TESTED

Service design for HIV testing in Sweden with a focus on immigrants

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Abstract
In 2018, human immunodeficiency virus (HIV) remains a social stigma in many different cultures. In Sweden because of the advanced treatment for HIV (Smittskyddsinstitutet, 2012) and people's attitude towards it (Danziger, 1999), it is less stigmatized when compared to other societies. Since 2003 the annual number of people who immigrate to Sweden is increasing drastically. A significant amount of people come to Sweden from different cultures with different backgrounds. In today’s Swedish society, immigrants make up a portion of the population that cannot be neglected. The Swedish healthcare system is not ready for this demographic change. The social stigma of HIV along with other things, like anxiety and fear of positive test result, create barriers of not taking an HIV test. Looking into deficiencies of current HIV testing services by field research that helps to understand reasons behind the dilemma. Research methods also include literature review, statistics analysis, interview, and workshop.

The purpose of this project is to create a more inclusive healthcare system for immigrants in Sweden. What the design outcome of this project is a service design proposal for HIV testing providers in Sweden with a focus on immigrants.

Keywords
HIV, test, immigrant, service design,
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1 Introduction

Human immunodeficiency virus (HIV) has been controlled thanks to modern medical technology as well as education but remains a problem of our society. According to a statistic from Joint United Nations Programme on HIV/AIDS (UNAIDS) in 2016 about 36.7 million people were living with HIV, and it resulted in deaths of one million of them (2017). Moreover, this is the number of people who died of AIDS-related illnesses only in 2016, when antiretroviral therapy(ART), which is used to slow down the HIV progression and suppress the virus, accessibility is more comprehensive than ever before (World Health Organization, 2018).

Personally, I went for HIV testing in Sweden before. Throughout the whole testing process, what I have found is that there are many different touchpoints where visitors interact with the HIV testing service. Patients’ opinions and perceptions are influenced by the contact that made with touchpoints, which can be positive or negative and they wholly depend on the person (Meyers, Schwager, 2017). Behind those touchpoints, there lie possibilities of improving HIV testing services. The complete testing service starts way earlier than patients arrive at a test point and their interactions are an act of co-producing service experience(Polaine, Løvlie, & Reason, 2013), which is of vital importance for a healthcare service.

What’s more, since 2000 (Sweden.se, 2018 ) an increasing amount of immigrants have been coming to Sweden (see figure 1) especially those who suffer from wars or conflicts in their home countries. Although Swedish parliament adopted legislative changes for asylum seekers and their families in 2016 (Migrationsverket), making it more difficult
for them to get a resident permit to stay in Sweden, this immigration trend continues. The climax happened in the same year; there were more than 70,000 asylum seekers who had been granted residence permits, and many more who applied for it (Sweden.se). Sweden’s Minister for Employment and coordinator of the government’s work with refugees admitted that the unprecedented population increase has resulted in a lack of healthcare resources and it is stretching Sweden’s system (thelocal.se). HIV testing services in Sweden, which is part of the health care system, is not ready for the change in its population structure neither.

According to “HIV/AIDS surveillance report Europe”: 35% of newly diagnosed HIV infections in 2013 were reported among migrants in Europe (World Health Organization[WHO], 2013). In Sweden, the number of new HIV positive cases has a slowly increasing trend since 2003, mainly because of the immigration of people infected prior to arrival in Sweden (Smittskyddsinstitutet, 2012).

The purpose of this research is that by understanding barriers that make immigrants in Sweden not to go for HIV testings to improve the HIV testing services and create a more inclusive healthcare service. The design outcome of this project is a service design concept for HIV testing providers in Sweden with a focus on immigrants.

1.1 Limitation

A participatory design workshop is an essential part of the design process in this project. However, the participants in the workshop were less than I expected: only four stakeholders participated in the workshop. One of them is an asylum seeker, one is an immigrant who’s studying in Sweden, so they are in the target group of this research. One of them is working at an HIV test point. Another one is working in Växjö. So I cannot say it was a wide range of stakeholders joined the participatory design activities. Consequently, the results of the workshop might not be comprehensive enough and it may limit potential possibilities to be developed to solve the problem.

The target group of this project is tricky to reach. International students are part of my target group, which is easier to contact when compared to other immigrants. However, a significant amount of immigrants come from different countries for other reasons rather than studying. As an immigrant myself, I do not speak Swedish and this it creates a language barrier to reach this group. Especially some immigrants in Sweden do not even speak Swedish or English but only their mother tongues, it makes the communication difficult. Besides, it is also difficult to get feedback on the design concept from this focused group. The research took place mainly in Växjö with a testing observation took place in Jönköping. In Sweden, testing services might differ from one testing point to another. This fact might restrict the research outcome.

Limited time is another restriction of this project. For some uncontrollable reasons, I only have three months to finish my master thesis project. Three months are short for a master student’s thesis project. I tested out part of the prototype with design students from the bachelor program. In this short time frame, I could not manage to test the prototype with the target group. All of those limitations might have influences on this design project.
1.2 Ethical approval

This research follows “Ethical guidelines for independent projects in programs at the first and second levels at Faculty of Arts and Humanities” throughout the project. A participatory design workshop, which is part of the design process, involves humans and sensitive personal data. All of the information that participants need to know was delivered to them ahead of their participation. Participants who joined workshop were anonymous, and consent had been obtained. Confidentiality is always a fundamental requirement of this sensitive project. All personal data collected in the research including the participatory design workshop is only used for the purpose of the research. The “Request for Participation in Student Project” (see appendix) had been presented to all participants in advance orally and in writing.

2 Context

2.1 Personal Motivation

I moved to Sweden almost two years ago from China, which is also the home country where I was born. I am an immigrant who lives in Sweden. I believe every migrant who moves from one country to another more or less experiences culture shock: the uncertainty of a new culture, and the unfamiliarity of a new environment. Consequently, immigrants are more vulnerable at an emotional level when compared to natives. Immigrants are often identified as a vulnerable population that has a higher risk for inadequate health care (Derose, Escarce, & Lurie, 2007) The vulnerability level become higher when immigrants encounter a system or service that is not designed for them but exclusively for Swedes.

This research is also inspired by my first HIV test in Sweden. I identify myself as a gay male. The fact that the HIV prevalence among men who have sex with men (MSM) is high so that MSM have increased the chance of being exposed to HIV (Centers for Disease Control and Prevention [CDC], 2017) made me went to get tested. I went for an HIV testing in a local hospital in Växjö, Sweden. What I have found is that the HIV testing service is designed from a rational medical perspective instead of a user-centered, which here is patient-centered, perspective. New technologies improve people’s lives; however, people remain at the heart of services (Polaine et al., 2013). As a designer, I know the most critical aspect of a service is users’ feelings, especially when it comes to the sensitive healthcare services like HIV testing. As a member of LGBTQ community, though HIV is not a problem only exists in LGBTQ community, I feel I have the responsibility to fight against HIV epidemic with others in the society.

2.2 Literature Review

“By the end of 2011, a total of 9,891 HIV positive cases had been reported in Sweden since HIV surveillance started in the mid-1980s. Today about 5,800 individuals are known to be living with HIV in Sweden. The number of new cases reported has been relatively stable over time, with a slowly increasing trend since 2003, mainly due to the immigration of people infected before arrival in Sweden. Between the late 1980s and 2002, approximately 280 new cases (3/100 000 population and year) were reported annually. Since 2003 an average of 440 cases have been reported per year (5/100 000 population and year). An increase in
reported HIV infections was observed among men who have sex with men over the period 2005-2009. However, a decreasing number was reported in this group in 2010-2011, although the number of cases reported remains at a higher level than before 2005 with 125 and 106 cases reported in 2010 and 2011 respectively. A decreasing number of cases has been observed among injecting drug users since 2007, and only 14 cases were reported in this transmission group in 2011. The number of reported AIDS cases peaked in 1995, and since then the number of cases per year has declined and stabilised. During the previous decade an average of 60 AIDS cases were reported per year and in 2010-2011 about 50 AIDS cases were reported annually, mainly in immigrants from countries with a generalised HIV epidemic.” (Smittskyddsinstitutet, 2012)

In order to develop a design proposal for preventing HIV/STI, I have to find out what has been done in the past either in Sweden or not.

“Sweden has become the first country to achieve the UNAIDS/World Health Organization (WHO) 90-90-90 target, research published in HIV Medicine shows. At the end of 2015, 90% of HIV cases in Sweden were diagnosed, 99.8% of people were linked to care and 95% of people taking antiretrovirals for at least six months had a viral load below 50 copies/ml. In October 2014, the 90-90-90 treatment goals were launched. These proposed that by 2020, 90% of people with HIV will be diagnosed, 90% of diagnosed people will be in care; 90% of people receiving care will have durable HIV suppression. Achievement of the 90-90-90 targets will mean that at least 73% of all people with HIV have viral suppression, a large enough proportion to have a major impact on rates of HIV-related mortality and new infections.

They suggest there are several reasons for Sweden’s success:
• Small size of the epidemic.
• Legislation that obliges laboratories and clinicians to report new HIV cases and patients to keep follow-up appointments.
• Linkage of patients to specialist treatment centres with multi-disciplinary teams.
• Free access to Antiretroviral Therapy (ART).
• High level of adherence to national guidelines by care providers; since 2014, these guidelines have recommended ART for all HIV-positive people.

“We should not be content with these good results, but should continue to improve prevention strategies and increase our efforts to diagnose those still unaware of their infection,” conclude the authors.” (Gisslén et al., 2017)

Sweden is in the front row in healthcare system especially in the area of HIV prevention. The previous study listed out several reasons for it, and I can learn from it in order to improve it.

“In the present study, more than a quarter of the patients had sought health care with AIDS- or HIV-associated symptoms without being offered an HIV test. Also, half of the patients of non-Swedish origin had lived for more than 1 year in the country at diagnosis and two-thirds had a missed opportunity for HIV testing at
Research has found out the deficiencies in the health care system contributed to the high proportion of late presentation in Sweden, especially within immigrants group. Study the deficiencies that this research found out, like consulting without being offered HIV test, is another way to look at the HIV testing system as a whole, and solve those problems in the service design.

“Screening, mainly at health examination at immigration, dominated as the reason for HIV testing in the first year, whereas the probability of testing in other health care settings because of symptoms increased continuously from arrival in Sweden until 2.5 years after arrival, when a plateau was reached.

Looking at the test initiator, in the first few months after arrival > 80% of patients were identified through screening. With time, the probability of being identified by screening decreased to 40% at 3 years, while the patient’s symptoms became the predominant reason for testing. Thereafter, screening once again became the main reason for testing. The probability of patient-initiated testing was constantly low at 20%.” (Brännström et al., 2016)

The test initiator of the patients in the study changes from screening to symptoms, including HIV and STD symptoms, and to screening again as time goes on. Understanding the motivation of immigrants go for a test is of vital importance for my service design.

“... at least 55%, and possibly 90%, of new cases of HIV infection were transmitted by people who had been unaware of their HIV status.

Data such as these are used less often than an expression of trust in the “Swedish character,” which is held to place high value on the collective good rather than purely on the individual’s freedom of choice. According to this view, it is Swedish people’s strong social conscience that leads so many who know they are infected to take measures to prevent the spread of HIV infection. The widespread belief that the protection of the society is more important than the freedom of the individual has, for example, been used to explain why compulsory partner notification is so widely accepted in Sweden.

Once people are diagnosed as HIV positive, they are required by law to tell current (and future) sexual partners of their infection and to adopt safer sex and safer injecting practices.

According to the Communicable Diseases Act, the county medical officer can petition the county administrative court to make an order for the compulsory isolation of people who do not voluntarily comply with the measures needed to prevent the infection from spreading.” (Danziger, 1998)

In Sweden, people value the collective health over individual’s freedom of choice. The “Communicable Diseases Act 1988” is a milestone in HIV prevention in Sweden. However, it can also be interpreted as a punitive method by some people. Because the strategy is identifying infected people and depend on them to lessen the risk of transmission, preventing its spread. When people interpreted it in this way, it might
become a barrier to getting tested with other worries. In this project, the reasons for not taking an HIV is also essential for improving the testing service. So analyzing the ways people understand the “Communicable Diseases Act 1988” is part of my research.

Between 2010–14, approximately 130 MSM per year were newly reported to be diagnosed with HIV in Sweden. Half of these are foreign-born MSM, which is an increase compared to 40% during the previous 5 year period (2005–2009) [11]. The proportion of newly diagnosed HIV cases among foreign-born MSM resulting from sex between men while in Sweden (as reported by the man himself) was 26% between 2005–2009 and increased to 36% between 2010–2014 [11]. This indicates that foreign-born MSM are not only exposed to a high risk of HIV before migration but also while living in Sweden.

Other possible reasons for the elevated risk of acquiring HIV while in Sweden among foreign-born MSM is that they may be sexually active within a network where HIV/STI prevalence is higher [15]. Another reason could be that due to low uptake of regular HIV/STI-testing those persons may be undiagnosed while living with asymptomatic HIV/STI for longer time periods during which they are unaware of the risk of transmission.

Barriers to HIV testing among migrant MSM in the UK are reported to include fear of HIV, fear of legal consequences if living with HIV, stigma and discrimination, lack of culturally sensitive and competent services, language difficulties, lack of knowledge of health services and low priority given to HIV. Foreign-born MSM who have lived for a long time in Sweden may overcome some of these barriers such as language, knowledge of health services and familiarity with rights, while other barriers such as stigma may remain.” (Strömdahl, Thorson, Persson, Forsberg, & Liljeros, 2017)

Fear of HIV, fear of legal consequences when living with HIV, stigma and discrimination, lack of culturally sensitive and competent services, language difficulties, lack of knowledge of health services and the low priority given to HIV are barriers to HIV testing among migrant MSM. After living for a while, some of them might be overcame by migrants, while some remains. Look into the reasons that make immigrants not go to HIV testing is a method to improve the system and solve the problem.
3 Research Methods

3.1 Literature review

Literature review is a fundamental research method of this project. At the early stage of the research, I did a lot of literature review of previous studies, from the current HIV and HIV testing background in Sweden to culture studies, in order to get an overall picture of this topic that I am doing. Statistics analysis is another online research method besides literature review. Due to the transparency of the public health data in Sweden, I got many statistics that I need for the scientific research. The primary statistic resource for this research is Folkhälsomyndigheten (The Public Health Agency of Sweden). HIV and HIV testing related theories and statistics are something that I can find online or in books, but real experience could be only be learned from getting contact with stakeholders of HIV testing services, like staffs who conduct HIV testing and patients who get tested or want to get tested. That is the reason why I did field research in a real context for the project.

3.2 Field research

Field research is conducted at three organization including Noaks Ark Småland and Halland, RFSL Kronoberg, and Ungdomsmottagningen (youth clinic) in Växjö, Sweden. Noaks Ark Småland and Halland is a local organization that works to increase the well-being and quality of life of people who are living with HIV and prevents the spread of HIV and other STIs. Noaks Ark provides rapid HIV testing (antibody test) that patients do not need to provide their name or Swedish personal number (personnummer). The youth clinic provides healthcare service for youth between 13 and
23. The HIV test at the clinic is nucleic acid test (NAT) that performed on a blood sample, which is the same as where I had the testing before in the Infektionskliniken Växjö (infection clinic). RFSL is the Swedish national association for gay (and lesbian), bisexual, transgender and queer rights. Some RFSL, for example, RFSL Stockholm and RFSL Göteborg, provide rapid HIV testing, which is the same test as the one provided by Noaks Ark. However, RFSL Kronoberg where I did my field research does not provide HIV testing service directly. I also tried to contact Infektionskliniken Växjö (infection clinic), however, due to the flu season the clinic is crowded with patients, so the operation manager refused my request to conduct field research at the infection clinic.

Field research of this project was conducted both within and outside the Swedish health care settings. The criteria of being considered in the Swedish health care settings in this research is whether patients of the health care service need to provide Swedish personal number. For example, the testing service at Noaks Ark, which is entirely anonymous, is not be considered as inside of the Swedish healthcare settings. However, it is part of the health care services provided in Sweden. Thus it is also part of this research. In this research, HIV testing services in Sweden is defined as consisting of two parts: Swedish health care services, which provided by hospitals, clinics, and HIV rapid testing services provided by organizations, like RSFL and Noaks Ark. In the field research, individual in-depth interviews are essential parts of it. “Individual in-depth interviews are widely used by health care researchers to co-create meaning with interviewees by reconstructing perceptions of events and experiences related to health and health care delivery” (DiCicco-Bloom & Crabtree, 2006, p. 316). Interview with professionals who work in those three organizations that I mentioned above is a way to get insights of the testing service and understand patients who use the service.

3. 3 Participatory design workshop

Participatory design workshop (PDW) is a method to get a broader range of stakeholders involving in this design process. Because I want to develop a user-centered service design at the end of this project, getting to understand users', patients' are more precise for this project, perspectives is an integral part of the design process. Participatory design methods could be used to cope with conflicting interests, like how to balance a current situation and its future version (Smith, Wallengren, & Öhlén, 2017). PDW can help a designer by using the collective intelligence of different stakeholders to solve social problems that they are encountering, which in this case is breaking the obstacles that make people not to take HIV tests. At the same time, it helps avoid the potential foreseeable pitfalls in design to a large extent.

3. 4 Observation

An observation of a pop-up test in Jönköping is also part of the field research. As a researcher, I did voluntary work for a pop-up testing event at Jönköping University to get to understand their experience. Direct observation in an HIV testing event gives me as a researcher opportunities to talk with people who come for testing. It is a good way to find out their motivation for HIV testing and in which way do they get the information about the testing. Sixteen out of twenty-eight people who came to the test saying that they got the information about the pop-up testing in the university’s application (app).
4 HIV and other STIs

In most cases, HIV is transmitted to another person by sexual contact, though there are other transmission routes like drugs injection, blood transfusion, giving birth, and etc. Sexually transmitted infection (STI) transmits by sexual contact. HIV and STIs are to a large extent related to the most private part of a person’s body and his or her sexual activities. From a social perspective, HIV and STI are both considered as the social stigma. However, the previous study has shown this stigma in Sweden is not so severe when compared to other cultures.

Another reason that the service design is for both HIV and STI is that they are internally connected in the HIV testing services in Sweden. During my field research, I went to testing services both within (youth clinic and infection clinic) and outside (Noaks Ark) the Swedish healthcare system. The test for HIV and STI are intimately connected. For example, if one person does an STI test in a clinic, the doctor at the clinic will ask him or her questions regarding sexual activity, screening frequency, and etc. The doctor could request for HIV testing routinely when he or she thinks it is necessary. According to previous research, the significant initiator of an HIV test among immigrants after immigration for one year is symptoms of STI and HIV. Although the testing methods for the main prevalent STIs (chlamydia and gonorrhea) and HIV are different, because of this internal connection I will still put STI and HIV together in this project.

Sweden is the place of both conducting my design research and the design project. Sweden has the lowest HIV+ and STI+ population within EU and around the world. Due to the openness and equality of the society, there is not much explicit discrimination towards people living with HIV or have STI. Legislation about HIV/STI is more comprehensive when compared to other countries. So is the healthcare system. However, there is still a significant portion of the population in Sweden do not get tested regularly, which could eventually reach a epidemic proportion. Because of Sweden is leading the world in healthcare system when it comes to HIV if this project could help restraint the epidemic, the experience could be used as a reference for other countries, which is a worse situation in preventing the epidemic of HIV.

5 Target group

The target group of my design research and project is people at high risk of getting HIV infection in Sweden. According to the statistics I got from Smittskyddsinstitutet’s “Global AIDS Response Progress Report 2012”, the annual number of HIV infection cases reported in Sweden is continuously growing since 2003 (Smittskyddsinstitutet, 2012). Before reading this report, I thought MSM is the group that has the highest risk of getting HIV because in the overall population MSM is the main transmission route. In Sweden, however, it turned out that the highest transmission route was heterosexual contact (see figure 3), the second was homosexual contact between men. In the infected population, a significant portion of them are immigrants from other countries. The report shows (see figure 4) that foreign-born population who’ve been reported is way higher than Sweden born population (Smittskyddsinstitutet, 2012). Moreover, it indicates that the marginalized immigrant group in Sweden have a higher risk of contracting HIV. All of those facts make my project focus on the immigrant group, which is a marginalized group in the Swedish society. Let’s look at Statistic Sweden’s
definition of an immigrant: foreign-born, legally admitted, and expected to stay in Sweden for at least 12 months, which is excluding undocumented immigrants. In my research, the definition of immigrants in Sweden is the foreign-born population who move to Sweden and expected to stay for at least 12 months.

Previous research has shown that HIV is less stigmatized in the Swedish society among people born in Sweden (Danziger, 1999). However, some of the immigrants' home countries are to the contrary. According to Statistikdatabasen (Statistics Sweden), in 2017 there were one hundred and seventy thousand immigrants from Syrian Arab Republic, one hundred and forty thousand immigrants from Iraq, seventy thousand immigrants from Iran, sixty thousand immigrants from Somalia (2018). These countries are three of the top five countries where people immigrated from. Let us look at another
scene, ten most common nationalities among asylum seekers in Sweden are Syrian, Afghan, Iraq, Stateless, Eritrean, Somali, Iranian, Albanian, Kosovan, Ethiopian (Sweden.se, 2018). Most of those countries are in the Middle East, previous research show HIV stigma exists: fears of stigma and discrimination are great against people living with HIV (Obermeyer, 2006). Not only in this region, according to American Public Health Association: immigrants from China and other Asian countries are failing to address HIV/AIDS in their communities and missing opportunities to reach out HIV/AIDS-related information (2005). So the strategy to attract this group and let them test HIV/STI regularly is a problem needs to be solved. Immigrants are in a marginalized group in the Swedish Society. Creating the service design with a focus on immigrants is not only a way to help prevent HIV epidemic but also a way to help them more integrated into this Swedish society.

In the population of people who are living with HIV in Sweden, Men who have sex with men (MSM) is one of the largest groups (Danziger, 1998). A study estimated that for every 100,000 MSM, 692 would be diagnosed with HIV. This makes this group 60 times more likely to contract the virus than other men and 54 times more likely than women (Wolitski & Fenton, 2011). The fact is that MSM has higher HIV transmission risk in the general population around the world. As a result, MSM was planed to be another target group of this research. However, after the field research and more literature review, I found out the fact that in MSM group, most people especially Sweden-born population, go for HIV testings regularly because of initiative screening. So the deficiencies in the healthcare system are not so severe for Swedish-born MSM when compared to immigrants. As a result, in this project, I will focus on the diversified immigrants’ group who live in Sweden. So, foreign-born MSM is still part of the research.

6 Testing to prevent HIV epidemic

In Sweden, according to previous research, since the HIV test was available, the authorities put the HIV testing in the center of the epidemic prevention program (Danziger, 1999) because of its wide acceptance in the Swedish society as well as the dependence on infected people. Depending on infected people to prevent HIV from spreading, diagnose the infected population in Sweden becomes essential to the preventing approach. This strategy is a very different approach when compared to what Britain has been doing. Whereas in Britain HIV testing is more regarded as a diagnosis tool instead of a prevention tool. This difference is the result of the cultural differences between these two countries. British people put individual’s freedom in the top priority (Danziger, 1999). In Britain, the health care authority believes that individuals have the equal right to know their HIV serostatus and not to know their HIV serostatus. Also, it is everyone’s responsibility to prevent HIV epidemic. To the contrast, in Sweden, Swedish people highly trust their government and healthcare system. They believe the collective health security is more important to their society than any individual’s liberty (Danziger, 1999). As a consequence, separating the infected people from the population by obligatory HIV testing is the most crucial component of their HIV prevention strategies. This division may cause more barriers for already marginalized immigrants group.

Another one of the reasons to put HIV testing in the center of the prevention program is more acceptable than many other countries is that HIV testing and HIV infection are
less stigmatized in Sweden. The answer to this phenomenon is that people in Sweden have more tolerance of homosexuality and gay culture (Danziger, 1999).

General low initiative for HIV testing among immigrants is a factor might cause increasing of the infection number of this group. How to meet the testing needs of immigrants is an integral part of this research as well as the design outcome.

7 Sustainability

Sustainability consists of three parts: environmental sustainability, economic sustainability, and social sustainability (Epstein & Buhovac, 2014). In this project, I am more focusing on the last two parts.

7.1 Social sustainability

For many people, social sustainability is more evident in this project. The current healthcare deficiency refers to not only the lack of resource but also the designed user/patient of the healthcare service. An unexpected amount of immigrants come to Sweden in the last decade; people come from active war zones looking for asylum contribute to it a lot (sweden.se). The current healthcare system is developed over decades for inhabitants who live in Sweden, and it is apparently not ready for this drastic population change, as Sweden’s Minister for Employment and coordinator of the government’s work with refugees described it as “stretching our system” (thelocal.se). When the healthcare needs of this immigrants population are not met, this deficiency of the healthcare system in Sweden might end up in massive gaps between different groups of people, and even segregation of the society in Sweden. All of the consequences are negative factors and have a negative impact on society.

7.2 Economic sustainability

Economic sustainability of this project is ambiguous to see. The healthcare system in Sweden has spent an enormous amount of money and put substantial effort to promote and conduct HIV testings. All of those efforts are trying to diagnose infected people as early as possible at stages of HIV. After diagnosed as HIV serostatus positive, inhabitants in Sweden will have free access to HIV treatment including antiretroviral therapy (ART). When an infected person is diagnosed at an early stage of HIV progression, the average money that a hospital or a clinic spends on the treatment of the person is significantly less than when the person is diagnosed at a late stage of HIV (Krentz, Auld, & Gill, 2004). A patient who is diagnosed as HIV positive with a CD4<200 cells/μL is regarded as a late presenter. For patients who present with a CD4 count >200 cells/μL are regarded as early presenters (Krentz et al., 2004). CD4 count is as an indicator of how well a person's immune system is functioning.

“Patients presenting with lower CD4 cell counts incurred a mean cost of $19 917 (±$8227) during their first year after diagnosis with 57% of the cost attributable to antiretroviral (ARV) and non-ARV drugs, 21% to outpatient services, and 22% to inpatient services. These costs were 2.5 times greater than for patients presenting with CD4 cell counts more than 350 μl ($7840). The cost for ARV drugs was significantly lower in those presenting with CD4 cell counts more than 350 μl as fewer patients (44 vs. 98%) were placed on ARV regimens during the first year.
By year 5, the median CD4 cell counts of patients who presented (and survived) with advanced HIV disease was comparable with patients presenting with higher CD4 cell counts (438 vs. 463 μl), however their costs still remained 76% higher. Mean 5-year total costs for patients presenting with advanced disease was $82 755 (±$25 122) compared with $41 570 (±$25 760) for early presenters. Although patients presenting with advance disease comprise 59% of the study population, they account for 74% of all costs over the 5-year period.” (Krentz, Hartmut, & Gill, 2010, p. 2751)

In this research, it proves that treatment for late presenters is more expensive than early presenter, though some cost will be spent on other HIV related diseases. More comprehensive HIV testing will help believably to identify many more undiagnosed individuals at a higher CD4 cell counts. Although the total cost of health care for the entire population might increase, “the mean yearly cost per patient will likely to be lower owning to more patients with CD4 cell counts more than 350 μl entering care” (Krentz, et al., 2010). The researchers also concluded that aggressive earlier HIV testing programs would save more financial resources for the entire population in both short term and long term if a higher portion of people are diagnosed and access health care at higher CD4 counts (Krentz, et al., 2010). Late diagnosis is not only unsustainable from an economic perspective, but it also contributes to increased morbidity and mortality (Brännström et al., 2016). Consequently, encouraging HIV testing in Sweden is not only a way to prevent HIV from spreading but also to prevent late diagnosis of HIV infection.

8 Design process
8.1 Individual in-depth interviews

Individual in-depth interviews is a method to gain understandings of this HIV testing topic, though I have done a lot of online research, the reality can be different from theories because of the time and location. The individual in-depth interviews are part of my qualitative research methods. Qualitative research interviews involve gathering information and facts (Targon, 2011) and learning about emotions, experiences, and relationships (Weiss, 1994) that cannot be observed easily (Baxter & Barbbie, 2003). So it is a supplement to the literature review, and it provides insights into the problem and helps to develop ideas or solutions for the problem. The unstructured technique has been used in the individual in-depth interviews. I went to three places where I conducted the field research: RFSL Kronoberg, Noaks Ark Småland and Halland, and Ungdomsmottagningen (youth clinic) Växjö. The interviewees are Nina Klingberg who’s chairwoman of RFSL Kronoberg, Elli Mokus who’s head of operations of Noaks Ark Småland and Halland, Emma Johannisson who’s Administrator and Sociologist of Noaks Ark Småland and Halland, and Jonas Lundborg at Ungdomsmottagningen.

During the interview with Elli Mokus, I found deficiencies in HIV testing services within the Swedish health care settings:

“...in the hospitals or clinics some nurses don’t know how to approach people who come to HIV test because they don’t have experience dealing with this kind of people...
...so, people prefer to go to Noaks Ark, because our staffs here are trained to do the rapid test and they have many experiences..."
Some testing providers within the Swedish health care settings their staff do not have interpersonal skills to help patients who come to HIV tests effectively. One of the reasons is that those providers are not specialized in HIV testing, some of them only have drop-in hours once a week or even less. She told me another problem for Noaks Ark is that it is difficult to reach out immigrants group. For example, the students who’re studying at Linnaeus University is like living in a different bubble from the Växjö city, which are difficult for them to reach. Many of them are international students, which is my target group. She also mentioned that many people who come to their testing service got the information from the internet and mostly different social media like Facebook and Instagram. The most important insights I got from this interview is the deficiency in testing services within the Swedish health care settings, the difficulty of reaching out immigrants group, and their preference in channels for getting information.

8.2 Participatory design workshop (PDW)

The PDW took place at Noaks Ark Småland and Halland at 22, March from 16:30 to 18:00. I choose this time because most people who work in downtown Växjö finish working around 16:00, and we want to include them in the PDW. The promotion of the workshop starts approximately one week in advance. The promotion methods include using online social media and offline visual materials. I used Facebook, Instagram and official website of Noaks Ark as online promoting platforms. By arranging a Facebook event and posting the event information in different Facebook groups in order to get as many people as possible. In cooperate with RFSL Kronoberg, I posted the information about the workshop on RFSL’s Instagram account and in their Instagram story. On the Noaks Ark’s website, we posted the information of the workshop in the “latest event”
section. For the visual materials, I chose to use small icons I draw that represent health care as the background of the poster and banner (see figure 5 & figure 6) to delivery the healthcare service aspect of the project. This is also the reason why I choose the colors that I am using on the poster. I hang the posters in different places: bulletin boards inside university buildings, entrance of the buildings, bulletin boards on the main street in downtown Växjö, RFSL, and Noaks Ark. All of the efforts that I made is to try to get more and broader range of stakeholders involved in the workshop. Visual materials that I made got positive feedbacks after publishing online and offline; however, the number of participants is lower than expected. One asylum seeker, which is my target group, and few other stakeholders participated in the workshop. It needs future researchers’ further exploration on how to involve more stakeholders to a PDW in sensitive projects like this.

Before starting the PDW, the “Request for Participation in Student Project” (see appendix) is delivered to all participants of the workshop both orally and in writing. The PDW is divided into two parts by presenting visualizations of two different testing services. The first part of the workshop is letting participants imagine their ideal HIV testing process without showing them any visual material of the current testing process. In this part, the participants’ initiatives were not so high when compared to the second part. My reflection on this is that it is difficult to imagine a rather long and sophisticated service process when no solid material presented. However, one comment for the healthcare service I got from a participant who’s an asylum seeker is “ignorance”. As an immigrant, I can really relate to this comment. Because I have the same experience while entering services in Sweden. How to adjust services to meet needs of immigrants is a question that needs to be considered in this service design process.
The next half of the PDW started with showing participants the two unique HIV testing service: antibody test (see figure 7) and NAT (see figure 8) in two patients’ journeys. In these patients’ journeys, each testing service has been separated into several stages, and has been visualized to help participants understand easily. Participants were invited to write down their thoughts, by using stickers, about each stage and categorize them into three parts: good, need improvement, and suggestions. Using different colors to present those three categories. During this part of the workshop, participants’ initiatives were much higher than the first part. At each stage of the patient’s journeys, I got many inputs from participants. No participants withdraw their inputs during or after the PDW.

One direct outcome of this PDW is opinions of different stakeholders on each stage of the two different testing services (see figure 9). While analyzing data collected from the workshop, one finding is that most stakeholders’ comments appeared in the first few
stages, from getting information to going to a test point, and stages where patients might get in contact with others, including staff of testing services. This finding is highly overlapped with patients’ experience charts (see appendix); in stages like getting information, booking and going to the test, and waiting for the test, patients’ experiences are quite low. The two patient experience charts are results of this qualitative research. Along with the patient experience charts, two patients’ journeys (see figure 7 and figure 8) are the results of the research as well. At each stage of the patients’ experience journeys, there’re five parts of the analysis: visualizations of the process, patients’ thinking, patients’ feeling, patients’ experience line, and opportunities. The highly overlapping pattern of patient experience charts and feedbacks I got from different stakeholders in the PDW and individual in-depth interviews is the reason that I choose to focus on those overlapped parts. (see figure 10) They are the beginning stages from getting information to going to a test point and touchpoints when patients meet other people throughout the testing service. Other parts of the testing service design I will only create a structure for them because of the time limit.

9 Design Outcome
With the results of my design research, I came up with a service design proposal for the HIV testing service providers in Sweden, including hospitals, clinics, and organizations like Noaks Ark. This design proposal could be deployed right away instead of in the future. The size of the project should be at least a community scale because the purpose of the project is to connect people and the healthcare system. It is not a group’s problem or a person’s problem. Instead, it is a societal problem, but we can deal with it together.
In this research, I found that scattered information about HIV testing together with the uncertainty about the availability of HIV testings create barriers for immigrants to take HIV testings. The most frequently asked questions in the PDW are where and when can they have a test? There is information on the internet about HIV, HIV testings, and health care centers or clinics that provide HIV testing services, however, they are not interconnected. For example, after reading information about HIV testing a person want to take an HIV test, he or she has to go to the testing providers’ websites or call 1177 (care guide service from Sweden’s county councils and regions) to check the availability of the test that they are providing. Most testing providers only offer the drop-in test instead of making an appointment to take a test. For many people, this is a concern that they might meet people they know when going to the test point. The uncertainty about the testing process is also a drawback of taking the test. There is no any website introduce the process of an HIV test. The HIV testing service varies depending on which HIV testing are taking, like NAT or antibody test. Moreover, as patients of the health care service, they have right to know it. Explaining HIV testing process is also a method to reduce HIV testing stigma. In the current situation, while researching HIV testing services the person might already lose initiatives to take an HIV test, because of the anxiety and uncertainty of HIV testing service.

9.1 Mobile App

My design response to this is a mobile application (app) that connects HIV information and local testing services in order to encourage HIV testing among immigrants.
9.1.1 User interface design
The design language of the user interface (UI) is trying to make the interaction of this app easy to understand for users. So “friendly” and “inviting” are two keywords of the UI.

9.1.2 User experience design
For the user experience (UX) design of the app, as a designer, I try to avoid creating a new way of interacting with different pages that might confuse users. Instead, primary ways of interacting have been used in the UX design. For example, click or tap is the most common trigger that has been using in this app to cause action, like go to a subpage. Time wheel is an interaction used in the booking part; it is commonly seen in the default alarm app in an iPhone or Android phone. By spinning the time wheel, users can choose the time they prefer to book an appointment for a test. No hidden gestures, like swipe right to see a menu or long press to drag, have been used in the app, because it takes time and effort to remember, and might lead to unnecessary confusion for users.

In the framework of the app, there are three parts: “information”, “booking”, and “consulting” (see figure 12). It consists of simply three parts because I want to make the app an easy to access tool for immigrants, it should not be complicated. In the first part, which is “information”, I choose to use video as a format to acknowledge HIV and HIV testing related information. The reason for choosing the format is the heterogeneity of immigrants group: their knowledge about HIV/AIDS varies depending on their level of education, geographical origin, and etc. The two principles of creating those videos for
the information part is easy to understand and choose the most important information to deliver. At the same time, trying to use visual to the maximum, because the perception of auditory wholly depends on the proficiency of the language that is using in the audio. The target group of this app is diversified immigrants in Sweden, many of them do not even speak Swedish or English. Consequently, it limits the effectiveness of auditory in a video. The most critical information is delivered visually, while auditory is also used in the video to acknowledge HIV related information. More information, which is in a lower priority, in each video is delivered in auditory. After watching the videos about an HIV testing service, users can click the book button to book the test directly (see figure 13). For instance, a user just watched the video about antibody testing service, he or she can just book an antibody test instantly in his or her city in the app. This is a strategy that to connecting HIV information and HIV testing in order to encourage users to take the tests.

The second part, which is “booking”, offers two different HIV testing services in their local cities for users to choose. As I wrote before, immigrants have the right to know the existence of two distinctive HIV testing, which is NAT and antibody test, and to choose whichever they prefer. When booking a test, users can choose time or place first depending on their priority and then choose a test point. The advantage of this interaction is users do not need to go back and forth pages when finding the time or place they prefer is not available. Give an example, at the first page I choose a date; then I choose a specific time of that day finding the available test points are too far from my apartment. Moreover, then I have to go back and forth to find a suitable time and place for me, which is not user-friendly. If users have been offered time and place to choose at the first page of “booking”, it increases few subpages in the framework of the
app but creates a more welcome sign for users. In this app design user-friendly comes first.

The third part, which is “consulting”, provides users more information from a local perspective. In the “consulting” part users can find three features: “call us”, “FAQ” (frequently asked questions), and “chat with us”. “Call us” basically is a feature that ties users with 1177 care guide service provided by Sweden's county councils and regions. By connecting 1177 to this app, it provides a more comprehensive guide for users who might need HIV testing service. In the “FAQ” page, users can find more information about HIV and HIV testing in a written form. It provides exhaustive information about HIV and HIV testing. In this part, users can find additional information that the videos in the “information” part cannot offer. It requires a little higher level of education to understand the information in this part, but the essential information to encourage HIV testing users can get from the videos.

“Chat with us” is a platform that users can talk with local volunteers depends on where you are by sending an instant message. Local volunteers can give users related information from a local perspective. Also, depending on their communication,
volunteers can give users personal suggestions. Take an example, a volunteer has many testing experiences and knows clinic A provides more privacy because of the room setting, so the volunteer suggests the patient to go there to avoid unexpected interaction with others. This instant message brings local people and immigrants together, creating an including social environment. This “chat with us” part is also a part that needs the most implementation including volunteers and an instant message platform for both volunteers and app users. It needs both financial and, mostly, human resources. At the initial stage of this app, it might not be enough volunteers to support this feature of the app fully. As a result, the “chat with us” part will be that users get a reply later instead of instant message and it needs iteration. With further development of this project, the instant message feature will be released at a later stage of this app.

9.2 Iteration

Iteration is essential for developing an app. An app is never complete without iteration. The information about HIV and HIV testing need to be updated to make sure users get the latest information. App iteration is an excellent way to add new features to an app at the right time. For instance, Instagram is a platform to share pictures; it launched a new feature called Instagram story where users can share a series of photos or videos that will disappear in 24 hours. Instagram added this feature in August 2016 that is almost six years after its initial release. So in the app that I am designing, comment on the testing service is a feature I want to include in the app because it gives patients the opportunities to influence the testing services, which gives patients ownership of the healthcare system. For testing providers, it is a platform to hear patients’ voices and get feedback from them in order to improve the testing services. However, this feature will not be available at the initial stage of the app, because at the initial release I want to keep the app as simple as possible. Additional features will be only added at the right time in the future.
9.3 Promoting the app
The app is one of the solutions that I am proposing in this service design project. However, only designing an app will not solve the problem in the healthcare system without reaching the target group. Consequently, how to promote the app to my target group, which is immigrants in Sweden, is another question waiting to be resolved. Venues, where immigrants meet, are the places to promote this app. The venues could be either online or offline. The online promotion part will take place in popular dating apps and social media. According to Statista (2018), the top 5 used dating apps in Sweden are Tinder (7%), Happy Pancake (5%), Badoo (5%), Mötesplatsen (5%), Match (5%). In the statistics, there’s only 1% population use Grindr, but it is one of the most popular gay dating apps so it will also be included. Favorite social media venues like Facebook, Snapchat, and Instagram will also be the platform to promote this App. Putting advertisements of the app in those apps mentioned above is the strategy to reach a broader range of people. When the advertisement appears in users app, by tapping the advertisement users will jump to App store or Google play where they can read more information and download the app. Offline promotion of this app is between advertising and cooperation with local stores and organizations. Using acrylic sign holder to display promotion information of the app is a primary offline promotion way (see figure 14). It could be placed on tables or shop counters where are easy to be noticed by customers of local organizations or shops. The information contains a quick response (QR) code so that people who see it can easily download the app by scanning the QR code displayed. There will be other forms of the information to promote this app as well, like posters that could be hanging on a wall or a bulletin board.

The promotion of the app will not only focused on people after immigration but also at immigration. Previous researchers collected data from 253 infected immigrants; the majority (141) of them had lived in Sweden for more than one year at the time of diagnosis. Two-thirds of them had missed a testing opportunity at immigration (Brännström et al., 2016). By promoting the app at immigration to decrease the missed opportunity. It requires strategical cooperation with Swedish government especially migration sectors. The promotion part of this project is more challenging to implement because the enormous amount of financial resources and cooperation will be needed.

9.4 HIV testing guideline
Another solution for the health care deficiency is testing guidelines for staffs who work at an HIV test point. This is a design concept for testing providers in Sweden. The guidelines are based on the patient’s journeys so there is one HIV testing guideline for NAT, and another one for antibody test (see figure 16 & figure 17). Recent research by Folkhalsomyndigheten (The Public Health Agency of Sweden) about the application of the infection control rules for HIV infection have been published. In the report, the researchers have found that: “it was rare to have written guidelines for which topic to address when meeting HIV patients” (Folkhalsomyndigheten, 2018). Without guidelines, HIV testing services differ much depending on the interpersonal skill of the staff who work at the test points. This report shows that there was a lack of guidelines in the healthcare system. Moreover, the HIV testing guidelines that I am proposing could fill this vacancy.
10 Conclusion

Immigration is becoming a widely discussed topic in Sweden, and it has been causing integration issues. People are coming to Sweden from different countries with different backgrounds. The healthcare system needs improvement according to this demographic change. Patients of the healthcare services need to be in the center of it, which requires different stakeholders to rethink about the overall structure of the healthcare system, like how to shift from a rational medical system to a user-centered one. This HIV testing service design concept is an example of dealing with diversified immigrant's group. The healthcare service not only takes place in a testpoint or a hospital, it starts way earlier than a patient step into a testpoint. The mobile app is a platform that patients could interact with the HIV testing services before they decide to take an HIV testing. Users are always in the center of this app: simple framework and inclusive visual communication language make it easy to use regardless the levels of education of users. It encourages people to get tested by providing essential information about HIV to users.

This app connects HIV information and HIV testing services from a local perspective. After watching a video about the latest HIV information users of the app can book the right HIV testing directly in the city where they live. The development of this platform does not only depend on one stakeholder. Instead, it needs extensive cooperation among different stakeholders both nationally and locally. This is my proposal for HIV testing service in Sweden dealing with increasing HIV cases in immigrants group. Once again, HIV epidemic is not any single group's problem; it is our society's collective problem. Only by standing together can we make it change.
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Appendices

Appendix 1

Patient’s journey of HIV Antibody testing services
Appendix 2
Patient’s journey of HIV Nucleic Acid testing services
Appendix 3
Request for Participation in Student Project

Request for Participation in Student Project

Project name: Service Design for HIV Testing in Sweden
Student name: Bowen Zhao
Institute: Design dept., Linnaeus University

Background and Purpose
I’m a student who’s studying Master Program in Design at Linnaeus University and this workshop is part of my thesis project: Service Design for HIV Testing in Sweden. In my thesis project I’m using Participatory Design method to find possible solutions for the deficiency in the healthcare system in HIV testing service in Sweden. The purpose of this workshop is to gather different stakeholders, and to understand different stages of HIV testing from their distinct perspectives in order to improve it, shifting from a medical rational service to a user centered service.

What does participation in the project imply?
The whole HIV testing service has been divided into different stages, participants will be asked about their thoughts and ideas of each stage of the testing service. Participants’ thoughts and ideas will be collected both verbally and in writing. In addition, the workshop will be documented in photo and video.

What will happen to the information about you?
The participation of this workshop is totally anonymous. All personal data will be treated confidentially. Only the researcher, which is me, have the access to the data that collected in the workshop. The data analytics will be written in my thesis, which will be published at DIVA https://lnu.se/en/library/Publish-in-diva/. I will send the thesis to participants on request before the publication. The photos and videos took in the workshop will be used in my design project. Any participant in the workshop will not be recognized in the publication. The project is scheduled for completion by 1 May 2018. After that, my design project will be part of the exhibition that will be hold at Växjö Konsthall from 19 May. All participants are invited to the exhibition.

Voluntary participation
It is voluntary to participate in the project, and you can, at any time, choose to withdraw your consent without stating any reason.
If you would like to participate or if you have any questions concerning the project, please contact me: bz222au@student.lnu.se

Consent for participation in the study
If you choose to stay it means you are willing to participate in the study by mutual consent.
Appendix 4
Patient’s experience charts
Appendix 5

App framework sketch

- Videos about HIV, HIV testing, and process:
  - Easy to understand, language barrier,
  - More interesting to watch.

- Encouraging testing → reduce stigma.

- Videos of information
- HIV testing

- Rapid test (antibody test)
- Nucleic acid test

- Q
- Phone
- Place
- Time
- Place

- Chat with staffs
- Q&A forum
- Consulting

- What's HIV?
- Why test?
- How it work?
- Rapid test
- Normal test

- Difference?

- Organizations: RX, Addict...
Appendix 6
App prototype sketches
Appendix 7
Documentation of workshop and app development
Appendix 8
App interaction prototype

Appendix 9
Exhibition report
A graduate exhibition could be used as a way to continue working on students’ works. However, for me, it is a platform to show what we have done in our thesis project and delivery the ideas to a large audience. Therefore, instead of using metaphors or artistic ways to show my project I want to display the direct outcome of my thesis project in my individual exhibition.

As a part of a collective exhibition, I started with my individual exhibition booth or space design. In the beginning, we thought the idea of using construction fences have already been decided, so we all stuck to the industrial feeling of the fences. Like the graphics production group that I am in; the mood boards that we created to find inspirations are all related to the industrial fence’s feelings. So did I; my previous sketches were based on a fence, although I did not go into the details of a specific fence.

Exhibiting is another way of telling a story of a design project. It is just like the project report or the presentation I did in the thesis defense; however, there are some differences like the format and the target audience. For a project report or a thesis defense presentation, the target audiences are still in the academic bubble, although, there might be some visitors outside academia in a thesis defense. As an owner of the project, I have to think about what to show and what not to show to a large audience in my individual exhibition. In other words, I need to rethink about how to tell the story. In a perspective of storytelling, there are three components: the current problem, the design process to solve the problem, and the design solution. In my thesis report, the proportion of “the current problem” part and “design process” is more significant than the “design solution”. To deliver my idea and show my design solution to the mass audience, I decided to focus on the
“design solution” part of my project. It does not mean that I will not exhibit the problem itself and how did I find the solution to it, nor do I not think those two part are essential.

My project involves many statistics related to HIV and healthcare deficiencies in Sweden. For average visitors, I think visual communication is the most efficient way to show those statistics as a background of my project. So I plan to use infographics as a starter to telling the story. As you can see in my sketch, there’s an infographic board, and the back side is the two patients’ experience journeys. Due to the limited space, I revised my plan to only one side combining the infographic and patients’ experience journeys. Below the graphics board is a space to display the App “TESTED” that I designed for the Swedish healthcare system and the way to promote it. In my thesis defense, the way to promote this App was using advertisement in regular shops or venues where immigrants meet, which has the possibility to expose immigrants and increase their vulnerability. After that, I have been thinking about feedbacks that I got from teachers, which is the visibility of the App. Besides, timing is also a factor need to be considered. After immigration, immigrants are scattered all over Sweden. So while immigrating is excellent timing to promote the App. I came up with the “welcome kit” idea that every immigrant gets a tote bag with much information about Sweden including the information of TESTED. In this way, the App hides among other materials in the tote bag.

I planned to buy many tote bags that visitors can take in the exhibition. Whereas because of the limited budget and time, I did not manage to buy them online. Instead, I bought two printed tote bags to use for the exhibition. Because one side of each bag is already printed, I had to print something on top of it to cover it and make them to my own design bags. The screen printing turned out pretty good, and I am satisfied with the results.

The information of TESTED is on an A6 size card. In the real proposal, there should be a brief description of TESTED in different languages depends on where is an immigrant from. However, for the exhibition, I will focus on the interaction between the tangible materials in my individual exhibition and visitors. A series of actions including open the tote bag, pick up an information card of TESTED, scan the QR code and try out the App prototype is what I have been trying to trigger in my exhibition. I want visitors to feel the way they read the in-

formation about TESTED is secured. Also, this is a different approach when compared to the one I used in my final defense.

While designing my exhibition booth, I was also working on graphics for the exhibition. Freja
and I were working on the postcard design, which is an even smaller way to present our works. Each exhibitor will have a postcard that visitors can take with after visiting the exhibition. The front side of each postcard is a picture of each student’s project, and the back side is a short description of his or her project with contact information. I have produced some visual materials for my final defense presentation that I can use as the front side of my postcard. However, I need to adjust the size to the A5 size. After printing out an A5 sample of my postcard design, the quality changed too much. I guessed the reason is that I used a transparent layer as a background, and it might end up with a poor quality of the image because of the unknown setting of the printer. So I decided to make a new one using the turquoise identity color of the UI (user interface) design. As you can see in the picture, I chose seven App pages that can represent my project. I think those App pages can show people what I have done in this project. Moreover, it is an attractive visual presentation of the back side, which is the project description.

The graphics board is made of two parts: the infographics and patients’ experience journeys.
Appendix 11
TESTED QR code card