The Hong Kong Council of Social Service (HKCSS)
Impact Assessment Support Scheme (IASS)

Innovation of Medication Instruction Labels (Drug Icon CC)

Final Report

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Table of Contents

Executive Summary

Drug Icon CC, a social enterprise, is being evaluated for its social impacts under the Impact Assessment Support Scheme (IASS) from June 2021 to October 2021.

Two primary beneficiaries have been identified, entailing **patients** and **caregivers**. Both qualitative and quantitative research methods have been used to render a holistic social impact evaluation of Drug Icon CC. **Three focus areas - (i) cognitive: knowledge gain and awareness development of correct drug use, (ii) attitudinal: psychosocial wellbeing and (iii) behavioural: accuracy of applying drug icons** - were identified. In addition, the **application of drug icons** in wider society was also explored.

Throughout the research timeline, multiple internal and external limiting factors, such as a limited sample size and inadequate time, were identified. In view of these constraints, recommendations were made to suggest solutions to various obstacles that hindered the progress of the current research. Additionally, the current research also provided insights into Drug Icon CC's products and their efficacy in a way that would be conducive to further refinement.

As things stand, our analyses provide empirical backing to the valuable work in which Drug Icon CC is engaged, particularly for elderly polypharmacy patients and their carers. With a proven track record of addressing the most pressing pharmaceutical needs in the elderly population and in ethnic minorities, Drug Icon CC may now devote their resources in implementing drug icons in the wider context by means of distributing training materials and collaborating with public healthcare entities.

1. Introduction

This social impact assessment aims to explore, recognise, and evaluate the social impact brought by a social enterprise, Drug Icon CC. Starting from 2019, Drug Icon CC developed a set of innovative medication instruction labels for patients and caregivers in Hong Kong.

Drug Icon CC aims to provide the target beneficiaries with easier medication instructions to enhance medication compliance and improve their understanding of drug labels to increase the compliance rate to prescription regimens by patients. Meanwhile, the social enterprise wishes to empower the patients, including the locals and ethnic minorities (EM), in self care management. While the improvement of medical compliance rate requires a longer period of time for measurement, with limited research time, this social impact assessment focuses on evaluating the **short-term** social impact of Drug Icon CC's (i) delivery of education workshops and (ii) distribution of pillboxes and drug icon labels on its primary stakeholders - the patients and caregivers. The research timeline is shown in **Appendix I**.

1.1 Overview of Drug Icon CC's project

Drug Icon CC aims to serve **patients with long term medication** and their **carers** who are responsible for serving drugs. While two-fifths of the elderly in Hong Kong take at least five different types of medicines on a daily basis according to researchers, the elderly are not the only group to be burdened by long-term and complex medicine regimens. The family carers of these patients, such as their partner, their daughters and sons, and even domestic helpers, are another group of target beneficiaries. These family carers, who are

often non-healthcare professionals, may suffer tremendous stress when taking care of these patients. On the other hand, the project also takes into account the ethinc minorities (**EM**) who might often be seen as outsiders of our society. Given there are limited healthcare-related resources in the Hong Kong community provided to non-Chinese, and that EM may be hesitant to seek help for their health due to religious and cultural reasons, Drug Icon CC has already translated the medication labels and training materials in Urdu - one of the major EM languages - to serve the needs of the Pakistani group in Hong Kong with easily accessible healthcare information. Hence, patients with long term medication, their family carers, and ethnic minorities are the three key stakeholders of the project.

To access these target beneficiaries, Drug Icon CC has collaborated with various partnering organisations, who are the secondary stakeholders of the project. During our research period, Drug Icon CC partnered with **Community Drug Advisory Council (CDAC)** to organise a three-day street booth in a shopping mall and distribute pillboxes and stickers with the innovative medication icons designed by Drug Icon CC, raising the awareness and knowledge of correct drug use of the elderly patients and their carers. **Hong Kong Federation of Women's Centres (HKFWC)** is another organisation with whom Drug Icon CC closely collaborated. Training workshops were conducted for carers, while some of the participants were also patients with long term medication. In hopes of raising their knowledge and awareness of the importance of correct drug use, pill boxes and labels were also distributed to the participants. Besides, **Health In Action (HIA)** jointly hosted a health career workshop with Drug Icon CC for EM and distributed the pill boxes and labels to patients on need-basis with pharmacists' careful assessment, increasing the patients' awareness of correct drug use and providing them with tools to build a better practice of medication intake. These

are only some examples of Drug Icon CC's collaboration projects with community partners to elevate their product exposure in the society. The overall impact framework is illustrated in **Appendix II**.

1.2 Literature review

The current literature revealed that drug non-adherence is a common phenomenon among geriatric patients. Barreto and colleagues (2014) found evidence that up to 43% of adult patients who have been on drug therapy for at least one year demonstrate a significant tendency of drug non-adherence. In epidemiological studies of the local population, the rate of drug non-adherence in Chinese geriatric patients ranges from 37% to 50% (Lam et al., 2007; Wu & Chang, 2006), further suggesting the pervasiveness of this phenomenon. In turn, these researchers have suggested that the lack of knowledge about the management of the disease from which they are suffering, a complicated regimen, and not using an annotated pillbox are some of the major risk factors of drug-non-adherence. These results coincide with another local study, which pointed out that forgetfulness and decreased cognitive functions – issues that are common among geriatric patients – are the primary causes of drug non-adherence (Chong et al., 1997). On the other hand, drug adherence is mediated by emotional, cultural and social factors that rendered the advocacy of drug adherence in the community pivotal to reducing drug non-adherence. In short, there is a clear sense in which drug non-adherence is a common problem in Hong Kong's older population, suggesting a need to increase the patient's understanding of their illness, reduce the difficulty of medicine taking and enhance their awareness of adhering to the prescribed regimen.

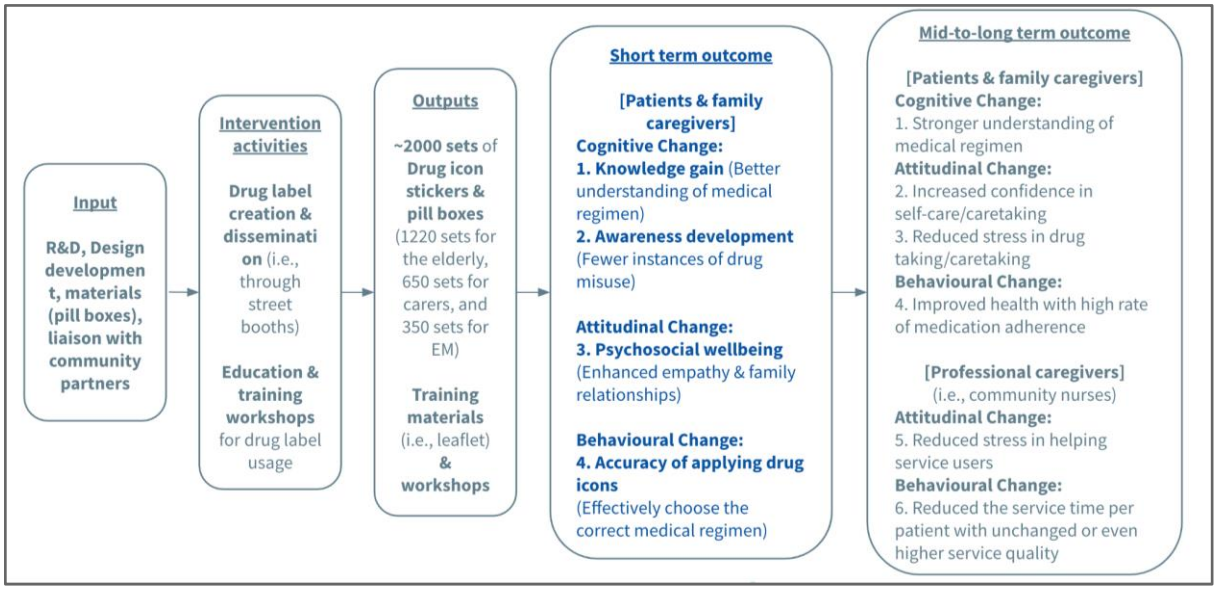
1.3 Logic model

Based on Drug Icon CC's proposal and our conversations with the founder, we applied a logic model to focus on the intended outcomes of the project - Innovation of Medication Instruction Labels (see **Figure 1**). Two major intervention activities are (i) Drug icon label creation and dissemination and (ii) Education and training for drug icon label usage. The corresponding outputs include approximately 2800 sets of medication instruction labels and pillboxes, as well as several training workshops for patients and caregivers. In terms of **short-term outcomes**, the key stakeholders' **cognitive change, attitudinal change, and behavioural change** will be measured. It is expected that patients and family caregivers (non-healthcare professionals) will experience cognitive change with knowledge gained of correct drug use (i.e., better understanding of medical regimen) and awareness developed regarding correct drug use (i.e., fewer instances of drug misuse). Psychosocial wellbeing (i.e., enhanced empathy and improved family relationships) will be one dimension measuring the attitudinal change of the target beneficiaries, while the behavioural change is measured via the accuracy testing of the primary stakeholders applying drug icons.

In regards to **mid-to-long term outcomes**, **key stakeholders** are expected to be equipped with a stronger understanding of the medical regimen (**cognitive change**). Increased confidence in self-care or caretaking and reduced stress in drug taking or caretaking are the intended **attitudinal changes** for both patients and family carers, while their expected **behavioural change** will be the high rate of medication adherence, resulting in improved health of the patients. Taking into account the **professional caregivers** such as community nurses, it is anticipated that the innovative tools will contribute to the **attitudinal change** of this target group in reducing their stress when they are serving patients and their

family carers. Consequently, the **behavioural change** will be the working efficiency of the nurses (i.e., time reduction of serving each patient with the same or even higher service quality).

Figure 1. Logic model of the project of Innovation of Medication Instruction Labels



2. Methodology

Qualitative and quantitative research methods were adopted in this research within the period from June 2021 to September 2021, to investigate the short-term social impacts that Drug Icon CC could bring to the target beneficiaries. The data collection record could be found in **Appendix III**.

2.1 Qualitative research

We conducted six in-depth interviews with both primary and secondary stakeholders, including two elderly patients, two family carers, a community pharmacist, and an NGO representative.

In terms of the right to participate and withdraw, the informants needed to sign a consent form before conducting the in-depth interview (see **Appendix IV**). All the research-related materials, for instance, the consent form and recording, were stored in the researcher's laptop in a password-protected folder.

The interview questions for the elderly patients, family carers, and NGO representatives are attached in **Appendix V, VI, and VII,** respectively. Case writing of the interviewees is enclosed in **Appendix VIII**.

2.2 Quantitative research

2.2.1 Survey design

The survey design for the primary stakeholders was a self-administered survey with 19 questions. With Chinese and English versions provided (see **Appendix IX and X)**, our survey explored two primary dimensions - knowledge and awareness the target beneficiaries gained from Drug Icon CC’s training workshops and education kits; while we were also interested in how effective the innovative medication labels can help the respondents understand medication instructions accurately through scenario questions. The questions were designed mainly with multiple choice and bipolar rating scale questions, with a one-week pilot study conducted before the mass distribution. Adjustments were made in order to

enhance our survey, including replacing the abstract concepts with more concrete wordings, as well as reducing the difficulty level of the scenario questions.

2.2.2 Data collection

We conducted convenience sampling for two groups of primary stakeholders (patients and carers) during the data collection period, which lasted around one month from mid-August 2021 to mid-September 2021. Drug Icon CC's founder assisted in survey distribution to its target audience through its collaborating partners and social media channels (i.e., Facebook). At the end of the data collection period, we received 80 samples with only 48 valid responses.

2.2.3 Quantitative results

The quantitative survey data was gathered from 80 respondents who showed their feedback on Drug Icon CC's innovative medication instruction labels. After removing invalid responses, 48 responses remained. The majority of the respondents are and/or take care of long term medicine users (See **Figure 2**). 37.5 percent of them are caretakers who handle medicines at home and more than one-fifth of them are medicine users (See **Figure 3**). It is also notable that 12.5 percent of our respondents are both medicine users and caretakers. In terms of the number of pills handled daily, half of the respondents take and/or serve at least three different medicines (See **Figure 4**).

Figure 2. Type of medicine users

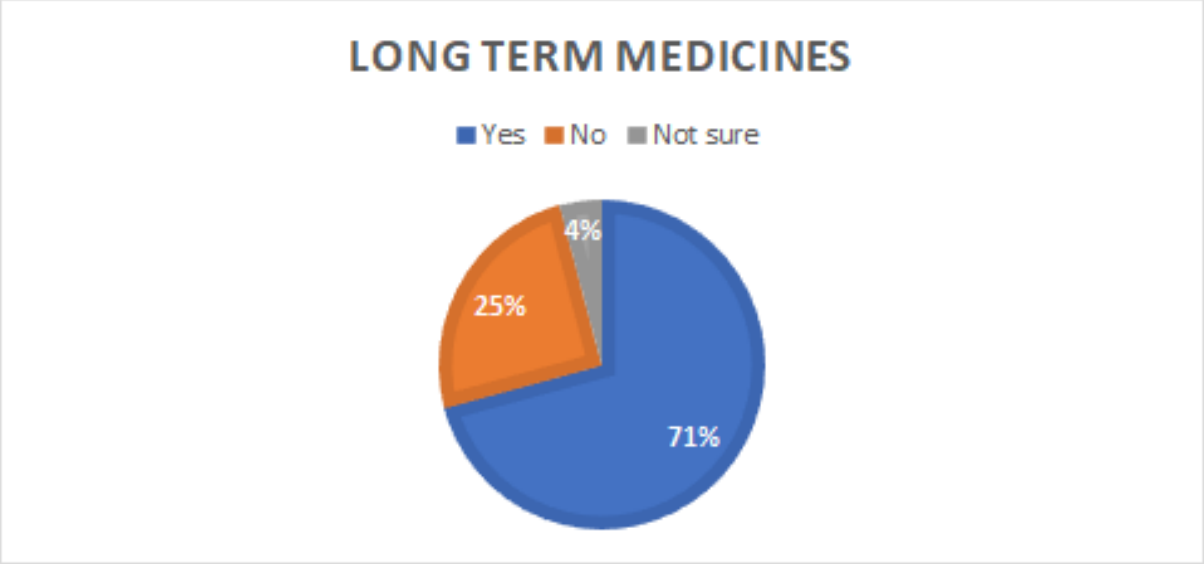


Figure 3. Role of respondents

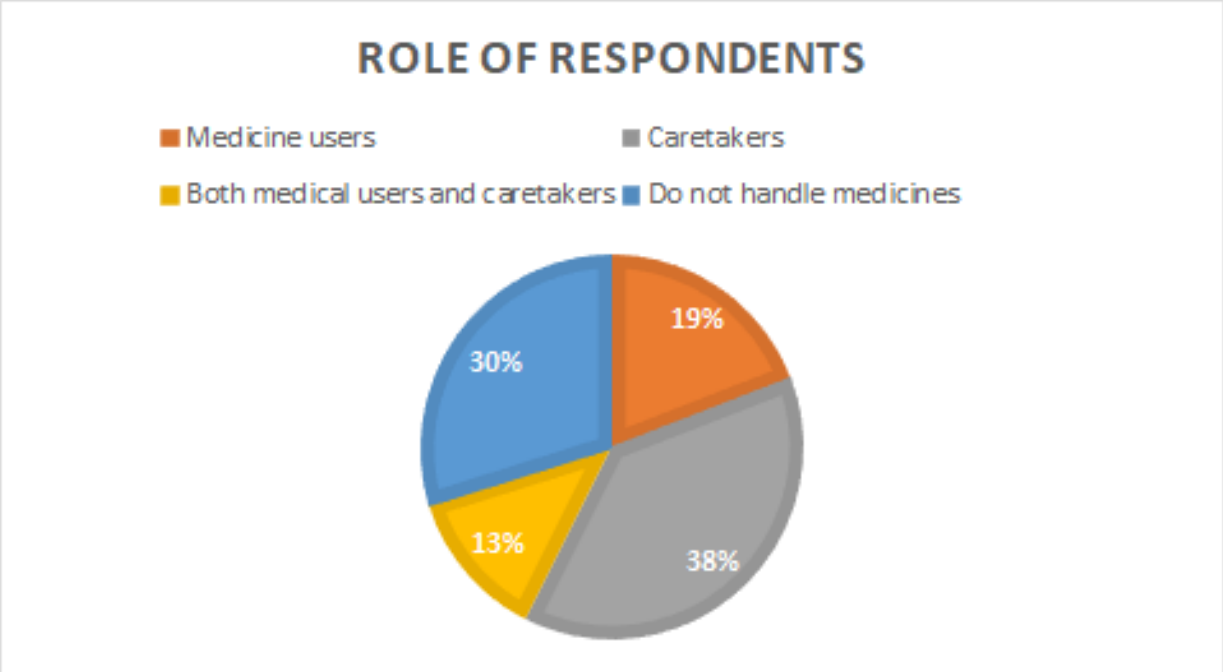
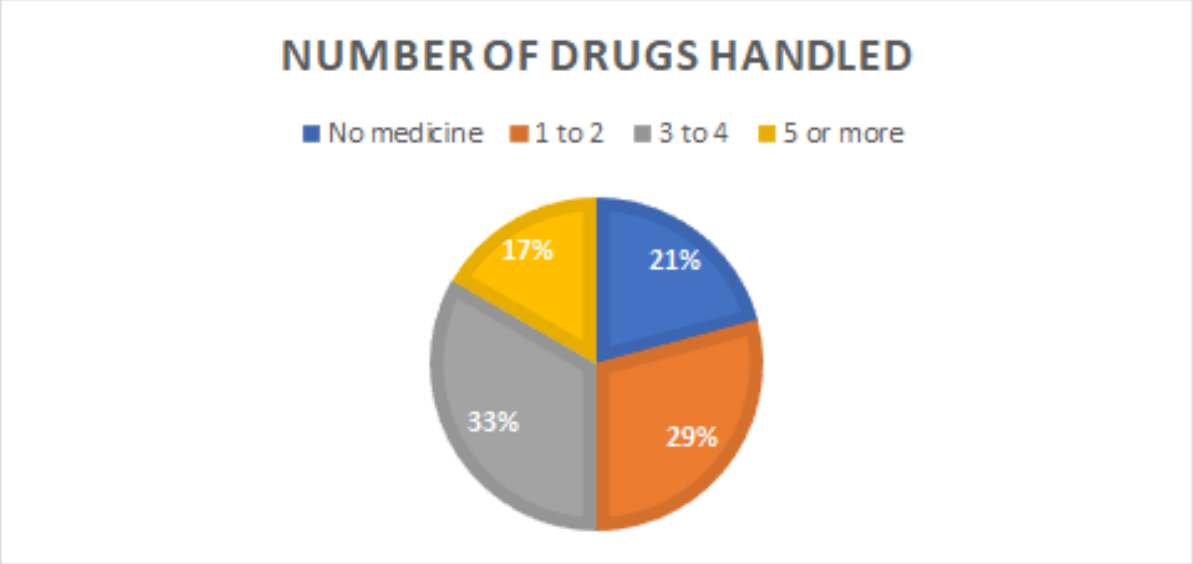


Figure 4. Number of drugs handled by respondents



Regarding the age, 35.5 percent of the respondents are from 18 to 30 years old and half of the respondents belong to the age group 31 to 60. The seniors who are aged 61 or above accounted for approxitemately 15 percent (See **Figure 5**). Considering the household monthly income, 15 percent of the respondents have no monthly income or below HK$5000, while approximately 40 percent of them have household income at around median level or below (around HK$27,000) (Census and Statistics Department, 2021). Notably, almost one-third of the respondents have HK$50,000 or above household monthly income (See **Figure 6**).

Figure 5. Respondents' age

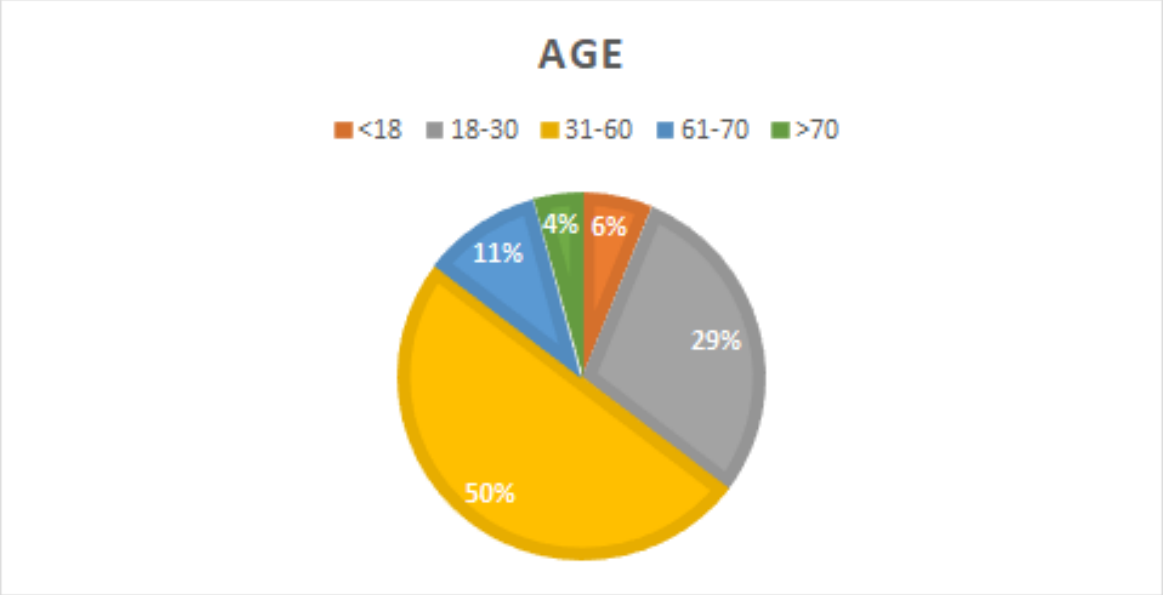
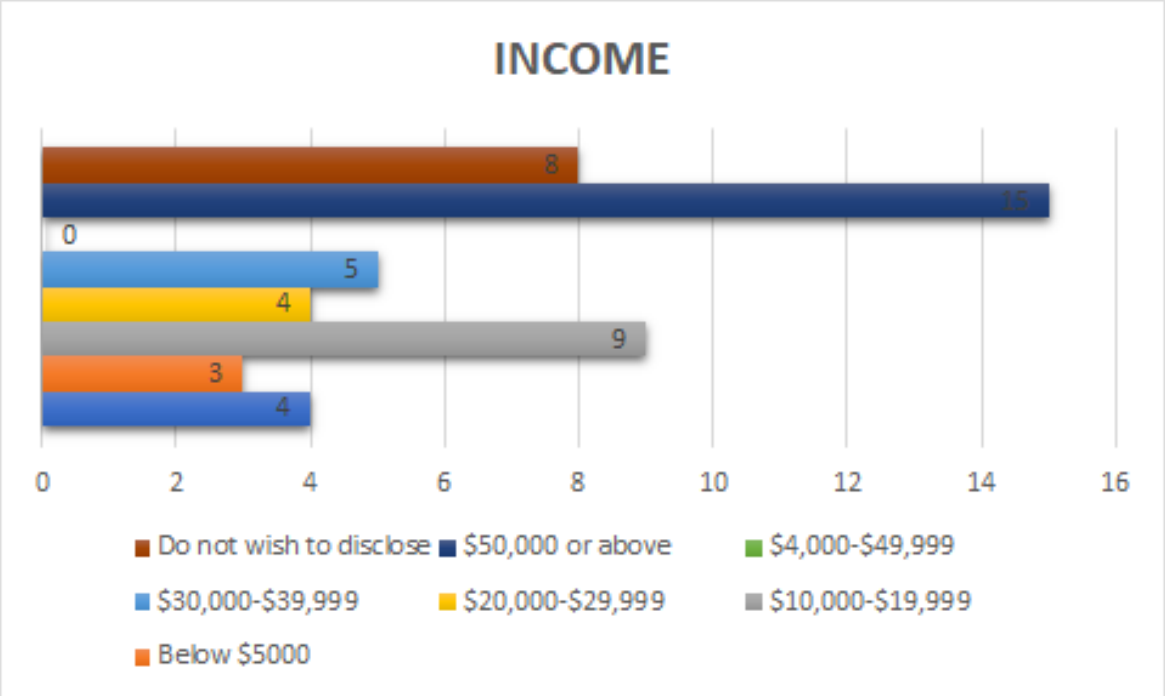


Figure 6. Respondents' household monthly income



Regarding the respondents' exposure to Drug Icon CC's intervention activities, only about 10% of the respondents attended the workshop, while around 45 percent of them received education materials from Drug Icon CC and the rest were not exposed to any Drug Icon CC's materials (See **Figure 7**). For ethnicity, most respondents (72.9%) are Chinese and more than one-fifth of the respondents are non-Chinese, while a few of them did not wish to disclose their ethnicity (See **Figure 8**). Due to the insufficient data collected from non-Chinese respondents, it is noted the insignificant results for EM specific questions were not included in part 3 (findings and analysis) in the report.

Figure 7. Respondents' exposure to Drug Icon CC's intervention activities

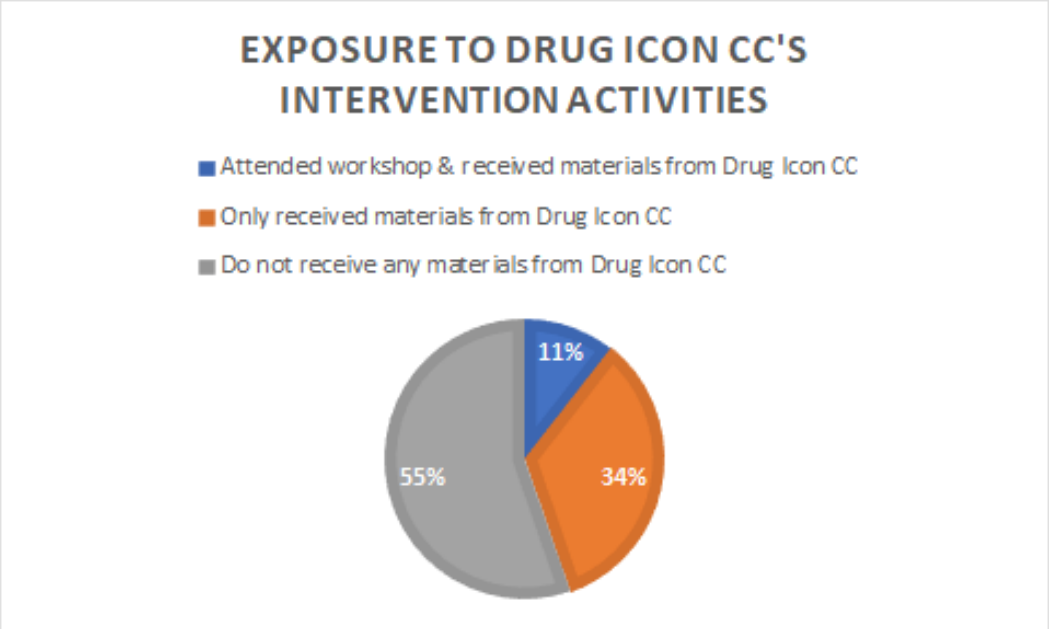
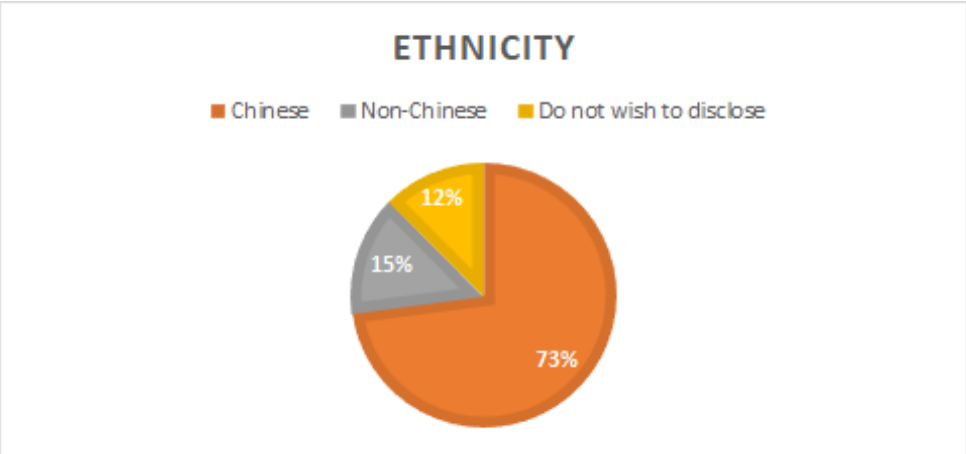
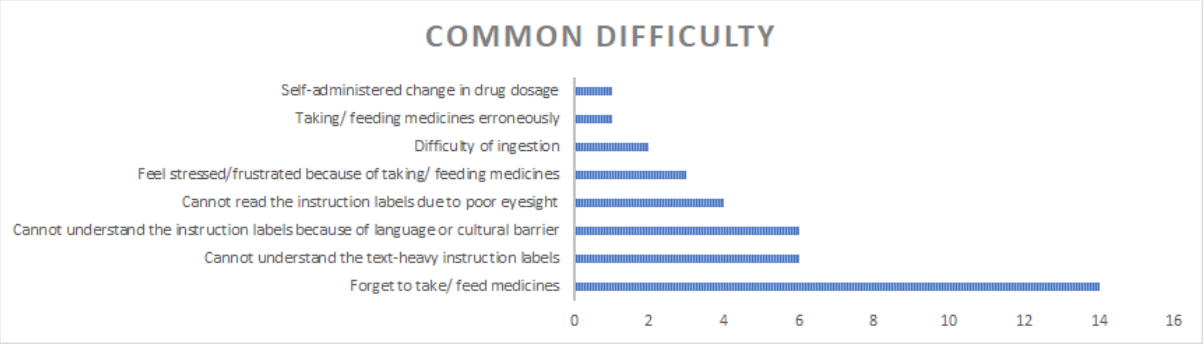


Figure 8. Ethnicity of respondents



The most common difficulty faced by around one-third of the respondents was that they "forget to take or feed medicines", followed by 14 percent of the respondents stating they "cannot understand the text-heavy instruction labels" and another 14 percent of them "cannot understand the instruction labels because of language or cultural barriers". Some respondents also revealed that they "cannot read the instruction labels due to poor eyesight" (9%) and "feel stressed or frustrated because of taking or feeding medicines" (7%) (See **Figure 9**).

Figure 9. Common difficulty faced by respondents



3. Findings and Analysis

The current investigation primarily examined Drug Icon CC's social impact on the elderly polypharmacy patients and their caretakers. Combining our findings from literature review and stakeholders interview, the following three focus areas were conceptualised as a measure of Drug Icon CC's short-term impact: (1)Cognitive: increase in knowledge about their disease and increase in drug adherence awareness; (2) Attitudinal: psychosocial wellbeing after attending Drug Icon CC's workshop or receiving their training materials; and (3) Behavioural: their competence of recognising the correct drug regimen. Relatedly, the above impacts were also analysed with respect to their role as a caretaker, medicine user or someone who is neither a medicine user or a caretaker. Additionally, we investigated the difference between traditional medicine labels and Drug Icon CC's drug icons along the axis of effectiveness (operationalised in time and in accuracy). Overall, our results revealed that Drug Icon CC's training materials significantly increased disease knowledge and awareness regarding correct drug intake in our participants. Due to the shortage of samples, the analysis of the training workshop (N = 5) could not be performed satisfactorily, and was thereby omitted from this section. Regardless, there was strong evidence that the newly developed drug icons were significantly more effective than traditional drug labels in conveying information about the patients' regimen, and this led to a corresponding demand for drug icons to be more widely available in both public and private medical services. A social impact table in **Appendix XI** revealed the actual outcomes we found during the research period under the IASS.

3.1 Cognitive Change - Knowledge Gain and Awareness Development

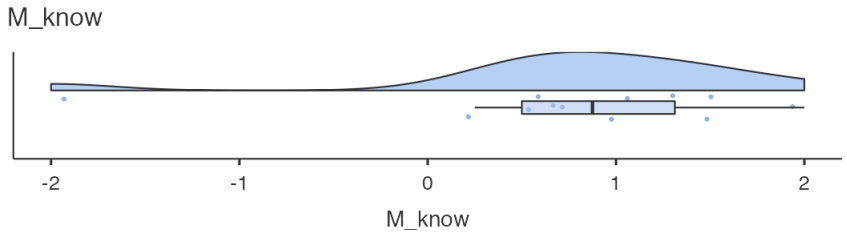
Significant and Large Gain in Medicine-using Knowledge

The measure of Knowledge Gain was measured with the following four items: (1) "I gained a deeper understanding of the correct usage of various medical drugs"; (2) "I gained a deeper understanding of medical drug labels"; (3) "I better understood the characteristics of the drugs I am or a care-taken family member is currently taking"; and (4) "I better understood the characteristics of the drugs I am or a care-taken family member is currently taking". Depending on the respondent's experience with Drug Icon's workshop and/or training materials, they were asked to rate on a 5-point scale to what extent they agreed that attending workshops and/or receiving training materials led to the above situations (-2: Strongly Disagree; 2: Strongly Agree).

A Shapiro-Wilk normality test was performed on the data, which suggested that the nonparametric Wilcoxon rank-sum test was more appropriate (Shapiro-Wilk $W = 0.813$, $p = 0.013$). Our analysis revealed that people reported a significant and large gain in knowledge after receiving Drug Icon CC's training materials (see **Figure 9**), Wilcoxon $W(11) = 66.50$, $p = 0.034$, $rrb = 0.705$. This means that individuals who received Drug Icon CC's training materials became more knowledgeable about the correct usage of the prescribed medicines, the drug icons and the medicines currently used by themselves or family members. While our analysis for the workshops' effects were made infeasible by the shortage of samples, our findings suggest that Drug Icon CC's training materials were effective in addressing the lack of knowledge about the disease and medicines. As this has consistently been pointed out as

one of the major risk factors of drug non-adherence, the current findings support the idea that Drug Icon CC helps alleviate drug non-adherence.

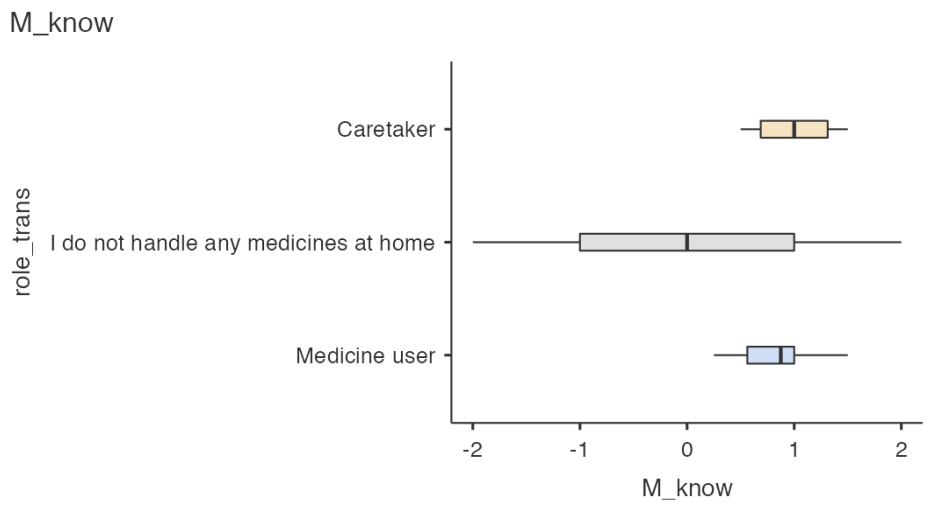
Figure 9. Boxplot and violin plot of Knowledge Gain from training materials



* "-2" - Strongly Disagree, "-1" - Disagree, "0" - Neither Agree nor Disagree, "1" - Agree, "2" - Strongly Agree

Analysing by the role of our respondents, it appears that caretakers benefited more from the usage of drug icons in comparison to medicine users, but both were better than those who did not handle medicines at home (see **Figure 10**). The mean knowledge gain score for caretakers was 1.00 (on a scale of -2 to 2), while that of the medicine users was 0.833. Those who did not handle any medicines at home were the most minimally benefitted with a mean knowledge gain score of 0. This points to the possibility that the population characteristics of caretakers lend themselves well to acquiring information about specific diseases and the family members' condition. Though, as expected from the modest sample size, a one-way ANOVA did not reveal a statistically significant difference between the three groups $F(2, 2.32) = 0.206$, $p = 0.827$.

Figure 10. Boxplot of Knowledge Gain from training materials described by Role



* "-2" - Strongly Disagree, "-1" - Disagree, "0" - Neither Agree nor Disagree, "1" - Agree, "2" - Strongly Agree

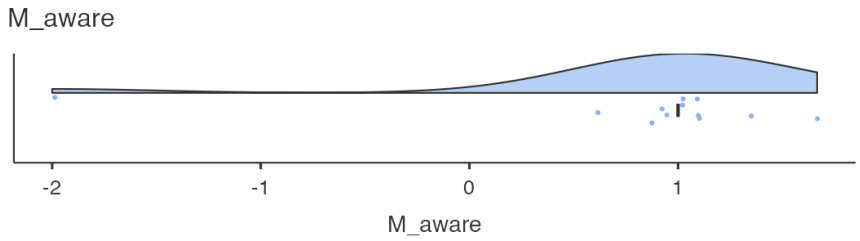
Significant and Large Awareness Development in Correct Medicine-taking

The measure of Awareness Development was measured with the following three items: (1) "I or a care-taken family member no longer forget to take my prescriptions"; (2) "I am more willing to consult relevant information whenever I forget or don't understand medical instruction labels"; and (3) "I realised the effectiveness of medicines is highly correlated to taking/ feeding medicines at the right time with the right amount". Depending on the respondent's experience with Drug Icon's workshop and/or training materials, they were asked to rate on a 5-point scale to what extent they agreed that attending workshops and/or receiving training materials led to the above situations (-2: Strongly Disagree; 2: Strongly Agree).

In general, our findings aligned with Drug icon CC's intended outcome of enhancing service users' awareness for correct drug usage. A Shapiro-Wilk normality test was

performed on the data, which suggested that the nonparametric Wilcoxon rank-sum test was more appropriate (Shapiro-Wilk $W = 0.539$, $p < 0.001$). Our results suggest that people reported a significant and large development in the awareness of correct drug usage after receiving Drug Icon CC's training materials (see **Figure 11**), Wilcoxon $W(11) = 66.50$, $p = 0.032$, $rrb = 0.692$. In other words, respondents who received Drug Icon CC's training materials became more mindful of taking the prescribed medicines at the right time and at the right dosage, and were more willing to consult the relevant professionals when they were unsure about the information on drug labels. Again, despite the shortage of samples rendered our the workshops' effects inconclusive, our findings regarding the training materials lend support to the idea that Drug Icon CC's was effective in raising the awareness for correct drug usage.

Figure 11. Boxplot and violin plot of Awareness Development from training materials

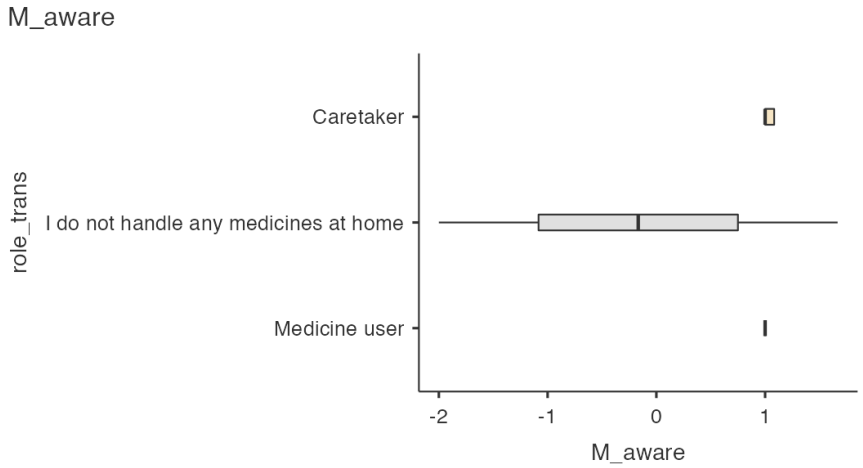


* "-2" - Strongly Disagree, "-1" - Disagree, "0" - Neither Agree nor Disagree, "1" - Agree, "2" - Strongly Agree

The analysis of Awareness Development by the role of our respondents showed a different pattern from that in Knowledge Gain. It seemed that caretakers and medicine takers benefited equally as much from the usage of drug icons in comparison and both reported a greater development in awareness than those who did not handle medicines at home (see

Figure 12). The mean Awareness Development score for both caretakers and medicine users was 1.00, while that of the respondents who did not handle any medicines at home scored a low -0.167. Again as anticipated, a one-way ANOVA revealed a statistically insignificant difference between the three groups $F(2, 2.26) = 0.896$, $p = 0.517$.

Figure 12. Boxplot of Awareness Development from training materials described by Role



* "-2" - Strongly Disagree, "-1" - Disagree, "0" - Neither Agree nor Disagree, "1" - Agree, "2" - Strongly Agree

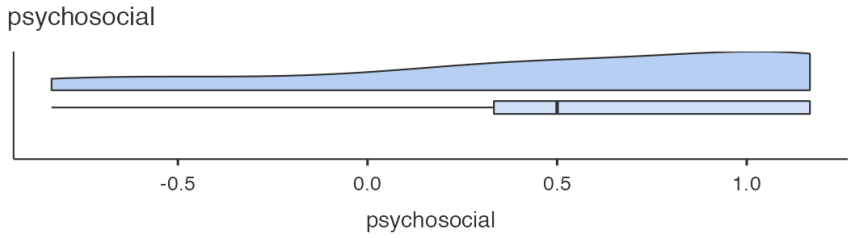
3.2 Attitudinal Change - Psychosocial wellbeing

The current measure examined the degree to which respondents obtained improvements in their psychosocial wellbeing after drug icons. Our survey questions attempted to measure constructs such as self-efficacy, empathy, relationship with family members and friends, as well as overall health. This was measured with the following six questions (1) I am more confident in taking care of myself; (2) I am more capable at understanding others' difficulties and needs; (3) Reduced conflicts with my family m; (4)

Increased social activities (e.g., gatherings) with my friends; (5) The medical condition(s) from which I or a care-taken family member is suffering has seen improvements; and (6) Reduced the number of appointments with medical professionals.

The construct analysed as a whole, our findings revealed that our respondents reported statistically significant improvements in their psychosocial wellbeing after using drug icons (see **Figure 13**), Wilcoxon $W(12) = 77.0$, $p = 0.030$, $rrb = 0.692$, (Shapiro-Wilk $W = 0.858$, $p = 0.036$). Examining the specific items, we found that respondents showed significant changes in their attitudes towards others. They were significantly more competent at understanding others' needs (i.e. item 2), Wilcoxon $W(12) = 73.5$, $p = 0.006$, $rrb = 0.885$. Moreover, they reported that they had significantly less conflicts with family members (i.e. item 3), $W(12) = 50.0$, $p = 0.015$, $rrb = 0.818$. Other items returned insignificant results with p-values ranging from 0.092 to 0.588. Regardless, our findings point to a positive attitudinal change in the respondents who have been exposed to Drug Icon's materials, particularly in the domains of empathy and family relationship. In a sense, these items may well be thought of as related since being more empathetic towards family members implies that their difficulties and needs are better understood, which in turn reduces misunderstandings and conflicts. It is suggested that future research may investigate the downstream effects of such change, such as the quality of relationship with family and friends.

Figure 13. Boxplot and violin plot of Psychosocial Wellbeing from respondents who had received workshop training and/or training materials



* Scaled means, where a mean score larger than 0 indicates a positive attitude towards the item

3.3 Behavioural Change - Effectiveness of Drug Icon usage

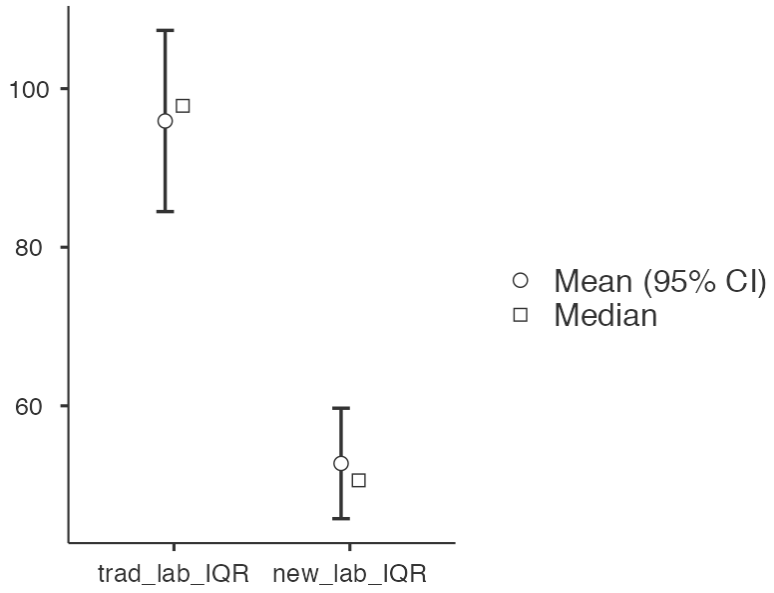
Drug Icons as Effective and Easy-to-Use Means of Improving Medicine-taking

In addition to the above measures, we operationalised the effectiveness of using Drug Icons with two subscales: 1) the time taken (in seconds) to answer a few scenario-based questions, and 2) the accuracy of their answers. In particular, respondents were given the regimen of two factitious individuals, each labeled with traditional drug labels or Drug Icons, controlling for difficulty. They were then asked to choose the correct regimen for the individuals on a given day. Overall, we found evidence that Drug Icons are an effective tool to increase the ease and accuracy of drug-taking, indicating an empirically-supported behavioural change.

A paired-samples t-test revealed that, after accounting for statistical outliers, respondents took significantly less time when they responded to questions labelled in Drug Icons (M = 52.5 , SD = 8.22) in comparison to when they responded to their traditionally-labelled counterparts (M = 104 , SD = 21.3), $t(6) = 6.67$, $p < .001$, d = 2.52 . In other words,

respondents took 43.2 seconds less when they answered questions labelled in Drug Icons as opposed to traditional drug labels, suggesting that Drug Icons reduced the difficulty to understand the prescription. See **Figure 14**.

Figure 14. Plot of Response Time (in seconds) by Traditional Label and Drug Icons



On the other hand, a binomial proportion test revealed that a significantly higher proportion of the respondents who responded to Drug Icons answered correctly in comparison to those who did not, $p = .002$. Meanwhile, when answering questions labelled in Drug Icons, our respondents had a higher accuracy (74.4%) in comparison to that of the traditional drug labels (67.4%), and this difference is statistically significant (See **Figures 15 & 16**).

Figure 15. Bar chart of response pattern to the question using traditional drug label

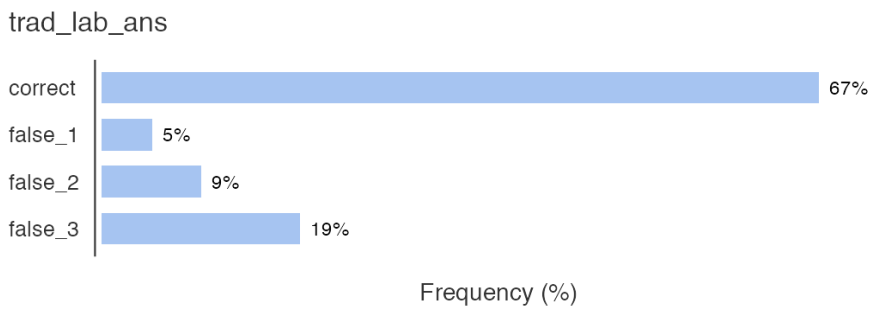
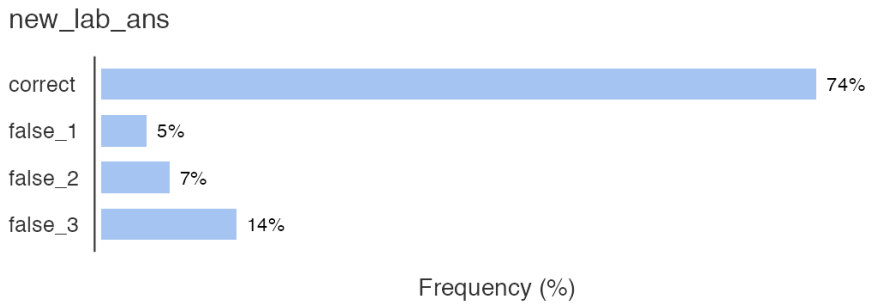


Figure 16. Bar chart of response pattern to the question using drug icons



Analysing their response time by exposure to Drug Icon CC's resources, our results revealed that respondents who have received workshop training or training materials performed significantly better on the drug icons question. On average, those who received the workshop training took 6.42 seconds less to answer the question, Mann-Whitney $U(8) = 1.00$, $p = 0.019$, $rrb = 0.917$. For the question with traditional drug labels, the respondents also spent 10.45 seconds less on the task on average, though this result was not statistically significant, $t(19) = 1.07$, $p = 0.300$, $d = 0.493$. These findings paralleled our qualitative findings. For instance, Ms P, a 70 year-old patient, reported that she preferred the drug icons as they are "large and simple to understand", which is especially helpful considering her deteriorating eyesight. Therefore, we might, at a minimum, conclude that exposure to Drug Icon CC's materials led to a significant improvement in understanding drug icons. Further

studies may probe into the same effect with a larger sample size to understand its effect on the questions labelled with traditional drug labels.

Drug Icons as Accessible and Public-oriented Means

In view of the fact that first-time recipients of the drug icons (i.e. participants who had not been to Drug Icon CC's workshop nor received their materials before; M = 56.0, SD = 8.88) still performed better than those on the traditional task – whether or not they had received workshop training or training materials (Yes: M = 97.4, SD = 14.33; No: M = 107.8, SD = 23.68) – a case could be made regarding the effectiveness of drug icons in making labels easier to understand for the general public, even for those who had not been exposed to any training as a supplement or as an alternative of the traditional drug labels (see **Figures 17 & 18**). Qualitative data also supports this finding, where Ms K reported right after a Drug icon workshop that she was already "ready to teach and distribute the stickers to family members and friends", indicating the accessibility and effectiveness of the drug icons. A possible way in which this may be explained is that drug icons are designed in a self-explanatory way that is conducive to mass distribution even with minimal training.

Figure 17. Response time (in seconds) to traditional label question by exposure to Drug Icon CC's materials

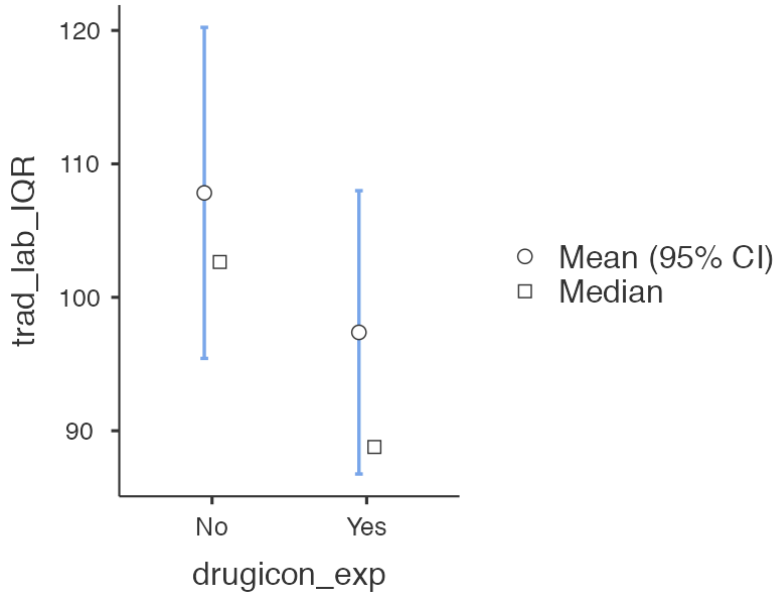
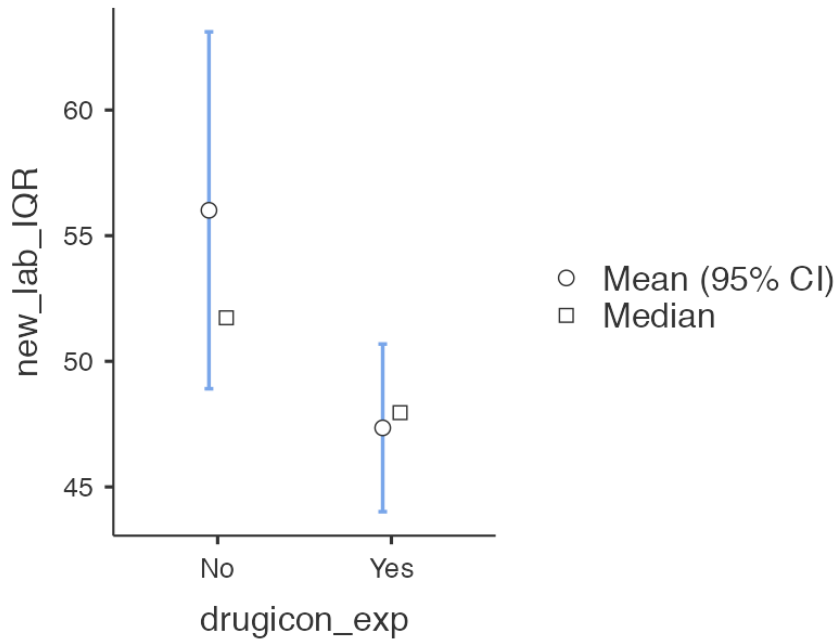


Figure 18. Response time (in seconds) to drug icons question by exposure to Drug Icon CC's materials



3.4 Application of Drug Icon in the Wider Society

Supportive Views of Implementing Drug Icons in the Larger Society

Another measure of interest was that of drug icons' application in the wider society and respondents' perception of the current drug labels. Overall, respondents agreed that drug icons should be incorporated into both the public and private sectors of medical services, $t(11) = 5.29$, $p < 0.001$, $d = 1.526$. This was measured via the following three questions: (1) The design of the traditional drug labels does not merit understanding; (2) The public health system should adopt Drug Icon CC's drug icons on its medicines; and (3) Drug Icon CC's drug icons should be more accessible in the community.

Shapiro-Wilk normality tests were performed on the data, which suggested that the nonparametric Wilcoxon rank-sum test was more appropriate for the result of the three questions (in the above order, (1)'s Shapiro-Wilk $W = 0.851$, $p < 0.038$; (2)'s, Shapiro-Wilk $W = 0.802$, $p = 0.010$, (3)'s Shapiro-Wilk $W = 0.802$, $p < 0.010$). Our analyses revealed a significant finding for (2) and (3), where respondents agreed that the public should adopt the drug icons designed by Drug Icon CC, Wilcoxon $W(11) = 45.0$, $p = 0.007$, $rrb = 1.000$, and that the drug icons should be more accessible and available in the community, Wilcoxon $W(11) = 45.0$, $p = 0.007$, $rrb = 1.000$. See **Figures 19, 20 and 21**.

Figure 19. Boxplot and violin plot of (2) The public health system should adopt Drug Icon CC's drug icons on its medicines

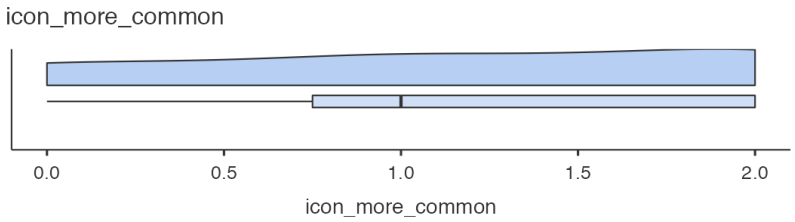
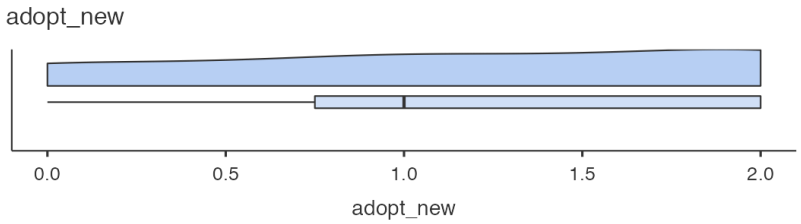
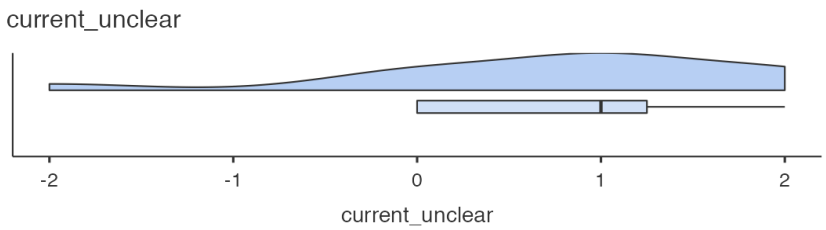


Figure 20. Boxplot and violin plot of (3) Drug Icon CC's drug icons should be more accessible in the community



On the other hand, we did not find a significant effect for (1), Wilcoxon $W(11) = 37.5$, $p = 0.078$, $rrb = 0.667$. One plausible way to interpret this result is that our respondents generally found the drug icons to be a good visual aid for understanding the medical regimen, but this is not strictly due to a deficit in the traditional drug labels. Rather, drug icons can count as a helpful addition to the current labelling system.

Figure 21. Boxplot and violin plot of (1) The design of the traditional drug labels does not merit understanding



4. Limitations

We faced several limitations throughout the research, including time constraints and the online research method. It resulted in a small sample size which hindered the progress and depth of research.

4.1 Time constraints

Time constraints could be one of the barriers we encountered. The whole timeline of the project was so tight that we only had one to two months for both qualitative and quantitative data collection. In addition to COVID-19, workshops were shifted online and informants were difficult to reach. We only managed to reach a few respondents who attended Drug Icon CC's workshop, resulting in a small sample size. Meanwhile, the social impacts on the EM group were unable to be examined with the insignificant survey results due to the imbalanced sample size (non-Chinese respondents accounted for only 14.6%). With the constraints, only short-term social impacts carried out by Drug Icon CC were explored, while longer term impacts on the target beneficiaries were not fully evaluated in this report. Hence, further studies could be done to investigate the social impacts of this social enterprise to a full extent.

4.2 Online research method

Our survey was designed and distributed online due to time constraint and social distancing reasons amid COVID-19, that respondents mostly did the survey on their mobile devices, contributing to the small sample size of our research. **Medium of testing** could be one of the reasons for the small sample size. Given there was a number of incomplete data

received, mainly missing the final part of our survey, where respondents were asked to read two different sets of medication instruction and choose the correct regimen, we believed that respondents may possibly find it difficult to read the medication instruction labels on a small screen and thus give up finishing the survey. **Computer literacy** may be another reason resulting in the small sample size. While respondents aged 61 or above only accounted for around 16 percent, we believed that online distributing our survey might not favour all our target groups, particularly the elderly who may have inadequate computer literacy. The senior may refuse to complete the online survey such that the number of sample sizes we received could not be representative enough.

5. Recommendations

As medicine users and caretakers were recognised as the primary beneficiaries of the current project, recommendations for further development in the following section are formulated based on the sample characteristics and survey responses. Overall, recommendations to maximise social impact are made regarding Drug Icon CC's target audience, operational context and the medium of knowledge transfer.

5.1 Directing resources to medicine users and caretakers

In view of our findings on the differential benefits that medicine users, caretakers and persons who do not handle any medicines at home derive from using drug icons respectively, a case could be made regarding Drug Icon CC's allocation of resources in a way that could maximise its social impact. Across the domains of Knowledge Gain and Awareness Development, medicine users and caretakers consistently benefited from the exposure to Drug Icon CC's training workshops and/or training materials in comparison to people who do not handle any medicines at home. Not only does this strategy translate into a reduction in drug non-adherence in the short-term, it also improves the patients' or the caretakers' overall health and psychosocial wellbeing in the mid-to-long term.

One possible explanation of this phenomenon is that medicine users and caretakers, having had previous experience with reading drug labels and assorting medicines, were predisposed to pharmacy-related information. This in turn made them more receptive to the educational content disseminated during workshops or in training leaflets. At any rate, it

appears that in order to maximise Drug Icon CC's social impact in the measures of Knowledge Gain and Awareness Development, it is therefore advisable to divert resources into settings that have a good concentration of medicine users and caretakers, some examples include community centres for the elderly, districts with an older population, and, if possible, public hospitals.

5.2 Adopting drug icons in the wider context

Our analysis revealed that respondents generally prefer drug icons to be more widely available in society. In particular, respondents welcome the introduction of drug icons into the public medical system as well as a greater availability of drug icons in the community. This could be taken as meaning that drug icons, as a set of visual-dominated labels designed for the public, could be added as a source of supplementary information alongside the traditional labels. Moreover, the respondents' preference for drug icons' wider availability in society reflect their confidence in the product's efficacy and the degree to which they can be applied in various settings, even in those that might not have the administrative support that institutional facilities (i.e. hospitals) have.

This complements recommendation 5.1 in that medicine users and caretakers now have personal (e.g. acquiring knowledge for medicines, developing an awareness for correct drug use) and institutional motivations (e.g. the knowhow of drug icons is transferable) to adopt drug icons as a part of their medicine-taking routine. Given such a salient pattern of responses, it is advisable for Drug Icons to liaise with community centres, private clinics and

related governmental entities to seek for large-scale implementation of drug icons in the future.

5.3 Sustained effort in using training materials as a medium of knowledge transfer

As aforementioned, the modes of knowledge transfer primarily endorsed by Drug Icon CC were 1-1.5 hour training workshops and the distribution of training kits in street settings. From our field observations and interviews with the relevant stakeholders, we learnt that the training kit was most often distributed alongside one of Drug Icon CC's pillboxes; each recipient of the package was briefed about the contents and the directions of usage. While no statistically respectable conclusions can be drawn regarding the efficacy of training workshops, strong evidence for the efficacy of training materials were derived from our analyses.

As such, in comparison to training workshops, street booths suffice as a more scalable method to disseminate drug icons. There are at least two reasons in support of why this is the case. The first is that the drug icons themselves benefitted from a succinct and self-explanatory design that merited self-learning. The emphasis on visuals in lieu of texts greatly reduced the barrier to understanding the icons and increased the accessibility of the training materials as a whole.

In the same vein, there has been no shortage of psychological studies that have shown that visual information aids the formation of new memories in comparison to textual

information (Hirst, 1990). Considering that the majority of our respondents reported difficulties related to forgetfulness and text-based difficulties, Drug Icon CC's products are especially equipped to address drug non-adherence in this respect.

5.4 Research methodology

(i) Employing online and offline sample methods

For logistical reasons and concerns for public health, the current research employed online tools via social media platforms to distribute the research survey. While this potentially led to greater reach and ease of data processing, it also had some major drawbacks. For instance, the target population of concern, the elderly and ethnic minority, could have been differentially omitted from the study seeing as the completion of the survey required a degree of technological literacy that might not be common in the populations in question. This meant that the elderly and members of EM communities did not receive the survey, and thus their view could not be adequately reflected in the current survey. This coincided with the relatively small composition of the elderly and EM on the current sample. In the future, researchers may attempt to adopt a dual mode of sample, both via online platforms and face-to-face setting to obtain a more comprehensive sample.

(ii) Longitudinal and follow-up studies

The results of the current research have demonstrated that Drug Icon CC has been able to bring about positive changes in the cognitive, attitudinal and behavioural domains within a short period of time. Meanwhile, it is recognised that correct medicine taking habits

eventuate in other benefits in the long-term, as delineated in the logic model. To fully understand the social impact of Drug Icon CC, it is suggested that future researchers could study research participants at various follow-up time points (e.g. 1-month, 6-month, 12-month). Not only could this provide information for Drug Icon CC long-term social impact, it also allows for time to examine how differing degrees of usage in Drug Icon CC's products leads to different outcomes. At any rate, a long-term study is warranted given that the current study has revealed Drug Icon CC's short-term social impact.

5.5 Suggested directions for future research

At the same time that the current research revealed critical information regarding Drug Icon CC's work, there were also questions to which the current research could not provide answers. This section delineates in few directions for further research that could further illuminate Drug Icon CC's extent of social impact.

(i) Examine other medical professionals

The current research has primarily focused on evaluating Drug Icon CC's social impact in a manner that is somewhat detached from stakeholders other than patients and caretakers. In reality, the pivotal role of medical professionals has not been explored in the current research. Other than the icons themselves, the success of implementing drug icons in the wider society also hinges on their incorporation into existing medical systems.

Although there has not been any major signs of concerns why the implementation of drug icons would be outright infeasible, it remains to be seen whether existing medical

systems, including professionals such as nurses, pharmacist and medical doctors would be able to accommodate the addition of drug icons to their workflow. Presumably, Drug Icon CC could benefit from examining the needs and concerns of professionals working in the healthcare industry. It is advisable to begin with consulting community nurses regarding the difficulty of adopting the icons, among other measures.

(ii) Drug assortment task in in-person settings

As delineated above, one of the limitations of the current research is using mobile devices as a way of administering the survey. Though founded on legitimate concerns of public health and logistics, this arrangement, nonetheless, was unsatisfactory for the reasons listed. In order to investigate the effectiveness of drug icons (i.e. ease of use and accuracy) with superior ecological validity, further investigations may attempt to replicate our timed questions using traditional drug labels and drug icons in an in-person environment. The results from such analyses could reflect, to a greater extent, how the drug icons will be used in real world settings as compared to the current investigation.

6. Conclusion

In conclusion, our findings aligned with Drug Icon CC's short term objectives, which are building awareness and knowledge of correct drug usage, improving psychosocial wellbeing, and improving medicine using practices. All of these objectives mapped onto cognitive, attitudinal and behavioural change.

It is estimated that approximately 2000 individuals have benefited from Drug Icon CC in the dimensions of knowledge development and awareness building. To reach out to the primary beneficiaries in the community, Drug Icon CC has collaborated with around 11 organisations, in which pill boxes and drug icon labels were distributed (1220 sets for the elderly, 650 sets for carers, and 350 sets for EM). Meanwhile, the social enterprise has also co-organised workshops with partners to communicate the importance of correct drug assortment, in pursuit of raising the awareness and knowledge of correct drug use in the society.

Despite the shortage of data collected from workshop attendees, our analysis concluded that Drug Icon CC's training materials significantly and effectively address the lack of knowledge about the correct usage of the prescribed medicines. In other words, Drug Icon CC has laid the groundwork for its future development, which is improving patients' medication compliance rate. While the related population has started to be aware of the correct drug use with the aid of Drug Icon CC's products (i.e., pill boxes and drug icon labels), continuous effort from Drug Icon CC and its partnering entities would be anticipated to achieve the mid-to-long term objectives.

Though our survey generally supported that Drug Icon CC could effectively raise the awareness and knowledge of the target beneficiaries, further analysis has to be conducted to examine the longer term social impacts which may lead to more behavioural changes. In the future, it is advisable that Drug Icon CC may cooperate with both private and public healthcare entities to launch the innovative medication labels in a wider context when the project development is mature enough. Taking into account the concerns of healthcare professionals to streamline the implementation process would be incredibly critical to the success of the project, especially in the sense of achieving the longer term intended social impacts, namely medical compliance and improved physical wellbeing.

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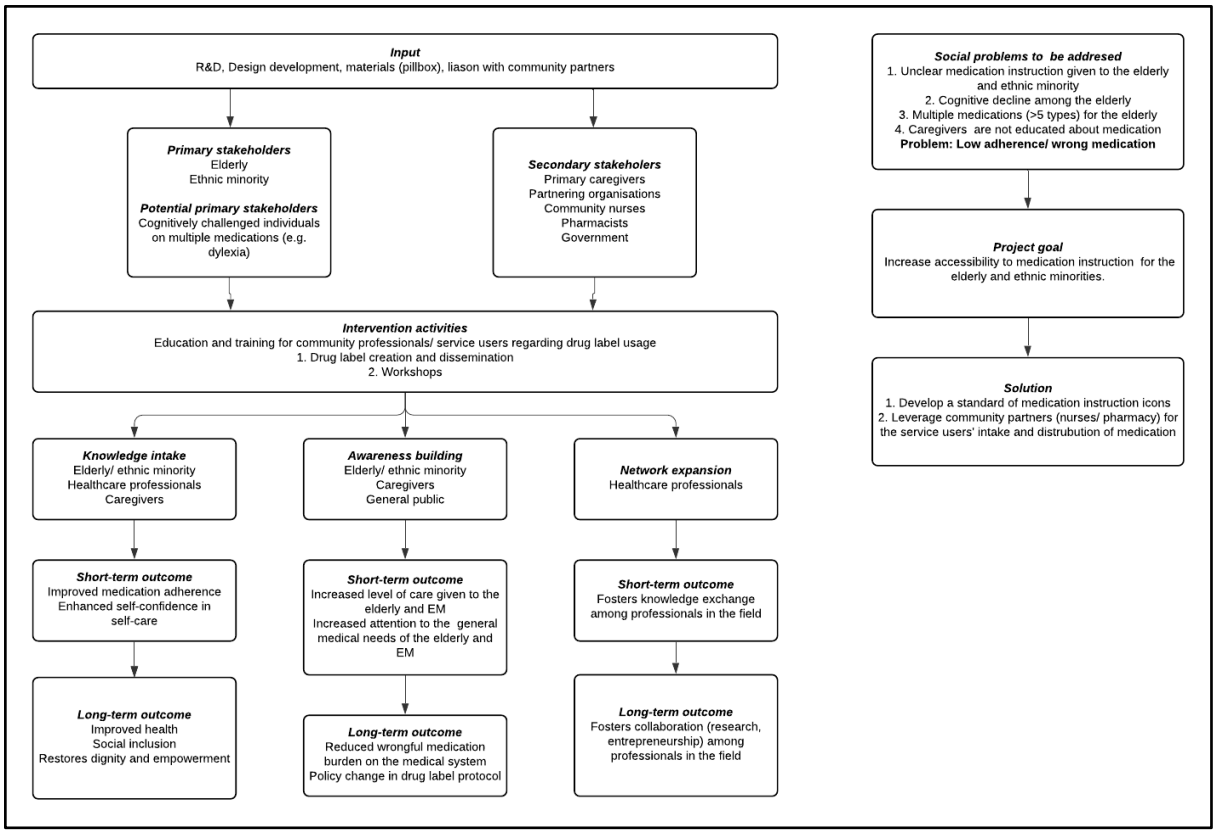
Appendix I - Research timeline

Date & Time	Tasks to be done	Action by
7 Jun 2021	Data collection: 1st meeting with Founder	Anthony & Clarice
8-12 Jun 2021	Impact Framework draft	Anthony & Clarice
13-22 Jun 2021	Theory of change Revised Impact Framework Preparation for site visit – Consent form & Interview questions	Anthony & Clarice
13-22 Jun 2021	Data Collection: Baseline Interview with potential target beneficiaries	Anthony & Clarice
23 Jun 2021	**Consultation 1**:Share initial findings of baseline interview, confirm survey focus	Anthony & Clarice
24 Jun - 9 Jul 2021	Data Collection: Site visit & Baseline Interview with Key Stakeholder(s) Revised Impact Framework	Anthony & Clarice
24 Jun - 9 Jul 2021	Interview Analysis - Quoting	Anthony & Clarice
24 Jun - 9 Jul 2021	1st draft of Questionnaire (Chinese version)	Anthony & Clarice
22 Jul 2021	**Consultation 2**: Feedback on questionnaire	Anthony & Clarice
28 Jul 2021	Revised Questionnaire –2nd draft of questionnaire (Chinese & English versions)	Anthony & Clarice
29-30 Jul 2021	Preparation & Pilot test of questionnaire	Anthony & Clarice
3 Aug 2021	Revised Questionnaire base on the feedback from Pilot test – 3rd draft of questionnaire	Anthony & Clarice
10 Aug 2021	**Impact Data Collection Record - submission**	Anthony & Clarice
17 Aug - 17 Sep 2021	Questionnaire distribution	Anthony & Clarice
18-30 Sep 2021	Data Analysis	Anthony & Clarice
1-6 Oct 2021	Impact Data Collection Report - preparation	Anthony & Clarice
7 Oct 2021	**Final Presentation**	Anthony & Clarice
21 Oct 2021	**Final Report Submission**	Anthony & Clarice

Appendix II - Impact Framework (mind map)



Appendix III - Data Collection Record

	Date & Time	Team Representative(s)	Name of activities (Including baseline Interview, site-visiting, activities provided by SE)	Objectives (Purpose of the activities)	Stakeholders Included	No. of participants
1	7 Jun 2021	Anthony & Clarice	Meeting with founder	Clarify the project details and intended impacts	Founder	1
2	Week of 14 Jun 2021	Anthony & Clarice	Interviews with potential target beneficiaries	Understand the current situation of the elderly and family carer who could be the potential target beneficiaries of the project	Elderly family carer	2
3	25 Jun 2021	Anthony & Clarice	Interview with secondary stakeholder – Keith, an NGO representative	Understand the collaboration between Dug Icon CC and CDAC (I.e., event held); Learn the social impacts brought by Drug Icon CC from the perspective of a partner	Representative of CDAC (Partner of Drug Icon CC)	1
4	28 Jun 2021	Anthony & Clarice	Meeting with potential partners – Nethersole Hospital Nursing Team	Understand the concerns of professional carers in terms of operational issues	Founder, the nursing team	5
5	29 Jun 2021	Anthony & Clarice	Interview with secondary stakeholder – Janet, a community pharmacy representative	Understand the collaboration between Drug Icon CC and Health In Action (HIA); Learn the social impacts brought by Drug Icon CC from the perspective of a partner	Representative of HIA (Partner of Drug Icon CC)	1

6	29 Jun 2021	Anthony & Clarice	Site-visiting; Interviews with primary stakeholders, the elderly & family carers	Sit in the training workshop and observe the reactions of the participants; Communicate with the primary stakeholders to understand their needs and comments on the training workshop	Founder, Primary stakeholders (The elderly & Family carer)	23
7	7 Jul 2021	Clarice	HKCS Workshop (Eng)	Sit in the training workshop to observe the reactions of and understand the concerns from the EM participants	Founder, Primary stakeholders (Ethnic minorities)	20
8	8 Jul 2021	Anthony	HKCS Workshop (Chin)	Sit in the training workshop to observe the reactions of and understand the concerns from the elderly participants (medicine users)	Founder, Primary stakeholders (The elderly)	20
9	17 Aug - 17 Sep 2021	Anthony & Clarice	Survey distribution	Disseminated the Qualtrics survey online for data collection regarding the difficulties with which primary stakeholders face and the efficacy of Drug Icon CC	Primary stakeholders (The elderly and Family carer)	80
10	17 Sep - 2 Oct	Anthony & Clarice	Data Processing and Analysis	Processed and analysed the collected data with the aid of statistical softwares and packages	Primary stakeholders (The elderly and Family carer)	80

Appendix IV - Consent Form for interviews

Consent Form of Social Impact Assessment Research for Drug Icon CC
藥物圖標社會影響評估研究同意書

Format of the in-depth interview

Several questions in terms of the themes regarding the contexts of drug label and pillbox usage, and medication adherence will be asked pertaining to informants' view towards the programme supported by Drug Icon CC. The in-depth interview will be conducted with the most fluent language being used by the informant(s). The whole process will be taped and recorded. Pseudonyms can be used for all informant(s) in order to safeguard informant(s)' privacy.

深度訪談形式

此深度訪談將圍繞藥物圖標的貼子和藥盒的作用、藥物依從性提出幾個問題，這些問題與受訪者對藥物圖標提供協助的活動有關。深度訪談將使用受訪者最流利的語言進行。整個過程將被錄音和錄製。假名可用於所有受訪者，以保護受訪者的隱私。

Right to Participate and Withdraw

Participation in this in-depth interview is voluntary. Informant(s) have the right to turn down any questions asked by the researcher. Meanwhile, you can interrupt or terminate the interview at any time. Refusal to participate will not cause any harm or loss to the individual interests of the informant(s). Should you decide at any time during the interview or discussion that you no longer wish to participate, you may withdraw your consent without prejudice.

參與和退出的權利

參與此深度訪談為自願性質。受訪者有權拒絕研究人員提出的任何問題。同時，您可以隨時中斷或終止採訪。拒絕參加不會對受訪者的個人利益造成任何傷害或損失。如果您在採訪或討論期間的任何時候都決定不想再參加，則可以在不影響您的情況下撤回您的同意。

Privacy Protection

The data will be used solely for this research, any forms of publications are strictly prohibited without prior consent by the informants. Any personal data obtained in this in-depth interview will be collected in strict confidentiality for research purposes only. As a data subject, you have the right to request access to and correction of the personal data under the Personal Data (Privacy) Ordinance. For requests to access, correct and update personal data,

please contact the researcher, Clarice Yip at clarice.yip@connect.polyu.hk or Anthony Wong at wchanthony1230@gmail.com.

隱私保護

數據將僅用於本研究，未經受訪者事先同意，嚴禁任何形式的出版物。在此深入採訪中獲得的任何個人數據都將嚴格保密，僅用於研究目的。作為數據主體，您有權根據《個人數據（隱私）條例》要求訪問和更正個人數據。有關訪問，更正或更新個人數據的請求，請通過 clarice.yip@connect.polyu.hk 與研究員 Clarice Yip 聯繫，或通過 wchanthony1230@gmail.com 與 Anthony Wong 聯繫。

Request for more information

You may ask more questions regarding the study at any time or the general overview of the findings of the study upon completion of the research. If you have any questions, please contact the researcher, Clarice Yip at +852 6233 9825 or clarice.yip@connect.polyu.hk, or Anthony Wong at +852 6839 2788 or wchanthony1230@gmail.com.

要求更多信息

您可以會在完成研究後隨時詢問有關該研究的更多問題或該研究結果的一般概述。如有任何疑問，請致電+852 6233 9825/clarice.yip@connect.polyu.hk 與研究人員 Clarice Yip 聯繫或致電+852 6839 2788/wchanthony1230@gmail.com 與研究人員 Anthony Wong 聯繫。

Signature

I hereby confirm that the purpose of the research, the study procedures, the possible risks and discomforts have been explained to the informant(s). The informant(s) has agreed to participate in the study.

簽署

我在此確認已了解此研究目的，研究程序及可能的風險。我同意參加該研究。

_____	_____	_____
Name of Informant **受訪者姓名**	**Signature of Informant** **受訪者簽署**	**Date** **日期**
_____	_____	_____

Name of Researcher	Signature of Researcher	Date
研究人員姓名	研究人員簽署	日期

Appendix V - Interview questions for patients and carers

Interview Guide of Social Impact Assessment Research for Drug Icon CC
Semi-structured interview

About the workshop

1. What problems are you or your family members facing in following medication regimen? How have these problems affected you personally?
2. How has the workshop helped you solve these problems? To what extent?
3. Did the workshop cover all the information that you expected to hear?
4. How does Drug Icon CC's products (pillboxes and stickers) help solve these problems? To what extent?
5. What are the advantages and disadvantages of Drug Icon CC's products? What recommendations would you give them?
6. Any other ideas or comments?

Personal information

1. What is your name? (Ask the informants if he/she wants to use pseudonyms or real name)
2. How old are you roughly?
3. How many pills per day do you/your family members take?
4. Have you ever forgotten to take/serve medicines?
5. Have you ever faced difficulty in complying with the medical instructions (i.e., taking the wrong medicines at the wrong timing)?
6. Have you used similar pillboxes before? If yes, compared to other pillboxes, what is the uniqueness of Drug Icon CC's pillboxes?
7. Anything else do you want to share with us?

Appendix VI - Interview questions for NGO representative (Janet from HIA)

Interview Guide of Social Impact Assessment Research for Drug Icon CC
Semi-structured interview

About Health In Action

- Could you tell us more about the aim of HIA's vision (i.e. to eliminate health inequity)?
- Could you give us a brief idea of the audience size of HIA? (e.g. 300 refugees, 500 ethinc minority individuals served in the past 10 years)
- Is there anything special about Kwai Tsing that led to the district-specific scheme on working family health (葵青區基層在職家庭健康項目)？
- What special role does HIA occupy in Hong Kong's healthcare ecosystem?

Collaboration with Drug Icon CC (workshop for ethnic minorities held on 19/6)

- How did the collaboration come about?
- Could you give us an overview of the arrangements, operations and materials of the whole event?
- Could you give us an overview of upcoming events and future collaborations, if any?
- Could you share the participants' feedback and comments with us?
- Any aspects of the workshop that you feel can be improved upon?
- Were there any similar collaborations with other organisations?

About EM support

- What healthcare problems are ethnic minorities facing in Hong Kong?
- How does Drug Icon CC's flagship products (i.e. drug labels and pillboxes) uniquely address health inequity in the community (and in particular EM)? Any caveats?

Appendix VII - Interview questions for NGO representative (Keith from CDAC)

Interview Guide of Social Impact Assessment Research for Drug Icon CC
Semi-structured interview

About CDAC

- What are CDAC's major target groups and what is the size of them (i.e. EM) ?
- Has there been extensive work on the elderly?
- Scope of work?

Collaboration between Drug Icon CC and CDAC

- Could you give us a general overview of the collaboration timeline and events?
- What is the rationale behind the collaboration?
- Were there any operational challenges during the partnership? (e.g. conveying the specifics of Drug Icon's vision, meeting both CDAC and Drug Icon's needs)

Roadshow street booth at Lok Fu shopping mall on 17-19 June 2021

- How many sets of drug labels and drug boxes were distributed, if any at all?
- Any guidance or brief introduction to the audience except distributing the drug labels and boxes?
- Could you give us an overview of the arrangements, operations and materials of the whole event?
- What are the demographics of the people aimed at targeting? Are they the same as those who were actually interested in the booth on those days?
- Have any interesting things happened? Any feedback from the audience?

About EM support

- What do you see as the needs of EM?
- How can Drug Icon help serve the needs of EM (through CDAC)?
- Future collaboration with Drug Icon:

Overall

- How can Drug Icon make improvements in the future?
- How effective is Drug Icon in *raising the public's awareness* towards non-adherence issues?
- How effective is it for Drug Icon to *educate* the public about non-adherence issues?
- From your point of view as a veteran in the field, how unique is the contribution of Drug Icon in serving the needs of EM or the community in general?

Appendix VIII - Case writing of interviewees

Case 1: Keith, CDAC, NGO representative

Keith has had extensive experience working in a community drug advisory NGO aiming at drug misuse prevention through raising awareness. Service targets consist of EM (+2300 persons) and the elderly.

Collaboration with Drug Icon CC motivated by complimentary aims (developing awareness and changing behaviour). Street booth for information and product dissemination, and was popular with elderly. Users thought it "provided [solution] for daily life issues''. 100 out of 500 sets of products were distributed on that day alone. Users suggested using colours in stickers. There are future plans for collaboration (purchase pillboxes and stickers)

Challenges of EM are twofold. Culturally, their cuisine uses a lot of condiments and they prefer 'natural' treatment (increase non-adherence). Quality education remains inaccessible to them. Drug Icon CC's work addresses education problems, but policy awareness remains low.

Case 2: Janet, Health In Action (HIA), Community pharmacy representative

Janet was a professor at HKU Pharm and now works at HIA to eradicate healthcare inequity in the community. Latest focus on EM (hundreds). Challenges of EM are language barrier, culture and institutional.

Collaboration with Drug Icon CC initiated through training kit curation. Health career workshop organised for EM. Participants were very engaged, pillboxes and labels were not distributed during the workshop, but distributed on need-basis at HIA centre with careful assessment. Janet thought Drug Icon CC's products helped solve the language barrier, but had comments related to the clarity of the icons. There is general interest to collaborate further (醫社合作).

Case 3: Ms L, Elderly

Ms L, who is 63 years old, has been taking more than 5 types of medicines. Some pills should be taken during daytime, while some are only needed before and after dinner. Ms L reveals that she often forgets to take the pill before dinner, while some pills needed to be taken every other day may also confuse her. She has tried to store different pills in separate drug boxes but it seems she lacks an effective and organised way to handle her medicines well.

Case 4: Ms P, Elderly

Ms P, around 70 years old and lives alone, has to take 3 drugs daily. Still, because of her deteriorating eyesight and memory, taking the right medicine at the right time becomes a challenge. She sometimes forgets to take medicine, and she thinks she might have mistook medicine because textual information is difficult to understand. She likes the stickers in particular because the icons are large and simple to understand, which helps considering her eyesight.

Case 5: Miss A, Carer

Miss A takes care of her parents who both need to take various types of medicines every day. Her mother takes 6 different medicines per day. Similarly, Miss A serves her father 16 pills per day (7 in the morning, 3 in the afternoon, 6 at night), which she says the types of medicine are too many to remember/count. Sometimes, Miss A is so busy that she forgets to serve her father medicines. Using pillboxes without any icons, she has also served her father the wrong medicines twice (i.e. pills should be taken at night were served in the morning). She always worries about making mistakes when serving her parents medicines. After introducing Drug Icon CC's pillboxes, Miss A says the icons on the pillboxes will help her identify the correct pills she should serve, avoiding making mistakes. However, she suggests that the size of each grid can be enlarged as it's a bit too small to store all the pills.

Case 6: Miss K, Carer

Miss K is about 70 years old and takes care of her husband who takes 5 medicines each day (excluding supplements). Her husband suffers from cognitive decline and has difficulty swallowing pills, as a result she has to help him assort drugs. Under her care, her husband has not had any instances of non-adherence at home. Regardless, she feels that the pillbox and stickers help her identify and assort the required drugs for her husband. She suggested that the pillbox can be more user-friendly (easier-to-open, larger compartments, sounding system), but the current design is good for outdoor use. She particularly liked the stickers because of their flexible use, and was willing to buy and distribute the stickers to friends and family. She is also confident that she can teach people to use Drug Icon CC's products after the training session.

Appendix IX - Questionnaire for patients and carers (Chinese version)

藥物圖表（Drug Icon CC）社會影響評估研究

是次社會影響評估由香港社會服務聯會（下稱「社聯」）委託，此項社會影響研究旨在評估藥物圖表（Drug Icon CC）的活動和產品對其對象及社會的影響，目的是了解不同持份者對 Drug Icon CC 的活動和產品的意見及評估現有服務模式的成效。

這份問卷大約需要 15 分鐘完成，非常感謝您的參與！如有任何查詢或意見，請通過 clarice.yip@connect.polyu.hk 與研究員 Clarice Yip 聯繫，或通過 wchanthony1230@gmail.com 與 Anthony Wong 聯繫。

<u>個人信息收集聲明</u>

i.未經您的明確批准或除非法律要求，否則此處收集的個人數據不會透露給第三方。

ii.除非另有說明，否則此研究需要此表中要求的所有個人數據。如果此類數據不完整或不准確，您的意見將視為無效或。

iii.未經您的同意，研究員將不會使用您提供給我們的個人信息進行直接營銷。

iv.作為數據個體，您有權根據《個人數據（隱私）條例》要求問卷調查和更正個人數據。有關查閱/更正/更新個人數據的請求，請通過 clarice.yip@connect.polyu.hk 與 Clarice Yip 或 wchanthony1230@gmail.com 與 Anthony Wong 聯繫。

（請在適當的方格內打勾)

我願意參加是次研究及同意上述聲明：

- 願意
- 不願意

第一部分

1）你的年齡是：

- 18 歲以下
- 18-30 歲
- 31-60 歲
- 61-70 歲
- 70 歲以上

2）你的身份是：

- 華裔人士 (請跳過第十六題)
- 非華裔人士

3）您家庭的總月入為港幣：

- 無收入
- $5,000 以下
- $5,000 - $9,999
- $10,000 - $19,999
- $20,000 - $29,999
- $30,000 - $39,999
- $40,000 - $49,999
- $50,000 或以上

4）你或你的家人現正因為疾病而需要長期服藥嗎（長期即六個月或以上）？

- 需要
- 不需要
- 不清楚

5）在家中接觸藥物（營養補充品除外）時，你的角色是（可選多於一個選項）：

- 用藥者
- 照顧者
- 沒有接觸藥物

6）你或你照顧的家人正服用的藥物（營養補充品除外）種類數量為（以多者為準）：

- 1-2
- 3-4
- ≥ 5
- 沒有服用藥物

7）如你或你的家人服藥時有面對以下情況，請依據其嚴重性排列它們為你帶來的不便：（1 = 影響最嚴重；數字越大影響越輕微）

忘記服藥/餵藥	
錯誤服藥/餵藥	
藥物難以吞嚥	
自行改變服用劑量	
難以理解有大量文字的藥物標籤	
因視力衰退而難以理解藥物標籤	
因言語或文化不通而難以理解藥物標籤	
因為服藥/ 餵藥而感到氣餒	
因為服藥/ 餵藥而感到有壓力	
其他：_____	

- 沒有面對任何困難

第二部分

8）以下哪個選項最能形容你？

在過往兩個月的時間內：

- 我有參加藥物圖標工作坊及獲得相關的教學單張和物資（由 Drug Icon CC 或與其合作的機構舉辦/派發）（請跳過第十一至第十二題）
- 我有收到藥物圖標教學單張和物資 （由 Drug Icon CC 或與其合作的機構派發）（請跳過第九至第十題）
- 我沒有參加工作坊或獲得任何藥物圖標教學物資（請跳過第九至第十六題）

9）請問您多大程度上同意以下的陳述？

參加由 Drug Icon CC 或與其合作的團體舉辦的**藥物圖標工作坊**之後：

	非常不同意	不同意	一般	同意	非常同意
a) 我加深了正確使用藥物的認識					
b) 我加深了對藥物圖標的認識					
c) 我更了解我或被我照顧的家人現正服用的藥物的特性					
d) 我更了解我或被我照顧的家人罹患的疾病					

10）請問您多大程度上同意以下的陳述？

參加由 Drug Icon CC 或與其合作的團體舉辦的**藥物圖標工作坊**之後：

	非常不同意	不同意	一般	同意	非常同意
a) 我或被我照顧的家人不再忘記準時服藥					
b) 如果我忘記或不理解藥物標籤，我更願意查閱有關資料					
c) 我更意識得到正確服藥的時間和劑量會影響藥效					

11）請問您多大程度上同意以下的陳述？

使用由 Drug Icon CC 或與其合作的團體舉辦派發的**藥物圖標教學單張和物資**之後：

	非常不同意	不同意	一般	同意	非常同意
a) 我加深了正確使用藥物的認識					
b) 我加深了對藥物圖標的認識					
c) 我更了解我或被我照顧的家人現正服用的藥物的特性					

d) 我更了解我或被我照顧的家人罹患的疾病					

12）請問您多大程度上同意以下的陳述？

使用由 Drug Icon CC 或與其合作的團體舉辦派發的**藥物圖標教學單張和物資**之後：

	非常不同意	不同意	一般	同意	非常同意
a) 我或被我照顧的家人不再忘記準時服藥					
b) 如果我忘記或不理解藥物標籤，我更願意查閱有關資料					
c) 我更意識得到正確服藥的時間和劑量會影響藥效					

13）請問您多大程度上同意以下的陳述？

使用藥物圖標：

	非常不同意	不同意	一般	同意	非常同意
a) 令我更有信心照顧自己起居飲食					
b) 令我更容易理解他人需要					
c) 增加了我和家人的磨擦					
d) 增加了我社交活動（如：和朋友聚會）的次數					

e) 我感到自己或被照顧的家人的病情有改善					
f) 減少了約見醫生的次數					

14）請問您多大程度上同意以下的陳述？

	非常不同意	不同意	一般	同意	非常同意
a) 我與一般人一樣享有共同的機會（例如平等接受醫療和使用社會資源等）					
b) 我對生活充滿期盼					

15）請問您多大程度上同意以下的陳述？

	非常不同意	不同意	一般	同意	非常同意
a) 現時公營機構的藥物標籤不能夠提供清晰的藥物使用指示					
b) 公營醫療機構應採用 Drug Icon CC 的藥物圖標					
c) Drug Icon CC 的藥物圖標應更普及					

16）請問您多大程度上同意以下的陳述？

使用藥物圖標後：

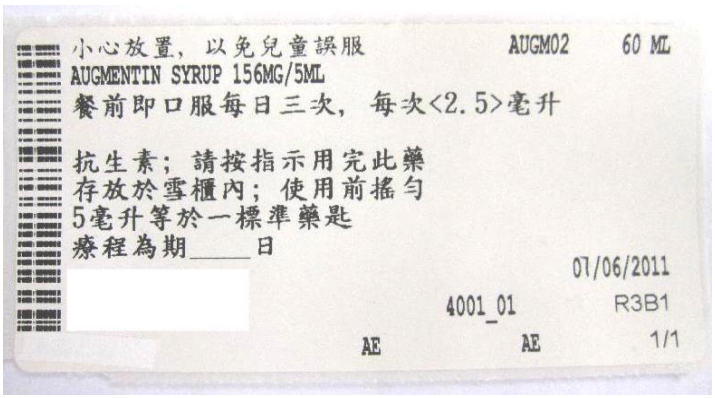
	非常不同意	不同意	一般	同意	非常同意
a) 如果我需要服藥建議時，有社福機構能幫助我					
b) 我和華裔人士有更多互動					
c) 在香港，我認為我醫療的需要有被尊重					

第三部分

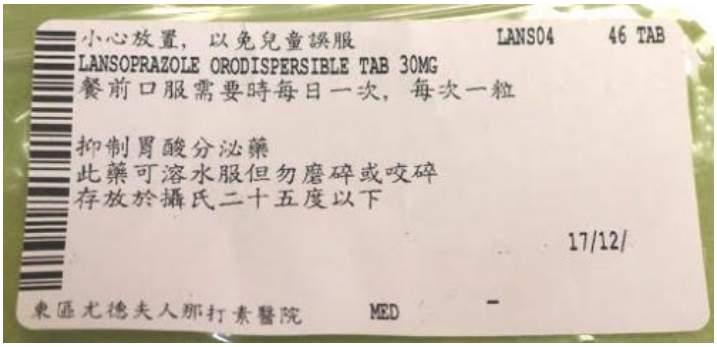
在接下來這部分，螢幕上會顯示不同的藥物標籤或圖標，請依照標籤的內容選取正確的服藥指示。為方便理解，所有藥物會由其顏色代稱。

紅色藥丸:

橙色藥水:



黃色藥丸:



17）該病人在一個正常早上的處方為何?

	需要時口服 1 粒 紅色藥丸; 飯前 1.5 藥匙 橙色藥水（搖勻）; 飯後需要時口服 0.5 粒 黃色藥丸;
	需要時口服 1 粒 紅色藥丸; 飯前 0.5 藥匙 橙色藥水（搖勻）; 飯後需要時咬碎服 1 粒 黃色藥丸;
	飯後需要時口服 1 粒 紅色藥丸; 飯後 1 藥匙 橙色藥水; 飯前需要時口服 1 粒 黃色藥丸
	需要時口服 1 粒 紅色藥丸; 飯前 0.5 藥匙 橙色藥水（搖勻）; 飯前需要時服 1 粒 黃色藥丸

在接下來這部分，螢幕上會顯示一位病人被醫生處方藥物的標籤或圖標，請依照它的內容選取正確的服藥指示。為方便理解，所有藥物會由其顏色代稱。

紅色噴劑:

橙色藥丸:

黃色藥膏:

18）該病人在一個正常晚上的處方為何？

	需要時 1 口紅色噴劑; 飯前 2 粒橙色藥丸（咬碎）; 需要時搽黃色藥膏;
	需要時 1 口 紅色噴劑; 飯前 1 粒 橙色藥丸（整粒吞服）; 需要時 1 藥匙 黃色藥膏;
	需要時 1 口 紅色噴劑; 需要時搽 黃色藥膏;
	需要時 1 口 紅色噴劑; 飯前 1 粒 橙色藥丸（整粒吞服）; 需要時搽 黃色藥膏;

19）如對本研究有任何意見，請留在以下空格。

問卷完結。感謝你參與是次研究。

Appendix X - Questionnaire for patients and carers (English version)

Drug Icon CC Social Impact Assessment

Commissioned by the Hong Kong Council of Social Service (HKCSS), the aim of the current project is to understand, measure and evaluate the social impact of Drug Icon CC's activities on its service users and the community. All information in the survey is collected solely for academic purposes, and will be kept strictly confidential. This survey will take about15 minutes to complete, and we thank you in advance for agreeing to participate.

Personal information collection statement

i. Without your approval or demanded by law, all the personal information collected in this survey will not be disclosed to a third party organisation

ii. Unless otherwise stated, the current study requires the usage of all of the collected information. If the survey is found to be returned incomplete or inaccurate, your response will be nullified and excluded from analysis.

iii. Without your approval, we will not use your personal information for direct marketing purposes.

iv. As an individual respondent, you reserve the right to change the response or personal information submitted in the current survey.

For enquiries regarding this study, please contact Ms Clarice Yip (clarice.yip@connect.polyu.hk) or Mr Anthony Wong (wchanthony1230@gmail.com).

(Please tick in the box to indicate the most suitable answer)

Do you agree to participate in the current study and to the above statement?

- Yes
- No

Part A

1) What is your age?

- <18
- 18-30
- 31-60
- 61-70
- >70

2) Which of the following best describes you?

- Chinese **(Please skip Q16)**
- Non-Chinese

3) The total income (HKD) of your household is:

- Below $5,000
- $5,000 - $9,999
- $10,000 - $19,999
- $20,000 - $29,999
- $30,000 - $39,999
- $40,000 - $49,999
- $50,000 or above

4) Are you or a family member prescribed medicine because of a chronic disease (≥ 6 months)?

- Yes
- No
- Not sure

5) When handling medicines (excluding nutritional supplements) at home, you are: (You may choose more than one option)

- Medicine user
- Caretaker
- I do not handle any medicines at home

6) The greatest number of medicines (excluding nutritional supplements) handled by you or a family members is:

- 1-2
- 3-4
- ≥ 5
- No medicines are used in the household

7) Please rank the situation(s), if any, you or a family member face when following prescriptions before using Drug Icons:
(1 = the greatest impact; the bigger the number the smaller the impact)

Forget to take medicines/feed medicines	
Taking/feeding medicines erroneously	
Difficulty of ingestion	
Self-administered change in drug dosage	
Cannot understand the text-heavy instruction labels	
Cannot read the instruction labels due to poor eyesight	
Cannot understand the instruction labels because of language or cultural barrier	
Feel frustrated because of taking/ feeding medicines	
Feel stressed because of taking/ feeding medicines	
Others:	

- I do not face any difficulties when taking/ feeding medicines

Part B
8) Which of the following statement(s) best describes you?
Within the last two months, I have:

- Participated in a workshop on drug labels and received the relevant training materials administered by Drug Icon CC or other collaborating parties **(Please skip Q11-12)**
- Received training materials for drug labels distributed by Drug Icon CC or other collaborating parties **(Please skip Q9-10)**
- Not participated in any workshop nor received any training materials from Drug Icon CC or other collaborating parties **(Please skip Q9-16)**

9) To what extent do you agree with the following statements?

After participating in the **drug label workshops** organised by Drug Icon CC or other collaborating parties:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I gained a deeper understanding of the correct usage of various medical drugs					
b) I gained a deeper understanding of medical drug labels					
c) I better understood the characteristics of the drugs I am or a care-taken family member is currently taking					
d) I better understood the medical condition I or a care-taken family member currently have					

10) To what extent do you agree with the following statements?

After participating in the **drug label workshops** organised by Drug Icon CC or other collaborating parties:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I or a care-taken family member no longer forget to take my prescriptions					

b) I am more willing to consult relevant information whenever I forget or don't understand medical instruction labels					
c) I realised the effectiveness of medicines is highly correlated to taking/ feeding medicines at the right time with the right amount					

11) To what extent do you agree with the following statements?

After receiving/ using the **drug label educational and training materials** disseminated by Drug Icon CC or other collaborating parties:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I gained a deeper understanding of the correct usage of various medical drugs					
b) I gained a deeper understanding of medical drug labels					
c) I better understood the characteristics of the drugs I am or a care-taken family member is currently taking					
d) I better understood the medical condition I or a care-taken family member currently have					

12) To what extent do you agree with the following statements?

After receiving/ using the **drug label educational and training materials** disseminated by Drug Icon CC or other collaborating parties:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I or a care-taken family member no longer forget to take my prescriptions					
b) I am more willing to consult relevant information whenever I forget or don't understand medical instruction labels					
c) I realised the effectiveness of medicines is highly correlated to taking/ feeding medicines at the right time with the right amount					

13) To what extent do you agree with the following statements?

Using Drug Icons:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I am more confident in taking care of myself					
b) I am more capable at understanding others' difficulties and needs					
c) Reduced conflicts with my family members					
d) Increased social activities (e.g., gatherings) with my friends					

e) The medical condition(s) from which I or care-taken family member is suffering has seen improvements					
f) Reduced the number of appointments with medical professionals					

14) To what extent do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I share the same opportunities as normal people					
b) I feel hopeful about life					

15) To what extent do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) The design of the traditional drug labels does not merit understanding					
b) The public health system should adopt Drug Icon CC's drug icons on its medicines					
c) Drug Icon CC's drug icons should be more accessible in the community					

16) To what extent do you agree with the following statements?
After using Drug Icons,

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
a) I know that there are social welfare organisations that can help me when I need medicine-taking advice					
b) I interact with local Chinese more often					
c) I think me medical needs are respected in Hong Kong					

Part C

In the following section, various medical drug labels or drug icons will be displayed on screen. Please choose the correct medical regimen according to the content of the drug labels. For the sake of simplicity, all of the drugs are named in colours.

Red tablets:

Orange cough syrup:

Yellow tablets:

17) What could be the correct regimen for the patient in the morning?

	One red tablet by mouth as needed; Half a teaspoon of orange cough syrup before meals (shaken well); One yellow tablet by mouth before meal (swallow whole);
	One red tablet by mouth as needed; Half a teaspoon of orange cough syrup before meals (shaken well); One yellow tablet by mouth after meal (chewed);
	One red tablet after meal; One teaspoon of orange cough syrup after meal; One yellow tablet before meal;
	One red tablet by mouth as needed; One and a half teaspoon of orange cough syrup by mouth (shaken well); Half a tablet of yellow tablet by mouth as needed;

In the following section, various medical drug labels or drug icons will be displayed on screen. Please choose the correct medical regimen according to the content of the drug labels. For the sake of simplicity, all of the drugs are named in colours.

Red inhaler:

Orange tablets:

Yellow balm:

18) What could be the correct regimen for the patient at night?

	One actuation of red inhaler as needed; Two orange tablets by mouth before meals (chewed); Yellow balm for external use as needed;
	One actuation of red inhaler as needed; One orange tablet by mouth before meals (swallow whole); One teaspoon of yellow balm as needed;
	One actuation of red inhaler as needed; Yellow balm for external use as needed;
	One actuation of red inhaler as needed; One orange tablet by mouth before meal (swallow whole); Yellow balm for external use as needed;

19) Please leave any thoughts or comments that you think will be helpful for the current study.

We thank you for your time spent taking this survey.

Appendix XI - Social Impacts Table

Expected Social Outcomes to Target Beneficiaries (Refer to the funding proposal) 預計社會效益	**Means of Measurement & Cumulative Number of Interviewees** 量度工具及累計受訪人數	**Cumulative Actual Outcome (Both intended and unintended outcome) *include quote from stakeholder as a proof** 累計實際成效
Increase the awareness of the medication instruction	Interview (6) Survey (80) Pillboxes (2800)	Understood the importance of drug adherence - Greater awareness of correct drug label usage as an important aspect of healthy living
Increase the understanding of the medication instruction	Interview (6) Survey (80) Pillboxes (2800)	Acquired knowledge for drug usage - Patients and family carers developed a better understanding of the medication regimen, drug characteristics and the disease through coming into contact with Drug Icon CC's materials
Make it easier for the elderly and family carers to adhere to the medication instruction	Interview (6) Survey (80) Pillboxes (2800)	Behavioural change - Reduced the duration of time used for drug assortment - Increased the accuracy if identifying the correct medication regimen
/	Survey (80) Pillboxes (2800)	Improved Psychosocial wellbeing - The elderly and family carers became more empathetic towards each other and had fewer conflict with their family members