

# Healthy Entrepreneurs Project: Preventive Goods

An empirical case study of how to improve the sales of  
preventive medicines in Uganda

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## Abstract

This paper studied the sales of and demand for preventive medicine in Uganda. Twenty researchers of EFR participated in this study commissioned by Healthy Entrepreneurs (HE). It is studied if and how HE consumers and HE entrepreneurs can be financially and non-financially incentivised to respectively buy and sell more preventive goods. To investigate this, desk research was conducted in the Netherlands and field research in the form of surveys and focus groups was conducted in the Ugandan districts Mubende, Kibaale and Mukono. On the consumers' side, the lack of information about preventive goods and severe financial constraints were found as most important reasons for low demand for preventive goods. One of the main reasons causing the lack of information is that the tablets with information about HE health products were not found to be used effectively by the entrepreneurs. Results suggest that sales trainings and business knowledge can improve entrepreneurs' performance. Summarised, both consumers and entrepreneurs seemed to be incentivised financially and non-financially to buy more preventive goods, but it is advised to HE to focus on non-financial incentives in the short-term.

*Keywords: Preventive medicine; Incentives*



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# 1 Introduction

In many developing countries, access to affordable and reliable primary health care products is scarce. The majority of the families live hours, if not days, from the nearest source of life saving medicines and health products; this is also the case for Uganda. Even though the health situation in Uganda has significantly improved over the last decade, for instance life expectancy has increased, child mortality rate has decreased and fertility rate per woman has decreased, there is still a lot of room for improvement (WHO, 2016). The total health expenditure per capita in the region is fifteen times lower than the global average and about 5.7% of gross domestic product is spent on health care (WHO, 2008). The public health care system also has some problems like absenteeism, corruption and mismanagement (Lewis, 2006).

Four out of five most occurring causes of death can be prevented and treated with simple, affordable interventions. These include mosquito nets and mosquito repellent spray for malaria, condoms for HIV and aids, diarrheal diseases can be tackled by antibiotics and respiratory infections can be reduced by mouth caps and antibiotics (WHO,2016). Estimates from the Ugandan Ministry of Health show that around 16 million cases of malaria occur every year and UNAIDS shows that in 2015 around 1.5 million people were living with HIV. Target 8E of the Millennium Development Goals targets the need to improve the availability of affordable medicines for the world's poor in cooperation with pharmaceutical companies (UNAIDS, 2015). In Uganda some NGO's and social enterprises try to address these problems first hand; among them is Healthy Entrepreneurs.

Healthy Entrepreneurs (HE) is an organisation that creates access to reliable and affordable health products and services in remote and untapped areas in developing countries. HE now works in Uganda, Haiti, Ghana, Tanzania and the Democratic Republic of Congo with 2000 entrepreneurs in total. They deliver their products and services through a network of qualified micro-entrepreneurs who run their own franchises with a complete basket of health commodities. In this way HE not only delivers high quality health products, but also creates a fair and stable income for their entrepreneurs. Among the products they sell are preventive goods, like food supplements, condoms, and mosquito repellent spray, and curative goods like antibiotics and malaria medicine.

HE's sales data show that curative goods sell better than preventive goods. This is not only the case for HE, but it is a common problem in developing countries, including Uganda. Many people in Uganda do not buy preventive goods, even if this would be beneficial for their health and cheaper than using curative medicine (Lengeler 2004). It seems that people prefer to cure their disease rather than to prevent the illness. This raises the question why this is the case. The aim of the research is to gather a better understanding of Ugandan people's priorities when consuming goods, and more specifically medical goods, in order to see what we can learn about their demand preferences, and see how we can influence consumers' behaviour in a way that they buy more preventive goods or in other words how we can nudge the locals' preferences.

Hence, the research question is:

***How can we nudge the locals' preferences for preventive goods in order to improve the health standards in Uganda?***

To answer this research question the twenty researchers are split up into three different Ugandan districts, namely Mubende, Kibaale and Mukono. The research question is split up in different hypotheses that will be described below.

The role of salesmen's motivation in achieving company goals has been linked to the financial incentives that they are given. Darmon (1977) shows that financial incentives are effective in motivating salesmen if management know how the salesmen will react to these incentives. More recently, De Walque et al. (2015) assess the implications of the setting of financial incentives in the healthcare industry. In this case, they consider the effects of giving performance based financial rewards to medical care providers on the improvement in the utilisation and quality of

care for HIV testing and counselling (HTC) services. The results show that Rwanda's pay for performance scheme strongly encouraged couple and partner testing. Another way to nudge locals' (entrepreneurs' and consumers') preferences towards preventive goods, is using non-financial incentives to influence their behaviour. A term that has been rising in popularity is the term Health literacy. Health literacy 'refers to the personal, cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health' (Nutbeam, 2000). This includes not only gaining more knowledge about certain diseases, but also changed attitudes and motivation towards health behaviour. Furthermore, various studies, such as that by Ashraf, Bandeira, and Jack (2014), confirm that both financial and non-financial incentives are effective for stimulating Health Workers (HW). However, a survey conducted by McCarthy and Holbeche (2003) revealed non-financial incentives such as formal recognition may even have a longer-lasting impact on motivation than financial rewards.

Therefore, the first and second hypotheses are based on incentives for entrepreneurs to sell more preventive goods. The third and fourth hypotheses are based on incentives for consumers to buy more preventive goods. The first hypothesis, which focuses on financial incentives for entrepreneurs is:

***H1: Giving entrepreneurs financial incentives for selling preventive goods will have a positive effect on their preference for selling preventive goods.***

This hypothesis is tested in the Ugandan district Mubende.

The second hypothesis, which focuses on non-financial incentives for entrepreneurs is:

***H2: Giving entrepreneurs non-financial incentives for selling preventive goods will have a positive effect on their preference for preventive goods.***

Non-financial incentives for entrepreneurs in this hypothesis are defined as formal recognition for entrepreneurs and reminding entrepreneurs of the benefits of preventive goods for the community. Therefore, this hypothesis is split up in two subparts:

*H2a: If formal recognition is given after selling more preventive goods, then more entrepreneurs will be motivated to continue promoting and selling said good.*

*H2b: If there is a greater focus on reminding the entrepreneurs about the benefits of preventive goods for the community, then they will be more persuaded to sell preventive goods.*

This hypothesis is tested in the Ugandan district Kibaale.

Furthermore, consumers' demand on health-protecting goods is highly elastic. Therefore even a small increase in price will lead to a drastic decrease in quantity (Tarozzi, Mahajan, Blackburn, Kopf, Krishnan & Yoong, 2014). Thus, the third hypothesis is:

***H3: Severe financial constraint is one of the reasons for low demand for preventive goods.***

Finally, the last hypothesis focus on the non-financial incentives for consumers and is as follows:

***H4: Giving consumers non-financial incentives for buying preventive goods will have a positive effect on their preference for preventive goods.***

Non-financial incentives for consumers are defined in this research as community based promotion of information about preventive goods. The third and fourth hypotheses are tested in the Ugandan district Mukono.

The remainder of this research paper is structured as follows. Firstly, a literature review will be given. Secondly, the general data and methodology section will be discussed. Thereafter,

the three district studies will be split up in three separate sections. Each section will have an own introduction, data and methodology, results, limitations and conclusion section. Finally, the overall conclusion will be stated and recommendations for further research will be given.

## 2 Literature

There are two common approaches to motivate people, in this case to motivate the entrepreneurs to boost sales of preventive goods: financial and non-financial incentives. Various studies, such as that by Ashraf, Bandeira, and Jack (2014), confirm that both financial and non-financial incentives are effective for stimulating Health Workers (HW). Additionally, a study by Dieleman, Cuong, Anh, and Martineau (2003) shows that motivation is influenced by both financial and non-financial incentives. They find that low income is the main discouraging factor, but that at a certain level of motivation does not increase when income does.

According to Henderson and Tulloch (2008) financial and non-financial incentives should be combined. Financial incentives have been shown to be an important motivating factor for health workers, especially in countries where government salaries and wages are insufficient to meet the basic needs of health workers and their families. These incentives include higher salaries, salary supplements, benefits and allowances. Countries such as Fiji, Samoa, Tonga, Vanuatu, Papua New Guinea, Vietnam, Cambodia and Thailand have identified low salaries as a major reason for job dissatisfaction and/or migration among health workers. Improved salaries and benefits are major financial incentives for workers to remain in the health sector. For example, since the mid-1990s Vietnam has encouraged doctors to work in communes in remote and disadvantaged areas by establishing permanent state staff positions with salaries and allowances from the state budget. This measure has improved the overall numbers of medical doctors working at the commune level in Vietnam; however, there is wide variation between provinces. Findings from a survey in Bangladesh of one hundred government-employed doctors with private practices indicate that doctors in primary health care would give up private practice if paid a higher salary, while doctors in secondary and tertiary care reported a low propensity to give up private practice.

### 2.1 Financial incentives for community health workers in developing countries

De Walque et al. (2015) assesses the implications of the setting of financial incentives in the healthcare industry. In this case, they consider the effects of giving performance based financial rewards to medical care providers on the improvement in the utilisation and quality of care for HIV testing and counselling (HTC) services. By using a quasi-experimental design, they examine the impact of this national financial incentive scheme on individual and couples HIV testing across district in Rwanda that began in 2006. This scheme tried to increase HIV testing by paying health providers for increase participation in HIV testing and counselling, with larger payment provided to couple HTC than individual HTC. The experiment was designed in the following: districts were randomly assigned into either a treatment group that began receiving performance based finance in January 2007 or a control group that began receiving payments in July 2008 (18 months after). Their results indicate a positive impact of the pay for performance scheme, concentrated among individuals in couples, on the probability of individuals having ever been tested. The findings also show larger impacts of pay for performance on HIV testing by both partners, especially among discordant couples in which only one of the partners is identified as HIV positive. Paying for performance increased testing by both partners by 14.7 percentage points among these couples. This gives evidence that paying health facilities for performance may be a feasible and effective method for improving health system performance under certain circumstances.

Eichler, Auxila, & Pollock (2001) looked at performance based system by NGO's in Haiti and how effective it was in delivering primary health care services. Previously they worked with a system which reimbursed expenses until a certain ceiling. The new system considered performance targets and granted a bonus when these were met. This had a positive effect. They found that performance-based contracting increased immunization coverage in all three NGO service areas and the use of oral rehydration therapy also increased, for example. Shifting the focus to results by the possibility of earning bonuses sharpened NGO staff's focus on achieving goals and led to innovation, including greater efforts to involve the community. Overall, there were some distinct improvements in performance through the use of financial incentives.

In the case of HE in Uganda, most entrepreneurs have another job in healthcare, next to their entrepreneurship. In Cambodia health workers also often work several jobs. In a research of the Ministry of Health (2005), they tested how much financial incentives were necessary to make the health workers devote all their time to their community health work. A survey of 320 health workers in Cambodia identified their main sources of income, explored their motivations for remaining in the public health sector and investigated the size of the financial incentive required to retain and motivate health workers. The results showed it would cost around US\$0.30 per capita to ensure that all doctors devoted 40 hours per week to public service; this represents an increase of approximately 16 percent in government health spending. This shows that financial incentives can help to increase the time health workers spend on their jobs. As such, we hypothesize that giving entrepreneurs financial incentives for selling preventive goods will have a positive effect on their preference for preventive goods (H1).

## **2.2 Efficiency risks of financial incentives for health workers**

Financial incentives might not work effectively in certain cases when for example the health workers don't have enough knowledge or if they start overproducing to earn more money.

In studying the implementation of a 'fee for service' mechanism in Democratic Republic of Congo, Huillery and Seban (2016) assesses the effects on motivation and performance of health workers. They conduct a field experiment in the Haut-Katanga district between 2010 and 2013. The 96 health areas of the district were randomly assigned to performance based or fixed payments, holding fixed the amount of resources for each health clinic. The study finds that the 'fee for service' mechanism induces an intensification of effort to increase utilisation of targeted health services. The incentivised health workers organised more preventive health sessions, with a 43% significant increase of preventive sessions offered by incentivised workers. However, Huillery and Seban (2016) find that the workers strategies to attract more patients are counterproductive. Although incentivised workers engaged in more direct selling, they also significantly reduced their fees and did not change service technical quality. This resulted in a loss in revenue, which may have signalled lower performance. The incentivised facilities suffered from a 42% decrease in total revenue and a 34% decrease in worker revenue. Overall, while Huillery and Seban (2016) show that fee for service schemes may increase motivation without detrimental effect on non-incentivised actions, they also suggest that financial incentives may lead to misplaced effort.

Liu and Mills (2005) tested this in hospitals in China. Hospital reforms in China have been some of the most radical: the government budget for public hospitals was fixed, and hospitals had to rely on charges to fill their financing gap. Accompanying these changes was the introduction of performance-related pay for hospital doctors. While the policy objective was to improve productivity and cost recovery, it is likely that this would incentivise doctors to operate regardless of whether the care was medically necessary. The study found that bonus system change over time contributed significantly to the increase in hospital service revenue and hospital cost recovery. There was an increase in unnecessary care and in the probability of admission when the bonus system switched from one with a weaker incentive to increase services to one with a stronger incentive. This suggests that improvement in the financial health of public hospitals was achieved at least in part through the provision of more unnecessary care and drugs and through admitting more patients. This shows that financial incentives can work contradictory in terms of efficiency.

## **2.3 Motivational risk of increasing financial incentives**

Financial incentives might also cause negative effects. Heyman & Ariely (2004) made a distinction between monetary and social markets. The use of a monetary reward for something that has been defined as a "social" effort could have negative effects. Similarly, Frey, B. S., & Jegen, R. (2001) suggested that extrinsic motivations, such as financial incentives can crowd out a person's intrinsic motivation. In a study with Nepalese health volunteers, stakeholders saw volunteers were motivated by social respect, religion and moral duty. The respondents also suggest that even though non-financial incentives may not be sufficient for the volunteers, that

salaries could also weaken the social respect given to the workers (Glenton, Scheel, Pradhan, et al., 2010).

## 2.4 Non-financial incentives for entrepreneurs

A survey conducted by McCarthy and Holbeche (2003) revealed non-financial incentives such as formal recognition may have a longer-lasting impact on motivation than financial rewards. For HE this provides a compelling argument for implementation of non-financial incentives as they may be more cost-effective in the short run as well as have longer lasting effects. Hence, this section aims to explore how non-financial incentives may be used to impact entrepreneurs.

Colvin (2013) defines incentives through three different levels: direct, indirect, and demand-side incentives. Within each level there are different incentives, as presented in Table 1 below.

Table 1: Common categories and examples of CHW incentives.

<b>Non-Financial Incentives</b>
<i>Direct Incentives</i>
Job satisfaction/work environment: autonomy, role clarity, supportive/facilitative supervision, manageable workload
Professional development: continuing training, effective supervision, study leave, career path that enables promotion and moving into new roles
Formal recognition by colleagues, health system, community, wider society
<i>Indirect Incentives: COMMUNITY-LEVEL</i>
CHW witnessing visible improvements in health of community members
<i>Demand-Side Incentives: COMMUNITY-LEVEL</i>
Community members witnessing and grateful for visible improvements in health of its members
Successful referrals to health facilities

Studies have noted the importance and effectiveness of supervision. Various systematic reviews have said supervision is generally effective in increasing HW motivation, increasing HW job satisfaction, and serving as a method of professional development (Lanata, Rowe, Savigny, Victora, 2005). This may be why studies conclude that for people who consider their job and salaries satisfactory, nonfinancial motivators are more effective than extra cash in building long-term employee engagement (Gibbons, 2006). Furthermore, it is the challenges to implementing quality supervision that are more prominent issues as of now, since managers and policymakers generally agree on the value of supervision itself (Lanata et al, 2005). This can easily be addressed by creating low-cost strengthening systems, such as small rewards (Lanata et al, 2005).

A non-financial reward, can be defined as a “non-cash award given in recognition of a high level of accomplishment or performance, which is not dependent on achievement of a predetermined target” (Rose, 1998). Supervision as a form of formal recognition, or those in which have higher authority than the Entrepreneurs such as cluster managers or district managers, may aid in this form of reward serving as a non-financial incentive. Non-financial incentives can be distinguished among many types, however, this paper will focus on the most fundamental level, praises. One way to praise the entrepreneurs for their work is by providing certificates, which are considered all-important for HWs (Hillary, 2000). In other words through supervision which acts as a form of formal recognition praises will be given through certificates. Therefore, we expect that giving entrepreneurs non-financial incentives for selling preventive goods will have a positive effect on their preference for preventive goods (H2).

## 2.5 Societal non-financial incentives

On the other hand societal incentives, which are incentives that stem from society and a person’s social relations, may also help to promote the sale of preventive goods. According to Amare (2009) HW have a strong desire to help their community.

HE can meet societal involvement of HW by implementing simple elements into their business model, like educating them through their tablets and send texts to remind them about the previous learned information about preventive goods. This solution has been tested by Mobile Health projects, because of the emerging ownership of mobile phones in Africa. Multiple studies on M-health believe the use of mobile phones for health promotion provides a cheap and effective way to reduce the gap in health information and increase disease prevention (Aranda-Jan, Mohutsiwa-Dide, & Loukanova, 2014). A study of Zoruvac et. al (2008) shows that when HW in Kenya received multiple reminder-messages about the national guidelines for treatments and what symptoms to check for, the quality of their treatment and the adherence to national guidelines increased. This kind of one-way communication is an easy and inexpensive way of influencing the behaviour of HW by, for example, sending the entrepreneurs texts about the importance of preventive goods and how many lives they can save on average. According to Zoruvac et. al (2008), making use of technology complements the more traditional interventions like supervision and recognition, as discussed in hypothesis 6.

According to several policy makers in developing countries, ICT interventions could lead to better understanding of the benefits of preventive goods and in the end behavioural change (Shields, Chetley, & Davies, 2013). One example is set in Uganda: public HW receive a handheld computer which contains records of all the patients and impact of their actions, which motivates them follow the proper procedure with every patient as they have a clear overview on how to do so.

Haines et. al (2007) states that community based HW can play a significant role in preventive interventions as promoting healthy behaviour and explaining the use of preventive goods. Training and strict rules are necessary for optimal performance. Important non-financial determinants of the success of HW are leadership and empowerment, which are achievable by gaining skills through trainings, peer support and active involvement of the community. All three means are important for HE to gain a better understanding of the community's development. Intensive training creates leaders by them how to approach and correctly diagnose the illness, what the possible effect of their treatment or advice will be and how to negotiate with villagers. Peer support by fellow-entrepreneurs and support from the community creates intrinsic motivation by making them feel an important member of a group.

## 2.6 Financial constraints for consumers

The concept of microfinance grants an easier access to financial services, as well as mobilises savings for the small-scale and/or medium-scale businesses; it also targets low-income individuals and households (Basu, Blavy & Yulek, 2004). This in result enables access to daily consumption at a cheaper rate.

A small yet significant number of highly effective microfinance programmes have demonstrated that low-income clients can use small loans productively, repay them back on time when given reason to do so. For instance Mishra (1994) finds that the application of microcredit within crop industry resulted in loan repayments in absolute terms. Additionally, the author depicts a significant increase in the flow of credits to other farmers who previously felt very sceptical towards the programme. The article by Khandker (2005), finds that the delivery of financial services to poor as well as low-income people reduced poverty alleviation by more than 25%. The supporting evidence also comes from Chowdhury, Ghosh and Wright. In this case the data on households was collected for more than 8 years; it was found that after 8 years of using microfinance program the poverty rate declined from 65% to 45%. Furthermore, when incentives were present, household effectively repaid loans with additional margins. This in turn corrects earlier notions that the poor segment cannot use credits effectively, do not have the capacity repay loans, cannot afford to pay high interest that reflects the real cost of funds, and do not generate sufficient surplus funds to enable them to save.

The existing literature analyses both formal and informal micro-credit lending. The most successful is the informal model, since it is typically applied in developing countries where poverty rate is high. It targets individuals, household and regions that are still isolated from stabilised mechanism of borrowing and lending. The correct organisational structure, as well

as correctly computed interest margins do attract poorer household (Aryeetey, 1995). Meaning that with the applicable level of communication, people are willing to try newer methods of financing.

The concept of microcredit in further can be extended to an application of a loan without traditional collateral. As borrowers usually possess no physical capital, the updated lending system induces social collateral, via group lending. Group lending encompasses a variety of methodologies, but all based on the principle of joint liability. In such a case, each group member is made responsible for the loan of other group members. Therefore, if one individual defaults, the other group members are required to cover the loan from their own resources, if they don't, they lose access to future loans (Brau & Woller, 2004). Nonetheless, both factors as culture and region of interest play a crucial role in determining the demand for such financing policy.

In any case, financial constraints prove to significantly hamper access to medicine, which could possibly be partially solved through the implementation of microfinance programs. Knowing that consumers' demand on health-protecting goods is highly elastic (Tarozzi et al., 2014), we therefore hypothesize that severe financial constraint is one of the reasons for low demand for preventive goods (H3). If financial constraint indeed prove to be a main obstacle, this suggests that microfinance programs might be an appropriate solution.

On the other note, Buckley (1997) claims that regardless of such a rapid increase of microfinance institutions, their impact is not yet proven to be positive, sustainable and significant. Nonetheless, the author emphasises high repayment rates in Africa. Basu, Blavy and Yulek (2004) found that after introducing microfinance program, the demand for deposits and credits increased significantly. The implementation of such program also induced improvements within banking sector. In addition, Afrane (2002) found evidence that not only demand sector had improved, there was also an effect on employment rates. It was found that both Ghana and South Africa increased its labour force by 43% and 44%, respectively. Thus, the public opinion is of a great interest, since it tends to determine the success rate for applying the financial implications in yet still developing regions.

Recent studies have also evaluated the perception of preventive care in Uganda by conducting surveys. For instance, the perception of one of Uganda's leading causes of mortality, malaria, has been investigated in Mbarara, via focus group discussion and interviews with community members. The study concludes that more than 70% of the patients with malaria have had treatment from non-public health sources, including self-treatment (13%), use of traditional healers (12%) and private medical practitioners and pharmacists (69%) (Nuwaha, 2002). Roughly 27% used bed nets to prevent malaria. People cited discomfort because of heat/humidity and high costs as their main reason for not using a bed net.

Furthermore, the results of a nationally representative survey examined the level of preventive care surrounding HIV. They show that only a minority of HIV-infected adults in Uganda knew they were infected and few used condoms. However, the knowledge of HIV status, both one's own and one's partner, led to an increase in condom use (Brunell et al, 2008). In this context Nakanjako et al. (2007), consider the acceptance of routine testing for HIV among adult patients at the medical emergency unit at a national referral hospital in Kampala. HIV testing is an entry point for prevention and care. In Uganda, routine testing and counselling is not widely offered. Overall, 83% were unaware of their HIV status and 88% of those had visited a health unit in the previous six months. Of those eligible to test, 95% accepted.

## 2.7 Role of attitudes and culture

In East Africa, medicine are often sold through unlicensed drug stores or other non-official channels, and as a result, many medicine are used in a wrong way. Often, people use medicine for a wrong purpose, in a wrong manner or in a wrong dosage (van der Geest, 1999). This can have very harmful consequences, for example in 1999, it was found that 70% of the medicine purchases took place outside medical settings (i.e. hospitals or pharmacies), with no or little involvement of qualified prescribers. However, if the people that sell medicine, like normal

shopkeepers, receive some kind of training, it has a tremendous positive effect on appropriate drug use (van der Geest, 1999).

Another study revealed that campaigns about diseases can help to raise awareness in Uganda, although it is slightly unclear what the effect is on behaviour. In Uganda, it has proven to be important to involve many influential people and institutions in the campaign such as NGOs, chiefs, Christian and Muslim groups, local influentials, government institutions etc. (Allen & Heald, 2004). It is important that certain (preventive) medicine like condoms become socially accepted, which is a major challenge due to conservative (religious) groups that have quite a lot of influence in society (Allen & Heald, 2004). It was found that the effect of health education on behaviour is always heavily confounded and influenced by other factors, and that health education only has an effect when the information given is linked through procedures of compliance.

In another study, it was found that cultural practices can hamper prevention of diseases. For example, although Ugandans have a fairly good knowledge about AIDS and how it spreads, their strategies to reduce the risk were limited, for example due to the cultural practices that men can and should have multiple sexual partners (McGrath et al., 1993). The study suggests that knowledge of a disease alone is not enough to reduce the risk of infection, as cultural behaviour has a major influence. As such, to achieve change, it is necessary to combine knowledge and culturally permissible behaviour change (McGrath et al., 1993). Another important factor in stimulating change is recognising people's needs, such as economic needs (McGrath et al., 1993). Due to these non-financial factors that influence consumers' demand for preventive goods, we suspect that non-financial incentives could play a significant role and potentially increase sales. Therefore, we expect that giving consumers non-financial incentives for buying preventive good will have a positive effect on their preference for preventive goods (H4).

## 2.8 Health Marketing

Health marketing is a form of social marketing, which is the use of traditional marketing aimed at "changing or maintaining people's behaviour for the benefit of individuals and society as a whole" (NSMC, 2016). In the case of health marketing, it involves "creating, communicating and delivering health information and interventions using customer-centered and science-based strategies to protect and promote the health of diverse populations" (CDC, 2005). The central idea behind health marketing is that traditional marketing techniques can be used to effectively educate, motivate and inform the public on health issues. The traditional marketing techniques are therefore applied to health products, services or messages, such as the use of the 4P marketing mix of Product, Price, Place and Promotion. A key difference, however, is that the aim of health marketing is not to benefit the seller, as it is in traditional marketing, but to benefit the buyer – that is, by improving the health of the general public (CDC, 2005).

Key aspects of health marketing includes truly understanding the behaviour of your customers. Behaviour is usually multi-faceted and depends on people's knowledge, attitudes and beliefs. To change behaviour, you need to understand and influence these aspects as well. To do so, a strong customer orientation is essential, and you first need to make sure that you fully understand people's lives, needs and their perspectives. Health marketing also faces some criticism, for example the accusation that it is manipulative to influence behaviours, and that responsibility is placed with individuals rather than with the government or health care institutions (Grier, Bryant, 2005). To counter these criticisms, Grier and Bryant (2005) argue that health marketing should always be based on research and should always aim to serve the interest of the customer. Moreover, Grier and Bryant (2005) argue that social marketing should always include consumers as partners, rather than as subjects, making sure that customers have a say in the marketing and behaviour-change process and centralising the customer in the process. A useful tool is community-based marketing, in which communities are actively involved in the marketing research, which helps to balance power differences between the health professionals and the customers, while both groups can benefit from the marketing approach to social change (Grier & Bryant, 2005).

The focus of the marketing research will be on Communicable, maternal, neonatal and nutritional diseases, because these diseases are acute diseases and are it is generally easier to take measures to prevent or cure these diseases than the Non-Communicable diseases. For this research, products with a large health impact are considered products that prevent or cure diseases that are on the list above, although the focus will be on the preventive medicine rather than the curative. If these products are combined with the products that are provided by HE, this will result in the products that are interesting for the marketing research.

## 2.9 Preventive medicine per disease

This is an overview of the preventive medicine available per disease. This overview is not complete, but will mainly be focused around products that HE sells and products that are on the essential medicine list of the World Health Organisation. In some cases there is still an ongoing debate about which products have a positive influence on preventive the disease, others are clearer.

- **HIV/AIDS.** A preventive product for HIV/AIDS is Pre-Exposure Prophylaxis (PrEP). When exposed to the virus the medicines contained in the PrEP keep it from establishing a permanent infection. The effect is promising, in the United States when taken consistently PrEP can reduce the risk of HIV with 90% (CDC, 2014). Also trials in Uganda show promising results, where the effect of PrEP was significant in reducing the risk of HIV (Baeten, 2012). Besides preventive medicine there are also ways of preventing HIV with behavioural change, for instance using a condom while having sex.
- **Low respiratory infections.** Several studies show different results regarding which preventive medicine have a significant effect on reducing the risk of acute low respiratory infection (ALRI). In a study from Roth, Caulfield, Ezzati and Black (2008) it shows that zinc supplements have a significant effect on reducing the ALRI child morbidity rate. Iron supplements alone do not have a significant effect on reducing ALRI. Vitamin A has a significant effect in the neonatal period, after the neonatal period the use of Vitamin A supplement does not have a significant effect in reducing ALRI morbidity.
- **Malaria.** Malaria infection can be prevented in two ways, namely by preventing to get stung by a malaria parasite carrying fly, or taking drugs to kill the parasites when they enter the body. HE does not sell treated bed nets or DEET. However, HE does sell Benzyl Benzoate, which can be used as an insect repellent (Jamaluddin Shaikh, 2005). However, this product is also used as an inexpensive drug against scabies (Burns, 2004).
- **Diarrheal diseases.** Multiple studies show that improving water quality and sanitation will reduce the risk of diarrhoea. In the study of Arnold and Colford Jr. (2007) it was found that improving water quality with chlorine tablets significantly reduced the risk of child diarrhoea. Another study in India shows that introducing piped water significantly reduces the prevalence and duration of diarrhoea (Jalan & Ravallion, 2003). Additionally, diarrhoea can also be prevented with zinc supplements. In a study in multiple developing countries a significant effect was found in all the trials of zinc supplements reducing the prevalence of diarrhoea and pneumonia.

## 3 General data and methodology

Data was collected from three districts of Uganda; Mubende, Kibaale and Mukono. Entrepreneurs working for HE and their consumers were subject of the research. Data was collected using surveys and focus groups. This section aims to give a description of both methods that are used. Further details on data and methodology is provided in each chapter of the research.

### 3.1 Focus groups

In order to understand how to optimise the product basket of HE in accordance to the demand of its customers, several focus groups were organised to find the underlying reasons why consumers prefer one product above another. A focus group is an in-depth discussion with a few participants, approximately 6-12, which is led by a moderator and is generally limited to one particular concept or topic (McDaniel & Gates, 2012). Focus groups are exploratory and therefore will result in more specific knowledge about consumers' preferences about preventing or curing common diseases, such as HIV and diarrhoea. During these focus group the goal is to find out if HE meets the market demand of products to cure or prevent these diseases. With these results the product basket of HE can be optimised.

Some advantages of a focus group are; that they do not discriminate against people that are not literate, consumers who are more reluctant to participate in an private interview are maybe more willing to participate in a group discussion due to the group design. The group design is also one of the advantages that could foster, when set up the right way, an insightful discussion between participants (Kitzinger, 1995). With an adult (15+) literacy rate of 74% in 2015 in Uganda, a focus group is the most appropriate way to prevent discriminating and excluding people from our sample who are not literate. The group discussion fostered during a focus group will help to understand the underlying reasons why the Ugandan consumers prefer certain products or product types due to group dynamics. This group interaction between participants is the main factor of success for a focus group discussion (Kotler & Keller, 2016).

There are some disadvantages for the use of focus group discussion as well. An in-person focus group discussion might be expensive, but this will not be the case for this particular research considering the location and moderators of the focus groups. Next to the costs it is important to make participants feel relaxed, comfortable, and they must be strongly motivated to answer truthfully (Kotler & Keller, 2016; McDaniel & Gates, 2012).

Nuwaha (2002) combined focus group discussions and individual semi-structured interviews to understand people's perceptions of malaria in the Mbarara region in Uganda. With these methods he found an indication that the Ugandan people might need more education about the connection between malaria and mosquitoes, since a lot of the participants blamed other things for causing malaria. This study proves the gained in-depth knowledge gathered from focus group discussions.

### 3.2 Survey

A survey was conducted to find more numerical data about entrepreneurs and consumers. These data were used to test the various hypotheses, by applying various statistical tests. The survey consisted mostly of multiple choice questions, but also of open questions and questions where a grade had to be given to a certain statement. Surveys were held to collect data on the financial incentives for both entrepreneurs and consumers and to collect data on the non-financial incentives for consumers. The surveys consisted of specific incentive-related questions as well as general questions about demographics. Entrepreneurs and consumers received different surveys. All respondents to the survey should be literate or should get some help.

A translator was hired to translate the survey to the locally spoken language. If multiple languages were spoken in a certain area, the survey was translated into all these languages, so that participants were able to fill out the survey in the language they were most familiar

with. The surveys were distributed and collected by members of the Involve research team on location.

Both surveys that were conducted have been added to the appendix of this paper.

## 4 Study 1: Financial and non-financial incentives for entrepreneurs

### 4.1 Introduction

*H1: 'Giving entrepreneurs financial incentives for selling preventive goods will have a positive effect on their preference for selling preventive goods'.*

This section constitutes of the financial incentives for the entrepreneurs. This study focuses on hours worked and income generated with HE, and whether the effort of the entrepreneurs was based on financial or social incentives, i.e. the intrinsic motivation.

The questioned health workers (HW) for HE are situated in the Mubende and Mukono districts. The majority of the entrepreneurs were women aged approximately between 18 and 65 years old. Each entrepreneur is responsible for their own region within their sub-county. This enables them to establish personal customer relationship, by learning about consumers, staying in regular contact with them and dealing with possible complaints.

The first three cluster meetings took place in the following sub-counties of Mubende: Nabinggoola, Kalwaana, and Kiyuni, respectively. The three last cluster meetings of the Kiganda, Madudu and Kigando sub-counties were combined into one in Mubende. Additional responses were collected from entrepreneurs in Mukono, in particular in the Nabbale, Goma and Ntenjeru sub-counties.

To gather data in order to answer the aforementioned hypothesis a survey was created, it consisted of 18 questions and can be found in Appendix A. The survey was originally created in English, however since the majority of entrepreneurs speak Luganda, a translation was required. Nonetheless, in the end, numerous entrepreneurs spoke a different dialect, hence the English version was also used. The district coordinator of Mubende checked both the validity and translation of the surveys before the cluster meetings took place. During all cluster meetings the district manager, district coordinator and HE's local intern assisted with the translation of the introduction, instructions and clarification of the entrepreneurs' understanding throughout the survey.

Before the survey was distributed, the entrepreneurs were provided with the following information:

1. A short introduction was given by each of the students of the Erasmus University, which included the requested information of their name, age, country of origin and studies.
2. An overview and purpose of the Involve Project was provided, namely that it is an evaluation of the work of HE, and that the project has no relation to the current operations of HE.
3. The importance of the entrepreneurs' honest contributions to the Project was highlighted.
4. The anonymity of their answers was guaranteed; it was particularly stressed that the individual answers would not be shared with HE.
5. Lastly, the entrepreneurs were kindly requested not to discuss the survey questions and answers. If necessary, they were advised to approach either the students or the district manager and his intern for help.

### 4.2 Data

A total of 103 responses were collected from the surveys distributed in the cluster meetings in the six sub-counties of Mubende district and three of the Mukono district. Since some of the key questions remained unanswered, merely 81 of the collected responses were found to be useful. This was because the 'Key Incentives' variable was used as the dependent variable, where questions 1, 8 and 13 were intended to deduct the main reason for working for HE; 22 of entrepreneurs did not answer these questions, hence their responses had to be removed.

In order to study the variations in the obtained sample, the summary of the statistics was computed, where mean, standard deviation, minimum value, maximum value, median and p-value were examined for the variables of interest.

### 4.3 Methodology

The goal of this section of the paper is to discover what the incentives of the entrepreneurs are, and what variables influence their working hours and income from HE. This was done using a survey given to 103 entrepreneurs. How this survey data was used to derive statistically significant results in STATA is explained in this section. Table 2 below provides a list of the applied variables, followed by their descriptions.

Table 2: Variables used for the financial incentives hypotheses on the entrepreneurs' side. A description of each variable is given.

Variable	Description
'Income Dependency 1' & 'Income Dependency 2'	The dummy variable (1) and numerical (2) were created. For (1) a dummy variable of 0 is created when the respondent is the 'Sole Provider' and 1 otherwise.
'Key Incentive'	Three dummy variables were created 'Social = 0', 'Financial = 1', and 'Other = 2'. The observations within, 'Other' variable and the missing values were dropped to transform the 'Key Incentive' into a binary variable.
'Farming' & 'Other Job'	'Two variables were generated, a binary dummy (Farming = 0; Others = 1) and five additional dummies (None4 = 0; Waring = 1; Tailoring = 2; Health = 3; Teaching = 4).
'Incentive Check 1' & 'Incentive Check 2'	The variables intended to measure incentive for selling preventive goods. To do that the dummy variables of: Financial = 1, and Social = 0 were created.
'Financial Incentive'	The variable measured the cost of effort by creating three dummies, which represented the different effort levels: 'Less = -1', 'Same = 0', and 'More = 1'
'No Stock'	The value of the products (i.e. whether the products were held in stock or purchased when, required) was measured with the variable 'No Stock', where the dummies were 'Keep Stock = 0' and 'Only Purchase When Required = 1'.
'Leisure vs. Money' & 'Financial Satisfaction' & 'Social Satisfaction'	Two dummies were created 'Leisur = 0' and 'Money = 1' The variable helped to measure the satisfaction of the entrepreneurs, with dummies of 'Unsatisfied = 0' and 'Satisfied = 1'
'Applied margin'	Four different products were introduced with varying costs and consumer prices to test the entrepreneurs' understanding of the applied margin. Two of the products had a high margin of three, while the remaining two portrayed a low margin of one. These translated into a 'Financial Incentive = 1' and 'Social Incentive = 0' dummies.
'Reward'	Additionally, the same dummies were applied to the variable 'Reward' to observe whether the entrepreneurs would prefer a 10% cash bonus or an official recognition in the cluster meeting (A value of 0 is created for recognition and 1 for the cash bonus).
'Effect: Effort'	(No effect = 0 and Effect = 1) was created, the variable intended to measure the possibility of the effect of external forces that influenced the entrepreneurs' effort (such as whether people require medication).

For two of the survey questions, namely Question 7 and Question 17, no variables were created. This is because the questions were difficult to quantify and interpret with the regression model.

#### 4.3.1 Descriptive Statistics

The descriptive statistics table allowed for a clear first impression of the data and the distribution of the variables. It also included a p-value which highlighted whether the mean and median for each variable were significantly different. This was the p-value of the one-sample t-test; if the mean and median are significantly different, then this implies a fat tail. This implied that the OLS regression was no longer appropriate and instead a non-linear model had to be used. Additionally, a simple count was conducted to see how many entrepreneurs in the sample were socially or financially incentivised. This was determined using the variables 'Key Incentive' and 'Incentive Check 1', which were both binary allowing for a simple count.

#### 4.3.2 T-tests

In further, two additional variables were created to check for consistency throughout the survey. 'Check 1' was equal to 'Key Incentive minus Incentive Check 1', while 'Check 2' was equal to 'Key Incentive minus Incentive Check 2'. Both these variables ranged between zero and one, hence theoretically if answers were consistent, the mean values for 'Checks 1' and '2' had to equal zero. Consequently, two t-tests were run, which tested whether the mean value for 'Incentive Checks 1' and '2' were significantly different than zero. If either of these tests was not significant then this implied that people had not been consistent throughout the survey.

#### 4.3.3 Regressions

The first regression which was run applied 'Key Incentive' as the dependent variable in a probit regression. This model was used because 'Key Incentive' was a binary variable. The regression distinguished which variables significantly correlated with whether an entrepreneur was financially or socially incentivised. For example, it was assumed that 'Incentive' had a strong relationship with 'Income Dependency 2', which measured the amount of people an entrepreneur provided for. The first probit regression included all variables; however, after the first model, the insignificant variables were removed to find the model with best fit. This was determined by the Akaike Information Criterion (AIC). The lower the AIC the better the fit of the model with the data. After the model with the best fit was selected, the probit regression was applied, and the average and conditional marginal effects were calculated, which yielded the effect sizes of the significant coefficients.

The second regression was an Ordinary Least Squares (OLS) regression with 'Hours Worked' for HE as the dependent variable. Similarly to the probit regression, the insignificant variables were removed until the model with best-fit was found, in accordance to the AIC. This regression depicted which variables had a significant relationship with the number of hours worked for HE per week.

The final regression which was run was an OLS regression with the 'Income HE' per week as the dependent variable. As explained above, only the model with best-fit was interpreted. This model indicated which variables correlated with the 'Income HE' per week, and therefore identified which variables influenced the income earned.

### 4.4 Results

#### 4.4.1 Descriptive Statistics

The mean of the hours worked by the entrepreneurs was approximately 19.531 per week. The mean of income earned by the entrepreneurs equalled 38,718 Ugandan Shilling per week (Table 3).

Table 3: Descriptive statistics Mubende survey.

Variable	Obs.	Mean	Standard deviation	Min	Max	Median	P value
Key Incentive	97	0.093	0.292	0	1	0.0	0.002
HrsWkHE	96	19,531	14,547	3	40	22.5	0.048
Ratio Income	91	0.681	0.314	0	1	0.8	0.001
Income HE	91	38,718,680	57,205,990	1000	500000	30000	0.150
Income Other	56	42,478,570	47,087,990	0		20000	0.001
Income Dependency 1	95	0.768	0.424	0	1	1.0	0.000
Income Dependency 2	96	5,813	2,826	0	15	6.0	0.517
Farming	97	0.670	0.473	0	1	1.0	0.000
OtherJob	97	0.918	0.277	0	1	1.0	0.004
Demand Dummy	94	0.989	1,169	0	3	0.0	0.000
Incentive check 1	95	0.042	0.202	0	1	0.0	0.045
Nostock	96	0.854	0.355	0	1	1.0	0.000
Leisure vs. Money	97	0.852	0.291	0	1	1.0	0.000
Financial Satisfaction	97	0.921	0.180	0	1	1.0	0.000
Social satisfaction	97	0.960	0.130	0	1	1.0	0.003
Incentive check 2	94	0.533	0.378	0	1	0.5	0.400
Financial incentive	96	1,656	0.708	0	2	2.0	0.000
Effect: margin	96	1,115	0.893	0	2	1.0	0.212
Reward	93	0.581	0.496	0	1	1.0	0.000
Effect effort	97	0.928	0.260	0	1	1.0	0.008

In order to compute the OLS regression the median and mean had to equal for the dependent variables. Table 2 depicted the results of the t-test for difference in mean and median. The mean of the dependent variable ‘Hours Worked’ for HE is significantly different from the median with a p-value of 0.048. This meant that ‘Hours Worked’ for HE has a fat tail. The t-test of the difference between the mean and median of Income did not generate a significant p-value (0.150).

#### 4.4.2 Financially vs. socially incentivised entrepreneurs

In order to find out whether financial incentives work for entrepreneurs, a distinction needed to be made between entrepreneurs that were mostly financially or socially incentivised. When the variable ‘Key Incentive’ was used, 88 entrepreneurs appeared to be socially incentivised while nine were financially incentivised. The t-test of ‘Key Incentive’ and ‘Incentive Check 1’, which checked for consistency in the entrepreneurs’ incentives, highlighted that the same entrepreneurs are financially and socially incentivised at a 1% significance level (Table 4).

Table 4: T-test for incentive consistency (Note: Check1 = key incentive - incentive check 1, Check2 = key incentive – incentive check 2).

Variable	Mean	P-value
Check1	0.053	0.167
Check2	-0.437	0.000

The same t-test with ‘Key Incentive’ and ‘Incentive Check 2’ provided an insignificant result. ‘Incentive check 2’ depicted a range from 0 to 1 with a mean of 0.53298. In this option ‘0’ indicated a clear preference for social incentives, while ‘1’ denoted a strong preference for financial incentives. A mean of 0.533 contradicted the earlier statement of social incentives having a greater influence on most entrepreneurs. A possible explanation was that entrepreneurs value the financial aspect as they required a minimum compensation for their work. One could argue that if the social incentive was not strong, the mean would be much closer to one. An

alternative explanation was that entrepreneurs might have provided socially desirable answers in questions, where those answers were easy to give. However, when social incentives were directly opposed to the financial compensation for their work, the entrepreneurs' answer was more balanced.

The survey also attempted to discover the potential reasons for the strong tendency for social incentives to work. However, no significant correlations were found in the probit model between the 'Incentive' category and variables, namely the income-generating activities, 'Income Dependency', 'Income HE', or 'Income Other'. These results remained insignificant for all of the available variable combinations.

#### 4.4.3 Effort Influencers

Given the established positive association between social factors and most of the entrepreneurs' incentives, the factors that influenced the 'Hours Worked' for HE per week were examined.

The OLS function for 'Hours Worked' per week read as follows (Table 5):

$$\begin{aligned} \text{Hours worked} = & 40.08458 - 0.00128 \text{ Income in Shilling} \\ & - 0.96073 \text{ Dependents in Household} \\ & - 6.38115 \text{ No Stock Dummy 1} \\ & + 13.06846 \text{ Leisure Preference Dummy 1} \\ & + 1.74910 \text{ Reward Preference Dummy 1} \\ & - 12.92707 \text{ Effort Dummy 1} \\ & - 1.72607 \text{ Demand Dummy 1} \\ & - 3.96552 \text{ Demand Dummy 2} \\ & - 2.93004 \text{ Demand Dummy 3} \\ & - 1.84856 \text{ Financial Incentive Dummy 1} \\ & - 12.03828 \text{ Financial Incentive Dummy 2} + \epsilon \end{aligned}$$

Table 5: OLS regression with Hours worked per week for HE as the dependent variable.

Variable	Coefficient	P-value
Income HE	0.000	0.784
Income Dependency 2	-0.961	0.095
Demand Dummy 1	-1,726	0.713
Demand Dummy 2	-3,966	0.366
Demand Dummy 3	-2,930	0.471
Nostock	-6,381	0.185
Leisure vs. Money	13,068	0.076
Financial incentive 1	-1,849	0.815
Financial incentive 2	-12,038	0.061
Reward	1,749	0.617
Effect effort	-12,927	0.009
Constant	40,085	0.000

Observations      81  
R squared          0.1824

The OLS regression highlighted there was no significant correlation between the 'Income HE' of each entrepreneur and the 'Hours Worked'. However, the negative correlation of 'Income Dependence 2' was surprising to the researchers because it was expected to be positive. The

researchers expected people who are more dependent on their income to work more hours for HE.

The amount of household dependents from an entrepreneur negatively and significantly (at a 10% level) impacted 'Hours Worked'. Each extra dependent on the entrepreneurs' income lowered the 'Hours Worked' by 0.961 every week. This statistic clearly indicated that caring for children or other household dependents cost extra time, and therefore resulted in a lower availability for HE.

Entrepreneurs who demonstrated to be willing to exert more effort into selling a product with a higher margin, significantly worked more hours than those who were unwilling to do so. The effect was an extra input of 13.068 hours per week at a 10% significance level. The mean of this statistic was 0.852, which indicated that most entrepreneurs would be willing to work harder for a higher profit. This result contradicted, or at least nuanced, the strong preference for social incentives as opposed to financial incentives as discussed before.

The 'Financial Incentive' dummy yielded a significant result for the group of entrepreneurs who understood that others would be willing to exert more effort when profits are raised. The entrepreneurs who answered this worked an average of 12.038 hours less per week at a 10% significance level. Similarly, entrepreneurs who preferred a financial reward for their work rather than a non-financial appraisal, worked fewer hours. For these entrepreneurs, there were an average of 12.92707 hours less at a significance level of 1%. Both results indicate that entrepreneurs who understand financial incentives make more deliberate choices when it comes to amount of effort they put into their work. Understanding that effort is the main driver of earnings shows that an entrepreneurs directly chooses between leisure time and working for HE.

#### 4.4.4 Income Influencers

Lastly, the survey answered questions regarding which factors had the potential to influence the income of the entrepreneurs. Earlier, it was established that there was no correlation between the hours worked and the income out of the entrepreneurs' activities. This section aims to find influencers of the income amongst the variables that were uncovered in the survey. The OLS regression with income as the dependent variable depicts four significant correlations and yields the following equation (Table 6).

$$\begin{aligned}
 \text{Income HE in Shilling} = & -8331.471 + 35.27835 \text{ Hours worked} \\
 & + 24839.38 \text{ Ratio Income} \\
 & + 10262.69 \text{ Depend on sole income} \\
 & - 2422.657 \text{ Dependents in household} \\
 & - 10375.9 \text{ Demand Dummy 1} \\
 & + 14474.87 \text{ Demand Dummy 2} \\
 & - 7649.929 \text{ Demand Dummy 3} \\
 & - 5811.356 \text{ No stock Dummy 1} \\
 & + 16996.64 \text{ Leisure preference Dummy 1} \\
 & + 11586.75 \text{ Financial Incentive Dummy 1} \\
 & + 4336.41 \text{ Financial Incentive Dummy 2} \\
 & + 225.4128 \text{ Reward preference dummy Dummy 1} \\
 & + 18978.89 \text{ Effort Dummy 1} + \epsilon
 \end{aligned}$$

Table 6: OLS regression with Income from HE as the dependent variable.

Variable	Coefficient	P-value
HrsWkHE	35,278	0.879
Ratio Income	24,839,380	0.020
Income dependency 1	10,262,690	0.189
Income dependency 2	-2,422,657	0.034
Demand Dummy 1	-10,375,900	0.187
Demand Dummy 2	14,474,870	0.303
Demand Dummy 3	-7,649,729	0.311
No stock	-5,811,356	0.549
Leisure vs. Money	16,996,640	0.078
Financial Incentive Dummy 1	11,586,750	0.505
Financial Incentive Dummy 2	4,336,410	0.684
Reward	225,413	0.975
Effect effort	18,978,890	0.105
Constant	-8,331,471	0.729

Observations 81

R squared 0.2196

The ‘Ratio Income’ variables related to the percentage of money that an individual entrepreneur earns. Surprisingly, the variable "HrsWkHE" does not have a significant impact on income obtained from HE. A possible explanation for this result is a measurement error due to the formulation of this question in the survey (see section 4.4.6: limitations for further explanation). Therefore, a higher ratio implied that relatively more income was generated solely from HE. It was observed that entrepreneurs who earned a larger proportion of their income from HE generally earned more in absolute terms too. For example, an entrepreneur with the ‘Ratio Income’ of one leads to a 24,839.4 Shillings difference in pay at a 5%. Additionally, such a relationship may also imply that entrepreneurs who spend a larger proportion of hours working for HE earn a sufficiently higher income.

Similarly to the earlier results obtained for the household dependents of an entrepreneur, there is a negative and significant correlation with income too. Each dependent in the entrepreneur’s household lowered the average pay by 2422.7 Shilling, at the 5% significance level.

Entrepreneurs who claimed to work harder for a higher margin in the ‘Leisure vs. Money’ variable earned a significantly higher amount than their colleagues who were not willing to do the same. Thus, working harder for an additional margin resulted in an increase of 11,586.8 Shillings in income, at the 10% significance level. This potentially implied that these entrepreneurs understood the optimal work ethic, and were more capable of selecting and selling the products with a higher margin. This indicates that the financial incentive of giving higher margins does influence the behaviour of the entrepreneurs. This finding is supported by the obtained result of the ‘Effect: Effort’ dummy. The dummy tested whether entrepreneurs believed that their sales depended on their own efforts. At the 11% significance level, given the belief the sales depended on their own efforts, the result yielded the 18,978.9 Shillings higher pay. This supported the findings of the previous variable, as similarly to the previous case, the awareness of the relationship between effort and income yielded a higher income. This indicated that more educated entrepreneurs were capable of selling products with higher margin.

#### 4.4.5 Conclusion

The general findings suggest that the entrepreneurs tend to be incentivised mainly by social factors, rather than financial factors. Nonetheless, due to the presence of the financial incentives, it was possible to observe the inconsistency within the social incentives; further analysis in regressions showed that they have a positive effect. The regressions claim that there is

tendency for the entrepreneurs who understand assigned financial incentives to perform better contrary to their peers who do not. Additionally it could be assumed that entrepreneurs who have more household dependents generally underperform.

Questions that focused on observing entrepreneurs' incentives clearly lead to the conclusion that they are more influenced by the social incentives, rather than the financial incentives. Multiple questions on this topic were enquired and the entrepreneurs were generally consistent in their revealed preference. However, when asked to balance earnings on one end of a scale against social incentives on the other side, the entrepreneurs provided a more even answer of 50/50. This indicated that entrepreneurs tend to believe the pay is an important integral part of their work, while being mostly incentivised by the social factors.

Additionally, it is suggested that entrepreneurs are positively influenced by financial incentives in the effort they put into their work and the salary they earn. The proportion of the entrepreneurs who claimed that a higher margin on a product would encourage them to extract more effort into sale, turned out to work more than their colleagues. This clear indication of susceptibility to financial incentives is reinforced by the strong correlation between the willingness to put in effort for a higher margin and the earnings from HE. Lastly, an increase in earnings for the entrepreneurs who believed that their own effort is the main driver of their earnings, resulted in earning more. Thus it could be assumed that the financial incentive of higher margin on products do lead to higher productivity among the entrepreneurs.

Consequently, if entrepreneurs understand the concept of the margin, namely they are able to recognise optimal profits from their sales, higher earnings are diagnosed. In fact, this tends to imply that the entrepreneurs in fact do require continuous training, particularly in the area of sales. However, the application of this conclusion must be viewed with caution due to the nature of the conflicting results. Furthermore, the entrepreneurs who believed that other entrepreneurs would be willing to put more working hours for higher earnings, turned out to work less. In addition to this, the entrepreneurs who chose a monetary reward over a social reward, also worked fewer hours.

It was also found that the entrepreneurs who have extended household dependents, worked fewer hours and earned less money, implying a negative association between income and household dependents. Hence, the entrepreneurs are incentivised by social and financial incentives. Social incentives are very important to the entrepreneurs and are the main reason they choose to work for HE. However, financial incentives improve the efficiency of the entrepreneurs because they focus on the work of the entrepreneurs and motivate them to put in effort. Lastly, the mere understanding of the financial incentives that were placed made the entrepreneurs more efficient too.

#### **4.4.6 Limitations**

The implications of the research entail a number of limitations, particularly in the data gathering and analysis phases. The first major limitation is the amount of observations collected, as only 103 entrepreneurs filled in the survey. Not only this could have affected the correctness of our findings, it also implied difficulty to find significant results. Furthermore, the fact that numerous questions remained unanswered by some of the entrepreneurs entailed that merely 81 of the responses were used in the regression analysis. In theory, such number could have affected the generalisability, as well as the representativeness of the findings.

This limitation relates to another constraint since some questions were considered unclear by the entrepreneurs, which contributed to them skipping the questions. Similarly, this encouraged some discussion amongst the entrepreneurs while answering the questions. Some entrepreneurs struggled with the language and required additional assistance from the district coordinator and district manager, which could have influenced the honest attitude of these entrepreneurs towards the survey. This brings forth an additional constraint namely, the language and translation barrier. Since the majority of the entrepreneurs lacked a sufficient level of the English language, the help of the district coordinator and district manager was required for both translating and clarifying some questions. This also made it difficult to check the consistency of the introductions for the survey, which may have influenced the responses of the entrepreneurs.

There are numerous biases associated with the survey, which can be categorised into response biases and sampling biases. The first can be defined as the tendency of an entrepreneur to provide untruthful or misleading answers to the survey, while the latter refers to the under representativeness of some entrepreneurs in the sample compared to the desired population sample.

There are two types of response bias present in this survey. Firstly, the social desirability bias since some of the respondents could have answered the questions differently than they would have if the students and their superiors were not present during the survey. This can take two forms, namely the over reporting of good behaviour and underreporting of undesirable behaviour, such as untruthfully prioritising the social incentive over the financial. Secondly, the leading question bias may have existed in some of the survey questions, which could have affected the entrepreneurs to choose certain responses over another due to the way the questions were phrased.

Similarly, three types of sample biases could be derived from the survey. Firstly, the under-coverage bias since majority of the sub-counties of Mubende and Mukono were underrepresented in the sample. Secondly, the voluntary response bias, which implies the self-selection of the respondents who participated in the survey since not all entrepreneurs attended the cluster meetings. Finally, there was the non-response bias given that some entrepreneurs in each cluster meeting were unable to participate in the survey due to their unavailability.

A regression was run using hours worked as the dependent variable. This variable was measured by asking entrepreneurs to pick a category regarding the number of hours worked. These categories were later transformed to a numerical value that averaged the range of number of hours worked within the category. A limitation of this approach is that the regression was not run on the actual hours worked by the entrepreneurs, but on an approximation of the hours worked by the researchers. Another limitation related to the use of categories was that the maximum hours worked was 40, while in reality it is possible that an entrepreneur works more hours. Overall, this limits the representativeness and conclusions that were drawn from the regression.

The last limitation concerning the methodology is that there was a fat tail in the income in Shilling variable. Due to the high reporting of the income by some of the entrepreneurs, the median income (30.000) was significantly lower than the mean income (38.718). The skewedness of the data may have influenced the correctness of the results of the regression using this variable.

## 5 Study 2: Non-financial incentives for entrepreneurs

### 5.1 Introduction

The research in Kibaale was aimed at researching non-financial incentives for entrepreneurs. By doing so, the following hypothesis will be accepted or rejected:

*H3: Giving entrepreneurs non-financial incentives for selling preventive goods will have a positive effect on their preference for preventive goods.*

Non-financial incentives for entrepreneurs in this hypothesis are defined as formal recognition for entrepreneurs and reminding entrepreneurs of the benefits of preventive goods for the community. Therefore, this hypothesis is split up in two subparts:

- H3a: If formal recognition is given after selling more preventive goods, then more entrepreneurs will be motivated to continue promoting and selling said good.
- H3b: If there is a greater focus on reminding the entrepreneurs about the benefits of preventive goods for the community, then they will be more persuaded to sell preventive goods.

The research in Kibaale is of qualitative nature, focus groups with the entrepreneurs, as described in the general methodology, will be held to gather information. The research is facilitated and supervised by HE, who set up the focus groups, selected the focus group participants and arranged logistics and interpreters. In the following sections the data from demographic forms that were handed out to the entrepreneurs will firstly be described. Subsequently the method to analyse the results from the focus groups will be elaborated. The Kibaale part concludes with the results from the analysis and limitations that must be taken into account when interpreting the results.

### 5.2 Data

58 of the participating entrepreneurs filled in demographic forms handed to them. The results are listed in this section.

The participants of the focus groups were mostly younger than 40 years old (approx. 70%) as can be seen in Figure 1. The gender of the entrepreneurs is fairly equally distributed across the district (see Table 7 below). The entrepreneurs were asked about the length of time they were active as a HE, the results of which can be found in Figure 2. As can be seen, a vast majority of the entrepreneurs (55%) was active for less than a year. Furthermore, nearly all the other entrepreneurs (45%) were active for one to two years.

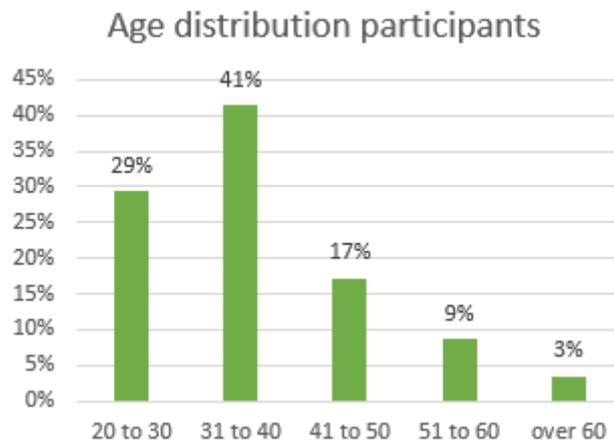


Figure 1: Percental age distribution entrepreneurs.

Table 7: Absolute and percental age distribution entrepreneurs.

<b>Gender</b>	<b>N</b>	<b>Percental distribution</b>
Female	27	47%
Male	31	53%
Total	58	100%

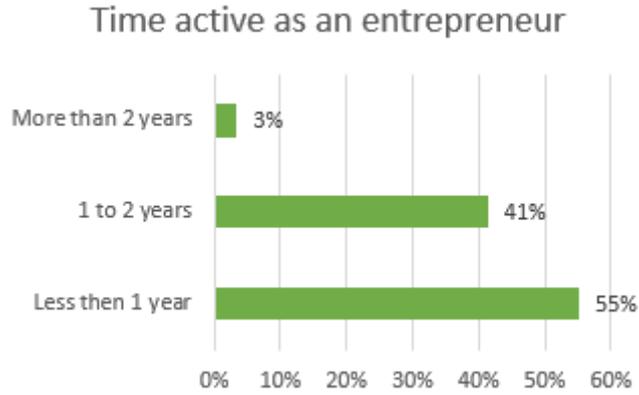


Figure 2: Percental distribution of time active as an entrepreneur.

### 5.3 Methodology

Our results were collected through 13 focus groups across 11 cluster meetings with HE in the Kibaale district. The focus group questions are added in Appendix B. Each focus group consisted of 4-7 entrepreneurs, as well as at least one interpreter and two members of the research team to moderate and take notes. The recordings of these focus groups were transcribed and subsequently coded using ATLAS.ti (ATLAS.ti 8, 2017) using a three-tiered coding process of open coding, axial coding and selective coding. The themes used and their descriptions can be found in Table 8 below:

Table 8: Themes and descriptions used in coding of focus groups.

Themes	Description
General motivation	Describing the general motivations to become an entrepreneur, including community, income, gaining knowledge and a general preference for HE.
Awareness of preventive goods	Describing the awareness of both entrepreneurs and consumers of preventive goods and methods to raise awareness.
Motivation to sell preventive goods	Describing the motivations of the entrepreneurs to sell preventive goods relative to curative goods.
Challenges in selling preventive goods	Describing the challenges entrepreneurs face in selling preventive goods, including lack in customer demand, stock and product basket issues and other challenges.
Certificates and reminders	Describing how the entrepreneurs evaluate the certificates and reminders as a motivation to sell more preventive goods.
Points of improvement	Describing the points of improvement for HE as mentioned by the entrepreneurs, including transportation, tablets, HE merchandise and other incentives.

This chapter is organised based on the most important themes (i.e. selective codes) that emerged from the focus group data, and aims to compile and interpret the main findings. Besides, we selected the quotes from the most common focus group results.

## 5.4 Results

### 5.4.1 General motivation

When asked about their general motivation why the entrepreneurs joined HE, a frequently mentioned motivation by the entrepreneurs was helping their **community**. They saw that a lot of people were suffering from various illnesses like skin diseases and malaria. By becoming a HE they felt that they helped these people. One of the entrepreneurs felt that she had become the ‘doctor of the community’.

Additionally, a lot of the participating entrepreneurs mentioned that they joined HE to acquire more **knowledge** and skills in health and medicine. Most entrepreneurs mentioned that they also joined HE to earn an **income** and to do business. Many entrepreneurs were previously active as community health workers under government programs, but they switched to HE because they **preferred** their products, because of better quality, and the approach of HE. The government programs only aided the children, whereas HE also covers adults, and the government program is unpaid whereas HE gives an opportunity to do business. One entrepreneur explained this advantage of HE as being able to serve the community as well as making a profit.

### 5.4.2 Awareness of Preventive Goods

The **entrepreneurs** in the focus groups were aware of preventive goods and their benefits. However, they felt that they still could learn more about them and as such they would like HE to provide workshops or refresher trainings. This way they can give better information and share their new insights with the community, which they stressed as very important.

The importance is caused by the lack of **awareness from the consumers**. A lot of entrepreneurs mentioned that the consumers were still somewhat reluctant to buy preventive goods and therefore need to be informed.

The entrepreneurs had some ideas on how to facilitate **awareness** raising. A frequently proposed method was to organise community gatherings or to broadcast radio programs. In any case the entrepreneurs currently make an effort to inform their customers on a daily basis.

#### 5.4.3 Motivation to sell Preventive Goods

There was no real unity in the answers from the entrepreneurs when asked about their **motivation** for selling preventive goods versus curative goods. Some of the entrepreneurs remarked that they are equally motivated to sell preventive goods as they are for curative goods. This was explained as follows by an entrepreneur:

*"Preventive goods are good, but curative goods are also important because some people are already affected by malaria."*

Other entrepreneurs were less eager to sell preventive goods, as they felt that there was less demand for preventive goods. This may be partially caused by the lack of information as mentioned before. Another partial cause might be the fact that the government provides some preventive goods like condoms and mosquito nets for free, decreasing the demand. However, the entrepreneurs are aware of the positive effects of preventive goods and are generally willing to spend more time on selling preventive goods.

#### 5.4.4 Challenges in selling Preventive Goods

Entrepreneurs face several challenges in selling preventive goods. One of the challenges is related to the **demand** from the consumers. They remarked that the customers are not aware of the benefits of preventive goods, thus are less likely to buy preventive goods and only buy medicine when they are already ill. This combined with the free supply of preventive goods from the government results in a low demand.

Another major issue the entrepreneurs face is a lack of products in **stock**, as well as a **product basket** that does not meet all the needs of the customers. An entrepreneur noted the following:

*"Preventive goods are not sold because they are usually not in stock even if people demand them."*

Another stock-related problem is that some of the products are expired and therefore cannot be sold anymore. Next to that, the entrepreneurs would like to see an expanded product basket, such as testing kits for HIV and malaria and pregnancy tests.

**Other challenges** for selling preventive goods are the difficulty in explaining certain products, damage to products due to weather conditions and a lack of information on their tablets.

#### 5.4.5 Certificates and Reminders

During the focus groups, several ways to incentivise entrepreneurs were discussed. Some groups were sent bi-weekly **reminders** encouraging them to sell preventive goods. Overall, the participants believed that reminders motivated them to increase their efforts. However, some participants expressed that they were more willing to work harder after discovering that they could receive a reward instead.

Subsequently, a potential **certificate** rewarding the employee of the month based on relative sales was presented. Generally, there was a positive reaction from entrepreneurs. Firstly, they believed that the certificates will build trust and recognition, which helps in their interaction with potential clients. This may also potentially increase their sales. A further benefit that was pointed out during the focus groups is that the certificates can increase community trust through allowing more credibility. In doing so, it distinguishes the entrepreneurs from fake organisations and sellers.

However, some groups pointed out that in the long run the certificates are not sustainable or effective on their own. This is because entrepreneurs will get accustomed to the certificates thus reducing their effectiveness. Once many certificates have been awarded, it becomes hard to distinguish between entrepreneurs. Furthermore, some participants expressed their desire for tangible goods as an addition to or instead of the certificates. Some examples mentioned include an extra t-shirt, umbrella and comfortable walking shoes.

## 5.5 Points of Improvement

Several points of improvement for the working lives of entrepreneurs emerged from the focus groups. As previously mentioned, participants expressed their need for more and improved **merchandise**. Firstly, the provided bag by HE does not allow for a large amount of medicines and does not protect drugs from sunlight and rain properly. Furthermore, a widely discussed issue in the focus groups was regarding the uniform provided by HE. The entrepreneurs felt that one t-shirt is not enough to get them through every day work life. Additionally, frequently washed t-shirts do not provide a professional impression to clients.

Other merchandise that would incentivise entrepreneurs and facilitate their work are umbrellas and rain jackets. In particular, comfortable walking shoes would allow entrepreneurs to reach further distances and broaden their customer base. High quality footwear would also ensure the health of the entrepreneurs themselves.

A frequently mentioned issue is the lack of methods of **transport**. According to the entrepreneurs, bikes or motorcycles would boost their sales and allow them to access more isolated communities. The increase in sales could potentially account for part of the transport cost.

The entrepreneurs believed that the **tablets** are useful and informative for clients. However, some entrepreneurs raised concerns about the functioning of the tablets. In this context, some tablets do not account for the local language and dialects, which hinders their adequate use. Furthermore, the entrepreneurs mentioned that there is a lack of information on preventive goods on the tablets. Hence, they feel that they cannot properly teach the community about certain products if they do not have videos that explain their purpose. Additionally, entrepreneurs prefer the tablets to be unlocked so that they can access a wider range of applications. For instance, testimonies of patients can be recorded and before and after pictures can be taken to track their progress. Another technical issue discussed was that the videos often took too long to load.

**Other incentives** to motivate entrepreneurs to improve their working life:

- Cellphones to encourage communication between entrepreneurs.
- Adjust prices to suit the income of the respective communities.
- Introduce different promotion programs such as discounts, prizes for customers, and free samples.
- Hand out ID cards and badges to increase the credibility of entrepreneurs.
- Use radio stations as a means of raising awareness of both HE and preventive care.

Lastly, the most important issue is the lack of stock. Entrepreneurs are forced to make promises to clients about products, which they cannot keep. This significantly reduces the community trust and reliability of entrepreneurs. Thus, restocking products that are in high demand such as washable pads, kits for HIV and malaria testing is highly important. In addition to restocking, we propose that there be an exchange system between entrepreneurs. This can be made possible by an application on the tablets that track individual stock for everyone within the cluster to see.

## 5.6 Conclusion

Summing up the findings of the focus groups, the following can be said regarding the efficiency of the entrepreneurs. Firstly, entrepreneurs are in general equally motivated to sell preventive goods compared to curative goods. However they face some challenges selling preventive goods. These are mainly demand-sided as the customers are often not aware of the benefits of preventive goods or have already received them through government programs. There are also supply issues, as not all preventive goods are in stock.

Non-financial incentives like certificates can be used to motivate entrepreneurs, as they got a positive reception in the focus groups, however their effectiveness may decline over time. Therefore a long-term solution to extra motivate the entrepreneurs still needs to be found. Finally, a lot of entrepreneurs stressed the importance of tangible goods or the lack thereof. HE can explore opportunities to provide more tangible goods in order to improve efficiency. This of course faces financial constraints from HE, analysis of which is outside the scope of this research.

Taking the above into account, HE could improve preventive goods sales by tackling the demand side issues by raising more awareness about preventive goods. This can for example be done by improving the training of entrepreneurs or organising community gatherings. Efficiency could be improved by offering more or better tangible goods. Non-financial incentives like certificates do motivate entrepreneurs, however more research into their long-term effects is needed.

## 5.7 Limitations

Several factors were found to be limitations in the gathering and analysis of the data. The foremost limitation was the necessity of a translator. This did not only limit the extent to which the research group was able to moderate the discussion, it potentially also led to biases in the data. The two interpreters were both from HE, namely the district manager and the warehouse manager. This means that these interpreters had a certain degree of authority over the entrepreneurs participating in the focus group, which might have limited them in speaking freely and truthfully. Additionally, since these interpreters are highly involved with HE, their translations might be biased. The members of the research team noted that the translations were often not literal translations but more like second-hand accounts and sometimes had the feeling that the interpreters added answers that were not given directly by the entrepreneurs. Other than clearly indicating to the entrepreneurs that the research was independent from HE and giving the two interpreters very clear instructions, this limitation could not be overcome. Therefore, this potential bias was taken into account when analysing the data (e.g. by putting a side-note whenever we felt the translation might have been biased).

Due to the small sample size of our focus group, the results might not be representative for all entrepreneurs in Uganda. Another possible bias is the reporting bias. This means that there is a risk that the members of the research team might have selected the results that were desirable for the outcome of the research. This was minimized by using the four eye principle in analysing the results.

In some of the questions asked an anchoring bias might have occurred. For example when the entrepreneurs were asked how many hours they spend on information provision. The answers of the entrepreneurs were anchored by the first respondent, other entrepreneurs were reluctant to give a different view.

## 6 Study 3: Financial and non-financial incentives for consumers

### 6.1 Introduction

The research in Mukono was aimed at researching financial and non-financial incentives for consumers to buy more preventive goods. To study this, the following two hypotheses were constructed:

*H2: Giving consumers non-financial incentives for buying preventive goods will have a positive effect on their preference for preventive goods*

*H3: Severe financial constraint is one of the reasons for low demand for preventive goods*

By accepting or rejecting the hypotheses, it can be concluded if and how consumers can be incentivised to buy more preventive goods. This study consists of surveys and focus groups, handed out during several meetings with HE consumers in different sub-counties in Mukono, which are arranged by the Mukono HE district manager. The remainder of the Mukono part is as follows. Firstly, the data and methodology section is described. Thereafter, the results are presented. Lastly, the limitations of this study are mentioned, followed by the conclusion.

### 6.2 Data

To study how consumers can be nudged to buy more preventive goods, data is conducted from surveys and focus groups in the sub counties Naama, Kasawo, Goma, Nabbale and Ntenjeru of the district of Mukono. The list of the questions in the surveys and the focus groups can be found in respectively Appendix C and D.

#### 6.2.1 Surveys

In total 108 consumers participated in the research. The number of consumer survey respondents totaled 55. As can be seen in Table 9, more than 40% of the responses of the consumer surveys are coming from Ntenjeru. Furthermore, nearly 30% of the responses is coming from Nabbale and the other responses are spread over the other three clusters.

Table 9: An overview of respondents per cluster.

Cluster	Number of respondents
Goma	6
Kasawo	2
Naama	7
Nabbale	16
Ntenjeru	24

The age in the sample ranged from 17 to 68 years old. The average age of the sample is 35 years old with a standard deviation of approximately 14. The gender division is shown in Table 10. Over 80% of the survey participants are female. Out of 55 participants, only 10 male participants were present. From all survey participants, 71% have children.

Table 10: The gender division in the sample.

	Frequency	Percentage
Female	45	81.8
Male	10	18.2

Lastly, the participants were asked about their marital status. The biggest section of the sample is married (56%), 29% of the sample is single and the other 16% of the sample is divorced, widowed or other.

### 6.2.2 Focus groups

In total six focus groups were conducted over a time span of six days. All these focus groups were conducted in the Mukono district, Uganda. The first two focus groups were on the 3rd of August in Naama. The third focus group took place in Kasawo on the 4th. The fourth focus group was conducted on the 7th of August in Goma. And the last two focus groups were conducted in Ntenjeru on the 8th of August. An overview of the participants information is shown in Table 11 below:

Table 11: Overview of participants information per focus group.

Cluster	Number of participants	Average age (years)	Range age (years)	Gender ratio female:male
Naama	8	26.4	10 – 49	07:01
	10	39.1	30 – 52	05:05
Kasawo	8	38.1	20 – 55	07:01
	10	41.5	21 – 73	08:02
Ntenjeru	9	31.6	21 – 50	08:01
	8	Unknown	Unknown	07:01

In total 53 consumers shared their opinion in the focus groups. 20,8% of these consumers were male and the other 79,2% participants of the focus group were female. The ages from the participants ranged from ten years old through 73 years old. All focus groups consisted of eight through ten consumers.

## 6.3 Methodology

### 6.3.1 Surveys

The surveys mostly consist of multiple-choice questions. Also, some open questions and rating questions are included. Surveys are held to gather data on the financial incentives and non-financial incentives for consumers to buy more preventive goods. The surveys consist of specific incentive-related questions as well as general questions about the demographics.

The surveys are conducted to gain information about which media channels consumers use and how often they use them. Furthermore, we gain information on what consumers' opinion of HE is. Also financial data of the consumers is gained. Since the level of schooling of the consumers is low, questions are phrased in a way that is conceived to be easily understandable.

The surveys are handed out in five different sub counties in the district of Mukono, namely Naama, Kasawo, Goma, Nabbale and Ntenjeru. The surveys are offered on tablets and on phones in a Google form. In some of the cases, the tablets and phones are hard to understand for the consumers. Also, some printed versions are handed out due to the high amount of consumers waiting for the tablets.

The consumers are people of rural areas in Uganda. A translator translates all surveys to Luganda, the most-spoken language in the sub counties, but some of the consumers are not able to read at all. If this is the case, either the district manager of HE or fellow consumers help them with filling out the survey.

To study how consumers can be nudged in a financial way to buy more preventive goods the following hypothesis performed:

*H2: Severe financial constraint is one of the main reasons for low demand for preventive goods*

To answer the hypothesis, firstly one sample t-tests for each of the relevant variables are performed with null hypothesis that the mean of the variable is equal to zero. Also, independent sample t-tests and regressions are performed. Table 12 shows the variables used to answer the hypotheses.

### **Statistical analysis - Financial incentives consumers**

#### *One sample t-tests*

The following information is used to study if financial constraint is one of the main reasons for low demand for preventive goods: reasons to buy products at HE, high costs of preventive goods and importance of medicine. The reasons to buy products at HE are divided into the following answers: good quality and reliable health products, cheaper than other health product providers, only source of health products in the neighbourhood and other. A dummy with value 1 is created for the answer “cheaper than other health product providers” and a dummy with value 0 is created for all other answers. If consumers answered with more than one reason, the answer is marked as a dummy with value 1 when “cheaper than other health product providers” was one of the included reasons. Thus, the following null hypothesis is performed:

H0: The low price of HE is not one of the reasons for consumers to buy their products at HE. To measure if consumers find preventive goods expensive a dummy with the value 1 is created for consumers that find preventive goods expensive and a dummy with the value of 0 is created for consumers that do not find preventive goods expensive. Thus, the following null hypothesis is performed:

H0: Consumers do not find preventive goods expensive

Lastly, the importance of medicine is measured. To study if consumers find medicine important a ranking question is asked in the survey with the following answers: very unimportant, unimportant, neutral, important, very important. A dummy with the value 1 is created for the answers “neutral”, “important” and “very important” and a dummy with the value 0 for the answers “very unimportant” and “unimportant”. Thus, the following null hypothesis is created:

H0: Consumers do not find medicine important

Table 12: Variables used for the financial incentives hypotheses on the consumers' side. A description of each variable is given.

Variable	Description
Age	Age of the respondent of the survey
Children_dummy	A dummy variable with the value 1 is created if the respondent of the survey has children and with the value of 0 otherwise.
Money_left_every_week	Money left after expenditure on food or housing in Shillings.
Male_dummy	A dummy variable with the value 1 is created if the respondent is a male and with the value of 0 otherwise.
HE_frequent_customers	A respondent is marked as a frequent buyer if he/she bought more than 5 times a product at HE in the last 12 months and as a less frequent buyer otherwise. Less frequent buyers are coded with a dummy value of 0 and frequent buyers, with a dummy value of 1.
Low_price_HE	Four reasons of buying products at HE are presented to the respondents. A dummy variable with value 1 is created if "cheaper than other health product providers" is given as one of the reasons and 0 otherwise.
Amount_preventivegoods_purchased	Respondents filled in how many times they have purchased preventive healthcare goods in the last 30 days. A value of 0 is given for never, 1 for 1-5 times, 2 for 5-10 and 3 for 10+ times.
High costs_preventivegoods	Respondents filled in how much they agreed with the statement that preventive goods were expensive. A value on a scale from 1 to 5 is given, where 1=very disagree and 5=very agree.
Importance_medicine	Respondents filled in how important certain expenses including medicine were from least important to most important. A value on a scale from 1 to 5 is given, where 1=least important and 5=most important.
Borrow_money	This variable is based on the question what respondents would do if they could not afford a medicine. Respondents could choose from 4 answers. A dummy variable with the value 1 is created for answers including "borrow money", and 0 otherwise.
Likeliness_applying_microcredit	Respondents ranked the likeliness of applying for a microcredit in the next 12 months. A value on a scale from 1 to 5 is given, where 1=very unlikely and 5=very likely.

#### *Independent sample t-tests*

The independent sample t-test consists of one grouping variable taken from the survey. This variable is split according to the grouping variable. An independent samples t-test should be adjusted when the variance of the grouped variables differs. To test this the Levene test is used. If the Levene test is significant, the test is adjusted to assume that the variance differs. The independent samples t-test returns a p-value. A significant p-value means that the mean of the variable is affected by the split in categories of the grouping variable.

For the independent sample t-test several indicators are used as grouping variables. These grouping variables are compared to the other variables. The grouping variables, which are

used are: High costs preventive goods, money left every week and amount preventive goods purchased. Age and gender are included to look at how personal characteristics differ between groups and if there is a significant difference between them.

The high costs of preventive goods is the first grouping variable used. The cut point of the group is set to 3, which splits up the group in consumers that find preventive goods expensive and consumers that do not find preventive goods expensive. It is expected that finding preventive goods expensive is related to a lack of money and also a lower likeliness to buy. Furthermore, it is expected that consumers that find preventive goods expensive give “cheaper than other health product provides” as reason to buy their products at HE.

The second group variable used is the amount of money that the consumers have left each week. The cut point for this group variable is set on the value of 10,000 Shillings per week, which is the median of the money left every week in our sample. This cut point splits the group variable in consumers that have less than 10,000 Shillings left every week and consumers that have more than 10,000 Shillings left every week. The amount of money left every week is expected to negatively influence the likeliness to buy and positively influence the perceptions of high costs of preventive goods.

The third group variable that is used is the amount of times consumers bought preventive goods. This is used to analyse how the amount of preventive goods bought in the last 30 days relates to the different variables. As mentioned above, this variable was changed to a 0 to 3 scale. This analysis splits the groups into one group with a value equal to 2 or higher, which contains the consumers who bought the preventive goods more than 5 times in the last 30 days. The other group consists of values below 2, which contains the consumers who bought less than 5 or nothing at all. To complement this, the variable `low_price_HE` studies if frequent buyers of preventive goods are more inclined to think that the low price is a reason to buy at HE or that there are other reasons for buying medicine from them. It is also expected that more frequent customers might be inclined to buy more products in general at HE, positively influencing the variable `HE_frequent_customers`. The variable `importance_medicine` is expected to be positively influenced, because buying medicine more frequently would imply that it is seen as more important.

The last group variable used is the number of children. Group one consists of consumers with children and group two of consumers without children.

### *Regressions*

In order to examine which variables have an effect on the amount of preventive goods bought in the last 30 days, a regression is run. To know if severe financial constraint is one of the main reasons consumers do not buy preventive goods, significance in the variables `money_left_every_week`, `low_price_HE` and `high_costs_medicine` is expected to be significant. The following regressions are run:

$$\begin{aligned} \text{amount\_preventivegoods\_purchased} = & \alpha + \beta(1) \text{ age} \\ & + \beta(2) \text{ male\_dummy} \\ & + \beta(3) \text{ money\_left\_every\_week} \\ & + \beta(4) \text{ children\_dummy} \\ & + \beta(5) \text{ HE\_frequent\_customer} \\ & + \beta(6) \text{ low\_price\_HE} \\ & + \beta(7) \text{ importance\_medicine} \\ & + \beta(8) \text{ high\_costs\_preventivegoods} + \epsilon \end{aligned}$$

$$\begin{aligned} \text{amount\_preventivegoods\_purchased} = & \alpha + \beta(1) \text{ age} \\ & + \beta(2) \text{ male\_dummy} \\ & + \beta(3) \text{ children\_dummy} \\ & + \beta(4) \text{ low\_price\_HE} \\ & + \beta(5) \text{ importance\_medicine} \\ & + \beta(6) \text{ high\_costs\_preventivegoods} + \epsilon \end{aligned}$$

$$\begin{aligned}
\text{amount\_preventivegoods\_purchased} = & \alpha + \beta(1) \text{ male\_dummy} \\
& + \beta(2) \text{ children\_dummy} \\
& + \beta(3) \text{ low\_price\_HE} \\
& + \beta(4) \text{ importance\_medicine} \\
& + \beta(5) \text{ high costs\_preventivegoods} + \epsilon
\end{aligned}$$

### *Microcredit*

If the financial constraint hypothesis is not rejected, it is assumable that microcredit could be a solution for financial constraint. If this is the case, it is studied if and which consumers would be likely to apply for a microcredit.

The following information is used to run a one sample t-test: likeliness to borrow money and likeliness of applying for microcredit. The borrow\_money variable is created by taking the answers of consumers for the question: “What would you do if you cannot afford a medicine?” The answers included are: “borrow money”, “work extra to buy it”, “sell personal belongings to buy it”, “not buy it”. A dummy variable with value 1 is created for the answer “borrow money” and with value 0 for all the other answers. If a consumer filled in more than one answer, a dummy variable with value 1 is given if the answer consisted of “borrow money” and 0 otherwise. Thus the following hypothesis is performed:

H0: consumers would not borrow money If they cannot afford to buy medicine

To measure if consumers would be likely to apply for a microcredit the answers of the question: “How likely are you to apply for a microcredit in the following 12 months from a scale from one to five?” are used. A dummy variable with value 1 is created for the likeliness of 3, 4 and 5 and with value 0 for the likeliness of 1 and 2. Thus, the following hypothesis is performed:

H0: consumers are not likely to apply for a microcredit

Furthermore, independent sample t-tests are used with grouping variables borrow\_money and likeliness\_applying\_microcredit.

The first group of borrow\_money consists of all consumers that would borrow money if they cannot afford medicine. The second group consists of consumers that would do something else. High costs preventive goods might be positively influenced because someone that has less funds available, might find these products to be expensive. Likeliness to apply for microcredit is expected to be strongly related to the willingness to borrow money, because a microcredit is a type of borrowing.

The first group of likeliness\_apply\_microcredit consists of everyone who replied that they are neutral or more likely to apply for a microcredit in the next 12 months. The second group consists of consumers that are unlikely and very unlikely to apply. It is expected that it is strongly related to borrow money.

### **Statistical analysis - Non-financial incentives consumers**

To study how consumers can be nudged to buy more preventive goods through the use of non-financial incentives, the following hypothesis is formed:

H2: Giving consumers non-financial incentives for buying preventive goods will have a positive effect on their preference for preventive goods.

Non-financial incentives for consumers are defined in this research as promotion of information about preventive goods. To answer this hypothesis, the optimal marketing channels will be identified, as well as the main barriers consumers experience in purchasing preventive goods.

To answer the hypothesis, first a one-sample t-test is conducted for all relevant variables. The null hypotheses in these tests is that the mean of the variable equals zero. In addition, several more one sample t-tests and chi-square tests are performed to measure the relative

importance of the variables, as well as a regression. Table 13 shows the variables used to answer the hypothesis.

Table 13: Simple t-tests with null hypothesis that the mean of the variables is zero.

	N	Mean	Probability
TV hours per day	55	2.05	5.272 (0.000)
Internet hours per day	55	1.71	3.508 (0.001)
Mobile phone or tablet hours per day	55	2.32	5.351 (0.000)
E-mail hours per day	55	1.13	1.847 (0.070)
Social media usage hours per day	55	1.85	3.981 (0.000)
Radio hours per day	55	2.55	7.397 (0.000)

### *Marketing Channels*

The usages of the following media types are analysed: tv, internet websites, apps on tablet or mobile phone, e-mail, social media and radio. Respondents were asked how many hours per day they spend using these media outlets. The possible answers were: zero to one hours per day, one to two hours per day, two to three hours per day, three to four hours per day, four to five hours per day and more than five hours per day. These are recoded into dummies 1 through 6. Missing variables were coded into a dummy with value one as well. Thus, a one-sample t-test is used to test six different null-hypotheses, of the format:

H0: Consumers in our sample use [media type] no more than one hour per day.

Where [media type] indicates tv, internet websites, apps on tablet or mobile phone, e-mail, social media or radio.

To measure consumer preferences in choice of radio stations, a multiple choice question on to which radio station consumers listen is asked in the survey. The possible answers are: 'Local radio', 'National radio' and 'I never listen to radio'. Consumers were able to fill out more than one answer. Respondents that filled out 'Local radio' and 'National radio' are manually split up into two separate respondents: one with the answer 'Local radio' and one with the answer 'National radio'. Next, dummies are created for 'Local radio', 'National radio' and 'Other'. The tested variable is coded with value 1, whereas the other variables are coded with value 0. Thus, the H0 below is tested with a one-sample t-test. This test is conducted for both the entire sample and the portion of the sample which indicated to listen to the radio for more than one hour a day.

H0: Consumers in our sample do not listen to [type of radio station].

Where [type of radio station] is either local or national radio.

Then, a one sample t-test is employed to measure the relative preference between local and national radio. The variables are coded into dummies once more, with value 0 for 'Local radio' and value 1 for 'National radio'. This test is conducted only for the portion of the sample which listens to radio for more than one hour daily. In this way the H0 below is tested:

H0: Consumers in our sample have no preference for either local or national radio.

A similar procedure is followed to test for consumer preferences in the use of social media. The options consumers could choose were: 'Facebook', 'Twitter', 'Instagram' or 'Other'. Since only one respondent used Instagram, this is coded in the category 'Other'. Respondents were able to fill out more than one answer. Respondents that gave more than one answer are again manually split up into two separate responses. Two one-sample t-tests are conducted to test if a significant portion of the sample uses Facebook and if a significant portion uses Twitter. These tests are employed for both the full sample and the part of the sample which uses social media for more than one hour per day. To do so, a dummy variable with value one is created for 'Facebook' and a dummy zero is created for 'Twitter' and visa versa. 'Other' and missing variables are always coded as 0. Thereby the following H0 is tested:

H0: Consumers in our sample do not use [social media platform].

Where [social media platform] stands for Facebook or Twitter.

Then, a one sample t-test with a test value of 0,5 is used to test the relative preference between Facebook and Twitter. In this test only the respondents which use social media for more than one hour a day are taken into account. The variables are coded into dummies once more, with value 0 for 'Facebook' and value 1 for 'Twitter'. In this way the H0 below is tested:

H0: Consumers in our sample have no preference for either Facebook or Twitter.

#### *Familiarity with HE*

To test the way in which current HE customers know HE, again three one-sample t-tests are employed. The answer to survey question 12: 'How do you know HE' is coded into dummies. Respondents who gave more than one answer to this question were again split up into two or more separate responses. For the first test, the answer 'I have purchased products at HE' is coded as one, whereas the other possible answers and missing variables are coded as zero. A one-sample t-test is then done with test value 0, to test hypothesis:

H0: Purchasing products at HE is not one of the ways consumers in our sample know HE.

The answers to this question are then recoded into different dummy variables to conduct two more one-sample t-tests. This way the following two hypothesis are tested:

H0: The community health worker being an entrepreneur is not one of the ways consumers in our sample know HE.

H0: Word of mouth advertising through friends or family is not one of the ways consumers in our sample know HE.

Familiarity with HE through previous purchase of products is not included since it somewhat allows an open door in our sample (since all respondents are HE consumers). Therefore an independent sample t-test is conducted only for the other two possibilities: 'The community health worker is a HE' and 'I have heard of HE through friends or family'. These answers are coded into zero and one respectively. This translates into the following hypothesis:

H0: The amount of consumers in our sample that have heard of HE through friends or family is equal to the amount of consumers in our sample that know it because their community health worker is a HE.

The reasons for buying at HE is the next variable that is tested. Here consumers could choose: 'Good quality and reliable health products', 'Cheaper than other health product providers', 'Only source of health products in the neighbourhood' and 'Other'. Respondents with multiple answers are manually split up into different respondents. Since the significance of the response 'Cheaper than other health product providers' is tested in the section on financial incentives, only the other two options are tested here. Again a one-sample t-test is employed to test for the following null-hypotheses:

H0: A lack of other health product providers in the area does not play a role in the decision of consumers in our sample to buy at HE.

H0: The good quality and reliability of HE' products does not play a role in the decision of consumers in our sample to buy at HE.

Furthermore, an independent sample t-test is conducted to test the null-hypothesis:

H0: An equal amount of consumers in our sample choose to buy at HE because of the inexpensive pricing as do for the good quality and reliability of products.

#### *Regression*

Lastly, a regression is run to measure the impact of different reasons to not buy preventive goods given by the consumers on the amount of preventive goods they have purchased in the last 30 days. The information from this regression will give more insight into why consumers that purchase few preventive goods do so. Therefore the independent variable is the amount

of goods purchased in the last 30 days, which is measured in four ordinal categories. A dummy with value one is added if a consumer indicated they do not purchase preventive goods because they are too expensive, as well as a dummy indicating if a consumer did not purchase preventive goods because they are too expensive and a dummy indicating the consumer finds preventive goods too dangerous (see table 40) for more information on the variables used). The control variables age and a dummy for children are added. The regression therefore looks as follows:

$$\begin{aligned} \text{Amount of preventive goods purchased in the last 30 days} = & \alpha + \beta(1) \text{ Age} \\ & + \beta(2) \text{ Children Dummy} \\ & + \beta(3) \text{ Not necessary} \\ & + \beta(4) \text{ Expensive} \\ & + \beta(5) \text{ Dangerous} + \epsilon \end{aligned}$$

### 6.3.2 Focus groups

Six focus groups were conducted in four different clusters of the Mukono district of Uganda. Only in the Nabbale cluster no focus group is conducted. Each of these focus groups consisted of eight to ten consumers of HE which were brought by the entrepreneurs who operate in the cluster. During all focus groups two researchers and one translator were present. The goal was to gain more insight into the reasons why people buy or do not buy certain products. All focus groups were recorded and transcribed by the researchers. Due to the presence of the translator the pronouns needed to be changed from third person to first person for the transcription. After transcribing the recordings, the transcriptions were analysed using MaxQDA (MaxQDA 2017). For the analysis a three-tiered coding process of open axial and selective coding was used. Extra attention was paid to the two main topics; reasons to buy and not to buy a certain product. Furthermore, in order to get more insight into these topics different methods of preventing and curing diarrhoea and obtaining safe drinking water were coded as well. The main themes are presented in Table 14.

Table 14: Themes and descriptions used for coding of focus groups.

Themes	Description
Reasons to buy	Different reasons why consumers buy certain goods such as affordability, accessibility, quality of the product and trustworthiness
Reasons not to buy	Different reasons why consumers do not buy certain goods such as homemade alternative, lack of awareness, high price, side effects and lack of accessibility

To study if the focus groups responses are representative for the consumers of HE, supporting questions are asked in the surveys:

- Access to safe drinking water: Respondents are asked how they have access to safe drinking water. The answers included are: “water purifying tablets”, “water filter”, “water pump”, “river or lake”, and “other”. For this question checking the boxes of multiple answers is possible. A dummy variable with value one is created for the test value and the other variables are given a value of zero. Thus, the following hypothesis is performed: H0: Consumers in our sample use [safe water source] to have access to safe water. Here [safe water source] indicates water purifying tablets, water filter, water pump, river or lake, and other.
- Recommended products for diarrhoea: To test which product has a significant number of usage in the target group of HE, respondents are asked to state which product they would recommend purchasing when someone close to them is dealing with diarrhoea. The answers included are: “Oral Rehydration Salt”, “Zinc Supplements”, “Water Filter”, “Nothing”, and “other”. For this question checking the boxes of multiple answers is possible. A dummy variable with value one is created for the test value and the other variables

are given a value zero. Thus, the following hypothesis is performed: H0: Consumers in our sample recommend [product] when someone close to them is dealing with diarrhoea. Here [product] stands for Oral Rehydration Salt, zinc supplements, water filter, nothing, and other.

- Recommended products during pregnancy: The last question which is related to the focus group questions is question ten. For this question respondents gave their recommended products or a medicine when someone close to them is pregnant. The answer possibilities are: “Zinc Supplements”, “Folic Acid Supplements”, “Multivitamins”, “Vitamin A”, “No additional products”, and “Other”. For this question checking the boxes of multiple answers is possible. A dummy variable with value one is created for the test value and the other variables are given a value zero. Thus, the following hypothesis is performed: H0: Consumers in our sample recommend [product or medicine] when someone close to them is pregnant. Here [product or medicine] indicates Zinc supplements, Folic Acid supplements, multivitamins, vitamin A, no additional products, and other.

Furthermore, HE came with a last-minute request to include questions about food and nutrition in the focus groups for their own separate research about these topics. These questions were asked during the focus groups and can be found in Appendix C. Since these topics are out of scope for our research, only a summary of the results has been added in Appendix E.

## 6.4 Results financial incentives consumers

*H3: Severe financial constraint is one of the reasons for low demand for preventive goods*

Firstly, one-sample t-tests are performed to test if the means of certain variables are significantly different from zero. Refer to Table 15 for the results. Since the p-value of low\_price\_HE is significant (p-value=0.000, 1% significance), the null hypothesis of the mean being zero can be rejected. Thus, it can be assumed that the low price of HE is one of the significant reasons for consumers in our sample to buy their products at HE. The second test measured if it can be assumed if consumers find preventive goods expensive. The null hypothesis is that consumers do not find preventive goods expensive. Since the p-value is significant (p-value=0.001, 1% significance), the null hypothesis of the mean being zero can be rejected. Thus, it can be assumed that consumers find preventive goods significantly expensive. Lastly, it is tested if consumers find medicine significantly important. The null hypothesis is that consumers do not find medicine important. This null hypothesis has to be rejected because of the significant p-value as well (p-value=0.000, 1% significance). This means that it can be assumed that consumers find medicine significantly important.

Table 15: One sample t-tests with null hypothesis that the mean of the variables is zero.

	N	Mean	Probability
Cheap price HE	55	0.3636	5.555 (0.000)
Expensiveness preventive goods	55	0.182	3.464 (0.001)
Importance medicine	54	0.352	5.364 (0.000)

Furthermore, independent sample t-tests are used. The first independent sample test was performed to analyse the attitude to medication of the consumers that highly agreed in the survey that preventive goods are expensive. Refer to Table 16 and 17 for the results. Since the p-value of the amount of preventive goods bought in the last 30 days is significant (p-value = 0.053, 10% significance), it can be assumed that there is a difference in amount of preventive goods bought between consumers that find preventive goods expensive and consumers that do not find preventive goods expensive. The results show that the consumers that find preventive goods expensive have bought significantly less preventive goods in the last 30 days than consumers that do not find preventive goods expensive. On average, consumers that do not find preventive goods expensive bought between five and ten times preventive goods in the last 30 days and consumers that find preventive goods expensive bought preventive goods only

between one and five times in the last 30 days. However, consumers that find preventive goods expensive have bought significantly (p-value = 0.017, 5% significance) more products of HE in the last twelve months than consumers that do not find preventive goods expensive.

Furthermore, the difference in attitude to medication is tested between consumers that bought preventive goods more than five times in the last 30 days and consumers that bought preventive goods less than five times in the last 30 days. It is found that consumers that bought preventive goods more than five times in the last 30 days, bought on average significantly (p-value = 0.024, 5% significance) more products at HE than consumers that bought preventive goods less than five times in the last 30 days. Also, consumers that bought preventive goods more than five times in the last 30 days find preventive goods significantly less expensive than consumers that bought preventive goods less than five times in the last 30 days.

Table 16: Independent sample t-test.

Grouping Variable	Expensiveness Preventive Goods						
	Neutral, Agree or Very Agree			Disagree or Very Disagree			Significance
Variable	N	Mean	SD	N	Mean	SD	
Times Bought Preventive Goods	12	1.25	0.62158	24	1.9167	1.05981	0.053
HE_customer	12	0.9167	0.28868	24	0.5833	0.50361	0.017

Table 17: Independent sample t-test.

Grouping Variable	Times bought preventive goods						
	More than five times			Less than five times			Significance
Variable	N	Mean	SD	N	Mean	SD	
HE_customer	30	0.8333	0.37905	24	0.5417	0.50898	0.024
Expensiveness preventive goods	20	1.95	1.191	16	2.88	1.893	0.101

Finally, regressions are performed. All results of the regressions can be found in Table 18, 19 and 20. It is found that consumers that give the low price of HE as reason to buy medication at HE bought significantly (p-value = 0.059, 10% significance) less times preventive goods in the last 30 days than consumers that gave another reason for buying at HE.

In the second regression, a couple of insignificant variables from the first regression are removed to increase the relevance of the regression: HE\_frequent\_customers and money\_left\_every\_week. The results show that gender has an impact on the amount of preventive goods bought in the last 30 days: male consumers bought significantly (p-value = 0.047, 5% significance) more times preventive goods than female consumers. Furthermore, children have an impact on the amount of times consumers bought preventive goods in the last 30 days. Consumers with children bought significantly (p-value = 0.014, 5% significance) more times preventive goods than consumers without children in the last 30 days. Lastly, consumers who find medicine important bought significantly (p-value = 0.006, 1% significance) less times preventive goods than consumers that do not find medicine important in the last 30 days.

In the third regression the age variable is removed. The results show that male consumers bought significantly (0.051, 10% significance) more times preventive goods than female consumers in the last 30 days. Also, consumers with children bought significantly (p-value = 0.006, 1% significance) more times preventive goods than consumers without children in the last 30 days. Furthermore, consumers that find medicine important bought significantly (p-value = 0.007, 1% significance) less times preventive goods than consumers that do not find medicine important.

Table 18: The effect of certain variables on the amount of preventive goods purchased in the last 30 days.

<b>Coefficient</b>	<b>Value</b>	<b>Probability</b>
Age	0.252	0.844 (0.412)
Male_dummy	0.374	1.582 (0.134)
Money_left_every_week	-0.109	-0.523 (0.608)
Children_dummy	0.283	1.421 (0.176)
HE_frequent_buyer	0.004	0.019 (0.985)
Cheap_price_HE	-0.605	-2.047 (0.059)
Importance_medicine	-0.304	-1.479 (0.160)
Expensiveness_preventive_goods	0.121	0.471 (0.644)

Table 19: The effect of certain variables on the amount of preventive goods purchased in the last 30 days after removing some insignificant variables of the last regression.

<b>Coefficient</b>	<b>Value</b>	<b>Probability</b>
Age	0.031	0.179 (0.859)
Male_dummy	0.321	2.087 (0.047)
Children_dummy	0.397	2.646 (0.014)
Cheap_price_HE	-0.167	-0.972 (0.340)
Importance_medicine	-0.462	-2.980 (0.006)
Expensiveness_preventive_goods	-0.151	-0.989 (0.332)

Table 20: The effect of certain variables on the amount of preventive goods purchased in the last 30 days after removing one insignificant variable of the last regression.

<b>Coefficient</b>	<b>Value</b>	<b>Probability</b>
Male_dummy	0.297	2.041 (0.051)
Children_dummy	0.426	2.992 (0.006)
Cheap_price_HE	-0.104	-0.708 (0.485)
Importance_medicine	-0.414	-2.889 (0.007)
Expensiveness_preventive_goods	-0.200	-1.396 (0.174)

#### 6.4.1 Summary

Based on the one sample t-tests it is found that in general consumers buy their products at HE because of the low price. Furthermore, consumers find preventive goods significantly expensive and find medicine significantly important.

Furthermore, based on the independent sample tests it is found that consumers that find preventive goods expensive bought less preventive goods than consumers who do not find preventive goods expensive. However, consumers that do find preventive goods expensive buy more products at HE than consumers who do not find them expensive. Furthermore, consumers that have bought more than five times preventive goods in the last 30 days, on average also bought more products at HE.

Based on the regressions it is found that consumers that buy products at HE because of the low price bought less preventive goods in the last 30 days. Male consumers and consumers with children also bought more preventive goods than female consumers and consumers without children. Finally, consumers that find medicine important bought less preventive goods than consumers that do not find medicine important.

To conclude, in general consumers find preventive goods expensive but important. However, these consumers bought less preventive goods, but bought more products at HE because of

the low price. Based on these results, the hypothesis cannot be rejected. Thus, there is not enough evidence to assume that severe financial constraint is not one of the main reasons for low demand of preventive goods. Thus, it is likely that severe financial constraint is a main reason.

#### 6.4.2 Group with financial constraints

Now it can be assumed that it is likely that severe financial constraint is a main reason for the low demand of preventive goods, other information from the above mentioned tests is used to further study the group with financial constraints. An overview of this information can be found in Table 21 and 22. Firstly, it is found that consumers that have less than 10000 Shillings per week left are significantly (p-value = 0.052, 10% significance) more likely to have children than consumers that have more than 10000 Shillings per week left. Furthermore, consumers that have more than 10000 Shillings per week left find medicine significantly (p-value = 0.050, 5% significance) more important than the consumers that have less than 10000 Shillings per month left on.

Another important finding is that consumers that have children give significantly (p-value = 0.062, 10% significance) more often the low price of HE as reason to buy products at HE than consumers without children.

Table 21: Independent sample t-test.

Grouping Variable	Amount left end of the week						
	10000 Shillings or more			Less than 10000 Shillings			Significance
Variable	N	Mean	SD	N	Mean	SD	
children	19	0.6522	0.48698	12	0.9167	0.28868	0.052
importancy_medicine	19	2.0526	1.39338	12	1.0833	1.08362	0.05

Table 22: Independent sample t-test.

Grouping Variable	Children or no children						
	Do not have children			Have Children			Significance
Variable	N	Mean	SD	N	Mean	SD	
Expensiveness preventive goods	16	0.1875	0.10078	39	0.4359	0.08044	0.062

#### 6.4.3 Microcredit

To study if microcredit can be a solution for financial constraint a couple of tests have been performed. The results can be found in Table 23, 24 and 25. The results of the one sample t-tests can be found in Table 23. The first null hypothesis is that consumers are not likely to apply for a microcredit and the second null hypothesis is that consumers are not likely to borrow money for medicine if they cannot afford it themselves. Both hypotheses are rejected since the p-values are both significant (p-value=0.000, 1% significance). Thus, it can be assumed that consumers are likely to apply for a microcredit and are likely to borrow money if they cannot afford to buy medicine themselves.

Table 23: One sample t-tests with null hypothesis that the mean of the variables is zero.

	N	Mean	Probability
Likelihood_borrow_money	54	0.5471	8.452 (0.000)
Likelihood_applying_microcredit	54	0.648	9.881 (0.000)

In the independent sample t-test it is found that consumers that are more likely to borrow money if they cannot afford a medicine are significantly (p-value=0.000, 1% significance) more likely to apply for a microcredit. The likeliness is almost two times as big for the consumers who would borrow than for consumers that would not borrow. Furthermore it is studied if there is a difference in likeliness to apply for a microcredit between consumers that find preventive goods expensive and consumers that do not find preventive goods expensive. However, no significant results have been found.

Table 24: Independent sample t-test.

Grouping Variable	Would borrow money when not able to afford medicine						
	Would not borrow money to pay for medicine			Would borrow money to pay for medicine			Significance
Variable	N	Mean	SD	N	Mean	SD	
Likeliness to apply for microcredit in the next 12 months	22	2.32	0.386	31	4.19	0.243	0.000

Table 25: Independent sample t-test.

Grouping Variable	Likeliness to apply for microcredit in the next 12 months						
	Neutral or more likely to apply			Unlikely or Very Unlikely to Apply			Significance
Variable	N	Mean	SD	N	Mean	SD	
Would borrow money when not able to afford medicine	34	0.7941	0.41043	19	0.2105	0.41885	0.000
Expensiveness preventive goods	23	2.57	1.647	13	2	1.472	0.312

## 6.5 Results non-financial incentives consumers

*H4: Giving consumers non-financial incentives for buying preventive goods, will have a positive effect on their preference for preventive goods.*

### 6.5.1 Surveys

In order to test what kind of media customers use and which media they use the most, we used a t-test. The null hypothesis stated: customers do not use television, radio, social media, mobile phones, e-mail and internet. After conducting this test, of which the results are shown in Table 26, we can reject H0 for all media types except for e-mail, since these were all used significantly by the consumers in our sample.

Table 26: Simple t-tests with null hypothesis that the mean of the variables is zero.

	N	Mean	Probability
TV hours per day	55	2.05	5.272 (0.000)
Internet hours per day	55	1.71	3.508 (0.001)
Mobile phone or tablet hours per day	55	2.32	5.351 (0.000)
E-mail hours per day	55	1.13	1.847 (0.070)
Social media usage hours per day	55	1.85	3.981 (0.000)
Radio hours per day	55	2.55	7.397 (0.000)

The data shows that the consumers use radio the most. 31 out of 48 consumers listen to the radio at least one hour a day. The next most popular media source is the use of mobile phones and television, with 23 consumers. These are followed by social media with 15 out of 34, and internet with 13 out of 33 consumers.

To gain insight into how HE can use these media for the promotion of their (preventive) products, we tested to which radio stations customers listen most and what kind of social media customers use.

For the use of radio, we looked at national radio versus local radio. The t-test showed that the use of local radio stations and national radio stations are both significantly listened to, with a significance of 0.001 and 0.000 respectively. This can be seen in Table 27 below.

Table 27: Simple t-tests with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Radio local	55	0.1818	3.464 (0.001)
Radio national	55	0.7818	13.910 (0.000)

We tested whether both types of radio stations are equally listened to in the categories of consumers who listen to radio for more than one hour. The results are shown in Table 28. The t-test shows a significant mean of 0.17. This means we can reject the null hypothesis that both types of radio stations are listened to the same amount of times. The mean of 0.17 shows that consumers listen significantly more to national radio(value=0) than to local radio(value=1).

Table 28: Simple t-tests with null hypothesis that the mean of the variable is equal to 0.5.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Radio station	30	0.17	-4.817 (0.000)

In the survey, 37 consumers indicated what kind of social media they use. The results of the t-test are shown in Table 29. Facebook and Twitter were the two types of social media that were both significantly used, with a significance of 0.044 and 0.000 respectively.

Table 29: Simple t-tests with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Twitter	54	0.0741	2.059 (0.044)
Facebook	54	0.5556	8.139 (0.000)

We then compared the use of Twitter and Facebook with the customers that use social media for one hour or more every day. Only 15 out of 55 respondents used social media for longer than one hour per day. Furthermore the customers that do use social media for one or more hours per day, mostly used Facebook. The t-test showed that there is a significant difference between the use of Facebook and Twitter, with a significance of 0.002. This can be seen in Table 30. The mean of 0.1667 shows that consumers significantly use Facebook(value=0) more often than they use Twitter(value=1).

Table 30: Simple t-tests with null hypothesis that the mean of the variable is equal to 0.5.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Social media	18	0.1667	-3.688 (0.002)

If HE decides to use social media to promote their (preventive) products, the type of social media that will give them the most reach to their customers, is Facebook.

We also tested how consumers know about HE. The results are shown in Table 31. We find that most consumers know HE through their purchases of HE products. In our t-test we saw that all answers were significantly used. The first response had a mean of 0.6538 and a significance of 0.000 in our t-test. The mean of consumers knowing HE because the community health worker is a HE is 0.4423 with a significance of 0.000. The mean of consumers knowing HE through friends or family is 0.1154 with a significance of 0.000.

Table 31: Simple t-tests with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Purchased	52	0.6538	-5.196 (0.000)
Community health worker	52	0.4423	-8.019 (0.000)
Friends or family	52	0.1154	-19.774 (0.000)

The t-test shows us that customers mostly know HE because the community health worker is a HE rather than through friends or family. This test showed that there is a significant difference in the number of customers knowing HE from a community health worker(value=0) versus through friends or family(value=1). The mean was 0.2069 with a significance of 0.001. These results are shown in Table 32 below:

Table 32: Simple t-tests with null hypothesis that the mean of the variable is equal to 0.5.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Community health worker or family	29	0.2069	-3.829 (0.001)

This result was confirmed in the Chi-Square test which showed that only six consumers indicated that they knew HE from word of mouth from friends or family. This can be seen in Table 33. This means that HE can still work on their word of mouth publicity.

Table 33: Chi-Square test with null hypothesis that the frequencies of the variables are equal.

	<b>Observed N</b>	<b>Expected N</b>	<b>Chi-Square</b>
Community health worker	23	14.5	
Friends or family	6	14.5	
Test Statistics			9.966 (0.002)

We also asked consumers why they bought their products at HE. Consumers had four options to choose from: good quality and reliable products, cheaper than other providers, only option in the neighbourhood and other. From our Chi-Square test we learned that the frequency in which every individual answer is chosen is significantly different and that most consumers choose one of the first two options. This is shown in Table 34 below:

Table 34: Chi-Square test with null hypothesis that the frequencies of the variables are equal.

	<b>Observed N</b>	<b>Expected N</b>	<b>Chi-Square</b>
Good quality and reliable	37	15.8	
Price	18	15.8	
Only option	7	15.8	
Other	1	15.8	
Test Statistics			47.667 (0.000)

Using a t-test, of which the results are shown in Table 35, we learned that the answer good quality and reliable products was chosen by a significant amount of consumers (sig=0.000),

as well as HE is cheaper than other providers (sig=0.000), and because HE is the only health product provider in the neighbourhood (sig=0.013).

Table 35: Simple t-tests with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Good quality and reliable	61	0.6066	9.618 (0.000)
Price	61	0.2951	5.012 (0.000)
Only option	61	0.0984	2.558 (0.013)

Since HE cannot change the number of their competitors in the region, we choose to focus on the other two variables: price and quality. When comparing only these in a t-test with test value of 0.5, we learned that consumers mostly buy their products from HE because of the quality and reliability (value=0) instead of the low prices (value=1). The results are shown in Table 36. The mean was 0.2951 with a significance of 0.001. The low prices of HE' products do play a big role in consumers decision to buy health products but they think the quality and reliability are more important.

Table 36: Simple t-tests with null hypothesis that the mean of the variable is equal to 0.5.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Price and quality	61	0.2951	-3.480 (0.001)

To investigate which factors influence the number of preventive products customers buy, we ran a regression. In the results we saw that consumers who indicated that preventive products are unnecessary, buy less preventive goods than consumers who indicated that they do not think that preventive products are unnecessary.

The coefficients of the regression for the statement that preventive products are dangerous, were not significant. Customers that agreed with the statement that preventive products are expensive buy less preventive goods than consumers who did not agree with the statement.

The age of a person positively effects the amount of preventive goods they buy. This means the older the person is, the more preventive products this person buys. Consumers with children also tend to buy more preventive goods than consumers without children. The beta values our regression showed are showed in Table 37.

Table 37: The effect of certain variables on the amount of preventive goods purchased in the last 30 days.

<b>Coefficient</b>	<b>Value</b>	<b>Probability</b>
Age	0.336	2.257 (0.036)
Children dummy	0.335	2.510 (0.021)
Necessary	-0.256	-2.149 (0.045)
Expensive	-0.540	-3.855 (0.001)
Dangerous	0.062	0.418 (0.681)

Because the number of preventive products was divided into categories in the survey, we created a dummy variable to use for the regression. The use of dummies means that we cannot translate the beta values into concrete amounts of preventive products bought, but we can see the direction they move in and their strength.

The results show that the number of preventive products customers buy is mainly influenced by whether they find preventive products expensive. Furthermore if consumers indicate that they don't find preventive products necessary, this has a significant negative effect on the

amount of preventive products they purchase. The age of consumers and whether they have children also influences their purchasing decision.

These results show that it is important to make sure that preventive products are not too expensive and to teach consumers about the necessity and advantages of preventive products.

### 6.5.2 Focus groups

#### *Reasons to buy health products*

During the focus group with HE' consumers, **affordability** was the most frequently mentioned reason to buy a certain product. This was emphasised when talking about Oral Rehydration Salts (ORS); their main reason for purchasing it was the low price. Furthermore, the **accessibility** of the product played an important role in their purchasing decision. Products such as ORS are easily found at HE, pharmacies, and health centres. When asked about how people feel about ORS, one of the consumers said:

*"It is easy to use, cheap and accessible everywhere."*

Another important aspect is the **quality of the product**. When discussing medicine for diarrhoea, consumers said they bought ORS and zinc for the beneficial characteristics of the products, such as the time it takes for the product to start working, as well as the fact that it is safe to use even for small children. When discussing ORS one of the consumers stated:

*"ORS gives back energy and fluids in the body. If you take ORS the chances of losing all the water in the body is small. You do not even need to go for a drip IV."*

The last mentioned reason for consumers to buy a product is **trustworthiness**. Knowing that a certain product works influences the purchase decision in a positive way. This is for example the case for water filters. One of the consumers mentioned:

*"I can see that you put dirty water up and then clean water comes down so I trust it more than the pills."*

#### *Reasons to buy health products*

The main reason not to buy a certain product is because there is a **homemade alternative** for it. These homemade alternatives are cheaper and most of the times easy to make. It is often mentioned that consumers make ORS themselves or use local herbs as a medicine for diarrhoea. They also use home produced alternatives for obtaining safe drinking water.

*"We use a sieve. We filter using a clean cloth."*

Furthermore, **lack of awareness** is another reason for consumers not to buy a certain product. For example, some consumers were not familiar with zinc as a cure for diarrhoea or water filters as a way to obtain safe drinking water. When the consumers got an explanation about the products and had more knowledge about how to use it, they were more interested in buying it.

Another factor that negatively influences the likelihood of buying a certain product is the **high price**. Consumers are often aware of the benefits of a product, but cannot afford to buy it. When asked about the motivation not to purchase a water filter, one of the main reasons was the price of the product. Water filters are often found in community centres such as churches and schools. Therefore some consumers are aware of the product, but cannot afford to buy it themselves.

*"I have drunk water from it, but I do not have the money to buy it for use at home."*

During a discussion about water purifying tablets, many consumers mentioned that **side effects** such as the bad smell the tablets give the water or the altered taste of the water would discourage them from buying the product again. Furthermore, some consumers felt that drinking the water which was chemically purified was unhealthy due to the existence of chemicals in the water. Most of the consumers who were not aware of water filters expressed their interest in them after being explained what they are. They preferred it over water purifying products such as WaterGuard.

Lastly, some consumers expressed their interest in a product but said they could not purchase it, as a consequence of **lack of accessibility**. This was especially mentioned, when discussing the water filters:

*"It is not easy to find. It is expensive and not easily accessible."*

The abovementioned reasons were most commonly mentioned in the focus groups. Therefore the four most important reasons for buying a product are: affordability, accessibility, quality of the product and trustworthiness. While the five most important factors that would discourage a consumer from buying a product are: homemade alternatives, lack of awareness, high price, side effects and lack of availability.

#### *Access to safe water*

To study which products were mostly used to access safe water, a sub hypothesis was formed using the survey questions that supported the focus groups:

*H0: Consumers in our sample do not use [safe water source] to have access to safe water.*

During the analysis, the following different sources of safe water were tested: water filter (p=0.022), borehole (p=0.011), water boiling (p=0.001) and water purifying tablets (p=0.000). This is shown in Table 38. All these different sources were significant on a 5% significance level. Thus, there is a significant number of consumers in the target group, who got access to safe water by each of these sources.

Table 38: Simple t-tests with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Access through water filter	27	0.185	2.431 (0.022)
Acces throught borehole	27	0.222	2.726 (0.011)
Acces through water boiling	27	0.333	3.606 (0.001)
Acces through water purifying water tablets	27	0.519	5.292 (0.000)

Safe water accessibility by a water pump is not proved to be used by a significant amount of people in the target group, because the p-value from this test is 0.160. A lake or river is also not proven to provide safe water to a significant amount of people because the test value was not known, due to the lack of results as this source of safe water.

#### *Recommendations for diarrhoea*

To study if HE offers the demanded products to the consumers in the target group, a question about recommendations when dealing with diarrhoea was analysed.

*H0: Consumers in our sample do not recommend [product] when someone close to them is dealing with diarrhoea.*

Table 39: Simple t-test with null hypothesis that the mean of the variables is zero.

	<b>N</b>	<b>Mean</b>	<b>Probability</b>
Recommended ORS for diarrhoea	53	0.793	14.092 (0.000)
Recommended Zinc for diarrhoea	53	0.340	5.171 (0.000)
Recommended Water filter for diarrhoea	53	0.075	2.060 (0.044)

There were three products analysed with a one sample t-test. Consumers stated that they would recommend someone who is dealing with diarrhoea to use ORS ( $p=0.000$ ), a Zinc supplement ( $p=0.000$ ) or use a water filter ( $p=0.044$ ). This is shown in Table 39. These three products were all recommended by a significant number of people in our target group, so  $H_0$  is rejected for these products.

#### *Recommendations for pregnancy*

Another question asked consumers about their recommendations when someone close to them is pregnant.

$H_0$ : Consumers in our sample do not recommend [product or medicine] when someone close to them is pregnant.

Table 40: Simple t-test with null hypothesis that the mean of the variables is zero.

	N	Mean	Probability
Recommended Zinc supplement for pregnancy	54	0.130	2.810 (0,007)
Recommended folic acid supplement for pregnancy	54	0.185	3.471 (0.001)
Recommended multivitamins for pregnancy	54	0.630	9.492 (0.000)
Recommended vitamin A for pregnancy	54	0.278	4.515 (0.000)
Recommended no addition products for pregnancy	54	0.018	1.000 (0.322)

There were several products that were tested regarding recommendations for someone who is pregnant. These products are a zinc supplement ( $p=0.007$ ), folic acid supplement ( $p=0.001$ ), multivitamins ( $p=0.000$ ), vitamin A ( $p=0.000$ ). This is shown in Table 40. Some respondents also stated that they would not recommend any additional products to someone who is pregnant, this was also tested and resulted in a p-value of 0.322. This implicates that the number of people in the target group who recommend no additional products is insignificant.

Therefore, there is a significant amount of people that recommend a zinc supplement, folic acid supplement, multivitamins, or vitamin A to someone who is pregnant. For these products,  $H_0$  is rejected.

## 6.6 Conclusion

### *H3: Severe financial constraint is one of the reasons for low demand for preventive goods*

The analyses showed that in general consumers buy their products at HE because of their low price. Consumers find preventive goods significantly expensive and find medicine significantly important.

The data also showed that consumers, which find preventive goods expensive bought less preventive goods than consumers who do not find preventive goods expensive. However, consumers that do find preventive goods expensive buy more products at HE than consumers who do not find them expensive. Also, consumers that have less than 10,000 Shillings per week left, find medicine less important and are more likely to have more children than consumers who have more than 10,000 Shillings per week left. Consumers with children are also more likely to buy their products at HE because of the low price. Furthermore, consumers that have bought preventive goods more than five times in the last 30 days, on average also bought more products at HE.

Furthermore, the analyses showed that consumers that buy products at HE, based on the price, purchased less preventive goods in the last 30 days. Male consumers and consumers with children also bought more preventive goods than female consumers and consumers without children. Finally, consumers that find medical products important bought less preventive goods contrary to those that do not find medicines important.

To conclude, in general consumers perceive preventive goods important but rather expensive. In fact, these consumers tended to purchase less preventive goods, but were willing to

cooperate with the HE because of the lower price. Based on these results, the hypothesis cannot be rejected. Thus, there is not enough evidence to not assume that severe financial constraint is one of the reasons for low demand of preventive goods.

*H4: Giving consumers non-financial incentives for buying preventive goods, will have a positive effect on their preference for preventive goods.*

From all sources of media used by HE consumers, radio broadcasting was discovered as the number one way people found out about HE. Furthermore, a relatively low but significant proportion of consumers use social media; the most popular social network is Facebook.

The majority of people recognise HE because the entrepreneur is typically someone from their community. A smaller but still significant proportion is familiar with HE through word of mouth publicity from friends or family. Most consumers favour HE because of the low prices and high quality reliable products, rather than because it is the only health product provider in their area.

Finally, consumers that do not find preventive goods necessary, or perceive them to be expensive, purchase less preventive goods than those who do not.

## **6.7 Limitations**

### **Selection bias**

Due to local regulations, there were some limitations related to the selection of participants for the research. Due to these local regulations, the researchers were not allowed to go on the street and gather a complete randomised sample. The data was collected during a meeting within a cluster arranged by the district manager of HE. The entrepreneurs were asked to bring consumers to the place where the research was conducted. Participation was not mandatory, but consumers were offered a compensation of 10.000 Ugandan Shilling (roughly 2.50 Euro) to cover transportation costs. Since the compensation offered outweighed the real cost of transportation, consumers received a financial incentive to attend. The real cost of transportation differed per location and per respondent.

These circumstances might have induced the poorest segment of the community to participate in the research in two ways. First, the monetary incentive could have a stronger impact on the attendance rate of less wealthy individuals. The sample of the research is not completely randomised because there were some people that were not able to participate in the field research because it took place during the day.

Another possible source of bias lies in the self-selection among entrepreneurs. The most active entrepreneurs in the district might have been more likely to attend. Furthermore, the consumers they brought might have been close to them or their family. Therefore these consumers might be more involved in health care than the average member of the population, and thus have more knowledge about health care.

It is therefore hard to estimate to what extent these two effects cancel each other out and what the direction of the bias in this sample is.

### **Response bias**

#### *Social desirability bias*

There are multiple levels at which social desirability bias could occur within the research. The participants of the focus group were coming from the same district and possibly belong to the same community. Therefore, participants of the focus groups might not speak their mind freely because they do not want to seem uninformed about health issues towards their peers (Fisher, 1993).

The social desirability bias can also occur due to the background of the researchers. All field researchers that gathered the data are Caucasian, whereas all subjects are born and raised on the African continent. This might have led participants to respond in a way they feel is

socially acceptable for the researchers (Weeks & Moore, 1981). This could lead to a bias in favour of western medication compared to traditional healing methods.

The last possible factor that can influence the occurrence of the social desirability bias is the presence of the HE themselves during the focus groups or when filling out the survey. Since the focus group did not take place in a private location, the entrepreneurs were able to listen in on the discussion. Furthermore, when filling in the surveys some questions were somewhat unclear to the participants. This could be due to translation issues or misconceptions regarding the participants' level of understanding of basic concepts (such as proportions or percentages). Additionally, the illiteracy rate in Uganda is approximately 26%, which lead to some illiteracy amongst the respondents (World Bank, 2015). Some participants asked for help to the surveyor or entrepreneurs. A lot of consumers had troubles with understanding a question about using percentages to divide their income into different categories. Therefore, a ranking question was added after the first day of surveying. Consumers possibly experienced social pressure to deliver the answers that were in the entrepreneur's best interest.

#### *Acquiescence bias*

Another bias that may have influenced the results is the acquiescence bias. Some questions in the survey were positively worded. For example: 'Please indicate, how often you use the following media channels'. This question assumed that the participants use media channels. This might have led to higher indications of the use of media channels (Baron-Epel et al., 2010).

Furthermore, a last minute adaption to the focus group questions lead to the inclusion of a loaded question. Subject 3, question 2: 'How difficult is it to feed your family several times a day?' Appendix C, relies on the assumption that there is some difficulty in feeding ones family multiple times a day. It may therefore elicit a stronger and more negative response from participants.

Lastly, the translators who translated during the focus groups received no formal training. The research relied instead on a district manager and a cluster coordinator of HE for translation. It is therefore possible that neutrally worded questions were translated in a more leading fashion. This could have influenced the responses from the participants. However, it is hard to determine the direction of this bias. The district manager of HE translated five out of six focus groups. So, it may be possible that the translator made assumptions about the answers that the consumers were going to give.

#### **General communication difficulties**

During the focus group, the answers were translated after every question to minimise the loss of information. However, it is still possible that some information got lost in translation.

As mentioned earlier, some of the survey questions might not have been entirely clear to the participants. This could lead to some imprecision in their answers. For example, in the dataset respondents gave two answers for a question where only one answer was requested. Furthermore, some respondents provided answers, which were inconsistent. For instance, some respondents answered one question with "I don't want to borrow money at all" and they responded positively to another question where they were asked about their willingness to take a loan for medicines. After the first day of the data collection, some questions were adapted after the evaluation. During the evaluation, the first completed surveys were analysed to check if the questions were understandable and if the desired information would come from the survey.

#### **Dataset limitations**

The sample size regarding to the consumer survey is 55. After deleting the unanswered questions, the sample size differed per question. Due to this relatively small sample size, the conclusions from the survey cannot be too strict and are not completely reliable. It might be that the conclusions from these answers are not externally valid for the whole target group. The consumer surveys have been conducted in the Mukono district only. Thus, these results could give an indication for other districts in Uganda, but they might not be completely reliable.

## 7 General conclusion

One of the general findings suggest that entrepreneurs tend to be incentivised mainly by social factors instead of financial factors to sell more preventive goods. In most of the cases, questions focused on social incentives were answered consistently by the entrepreneurs. Nonetheless, payment and financial knowledge factors also positively influence entrepreneurs' performance. As higher margins directly linked to high productivity. This is because increased financial knowledge allows the entrepreneurs to recognize and realize higher margins, the importance of continuous trainings is pointed out. Thus it can be assumed that provision of financial incentives will increase entrepreneurs sales of preventive goods regardless of the beliefs that social factors impact the performance.

Non-financial incentives seemed to work in the form of greater and improved merchandise, the provision of transport methods and updated tablets. The problem with the tablets was mainly caused by the insufficient level of knowledge on the functionality, as well as simplification that it brings along. Also, entrepreneurs pointed out the lack of demand for preventive goods due to lack of information as an important issue on why preventive goods do not sell well. Thus, if entrepreneurs learn how to use the tablets, they will be able to provide more information about preventive goods to the consumers.

Furthermore, based on the findings that preventive medicine is generally perceived as more expensive. It can be assumed that severe financial constraint is one of the main reasons for low demand for preventive goods. It can be assumed that severe financial constraint is one of the main reasons for low demand for preventive goods. Furthermore, based on the focus groups, it is found that the lack of information is also an important reason for consumers not to buy certain health products, which has also been pointed out by the entrepreneurs earlier. Also, a significant amount of HE consumers that buy less preventive goods, do not find preventive goods necessary. Thus, it can be assumed that giving consumers non-financial incentives such as more promotion of and information about preventive goods, will make them buy more preventive goods. Since the radio broadcasting was one of the leading sources of obtaining information on HE, it is recommended to consider implementing better promotional tools via the national radio station. Furthermore, since a relatively low yet significant number of HE consumers uses Facebook, this should also be considered when implementing the advertising tools. Lastly, word of mouth should also be taking with caution, as it played a vital role in the examined districts. Based on these findings, it is recommended for HE to invest in their promotion tools, namely broadcasting on national radio, exercising Facebook advertising and introducing a 'bring-your-friend' system.

The most important limitation of this research is the response bias, which has already been thoroughly explained after the separate studies. In all studies it has been experienced that some of the participants had troubles understanding the survey questions and had to be helped out by fellow participants or by the translator. Since some of the participants also had troubles with the tablets, this could have led to not representative and missing answers as well. Moreover, in the focus groups all the answers have been translated by the translator. The above mentioned factors could have limited the participants to speak and fill in the surveys freely and truthfully. This leads to a recommendation to further research this topic without the need of a translator. Ideally, researches that do speak Luganda themselves have to study this topic. This would make sure that parts of important information will not disappear and that the researchers will be able to help the participants with filling out the surveys.

In summary, this study found that HE consumers do find medicine important, but the lack of information and high costs of preventive goods discourage them to purchase it. On the other hand, the entrepreneurs should be incentivised to increase their knowledge on profit margins, sales and the functioning of the tablets, concretely via contentious training sessions. The combination will help HE to optimise the current level of the performance. Nonetheless, the excerpt is that consumers and entrepreneurs can be incentivised both financially as non-financially to buy and sell more preventive goods. However in order for it to work out, specific order should take place, namely in the short-term, HE should start with non-financial incentives and in the long-term, if possible, also focus on financial incentives. This is because

non-financial incentives should be prioritized as they are cost-efficient and have proven to be effective; however, if more budget frees up in the future, financial incentives should be added to fully exploit all the benefits of incentivising the entrepreneurs and consumers.

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## Appendix A: Entrepreneurs survey questions

1. The reason you started working for HE? (lease rank the options in order of importance with 1 being the most important)
  - Because I want to earn extra money
  - Because I want to help people in my community
  - Because I think good healthcare is very important
  - Because I like the job
  - Other.....
2. How much time do you spend every week on your work for HE?
  - (A) 0-5 hours
  - (B) 5-15 hours
  - (C) 15-30 hours
  - (D) 30-40 hours
  - (E) More than 40 hours
3. How much money, in Ugandan Shilling, do you earn per week, all your income-generating activities together?
4. Do other household members contribute to the household income? (Ask)
5. How many people in your household depend on your income? (Ask)
6. With what kind of activities do you generate income ? (Ask)
7. What do you think is the biggest challenge in selling preventive good A?
  - (A) Takes time to explain to people
  - (B) People don't know the product
  - (C) The product is too expensive for the consumers
  - (D) Consumers have another alternative
8. Why would you sell preventive product A?
  - (A) To cure someone
  - (B) Because people ask for it
  - (C) Because of the money I earn from it
  - (D) Because I think they need it
9. "What is typically the value of the products that you hold in stock?"
  - (A) I keep a stock
  - (B) I only buy products if people ask for it
10. "I would sacrifice x more hours of my leisure time to sell more of -preventive product A- if I would get a higher margin on it."
 

Strongly disagree-----strongly agree
11. "I am satisfied with the overall compensation I get from working for HE"
 

Strongly disagree-----strongly agree
12. "I am satisfied with how my work for HE is affecting the local community"
 

Strongly disagree-----strongly agree

13. What is most important for you

My income ————— 1 ————— 1 ————— 1 ————— helping people

50/50

14. If we would double the profit from a certain product, how much effort do you think the other entrepreneurs will make for selling this product?

- (A) Less effort
- (B) The same effort
- (C) More effort

15. If you could only sell one of these products, which one would you choose?

- (A) Product A: costs 1, consumer price 2
- (B) Product B: costs 3, consumer price 6
- (C) Product C: cost 1, consumer price 3
- (D) Product D: cost 6, consumer price 7

16. "Please imagine that you are the best-selling agent of the past month. HE wants to reward you for this. Would you prefer to:

- (i) to get a 10% cash bonus or
- (ii) to have your achievement be announced to all other agents in a ceremony?

17. Are your sales constant over the year? Please indicate for the following periods (q3 2016, q4 2016, q1 2017, q2 2017) your approximate sales volume.

- (A) Yes I sell about the same amount of products every month
- (B) No, it varies a lot depending on how much money the consumers have
- (C) No, it varies a lot depending on how much effort I put into the sales
- (D) No, it varies a lot but I don't know why

18. To what extent do you agree with the following statement:

"My sales performance is mostly caused by my own efforts, and not by forces outside of my control (such as whether people require medication)"

- (i) I agree with the statement
- (ii) I disagree with the statement

## Appendix B: Entrepreneurs focus group questions

Motivations (general):

- Why have you become an entrepreneur? What were your motivations?
- What are in your opinion the most important goods that HE sells and why?
- Could you think of any goods that HE does not sell yet and should sell?
- What role do you see yourself having in the community?
- How much of your time goes into providing the consumers with information about medicines? And do you think this is important?
- Do you think you are making a difference and why?

Motivations (preventive goods, prior to the implementation):

- What are in your opinion the benefits of preventive goods?
- How motivated are you to sell preventive goods?
- How motivated are you to sell preventive goods compared to curative goods?
- How much of your time goes into selling preventive goods?
- How much of your time goes into providing the consumers with information about preventive goods?

Motivations (preventive goods, after the implementation):

- Do you think your interest in the benefits of preventive goods has changed?
- How much extra time did you spend on promoting preventive goods?
- How did you feel knowing someone(or you) won a certificate?
- How has your motivation changed? And compared to curative goods?
- Do you think you know more about the benefits?
- Do you think you spend more time on providing consumers with information about preventive goods?

## Appendix C: Consumer focus group questions

1. We would first like to discuss diarrhoea. When someone in your family has diarrhoea,
  - (a) What would you recommend them to do?
  - (b) Would you recommend them to use a certain product/medicine?
    - (i) If yes, which one do you recommend? What do you like best about this product?
    - (ii) If no, why not? What are your experiences with using products/medicine for diarrhoea?
  - (c) What would you recommend someone to do to prevent diarrhoea in the future?
  - (d) Who or what influences your decision to recommend these products?
  - (e) Could you tell us what ORS is and how to use it? How do you feel about ORS to prevent and cure diarrhoea?
    - (i) What is your opinion about ORS? (easy to use, attractive, cheap/expensive)
  - (f) How do you feel about using Zinc to prevent diarrhoea among children?
    - (i) What is your opinion about zinc? (easy to use, attractive, cheap/expensive)
2. Now, we would like to discuss the provision of safe drinking water. When someone close to you needs safe drinking water,
  - (a) What would you recommend them to do?
  - (b) Would you recommend them to use a certain product?
    - (i) If yes, which one do you recommend and what do you like best about this product?
    - (ii) If no, how do you access clean drinking water?
  - (c) How do you feel about a Water Filter to provide clean drinking water?
    - (i) What do you like about it / what not? (easy to use, attractive, cheap/expensive)
3. Lastly, we would like to ask you some questions about nutrition.
  - (a) What do you consider healthy food?
  - (b) How difficult is it for you to feed your family several time each day?
  - (c) What are the signs of someone not having enough food?
  - (d) Do you use any nutrition supplements? example: vitamin pills

This concludes our focus group. Do you have any final remarks? Thank you so much for coming and sharing your thoughts and opinions with us. We have a short evaluation form that we would like you to fill out if you time. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form.

## Appendix D: Consumers survey questions

1. What is your age?
2. What is your gender?
  - (A) Male
  - (B) Female
3. What is your marital status?
  - (A) Single
  - (B) Married
  - (C) Widowed
  - (D) Divorced or separated
  - (E) Other
4. Do you have any children?
  - (A) No
  - (B) Yes
5. Please indicate how often you use the following media channels:

	0-1	1-2	2-3	3-4	4-5	5+ hours per day
I watch television ...						
I go to internet websites ...						
I use apps on a mobile phone or tablet ...						
I use e-mail ...						
I listen to the radio ....						
I use social media websites (Facebook, Instagram etc.) ...						

6. When I listen to radio, I usually listen to
  - (A) Local radio
  - (B) National radio
  - (C) I never listen to radio
7. When I use social media, I use the following (multiple answers are possible):
  - (A) Facebook
  - (B) Twitter
  - (C) Instagram
  - (D) Other (please indicate): . . . . .
8. How do you have access to clean drinking water?
  - (A) Water purifying tablets
  - (B) Water filter
  - (C) Waterpump
  - (D) River or lake
  - (E) Boiled water

- (F) Borehole
  - (G) Other (please indicate): . . . .
9. What kind of products or medicine would you recommend to purchase when someone close to you is dealing with diarrhoea? (multiple answers are possible)
- (A) Oral Rehydration Salts (ORS)
  - (B) Zinc Supplements
  - (C) Water Filter
  - (D) Nothing
  - (E) Other (please indicate): . . . .
10. What kind of products or medicine would you recommend someone close to you to purchase when she is pregnant?
- (A) Zinc Supplement
  - (B) Folic Acid Supplement
  - (C) Multivitamins
  - (D) Vitamin A
  - (E) Dough
  - (F) No additional products
  - (G) Other (please indicate): . . . .
11. Are you familiar with HE?
- (A) Yes
  - (B) No (skip to questions 14)
12. How do you know HE?
- (A) I have purchased products at HE
  - (B) I have heard of HE through friends or family
  - (C) The community health worker is a HE
  - (D) Other (please indicate) . . .
13. How many times have you purchased a product at HE in the last 12 months?
- (A) 0 times
  - (B) 1-2 times
  - (C) 3-4 times
  - (D) 5+ times
14. What is the reason you buy products at HE?
- (A) Good quality and reliable health products
  - (B) Cheaper than other health product providers
  - (C) Only source of health products in the neighborhood
  - (D) Other (please indicate): . . . .
15. (if answered 0 times to question 12 or no to question 10). Where do you purchase your health products or medicine?
- (A) Local Pharmacy
  - (B) Local Hospital

- (C) I don't purchase health products  
 (D) Other organisations (please indicate): ...
16. Do you know what preventive health products are?  
 Preventive health products are products you buy to prevent getting sick. Examples of preventive health products are mosquito nets, condoms, water purifying tablets and food supplements like vitamin pills.
17. How many times have you purchased preventive health care goods in the last 30 days?  
 (A) More than 10 times  
 (B) 5 - 10 times  
 (C) 1- 5 times  
 (D) Never
18. To what extent do you agree with the following statements?
- Preventive goods are too expensive:  
 Strongly disagree ----- strongly agree
  - Preventive goods are dangerous:  
 Strongly disagree ----- strongly agree
  - Preventive goods are not necessary for me:  
 Strongly disagree ----- strongly agree
  - Preventive goods are not easily available:  
 Strongly disagree ----- strongly agree
- Micro-credit is a concept where you get your health care goods now, but re-pay later in installments. Because you borrow money, you have to pay some interest.
19. How likely are you to apply for a microcredit in the upcoming 12 months?  
 Very unlikely ----- very likely
20. What is the reason why you are (very) unlikely to apply (more options are possible)?  
 (A) I have enough money to buy it myself  
 (B) Risk of not being able to repay is too high  
 (C) I don't want to borrow money at all  
 (D) I don't want to pay interest
21. If others in your community chose micro-credit, would that influence your decision in obtaining it ? (Yes/No)
22. How much money do you have left every week to spend on things other than food and housing?
23. Please divide your monthly budget across the different buckets:

House (repairs, rent, electricity, water etc.)	.....%
Food	.....%
Medication (toothbrushes, medicines, cream etc.)	.....%
Insurances	.....%
Other	.....%
Total	100%

24. How important do you find (choose from very unimportant, unimportant, neutral, important, very important)...

- Food

Very unimportant — Unimportant — Neutral — Important — Very important

- House

Very unimportant — Unimportant — Neutral — Important — Very important

- Telephone

Very unimportant — Unimportant — Neutral — Important — Very important

- TV

Very unimportant — Unimportant — Neutral — Important — Very important

- Medication

Very unimportant — Unimportant — Neutral — Important — Very important

- Insurance

Very unimportant — Unimportant — Neutral — Important — Very important

- Celebrations

Very unimportant — Unimportant — Neutral — Important — Very important

25. Pick an answer for the following scenario:

‘If you need a medicine, but cannot afford it, you would’ :

- (A) Borrow money
- (B) Sell personal belongings to buy it
- (C) Work extra to buy it
- (D) Not buy it

## Appendix E: Summary results nutrition

HE is planning on expanding the Ugandan product basket with some nutritional products. Combined with study three, we did some preliminary research for the implementation of these plans. During the focus groups the consumers were asked about nutrition. Many of the customers mentioned that a nutritious diet is a balanced diet that includes carbohydrates, proteins and vitamins. They get these from locally grown foods such as posho(a kind of sweet potato), beans, cassava, silver fish, meat and greens. Products such as rice, porridge, bread or milk are bought at a supermarket.

Furthermore, it is also hard for the consumers to provide a dish for their family three times a day. Therefore, many of them only cook two meals per day; lunch and supper. This is mostly due to the high prices of food as well as cultural habits. Barely any consumers were aware of food supplements. When the translator explained to the customers what a food supplement is and gave examples, more people recognized it. None of the consumers were regular food supplement users. They mentioned that they are quite expensive.

Lastly, most consumers were aware of the signs of someone being malnourished. Most often mentioned symptoms were; light hair, swollen feet and cheeks and the person has no energy.

We also showed the consumers some products that HE is considering to sell in Uganda. Among the products were a vitamin powder that should be mixed with water, fortified porridge, vitamin powder to put in your food, a zinc and ORS package and different seeds for tomatoes cabbage and carrots. The main finding regarding introducing new products is that the consumers find the price of the product very important. Therefore when implementing new medicine, Healthy Entrepreneurs should consider setting the price as low as possible. Furthermore, the consumers want to be thoroughly informed about the product before they buy it. Therefore, it is important to implement an information booklet along with the introduced product and add information about the new products to the entrepreneurs' tablets.

- Seeds: When the seeds sachets were shown to the consumers, most of them knew what the sachet contained. They recognized most of the vegetables on the packaging, except for the cabbage. When asked whether they would buy it they said they would buy it for a good price (1000-6000 Ugandan Shillings). They need more information on how to plant the seeds, how to take care of the plants and how they can harvest it. Furthermore, the consumers need to know how long the plants will grow and how many seeds are in one sachet. Other plants they would like to grow are soya, onions, green pepper, cucumber, eggplant, spinach, garlic, tomatoes, sweet potatoes, pumpkins and French beans. The consumers would also like to buy complementary products, such as pesticides, at HE.
- Porridge: Consumers say they would buy it if it is not expensive (2000 Ugandan Shillings). HE already provides porridge in Uganda so they were not very impressed by the product.
- Multivitamin drink: The consumers want to test and taste it first but say they would like to buy it for a good price (500 Ugandan Shillings). They like the branding although most of the consumers do not know strawberries.
- Vitamin food supplements: If it is cheap (5000 - 12000 Ugandan Shillings per package of 20 sachets) and it works well, consumers would like to buy it. The currently available food supplements are too expensive.
- ORS+Zinc Package: Consumers say that they need more information about the product. But they will buy it for a good price (2000 Ugandan Shillings). HE is already selling ORS and Zinc separately so not all consumers saw the benefits of the package.