including heartburn, bloating, and indigestion. Based on their feedback, the visual aids were redesigned to better match participants' perceptions.

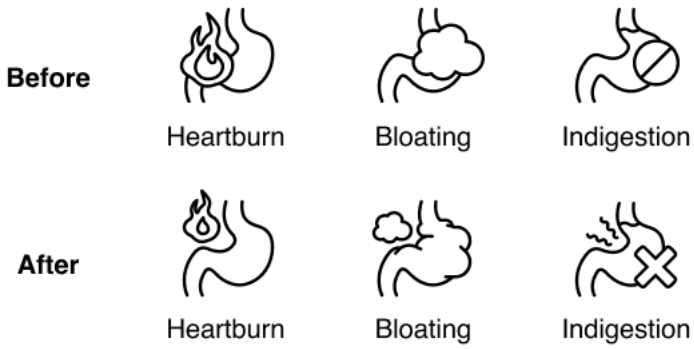


Figure 7.
Before and After Comparison of Symptom Visual Aids

5.2.3. Dosage Instruction Visualization

Feedback on dosage instructions mainly focused on the unclear 24-hour timeline. Participants pointed out that the timeline needed better clarity to show a full 24-hour dosing cycle. Based on their feedback, the timeline was updated and now clearly represents a full 24-hour medication schedule. The maximum usage duration is also included in the dose instructions to provide clearer medication information.

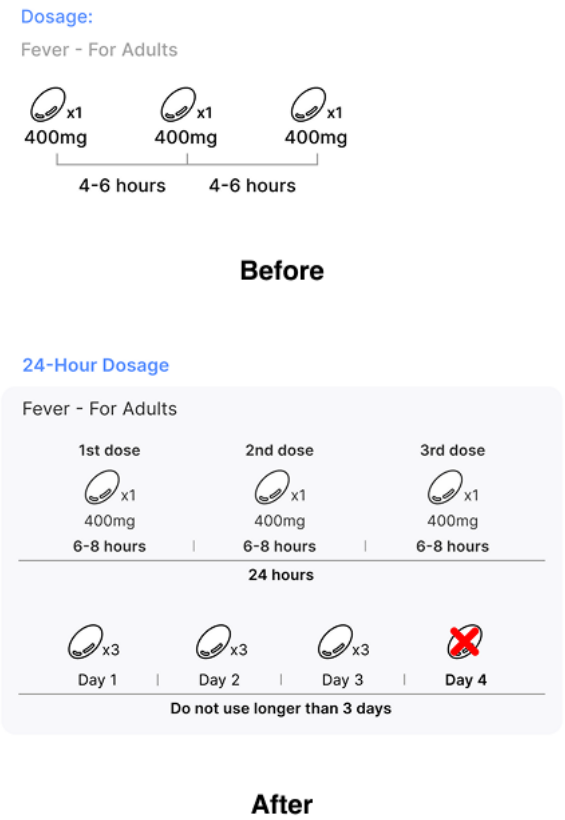


Figure 8.
Before and After Comparison of Dosage Timeline Visualization

There was also feedback specifically about the Pepcid dosage instructions. Participants found the order of the wording confusing. They suggested improving it by adding more clarity and changing the wording.

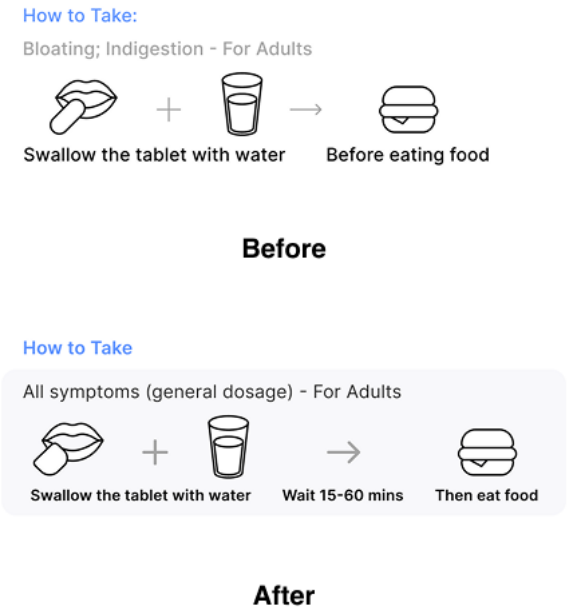


Figure 9.
Before and After Comparison of Pepcid Dosage Instruction

5.2.4. Layout and Information Hierarchy

The feedback regarding layout and information hierarchy mainly focused on the visual structure of the medication screens. Participants mentioned that when all texts appeared in the same size and weight, it was harder to focus on key content areas. Based on their feedback, the design now uses different text styles for better emphasis.

Participants also pointed out that the sections looked too similar across the screen making it hard to navigate. In response, the content is now divided into sections with clear background colour to help users navigate the information more easily.

Concerns about legibility were also raised especially regarding low-contrast elements. To address this, the grey font colours and delicate lines were adjusted to improve contrast against the white background, making the design more accessible for users with different vision needs.

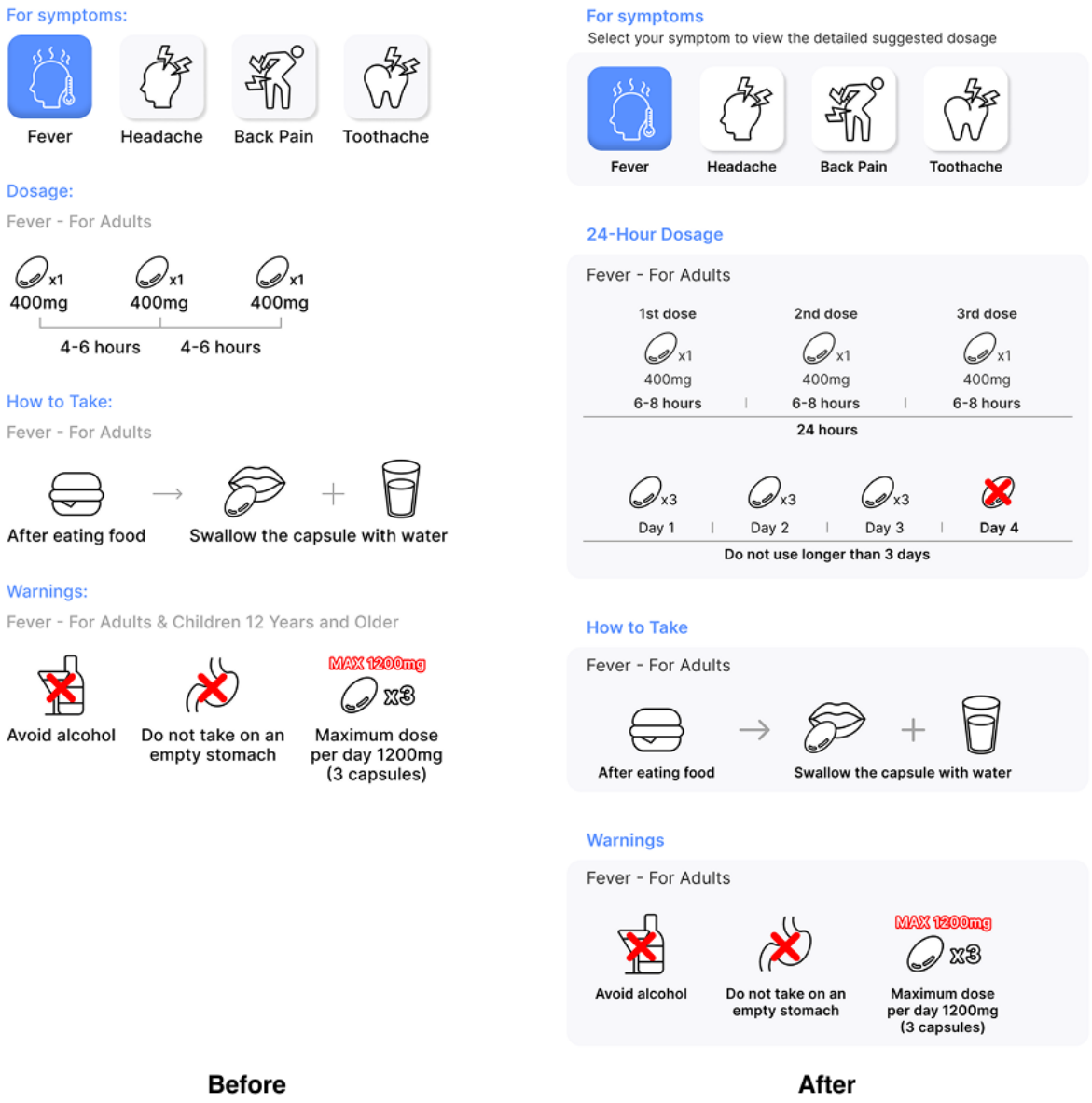


Figure 10. Before and After Comparison of Layout and Information Hierarchy

6. Discussion

This study explored how Chinese newcomers in Canada understand and use unscheduled medications. It also examined how inclusive design strategies can improve comprehension and support safer self-medication. Based on focus groups and user testing, six themes were identified. These themes highlight challenges related to language, culture, and the healthcare system. This section discusses those findings in relation to existing research and considers their implications for inclusive design and health equity.

6.1 Interpretation of Findings

The findings support what earlier studies have shown: language is a major barrier for immigrants trying to access health information (Pandey et al., 2021). Participants had difficulty understanding important medication details. This included dosage instructions, ingredients, and what the medication is used for. Many were confused by unfamiliar medical terms, busy layout, and lack of visual aids. Bilingual packaging often added extra confusion. The bilingual layout made it difficult for participants to know where to start reading or how to follow the flow of information.

Cultural beliefs also influenced how participants viewed medication. Many described a preference for resting or drinking warm water instead of taking medicine immediately. This approach aligns with common self-medicating practices in Chinese culture, which

emphasize letting the body heal naturally before turning to pharmaceuticals (Zhu et al., 2024). One participant specifically mentioned this habit as part of their regular approach when having mild illness. However, not all participants had this hesitation. Another participant expressed feeling comfortable with taking medication when needed. This suggests that personal attitudes toward medication varied within the group.

In addition, participants discussed how differences in medication regulation between China and Canada shaped their self-medication habits. One noted that antibiotics were more easily accessible in China. And they recalled taking them more frequently for common illnesses. In contrast, they reported using more unscheduled painkillers in Canada because of the stricter controls on antibiotics. These regulation differences led to distinct medication habits in each context.

Participants welcomed the idea of visual aids and digital tools, but only when they were clearly organized and felt familiar. Icons showing symptoms or instructions were especially helpful. Some participants noted that while they had experience interpreting visual aids in other contexts such as road signs, they were less familiar with seeing visual aids used in medication or healthcare settings. Some mentioned that it would take time to adjust to interpreting health-related visuals. Visuals that were too abstract or unfamiliar caused confusion. This highlights the importance of not only creating culturally relevant visual designs (Malhotra et al., 2022) but also promoting the use of visual aids in healthcare communication to support user familiarization. Over time, greater exposure to health related visual strategies could help improve comprehension and confidence among immigrants navigating medication information.

Many participants used translation apps and health websites, but they didn't always trust the information. They preferred multilingual platforms from reliable sources, like the Mayo Clinic. The idea of scanning a QR code on packaging to access simplified information was well received. This supports recent studies that emphasize the need for mobile health tools that are both culturally sensitive and easy to use (Hyman et al., 2021).

During the user testing sessions, participants shared feedback about the initial app prototype. While much of the feedback was positive, some participants pointed out areas that were unclear and needed improvements. These comments led to additional rounds of prototype design refinements. They also highlighted the importance of user-informed design and showed how essential user testing is for the design process.

6.2 Relation to Previous Research

This study adds to existing research on the power of visual communication. Prior studies have shown that icons and pictograms can improve understanding, especially for people with limited literacy or language skills (Katz et al., 2006; Barros et al., 2014). In this study, participants consistently said that visual cues helped them identify symptoms and know how to take their medication. Again, the success of these visuals depended on whether they made sense in a cultural context (Malhotra et al., 2022).

The findings also confirm concerns about the mismatch between Western medication systems and immigrant health beliefs. As noted in other research (Zhu et al., 2024),

many older Chinese immigrants expressed a stronger trust in Traditional Chinese Medicine and felt that Western approaches to treatment were often unfamiliar or misaligned with their health beliefs. Some participants in this study also shared similar experiences. They described a stronger comfort with mild or traditional treatments and showed hesitation toward using Western medications. These cultural differences contributed to hesitation or delay in engaging with Western healthcare practices, including the use of unscheduled medications.

The study also supports findings from Emerson et al. (2022) and Gibbons et al. (2014), which show that well-designed digital tools can improve health information understanding. But it is also a reminder that technology is not always the answer. As Hyman et al. (2021) pointed out, many newcomers still face challenges when using digital tools. In this study, participants only trusted and used digital tools when they were culturally familiar and clearly presented. The initial app prototype included design mismatches that led to confusion among participants. This highlights the importance of continuing user-informed design process to better meet the needs and expectations of diverse users.

6.3 Implications for Inclusive Design

These findings highlight the need for inclusive and user-centred design in how unscheduled medication information is communicated among Chinese newcomers with

limited language skills in Canada. Common barriers can be improved through better design.

Based on the study results, several key recommendations emerge. First, using culturally familiar icons can help users more easily recognize symptoms and understand dosage instructions. Symptom-based navigation in digital tools is also important as it allows users to confirm that a medication and its dosage are appropriate for their specific condition. Presenting information in clearly separated sections can further reduce information overload and make essential details easier to find. Additionally, involving target users in the design process is crucial to ensure that content is relevant.

The app prototype tested in this study demonstrates how a digital tool with visual aids can complement physical packaging. The tool offers a structured and accessible way to present important information. It helps users make safer decisions. It supports broader recommendations for connecting physical and digital communication to improve health access and reduce misunderstandings.

In user testing, participants responded positively to the app prototype. They found the user flow, from the homepage, to the scanning screen, to confirming a QR code match, and finally arriving at the medication information screen clear and easy to follow. This suggests that the overall user experience was well aligned with their expectations. However, it is important to acknowledge different perspectives in the design review process. The principal supervisor raised concerns that this step-by-step flow might feel lengthy or confusing for some users. This points to the need for continued testing and iteration to hit the right balance between clarity and usability.

6.4 Limitations and Future Research

This study focused only on Chinese newcomers in Canada who had basic digital tool skills. It did not include individuals with visual impairments, very low digital literacy, or those from other cultural and linguistic backgrounds. A more diverse sample would provide a broader view and help extend the findings to other newcomer groups facing similar challenges.

Another limitation is that the visual aids developed in this study were specifically tailored to the cultural background of the Chinese newcomer participants. While the icons and navigation strategies were informed by user feedback and cultural familiarity within this group, it is uncertain that how well these designs would be received by newcomers from other cultural and linguistic backgrounds. If the app is intended for broader use among diverse immigrant populations in Canada, future work would need to carefully consider how to design visual communication strategies that are inclusive and culturally adaptable across different communities.

In addition, participants in this study had at least basic comfort with using smartphones and digital platforms. Future research should explore the needs of users with very limited or no digital experience. Because their challenges in accessing and interpreting digital health tools may be significantly different.

The study also had limitations in user testing. Only one round of testing was done with two different groups of participants. Although changes were made to the app prototype

after the sessions, more rounds of user testing and iterations would help better evaluate participants' acceptance of the updates.

Building on these limitations, future studies could explore several important areas. Research could investigate how different types of visuals, such as icons versus illustrations, affect user understanding medication information. Studies could also examine how similar visual communication strategies work across different language and cultural groups. Another important area is how to involve older adults or individuals unfamiliar with technology in the design process to ensure broader accessibility. Additional user testing could help future studies improve the design of digital tools for users. Split testing could be done by sending two versions of the design to different groups of people to see which one performs better. It could be used to determine whether certain app layouts are more effective. Finally, future research could explore strategies to build trust in digital health tools through partnerships with community organizations.

By listening to participant experiences and learning from past research, this study contributes to the growing field of inclusive health design. It emphasizes the urgent need to create health systems and communication tools that reflect the needs of diverse communities.

7. Conclusion

This study explored the challenges Chinese newcomers in Canada face when using unscheduled over-the-counter medications. It focused on how language barriers, cultural beliefs, and unfamiliar packaging designs make self-medication difficult. Through inclusive facilitation and user testing sessions, the study found that current systems often fail to meet the needs of linguistically diverse users in Canada. To address these issues, actions like promoting digital health literacy and incorporating visual aids could help improve medication comprehension.

This study used qualitative research methods and a participatory design process to ensure it was user-centred. All design decisions were grounded in participants' experiences and informed by their feedback. User testing further enhanced the research by allowing participants to test out the prototype and suggest revisions. Through this process, the study was able to better understand participant needs and develop more inclusive strategies to meet them.

This research adds to the broader conversation about inclusive healthcare design. It shows that improving medication understanding is not just about translation. It is about designing with users based on their lived experiences and expectations.

In conclusion, this research highlights the importance of designing health communication tools that reflect real user needs. When systems are designed with cultural and language differences in mind, they can help newcomers make safer and more confident healthcare decisions and promote health equity for all.

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9. Appendices

Appendix A: Inclusive Facilitation Questions and Activities

1. Can you share specific difficulties you've faced when looking for or selecting unscheduled medications in Canadian pharmacies?

2. Can you describe your experiences when reading unscheduled medication information on their packaging before taking them?

3. How does the unscheduled medication packaging here compare to what you were used to in China?

4. Are there any cultural beliefs or practices that affect how you use unscheduled medications?

5. How have language barriers affected your confidence in using medications correctly?

6. Are you familiar with visual aids? Have you come across any visual aids or visual elements that helped you better understand medication instructions?

7. Have you ever used a mobile app to search for or better understand medication information? If so, how was your experience?

8. What information do you consider most essential for understanding how to use an unscheduled medication?

9. For the following unscheduled medication packaging (Advil, Benadryl, Pepcid), please highlight any information that you find particularly helpful in understanding its purpose. Additionally, identify any details that you find unclear or difficult to understand.

10. Among these unscheduled medications, please select the one with information you find most difficult to understand. We will use it in the next section to identify areas for improvement and brainstorm design solutions. For the information on this medication packaging that you find difficult to understand, how would you improve it if you were the designer?

Appendix B: User Testing Questions and Activities

1. How was your experience using the app prototype? Did you encounter any difficulties or dead ends? Was the user interface clear and easy to navigate?

2. Do the medication information screens provide enough key details to help you understand what the medication is and how to take it?

3. Here are the key pieces of information about the unscheduled medication you discussed in the last focus group session. Do you think they are clearly presented in the design?

4. Do the visual aids clearly convey their intended meaning?

Appendix C: Screening Questionnaire

Thank you for your interest in participating in our study. Please answer the following questions to determine your eligibility.

1. Do you self-identify as a Chinese newcomer to Canada?

   Yes/No

2. Are you 18 years of age or older?

   Yes/No

3. How long have you lived in Canada?

   Under 5 years/5 years or more

4. How would you rate your proficiency in English or French?

   Limited proficiency (can understand and communicate basic information)/

   Moderate proficiency (can handle most everyday interactions; may find complex information challenging)/

   Advanced proficiency (can communicate effectively on a wide range of topics, including complex information)

5. Do you consider yourself to have basic digital literacy (e.g., using smartphones, accessing apps, navigating the internet, basic digital whiteboard skills)?

   Yes/No

6. Have you ever used over-the-counter (unscheduled) medication in Canada, such as acetaminophen (e.g., Tylenol), ibuprofen, or antacids?

   Yes/No

7. Have you experienced challenges in understanding over-the-counter (unscheduled) medication information in Canada?

   Yes/No

8. Are you currently a healthcare professional (e.g., doctor, nurse, pharmacist)?

   Yes/No

Appendix D: Recruitment Poster

Appendix D1: Recruitment Poster (English Version)

Appendix D2: Recruitment Poster (Chinese Version)