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SON PREFERENCE: SEX-SELECTIVE ABORTION AND
DETERMINANTS OF SEX OF THE LAST BIRTH IN VIETNAM

Miss Thi Thanh Truc Nguyen

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Arts Program in Demography
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ความชื่นชอบบุตรชายเป็นค่านิยมที่มีมานานแล้วในประเทศเวียดนาม ซึ่งได้รับอิทธิพลมาจาก
แนวคิดของจื้อที่ให้คุณค่าแก่ความเป็นผู้ชาย ทั้งนี้เพราะผู้ชายสามารถการสืบทอดนามสกุล กราบไหว้บรรพ
บุรุษ และให้การดูแลพ่อแม่ยามแก่เฒ่า ในสถานการณ์ที่ภาวะเจริญพันธุ์ลดลง ประกอบกับมีเทคโนโลยี
สำหรับการเลือกเพศบุตรเกิดขึ้น อัตราส่วนเพศแรกเกิดของประเทศเวียดนามที่ได้เพิ่มสูงขึ้นมากตั้งแต่ปี
1999 ซึ่งได้ปลุกให้คนในประเทศตื่นตัวกับจำนวนเด็กผู้หญิงที่หายไปก่อนเกิด โดยมีสาเหตุมาจากการทำ
แท้งแบบเลือกเพศ การศึกษาชิ้นนี้มีวัตถุประสงค์ที่จะให้ข้อมูลตัวเลขคาดประมาณการทำแท้งแบบเลือก
เพศในช่วงปี 1999-2099 และอธิบายปัจจัยที่มีความสัมพันธ์กับการมีบุตรคนสุดท้ายเป็นเพศชายใน
ประเทศเวียดนาม

สำหรับการคาดประมาณตัวเลขการทำแท้งแบบเลือกเพศ ผู้วิจัยได้ใช้วิธี Reverse Survival
และใช้ข้อมูลจากการสำมะโนประชากรของประเทศเวียดนามในปี 2009 และตารางชีพปี 1999 ของ
องค์การอนามัยโลก ผลการศึกษาพบว่า มีการทำแท้งแบบเลือกเพศเกิดในช่วงเวลาที่ศึกษาจำนวนทั้งหมด
217,902 ราย เมื่อแบ่งช่วงเวลาดังกล่าวออกเป็น 2 ช่วง พบว่าจำนวนการทำแท้งแบบเลือกเพศนั้นเพิ่มขึ้น
เป็นเท่าตัวจาก 74,179 รายในระหว่างปี 1999-2004 เป็น 143,723 รายในช่วงปี 2004-2009 แม้ว่าในปี
2003 รัฐบาลเวียดนามจะบังคับใช้กฎหมายห้ามไม่ให้มีการทำแท้งแบบเลือกเพศแล้วก็ตาม สำหรับ
การศึกษาปัจจัยที่มีความสัมพันธ์กับการมีบุตรคนสุดท้ายเป็นเพศชาย ผู้วิจัยใช้ข้อมูลจากการสำรวจ
Multiple Indicator Cluster Survey (MICS) ปี 2011 ผลการศึกษาพบว่าการมีบุตรคนสุดท้ายเป็นเพศ
ชายมีความสัมพันธ์กับศาสนา จำนวนบุตรที่มีอยู่แล้ว การมีบุตรเพศชายแล้วหรือไม่ และฐานะทาง
เศรษฐกิจของครอบครัว โดยในปัจจัยที่กล่าวมาทั้งหมด พบว่าการมีบุตรเพศชายแล้วหรือไม่เป็นปัจจัยที่มี
ความสำคัญที่สุด ผลจากการศึกษาครั้งนี้ได้นำไปสู่ข้อเสนอแนะเชิงนโยบาย 3 ประเด็นด้วยกัน ได้แก่ การ
เสริมสร้างความเข้มแข็งของระบบควบคุมการการทำแท้งแบบเลือกเพศ จัดตั้งโปรแกรมแทรกแซงใน
ระดับชุมชนเพื่อเปลี่ยนทัศนคติและวิธีปฏิบัติต่อสตรี และการกระตุ้นบทบาทของสตรีและความเท่าเทียม
กันระหว่างเพศในทุกมิติของชีวิต

สาขาวิชา   ประชากรศาสตร์   ลายมือชื่อนิสิต _____

ปีการศึกษา 2557   ลายมือชื่อ อ.ที่ปรึกษาหลัก _____

5686855451 : MAJOR DEMOGRAPHY

THI THANH TRUC NGUYEN: SON PREFERENCE: SEX-SELECTIVE ABORTION AND DETERMINANTS OF SEX OF THE LAST BIRTH IN VIETNAM. ADVISOR: ASST. PROF. WIRAPORN POTHISIRI, Ph.D., 108 pp.

Son preference is a long-standing culture in Vietnam, which is related to patriarchal values derived from traditional Confucian system where sons are perceived as important status symbols, indispensible elements of the perpetuation of the family name and guarantors of the continuing worship of ancestors, as well as family and old age major supports. In tandem with the low fertility and the availability of sex selection technologies, the sex ratio at birth in Vietnam has dramatically increased since 1999, thus alarming a sharp increase in the number of missing girls before birth due to sex-selective abortions. This study aimed to provide numerical evidence of abortions due to sex selection and explanatory factors associated with having sons in Vietnam. The objective of this study is two-fold. The first fold is to estimate the number of sex-selective abortions during 1999-2009. The second fold is to examine the determinants of the sex of the last birth.

With respect to the first fold, the study adopted the Reverse Survival method and used the data from the 2009 Vietnam Census and the 1999 WHO's Life table. It was found that there were 217,902 abortion cases due to sex selection between 1999 and 2009 in Vietnam. Moreover, this figure nearly doubled from 74,179 to 143,723 for 1999-2004 and for 2005-2009 respectively, even though the national regulation on sex-selective abortion was initiated in 2003. Regarding to the second fold, the secondary data from Vietnam Multiple Indicator Cluster Survey (MICS) in 2011 was employed to examine the determinants of the sex of the last birth. It was found that there were significant associations between the sex of the last birth and religion, parity excluding the last birth, having a son before the last birth, and family wealth. Among others, having no son before the last birth was the strongest factor. Based on the study results, three policy recommendations were proposed. These included strengthening the monitoring system for sex-selective abortion, establishing community-based intervention programs to females to change the attitude and the practice of the society toward partial role and son preference, and encouraging women's empowerment and gender equality in all spheres of life.

Field of Study: Demography	Student's Signature	....
Academic Year: 2014	Advisor's Signature	....

ACKNOWLEDGEMENTS

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List of Abbreviations

ADB	Asian Development Bank
AIDS	Acquired Immunodeficiency Syndrome
CBR	Crude Birth Rate
CCT	Conditional cash transfer
CMC	Century Month Code
DHS	Demographic and Health Survey
GDP	Gross Domestic Product
GNP	Gross National Product
GSO	General Statistic Office
HIV	Human Immunodeficiency Virus Infection
IMR	Infant Mortality Rate
IUSSP	International Union for the Scientific Study of Population
MICS	Multiple Cluster Sampling Survey
NGOs	Non-governmental Organizations
NSRB	Normal sex ratio at birth
SR	Sex Ratio
SRB	Sex Ratio at Birth
SRLB	Sex Ratio of the Last Birth
SRS	Sample Registration System
SSA	Sex-selective abortion
TFR	Total Fertility Rate
U5MR	Under-five Mortality Rate
UN	United Nations
UNICEF	United Nations International Emergency Children's Fund
UNFPA	United Nations Population Fund
WHO	World Health Organization

Chapter 1: Introduction

1.1. Background of the study

The term "missing women" was first mentioned in 1990 by the Nobel Laureate Amartya Sen who observed the geographical differences in gender imbalance across the world. The gender imbalance, measured by the ratio of women to men, was seen to be around 1.05 to 1.06 in Europe and North America, and distinctively low at about 0.94 in South and West Asia. By using the so called "normal range" of sex ratios in the estimation of expected numbers of women in countries with low sex ratios, the author claimed that more than 100 million women were missing, and more than 50 per cent of which were in China and India (Sen, A., 1990). Global statistics from recent studies have insisted that this phenomenon remains pronounced. In 2010, approximately 117 million women were estimated to be missing, and most missing women were from China and India (UNFPA, 2012).

Women can be missing before birth or after birth due to some sex-selective mechanisms. Nowadays, missing women before birth in the early period of life have received more research attention. This is mainly due to the persistent rise in male-bias sex ratios at birth in many countries, especially the world-populated countries like China and India. Gender balance/imbalance at birth is often estimated by the ratio of male babies born per 100 female babies born (Guilmoto, C.Z., 2010, UNFPA, 2012). This ratio is called by demographer sex ratio at birth (SRB) and has been widely used. Based on the long observation since 1660s, boys at birth are always more numerous than girls at birth, and the range of SRB is between 104 and 107 boys for every 100 girls under normal circumstances, that is, no deliberate intervention during the process of reproduction (Nixon, N.N., 2013).

According to the report of UNFPA (2012), China ranked first with the highest SRB in the world with 117.8 baby boys per 100 baby girls. It is evident that most countries with high SRBs were in Asia, for example, China, Azerbaijan (116.5), Vietnam (111.2), and India (110.5), only few countries in Europe, for instance, Albania (111.7), and Montenegro (109.8). These figures suggest that baby girls are missing at

birth in these countries. Another report of World Bank on Gender Equality and Development (2011) revealed the alarming number of 1.5 million girls who were missing at birth around the world, mostly in China and India.

Literature postulated that the main direct cause of the imbalance sex ratio at birth is prenatal sex selection, which derived from three major factors including son preference, low fertility, and availability of sex selection technologies (GSO, 2009, Guilmoto, C.Z., 2009, Guilmoto, C.Z., 2012, Gilles, K. and Jacobs, C.F., 2012, UNFPA, 2012). Among them, son preference is the root factor since the prenatal sex selection has not existed in the regions where there is no preference for sons, even though two remaining factors are met, such as Western Europe. Son preference relates to patriarchal values derived from traditional Confucian system, in which the family requires a son to perpetuate the family name. Sons have been viewed more favorable as they are physically stronger than daughters, then more capable of doing farm and taking care of the whole family, especially when the parents get older. In addition, low fertility had negatively exacerbated the situation (UNFPA, 2012). Presently, a couple's perception on childbearing has been focused on the quality of children, rather than the quantity of children (Bongaarts, J., 2002). In tandem with antinatalist policy, most women have only one or two children (Institute for Social Development Studies, 2007). Thus, the chance of having a son obviously declines, which strengthens the need for prenatal sex selection for both limiting the number of children and attaining the desired number of sons (Bongaarts, J., 2002, UNFPA, 2012). It is fact that, ultrasound scans have improved the quality of prenatal care for millions pregnant women. However, now this scan has become the most common mean to know the sex of the fetus and indirectly increases the number of sex-selective abortions.

The imbalanced sex ratio at birth has undoubtedly posed a number of challenges to the society. First, the disproportionate sex ratio at birth affects the population structure by changing the number of boys and girls aged less than one year old, which subsequently results in the shortage of female adults and the marriage squeeze in the future. The problem can be worse for men who are economically and socially disadvantaged because they cannot compete with other unmarried men to fulfill the

family wish to find a bride and carry on the family name. The marriage squeeze is not only a problem for men but also for women as well as for the society. As pregnancy with undesired female fetus is often ended in abortion, it is likely for women who underwent sex-selective abortion to have greater risks to their physical and psychological health. Health risk could be higher if abortion is not carried out by health professionals. It is also apparent that the exploitation of women, female trafficking, and gender-based violence have increased over time in the countries with the reported high SRBs, and this inevitably undermines the country's development and stability (Guilmoto, C.Z., 2012).

In Vietnam, son preference has been a long-standing culture (Gilles, K. and Jacobs, C.F., 2012). Sons have a higher "value" than daughters because they take care of their older parents, perpetuate the family name and worship the ancestors (Lee, S.Y. and Marwell, G., 2013). The demand for a son was aggravated by low fertility, TFR continuously declined from 2.25 in 2001 to 2.03 in 2009, reducing the chance of having a son (GSO, 2009). Moreover, abortions have been legal in Vietnam. It is like the open door for sex-selective abortions. Vietnamese women can undergo abortions on request with any reason. The situation has become worse since 2000, when ultrasound scans have been extremely common nationwide (Asian safe abortion partnership, 2013). Along with the health of the fetus, woman and their family knew the sex of the fetus. With existing preference for a son, woman could have abortion if the fetus was a girl. As the result, SRB significantly increased from 104 in 2003 to 110.5 in 2009 in Vietnam (GSO, 2012).

However, it is fortunate that the Vietnamese government was aware of negative impacts of imbalanced sex ratio at birth and has undertaken several measures in response to this phenomenon. These included the ban of sex selection by any methods (National Committee, 2003, Vietnam Congress, 2006), and the revision of antenatal care protocol, in which health providers have been not allowed to inform pregnant women with the sex of their babies (Vietnam Goverment, 2006). Moreover, in the National Strategy on Population and Reproductive Health for 2011-2020, the government has expressed their determination by setting a target to bring down the sex ratio at birth to lower than 113 in 2015, and 115 in 2025 (Vietnam Goverment,

2011). In addition, the government is considering to initiate the conditional cash transfer (CCT) scheme to support the family having only female children (Nguyen, K., 2013). Despite the government's huge efforts, the percentages of women knowing the sex of their fetus before birth still continuously increased from 63.8% in 2006 to 81.3% in 2012 (GSO, 2012).

Overall, son preference and sex-selective abortion have been hot issues in Asia countries, especially in China, India and Vietnam and clearly warrant more studies. To my best knowledge, however, very few studies have estimated the number of missing baby girls because of sex-selective abortions. Among these existing studies, none has employed the information from Census. Regarding the existing studies in Vietnam, the qualitative research identified apparently the cultural driving force of son preference, and the annual Demographic Survey pointed out the trend of the fertility decline and the increase of women using ultrasonic scans to know the sex of their fetus before birth. Thus, the hidden aspect was the number of women having abortions because of sex selection. This study, therefore, estimated the number of sex-selective abortions using the data from the 2009 Vietnam Census and provided a better understanding of son preference via the determinants of the sex of the last birth using the most update 2011 Vietnam MICS, which helped to guide the priority of intervention activities for the government.

1.2. Objectives of the study

The objective of this study was two-fold. The first fold was to estimate the number of sex-selective abortions from 1999 to 2009. The second fold was to identify the determinants of the sex of the last birth.

1.3. Benefits of the study

The study has provided the numerical evidence of abortions because of sex selection as well as reflected the methodology of SSA estimation. In addition, the results have drawn the whole recent picture of the determinants of the sex of the last birth. Based on the study results, the effective of the related laws were partly evaluated, and then policy implications and directions of future studies were suggested.

1.4. Thesis structure

The layouts for this thesis are as following:

Chapter 1: Introduction

This chapter has four sections. The introduction aims to provide the background information about the thesis and answers the question of why we choose this topic by showing the gaps of previous studies, the alarming problems, and the benefits of this study. In addition, the thesis objectives and the thesis structure are presented so that readers can have an overview of the study and follow the next chapters easily.

Chapter 2: Literature Review

This chapter is the platform for developing the remaining chapters. It has nine sections which present all literatures related to the study objectives, obtained from the prior research, journal papers, government's documents, and reports of international organizations. The reviews include global patterns and consequences, previous estimation methods, relevant theories, and the detail description of Vietnamese context. Based on the reviews, the conceptual framework of this study is built up.

Chapter 3: Research Methods

This chapter has four sections, and each section presents data sources and methodologies regarding the study objectives. Finally, limitations of this study are highlighted.

Chapter 4: Research Findings

This chapter displays the study results and analyses, following the methodology chapter and the study objectives. With respect to the estimation of SSA, the study findings are presented according to the steps of calculation. Regarding the determinants of the sex of the last birth, the study results are outlined corresponding with the flow of analysis methods and indicate the statistical significance of the data.

Chapter 5: Discussion and Conclusions

This chapter has five sections which present the discussion on the validity of the estimation of SSA and key findings. Based on the results of the study, policy implications are suggested. In addition, conceptual contributions of this study to son preference research and directions for future studies are also discussed.

Chapter 2: Literature Review

2.1. Introduction

This chapter reviews the literature regarding to the two objectives of the study. It begins with the strategy employed to locate the literature and the researcher's reflection on the literature review (Section 2.2), followed by the review of the three preconditions of prenatal sex selection (Section 2.3). Then, the measurement, the recent increasing trend of SRBs and social consequences are showed (Section 2.4 and Section 2.5). Next, the methods have been used to estimate the numbers of sex selective abortions and the determinants of the sex of the last birth in previous studies are presented (Section 2.6 and Section 2.7). After that, the study context- Vietnam is described (Section 2.8). Based on the literature review, the conceptual framework is showed (Section 2.9).

2.2. The reflection from the literature review

In this current study, the literature review was drawn on a wide range of interdisciplinary perspectives, including demography, social medicine, public health, and cultural studies. The literature review included academic papers published and unpublished theses, and reports from government agencies and international organizations, such as UNFPA and UNICEF. Most academic papers were accessed through the electronic journal databases, including JSTOR, MEDLINE, and ISI's Web of Knowledge, whereas the governmental documents were obtained from the government's official webpages and the search engine.

It is found that the literature review on this issue was not completely new but relatively scarce. Most existing research concentrated on the pattern of SRBs, direct and indirect causes of preference for sons and the variations of SRBs according to demographic and socioeconomic characteristics such as birth order, residence, region, ethnicity, religion, and family wealth. It is undoubted that the idea of missing girls started early by Sen (1990), and several studies did on missing girls using Sen or

newer methods. However, the literate review on techniques to calculate the number of sex-selective abortions has been very rare. Only two papers were found, even though SSAs has received a lot attention from international organizations such as UNFPA and UN. In addition, most the existing work was written by Guilmoto. It is not surprising most literature was based in the Chinese and Indian contexts. Turning to the literature review on SSA in Vietnam, the studies on the number of missing girls or sex-selective abortions have received relatively little attention, even though a lot of qualitative research was conducted to explore reasons of having abortions.

2.3. Three preconditions for prenatal sex selection

Existing research has suggested that there are three main preconditions for prenatal sex selection, namely son preference, fertility decline, and sex-selective technology. These factors have worked as "intermediate variables", which any social factors influencing prenatal sex selection must operate. Among them, preference for sons has been considered as the most important motivation of sex selection (Guilmoto, C.Z., 2010, Gilles, K. and Jacobs, C.F., 2012, UNFPA, 2012).

2.3.1. Son preference

According to the theory on the value of the child, parents tend to have a child of particular gender who has higher value. The value of the child comes from three functions, including child capital, parent capital, and power of parent. First, child capital consists of three dimensions, namely comfort, social esteem and affection. Comfort is related to the economic aspect, whereas social esteem concerns the socio-cultural aspect, and affection is related to the psychological aspect. Specifically, children are expected to provide support to parents, for instance, child labor, old-age security, and maintenance of the family name. Second, parent capital consists of resources that children are interested in but within parents control such as the property of parents. Third, parental power gives them the right to get involve in their children's

behaviors, for example, educating their children, being supported by their child when they are old, or selling the child in some countries. This theory suggests that the stronger interrelation of three functions of the value of the child, the higher value of the child will be (Lee, S.Y. and Marwell, G., 2013). This theory seems appropriate to explain the phenomenon of son preference in Asian countries, especially in India, where parents of the brides spend a large amount of expenses, while parents of the grooms are benefited from these dowries. None of these requirements are seen in Western countries, where marriage payments appear more balanced. In addition, married daughters are not supposed to contribute to their parents' expenses after marriage in Asia.

Asian countries have also experienced a sharply decline in the adult mortality and an increase in the life expectancy. As the result, parents have been living longer, but pension benefits and social security were only restricted to a small percentage of the population. Local authorities normally consider that children would be responsible for the care of their parents. Thus, having a son makes parents safe in their old age because married daughters usually live far away from their parents and their natal family. In addition, in several countries, the apparent economic role of sons in patriarchal systems has coalesced into strictly defined religious duties. For example, Hindu and Buddhist societies, only male descendants can perform rituals during the funerals of their parents or ceremonies for the ancestors. Hence when asked why couples preferred sons to daughters, some of them mentioned social pressure as their main motivation, rather than economic benefits (UNFPA, 2012).

It is fact that prenatal sex selection has been not existed in countries with no preference for sons, even though two remaining preconditions are met. Taking Western Europe as an example, this region has the low TFR and the high medical technology, but there is no evidence of imbalance sex ratio at birth. Grooms and brides are both expected to bring resources to marriage. Little discrimination between men and women are reported at work. The family solidarity in Western countries is obviously weaken than in Asia countries, so parents and their children are independent in all spheres in life, which results in no sex preference of children among parents (Lynch, K.A., 2011).

2.3.2. Low fertility

The decline of fertility has been the global trend in several decades, and the low fertility strengthens the need for prenatal sex selection for both limiting the number of children and attaining the desired number of sons. As the common trend, fertility level has fallen below the replacement level in many Asian countries, where women presently have two or fewer children. Since reducing the number of children means declining the probability of having a son. A decrease by one child in fertility rate translates exactly into a doubling of the proportion of couples with no son in the absence of prenatal selection (Bongaarts, J., 2002, UNFPA, 2012).

2.3.3. Accessibility and acceptability of sex-selective technologies

Accessibility and acceptability of sex-selective technologies makes sex selection feasible directly. Parents can access to acceptable and efficient methods to get their desire sex of the child. Ultrasound scan is the most common mean to determine the sex of the fetus and initiated in 1880 (Man, A. and Karmakar, M.K.). Then the use of ultrasound scan has increased rapidly in many countries because of a low cost and a simple of implication in health centers. By the 1980s, thousands of clinics were already in operation and offered sex diagnosis services. In tandem with the establishment of private health centers and the diffusion of the new technology, ultrasound scans have been adopted widely by women in both urban and rural areas (Science-Based Medicine, 2013).

Besides ultrasound scan, there are other means such as blood test and amniocentesis, which require more high-tech laboratories. These tests have been proved by manufacturers to be more precise and quicker than ultrasound scan. Amniocentesis is conducted by using the needle inserted into amniotic fluid. Most often, it is used to spot common genetic defects (such as Down syndrome) and neural tube defects (such as spine bifida and hydrocephalus). However, amniocentesis can cause miscarriage and uterine infection, especially for women with under 15th weeks of pregnancy (University of Maryland Medical Center, 2012). Blood test can be done as early as the

9th weeks of pregnancy by analyzing cell-free fetal DNA circulating in the mother's blood (Science-Based Medicine, 2013).

It is important to note that using medical technologies to determine the sex of the fetus might be impossible in some countries, for example, in China, India, Nepal, South Korea, and Vietnam, where prenatal sex determinant was prohibited since 1989, 1994, 2002, 1987, and 2003 respectively (Ganatra, B., 2008). Thus, the sex determinant technologies need to be acceptable by law to be possible in practice. In addition, traditional sex selection methods have also existed such as prayers, a specific diet, timing and types of intercourse. Few scientific evidences can support for the effectiveness of these methods but the attitude toward sex preference of parents is reflected. Overall, there are many ways to determine the sex of the baby, and parents can get this information easily if they want to. (UNFPA, 2012).

2.4. Measures and sources of variation of sex composition

According to Hobbs (2004), there are three commonly used measures of sex composition, namely masculinity proportion, the excess/ deficit of males, and sex ratio/ masculinity ratio.

2.4.1. Measures of sex composition

The first measure is masculinity proportion. It represents the percentage of males in total population. Fifty per cent is the balancing point between two sexes. The figure above 50 percent means an excess of males, in other words, there is an excess of females. The masculinity proportions of national population are usually below 50% and vary over a narrow range.

The second measure is a ratio of excess or deficit of males to the total population. Zero is the point of balance between male and female. The positive value shows an excess of males, and the negative point denotes an excess of females.

The last measure is sex ratio, widely used. It is defined as the number of males per 100 females and can be calculated for single age or age groups. Except for India, where the number of females per 1000 males are used (Kulkarni, P.M., 2007). One hundred is the balance point between two sexes. The value above 100 reflects the excess of males, and vice versa denoted the deficit of males. It is evident that SRs of national population usually range from 95 to 102. The estimation of SR is extremely sensitive to the sample size. A sex ratio of 100 computed over a sample of 5000 observations ranges from 94.6 to 105.7 (95 per cent confidence interval), thus large samples are always more preferable (UNFPA, 2012).

Nowadays, SR at the early age of life, such as at birth, has received a lot of attention from NGOs and researcher. The normal level of SRB varies from 104 to 107 male births per 100 female births (Nixon, N.N., 2013). In addition, the best source for SRB estimation is the birth registration data when vital statistics are available and exhaustive. This data source provides annual and regional series data to identify differentials and trends of SRB. In Vietnam, SRs and SRBs are provided by the annual Population change and Family planning surveys and the Censuses (GSO, 2009, GSO, 2010). Overall, there are three numerical measures of sex composition, and the most popular one is sex ratio. Therefore, this current study used SRB to measure sex composition at birth.

2.4.2. Current pattern of SRs and SRBs in some countries

In this subsection, we discuss on patterns of SRs of three regions including Africa, Asia, and Europe, which can be representative for less developed, developing, and developed countries respectively. As shown in Figure 2-1, the sex ratio of Asia is about 104, which is higher than the normal range of SR (from 95 to 102) and the two remaining regions for 1990-2010. The SR of Africa fluctuate around 100 whereas Europe has the lowest SR with 92.

Figure 2-1: Sex ratios by regions from 1990 to 2030
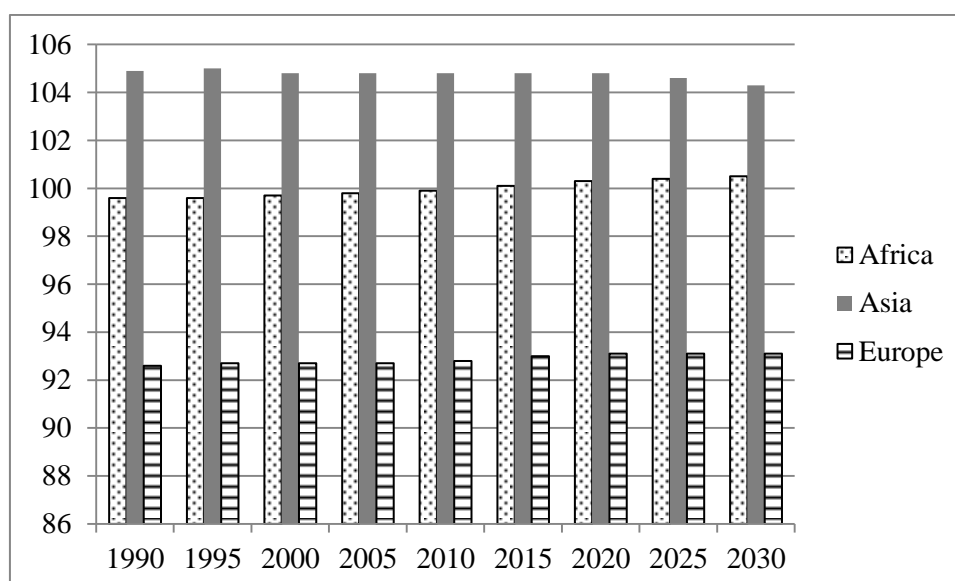
Source: *World Population Prospects: The 2012 Revision*, http://esa.un.org/unpd/wpp/index.htm

In addition, there were many countries having the SRBs higher than the normal level of SRB (from 104 to 107) (Ganatra, B., 2008) by 1.6-12.2 per cent as shown in Table 2-1. More interestingly, most countries with high SRBs locate in Asia.

Table 2-1: Sex ratio at births in some countries for 2007-2011

Country/Region	SRB	Period	Data source
Asia			
China	117.8	2011	Annual estimate
Singapore	107.5	2009	Birth registration
South Korea	106.7	2010	Birth registration
Vietnam	111.2	2010	Annual demographic survey
India	110.5	2008-10	Sample registration
Pakistan	109.9	2007	Population and demographic survey
Azerbaijan	116.5	2011	Birth registration
Armenia	114.9	2010	Birth registration
Georgia	113.6	2009-11	Birth registration
Southeast Europe			
Albania	111.7	2008-10	Birth registration
Montenegro	109.8	2009-11	Birth registration

Source: UNFPA Asia/The Pacific Regional Office (2012), Sex Imbalances at Birth: Current trends, consequences and policy implications.

2.4.3. Sources of variation in SRs and SRBs

Sex ratio and sex ratio at birth of the population vary due to death and migration. The mortality rate of women is lower than men so the sex ratio decline with age. In addition, the social events, for instance, wars, SR of adults declined due huge loss of men. In rural areas, SRs of working population decrease because men are more likely to migrate to urban to work than women (Siegel, J.S. and Swanson, D.A., 2004). Besides mortality and migration, SR also increases because of sex-selective abortions.

As shown in Figure 2-2, there are two main factors affecting on the sex ratio from the conception to the adulthood. The left panel shows biological and environmental factors that increase the gender bias in mortality via discrimination against females, while the right panel displays social decisions and gender preferences. The probability of conceiving a male embryo is slightly higher than a female embryo in the human species. Thus, sex ratio at birth in the absence of social manipulations is usually close to 105 male births per 100 female births. In addition, it is showed the SRB is changed because of spontaneous abortions and abortions after prenatal sex determination (UNFPA, 2012). Moreover, Table 2-2 shows the variations of SRB by demographic and social characteristics such as birth order, residence, region, ethnicity, religion, and social economic status.

Figure 2-2: Factors affecting sex ratios at different ages
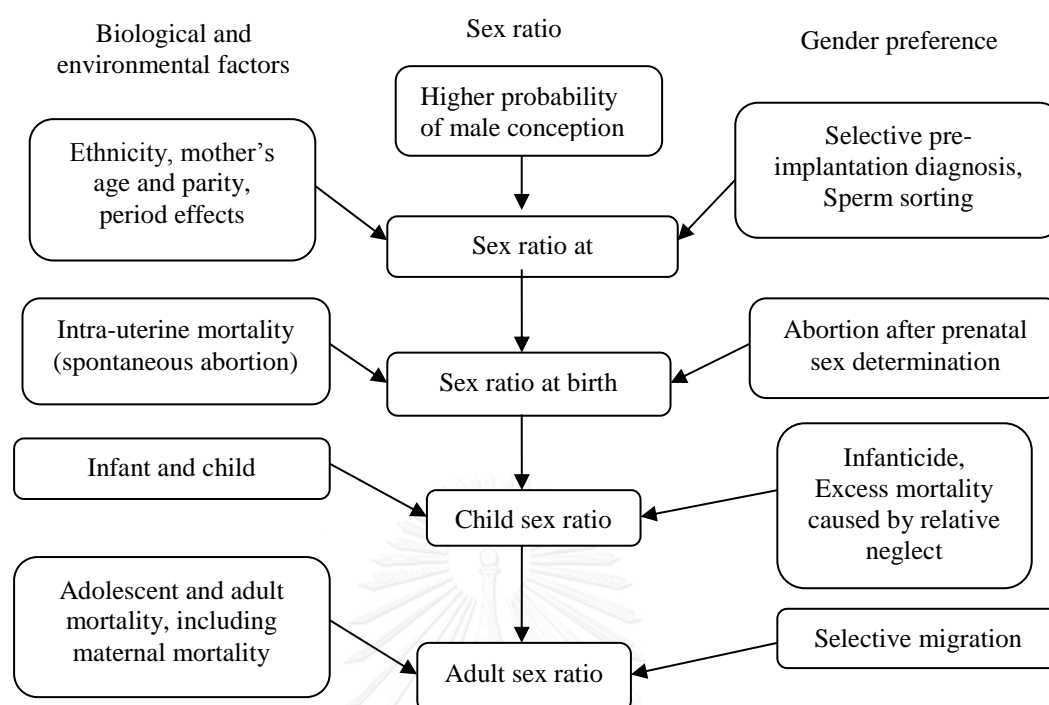
Source: Christophe Z.Guilmoto (2010) "Sex imbalances at birth in 2010: Some theory and a few recent estimates". UNFPA Asia/The Pacific Regional Office (2012), Sex Imbalances at Birth: Current trends, consequences and policy implications.

Table 2-2: Sources of variation in sex ratio at birth

Factor	Impact on sex ratio at birth	Country
Birth order	Increases with higher birth order Highest among final births Highest in families without a son	All countries
Rural/urban	Moderate variation	All countries
Region	Geography usually a strongest source of variation of a sex ratio within a country	All countries
Ethnicity	Ethnic groups exhibited very distinct SRB. Most minority groups had low SRB	Vietnam, China, India, Singapore
Religion	Hindus, Sikhs, Buddhists, and Janis had higher SRBs than Muslims or Christians	India, South Korea
Socioeconomic status	Low SRB among poorest households Highest SRB among the richer households and the better educated people	China, India Vietnam

Factor	Impact on sex ratio at birth	Country
	Low SRB among the most affluent in China	
	Low SRB among women with social insurance in China	

Source: Christophe Z.Guilmoto (2010) "Sex imbalances at birth in 2010: Some theory and a few recent estimates."

2.5. Consequences of prenatal sex selection

In recent years, imbalanced SRB has received enormous attention of policy makers. Many countries have collected the SRB annually, and initiated regulations and measures to control the rapid increase of SRB. Experts have expressed their serious concern about the negative consequences of imbalanced SRB on males, females and the society.

2.5.1. Consequences on males

Guilmoto (2012) examined the potential impacts of the marriage squeeze in China and India during the twenty-first century. The grooms in both countries were estimated to outweigh the prospective brides by more than 50% for three decades in the most favorable scenario. In addition, the proportion of unmarried men at age 50 was expected to rise to 15% in China in 2055 and to 10% in India in 2065. UNFPA (2012) indicated that the impacts would be stronger among the vulnerable men who were poorer, less educated, and from remote areas. Thus, single males have to self-prepare for their old age without children because of incomplete social insurance system in two countries.

2.5.2. Consequences on females

With regard to the direct impact, imbalance SRB reduces the well-being of girls. The research (Hu, L. and Schlosser, A., 2011) found that girls were breastfeed for a shorter period than boys, even though the benefits of breastfeeding on children's health is apparent. In addition, the female mortality was excess the male mortality since the age of one month. No larger reduction in the female child mortality in states with a high incidence of prenatal sex selection in India. While, there was no discrimination in the allocation of food and calories in China but the supply of healthy goods were not equal between young girls and young boys (aged 0 to 4 years old), especially who lived in the poorer provinces (Burgess, R. and Zhuang, J., 2002). In summarize, prenatal sex selection does not only cause the imbalance sex ratio at birth, but also reduces the well-being of girls due to neglect after birth.

For further optimistic expectation, of course, women would be great demand and easy to get married at their expected age, while men would have to compete with others to have a wife. However, a renewed stress on the women's reproductive responsibility to marry and perform wife's traditional role, whereas modern women tend to delay marriage to devote to their higher education and better employment positions. More seriously, the need for women could result in the higher risk of gender-based violence, increasing forced fraternal polyandry, rising demand for sex workers, and thriving trafficking networks. Moreover, reducing women's share of the population in several countries would lead to a weaker political voice in public decision-making. Men would strengthen their control on public and political institutions and then have a greater influences on family and gender legislations (UNFPA, 2012). In general, the negative impacts of skewed sex ratio at birth on females outweigh on males.

2.5.3. Consequences on the society

The intensity and the duration of the current imbalanced sex ratio at birth will shape the population structure and the size of the masculinization. In addition, reducing the number of girls means that mothers will be deficit, which results in declining the number of births in the future. These demographic changes have posed numbers of

challenges to society. For example, the rise in male bachelorhood alarms that the government will take the responsibility to support for single men when they get older which can be the enormous burden on the government's budget. Besides, international marriage migration would be more and more popular within Asia. For example, in China and India, males tended to get married with females migrating from Nepal, Bangladesh, Lao, Mongolia, and Vietnam. However, the problem is that migrant brides have not been well prepared to adapt to the new living environment in foreign countries so they are often the victims of violence, neglect, and discrimination (UNFPA, 2012).

2.6. Prior work on the numbers of sex-selective abortions

Data quality seems to be the most important factor in studying the effect of abortions and sex-selective abortions (Jonhston, H.B. and Hill, K.H., 1996). In general, the methods to measure abortions have been distinguished into (1) direct method and (2) indirect method. Direct method has been used when abortions were accurately reported. The abortion data typically has come from health facility's records and individual surveys.

In the countries where abortions have been legal, the prevalence of abortions is obtained directly from medical reports, but it excludes considerable number of abortions in private and undocumented health centers. In the countries where abortions have been illegal, a community-based survey is the only method. In theory, community-based surveys offer an advantage over indirect method. For example, the number of abortions can be found among all subgroups of women, which provides geographic, demographic and socioeconomic characteristics of women. However, in practice, community surveys are susceptible to a range of problems, including underreporting, misreporting, social courtesy bias, and recall bias. As abortions reporting in community surveys are influenced by the wording of the questionnaire, the legal environment of a country, and the public attitude toward abortions (Singh, S., Remez, L. et al., 2010). Thus, in many contexts, abortions are illegal and involve

with the stigma so it is highly likely that the number of abortions are underreported, hence reasons for abortions are hidden as well. As the result, the number of abortions due to sex selection has been poorly estimated by the direct method, especially in countries where sex-selective abortions are illegal. According to UNFPA (2009), no survey has ever found accurate SSA estimates. Therefore, it is justified to use the indirect estimation of sex-selective abortions in this study as shown in Section 2.6.1 and Section 2.6.2.

According to Cai and Lavely (2003), girls can be missing before birth due to excess female mortality in uterus, presumably the result of sex-selective abortions; and after birth because of two causes including (1) excess female mortality in infancy, probability because of discriminatory behaviors of parents, and (2) net out-migration of girls, presumably due to international adoption. It is noted that undercount of girls in Censuses also makes the number of missing girls overestimated. The total number of girls who were removed from the population, before and after birth, by some sex-selective mechanisms is called "truly missing girls". Combining this with girls who were undercounted in the Census was termed as "nominally missing girls". The majority of missing girls was truly missing (66.1 per cent).

In addition, according to Guilmoto (2010) and UNFPA (2012), besides sex-selective abortions, girls can be missing before birth due to miscarriages as shown in Figure 2-2. However, miscarriages have been less likely to be mentioned in the previous studies which estimated the number of missing girls before birth, as most of studies focused on sex-selective abortions only (Cai, Y. and Lavely, W., 2003, Kulkarni, P.M., 2007, Yadav, P., 2011). Miscarriage, as defined by WHO is a premature loss of fetus up to 23 gestational weeks and weighing up to 500 grams (Mehta, M. and Pattanayak, R., 2013). Most miscarriages occurred during the first 7 weeks of pregnancy (MedlinePlus, 2012) when the sex of fetus is not known. Hence miscarriages may be less likely to associate to sex selection. Furthermore, the national report on miscarriages is unavailable. There is no mechanism to monitor the prevalence of miscarriages in Vietnam. The information about miscarriage can be only found in hospitals but is highly likely to be underreported. Therefore, in this

current study, we focused on the females removed from the population before birth due to sex-selective abortions only.

The following subsections detail two estimation methods, namely the reverse survival method and the Kulkarni's method.

2.6.1. Reverse survival method

Meaning of the reverse survival is that in a closed population, children currently aged x are the survivors of the births that occurred x years ago. From this fact it is easily inferred that the number of births occurring x years ago can be estimated by using life-table survivorship probabilities to "resurrect' numerically those no longer present among the population aged x. This method of estimation is known as "reverse survival" or "reverse projection" because the population now aged x is "survived" or "reverse-projected" to age x-t by moving it with a suitable life table, t years into the past. It is immediately evident that if the single-year age distribution of a population enumerated at t_0 is available, the number of births which occur during each of the 15 or 20 years preceding t_0 could be estimated. For example, population aged 0-9 in 2009 is reversed survival to estimate the total number of births during 1999-2009. The reverse survival method has been widely known in the estimation of TFR and migration (United Nations, 1983). However, it is worth noting that the reverse survival method is heavily dependent on the accuracy of the reported age distribution of the population. Errors in age-reporting, especially of the younger ones, are certain to bias the estimates obtained.

Step 1: Calculate the life table survivorship of children

In order to reverse the survived population in the two age groups 0–4 and 5–9, we needs the values of $_5L_0$ and $_5L_5$, which are the person-years lived between birth and age 5, and between age 5 and 10, respectively. The $_5L_0$ and $_5L_5$ could be obtained from an empirically-based life table of the population or a model life table which are

appropriate to the study context, for example, the regional model life tables or the WHO's life table.

In the life table, the value of $_5L_0$ can be obtained from the summation of $_1L_0$ and $_5L_1$ or the difference between T_0 and T_5 (the total person-year lived since age 0 and age 5).

$$_5L_{0 = 1}L_{0 + 5}L_1 \text{ or } T_0\text{-}T_5$$

Then the survival ratio for any age group is calculated by the following formula:

$$_nS_x = {_nL_{x+n}}/ {_nL_x}$$

According to (Siegel, J.S. and Swanson, D.A., 2004), the survival ratios for young age groups including age group of 0-5 and 5-9 should be calculated from the following formula:

$$S_{0\text{-}4} = {_5L_0}/ 5*l_0 = ({_1L_{0 + 5}L_1})/ 5*l_0$$
$$S_{5\text{-}9} = {_5L_5}/ 5*l_0$$

Step 2: Estimate the numbers of births in each five-year period preceding the inquiry

The numbers of births are born from (t-5) to t and from (t-10) to (t-5) can be derived from the following equations, respectively:

$$B(t-5,t) = {_{x+5}N_x(t)}/ S_{(t-5,t)}$$

$$B(t-10,t-5) = {_{x+5}N_x(t)}/ S_{(t-10,t-5)}$$

Where B(t–5,t) is the number of births that occurred from year t–5 to year t. While $_{x+5}N_x(t)$ is the enumerated population aged between x and x+5 in year t.

Following two steps, we can estimate the actual number of male births and female births in each five-year period before the selected year. With the assumptions of fully enumeration of male population, the expected number of female births during each five-year period is equal to the number of male births divided by the normal sex ratio at birth (105). Therefore, the gap between the expected and actual numbers of female births during each five-year period is the number of sex-selective abortions (Kulkarni,

P.M., 2007, Yadav, P., 2011). According to Yadav (2011), who applied the reverse survival method to estimate the number of sex-selective abortions, there were 184,864 sex-selective abortions, accounting for 65.4 per cent of total missing girls aged 0-6 during 2004-2011 in Madhya Pradesh in India.

The reverse survival method has two advantages. First, it requires minimum data which is suitable for countries with incomplete vital registration system, .i.e. Vietnam. Second, the reverse survival method has high validity and reliability in the estimation of the total number of births occurring in specific period. As it has been widely applied in the estimation of TFR (IUSSP, 2012, United Nations, 1983). However, there are some caveats for user. The quality of this method results heavily depends on the selection of data sources, the life table, and the value of normal SRB. Thus, the researcher needs to invest on all these things when discussing on the validity of the estimation results.

2.6.2. Kulkarni's method

The Kulkarni's method provided another means to estimate the number of total missing girls and the number of sex-selective abortions. For sake of brevity, this subsection discusses only the technique to estimate the number of sex-selective abortions. The basic concept of the Kulkarni's method is that the number of sex-selective abortions equals to the gap between the expected and actual numbers of female births, given that there are no male sex-selective abortions (Kulkarni, P.M., 2007). The following steps describe this technique in detail.

Step 1: Calculate the total number of births (LB) in each five-year period

The mid-period population and the average crude birth rate (CBR) were needed to calculate LB by using below formula:

$$LB = \text{Mid-period population} * CBR * 5 / 1000$$

In which, CBRs for each five-year period gave by India General Registration.

Step 2: Estimate of the number of male births (MB) in each five-year period

The average SRBs were estimated from the Sample Registration System (SRS) for three-year segments. However, in this case, Kulkarni was interested in five-year period so the average SRBs for five-year period are assumed to be equal to the SRBs of three-year period. It is important to note that based on the analysis of missing girls, the SRBs from the SRS were probably over-estimates. Thus, instead of using SRB, they used adjusted SRB, which were obtained by applying the correction factor 0.9766. Finally, the numbers of male births in each five-year period was derived from the following equation:

$$MB = LB * SRB \text{ (adjusted)} / [100 + SRB \text{ (adjusted)}]$$

In which, adjusted SRB was equal to SRB multiply by 0.9766.

Step 3: Estimate the numbers of sex-selective abortions (SSA) in each five-year period

The expected numbers of female births (EFB) were calculated from the numbers of male births in each five-year period, given that the normal sex ratio at birth (NSRB) was 105, by using the following formula:

$$EFB = MB*100/ 105$$

Then the actual numbers of female births in each five-year period were the gap between the total numbers of births and the numbers of male births.

$$FB = LB - MB$$

Then the number of sex-selective abortions was the difference between the expected and actual numbers of female births.

$$SSA = EFB - FB$$

According to Kulkarni (2007), the number of sex selective abortions fluctuated from 1981 to 2005 in India. Specifically, it started at 1.1 million sex-selective abortions,

followed by continuously increased to 3.1 million for 1991-1995, then declined a little for 1996-2000, and finally stood at over 3 million for 2001-2005. In conclusion, corresponding with the spread of the sex-selective technologies, about 11 million sex-selective abortions were performed in India since 1981.

The Kulkarni's method requires many indicators such as the mid-year population, the crude death rate, and the sex ratio birth in five-year period, which may not be consistently available in some developing countries, i.e. Vietnam. In addition, many steps of calculation are needed to find out the number of sex-selective abortions, thus bias can be cumulated. However, this method can get more accurate result if the interested country has complete vital registration system. Thus, crucial elements are the accessibility, availability, sufficiency and reliability of required data to apply this method.

2.7. Prior work on the determinants of the sex of the last birth

Literature denotes that there were statistical associations between the sex of the last birth and (1) household and maternal-related factors such as residence, religion, family wealth, women education level and women's position in the household; (2) the mother's motivation to have a son including parity, having a son before the last birth, and the Vietnamese zodiac year of the last birth. The following sections discuss these factors in detail.

2.7.1. Household and maternal-related factors
a) Residence

Residence indicates urban and rural areas. Living in urban area increases both the cost of children and the accessibility to prenatal sex determination, which results in the high prevalence of sex-selective abortions (Portner, C.C., 2009). In contrast, the higher fertility rate and less stringent family planning regulations in rural areas offer

more chances to parents who failed to have a son as the first child (Guilmoto, C.Z., 2012). Therefore, rural was supposed to have lower SRB than urban.

b) Religion

Religion is also an important factor. Muslim women were less likely to bear a son as the last birth than Hindu women in Nepal (Leone, T., Matthews, Z. et al., 2003). With respect to Buddhist, they had higher sex ratio at birth than Christians. It is justified that Buddhists needed sons to worship the ancestors while it was not necessary to be sons among Christians (Guilmoto, C.Z., 2010).

c) Region

It is fact that region can reflect the son preference, the women's autonomy, the economic status, and the culture of the household. For instance, son preference increased toward the South of Nepal where the women's autonomy was weak (Leone, T., Matthews, Z. et al., 2003). Whereas high SRB was witnessed in the North of Vietnam and in the South of India, where son preference was strong (Guilmoto, C.Z., 2012, Robitaille, M.C., 2013). Interestingly, provinces with SRBs lower than 105 mostly located in the mountainous and minority-inhabited areas (Guilmoto, C.Z., 2012).

d) Family wealth

The SRB was close to the normal level (105) among the poorest households while the higher SRB was witnessed among the richest household (GSO, 2009). Since more affluent households wanted fewer children, and then could easily access and afforded sex-selective technologies to achieve their desired sex of the child (Retherford, R.D. and Roy, T.K., 2003, UNFPA, 2012). However, the situation was reversed in India where wedding dowries were the duty of brides' families. Thus, women from rich

households had lower son preference compared to those from the poorer households because wedding gifts was a enormous burden for the low economic classes (Robitaille, M.C., 2013).

e)   Education level

The mother's education is the important determinant of the opportunity cost of fertility. Hence women with higher education are expected to have lower fertility. This in turn increases the use of sex-selective abortions to obtain a son (Portner, C.C., 2009). According to GSO (2009), the higher SRB was closely associated with the higher education level of women (Retherford, R.D. and Roy, T.K., 2003).

In contrast, Guilmoto (2010) found that women who have completed primary school reduced the probability of having a son as the last birth, probably because these women undergo sex-selection at the first pregnancy. Another study (Robitaille, M.C., 2013) suggested that never-married women who were younger and worked as professional or clerical staff had lower son preference and vice versa among those working in agriculture. It is explained that women who are working in formal sectors are influenced by peers and widely access to media so they follow Western thinking of no gender preference. Thus, the impact of the education level on the sex of the child is not straight forward across previous studies.

f)   Women's position in the household

Women who were the heads of the household had significantly fewer boys than those who were spouses or daughter-in-laws of the household heads. Similarly, singlehood mothers tended to decrease the SRB because these women belonged to the less traditional families and in which patriarchal norms were weaker. Thus, women were more independent on fertility choice (GSO, 2009). In addition, when women are the heads or the wife of the heads of the household, the couples stay in their nuclear families, thus the direct pressure to bear a son from the parents-in-law is reduced. For

example, the parents-in-law are powerful in India and have a strong influence on their sons and their daughters-in-law's decisions, such as number of sons, use of contraception, education, vaccination, and breastfeeding of the children (Robitaille, M.-C. and Chatterjee, I., 2013). Similarly, women underwent sex-selective abortions due to the pressure from their husbands and their parents-in-law, who really cared about perpetuating the family name in China (Junhong, C., 2001).

2.7.2.   Mother's motivation to have a son
a)   Parity

It is witnessed that SRB increased rapidly with the higher birth order, and was highest at the final birth. The parity of three induced a significant increase in SRB (GSO, 2009, Leone, T., Matthews, Z. et al., 2003, Retherford, R.D. and Roy, T.K., 2003, WHO, 2011). However, in Vietnam, SRB was significantly higher among the first child (110.2) than the second child (109), which has not been seen in other countries. Hence, sex selection probably started at the first child in Vietnam (GSO, 2009).

b)   Having a son before the last birth

High SRB was observed among the third child of the women who had no living sons while it is reversed with those having two living sons (Retherford, R.D. and Roy, T.K., 2003). Thus, the sex of the previous births were a strong predictor of the sex of the following birth, the practice of sex-selective abortion and the infant survival (Portner, C.C., 2009, UNFPA, 2012).

c)   Vietnamese zodiac year of the last birth

The root of Vietnamese superstition is the Chinese "Y King" (4000 years B.C.) whereby the Universe found its origin from a unique entity and from such entity, emerged two states, Yin and Yang. In which Yang is as positive, masculine, left, high,

and tough while Yin is negative, feminine, right, low, and soft. In many Asian countries, people believe that the lunar year of birth is important to determine the fate of a newborn child. Lunar year is formed by twelve zodiacs and five elements. The zodiac is characterized by twelve animals namely Rat, Ox, Tiger, Rabbit, Dragon, Snake, Horse, Goat, Monkey, Chicken, Dog, and Pig. Besides, the characteristics of these zodiacs are modified by the five elements including Wood, Fire, Earth, Metal, and Water. Then matching the two terms above, we get the name of the lunar year, for example, 2008 refers to the "Earth Rat" year (Mau Ty in Vietnamese). The lunar calendar is characterized by 60-year cycles, and then the horoscope is determined by the compatibility between the gender and the lunar year of birth. Commonly, the Yin years including Ox, Rabbit, Snake, Goat, Rooster, and Pig are more compatible with girls. In contrast, Yang years namely Rat, Tiger, Dragon, Horse, Monkey, and Dog are more compatible with boys (Do, Q.T. and Phung, T.D., 2009). However, there are differences between countries in using the zodiac. For instance, the second animal of the zodiac line is the Water Buffalo instead of the Ox, and the fourth animal is the Cat instead of the Rabbit in Vietnam. It is almost the same between China and Korea.

Asian countries had a slightly difference in considering which zodiac years are auspicious or inauspicious for girls or boys. For instance, the year of the Fire Horse is considered as the most inauspicious for girls in Japan, while Chinese and Vietnamese avoid bearing daughters in the year of the Tiger. The deficit of female births was witnessed in the years of the Tiger, Dragon, and Horse in Korea (Chun, H. and Gupta, M.D., 2009). The Chinese prefers the Dragon year, which has been a symbol of the divinity and the good fortune (Yipa, P.S.F., Leeb, J. et al., 2002).

As is shown in Figure 2-3, SRB increased suddenly in some zodiac years such as the Horse, Monkey, Rat, and Dragon, which corresponding with the rise of TFR. In Vietnam, the research related to the zodiac year has been rare, only one (Do, Q.T. and Phung, T.D., 2009) was found. According to Do (2009), the zodiac year of birth had a significant impact on the fertility. The cohorts born in auspicious years were 12 percent larger and received more investment from parents such as having two extra months of schooling than their siblings in Vietnam. However, the hypothesis of sex-

selective abortion or gender-biased infant mortality rates being driven by the zodiac year of birth was rejected.

Figure 2-3: The trend of SRB and TFR in Vietnam from 1999 to 2012
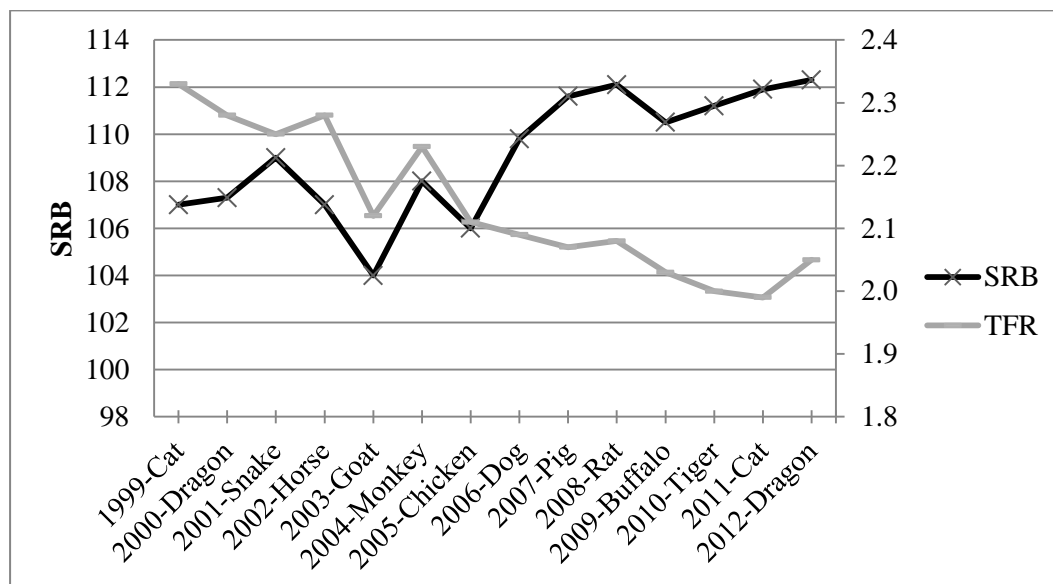
2.8. Vietnam - the study context
2.8.1. Three preconditions of sex-selective abortion in Vietnam

Vietnam has enough three preconditions of sex-selective abortion, namely son preference, low fertility, and accessibility of sex-selective technology. Among them, son preference is the crucial driving force for two remaining conditions.

2.8.1.1. Son preference

Son preference has been obviously strong in Vietnam, which related to patriarchal values derived from traditional Confucian system, where sons have been perceived as important status symbols, and indispensible elements of the perpetuation of the family name, guarantors of the continuing worship of the ancestors as well as family and old age major supports. In Vietnam, only sons can carry out the ceremonies to worship

the ancestors and take care of the family's graves. Without a son, a man has to pass on the worship to the closest male relative, such as his younger brother's son. Therefore, married couples, especially the only son, are received regular injunctions to produce at least one son. Many women want to bear a son to please their husbands and their parents-in-law. Sonless women might face continuous difficulties with their parents-in-law and be ignored by their husbands, whereas sonless men were discriminated against by their friends and colleagues and treated differently.

Moreover, parents have been bared in mind that sons are needed to ensure their old age. Popularly, older parents prefer to live with married sons than married daughters. Married daughters tend to live far away from their parent after getting married, which increases the physical distance between them. Unsurprisingly, inheritance is biased toward sons for these reasons, and women often get a reduced share of the family property. Son preference in Vietnam is derived from the culture, economic, and social norm as described in Figure 2-4 so it is hard to change in a short time (UNFPA, 2012).

2.8.1.2. Low fertility

In 1986, the government initiated the Doi Moi, a controlled transition toward a market economy. The ongoing reforms produced a positive impact on the country's development such as increasing GDP, GNP and slowing down the inflation. At the same period as Doi Moi, the government established new family-planning program called one-to-two child policy, which resulted in the later marriage and the smaller family size nowadays. A wide range of family planning services has been available from central to local provinces. Moreover, to control the population growth, in some specific employment sectors, couples who have the third child are punished or limited promotions in their career (Institute for Social Development Studies, 2007).

As the result, TFR continuously declined from 2.25 in 2001 to 2.03 in 2009 and has remained under the replacement level in several decades (GSO, 2009). Thus, couples do not have a lot of chance to have a son. However, in case of Vietnam, couples want

to get the ideal family consisting of one boy and one girl, or if only one child, it should be a boy. It explains why the pressure of having a son declines when couples already had at least one son (Guilmoto, C.Z., 2012).

2.8.1.3. Accessibility of sex-selective technologies

Ultrasound scans have become extremely common after 2000 in Vietnam, and its main purpose is examining women and child health during pregnancy. Thus, there were 74% of pregnant women having at least an ultrasound scan in 2006. On average, a pregnant woman received about 6 ultrasound examinations in urban areas and 3.5 in rural areas. Nowadays, ultrasonic scan has been applied widely in both public and private health centers with the cheaper price (Asian safe abortion partnership, 2013). According to Hoang (2008), ultrasound scan was used both to screen for fetal anomalies and for the sex determination. A lot of pregnant women knew the sex of their child in their 15th weeks of gestation, and abortion has been possible up to the 22nd weeks of pregnancy, thus women can undergo abortions for sex selection.

In tandem with, a lot of materials mention how to get the desire sex of children, for example, "What pregnant women should know", "99 tips for pregnancy and delivery", "Nutrition for mother and babies", etc. These materials guided in detail that women should eat more salt, meat, fish, and potatoes in three months before pregnancy to have a son (Institute for Social Development Studies, 2007). Even though, it is uncertain on the effectiveness of these traditional tips but son preference is reflected among those who seeking for these tips.

Figure 2-4: Factors affecting sex ratio at different ages
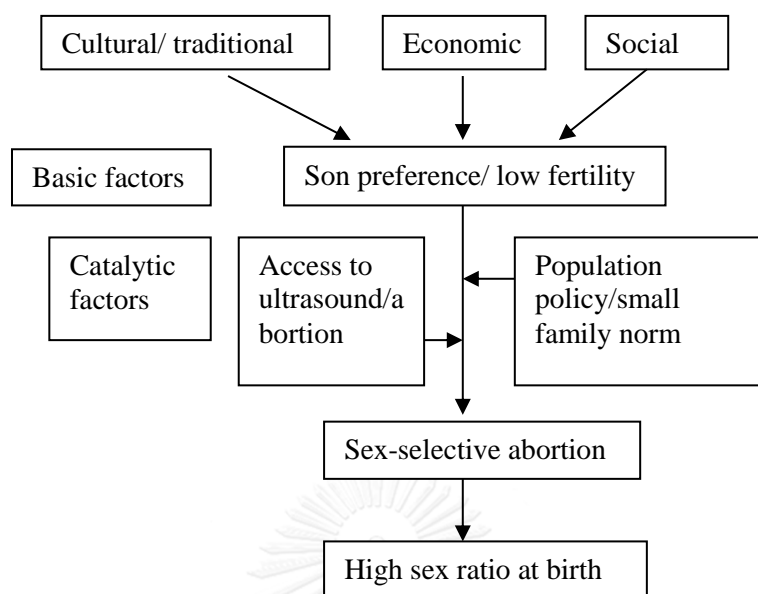
Source: Pham, B.N., Hall, W., Hill, P.S. and Rao, C. (2008). "Analysis of socio-political and health practices influencing sex ratio at birth in Vietnam." Reproductive Health Matters 16(32): 176–184.

2.8.2. Pattern of sex ratio at birth in Vietnam

The Vietnam Population and Housing Census in 2009 showed that sex ratio at birth fluctuated between 106 and 107 for 1999-2005, followed by the significant increase to the peak at 112.1 in 2008, and then slightly declined to 110.5 in 2009. According to the Vietnam Population Projection for 2009-2049 (2011), SRB is estimated to increase to 115 in 2020, and then rapidly decline to the normal level (105) in 2030.

2.8.3. Sex-selective prohibited laws and intervention projects in Vietnam
2.8.3.1. Abortion law

Abortion has been legal and available on women's request in Vietnam since the early 1960s, which reflecting the Government's commitment to provide reproductive choice for women (Institute for Social Development Studies, 2007). By 1989, the Law on Protection of People's Health stated: "women have the rights to have abortion; to receive gynecological diagnosis and treatment; and health check-up during

pregnancy; and medical service when giving birth at health facilities" (Vietnam Goverment, 1986). It is important to note that there are two terms regarding abortion in Vietnam, including abortion and menstrual regulation. The term of abortion indicates the pregnancy termination undergoing at the later stage of gestation which is from 7th weeks to 22nd weeks (Sjösten, C., 2014). While menstrual regulation is referred to an early abortion occurring six weeks or less after the beginning of women's last menstrual period (Vach, T.H., Bishop, A. et al., 1998). At this stage, the fetus is not yet formed so it is more tolerant for the women to terminate the pregnancy compared to abortion. Therefore, SSA is more related to the practice of abortion rather than menstrual regulation because, it is impossible to determine the sex of fetus via ultrasound scan during the first six weeks of pregnancy.

In addition, the National Standards and Guidelines for Reproductive Health Services also has indicated a wide range of health professionals who legally perform abortions such as trained obstetricians, assistant doctors with obstetrics - pediatric specialist as well as trained midwives. Abortion has been allowed at three administrative levels of the health system: (1) abortion of 6th- 22nd weeks gestation at central and provincial hospitals; (2) abortion of 6th- 22nd weeks gestation at district health stations; and (3) abortion up to 6th weeks gestation at communal health centers. Private clinics in certain provinces have been allowed to perform abortion up to 6 weeks gestation if they met the required criteria of the provincial health services (Asian safe abortion partnership, 2013).

It is fact that Vietnam is one of the countries having the highest abortion rate in the world. However, as can be seen from Table 2-3, the number of abortions including menstrual regulation was continuously declining since 1999. The explanations of this trend are the increase of the modern contraceptives use, the quality of family planning services, and improvement in women's awareness on the negative impact of abortions on health (Thinh, H.B., 2009). On average, there were about 536,430 abortion cases per year for 1999-2008 (the data of 2007 is excluded due to the unexplained sudden decrease). It is important to note that the number of abortions was probability underestimated because the abortions of cohabitation couples and illegal abortions were underreported.

Table 2-3: Number of abortions in Vietnam for 1999-2012

Year	Menstrual regulation	Abortion	Total	Source
1999	//	//	780,000	Thinh (2009)
2001	421,701	196,627	618,328	
2002	404,340	167,955	572,295	
2003	365,872	174,505	540,377	
2004	346,988	243,643	590,631	
2005	359,956	179,764	539,720	
2006	345,482	143,594	489,076	
2007	//	//	26,932	GSO (2007)
2008	//	//	161,016	GSO (2008)
2010	//	//	127,034[+]	GSO (2010)
2011	//	//	96,068[+]	GSO (2011)
2012	//	//	88,783[+]	GSO (2012)

+ Number of married women who had at least an abortion
//: not available

2.8.3.2.   Sex-selective abortion laws

The first law was initiated in 2003 in Vietnam, namely the Ordinance on Population (National Committee, 2003), stating: "banning sex selection in all forms, and the state need to have policies and solutions to prevent the sex selection". After that, the Gender Equality was introduced in 2006 (Vietnam Congress, 2006) and mentioned: "banning sex selection in all forms or inciting or forcing women to have abortions because of sex selection". Next, the Administrative sanction regulations on Population and Children made two general laws above into practice. Health providers are fined from 3,000,000 VND to 7,000,000 VND or withdrawn their license if they provide ultrasound scans or other medical tests to identify the sex of the fetus. In addition, persons who force a woman to give more births because all of her children are females or males, are also fined from 2,000,000 VND to 5,000,000 VND (Vietnam Goverment, 2006).

In addition, the regulations to promote bilateral kinship model have been initiated, for example, the children can bear the mother's surname and worship ancestors, sons and

daughters are inherited equally, and couples are encouraged to live in the wife's families. There is an advocacy to recognize the value of daughters in taking care of the elderly (UNFPA, 2011). Moreover, a national program has been established in 43 provinces in Vietnam to normalize the SRB for 2013-2020. Main program objective is to encourage and support women, girls and families which had no son (General Office for Population Family Planning, 2013).

However, the percentage of women knowing the sex of the fetus before birth continuously increased from 63.8 per cent in 2006 to 81.3 per cent in 2012 (GSO, 2012), even though the health providers are not allowed to inform pregnant women about the sex of the fetus. It is possible that health providers used unofficial ways to let women know about the sex of the fetus without recording in medical documents. Hence with preference for sons, woman would undergo an abortion if the fetus was girl.

2.8.4. Possible consequences of imbalanced sex ratio at birth

According to Vietnam Population Projection for 2009-2049 (2011), in both the optimistic and the pessimistic scenarios, the number of males is expected to exceed the number of females in the total population since 2020 onward, leading to the imbalanced marriage system in the future. In addition, the age at first marriage of females is predicted to continuously rise in the next decades, then exacerbating the bachelorhood among males especially those are poor and less-educated. Furthermore, more Vietnamese brides would get married with foreign grooms coming from China, Korea, and Taiwan. With the insufficient self-preparation and the low social protection in destination countries, many brides would be suffered from violence and discrimination (UNFPA, 2012). Besides the long term impact, the direct effects on women health for undergoing abortions were obvious. Women need to wait until 12th weeks of pregnancy to know the sex of their fetus (GSO, 2011), and it takes time to make decision for an abortion. Thus, they normally get risk of a late abortion with more complications on health.

2.8.5. Missing girls in Vietnam of prior studies

To my best knowledge, the literature review on the number of sex selective abortions in Vietnam could not be found. Thus, this subsection only discuss on the total missing girls, which including the number of sex-selective abortions. According to UNFPA (2012), there were 245,000 missing girls aged 0-19 in 2010 in Vietnam, while Guilmoto (2010) estimated to be 139,000 missing girls as shown in Table 2-4. The results of two studies were significantly different, even though using the same data and estimation technique[1]. The number of excess female aged under five deaths per year was low in Vietnam so most missing girls have occurred before birth due to sex-selective abortions.

Table 2-4: The numbers of missing girls in Vietnam

Year	Missing girls aged 0-19	Percentage over corresponding female population	Excess female aged under five deaths per year	Data used for estimation	Source
2010	245,000	1.7	< 1,000	2010 UN Population Division	UNFPA (2012)
2010	139,000	1.0	Not available	2010 UN Population Division	Guilmoto (2010)

2.9. Conceptual framework for determinants of the sex of the last birth

The literature review has revealed that there are associations between the sex of the last birth and (1) household and maternal-related factors, and (2) mother's motivation to have a son. Therefore, the conceptual framework of this study was constructed as illustrated in Figure 2-5.

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1 First, they computed sex ratios by age in "normal" countries, which mean countries without sex discrimination. Then they inferred from these sex ratios the expected number of women in countries with sex discrimination. Finally, the number of missing women was calculated by age by comparing the expected number of women with the observed number of women. This method did not consider the mismatch in the mortality rate and the population structure between countries.

Figure 2-5: Conceptual framework for the determinants of the sex of the last birth

INDEPENDENT VARIABLES   DEPENDENT VARIABLE

Household-related factors
    Residence
    Religion of the household head
    Region
    Family wealth

Maternal-related factors
    Mother's age at the last birth
    Education level
    Marital status
    Women's position in the household

Sex of the last birth
    Male
    Female

Mother's motivation to have a son
    Parity excluding the last birth
    Having a son before the last birth
    Vietnamese zodiac year of the last birth

Chapter 3: Research Methods

3.1. Introduction

This chapter aims to present the methods used in this study. It is divided into three main sections corresponding to the research objectives. The first section describes the sources of data and the method used to estimate the number of sex-selective abortions (Section 3.2). The second section addresses the determinants of the sex of the last birth (Section 3.3). It begins with the description of the dataset, followed by the definition, measures of dependent and independent variables, and the analytical method. Finally, limitations of the study are presented (Section 3.4).

3.2. Estimation of sex-selective abortions during 1999-2009

Aforementioned, two means to estimate the number of sex-selective abortions were found, namely the reverse survival method and the Kulkarni's method. Based on the pros, cons, and required data of each method, this current study decided to adopt the reverse survival method.

3.2.1. Data Sources

The reverse survival method needs (1) the numbers of males and females in 2009, and (2) the Vietnam life table in 1999. The numbers of males and females in two age groups , i.e. 0-4 and 5-9 were obtained directly from the 2009 Vietnam Census (GSO, 2009). While the Vietnam life table in 1999 for male and female were taken from the WHO's estimation (see the whole life table in Appendix 1) (Lopez, A.D. and ect, 2000). Then the l_0 (the radix population), the $_1L_0$, the $_5L_1$ and the $_5L_5$ (the person years lived of people aged 0-1, 1-5 and 5-10 respectively) for male and female were collected from the WHO's life table.

3.2.2. Methodology

According to Yadav (2011), the reverse survival method can be applied to estimate the number of SSA. The numbers of males and females aged 0-9 in the 2009 Census were reversed to obtain the numbers of male and female births occurring between 1999 and 2009. Three assumptions used in this method (1) no migration of children aged 0-9 during 1999-2009, (2) full reporting of males aged 0-9 in 2009 Census and (3) selecting 105 as the normal level of SRB.

Step 1: Calculate the survival ratios for males and females

Survival ratios for males and females aged 0-4 and 5-9 were calculated by the following equations:

$$S_{0-4} = {_5L_0}/ 5*l_0 = (_1L_0 + {_5L_1})/ 5*l_0$$

$$S_{5-9} = {_5L_5}/ 5*l_0$$

Step 2: Calculate the numbers of male and female births during 1999-2009

Applying the survival ratios to the male and female children aged 0-9 in 2009, and then the numbers of male and female births during 1999-2009 were obtained from the following calculations:

Births born 1999-2004 = Children aged 5-9 in 2009/ S_{5-9}

Births born 2005-2009 = Children aged 0-4 in 2009/ S_{0-4}

Step 3: Calculate the expected number of female births and the number of sex-selective abortions during 1999-2009

The expected number of female births was the number of male births divided by the normal sex ratio at birth (105). Then, the number of sex-selective abortions was the gap between the expected and actual numbers of female births.

Expected female births = male births *100/ normal SRB

Sex-selective abortions = Expected number of female births − actual number of female births

3.3. Determinants of the sex of the last birth

3.3.1. Data Source

This study employed the secondary data from 2011 Vietnam Multiple Indicator Cluster Survey (MICS) conducted by the General Statistics Office in collaboration with the Ministry of Health (MOH) and the Ministry of labor, Invalids and Social Affairs (MOLISA), with financial and technical support from UNICEF and financial support from UNFPA. The 2011 MICS is the fourth round survey of Multiple Indicator Cluster Surveys in Vietnam, conducted between December 2010 and January 2011.

This survey provides the wide range of information regarding situations of children and women in Vietnam, updating information from the previous 2006 Vietnam MICS. The survey examined on a broad range of issues such as Child Mortality, Nutritional Status and breastfeeding, Immunization, Care of Illness, Malaria Prevention, Water and Sanitation, Reproductive Health, Early Childhood Development, women Education, Child Protection, and HIV-AIDS. These information is essential to monitor the goals and targets of the Millennium Declaration, the World Fit for Children Declaration and Action Plan, as well as the National Program of Action for Children 2011–2020 (GSO, 2011).

Three sets of questionnaires were used in the survey, including (1) a household questionnaire which was collected information on all de jure household members (usual residents), the household, and the dwelling by asking the household head; (2) a woman questionnaire was administered to all women aged 15–49 years in each household at the time of interview; and (3) a children questionnaire was administered to all children aged under 5 years old living in each household by interviewing the mothers or the caregivers. Thus, there are four datasets separately according to the sets of questionnaires. In this current study, we merged the household and children

datasets onto the women dataset before analysis (please see the questionnaires in Appendix B).

To obtain the datasets for this study, a request was sent to childinfo.org to get permission to download this datasets. Datasets were distributed at no cost for legitimate research, with the condition that copies of all reports and publications based on the requested data must be sent to the following persons (1) Mr. Nguyen Dinh Chung - Deputy Director, Social and Environment Statistic Department, General Statistic Office, Ministry of Planning and Investment; (2) Ms. Sigrid Breddy - Monitoring and Evaluation Specialist, UNICEF Viet Nam (GSO, 2011).

3.3.2. MICS4's sample design and the current study sample size

The sample size for the Vietnam MICS 2011 was calculated as 12,000 households. It was designed to provide estimates for a large number of indicators at the national level, represent for urban and rural areas, and for six regions namely the Red River Delta, the Northern Midland and the Mountain areas, the North Central area and Central Coastal area, the Central Highlands, the South East and the Mekong River delta. A multi-stage, stratified cluster sampling approach was used for the sample selection. The average number of households selected per cluster was determined as 20 households. They allocated equally the total sample size to the six regions. Hence, 100 clusters were allocated to each region, distributed proportional to the size of urban and rural populations in each region. Therefore, the final sample size of 12,000 households (100 clusters * 6 regions * 20 households per cluster) (GSO, 2011).

Of total 12,000 households, 11,614 household questionnaires were completed. Then, in each visited household, all women aged 15-49 were interviewed, and there were 11,663 cases of success. Among them, only 2,983 ever-married women who had at least one living child in the five preceding the survey (2006-2010) were included in this current study analysis. Results in this study analysis were weighted by women's weight provided by GSO to use the national representative results (GSO, 2011).

3.3.3. Variables definition and measures

In the following subsection, the definition and measures of dependent and independent variables are described in detail and summarized in Table 3-5.

3.3.3.1. Dependent variable

This study is interested in a binary variable indicating the recorded sex of the last birth aged less than five years old. This dummy variable is coded 1 for if the respondent reported male birth and 0 for otherwise.

3.3.3.2. Independent variables
a) Household-related factors

Residence: it is dichotomous variable which represents the current residence of the women's household. This variable is coded 1- urban and 2- otherwise.

Religion of the household head: it is nominal variable which describes the religion of the household head. In the origin survey, this variable includes eight categories, namely Buddhism, Muslim, Cao Dai, Hoa Hao, Christian Catholic, Christian Protestant, no religion, and other religions. However, in this current study, this variable is coded 1-Buddhism, 2- Cao Dai, 3- Hoa Hao, 4- Christian Catholic, 5- Other religions, and 6- No religion.

Region: it is nominal variable which illustrates the location of the household. This variable is coded 1- Red River Delta, 2- Northern Midlands and Mountain area, 3- North Central and Central Coastal area, 4- Central Highlands, 5- South East, and 6- Mekong River Delta.

Family wealth: In the origin survey, this variable includes five categories, namely poorest, second, middle, fourth, and richest. Principal components analysis was performed by using information on the ownership of consumer goods, dwelling characteristics, water and sanitation, and other characteristics that were related to the household's wealth to assign weights to each of the household assets. Each household

was then assigned a wealth score based on these weights and the assets owned by that household. The survey household population was then ranked according to the wealth score of the household, and was finally divided into five equal quintiles. The assets and other characteristics related to wealth used in these calculations were as follows: water sources, toilet facility, housing, fuel types for cooking, electricity, bank account, durable goods (such as radio, TV, refrigerator, fixed telephone, watch, mobile phone, bicycle, motorcycle, boat with motor, car), animals (such as buffalo, cattle, horse, donkey, goat, sheep, chicken, pig). The family wealth index was calculated by GSO and readily in the dataset (GSO, 2011). In this current study, the family wealth is ordinal variable and consists three categories: 1- Poorest, 2- Middle (the combination of the second, middle and fourth quintiles), and 3- Richest.

b)   Maternal-related factors

Mother's age at the last birth: it is the completed age of women at the last birth, an ordinal variable. Mother's age at the last birth = integer (CMC of date of birth of the last birth − CMC date of birth of the women). Whereas Century Month Code (CMC) = (year of birth − 1990)*12 + month of the last birth (UNICEF, 2010). From the numerical variable, the variable is grouped into five categories, including 1 for 14-19, 2 for 20-24, 3 for 25-29, 4 for 30-34, and 5 for 35+.

Education level: it is an ordinal variable. This variable is obtained from two questions (1) whether the women ever attended to school or preschool with the "yes" and "no" answers, (2) the highest level of school woman attended with the "preschool", "primary", "lower secondary", "upper secondary", "professional school", and "college/university & above" answers. In addition, among 2,983 women selected in this study, no one had preschool education so it is grouped into four categories, including 1- no education (never attended to school), 2- primary (grade 1 to 5), 3- lower secondary (grade 6 to 9), and 4- higher secondary (grade 10 to 12) and above (the group of upper secondary, professional school, college/ university and above).

Marital status: it is the current marital status of the women, a nominal variable. This variable is coded 1- currently married and 2- windowed/ divorced/ separated.

Women's position in the household: it is a nominal variable including fourteen categories, (1) head, (2) wife / husband, (3) son / daughter, (4) son-in-law / daughter-in-law, (5) grandchild, (6) parent, (7) parent-in-law, (8) brother / sister, (9) brother-in-law / sister-in-law, (10) uncle / aunt, (11) niece / nephew, (12) other relative, (13) adopted / foster / stepchild, and (14) not related. Based on the objective of this current study, the variable is grouped into four categories, including 1- household head, 2- wife of the head, 3- daughter of the head, 4- daughter in law of the head and 5- other relationship.

c) Mother's motivation to have a son

Parity excluding the last birth: it is dummy variable which describes the total number of living children women had before the last birth. The parity excluding the last birth is equal to the total number of living children minus one. The variable is coded 1 – "more than two" if the women had more than two living children excluding the last birth and 0– otherwise.

Having a son before the last birth: it is dummy variable which reconstructed by the information of the total number of living sons that the woman had. However, it needs to put into concern that the total number of living sons includes a son as the last birth. The variable is coded 1- "No" if women had no son before the last birth and 0-"Yes" if women had at least a son before the last birth.

Vietnamese zodiac year of the last birth: it is dummy variable and reflects whether the zodiac years of the last birth are compatible with boys or not. Because of the mismatch between lunar and solar calendars, zodiac years of the last birth are re-computed based on the solar month and year recorded in the survey. For example, the child was born from February 7th in 2008 to January 25th in 2009 in the solar calendar, which corresponds to 2008-the year of the Rat in the lunar calendar. Thus, the zodiac

year of the last birth born on January 2008 was hence be coded 2007-the year of the Pig instead of the year of the Rat (Do, Q.T. and Phung, T.D., 2009). This study is interested in the last births aged less than five years old so they were born in six zodiac years including 2005 (Rooster), 2006 (Dog), 2007 (Pig), 2008 (Rat), 2009 (Water Buffalo), and 2010 (Tiger). As mentioned in Section 2.6.2, the year 2006 (Dog), 2008 (Rat), and 2010 (Tiger) are more compatible with boys. Thus, six zodiac years are grouped into two categories including 1-compatible years with boy and 0-otherwise.

Table 3-5: Summarize of variables description, measurement scale and sources of information.

No	Variable	Description	Measurement scale	Source of information
1	The sex of the last birth	The recorded sex of the last birth	1 = Male 0 = Otherwise	Household questionnaire HL4
2	Residence	The current residence of the woman's household	1 = Urban 2 = Otherwise	Household questionnaire HH6
3	Religion of the household head	The religion of the household head	1 = Buddhism 2 = Cao Dai 3 = Hoa Hao 4 = Christian Catholic 5 = Other religions 6 = No religion.	Household questionnaire $HC1_A$
4	Region	The current location of the household	1 = Red River Delta 2 = Northern Midlands and Mountain area 3 = North Central and Central Coastal area 4 = Central Highlands 5 = South East 6 = Mekong River Delta.	Household questionnaire HH7
5	Family wealth	The groups of wealth quintiles	1= Poorest 2 = Middle 3 = Richest	Reserved in household dataset (windex5)
6	Mother's age at the last birth	The completed mother's age at the last birth	1 = 14-19 2 = 20-24 3 = 25-29 4 = 30-34 5 = 35+	Reserved in women dataset (CDOB, WDOB)

No	Variable	Description	Measurement scale	Source of information
7	Education level	The highest level of school that women attended	1 = No education 2 = Primary 3 = Lower Secondary 4 = Higher Secondary and above	Women questionnaire WB3, WB4
8	Marital status	The current marital status of the women	1 = Currently married 2 = Windowed/ Divorced/ Separated.	Women questionnaire MA1, MA5
9	Women's position in the household	The relationship of the women and the household head	1 = Head 2 = Wife of the head 3 = Daughter of the head 4 = Daughter in law of the head 5 = Other	Household questionnaire HL3
10	Parity excluding the last birth	The number of living children minus one	1 – More than two 0 – Otherwise	Women questionnaire CM5A, CM5B, CM7A, CM7B
11	Having a son before the last birth	Whether women had a son before the last birth or not	1 = No 0 = Yes	+ Women questionnaire CM5A, CM7A and CM9A + Children questionnaire HL4
12	Vietnamese zodiac year of the last birth	Whether the zodiac year of the last births are compatible with boy or not	1 = Compatible with boys 0 = Otherwise	Women questionnaire CM12M, CM12Y

3.3.4. Method of analysis

The Statistical Package for the Social Sciences (SPSS) version 21 for Windows was used. The analysis included descriptive statistics (e.g. frequency, percentage for binominal and categories variables). Besides, Chi-square test was used to determine the existence of the relationship between two variables. Then binary logistic regression was adopted to point out the strength of the relationship when controlling for other potential confounding factors. Aforementioned, to account for the complex sampling design, all the analyses for this study were conducted with the women's weighted data, provided by the Vietnam General Statistical Office (GSO, 2011)

3.4. Limitation of the study

This study, like previous studies, is not free from limitations. The first two limitations mentioned below refer to the first objective of the study, and the two remaining limitations are posed by the second objective. The first restriction is the 2009 Census reported that there was an undercount of the population aged 0-4, but the estimated percentage of an undercount by sex was not provided. Since, girls are more likely to be underreported than boys so some girls can be hidden from the Census. Hence, the estimated number of sex-selective abortions could be overestimated. Secondly, the estimation result can be varied by the selected value of the normal SRB, as some studies used 105 while others used 106 (Cai, Y. and Lavely, W., 2003, Kulkarni, P.M., 2007, Yadav, P., 2011).

Thirdly, the definition of the "last birth" in this current study was the youngest birth aged less than five years old of a woman, which does not mean the actual last birth of the woman's reproductive life. In contrast, according to Leone (2003), their target population was the women who decided to stop childbearing so the "last birth" means the final birth of the women's reproductive life. In this case, preference for sons is reflected apparently when examining the sex component and the birth order in the completed family. However, it is impossible to apply Leone's definition of the last birth in this current study, since limited number of women who did not want to have more children after the time of interview, only 80 women (GSO, 2011). Finally, the limitation of using cross-sectional data does not allowed determining a conclusive causal relationship in these models. Two distinct variables are measured at the same point in time. Cross-sectional studies can say that the two variables are related somehow, but they cannot positively determine if one caused the other (Carlson, M.D.A. and Morrison, R.S., 2009).

Chapter 4: Research Findings

4.1. Introduction

This chapter presents detailed findings of this study. The first section describes the calculation on the number of sex-selective abortions in Vietnam during 1999-2009 using the reverse survival method (Section 4.2). Then, the second section displays the statistical analysis on the determinants of the sex of the last birth using the secondary data collected in 2011 by MICS4 project (Section 4.3). The second section is divided into two main subsections. The first subsection shows key characteristics of the studied sample, that is, mothers, followed by the description of characteristics of the last birth (Subsection 4.3.1). The second subsection presents the results from the bivariate and multivariate analysis on the determinants of the sex of the last birth (Subsection 4.3.2).

4.2. Estimation of the number of sex-selective abortions during 1999-2009

For sake of clarity, the step-by step of computations is shown in Table 4-8 and Table 4-9. First of all, the survival ratios for males and females aged 0-4 and 5-9 were calculated from the Vietnam life table in 1999. As can be seen from Table 4-6 and Table 4-7, the probability of survival of females were .974 for aged 0-4 and .967 for aged 5-9, which were significantly higher than males (.968 and .958 respectively). So with the same number of males and females were born during 1999-2009, it is expected to have more females aged 0-9 enumerated in the 2009 Census than males. However, the number of females aged 0-9 in the Census in 2009 was much lower than males at the same ages by 497,215 cases.

According to Yadav (2011), the reverse survival method can draw the historical picture from the current sex composition of children aged 0-9 in the population. We assumed that the children aged 0-9 in 2009 were experienced the survival ratio of children aged 0-9 in 1999. Then, the actual numbers of births born in each five-year

period preceding the year 2009 were calculated by the numbers of children in 2009 divided by the corresponding survival ratios. We found that the number of male births was significantly higher than the number of female births by 570,007 cases, which resulted in the imbalance sex ratio (108.4). In addition, the actual SRB increased according to the birth cohorts, which were 107.3 for the cohort 1999-2004 and 109.4 for the cohort 2004-2009.

Regarding to the final step, if there had been no imbalance SRB in Vietnam during 1999-2009, the normal SRB would have been 105 but this study showed the actual SRB was much higher. Therefore, the expected number of female births was calculated by the number of male births divided by 105. With an assumption that males were fully enumerated in the 2009 Census, then the gap between the actual and expected numbers of female births was the number of sex-selective abortions. Hence, the number of missing girls due to SSA was 217,902 cases, occupied 3.19 percent of the total female births (6,824,212) born during 1999-2009 in Vietnam. Another interpretation is that there were on average 21,790 abortion cases due to SSA per year in Vietnam for 1999-2009.

Table 4-6: Survival ratios of females aged 0-4 and 5-9

Age group	x	l_x	$_nL_x$	T_x	e_x
<1	0	100,000	98,800	6,864,000	68.64
1-4	1	97,862	388,201	6,765,200	69.13
5-9	5	96,856	483,587	6,376,999	65.84

$$S_{0\text{-}4} = {_5L_0} / 5*l_0 = ({_1L_0} + {_5L_1})/ 5*l_0 = (98,800 + 388,201)/ 5*100,000 = .974$$

$$S_{5\text{-}9} = {_5L_5} / 5*l_0 = 483,587/ 5*100,000 = .967$$

Note: the results were rounded

Table 4-7: Survival ratios of males aged 0-4 and 5-9

Age group	x	l_x	$_nL_x$	T_x	e_x
<1	0	100,000	98,160	6,465,000	64.65
1-4	1	97,174	385,682	6,366,840	65.52
5-9	5	96,052	479,101	5,981,158	62.27

$$S_{0-4} = {}_5L_0 / 5*l_0 = ({}_1L_0 + {}_5L_1)/ 5*l_0 = (98,160 + 385,682)/ 5*100,000 = .968$$

$$S_{5-9} = {}_5L_5 / 5*l_0 = 479,101/ 5*100,000 = .958$$

Note: the results were rounded

Table 4-8: Numbers of male and female births during 1999-2009

Age in 2009	Enumerated in the Census 2009		Survival ratio		Male births 1999-2009	Female births 1999-2009
	Male	Female	Male survival ratio	Female survival ratio		
	(1)	(2)	(3)	(4)	(5)=(1)/(3)	(6)=(2)/(4)
0-4	3,662,889	3,371,255	.968	.974	3,785,212	3,461,241
5-9	3,458,159	3,252,578	.958	.967	3,609,007	3,362,971
Total	7,121,048	6,623,833			7,394,219	6,824,212

Note: the results were rounded

Table 4- 9: The number and percentage of sex-selective abortions during 1999-2009

Age in 2009	Male births 1999-2009	Female births 1999-2009	Actual SRB	Normal SRB	Expected female births 1999-2009	Missing	
						SSA	%
	(1)	(2)	(3)=(1)/(2)	(4)	(5)=(1)*100/(4)	(6)=(5)-(2)	(7)=(6)/(2)
0-4	3,785,212	3,461,241	109.4	105	3,604,964	**143,723**	**4.15**
5-9	3,609,007	3,362,971	107.3	105	3,437,150	**74,179**	**2.21**
Total	7,394,219	6,824,212	108.4	105	7,042,114	**217,902**	**3.19**

Note: the results were rounded

4.3. Determinants of the sex of the last birth

4.3.1. Sample characteristics

This section shows descriptive statistics of the sample, which are classified into 4 parts: (1) household-related factors, (2) maternal-related factors, (3) mother's motivation to have a son, and (4) characteristics of the last birth. Of total 11,663 women successfully interviewed in the MICS4 survey, only 2,983 ever-married women who reported to have at least one living child in the five preceding the survey (2006-2010) were selected for the analysis.

4.3.1.1.   Household-related factors

As shown in Table 4-10, most sampled women resided in rural (71.3%) and lived in the households that the household heads did not follow any religion (72%). The distribution of women in each region was approximately the same[2], except for Central highland where only 6.4% and more than half of women lived in middle-income families (58.8%).

Table 4-10: Description of household-related factors

Variables	Sample size	Percent
Residence		
Urban	1200	28.7
Rural	1783	71.3
Religion of the household head		
Buddhism	567	18.4
Cao Dai	37	1.4
Hoa Hao	47	1.5
Christian Catholic	246	6.1
Other religions	49	.6
No religion	2037	72.0
Region		
Red River Delta	446	21.5
Northern Midlands and Mountain area	555	18.8
North Central and Central Coastal area	455	19.6
Central Highlands	590	6.4
South East	498	16.5
Mekong River Delta	449	17.2
Family wealth		
Poorest	676	20.5
Middle	1643	58.8
Richest	664	20.6
Total number of women	2983	100

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[2] Women were equally distributed according to the MICS4 survey design of sampling, in which 2,000 households were selected in each region (see Section 3.2.2)

4.3.1.2. Maternal-related factors

Most women gave their last child at relatively young age when they were younger than 30 (70.8%) and the mean mother's age at the last birth was 26.8 years (SD=5.4 years, min=14 years old, max=47 years old). A vast majority of women had the secondary education or higher (79%), and currently married (97.9%). In addition, nearly half of them lived in the household as the wife of the household head.

Table 4-11: Description of maternal-related factors

Variables	Sample size	Percent
Mother's age at the last birth		
14-19	215	6.9
20-24	885	30.5
25-29	982	33.4
30-34	594	19.6
35+	309	9.6
Education level		
No education	199	4.5
Primary	501	16.4
Lower secondary	1129	40.3
Higher secondary and above	1154	38.7
Marital status		
Currently married	2917	97.9
Windowed/ Divorced/ Separated	66	2.1
Women's position in the household		
Head	285	8.7
Wife of the head	1526	49.7
Daughter of the head	309	10.0
Daughter in law of the head	807	29.6
Other relationships	56	2.0
Total number of women	2983	100

4.3.1.3.   Mother's motivation to have a son

Excluding the last births, 40% of the women have never given birth. This pattern corresponded with the relatively young age structure of the studied women. Among those who ever had at least one child before the last birth, the percentage of women who never have had a son were still high in all parties. For example, nearly half of women (49.4%), who already had two children but had no son. Given to the strong preference on sons, these women might desire to have a son for their following birth. In addition, with regard to the women with high parities, the number of sons was lower than the number of daughters. For instance, the women with 7 or 8 children had only 1 son. The younger cohort of women with lower parities such as 3 or 4 children, the majority of them had no son or one son. It is supposed that women extend their number of children to obtain at least one son.

Table 4-12: Description of women's birth histories

Number of living children excluding the last birth	Sample size	Percent	Percentage of existing of male births				
			0	1	2	3	4
0	1170	40.0					
1	1286	44.3	49.2	50.8			
2	351	11	49.4	36.7	13.9		
3	106	3.0	44.9	29.2	19.1	6.7	
4	40	1.1	39.4	27.3	12.1	18.2	3
5	18	.4	16.7	0	25	8.3	50
6	5	.1	0	0	50	50	0
7	3	0	0	100	0	0	0
8	4	0	0	100	0	0	0
Total	2983	100					

4.3.1.4.   Description of the last birth

With respect to the last births aged less than 5 years old, over 60% were born in the year 2008 and after, and more than half were male (51.4%). As mentioned previously in Chapter 3, one of this study's limitations was the definition of "the last birth", which was the youngest birth aged less than 5 years old of a woman, and it did not mean the actual last birth of the woman's reproductive life. In this study, we found that more than 40% of last births were the second child. According to the one-two

child policy in Vietnam, this suggested a possibility of this last birth to be the actual last birth of a woman.

Table 4-13: Description of the last births aged less than 5 years old

Variables	Sample size	Percent
Vietnamese zodiac year of the last birth		
2005 (Rooster)	34	1.0
2006 (Dog)	450	15.1
2007 (Pig)	586	19.9
2008 (Rat)	657	22.0
2009 (Water Buffalo)	684	22.7
2010 (Tiger)	572	19.3
Sex		
Female	1456	48.6
Male	1527	51.4
Birth order		
1	1170	40.0
2	1286	44.3
3+	527	15.7
Total number of last births	2983	100

4.3.2. Determinants of the sex of the last birth

This section examines the associations between household-related factors, maternal-related factors, and mother's motivation to have a son and the sex of the last birth by using bivariate analysis, namely chi-square test. The results were considered as statically significance at the level of 1% and 5%. Moreover, in order to determine the strength of the associations between dependent variable and independent variables, multivariate analysis namely binary logistic regression was adopted, and the results were shown in Table 4-18. In addition, it is essential to test for multicollinearity among independent variables before conducting a logistic regression analysis. Of course, the results of multivariate analysis can be different with bivariate analysis. In this case, the results of logistic regression are selected due to the advantage of controlling for many potential confounding factors.

4.3.2.1.   Bivariate analysis

a)   Household-related factors

It is found that religion of the household head showed the significance association with the sex of the last birth. The percentage of having a son as the last birth of the women who had the household head following the Hoa Hao religion was higher than the others (χ^2=6.19, p<.05). Aforementioned in the literature review, region is one of the main determinants of SRB. The percentage of having a son as the last birth was significantly higher among women living in the North Central and Central Coastal area, compared to those living in other regions (χ^2=4.02, p<.05). Besides, family wealth was very negative with the sex of the last birth (χ^2=9.31, p<.01).

Table 4-14: The sex of the last birth by household-related factors

Variables	Sex of the last birth		χ^2
	Female (%)	Male (%)	
Residence			
Urban	51.2	48.8	3.298
Rural	47.6	52.4	
Religion of the household head			
Hoa Hao	30.4	69.6	6.186**
Otherwise	48.9	51.1	
Region			
North Central and Central Coastal area	44.9	55.1	4.019**
Otherwise	49.5	50.5	
Family wealth			
Poorest	45.9	54.1	
Middle	47.7	52.3	9.307***
Richest	53.9	46.1	

Note: *** significance level of 1 percent, ** significance level of 5 percent

b) **Maternal-related factors**

With regard to personal characteristics of the women, only women's education level showed a negatively significant association with the sex of the last birth (χ^2=6.80, p<.01). The percentage of having a son as the last birth was more likely to decline when the women's education level increased.

Table 4-15: The sex of the last birth by maternal-related factors

Variables	Sex of the last birth		χ^2
	Female (%)	Male (%)	
Mother's age at the last birth			
14-19	47.8	52.2	
20-24	47.4	52.6	
25-29	50.4	49.6	2.791
30-34	49.2	50.8	
35+	45.8	54.2	
Education level			
Lower secondary and below	46.8	53.2	6.804***
Higher secondary and above	51.6	48.4	
Marital status			
Currently married	48.5	51.5	1.553
Windowed/ Divorced/ Separated	56.5	43.5	
Women's position in the household			
Head	51.0	49	
Wife of the head	47.4	52.6	
Daughter of the head	46.4	53.6	5.424
Daughter in law of the head	50.0	50.0	
Other relationships	59.3	40.7	

Note: *** significance level of 1 percent, ** significance level of 5 percent

c) Mother's motivation to have a son

There was a positively significant association between parity excluding the last birth and the sex of the last birth (χ^2=5.49, p<.05). The percentage of having a son as the last birth was much higher among women who already had more than two children, which suggests that women continue their childbearing because of a desire for a son. Another crucial motivation for sex selection was having no son before the last birth. The percentage of having a son as the last birth significantly increased when the women have never had a son before the last birth (χ^2=5.17, p<.05).

Table 4-16: The sex of the last birth by the mother's motivation to have a son

Variables	Sex of the last birth		χ^2
	Female (%)	Male (%)	
Parity excluding the last birth			
More than two	39.0	61.0	5.495**
Otherwise	49.1	50.9	
Having a son before the last birth			
No	47.2	52.8	5.167**
Yes	51.7	48.3	
Vietnamese zodiac year of the last birth			
Compatible year with boy	48.9	51.1	0.118
Otherwise	48.3	51.7	

Note: *** significance level of 1 percent, ** significance level of 5 percent

4.3.2.2. Logistic Regression Analysis
a) Multicollinearity test

It is essential to test for multicollinearity among all variables before conducting a logistic regression analysis. Menard (1995) and Myers (1990) suggested that a tolerance value less than 0.1 and a VIF value greater than 10 indicated a serious multicollinearity problem (Field, A., 2009). This study result suggests that there was no problem with multicollinearity.

Table 4-17: Tolerance and VIF for independent variables

Variables	Tolerance	VIF
Religion of the household head	.991	1.010
Region	.979	1.021
Parity excluding the last birth	.939	1.065
Having a son before the last birth	.959	1.042
Education level	.728	1.373
Family wealth	.762	1.313

b)   Binary logistic regression analysis

The interested dependent variable in our model is the sex of the last birth. By adopting multivariate analysis, we can see the pure effect of each independent variable on the dependent variable when other independent variables are controlled. In the process of model building up, six independent variables which denoted significant associations with the sex of the last birth in the bivariate analysis, namely religion of the household head, region, parity excluding the last birth, having a son before the last birth, education level, and family wealth were included in the model. With regard to education level and family wealth, when only the main effects were initially examined, none denoted the significance. As their influence showed in other studies (Aitsi-Selmi, A., Chandola, T. et al., 2012, Grinstein-Weiss, M., Shanks, T.R.W. et al., 2014), the interaction terms between education level and family wealth were included in the model.

With regard to the overall validity of the model, the chi-square was 34.7, which was the gap between the -2 Log likelihood of adjusted model when all independent variables were included and the -2 Log likelihood of the initial model when only the constant included. It was significant at 1 per cent which indicated the positive improve of the model (Field, A., 2009). In addition, the Hosmer and Lemeshow test showed the goodness of fit of the model. With the value of p above .05, the model had adequate fit with the MICS4 data (University of Strathclyde). Thus, our model was well-fitting because the p value of the Hosmer and Lemeshow test was 0.887.

As shown in Table 4-18, women who had the household head following the Hoa Hao religion increased 2.126 times the odd of having a son as the last birth (p<.05). With respect to the parity excluding the last birth, women who had more than two children were more likely to have a son as the last birth, the odd of having a son as the last birth was 1.497 times higher (p<.05). Among all other variables, having no son before the last birth was the strongest predictor. The odd ratio indicated that having no son before the last birth increased the likelihood of having a son as the last birth 1.270 times, compared to those who already had at least one son before the last birth.

Finally, education level and family wealth denoted strongly negative associations with the sex of the last birth in the bivariate analysis, but both were insignificant when putting in the regression model. However, after controlling for their interaction terms, family wealth became significant. Specifically, women with higher secondary education and from the middle class families were 1.287 times more likely to have a son as the last birth than women with higher secondary education and from the rich families (p<.05).

Table 4-18: Logistic regression analysis of likelihood of factors affecting the sex of the last birth

Variables	B	SE	OR
Constant	-.428***	.111	.652
Religion of the household head			
Hoa Hao	.754**	.321	2.126
Otherwise *(ref)*			1
Region			
North Central and Central Coastal area	.182	.093	1.199
Otherwise *(ref)*			1
Parity excluding the last birth			
More than two	.404**	.182	1.497
Otherwise *(ref)*			1
Having a son before the last birth			
No	.239***	.081	1.270
Yes *(ref)*			1
Education level			

Variables	B	SE	OR
Lower secondary and below	.287	.195	1.333
Higher secondary and above *(ref)*			1
Family wealth			
Poorest	.074	.246	1.077
Middle	.252**	.123	1.287
Richest *(ref)*			1
Interaction education * family wealth			
Lower secondary * poorest	.021	.313	1.021
Lower secondary * middle	-.233	.220	.792
-2 Log likelihood	4143		
Model χ^2	34.7***		
Hosmer and Lemeshow test	p = .887		
Number of observation	2983		

Note: *** significance level of 1 percent, ** significance level of 5 percent, *ref:* reference group
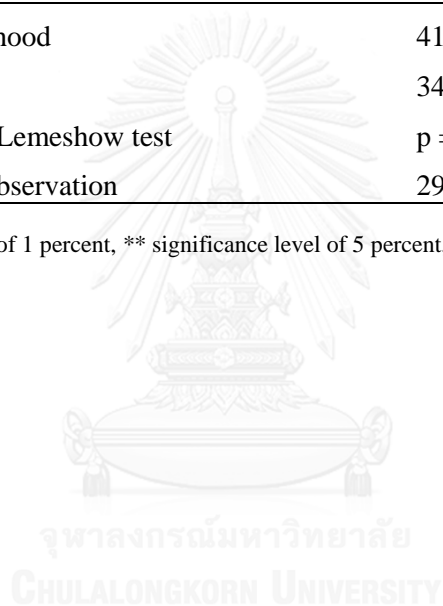
Chapter 5: Discussion and Conclusions

5.1. Introduction

This concluding chapter aims to provide a discussion of salient findings and policy implications to reduce the number of SSAs and preference for sons in Vietnam. The chapter begins with a brief review of the thesis, followed by a discussion of the validity of SSA estimation method, key determinants of the sex of the last birth and certain policy gaps (Section 5.2). Then, three policy implications are suggested (Section 5.3). Next, contributions of this study to son preference research are presented (Section 5.4). In the final section, directions for future studies are highlighted (Section 5.5).

5.2. A brief review of the thesis

This study was conducted in the context of enormous public attention that has been focused on the increasing trend of SRBs in many countries around the world, especially in Asia. However, most of research on this topic has been located in the two highest SRB countries, namely China and India. In Vietnam, the number of SSAs is still unknown, even though many qualitative studies have highlighted the social reasons of the preference for sons. Hence, this study applied the reverse survival method to estimate the number of SSAs and used the latest secondary data of a MICS survey to identify the determinants of having a son as the last birth. This section reveals the high validity of this SSA estimation method in order to show the validity of the study results. In addition, the main determinants of the sex of the last birth and certain policy gaps are also discussed.

5.2.1.   The validity of the SSA estimation method

It is important to mention the validity of the estimation method to indicate how accurately the results of this study reflect the real situation in Vietnam. The methodology can be of high quality itself if it has good background theory and solid characteristics. In addition, the researcher can contribute to the validity of the method by choosing the highest quality data sources and using assumptions that have high validity for the chosen method. In addition, the validity of the estimation can be determined by examining whether the results are consistent with previous studies. Therefore, to ensure the validity of the results, four aspects have been investigated: the methodology; the assumptions used; the quality of the data sources; and the consistency of the study results with prior studies.

Methodology

With respect to the methodology, according to Spoorenberg (2014), the reverse survival method of fertility estimation is simple and the data requirements are not too onerous . Moreover, this method tends to produces fertility estimates that are very insensitive and consistent with the original values of the population. This method can be applied to a large body of existing and easily available population data – both contemporary and historical – that so far has remained largely under-exploited. In addition, UN (1983) and IUSSP (2012) also recommended estimating fertility by using the reverse survival method. Thus, applying this technique can provide the accurate number of births in the specific period since the selected year, which was needed to estimate the number of SSAs in this current study.

Moreover, the reverse survival method has advantages when applying the life table and the survival ratio to get a more accurate number of missing girls due to SSA. The previous studies (Guilmoto, C.Z., 2010, Sen, A., 1990, UNFPA, 2012) on estimation of the number of missing girls did not consider the difference in mortality rate and population structure between countries when they compared sex ratios by age, thus

seeming to be more like a snapshot on the differences in the sex ratio between countries.

Assumptions of the method

The three assumptions used in this method – no migration of children aged 0-9 during 1999 to 2009, full reporting of males aged 0-9 in Census in 2009, and selecting 105 as the normal level of SRB were strongly validated.

First, most international migrants have been of working age (Johns Hopkins University, 2006), so groups in early age of life, such as at 0-9 years old, are less likely to migrate oversea, except for a small number of those whose parents migrate. Thus, the assumption of no migration of children aged 0-9 during 1999 to 2009 is not violated by this study. According to GSO (2009), there was underreporting of the population aged 0-4 in the 2009 Census, but the estimated percentage of underreported rate by sex was not provided in the final report. However, the undercount rate of the whole country was quite low (1.5%), and girls tended to be undercounted more than boys in general. In addition, another report of GSO (2009) compared the child population aged 0–4 as recorded in the Census and the estimated child population during the five years prior to the Census. The number was higher than estimated for both sexes, and the difference among male children was higher than among female children, which means that males were more likely to be counted than females. Thus, it is possible to use the assumption of full reporting of males as reported in the Census in 2009.

Third, the normal sex ratio at birth has varied between 104 and 107 boys to 100 girls (Ganatra, B., 2008). However, the value of 105 was adopted by most studies (Kulkarni, P.M., 2007, Nixon, N.N., 2013, UNFPA, 2012, Yadav, P., 2011), except for Cai (2003) which used 106. Hence, this study elected to use 105 as the normal level of SRB.

Quality of the data sources

With regard to the quality of the data sources, this study obtained the number of males and females from the 2009 national Census, which has been considered the most reliable and up to date nationally-representative data in Vietnam. In addition, the survival ratios were calculated from the WHO's life table, which was based on the national data of Vietnam, including the Demographic and Health Surveys in 1988 and 1997, and the 1989 Census (Lopez, A.D. and ect, 2000).

Consistency of the study results with prior studies

With reference to the consistency of the study results with prior studies, this current study found that the total number of births was 14,218,430 for 1999-2009, similar to the UN's estimate of 14,455,000 births for 2000-2010 (United Nations).[3]

This study found that the average number of abortions due to sex selection was 21,790 per year. According to the statistics reported in Table 2-3, Section 2.8.3, the average number of abortions due to all reasons, including SSA, was 184,348 per year.[4] This suggests that SSAs accounted for 11.8% of total abortions in Vietnam. This percentage is considerable lower than the statistics of the two highest SRB in the world, namely China and India. A study (Ganatra, B., Hirve, S. et al., 2001) indicated that 36% of married women said their abortions were sex selective in rural China and 17% of abortions were related to sex selection in India.

Preference for sons surprisingly has not led to discriminatory treatment of females after births in Vietnam, which commonly occurs in India (Yadav, P., 2011). As well,

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[3] The statistics were obtained from World Population Prospect. They reported that the total number of births per year were 1,414,000 for 2000-2005 and 1,477,000 for 2005-2010. Therefore, the total number of births for 2000-2010 was calculated by the formula: $(1,414,000 + 1,477,000)*5 = 14,455,000$.

[4] The data of the third column of Table 2-3, Section 2.8.3 showed the number of abortions excluding the menstrual regulation. Thus, the average number of abortions was calculated using the sum of abortions from 2001 to 2006, divided to 6 (the total number of years).

mortality rates for boys have been substantially higher than for girls in Vietnam. The IMR as well as U5MR for girls were always lower than for boys from 2009 to 2012 (GSO, 2012). Since boys are more involved in risky behavior in early ages of life, accidents, such as drowning, traffic accidents and violence, increase the mortality rate (Pham, T.L., Kooreman, P. et al., 2013). Therefore, it is assumed that most missing girls in Vietnam occur before birth due to SSAs, rather than after birth. Accordingly, reducing SSAs is a crucial intervention method to lower the missing girls in Vietnam. It can, therefore, be concluded that the results of this study are valid and can use as a reference for later research on SSA.

5.2.2.   The key determinants of the sex of the last birth

This study found that the strongest factor is not having a son before the last birth as the only factor denoted significance at 1%. This finding is consistent with previous studies (Gray, E. and Evans, A., 2004, Guilmoto, C.Z., 2010, Leone, T., Matthews, Z. et al., 2003). In the case of Vietnam, couples want to have the ideal family consisting of one boy and one girl, or if only one child, it should be a boy. This explains why the pressure of having a son declines when they already had at least one son (Guilmoto, C.Z., 2012).

This study also found that women with high parity excluding the last birth were more likely to have a son as the last birth, which is similar to other studies (GSO, 2009, Leone, T., Matthews, Z. et al., 2003, Retherford, R.D. and Roy, T.K., 2003, WHO, 2011). Gray (2004) indicated that sex composition of existing children was a factor in progressing to having a further birth, and a more important factor under low fertility regimes than under high fertility regimes. Thus, sex preference had the effect of increasing fertility or sex selection before birth.

In addition, this study has identified that women who lived in the household that the household head followed the Hoa Hao religion were more likely to bear a son as the last birth. The motivation for this comes from the need for having a son in the family because patriarchal values have been more influential on Hoa Hao followers. This is owing to the fact that Hoa Hao is a fundamental Buddhist religion associated with two

other great and old doctrines of oriental philosophy – Confucianism and Taoism – that have had a deep influence on the Vietnamese people for centuries. This has led to the oldest son always having a strong voice in the family and if there is only one son in family, that son needs to bear a son to perpetuate the family name (Hoa Hao Youth). This religion, founded in 1939, has spread widely over the Red River Delta, which had the highest SRB in Vietnam (GSO, 2009). Surprisingly, this study did not find a significant effect of having a son as the last birth among women who reside in the Red River Delta.

Moreover, existing studies (Aitsi-Selmi, A., Chandola, T. et al., 2012, Grinstein-Weiss, M., Shanks, T.R.W. et al., 2014) have indicated the association between education and family wealth. Apparently, wealthier families tend to invest more on the education of all family members. This study found the indication of declining son preference among women with higher secondary education and from rich families in Vietnam. Using the 2009 Vietnam Census, GSO indicated that the probability of having a son as the last birth has increased corresponding with the rising level of wealth (GSO, 2009). In this study, however, the level of wealth just matters with higher educated women; those from rich families were less likely to have a son as compared to those from middle-class families. It can be explained that women with high education are commonly working in formal sectors and influenced by peers and media. Therefore, they are more likely to be independent, aware the social consequences of imbalance SRB and adopt modern thinking from Western countries of no gender preference on children easily. This pattern is found to be similar to South Korea before they were successful in resolving the imbalance SRB. It is observed that the sex determination technologies were adopted first by better educated, white-collar workers, urban dwellers, and the signal of reducing son preference also emerged from these groups, who spread the new idea to other people in the community (UNFPA, 2011).

Surprisingly, women's position in the household did not have any significance in this study. Using the Vietnam Census in 2009, UNFPA (2012) showed that women who were the head of their household appeared to have significantly fewer boys than those

who were spouses or daughter-in-laws of the household head because they have more voice in household decisions.

Overall, the results of this study were quite justified, particularly as explained in a Vietnamese context and compared with other previous studies. The p value of Hosmer and Lemeshow test indicates the model used in this study as being well-fitting with MICS data. In addition, a new group with a high son preference was found in this study, that being women who lived in the household that the household head followed the Hoa Hao religion, which has not been noted with any significance in previous studies. Moreover, this study highlights that preference for sons is the root determinant of the sex of the last birth, which reflects the significant impact of having no son before the last birth, while external factors, such as household or women characteristics, play less of a role.

5.2.3. Policy gaps

The first policy gap is the prohibition of SSAs that was initiated in the context of legal abortion in Vietnam. Health providers generally provide abortion services without asking the women the reason for the abortion. The Law on Protection of People's Health states: "women have the rights to have an abortion" (Vietnam Goverment, 1986). Therefore, Vietnamese women can have an abortion on request up to 22nd weeks of gestation (Asian safe abortion partnership, 2013). At the beginning, ultrasound scans were used in most health centers in Vietnam to monitor the health of pregnant women, but later such scans have become the most common mean to know the sex of the fetus. Women who go to the health center for a routine medical check in their 12th weeks of pregnancy, either by chance or on purpose, learn the sex of the fetus (GSO, 2011). Those who are hoping for a son will undergo an abortion if the fetus is a girl without reporting the true reason. According to Truc (2011), among 381 pregnant women having abortions, no one expressed as sex selection the reason; the common reasons were insufficient economic resources, already having two children and health problems of the mother.

This situation raises a concern about the second policy gap, which is how can women know the sex of the fetus after an ultrasound scan when the health providers are not allowed to inform them. The women may not be afraid to ask about the sex of their fetus because they are not subject to any punishment. The regulations (Vietnam Goverment, 2006) have targeted the health providers who performing ultrasound scans and then inform pregnant women, and those who force women to have an abortion because of sex selection. Evidence shows that most women know the sex of the fetus from 12th to 22nd weeks of pregnancy (77%), with the percentage of women knowing the sex of the fetus before birth having increased continuously from 63.8% in 2006 to 81.3% in 2012 (GSO, 2011, GSO, 2012). Therefore, health providers must be informing the women of the sex of their fetus in an informal way without recording such in their medical report, which would seems to be out of control of the law.

This study has found that the number of sex selective abortions has nearly doubled, going from 74,179 in 1999-2004 to 143,723 in 2005-2009. It can be seen that the number of SSAs did not decline after the first law was introduced in 2003 and has continue to increase, even though higher penalties were enacted in 2006 (see more detail in Section 2.8.3.2). The policy gaps mentioned above partly explain the positive causes that have made the laws and many government intervention efforts ineffective. However, incomplete and insufficient monitoring of laws, as well as delays in punishments for prohibited behaviors, also is responsible for the increasing trend of SSAs.

5.3.   Policy implications of this study

This section suggests implications of this study for policy makers and health facilities. Three main policy implications are discussed: (1) the need to strengthen monitoring of laws and punishments; (2) establishment of community-based intervention programs; and (3) encouragement of women's empowerment and gender equality.

Strengthening monitoring of laws and punishments

As mentioned in the policy gaps above, more stringent monitoring and evaluation of the related laws is essential, especially in private health centers. Commonly, women who cannot access information on the sex of their fetus in public hospitals will go to a private hospital. Medical doctors who violated the laws should be received strong punishments as a warning to others.

In addition, data sources on the number of sex-selective abortions should be increased. Community surveys to determine the prevalence of prenatal sex-determination and sex-selective abortions are needed. This information can support the estimation of SSAs. In addition, missing girls before birth are caused by miscarriages which should be reported in some ways in medical centers or via community surveys.

Community-based intervention programs

Besides the national laws on paper to promote bilateral kinship models such as the child can bear the mother's surname, equally inherited between sons and daughters; it is important to change the attitude and the practice of the society toward partial role and son preference, starting with males and older parents who will be husbands, fathers, and grandparents respectively in the future. This is because husbands and grandparents have enormous influence on women's decision on sex selection (Junhong, C., 2001, Robitaille, M.-C. and Chatterjee, I., 2013).

The community-based intervention programs may be an alternative. The community-based approach has advantage of engaging the involvement of many units in the community including the administration, the local council and management, and the local people. Thus, a friendly living environment for females can be created when the traditional social norm on son preference changes. Media campaigns play an important role in declining the need for sons and enhancing the value of daughters on supporting for older parents. For example, negative consequences of son preference

and sex-selective abortions, such as the marriage squeeze and poor well-being of women should be propagated via public means such as radio, poster, banner, and community meeting. In addition, the national laws on banning prenatal sex determination and its punishments should also need to be promoted widely. Media can increase the spread of the awareness on the new ideal family concept, in which having son is not necessary. As evident in this study, campaigns may target first at the more educated people in the community.

In addition, all the intervention programs should focus on the groups with high son preference that have been identified by this study, such as those following the Hoa Hao religion, who currently have more than two living children but without any son. Moreover, specific programs should directly target those groups to change their attitude and behavior regarding son preference.

Encouragement of women's empowerment and gender equality

It is a fact that son preference is strong because of the long-standing traditional culture in Vietnam. Thus, the objectives of policies need to be broader to encourage women's empowerment and gender equality in all spheres of life through legal and regulatory reforms. Therefore, under legal protection in Vietnam, if women could overcome the influence of husbands or parents-in-law, or social norms, and make their own decision, the number of SSA would decline.

In addition, policy action against gender discrimination is a lesson to be learned from countries that have had success in reducing a high SRB. For example, South Korea has tried to weaken the patrilineal family system and increase the status of women in society (UNFPA, 2011). Consequently, South Korea has been successful in bringing their SRB down to a normal level in 2007, only 20 years after the first prohibited law on SSA was introduced (Liisanantti, A. and Beese, K., 2012). Moreover, there has been an emergence of daughter preference in Japan as the result of efforts to address gender relations inside and outside the family (Fuse, K., 2013).

5.4. Contributions to son preference research

This study provides a fuller conceptual framework to examine the determinants of the sex of the last birth in Vietnam. Specifically, we use the parity excluding the last birth instead of using the parity of women or birth orders, as in prior studies (GSO, 2009, Leone, T., Matthews, Z. et al., 2003, Retherford, R.D. and Roy, T.K., 2003, WHO, 2011). It is assumed by this study that the number and the sex of the children that the women had before the last birth would have a true impact on the sex of the last birth.

Moreover, the zodiac year of the last birth was added in the framework by this study. The national statistics of Vietnam revealed that SRB was significantly higher in some zodiac years, such as Horse, Monkey, Rat, and Dragon (GSO, 2009, GSO, 2012). However, it seems that MICS is not an appropriate dataset to analyze the zodiac year of the last birth. The distribution of the sex of the last birth by the single zodiac year could not be explained by the theories and be reversed with the national trend of SRB, as mentioned in Figure 2-3, Section 2.7.2. Therefore, we tried to work with the group of the compatible years with boys, but no significance was noted in this study. Accordingly, future studies can try to work with another national dataset and may find interesting result.

5.5. Directions for future studies

Four directions for future research are suggested as below:

a) Conduct a qualitative research to explore why currently women with high education and from rich family are more likely to become neutral on gender of children.

b) Compare policies related to a decreased imbalance in SRB between Vietnam and South Korea, which is a unique case of success in the world, by analyzing the time line of relevant events during the SRBs transitional period in each country and Bongaarts' theory (2013).

c) Estimate the number of missing girls in Vietnam, including those missing both before birth and after birth.

d) Use this current study method to estimate the number of SSAs for the next coming period when the needed data is available.

e) Study fertility preference, such as how many children women want, how many boys and how many girls, to project the trend of SRB in Vietnam in the future

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APPENDIX

Appendix A: Vietnam Life table in 1999 for male and female
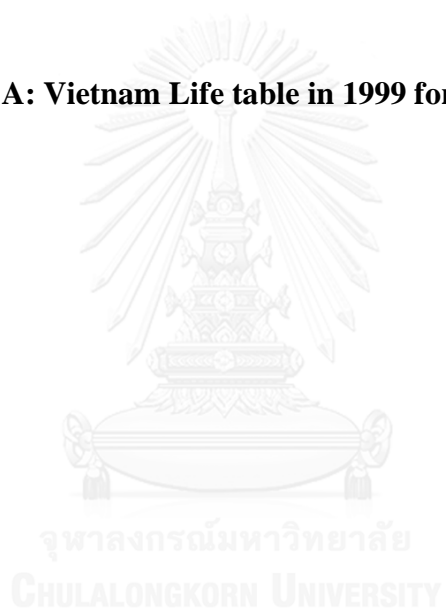
Males					Females				
x	$_nM_x$	$_nq_x$	l_x	e_x	x	$_nM_x$	$_nq_x$	l_x	e_x
0	0.029	0.0283	100,000	64.65	0	0.0218	0.0214	100,000	68.64
1	0.0029	0.0115	97,174	65.52	1	0.0026	0.0103	97,862	69.13
5	0.001	0.0052	96,052	62.27	5	0.0006	0.0032	96,856	65.84
10	0.0008	0.0041	95,555	57.58	10	0.0005	0.0026	96,550	61.04
15	0.0014	0.0068	95,159	52.81	15	0.001	0.0048	96,298	56.19
20	0.0018	0.0089	94,515	48.15	20	0.0013	0.0066	95,839	51.45
25	0.0017	0.0087	93,679	43.56	25	0.0012	0.0062	95,209	46.77
30	0.0024	0.012	92,863	38.92	30	0.0015	0.0077	94,617	42.05
35	0.003	0.0149	91,749	34.36	35	0.0018	0.009	93,892	37.35
40	0.0042	0.021	90,384	29.84	40	0.0027	0.0133	93,046	32.67
45	0.0068	0.0333	88,487	25.43	45	0.0043	0.0215	91,807	28.08
50	0.0112	0.0546	85,539	21.22	50	0.0073	0.0357	89,836	23.64
55	0.0185	0.0884	80,871	17.3	55	0.012	0.0581	86,626	19.42
60	0.0316	0.1464	73,724	13.74	60	0.0215	0.102	81,591	15.47
65	0.0511	0.2265	62,928	10.66	65	0.0372	0.17	73,265	11.94
70	0.0827	0.3426	48,676	8.05	70	0.0671	0.2873	60,811	8.87
75	0.1322	0.4968	32,000	5.95	75	0.1138	0.4429	43,338	6.44
80	0.2039	0.6754	16,101	4.35	80	0.1881	0.6398	24,145	4.57
85	0.3119	1	5,227	3.21	85	0.307	1	8,698	3.26

Appendix B: Viet Nam 2011 MICS questionnaires
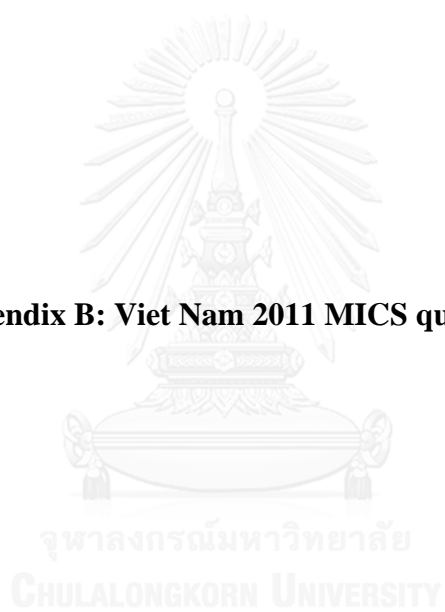
APPENDIX F. Questionnaires
See the Questionnaires in separate file

MICS

HOUSEHOLD QUESTIONNAIRE
VIET NAM

HH

HOUSEHOLD INFORMATION PANEL

HHA. Province/ City name and number:

HHB. District name and number:
Name ....

HHC. Commune/ Ward name and number:
Name ....

HH1. EA name and number:
Name ....

HH2. Household number:
Name ....

HH3. Interviewer name and number:
Name ....

HH4. Team leader name and number:
Name ....

HH5. Day / Month / Year of interview:
_ _ / _ _ / _ _ _ _

HH6. Area:
Urban 1
Rural 2

HH7. Region:
Red River Delta 1
Northern Midlands and Mountain area 2
North Central and Central Coastal area 3
Central Highlands 4
South East 5
Mekong River Delta 6

We are from General Statistics Office. We are working on a survey concerned with family health and education. I would like to talk to you about these subjects. The interview will take about 40 minutes. All the information we obtain will remain strictly confidential and your answers will never be shared with anyone other than our project team.

May I start now?

☐ Yes, permission is given ⇨ Go to HH18 to record the time and then begin the interview.

☐ No, permission is not given ⇨ Complete HH9. Discuss this result with your team leader.

After all questionnaires for the household have been completed, fill in the following information:

HH8. Name of head of household:

HH9. Result of household interview:
Completed 01
No household member or no competent respondent at home at time of visit 02
Entire household absent for extended period of time 03
Refused 04
Dwelling vacant / Address not a dwelling 05
Dwelling destroyed 06
Dwelling not found 07
Other (specify) 96

HH10. Respondent to household questionnaire:
Name: ....
Line Number: _ _

HH11. Total number of household members: _ _

HH12. Number of women age 15-49 years: _ _

HH13. Number of woman's questionnaires completed: _ _

HH14. Number of children under age 5: _ _

HH15. Number of under-5 questionnaires completed: _ _

HH16. Field edited by (Name and number):
Name _ _

HH17. Data entry clerk (Name and number):
Name _ _

A1

A2

HOUSEHOLD LISTING FORM

HL

HH18.
Record the time.

Hour.......... _ _

Minutes __ _

First, please tell me the name of each person who usually lives here, starting with the head of the household.
List the head of the household in line 01. List all household members (HL2), their relationship to the household head (HL3), and their sex (HL4)
Then ask: Are there any others who live here, even if they are not at home now?
If yes, complete listing for questions HL2-HL4. Then, ask questions starting with HL5 for each person at a time.
Use an additional questionnaire if all rows in the household listing form have been used.

						For women age 15-49	For children age 5-17	For children under age 5	For all household members			For children age 0-17 years		
HL1. Line number	**HL2.** Name	**HL3.** What is the relationship of (name) to the head of household?	**HL4.** Is (name) male or female?	**HL5.** What is (name)'s date of birth? Record response in Solar calendar only. If needed use the Lunar-Solar conversion table.	**HL6.** How old is (name)? Record in completed years. If age is 95 or above, record '95'	**HL7.** Circle line number if woman is age 15-49	**HL8.** Who is the mother or primary caretaker of this child? Record line number of mother/ caretaker	**HL9.** Who is the mother or primary caretaker of this child? Record line number of mother/ caretaker	**HL10.** Did (name) stay here last night? 1 Yes 2 No	**HL11.** Is (name)'s natural mother alive? 1 Yes 2 No⇨HL13 8 DK⇨HL13	**HL12.** Does (name)'s natural mother live in this household? Record line number of mother or 00 for "No"	**HL13.** Is (name)'s natural father alive? 1 Yes 2 No⇨Next Line 8 DK⇨Next Line	**HL14.** Does (name)'s natural father live in this household? Record line number of father or 00 for "No"
			1 Male 2 Female	98 DK / 9998 DK		15-49	Mother	Mother					
Line	Name	Relation*	M	F	Month	Year	Age	15-49	Mother	Mother	Y N	Y N DK	Mother	Y N DK	Father
01		0 1	1	2	_ _	_ _ _ _	_ _	01	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
02		_ _	1	2	_ _	_ _ _ _	_ _	02	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
03		_ _	1	2	_ _	_ _ _ _	_ _	03	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
04		_ _	1	2	_ _	_ _ _ _	_ _	04	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
05		_ _	1	2	_ _	_ _ _ _	_ _	05	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
06		_ _	1	2	_ _	_ _ _ _	_ _	06	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
07		_ _	1	2	_ _	_ _ _ _	_ _	07	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _
08		_ _	1	2	_ _	_ _ _ _	_ _	08	_ _	_ _	1 2	1 2 8	_ _	1 2 8	_ _

HOUSEHOLD LISTING FORM   HL

HH18.
Record the time.

Hour............ __ __

Minutes __ __

FIRST, PLEASE TELL ME THE NAME OF EACH PERSON WHO USUALLY LIVES HERE, STARTING WITH THE HEAD OF THE HOUSEHOLD.
List the head of the household in line 01. List all household members (HL2), their relationship to the household head (HL3), and their sex (HL4)
Then ask: ARE THERE ANY OTHERS WHO LIVE HERE, EVEN IF THEY ARE NOT AT HOME NOW?
If yes, complete listing for questions HL2-HL4. Then, ask questions starting with HL5 for each person at a time.
Use an additional questionnaire if all rows in the household listing form have been used.

HL1. Line number	HL2. Name	HL3. WHAT IS THE RELATIONSHIP OF (name) TO THE HEAD OF HOUSEHOLD?	HL4. Is (name) MALE OR FEMALE? 1 Male 2 Female	HL5. WHAT IS (name)'s DATE OF BIRTH? Record response in Solar calendar only. If needed use the Lunar-Solar conversion table. 98 DK / 9998 DK	HL6. How OLD IS (name)? Record in completed years. If age is 95 or above, record '95'	For women age 15-49 — HL7. Circle line number if woman is age 15-49	For children age 5-17 — HL8. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? Record line number of mother/ caretaker	For children under age 5 — HL9. WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD? Record line number of mother/ caretaker	For all household members — HL10. DID (name) STAY HERE LAST NIGHT? 1 Yes 2 No	For children age 0-17 years — HL11. Is (name)'s NATURAL MOTHER ALIVE? 1 Yes 2 No↴ HL13 8 DK↴ HL13	HL12. DOES (name)'s NATURAL MOTHER LIVE IN THIS HOUSEHOLD? Record line number of mother or 00 for "No"	HL13. Is (name)'s NATURAL FATHER ALIVE? 1 Yes 2 No↴ Next Line 8 DK↴ Next Line	HL14. DOES (name)'s NATURAL FATHER LIVE IN THIS HOUSEHOLD? Record line number of father or 00 for "No"
Line	Name	Relation*	M / F	Month / Year	Age	15-49	Mother	Mother	Y N	Y N DK	Mother	Y N DK	Father
09		__ __	1 2	__ __ __ __ __ __	__ __	09	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
10		__ __	1 2	__ __ __ __ __ __	__ __	10	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
11		__ __	1 2	__ __ __ __ __ __	__ __	11	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
12		__ __	1 2	__ __ __ __ __ __	__ __	12	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
13		__ __	1 2	__ __ __ __ __ __	__ __	13	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
14		__ __	1 2	__ __ __ __ __ __	__ __	14	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __
15		__ __	1 2	__ __ __ __ __ __	__ __	15	__ __	__ __	1 2	1 2 8	__ __	1 2 8	__ __

Tick here if additional questionnaire used ☐

A3

A4

Probe for additional household members.
Probe especially for any infants or small children not listed, and others who may not be members of the family (such as servants, friends, adopted children) but who usually live in the household.
Insert names of additional members in the household list and complete form accordingly.

Now for each woman age 15-49 years, write her name and line number and other identifying information in the information panel of a separate Individual Women's Questionnaire.
For each child under age 5, write his/her name and line number AND the line number of his/her mother or caretaker in the information panel of a separate Under-5 Questionnaire.
You should now have a separate questionnaire for each eligible woman and each child under five in the household.

01 Head	06 Parent	11 Niece / Nephew
02 Wife / Husband	07 Parent-In-Law	12 Other relative
03 Son / Daughter	08 Brother / Sister	13 Adopted / Foster / Stepchild
04 Son-In-Law / Daughter-In-Law	09 Brother-In-Law / Sister-In-Law	14 Not related
05 Grandchild	10 Uncle / Aunt	98 Don't know

A5

GRADE CONVERTION TABLE FOR UNIVERSALISED EDUCATION SYSTEMS

General education system for conversion		System under the French time	EQUIVALENT GENERAL EDUCATION LEVELS				Educational system in Northern Viet Nam			Current national education system
			From 1945 until 1954			Complementary education (CE) system		From Quảng Bình northward		
			Free region		Temporarily occupied region		Prior to 1981			
Level	Grade		1945-1950	1950-1954				1981-1986	1986-1989	
Primary School	1	Grade 5 (Cours enfantin)			Grade 5 primary school		Pre-school	Grade 1	Grade 1	Grade 1
	2	Grade 4 (Cours préparatoire)	Grade 4	Grade 1	Grade 4 primary school	Grade 1 CE	Grade 1	Grade 2	Grade 2	Grade 2
	3	Grade 3 (Cours elementaire)	Grade 3	Grade 2	Grade 3 primary school	Grade 2 CE	Grade 2	Grade 3	Grade 3	Grade 3
	4	Intermediate 1 (Moyen1) Intermediate 2 (Moyen2)	Grade 2	Grade 3	Grade 2 primary school	Grade 3 CE	Grade 3	Grade 4	Grade 4	Grade 4
	5	Upper intermediate (Supérieur) Certificate (Certificat)	Grade 1	Grade 4	Grade 1 primary school	Grade 4 CE	Grade 4	Grade 5	Grade 5	Grade 5
Lower Secondary School	6	First year (Première année)	First year		7th class Secondary school	Grade 5 CE			Grade 6	Grade 6
	7	Second year (Deuxième année)	Second year	Grade 5	6th class Secondary school	Grade 6 CE	Grade 5	Grade 6	Grade 7	Grade 7
	8	Third year (Troisième année)	Third year	Grade 6	5th class Secondary school	Grade 7 CE	Grade 6	Grade 7	Grade 8	Grade 8
Upper Secondary School	9	Fourth year - Diploma (Quatrième année - Diplôme)	Fourth year	Grade 7	4th class Secondary school	Grade 7B CE	Grade 7			Grade 9
	10	First year	First year Specialisation	Grade 8	3rd class	Grade 8 CE	Grade 8	Grade 10	Grade 10	Grade 10
	11	First part, secondary school degree (Baccalauréat première partie)	Second year Specialisation	Grade 9	2nd class Baccalaureate I	Grade 9 CE Grade 10A CE	Grade 9	Grade 11	Grade 11	Grade 11
	12	Second part, secondary school degree (Baccalauréat deuxième partie)	Third year Specialisation		1st class 2nd education degree	Grade 10B CE	Grade 10	Grade 12	Grade 12	Grade 12

A6

EDUCATION   ED

| | For household members age **5 and above** | | | | | | | For household members age **5-24 years** | | | | |

ED1. Line number	ED2. Name and age		ED3. Has (name) ever attended school or pre-school?	ED4. What is the highest level of school (name) attended? / What is the highest grade (name) completed at this level?		ED5. During the (2011) school year, did (name) attend school or pre-school at any time?	ED6. During this school year, which level and grade is/was (name) attending?		ED7. During the previous school year, that is (2009-2010), did (name) attend school or preschool at any time?	ED8. During that previous school year, which level and grade did (name) attend?	

Line	Name	Age	Yes	No	Level	Grade	Yes	No	Level	Grade	Y	N	DK	Level	Grade
01		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
02		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
03		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
04		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
05		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
06		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
07		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
08		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
09		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
10		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
11		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
12		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
13		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
14		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___
15		___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	0 1 2 3 4 5 8	___ ___	1	2	8	0 1 2 3 4 5 8	___ ___

ED3 details: 1 Yes / 2 No ↳ Next Line

ED4 details: Record response in 12 year system. Use conversion table if needed. Level: 0 Preschool ↳ ED5 / 1 Primary / 2 Lower Secondary / 3 Upper Secondary / 4 Professional School ↳ ED5 / 5 College/University & above ↳ ED5 / 8 DK. Grade: 98 DK. If less than 1 full grade at this level, enter 00.

ED5 details: 1 Yes / 2 No ↳ ED7

ED6 details: Level: 0 Preschool ↳ ED7 / 1 Primary / 2 Lower Secondary / 3 Upper Secondary / 4 Professional School ↳ ED7 / 5 College/University & above ↳ ED7 / 8 DK. Grade: 98 DK.

ED7 details: 1 Yes / 2 No ↳ Next Line / 8 DK ↳ Next Line

ED8 details: Level: 0 Preschool ↳ Next person / 1 Primary / 2 Lower Secondary / 3 Upper Secondary / 4 Professional School ↳ Next person / 5 College/University & above ↳ Next person / 8 DK. Grade: 98 DK.

WATER AND SANITATION | WS

Piped water		
Piped into dwelling	11	11→WS6
Piped into compound, yard or plot	12	12→WS6
Piped to neighbour	13	13→WS6
Public tap / standpipe	14	14→WS3
Tube Well, Borehole	21	21→WS3
Dug well		
Protected well	31	31→WS3
Unprotected well	32	32→WS3
Water from spring		
Protected spring	41	41→WS3
Unprotected spring	42	42→WS3
Rainwater collection	51	51→WS3
Tanker-truck	61	61→WS3
Cart with small tank / drum	71	71→WS3
Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	81	81→WS3
Bottled water	91	
Other (specify)___	96	96→WS3

WS1. WHAT IS THE MAIN SOURCE OF DRINKING WATER FOR MEMBERS OF YOUR HOUSEHOLD?

Piped water		
Piped into dwelling	11	
Piped into compound, yard or plot	12	
Piped to neighbour	13	
Public tap / standpipe	14	
Tube Well, Borehole	21	
Dug well		
Protected well	31	
Unprotected well	31	
Water from spring		
Protected spring	41	41→WS6
Unprotected spring	42	42→WS6
Rainwater collection	51	51→WS6
Tanker-truck	61	
Cart with small tank / drum	71	
Surface water (river, stream, dam, lake, pond, canal, irrigation channel)	81	
Other (specify)___	96	

WS2. WHAT IS THE MAIN SOURCE OF WATER USED BY YOUR HOUSEHOLD FOR OTHER PURPOSES SUCH AS COOKING AND HANDWASHING?

WS3. WHERE IS THAT WATER SOURCE LOCATED?

In own dwelling	1	1→WS6
In own yard / plot	2	2→WS6
Elsewhere	3	

WS4. HOW LONG DOES IT TAKE TO GO THERE, GET WATER, AND COME BACK?

Number of minutes	__ __
DK	998

WS5. WHO USUALLY GOES TO THIS SOURCE TO COLLECT THE WATER FOR YOUR HOUSEHOLD?

Probe:
Is THIS PERSON UNDER AGE 15?
WHAT SEX?

Adult woman (age 15+ years)	1
Adult man (age 15+ years)	2
Female child (under 15)	3
Male child (under 15)	4
DK	8

WS6. DO YOU DO ANYTHING TO THE WATER TO MAKE IT SAFER TO DRINK?

Yes	1
No	2	2→WS8
DK	8	8→WS8

WS7. WHAT DO YOU USUALLY DO TO MAKE THE WATER SAFER TO DRINK?

Probe:
ANYTHING ELSE?

Record all items mentioned.

Boil	A
Add bleach / chlorine	B
Strain it through a cloth	C
Use water filter (ceramic, sand, composite, etc.)	D
Solar disinfection	E
Let it stand and settle	F
Other (specify)___	X
DK	Z

WS8. WHAT KIND OF TOILET FACILITY DO MEMBERS OF YOUR HOUSEHOLD USUALLY USE?

If "flush" or "pour flush", probe:
WHERE DOES IT FLUSH TO?

If necessary, ask permission to observe the facility.

Flush / Pour flush		
Flush to piped sewer system	11	
Flush to septic tank	12	
Flush to pit (latrine)	13	
Flush to somewhere else	14	
Flush to unknown place / Not sure / DK where	15	
Pit latrine		
Ventilated Improved Pit latrine (VIP)	21	
Pit latrine with slab	22	
Pit latrine without slab / Open pit	23	
Composting toilet	31	
Bucket	41	
Hanging toilet, Hanging latrine	51	
No facility, Bush, Field	95	95→WS11
Other (specify)___	96	96→WS11

WS9. DO YOU SHARE THIS FACILITY WITH OTHERS WHO ARE NOT MEMBERS OF YOUR HOUSEHOLD?

Yes	1	
No	2	2→Next Module

WS10. DO YOU SHARE THIS FACILITY ONLY WITH MEMBERS OF OTHER HOUSEHOLDS THAT YOU KNOW, OR IS THE FACILITY OPEN TO THE USE OF THE GENERAL PUBLIC?

Other households only (not public)	1	
Public facility	2	2→Next Module

WS11. HOW MANY HOUSEHOLDS IN TOTAL USE THIS TOILET FACILITY, INCLUDING YOUR OWN HOUSEHOLD?

Number of households (if less than 10)	0 __
Ten or more households	10
DK	98

HOUSEHOLD CHARACTERISTICS HC

HC1A. What is the religion of the head of this household?

Budhism	1
Muslim	2
Cao Dai	3
Hoa Hao	4
Christian Catholic	5
Christian Protestant	9
No religion	7
Other religion (specify) ____	6

HC1c. To what ethnic group does the head of this household belong?

Kinh	01
Tay	02
Thai	03
Muong	04
Khmer	05
Chinese	06
Nung	07
Hmong	08
Other (specify) ____	96

HC2. How many rooms in this household are used for sleeping?

Number of rooms	__
Unspecified	97

HC3. Main material of the dwelling floor.
Record observation.

Natural floor	
Earth / Sand	11
Rudimentary floor	
Wood planks	21
Palm / Bamboo	22
Finished floor	
Parquet or polished wood	31
Vinyl sheets	32
Ceramic tiles	33
Cement/ concrete	34
Carpet	35
Enamelled tiles/ marble	36
Other (specify) ____	96

HC4. Main material of the roof.
Record observation.

Natural roofing	
No Roof	11
Thatch / Palm leaf/ Straw	12
Rudimentary Roofing	
Bamboo/ tree-trunk	22
Wood planks/ shingles	23
Cardboard	24
Finished roofing	
Metal/ corrugated iron sheet	31
Calamine / Cement fibre	33
Ceramic tiles	34
Cement/ reinforced concrete	35
Stone slates	37
Asphalt sheets	38
Other (specify) ____	96

HC5. Main material of the exterior walls.
Record observation.

Natural walls	
No walls	11
Bamboo/ Cane / Palm / Tree-Trunks	12
Dirt	13
Reed	14
Rudimentary walls	
Bamboo with mud	21
Stone with mud	22
Uncovered adobe	23
Plywood	24
Cardboard	25
Reused wood (packing wood)	26
Finished walls	
Reinforced concrete	31
Stone/ Laterite	32
Bricks (covered or uncovered)	33
Cement blocks/ coal residue bricks	34
Covered adobe	35
Wood planks / shingles	36
Other (specify) ____	96

HC6. What type of fuel does your household mainly use for cooking?

Electricity	01 01→HC8
Liquefied Petroleum Gas (LPG)	02 02→HC8
Natural gas	03 03→HC8
Biogas	04 04→HC8
Kerosene	05 05→HC8
Coal/ Pie-coal/ light coal	06
Charcoal	07
Wood	08
Straw / Shrubs / Grass	09
Animal dung	10
Agricultural crop residue	11
No food cooked in household	95 95→HC8
Other (specify) ____	96

HC7. Is the cooking usually done in the house, in a separate building, or outdoors?
If "In the house", probe: Is it done in a separate room used as kitchen?

In the house	
In a separate room used as kitchen	1
Elsewhere in the house	2
In a separate building	3
Outdoors	4
Other (specify) ____	6

HC8. Does your household have:

			Yes	No
[A]	Electricity?	Electricity	1	2
[B]	A radio?	Radio	1	2
[C]	A television?	Television	1	2
[D]	A non-mobile telephone?	Non-mobile telephone	1	2
[E]	A refrigerator?	Refrigerator	1	2
[F]	A bed?	Bed	1	2
[G]	A table and chairs set?	Table and chairs set	1	2
[H]	A sofa?	Sofa	1	2
[I]	A cupboard for cloth?	Cupboard	1	2
[J]	Kitchen cabinets?	Kitchen cabinets	1	2
[K]	A fan?	Fan	1	2
[L]	Cable/ digital TV?	Cable/ digital TV	1	2
[M]	A computer?	Computer	1	2
[N]	Air conditioner?	Air conditioner	1	2

HC9. Does any member of your household own:

			Yes	No
[A]	A wrist watch?	Wrist watch	1	2
[B]	A mobile telephone?	Mobile telephone	1	2
[C]	A bicycle?	Bicycle	1	2
[D]	A motorcycle or scooter?	Motorcycle / Scooter	1	2
[E]	A power-tiller or tractor?	Power-tiller / Tractor	1	2
[F]	A car or truck?	Car / Truck	1	2
[G]	A ship or boat with a motor?	Ship/ Boat with motor	1	2

HC10. Do you or someone living in this household own this dwelling?

Own 1
Rent 2
Other (Not owned or rented) 6

If "No", then ask: Do you rent this dwelling from someone not living in this household?

If "Rented from someone else", circle "6". For other responses, circle "2".

HC11. Does any member of this household own or have user rights for any land that can be used for agriculture? — Yes 1   No2 2→HC12A

HC12. How many square meters (m²) of agricultural land do members of this household own or have user rights for? — M² _ _ _ _ _

HC12A. Does any member of this household own or have user rights for any water surface area that can be used for aquaculture? — Yes 1   No2 2→HC13

HC12B. How many square meters (m²) of water surface area do members of this household own or have user rights for? *If unknown, record '99998'.* — M² _ _ _ _ _

HC13. Does this household own any livestock, herds, other farm animals, or poultry? — Yes 1   No2 2→HC15

HC14. How many of the following animals does this household have?

[A]	Buffalo, milk cows, or bulls?	Buffalo, milk cows, or bulls _ _
[B]	Horses?	Horses _ _
[C]	Goats?	Goats _ _
[D]	Sheep?	Sheep _ _
[E]	Chickens?	Chickens _ _
[F]	Pigs?	Pigs _ _
[G]	Ducks, geese, or swans?	Ducks, geese, swans _ _

If none, record '00'.
If 95 or more, record '95'.
If unknown, record '98'.

HC15. Does any member of this household have a bank account? — Yes 1   No 2

Not including Deposit Certificate.

INSECTICIDE TREATED NETS | **TN**

TN1. Does your household have any mosquito nets that can be used while sleeping?	Yes...1 No 2	2⇨Next Module

TN2. How many mosquito nets does your household have? — Number of nets.. _ _

TN3. *ASK THE RESPONDENT TO SHOW YOU THE NETS IN THE HOUSEHOLD. IF MORE THAN 6 NETS, USE ADDITIONAL QUESTIONNAIRE(S).*

	1ˢᵗ Net	2ⁿᵈ Net	3ʳᵈ Net	4ᵗʰ Net	5ᵗʰ Net	6ᵗʰ Net
TN4. *Mosquito net observed?*	Observed .... 1 Not observed.................. 2	Observed .... 1 Not observed.................. 2	Observed .... 1 Not observed.................. 2	Observed .... 1 Not observed.................. 2	Observed .... 1 Not observed.................. 2	Observed .... 1 Not observed.................. 2
TN5. *Observe or ask the brand/type of mosquito net.* *If brand is unknown and you cannot observe the net, show pictures of typical net types/brands to respondent.*	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) ... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) ... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) ... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) .... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) .... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98	Long-lasting treated nets Global Fund.............. 11 Other (specify) .... 16 DK brand.................. 18 Pre-treated nets Global Fund.............. 21 Other (specify) .... 26 DK brand.................. 28 Other net (specify) _____ 31 DK brand / type............ 98
TN6. How MANY MONTHS AGO DID YOUR HOUSEHOLD GET THE MOSQUITO NET? *If less than one month, record "00"*	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98	Months ago........ _ _ More than 36 mo. ago.....................95 DK / Not sure..............98
TN7. Check TN5 for type of net	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*	☐ *Long-lasting (11-18)* ⇨ *TN11* ☐ *Pre-treated (21-28)* ⇨ *TN9* ☐ *Else ⇨ Continue*
TN8. WHEN YOU GOT THE NET, WAS IT ALREADY TREATED WITH AN INSECTICIDE TO KILL OR REPEL MOSQUITOES?	Yes...................1 No2 DK / Not sure...................8	Yes...................1 No2 DK / Not sure...................8	Yes...................1 No2 DK / Not sure...................8	Yes...................1 No2 DK / Not sure...................8	Yes...................1 No2 DK / Not sure...................8	Yes...................1 No2 DK / Not sure...................8

TN9. SINCE YOU GOT THE NET, WAS IT EVER SOAKED OR DIPPED IN A LIQUID TO KILL OR REPEL MOSQUITOES?	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11	Yes .... 1 No2 ⇨TN11 DK / Not sure....... 8 ⇨TN11
TN10. How MANY MONTHS AGO WAS THE NET LAST SOAKED OR DIPPED? *If less than one month, record "00"*	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98	Months ago........... _ _ More than 24 mo. ago.....................95 DK / Not sure..............98
TN11. Did anyone SLEEP UNDER THIS MOSQUITO NET LAST NIGHT?	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13	Yes ....1 No2 ⇨TN13 DK / Not sure....... 8 ⇨TN13
TN12. WHO SLEPT UNDER THIS MOSQUITO NET LAST NIGHT? *Record the person's line number from the household listing form* *If someone not in the household list slept under the mosquito net, record "00"*	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _	Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _ Name _____ Line number ....._ _
TN13.	*Go back to TN4 for next net. If no more nets, go to next module*	*Go back to TN4 for next net. If no more nets, go to next module*	*Go back to TN4 for next net. If no more nets, go to next module*	*Go back to TN4 for next net. If no more nets, go to next module*	*Go back to TN4 for next net. If no more nets, go to next module*	*Go back to TN4 in first column of a new questionnaire for next net. If no more nets, go to next module* *Tick here if additional questionnaire used ☐*

INDOOR RESIDUAL SPRAYING

			IR
IR1. AT ANY TIME IN THE PAST 12 MONTHS, HAS ANYONE COME INTO YOUR DWELLING TO SPRAY THE INTERIOR WALLS AGAINST MOSQUITOES?	Yes..1 No.2		
	DK...8		

CHILD LABOUR — CL

To be administered for children in the household age **5-17** years. For household members below age 5 or above age 17, leave rows blank.
NOW I WOULD LIKE TO ASK ABOUT ANY WORK CHILDREN IN THIS HOUSEHOLD MAY DO.

CL1. Line number	CL2. Name and Age Copy from Household Listing Form, HL2 and HL6		CL3. DURING THE PAST WEEK, DID (name) DO ANY KIND OF WORK FOR SOMEONE WHO IS NOT A MEMBER OF THIS HOUSEHOLD? If yes: FOR PAY IN CASH OR KIND? 1 Yes, for pay (cash or kind) 2 Yes, unpaid 3 No ⇒CL5			CL4. SINCE LAST (day of the week), ABOUT HOW MANY HOURS DID HE/SHE DO THIS WORK FOR SOMEONE WHO IS NOT A MEMBER OF THIS HOUSEHOLD? If more than one job, include all hours at all jobs.	CL5. DURING THE PAST WEEK, DID (name) FETCH WATER OR COLLECT FIREWOOD FOR HOUSEHOLD USE? 1 Yes 2 No ⇒ CL7		CL6. SINCE LAST (day of the week), ABOUT HOW MANY HOURS DID HE/ SHE FETCH WATER OR COLLECT FIREWOOD FOR HOUSEHOLD USE?	CL7. DURING THE PAST WEEK, DID (name) DO ANY PAID OR UNPAID WORK ON A FAMILY FARM OR IN A FAMILY BUSINESS OR SELLING GOODS IN THE STREET? Include work for a business run by the child, alone or with one or more partners. 1 Yes 2 No ⇒ CL9		CL8. SINCE LAST (day of the week), ABOUT HOW MANY HOURS DID HE/ SHE DO THIS WORK FOR HIS/ HER FAMILY OR HIMSELF/ HERSELF?	CL9. DURING THE PAST WEEK, DID (name) HELP WITH HOUSEHOLD CHORES SUCH AS SHOPPING, CLEANING, WASHING CLOTHES, COOKING; OR CARING FOR CHILDREN, OLD OR SICK PEOPLE? 1 Yes 2 No ⇒ Next Line		CL10. SINCE LAST (day of the week), ABOUT HOW MANY HOURS DID HE/ SHE SPEND DOING THESE CHORES?
				Yes	No	Number			Number			Number			Number
Line	Name	Age	Paid	Unpaid		of hours	Yes	No	of hours	Yes	No	of hours	Yes	No	of hours
01		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
02		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
03		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
04		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
05		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
06		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
07		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
08		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
09		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
10		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
11		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
12		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
13		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
14		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __
15		__ __	1	2	3	__ __	1	2	__ __	1	2	__ __	1	2	__ __

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CHILD DISCIPLINE CD

Table 1: Children Aged 2-14 Years Eligible for Child Discipline Questions

o List each of the children aged 2-14 years below in the order they appear in the Household Listing Form. Do not include other household members outside of the age range 2-14 years.
o Record the line number, name, sex, and age for each child.
o Then record the total number of children aged 2-14 in the box provided (CD6).

CD1. Rank number	CD2. Line number from HL1	CD3. Name from HL2	CD4. Sex from HL4		CD5. Age from HL6
Rank	Line	Name	M	F	Age
1	——	——	1	2	——
2	——	——	1	2	——
3	——	——	1	2	——
4	——	——	1	2	——
5	——	——	1	2	——
6	——	——	1	2	——
7	——	——	1	2	——
8	——	——	1	2	——
CD6.	Total children age 2-14 years				—— ——

o If there is only one child age 2-14 years in the household, then skip table 2 and go to CD8; write down '1' and continue with CD9.

Table 2: Selection of Random Child for Child Discipline Questions

o Use Table 2 to select one child between the ages of 2 and 14 years, if there is more than one child in that age range in the household.
o Check the last digit of the household number (HH2) from the cover page. This is the number of the row you should go to in the table below.
o Check the total number of eligible children (2-14) in CD6 above. This is the number of the column you should go to.
o Find the box where the row and the column meet and circle the number that appears in the box. This is the rank number of the child (CD1) about whom the questions will be asked.

CD7.

Last digit of household number (HH2)	Total Number of Eligible Children in the Household (CD6)							
	1	2	3	4	5	6	7	8+
0	1	2	3	4	5	6	7	4
1	1	1	1	1	1	1	1	5
2	1	2	2	2	2	2	2	6
3	1	1	3	3	3	3	3	7
4	1	2	1	4	4	4	4	8
5	1	1	2	1	5	5	5	1
6	1	2	3	2	1	6	6	2
7	1	1	1	3	2	1	7	3
8	1	2	2	4	3	2	1	4
9	1	1	3	1	4	3	2	5

CD8. Record the rank number of the selected child. ____

CD9. Write the name and line number of the child selected for the module from CD3 and CD2, based on the rank number in CD8.

Name _____ Line number _____

CD10. ADULTS USE CERTAIN WAYS TO TEACH CHILDREN THE RIGHT BEHAVIOUR OR TO ADDRESS A BEHAVIOUR PROBLEM. I WILL READ VARIOUS METHODS THAT ARE USED AND I WANT YOU TO TELL ME IF YOU OR ANYONE ELSE IN YOUR HOUSEHOLD HAS USED THIS METHOD WITH (name) IN THE PAST MONTH.

CD11. TOOK AWAY PRIVILEGES, FORBADE SOMETHING (name) LIKED OR DID NOT ALLOW HIM/HER TO LEAVE HOUSE.
Yes...1
No2

CD12. EXPLAINED WHY (name)'S BEHAVIOUR WAS WRONG.
Yes...1
No2

CD13. SHOOK HIM/HER.
Yes...1
No2

CD14. SHOUTED, YELLED AT OR SCREAMED AT HIM/HER.
Yes...1
No2

CD15. GAVE HIM/HER SOMETHING ELSE TO DO.
Yes...1
No2

CD16. SPANKED, HIT OR SLAPPED HIM/HER ON THE BOTTOM WITH BARE HAND.
Yes...1
No2

CD17. HIT HIM/HER ON THE BOTTOM OR ELSEWHERE ON THE BODY WITH SOMETHING LIKE A BELT, HAIRBRUSH, STICK OR OTHER HARD OBJECT.
Yes...1
No2

CD18. CALLED HIM/HER DUMB, LAZY, OR ANOTHER NAME LIKE THAT.
Yes...1
No2

CD19. HIT OR SLAPPED HIM/HER ON THE FACE, HEAD OR EARS.
Yes...1
No2

CD20. HIT OR SLAPPED HIM/HER ON THE HAND, ARM, OR LEG.
Yes...1
No2

CD21. BEAT HIM/HER UP, THAT IS HIT HIM/HER OVER AND OVER AS HARD AS ONE COULD.
Yes...1
No2

CD22. DO YOU BELIEVE THAT IN ORDER TO BRING UP, RAISE, OR EDUCATE A CHILD PROPERLY, THE CHILD NEEDS TO BE PHYSICALLY PUNISHED?
Yes...1
No2
Don't know / No opinion.......................8

HANDWASHING | HW

HW1. Please show me where members of your household most often wash their hands.
Observed	1
Not observed	2
Not in dwelling / plot / yard	2→HW4
No permission to see	3→HW4
Other reason	6→HW4

HW2. Observe presence of water at the specific place for handwashing.
Verify by checking the tap/pump, or basin, bucket, water container or similar objects for presence of water.
Water is available	1
Water is not available	2

HW3. *Record if soap or detergent is present at the specific place for handwashing.*
Circle all that apply.
Skip to HH19 if any soap or detergent code (A, B, C or D) is circled. If "None" (Y) is circled, continue with HW4.
Bar soap	A	A→HH19
Detergent (Powder / Liquid / Paste)	B	B→HH19
Liquid soap	C	C→HH19
Ash / Mud / Sand	D	D→HH19
None	Y	

HW4. Do you have any soap or detergent in your household for washing hands?
Yes	1	
No	2	2→HH19

HW5. Can you please show it to me?
Record observation. Circle all that apply.
Bar soap	A
Detergent (Powder / Liquid / Paste)	B
Liquid soap	C
Ash / Mud / Sand	D
Not able / Does not want to show	Y

HH19. *Record the time.*
Hour and minutes ..... __ __ : __ __

SALT IODIZATION | SI

SI1. We would like to check whether the salt used in your household is iodized. May I have a sample of the salt used to cook meals in your household?
Once you have tested the salt, circle number that corresponds to test outcome.
Not iodized 0 PPM	1
More than 0 PPM & less than 15 PPM	2
15 PPM or more	3
No salt in the house	6
Salt not tested	7

HH20. Does any eligible woman age 15-49 reside in the household?
Check Household Listing Form, column HL7 for any eligible woman. You should have a questionnaire with the Information Panel filled in for each eligible woman.

☐ Yes → *Go to QUESTIONNAIRE FOR INDIVIDUAL WOMEN to administer the questionnaire to the first eligible woman.*

☐ No → *Continue.*

HH21. Does any child under the age of 5 reside in the household?
Check Household Listing Form, column HL9 for any eligible child under age 5. You should have a questionnaire with the Information Panel filled in for each eligible child.

☐ Yes → *Go to QUESTIONNAIRE FOR CHILDREN UNDER FIVE to administer the questionnaire to mother or caretaker of the first eligible child.*

☐ No → *End the interview by thanking the respondent for his/her cooperation. Gather together all questionnaires for this household and complete HH8 to HH15 on the cover page.*

Interviewer's Observations

Field Editor's Observations

Team Leader's Observations

MICS

QUESTIONNAIRE FOR INDIVIDUAL WOMEN

VIET NAM

WM

WOMAN'S INFORMATION PANEL

This questionnaire is to be administered to all women age 15 through 49 (see Household Listing Form, column HL7). A separate questionnaire should be used for each eligible woman.

WMA. Province/ City name and number:
Name _____

WMB. District name and number:
Name _____

WMC. Commune/ Ward name and number:
Name _____

WM1. EA name and number:
Name _____ |__|__|__| WM2. Household number: |__|__|__|

WM3. Woman's name:
Name _____   WM4. Woman's line number: |__|__|

WM5. Interviewer name and number:
Name _____   WM6. Day / Month / Year of interview: |__|__| / |__|__| / |__|__|__|__|

Repeat greeting if not already read to this woman:

WE ARE FROM GENERAL STATISTICS OFFICE. WE ARE WORKING ON A SURVEY CONCERNED WITH FAMILY HEALTH AND EDUCATION. I WOULD LIKE TO TALK TO YOU ABOUT THESE SUBJECTS. THE INTERVIEW WILL TAKE ABOUT 30 MINUTES. ALL THE INFORMATION WE OBTAIN WILL REMAIN STRICTLY CONFIDENTIAL AND YOUR ANSWERS WILL NEVER BE SHARED WITH ANYONE OTHER THAN OUR PROJECT TEAM.

If greeting at the beginning of the household questionnaire has already been read to this woman, then read the following:

NOW I WOULD LIKE TO TALK TO YOU MORE ABOUT YOUR HEALTH AND OTHER TOPICS. THIS INTERVIEW WILL TAKE ABOUT 30 MINUTES. AGAIN, ALL THE INFORMATION WE OBTAIN WILL REMAIN STRICTLY CONFIDENTIAL AND YOUR ANSWERS WILL NEVER BE SHARED WITH ANYONE OTHER THAN OUR PROJECT TEAM.

MAY I START NOW?
☐ Yes, permission is given ⇒ Go to WM10 to record the time and then begin the interview.
☐ No, permission is not given ⇒ Complete WM7. Discuss this result with your team leader.

WM7. Result of woman's interview
Completed 01
Not at home 02
Refused 03
Partly completed 04
Incapacitated 05
Other (specify) _____ 96

WM8. Field edited by (Name and number):
Name _____   WM9. Data entry clerk (Name and number):
Name _____

WM10. *Record the time.*
Hour and minutes .... |__|__| : |__|__|

WOMAN'S BACKGROUND

WB1. IN WHAT MONTH AND YEAR WERE YOU BORN?
Record response in Solar calendar only. If needed use the Lunar-Solar conversion table.
Date of birth
Month .... |__|__|
DK month 98
Year .... |__|__|__|__|
DK year 9998

WB2. HOW OLD ARE YOU?
Probe: How old were you at your last birthday?
Compare and correct WB1 and/or WB2 if inconsistent
Age (in completed years) .... |__|__|

WB3. HAVE YOU EVER ATTENDED SCHOOL OR PRESCHOOL?
Yes 1
No 2   2⇒WB7

WB4. WHAT IS THE HIGHEST LEVEL OF SCHOOL YOU ATTENDED?
Preschool 0   0⇒WB7
Primary 1
Lower Secondary 2
Upper Secondary 3
Professional School 4   4⇒Next module
College/ University & above 5   5⇒Next module

WB5. WHAT IS THE HIGHEST GRADE YOU COMPLETED AT THAT LEVEL?
If less than 1 full grade at this level, enter "00".
Grade .... |__|__|

WB6. Check WB4:
☐ Lower Secondary or higher ⇒ Go to Next Module
☐ Primary ⇒ Continue with WB7

WB7. Now I WOULD LIKE YOU TO READ THIS SENTENCE TO ME.
Show sentence on the card to the respondent. If respondent cannot read whole sentence, probe:
CAN YOU READ PART OF THE SENTENCE TO ME?
Cannot read at all 1
Able to read only parts of sentence 2
Able to read whole sentence 3
No sentence in required language _____ (specify) language ... 4
Blind / mute, visually / speech impaired 5

CHILD MORTALITY | CM

All questions refer only to LIVE births.

CM1. Now I would like to ask about all the births you have had during your life. Have you ever given birth?

Yes 1
No .... 2→CM8

CM2. What was the date of your first birth?

I mean the very first time you gave birth, even if the child is no longer living, or whose father is not your current partner.

Date of first birth
Day .... DK day 98
Month .... DK month 98
Year .... ⇒ CM4
DK year 9998

Skip to CM4 only if year of first birth is given. Otherwise, continue with CM3.

CM3. How many years ago did you have your first birth?

Completed years since first birth .... ___ ___

CM4. Do you have any sons or daughters to whom you have given birth who are now living with you?

Yes 1
No .... 2→CM6

CM5. How many sons live with you?

Sons at home .... ___ ___

How many daughters live with you?

Daughters at home .... ___ ___

If none, record '00'.

CM6. Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?

Yes 1
No .... 2→CM8

CM7. How many sons are alive but do not live with you?

Sons elsewhere .... ___ ___

How many daughters are alive but do not live with you?

Daughters elsewhere .... ___ ___

If none, record '00'.

CM8. Have you ever given birth to a boy or girl who was born alive but later died?

Yes 1
No .... 2→CM10

If "No" probe by asking:
I mean, to a child who ever breathed or cried or showed other signs of life – even if he or she lived only a few minutes or hours?

CM9. How many boys have died?

Boys dead .... ___ ___

How many girls have died?

Girls dead .... ___ ___

If none, record '00'.

CM10. *Sum answers to CM5, CM7, and CM9.*

Sum .... ___ ___

CM11. Just to make sure that I have this right, you have had in total, (*total number in CM10*) live births during your life. Is this correct?

☐ Yes. *Check below:*

    ☐ No live births ⇒ *Go to* ILLNESS SYMPTOMS *Module*

    ☐ One or more live births ⇒ *Continue with CM12*

☐ No⇒ *Check responses to CM1-CM10 and make corrections as necessary before proceeding to CM12*

CM12. Of these (*total number in CM10*) births you have had, when did you deliver the last one (even if he or she has died)?

Month and year must be recorded.

Date of last birth
Day .... DK day ....
Month 98
Year .... ___ ___ ___ ___

CM13. *Check CM12: Last birth occurred within the last 2 years, that is, since (day and month of interview) in 2008/2009?*

☐ *No live birth in last 2 years.* ⇒ *Go to* ILLNESS SYMPTOMS *Module.*

☐ *One or more live births in last 2 years.* ⇒ *Ask for the name of the child*

Name of child _____

If child has died, take special care when referring to this child by name in the following modules.

Continue with the next module.

DESIRE FOR LAST BIRTH | DB

This module is to be administered to all women with a live birth in the 2 years preceding date of interview. Check child mortality module CM13 and record name of last-born child here _____

Use this child's name in the following questions, where indicated.

DB1. When you got pregnant with (*name*), did you want to get pregnant at that time?

Yes .... 1→Next Module
No 2

DB2. Did you want to have a baby later on, or did you not want any (more) children?

Later 1
No more .... 2→Next Module

DB3. How much longer did you want to wait?

Months .... 1 ___ ___
Years .... 2 ___ ___
DK 998

MONITORING THE SITUATION OF CHILDREN AND WOMEN

MATERNAL AND NEWBORN HEALTH | MN

This module is to be administered to all women with a live birth in the 2 years preceding date of interview.
Check child mortality module CM13 and record name of last-born child here _____
Use this child's name in the following questions, where indicated.

| MN1. Did you see anyone for antenatal care during your pregnancy with (name)? | Yes .... 1 |
| | No .... 2⇒MN5 |

| MN2. Whom did you see?

Probe:
Anyone else?

Probe for the type of person seen and circle all answers given. | Health professional:
Doctor .... A
Nurse / Midwife .... B
Elementary midwife/nurse C
Other person
Traditional birth attendant .... F
Village health worker .... G

Other (specify) _____ X |

| MN3. How many times did you receive antenatal care during this pregnancy? | Number of times .... ⎯
DK .... 98 |

MN4. As part of your antenatal care during this pregnancy, were any of the following done at least once: *If a card is presented, use it to assist with answers to the following questions.*	Yes No
[A] Was your blood pressure measured?	Blood pressure 1 2
[B] Did you give a urine sample?	Urine sample 1 2
[C] Did you give a blood sample?	Blood sample 1 2

| MN5. Do you have a card with your own immunizations listed?

May I see it please? | Yes (card seen) 1
Yes (card not seen) 2
No 3
DK .... 8 |

| MN6. When you were pregnant with (name), did you receive any injection in the arm or shoulder to prevent the baby from getting tetanus to nord, that is convulsions after birth? | Yes 1
No .... 2⇒MN9
DK .... 8⇒MN9 |

| MN7. How many times did you receive this tetanus injection during your pregnancy with (name)?

If 7 or more times, record '7'. | Number of times .... ⎯
DK .... 8⇒MN9 |

| MN8. How many tetanus injections during last pregnancy were reported in MN7?

☐ Two or more tetanus injections during last pregnancy. ⇒ Go to MN17

☐ One tetanus injection during last pregnancy. ⇒ Continue with MN9 | |

| MN9. Did you receive any tetanus injection at any time before your pregnancy with (name), either to protect yourself or another baby? | Yes 1
No .... 2⇒MN17
DK .... 8⇒MN17 |

| MN10. How many times did you receive a tetanus injection before your pregnancy with (name)?

If 7 or more times, record '7'. | Number of times .... ⎯
DK .... 8⇒MN17 |

| MN11. How many years ago did you receive the last tetanus injection before your pregnancy with (name)? | Years ago .... ⎯ |

MONITORING THE SITUATION OF CHILDREN AND WOMEN

| MN17. Who assisted with the delivery of (name)?

Probe:
Anyone else?

Probe for the type of person assisting and circle all answers given.

If respondent says no one assisted, probe to determine whether any adults were present at the delivery. | Health professional:
Doctor .... A
Nurse / Midwife .... B
Elementary midwife/ nurse C
Other person
Traditional birth attendant .... F
Village health worker .... G
Relative / Friend .... H

Other (specify) _____ X
No one .... Y |

| MN18. Where did you give birth to (name)?

Probe to identify the type of source.

If unable to determine whether public or private, write the name of the place.

_____

(Name of place)

_____ | Home
Your home .... 11 11⇒MN20
Other home .... 12 12⇒MN20

Public sector
Govt. hospital 21
Policlinic 22
Commune health centre 23
Sectoral hospital (army, police) 24
Other public (specify) _____ 26

Private Medical Sector
Private hospital 31
Private clinic 32
Private maternal hospital 33
Other private
medical (specify) _____ 36

Other (specify) _____ 96 96⇒MN20 |

| MN19. Was (name) delivered by caesarean section? (That is, did they cut your belly open to take the baby out?) | Yes 1
No .... 2 |

| MN20. When (name) was born, was he/she very large, larger than average, average, smaller than average, or very small? | Very large 1
Larger than average 2
Average 3
Smaller than average 4
Very small .... 5 |

| MN21. Was (name) weighed at birth? | Yes 1
No2 .... 2⇒MN23
DK .... 8⇒MN23 |

| MN22. How much did (name) weigh?

Record weight from immunization handbook or Certificate of Hospital Discharge after Delivery, if available. | From handbook .... 1 (kg) __.___
From recall .... 2 (kg) __.___
DK .... 99998 |

| MN23. Has your menstrual period returned since the birth of (name)? | Yes 1
No .... 2 |

| MN24. Did you ever breastfeed (name)? | Yes 1
No .... 2⇒Next Module |

| MN25. How long after birth did you first put (name) to the breast?

If less than 1 hour, record '00' hours.
If less than 24 hours, record hours.
Otherwise, record days. | Immediately 000
Hours .... 1 __ __
Days .... 2 __ __
Don't know / remember .... 998 |

| MN26. In the first three days after delivery, was (name) given anything to drink other than breast milk? | Yes 1
No .... 2⇒Next Module |

MN27. What was (name) given to drink?

Probe:
Anything else?

Milk (other than breast milk)	A
Plain water	B
Sugar or glucose water	C
Gripe water	D
Sugar-salt-water solution	E
Fruit juice	F
Infant formula	G
Tea / Infusions	H
Honey	I
Rice soup	J
Other (specify) _____	X

ILLNESS SYMPTOMS

IS1. *Check Household Listing, column HL9*

Is the respondent the mother or caretaker of any child under age 5?

☐ Yes ⇒ *Continue with IS2.*

☐ No ⇒ *Go to Next Module.*

IS2. Sometimes children have severe illnesses and should be taken immediately to a health facility. What types of symptoms would cause you to take your child to a health facility right away?

Probe:
Any other symptoms?

Keep asking for more signs or symptoms until the mother/caretaker cannot recall any additional symptoms.

Circle all symptoms mentioned, but do NOT prompt with any suggestions.

Child not able to drink or breastfeed	A
Child becomes sicker	B
Child develops a fever	C
Child has fast breathing	D
Child has difficult breathing	E
Child has blood in stool	F
Child is drinking poorly	G
Child is vomiting	H
Child choked	I
Other (specify) _____	X
Other (specify) _____	Y
Other (specify) _____	Z

CONTRACEPTION

CP1. I would like to talk with you about another subject — family planning.

Are you pregnant now?

Yes, currently pregnant	1⇒Next Module
No	2
Unsure or DK	8

CP2. Couples use various ways or methods to delay or avoid a pregnancy.

Are you currently doing something or using any method to delay or avoid getting pregnant?

Yes	1
No	2⇒Next Module

CP3. What are you doing to delay or avoid a pregnancy?

Do not prompt.
If more than one method is mentioned, circle each one.

Female sterilization	A
Male sterilization	B
IUD	C
Injectables	D
Implants	E
Pill	F
Male condom	G
Female condom	H
Diaphragm	I
Foam / Jelly	J
Lactational amenorrhoea method (LAM)	K
Periodic abstinence / Rhythm	L
Withdrawal	M
Other (specify) _____	X

UNMET NEED

UN1. *Check CP1. Currently pregnant?*

☐ Yes, currently pregnant ⇒ *Continue with UN2.*

☐ No, unsure or DK ⇒ *Go to UN5*

UN2. Now I would like to talk to you about your current pregnancy. When you got pregnant, did you want to get pregnant at that time?

Yes	1
No	2
Later	1⇒UN4

UN3. Did you want to have a baby later on or did you not want any (more) children?

No more	2
Have another child	1⇒UN7

UN4. Now I would like to ask some questions about the future. After the child you are now expecting, would you like to have another child, or would you prefer not to have any more children?

No more / None	2⇒UN13
Undecided / Don't know	8⇒UN13

UN5. *Check CP3. Currently using "Female sterilization"?*

☐ Yes ⇒ *Go to UN13*

☐ No ⇒ *Continue with UN6*

UN6. Now I would like to ask you some questions about the future. Would you like to have (a/another) child, or would you prefer not to have any (more) children?

Have (a/another) child	1
No more / None	2⇒UN9
Says she cannot get pregnant	3⇒UN11
Undecided / Don't know	8⇒UN9

UN7. How long would you like to wait before the birth of (a/another) child?

Months.	1 __ __	
Years.	2 __ __	
Soon / Now.	993	
Says she cannot get pregnant.	994	994⇒UN11
After marriage.	995	
Other.	996	
Don't know.	998	

UN8. *Check CP1. Currently pregnant?*

☐ *Yes, currently pregnant ⇒ Go to UN13*

☐ *No, unsure or DK ⇒ Continue with UN9*

UN9. *Check CP2. Currently using a method?*

☐ *Yes ⇒ Go to UN13*

☐ *No ⇒ Continue with UN10*

UN10. Do you think you are physically able to get pregnant at this time?

Yes.	1	1⇒UN13
No.	2	
DK.	8	8⇒UN13

UN11. Why do you think you are not physically able to get pregnant?

Infrequent sex / No sex.	A
Menopausal.	B
Never menstruated.	C
Hysterectomy (surgical removal of uterus).	D
Has been trying to get pregnant for 2 years or more without result.	E
Postpartum amenorrheic.	F
Breastfeeding.	G
Too old.	H
Fatalistic.	I
Other (specify) _____	X
Don't know.	Z

Circle all the codes if more than one reason is given.

UN12. *Check UN11. "Never menstruated" mentioned?*

☐ *Mentioned ⇒ Go to Next Module*

☐ *Not mentioned ⇒ Continue with UN13*

UN13. When did your last menstrual period start?

Days ago.	1 __ __
Weeks ago.	2 __ __
Months ago.	3 __ __
Years ago.	4 __ __
In menopause / Has had hysterectomy.	994
Before last birth.	995
Never menstruated.	996

ATTITUDES TOWARD DOMESTIC VIOLENCE

DV1. Sometimes a husband is annoyed or angered by things that his wife does. In your opinion, is a husband justified in hitting or beating his wife in the following situations:

		Yes	No	DK
[A] If she goes out without telling him?	Goes out without telling	1	2	8
[B] If she neglects the children?	Neglects children.	1	2	8
[C] If she argues with him?	Argues with him.	1	2	8
[D] If she refuses to have sex with him?	Refuses sex.	1	2	8
[E] If she burns the food?	Burns food.	1	2	8

MARRIAGE/UNION

MA1. Are you currently married or living together with a man as if married?

Yes, currently married.	1
Yes, living with a man.	2
No, not in union.	3	3⇒MA5

MA2. How old is your husband/partner?

Probe: How old was your husband/partner on his last birthday?

Age in years.	__ __
DK.	98

MA3. Besides yourself, does your husband/partner have any other wives or partners or does he live with other women as if married?

Yes.	1
No.	2	2⇒MA7

MA4. How many other wives or partners does he have?

Number.	__ __	⇒MA7
DK.	98	98⇒MA7

MA5. Have you ever been married or lived together with a man as if married?

Yes, formerly married.	1
Yes, formerly lived with a man.	2	3 ⇒ Next Module
No.	3	

MA6. What is your marital status now: are you widowed, divorced or separated?

Widowed.	1
Divorced.	2
Separated.	3

MA7. Have you been married or lived with a man only once or more than once?

Only once.	1
More than once.	2

MA8. In what month and year did you first marry or start living with a man as if married?

Date of first marriage	
Month.	__ __
DK month.	98
Year.	__ __ __ __
DK year.	9998	⇒Next Module

MA9. How old were you when you started living with your first husband/partner?

Age in years.	__ __

SEXUAL BEHAVIOUR

SB

Check for the presence of others. Before continuing, ensure privacy.

SB1. Now I would like to ask you some questions about sexual activity in order to gain a better understanding of some important life issues.

THE INFORMATION YOU SUPPLY WILL REMAIN STRICTLY CONFIDENTIAL.

HOW OLD WERE YOU WHEN YOU HAD SEXUAL INTERCOURSE FOR THE VERY FIRST TIME?

Never had intercourse 00	00⇒Next Module
First time when started living with (first) husband/partner 95	
Age in years .... ☐☐	

SB2. THE FIRST TIME YOU HAD SEXUAL INTERCOURSE, WAS A CONDOM USED?

Yes 1	
No 2	
DK / Don't remember 8	

SB3. WHEN WAS THE LAST TIME YOU HAD SEXUAL INTERCOURSE?

Record 'years ago' only if last intercourse was one or more years ago. If 12 months or more the answer must be recorded in years.

Days ago .... 1 ☐☐	
Weeks ago .... 2 ☐☐	
Months ago .... 3 ☐☐	
Years ago .... 4 ☐☐	4⇒SB15

SB4. THE LAST TIME YOU HAD SEXUAL INTERCOURSE, WAS A CONDOM USED?

Yes 1	
No 2	

SB5. WHAT WAS YOUR RELATIONSHIP TO THIS PERSON WITH WHOM YOU LAST HAD SEXUAL INTERCOURSE?

Probe to ensure that the response refers to the relationship at the time of sexual intercourse

If 'boyfriend', then ask:
Were you living together as if married?
If 'yes', circle '2'. If 'no', circle '3'.

Husband 1	
Cohabiting partner 2	
Boyfriend 3	3⇒SB7
Casual acquaintance 4	4⇒SB7
Other (specify) _____ 6	6⇒SB7

SB6. *Check MA1:*

☐ Currently married or living with a man (MA1 = 1 or 2) ⇒ Go to SB8

☐ Not married / Not in union (MA1 = 3) ⇒ Continue with SB7

SB7. HOW OLD IS THIS PERSON?

If response is DK, probe:
ABOUT HOW OLD IS THIS PERSON?

Age of sexual partner .... ☐☐
DK 98

SB8. HAVE YOU HAD SEXUAL INTERCOURSE WITH ANY OTHER PERSON IN THE LAST 12 MONTHS?

Yes 1	
No 2	2⇒SB15

SB9. THE LAST TIME YOU HAD SEXUAL INTERCOURSE WITH THIS OTHER PERSON, WAS A CONDOM USED?

Yes 1	
No 2	

SB10. WHAT WAS YOUR RELATIONSHIP TO THIS PERSON?

Probe to ensure that the response refers to the relationship at the time of sexual intercourse

If 'boyfriend' then ask:
Were you living together as if married?
If 'yes', circle '2'. If 'no', circle '3'.

Husband 1	
Cohabiting partner 2	
Boyfriend 3	3⇒SB12
Casual acquaintance 4	4⇒SB12
Other (specify) _____ 6	6⇒SB12

SB11. *Check MA1 and MA7:*

☐ Currently married or living with a man (MA1 = 1 or 2)
AND
Married only once or lived with a man only once (MA7 = 1) ⇒ Go to SB13

☐ Else ⇒ Continue with SB12

SB12. HOW OLD IS THIS PERSON?

If response is DK, probe:
ABOUT HOW OLD IS THIS PERSON?

Age of sexual partner .... ☐☐
DK 98

SB13. OTHER THAN THESE TWO PERSONS, HAVE YOU HAD SEXUAL INTERCOURSE WITH ANY OTHER PERSON IN THE LAST 12 MONTHS?

Yes 1	
No 2	2 ◆SB15

SB14. IN TOTAL, WITH HOW MANY DIFFERENT PEOPLE HAVE YOU HAD SEXUAL INTERCOURSE IN THE LAST 12 MONTHS?

Number of partners .... ☐☐

SB15. IN TOTAL, WITH HOW MANY DIFFERENT PEOPLE HAVE YOU HAD SEXUAL INTERCOURSE IN YOUR LIFETIME?

If a non-numeric answer is given, probe to get an estimate.

If number of partners is 95 or more, write '95'.

Number of lifetime partners .... ☐☐
DK 98

HIV/AIDS

HA

HA1. Now I would like to talk with you about SOMETHING ELSE.

HAVE YOU EVER HEARD OF AN ILLNESS CALLED HIV/ AIDS?

Yes 1	
No 2	2⇒WM11

HA2. CAN PEOPLE REDUCE THEIR CHANCE OF GETTING THE HIV/AIDS VIRUS BY HAVING JUST ONE UNINFECTED SEX PARTNER WHO HAS NO OTHER SEX PARTNERS?

Yes 1	
No 2	
DK 8	

HA3. CAN PEOPLE GET THE HIV/AIDS VIRUS BECAUSE OF WITCHCRAFT OR OTHER SUPERNATURAL MEANS?

Yes 1	
No 2	
DK 8	

HA4. CAN PEOPLE REDUCE THEIR CHANCE OF GETTING THE HIV/AIDS VIRUS BY USING A CONDOM EVERY TIME THEY HAVE SEX?

Yes 1	
No 2	
DK 8	

HA5. CAN PEOPLE GET THE HIV/AIDS VIRUS FROM MOSQUITO BITES?

Yes 1	
No 2	
DK 8	

HA6. CAN PEOPLE GET THE HIV/AIDS VIRUS BY SHARING FOOD WITH A PERSON WHO HAS THE AIDS VIRUS?

Yes 1	
No 2	
DK 8	

HA7. IS IT POSSIBLE FOR A HEALTHY-LOOKING PERSON TO HAVE THE HIV/AIDS VIRUS?

Yes 1	
No 2	
DK 8	

HA8. CAN THE VIRUS THAT CAUSES HIV/AIDS BE TRANSMITTED FROM A MOTHER TO HER BABY:

	Yes	No	DK
[A] DURING PREGNANCY?	During pregnancy 1	2	8
[B] DURING DELIVERY?	During delivery 1	2	8
[C] BY BREASTFEEDING?	By breastfeeding 1	2	8

HA9. In your opinion, if a female teacher has the HIV/AIDS virus but is not sick, should she be allowed to continue teaching in school?

Yes 1
No 2
DK / Not sure / Depends 8

HA10. Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the HIV/AIDS virus?

Yes 1
No 2
DK / Not sure / Depends 8

HA11. If a member of your family got infected with the HIV/AIDS virus, would you want it to remain a secret?

Yes 1
No 2
DK / Not sure / Depends 8

HA12. If a member of your family became sick with HIV/AIDS, would you be willing to care for her or him in your own household?

Yes 1
No 2
DK / Not sure / Depends 8

HA13. Check CM13: Any live birth in last 2 years?

☐ One or more live births in last 2 years ⇨ Continue with HA14

☐ No live birth in last 2 years ⇨ Go to HA24

HA14. Check MN1: Received antenatal care?

☐ Received antenatal care ⇨ Continue with HA15

☐ Did not receive antenatal care ⇨ Go to HA24

HA15. During any of the antenatal visits for your pregnancy with (name), were you given any information about:

	Y	N	DK
[A] Babies getting the HIV/AIDS virus from their mother?	AIDS from mother 1	2	8
[B] Things that you can do to prevent getting the HIV/AIDS virus?	Things to do 1	2	8
[C] Getting tested for the HIV/AIDS virus?	Tested for AIDS 1	2	8

HA16. I don't want to know the results, but were you offered a test for the HIV/AIDS virus?
[D] offered you:

Offered a test 1
No .... 2 ⇨ HA19
DK .... 8 ⇨ HA19

HA16. I don't want to know the results, but were you tested for the HIV/AIDS virus as part of your antenatal care?

Yes 1
No .... 2 ⇨ HA19
DK .... 8 ⇨ HA19

HA17. I don't want to know the results, but did you get the results of the test?

Yes 1
No .... 2 ⇨ HA22
DK .... 8 ⇨ HA22

HA18. Regardless of the result, all women who are tested are supposed to receive counseling after getting the result.

After you were tested, did you receive counseling?

Yes .... 1 ⇨ HA22
No .... 2 ⇨ HA22
DK .... 8 ⇨ HA22

HA19. Check MN17: Birth delivered by health professional (A, B or C)?

☐ Yes, birth delivered by health professional ⇨ Continue with HA20

☐ No, birth not delivered by health professional ⇨ Go to HA24

HA20. I don't want to know the results, but were you tested for the HIV/AIDS virus between the time you went for delivery but before the baby was born?

Yes 1
No .... 2 ⇨ HA24

HA21. I don't want to know the results, but did you get the results of the test?

Yes 1
No 2

HA22. Have you been tested for the HIV/AIDS virus since that time you were tested during your pregnancy?

Yes 1
No .... 2 ⇨ HA25

HA23. When was the most recent time you were tested for the HIV/AIDS virus?

Less than 12 months ago .... 1 ⇨ WM11
12-23 months ago .... 2 ⇨ WM11
2 or more years ago .... 3 ⇨ WM11

HA24. I don't want to know the results, but have you ever been tested to see if you have the HIV/AIDS virus?

Yes 1
No .... 2 ⇨ HA27

HA25. When was the most recent time you were tested?

Less than 12 months ago 1
12-23 months ago 2
2 or more years ago 3

HA26. I don't want to know the results, but did you get the results of the test?

Yes .... 1 ⇨ WM11
No .... 2 ⇨ WM11

HA27. Do you know of a place where people can go to get tested for the HIV/AIDS virus?

DK .... 8 ⇨ WM11
Yes 1
No 2

WM11. Record the time.

Hour and minutes .... __ __ : __ __

WM12. Check Household Listing Form, column H4.9.
Is the respondent the mother or caretaker of any child age 0-4 living in this household?

☐ Yes ⇨ Go to QUESTIONNAIRE FOR CHILDREN UNDER FIVE for that child and start the interview with this respondent.

☐ No ⇨ End the interview with this respondent by thanking her for her cooperation.
Check for the presence of any other eligible woman or children under-5 in the household.

Interviewer's Observations

Field Editor's Observations

Team Leader's Observations

![MICS] QUESTIONNAIRE FOR CHILDREN UNDER FIVE
VIET NAM

UNDER-FIVE CHILD INFORMATION PANEL UF

This questionnaire is to be administered to all mothers or caretakers (see Household Listing Form, column HL9) who care for a child that lives with them and is under the age of 5 years (see Household Listing Form, column HL6).
A separate questionnaire should be used for each eligible child.

UFA. Province/ City name and number:
Name _____

UFC. Commune/ Ward name and number:
Name _____

UF1. EA name and number:
Name _____

UF3. Child's name:
Name _____

UF5. Mother's / Caretaker's name:
Name _____

UF7. Interviewer name and number:
Name _____

UFB. District name and number:
Name _____

UF2. Household number:

UF4. Child's line number:

UF6. Mother's / Caretaker's line number:

UF8. Day / Month / Year of interview:
_____ / _____ / _____

Repeat greeting if not already read to this respondent:

We are from General Statistics Office. We are working on a survey concerned with family health and education. I would like to talk to you about (*name*)'s health and well-being. The interview will take about 30 minutes. All the information we obtain will remain strictly confidential and your answers will never be shared with anyone other than our project team.

May I start now?

☐ Yes, permission is given ⇨ Go to UF12 to record the time and then begin the interview.

☐ No, permission is not given ⇨ Complete UF9. Discuss this result with your team leader.

If greeting at the beginning of the household questionnaire has already been read to this woman, then read the following:

Now I would like to talk to you more about (*name*) from UF3)'s health and other topics. This interview will take about 30 minutes. Again, all the information we obtain will remain strictly confidential and your answers will never be shared with anyone other than our project team.

UF9. Result of interview for children under 5

Codes refer to mother/caretaker.

Completed	01
Not at home	02
Refused	03
Partly completed	04
Incapacitated	05
Other (specify)_____	96

UF10. Field edited by (Name and number):
Name _____

UF11. Data entry clerk (Name and number):
Name _____

UF12. Record the time.
Hour and minutes _____:_____

AGE AG

AG1. Now I would like to ask you some questions about the health of (*name*).

In what day, month and year was (*name*) born?

Probe:
What is his / her birthday?

If the mother/caretaker knows the exact birth date, also enter the day; otherwise, circle 98 for day.

Month and year must be recorded.

Date of birth	
Day	_____
DK day	98
Month	_____
Year	_____

AG2. How old is (*name*)?

Probe:
How old was (*name*) at his / her last birthday?

Record age in completed years.

Record '0' if less than 1 year.

Compare and correct AG1 and/or AG2 if inconsistent.

Age (in completed years) _____

EARLY CHILDHOOD DEVELOPMENT EC

EC1. How many children's books or picture books do you have for (*name*)?

None 00
Number of children's books .... 0 ___
Ten or more books 10

EC2. I am interested in learning about the things that (*name*) plays with when he/she is at home.

Does he/she play with:

[A] Homemade toys (such as dolls, cars, or other toys made at home)?

[B] Toys from a shop or manufactured toys?

[C] Household objects (such as bowls or pots) or objects found outside (such as sticks, rocks, animal shells or leaves)?

If the respondent says "YES" to the categories above, then probe to learn specifically what the child plays with to ascertain the response

	Y	N	DK
Homemade toys	1	2	8
Toys from a shop	1	2	8
Household objects or outside objects	1	2	8

EC3. Sometimes adults taking care of children have to leave the house to go shopping, wash clothes, or for other reasons and have to leave young children.

On how many days in the past week was (*name*):

[A] Left alone for more than an hour?

[B] Left in the care of another child, that is, someone less than 10 years old, for more than an hour?

If 'none' enter '0'. If 'don't know' enter '8'

Number of days left alone for more than an hour .... ___

Number of days left with other child for more than an hour .... ___

EC4. Check AG2: Age of child

☐ Child age 3 or 4 ⇒ Continue with EC5

☐ Child age 0, 1 or 2 ⇒ Go to Next Module

EC5. Does (name) attend any organized learning or early childhood education programme, such as a private or government facility, including kindergarten or community child care?
Yes....1
No....2 2⇒EC7
DK....8 8⇒EC7

EC6. Within the last seven days, about how many hours did (name) attend?
Number of hours....__ __

EC7. In the past 3 days, did you or any household member over 15 years of age engage in any of the following activities with (name):

If yes, ask:
who engaged in this activity with (name)?

Circle all that apply.

		Mother	Father	Other	No one
[A] Read books to or looked at picture books with (name)?	Read books	A	B	X	Y
[B] Told stories to (name)?	Told stories	A	B	X	Y
[C] Sang songs to (name) or with (name), including lullabies?	Sang songs	A	B	X	Y
[D] Took (name) outside the home, compound, yard or enclosure?	Took outside	A	B	X	Y
[E] Played with (name)?	Played with	A	B	X	Y
[F] Named, counted, or drew things to or with (name)?	Named/counted	A	B	X	Y

EC8. I would like to ask you some questions about the health and development of your child. Children do not all develop and learn at the same rate. For example, some walk earlier than others. These questions are related to several aspects of your child's development.

Can (name) identify or name at least ten letters of the alphabet?
Yes....1
No....2
DK....8

EC9. Can (name) read at least four simple, popular words?
Yes....1
No....2
DK....8

EC10. Does (name) know the name and recognize the symbol of all numbers from 1 to 10?
Yes....1
No....2
DK....8

EC11. Can (name) pick up a small object with two fingers, like a stick or a rock from the ground?
Yes....1
No....2
DK....8

EC12. Is (name) sometimes too sick to play?
Yes....1
No....2
DK....8

EC13. Does (name) follow simple directions on how to do something correctly?
Yes....1
No....2
DK....8

EC14. When given something to do, is (name) able to do it independently?
Yes....1
No....2
DK....8

EC15. Does (name) get along well with other children?
Yes....1
No....2
DK....8

EC16. Does (name) kick, bite, or hit other children or adults?
Yes....1
No....2
DK....8

EC17. Does (name) get distracted easily?
Yes....1
No....2
DK....8

BREASTFEEDING BF

BF1. Has (name) ever been breastfed?
Yes....1
No....2 2⇒BF3
DK....8 8⇒BF3

BF2. Is he/she still being breastfed?
Yes....1
No....2
DK....8

BF3. I would like to ask you about liquids that (name) may have had yesterday during the day or the night. I am interested in whether (name) had the item even if it was combined with other foods.

Did (name) drink plain water yesterday, during the day or night?
Yes....1
No....2
DK....8

BF4. Did (name) drink infant formula such as (local names) yesterday, during the day or night?
Yes....1
No....2 2⇒BF6
DK....8 8⇒BF6

BF5. How many times did (name) drink infant formula?
Number of times....__ __ 8⇒BF6

BF6. Did (name) drink milk, such as condensed, powdered or fresh animal milk yesterday, during the day or night?
Yes....1
No....2 2⇒BF8
DK....8 8⇒BF8

BF7. How many times did (name) drink condensed, powdered or fresh animal milk?
Number of times....__ __

BF8. Did (name) drink juice or juice drinks yesterday, during the day or night?
Yes....1
No....2
DK....8

BF9. Did (name) drink clear broth or herbal/ meat water yesterday, during the day or night?

Yes 1
No 2
DK 8

BF10. Did (name) drink or eat vitamin or mineral supplements or any medicines yesterday, during the day or night?

Yes 1
No 2
DK 8

BF11. Did (name) drink ORS (oral rehydration solution) yesterday, during the day or night?

Yes 1
No 2
DK 8

BF12. Did (name) drink any other liquids (tea, coffee, coke, or others) yesterday, during the day or night?

Yes 1
No 2
DK 8

BF13. Did (name) drink or eat yogurt yesterday, during the day or night?

Yes 1   2→BF15
No 2
DK 8   8→BF15

BF14. How many times did (name) drink or eat yogurt yesterday, during the day or night?

Number of times .... __ __
DK 8   8→BF15

BF15. Did (name) eat thin porridge (rice porridge) yesterday, during the day or night?

Yes 1
No 2
DK 8

BF16. Did (name) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night?

Yes 1   2→BF18
No 2
DK 8   8→BF18

BF17. How many times did (name) eat solid or semi-solid (soft, mushy) food yesterday, during the day or night?

Number of times .... __ __

BF18. Yesterday, during the day or night, did (name) drink anything from a bottle with a nipple?

Yes 1
No 2
DK 8

CARE OF ILLNESS

CA

CA1. In the last two weeks, has (name) had diarrhoea?

Yes 1
No 2   2→CA7
DK 8   8→CA7

CA2. I would like to know how much (name) was given to drink during the diarrhoea (including breastmilk).

During the time (name) had diarrhoea, was he/ she given less than usual to drink, about the same amount, or more than usual?

Much less 1
Somewhat less 2
About the same 3
More 4
Nothing to drink 5

If less, probe:
Was he/she given much less than usual to drink, or somewhat less?

DK 8

CA3. During the time (name) had diarrhoea, was he/she given less than usual to eat, about the same amount, more than usual, or nothing to eat?

Much less 1
Somewhat less 2
About the same 3
More 4
Stopped food 5
Never gave food 6

If 'less', probe:
Was he/she given much less than usual to eat or somewhat less?

DK 8

CA4. During the episode of diarrhoea, was (name) given to drink any of the following:

Read each item aloud and record response before proceeding to the next item.

[A] A fluid made from a special packet called Oral Rehydration Solution (ORS)? Fluid from ORS packet 1 2 8

                                                                                              Y N DK

[B] A pre-packaged ORS fluid for diarrhoea? Pre-packaged ORS fluid 1 2 8

[C] Water from rice porridge/ rice soup (with salt)? Water from rice porridge/ rice soup 1 2 8

[D] Lemon-orange/ coconut drink? Lemon-orange/ coconut drink 1 2 8

[E] Soup water from boiled vegetables/ meat? Soup water from boiled vegetables/ meat 1 2 8

[F] Water from fried-and-boiled rice? Water from fried-and-boiled rice 1 2 8

CA5. Was anything (else) given to treat the diarrhoea?

Yes 1
No 2   2→CA7
DK 8   8→CA7

CA6. What (else) was given to treat the diarrhoea?
Probe: Anything else?
Record all treatments given. Write brand name(s) of all medicines mentioned.
_____ (Name)

Pill or Syrup	
Antibiotic	A
Antimotility	B
Zinc	C
Other (Not antibiotic, antimotility or zinc)	G
Unknown pill or syrup	H
Injection	
Antibiotic	L
Non-antibiotic	M
Unknown injection	N
Intravenous	O
Home remedy / Herbal medicine	Q
Other (specify) _____	X

CA7. At any time in the last two weeks, has (name) had an illness with a cough?
Yes	1	
No	2	2⇒CA14
DK	8	8⇒CA14

CA8. When (name) had an illness with a cough, did he/she breathe faster than usual, with short, rapid breaths or have difficulty breathing?
Yes	1	
No	2	2⇒CA14
DK	8	8⇒CA14

CA9. Was the fast or difficult breathing due to a problem in the chest or a blocked / runny nose?
Problem in chest only	1	
Blocked or runny nose only	2	2⇒CA14
Both	3	
Other (specify) _____	6	6⇒CA14
DK	8	8⇒CA14

CA10. Did you seek any advice or treatment for the illness from any source?
Yes	1	
No	2	2⇒CA12
DK	8	8⇒CA12

CA11. From where did you seek advice or treatment?
Probe: Anywhere else?
Circle all providers mentioned, but do NOT prompt with any suggestions.

Probe to identify each type of source. If unable to determine if public or private sector, write the name of the place.
_____ (Name of place)

Public sector	
Govt. hospital	A
Commune health centre	B
Polyclinic	C
Village health worker	D
Mobile clinic (health service)	E
Sectoral hospital (army, police)	F
Govt. pharmacy	G
Other public (specify) _____	H
Private medical sector	
Private hospital / clinic	I
Private doctor	J
Private pharmacy	K
Other private medical (specify) _____	O
Other source	
Relative / Friend	P
Shop	Q
Traditional healer	R
Other (specify) _____	X

CA12. Was (name) given any medicine to treat this illness?
Yes	1	
No	2	2⇒CA14
DK	8	8⇒CA14

CA13. What medicine was (name) given?
Probe: Any other medicine?
Circle all medicines given. Write brand name(s) of all medicines mentioned.
_____ (Names of medicines)

Antibiotic	
Pill / Syrup	A
Injection	B
Anti-malarials	M
Paracetamol / Panadol / Acetaminophen	P
Aspirin	Q
Ibuprofen	R
Other (specify) _____	X
DK	Z

CA14. Check AG2: Child aged under 3?
☐ Yes ⇒ Continue with CA15
☐ No ⇒ Go to Next Module

CA15. The last time (name) passed stools, what was done to dispose of the stools?
Child used toilet / latrine	01
Put / Rinsed into toilet or latrine	02
Put / Rinsed into drain or ditch	03
Thrown into garbage (solid waste)	04
Buried	05
Left in the open	06
Other (specify) _____	96
DK	98

MALARIA   ML

ML1. In the last two weeks, has (name) been ill with a fever at any time?
Yes	1	
No	2	2⇒Next Module
DK	8	8⇒Next Module

ML2. At any time during the illness, did (name) have blood taken from his/her finger or heel for testing?
Yes	1
No	2
DK	8

ML3. Did you seek any advice or treatment for the illness from any source?
Yes	1	
No	2	2⇒ML8
DK	8	8⇒ML8

ML4. Was (name) taken to a health facility during this illness?
Yes	1	
No	2	2⇒ML8
DK	8	8⇒ML8

ML5. Was (name) given any medicine for fever or malaria at the health facility?
Yes	1	
No	2	2⇒ML7
DK	8	8⇒ML7

ML6. What medicine was (name) given?

Probe:
Any other medicine?

Circle all medicines mentioned. Write brand name(s) of all medicines, if given.

_____
(Name)

Anti-malarials:
Chloroquine (tab.) .... B
Quinine sulfate (tab.) .... D
Artemisin based Combination Therapy (ACT) .... E
Quinine dihydrochloratte (inj.) .... F
Dihydroartemisinin-Piperaquine (tab.) .... G
Artesunate (inj.) .... K
Primaquine (tab.) L
Other anti-malarial
(specify) _____ CH
                     QU

Antibiotic drugs
Pill / Syrup .... AR
Injection .... QDI
                                                        DPH
Other medications: ART
Paracetamol/ Panadol/ Acetaminophen .... PRI
Aspirin .... OA
Ibuprofen

ML7. Was (name) given any medicine for the fever or malaria before being taken to the health facility?

Yes .... 1⇒ML9
No .... 2⇒ML10
DK. .... 8⇒ML10

ML8. Was (name) given any medicine for fever or malaria during this illness?

Yes 1
No .... 2⇒ML10
DK. .... 8⇒ML10

ML9. What medicine was (name) given?

Probe:
Any other medicine?

Circle all medicines mentioned. Write brand name(s) of all medicines, if given.

_____
(Name)

Anti-malarials:
Chloroquine (tab.) .... B
Quinine sulfate (tab.) .... D
Artemisin based Combination Therapy (ACT) .... E
Quinine dihydrochloratte (inj.) .... F
Dihydroartemisinin-Piperaquine (tab.) .... G
Artesunate (inj.) .... K
Primaquine (tab.) L
Other anti-malarial
(specify) _____ H

Antibiotic drugs
Pill / Syrup I
Injection .... J

Other medications:
Paracetamol/ Panadol/ Acetaminophen .... P
Aspirin .... Q
Ibuprofen .... R
Other (specify) _____ X
DK. .... Z

ML10. Check ML6 and ML9: Anti-malarial mentioned (codes B, D, E, F, G, K, L, H)?

☐ Yes ⇒ Continue with ML11

☐ No ⇒ Go to Next Module

ML11. How long after the fever started did (name) first take (name of anti-malarial from ML6 or ML9)?

If multiple anti-malarials mentioned in ML6 or ML9, name all anti-malarial medicines mentioned.

Same day
Next day 0
2 days after the fever 1
3 days after the fever 2
4 or more days after the fever 3
                                                        4
DK. 8

IMMUNIZATION

If an immunization card/ handbook is available, copy the dates in IM3 for each type of immunization recorded on the card/ handbook. IM6-IM16 are for registering vaccinations that are not recorded on the card/ handbook. IM6-IM16 will only be asked when a card/handbook is not available.

IM1. Do you have a card/ handbook where (name)'s vaccinations are written down?

Yes, seen 1
Yes, not seen .... 2⇒IM3
No card/ handbook 3

(If yes) May I see it please?

IM2. Did you ever have a vaccination card/ handbook for (name)?

Yes .... 1⇒IM6
No .... 2⇒IM6

IM3.
(a) Copy dates for each vaccination from the card/ handbook.
(b) Write '44' in day column if card/ handbook shows that vaccination was given but no date recorded.

	Date of Immunization		
	Day	Month	Year
BCG	BCG		
Polio 1	OPV1		
Polio 2	OPV2		
Polio 3	OPV3		
Pentavalent1	DPT-VGB-Hib1		
Record this vaccine only from the new handbook (page 6).	DPT: Bạch hầu - Ho gà - UV VGB: Viêm phôi HIB: Viêm màng não		
Pentavalent2	DPT-VGB-Hib2		
Record this vaccine only from the new handbook (page 6).			
Pentavalent3	DPT-VGB-Hib3		
Record this vaccine only from the new handbook (page 6).			
DPT1	DPT1		
DPT2	DPT2		
DPT3	DPT3		
HepB at birth	H0		
Available from the new handbook (page 5), or record from the card if HepB1 vaccine was administered on the date of birth.			
HepB1	H1		
HepB2	H2		
HepB3	H3		
Measles (or MMR)	MEASLES		
Vitamin A (most recent)	Vit A		

MONITORING THE SITUATION OF CHILDREN AND WOMEN

IM4. Check IM3. Are all vaccines (BCG to Measles) recorded?

☐ Yes ⇨ Go to IM18

☐ No ⇨ Continue with IM5

IM5. In addition to what is recorded on this card/ handbook, did (name) receive any other vaccinations – including vaccinations received in campaigns or immunization days?

Record 'Yes' only if respondent mentions vaccines shown in the table above.

Yes .... 1 (Probe for vaccinations and write '66' in the corresponding day column for each vaccine mentioned. Then skip to IM18)	
No .... 2 ⇨ IM18	
DK .... 8 ⇨ IM18	

IM6. Has (name) ever received any vaccinations to prevent him/her from getting diseases, including vaccinations received in a campaign or immunization day?

Yes 1	
No .... 2 ⇨ IM18	
DK .... 8 ⇨ IM18	

IM7. Has (name) ever received a BCG vaccination against tuberculosis – that is, an injection in the upper arm that usually causes a scar?

Yes 1	
No 2	
DK 8	

IM8. Has (name) ever received any 'vaccination drops in the mouth' to protect him/her from getting diseases – that is, polio?

Yes 1	
No .... 2 ⇨ IM10A	
DK .... 8 ⇨ IM10A	

IM10. How many times was the polio vaccine received?

Number of times .... __

IM10A. Has (name) ever received a pentavalent (DPT+VGB+Hib) vaccination – that is, an injection in the thigh or buttocks – to prevent him/her from getting DPT, Hepatitis B and Hib?

Probe by indicating that Pentavalent vaccine is sometimes called 5 in 1.

Yes 1	
No .... 2 ⇨ IM11	
DK .... 8 ⇨ IM11	

IM10B. How many times was a pentavalent (DPT-VGB-Hib) vaccine received?

Number of times .... __

IM11. Has (name) ever received a DPT vaccination – that is, an injection in the thigh or buttocks – to prevent him/her from getting tetanus, whooping cough, or diphtheria?

Yes 1	
No .... 2 ⇨ IM13	
DK .... 8 ⇨ IM13	

Probe by indicating that DPT vaccination is sometimes given at the same time as Polio.

IM12. How many times was a DPT vaccine received?

Number of times .... __

IM13. Has (name) ever been given a Hepatitis B vaccination – that is, an injection in the thigh or buttocks – to prevent him/her from getting Hepatitis B?

Yes 1	
No .... 2 ⇨ IM16	
DK .... 8 ⇨ IM16	

Probe by indicating that the Hepatitis B vaccine is sometimes given at the same time as Polio and DPT vaccines.

IM14. Was the first Hepatitis B vaccine received within 24 hours after birth, or later?

Within 24 hours 1	
Later 2	

IM15. How many times was a Hepatitis B vaccine received?

Number of times .... __

IM16. Has (name) ever received a measles injection or an MMR injection – that is, a shot in the arm at the age of 9 months or older – to prevent him/her from getting measles?

Yes 1	
No 2	
DK 8	

MONITORING THE SITUATION OF CHILDREN AND WOMEN

IM18. Has (name) received a Vitamin A dose like (this/any of these) within the last 6 months?

Show common types of ampoules / capsules / syrups

Yes 1	
No 2	
DK 8	

IM19. Please tell me if (name) has participated in any of the following campaigns, national immunization days and/or for Vitamin A or child health days:

	Y N DK
[A] June 2010, Vitamin A campaign	1 2 8
[B] December 2010, Vitamin A campaign	1 2 8
[C] September-November 2010, Measles vaccination campaign/ Measles supplementary immunization activity (SIA) Sep-Nov 2010, Measles	1 2 8

UF13. Record the time.

Hour and minutes. .... __ __ : __ __

UF14. Is the respondent the mother or caretaker of another child age 0-4 living in this household?

☐ Yes ⇨ Indicate to the respondent that you will need to measure the weight and height of the child later. Go to the next QUESTIONNAIRE FOR CHILDREN UNDER FIVE to be administered to the same respondent

☐ No ⇨ End the interview with this respondent by thanking him/her for his/her cooperation and tell her/him that you will need to measure the weight and height of the child

Check to see if there are other woman's or under-5 questionnaires to be administered in this household.

Move to another woman's or under-5 questionnaire, or start making arrangements for anthropometric measurements of all eligible children in the household.

ANTHROPOMETRY   **AN**

After questionnaires for all children are complete, the measurer weighs and measures each child.
Record weight and length/height below, taking care to record the measurements on the correct questionnaire for each child. Check the child's name and line number on the household listing before recording measurements.

AN1. Measurer's name and number.

Name _____ | __ __

AN2. Result of height / length and weight measurement

Either or both measured 1	
Child not present .... 2 ⇨ AN6	
Child or caretaker refused .... 3 ⇨ AN6	
Other (specify) _____ .... 6 ⇨ AN6	

AN3. Child's weight

Kilograms (kg) .... __ __ . __	
Weight not measured 99.9	

AN4. Child's length or height

Check age of child in AG2:

☐ Child under 2 years old ⇨ Measure length (lying down).

Length (cm) Lying down 1	
Height (cm) Standing up 2	

☐ Child age 2 or more years. ⇨ Measure height (standing up).

Length / Height (cm) .... __ __ __ . __

Length / Height not measured 999.9

AN5. Oedema

Observe and record

Checked

Oedema present............................... 1
Oedema not present........................... 2
Unsure....................................... 3

Not checked

(specify reason) _____ 7

AN6. Is there another child in the household who is eligible for measurement?

☐ Yes ⇒ Record measurements for next child.

☐ No ⇒ End the interview with this household by thanking all participants for their cooperation.

Gather together all questionnaires for this household and check that all identification numbers are inserted on each page. Tally on the Household Information Panel the number of interviews completed.

Interviewer's Observations

Field Editor's Observations

Team Leader's Observations

VITA

Full name: Thi Thanh Truc Nguyen

Date of Birth: 16th August 1988

Place of Birth: KonTum, Vietnam

Citizen: Vietnamese

Sex: Female

Religious: Buddhist

E-mail: nguyenthanhtruc16.8@gmail.com

Education

Degree: Bachelor of Public Health (academic year: 2006-2010)

Institution: University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam

Work experience

From January, 2011 to now

Position: Lecturer

Office: Demography Department, Faculty of Public Health, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam

From June, 2011 to July, 2012

Position: Secretary

Project: Health Research for Development Initiative in Viet Nam - HRDI

Local academic publications

Truc, N.T.T., Lo, N.V. and Trang, N.T.M. (2010). "The reasons of late entry to antenatal care of Ba Na Women in Thong Nhat Ward, Kon Tum City, Kon Tum Province." HCMC Medical Journal 16(1): 345-350.

Truc, N.T.T., Lo, N.V., Nga, T.T.T. and My, D.T. (2011). "The reasons of abortions and the contraceptive user errors among women having abortion in Hung Vuong hospital." HCMC Medical Journal 17(1): 266-275.

Truc, N.T.T. and Morna, D.T. (2014). "Information sources and education demand of sexual-reproductive health knowledge among students of ethnic boarding high school in Ninh Thuan province." HCMC Medical Journal 18(1): 117-126.