Maternal Mortality in Viet Nam 2000-2001
An In-Depth Analysis of Causes and Determinants
Maternal Mortality in Viet Nam 2000-2001

An in-depth analysis of causes and determinants


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CONTENTS

PREFACE ........................................................................................................................................ IX

ACKNOWLEDGEMENTS ............................................................................................................ X

PART 1: BACKGROUND .............................................................................................................. 1
  1.1 INTRODUCTION .................................................................................................................... 1
  1.2 REVIEW OF MATERNAL MORTALITY ..................................................................................... 3
    1.2.1 Maternal mortality in the world ......................................................................................... 3
    1.2.2 Maternal mortality in Viet Nam .......................................................................................... 7
  1.3 CAUSES OF MATERNAL MORTALITY .................................................................................... 8
  1.4 FACTORS RELATED TO MATERNAL MORTALITY ............................................................... 8
  1.5 CURRENT STRATEGIES FOR PREVENTING MATERNAL MORTALITIES ............................... 9
  1.6 METHODS USED IN MATERNAL MORTALITY STUDIES .................................................... 10

PART 2: DESCRIPTION OF STUDY .......................................................................................... 13
  2.1 OBJECTIVES ........................................................................................................................ 13
  2.2 RESEARCH METHODOLOGY ............................................................................................... 13
    2.2.1 Definitions used in the research ....................................................................................... 13
    2.2.2 Targeted groups ................................................................................................................ 13
    2.2.3 Sample size and sampling method .................................................................................... 13
    2.2.5 Research methodology .................................................................................................... 14
  2.3 RESEARCH IMPLEMENTATION ............................................................................................ 16
    2.3.1 Developing the proposal and questionnaires ................................................................. 16
    2.3.2 Pre-testing the questionnaires ......................................................................................... 16
    2.3.3 Selecting and training researchers and monitors ............................................................ 16
    2.3.4 Administrative and financial preparation for the research ........................................... 17
    2.3.5 Field survey .................................................................................................................. 17
    2.3.6 Reporting ....................................................................................................................... 17
  2.4 BACKGROUND OF STUDY SITES ..................................................................................... 17
    2.4.1 Cao Bang Province (Northern Mountain) ................................................................. 17
    2.4.2 Ha Tay Province (Red River Delta) ............................................................................ 18
    2.4.3 Quang Ngai Province (Central Coast) ......................................................................... 18
    2.4.4 Dak Lak Province (Central Highlands) ....................................................................... 19
    2.4.5 Binh Duong Province (South East) ............................................................................. 20
    2.4.6 Kien Giang Province (Mekong River Delta) ............................................................... 20
    2.4.7 Quang Tri Province (North Central Coast) ................................................................. 21
LIST OF TABLES

Table 1: Some examples of the correlation between deliveries where a skilled attendant is present, lifetime risk of maternal death and perinatal deaths ................................................................. 6
Table 2: Summary of MMR studies in Viet Nam ................................................................................... 7
Table 3: Estimated national MMR for Viet Nam from different sources: ............................................ 8
Table 4: List of provinces and districts after random selection ............................................................ 14
Table 5: Number of mortalities among women aged 15-49 years from reported and research data, Viet Nam 2000-2001 ........................................................................................................ 23
Table 6: Causes of female mortality under ICD-10 classification among women aged 15-49 years in seven provinces of Viet Nam, 2000-2001 ................................................................. 27
Table 7: Causes of deaths among women aged 15-49 years by province, Viet Nam 2000-2001 .......... 29
Table 8: Causes of female mortality among women aged 15-49 years by place of residence, Viet Nam 2000-2001 ........................................................................................................ 30
Table 9: General causes of deaths, by geographical areas .................................................................. 31
Table 10: Maternal Mortality ratio and maternal mortality rate in the surveyed areas ......................... 32
Table 11: Lifetime risk in the surveyed areas ....................................................................................... 33
Table 12: Maternal Mortality Ratio by area of residence ................................................................. 33
Table 13: Maternal mortality ratio by geographical area ................................................................. 33
Table 14: Maternal mortality ratio by ethnic group (per 100 000 live births) .................................... 33
Table 15: Maternal mortality ratio by district. ..................................................................................... 34
Table 16: Estimated MMRs for seven provinces in Viet Nam, 2000-2001 ............................................. 35
Table 17: Comparing reported and surveyed MMR ........................................................................... 35
Table 18: The MMR in seven ecological regions in 1990 (UNICEF) and in 2000-2001 (MCH/FP Department) .................................................................................................................. 35
Table 19: Figures compared among areas in 1990 and 1995 ................................................................. 36
Table 20: Lifetime risk in some areas in the world in 1990 – 1995 ...................................................... 37
Table 21: Estimated MMR for women aged 15-49 years by age group, Viet Nam, 2000-2001 ............. 37
Table 22: Risk factors that influence MMR among women aged 15-49 years, Viet Nam, 2000-2001 .... 39
Table 23: MMR and education level among women aged 15-40 years, Viet Nam, 2000-2001 ............ 39
Table 24: Direct and indirect causes of maternal mortality in seven provinces of Viet Nam among women aged 15-49 years, 2000-2001 .................................................................................. 41
Table 25: Direct and indirect causes of maternal mortality by place of residence among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 41
Table 26: Direct and indirect causes of maternal mortality by topography among women aged 15-49 years, Viet Nam, 2000-2001 ............................................................. 42
Table 27: Direct causes of maternal mortality by province among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 43
Table 28: Direct causes of maternal mortality by place of residence among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 44
Table 29: Direct causes of maternal mortality by living topography among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 45
Table 30: Direct and indirect causes of 16 antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 45
Table 31: Causes of 16 antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 46
Table 32: Number of previous deliveries among 80 maternal mortalities among women aged 15-49 years, Viet Nam 2000-2001 .................................................. 46
Table 33: Estimated MMR against number of previous deliveries among women aged 15-49 years, Viet Nam, 2000-2001 .............................................................. 47
Table 34: Age of fetus at termination of pregnancy ........................................................................ 48
Table 35: Forms of pregnancy termination among 64 mortalities among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 49
Table 36: Number of antenatal check-ups among maternal mortalities, women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 50
Table 37: Place and timing of death for maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 52
Table 38: Place of death and place of residence among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 52
Table 39: Place of deaths and geographical area among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 53

LIST OF FIGURES
Figure 1: Distribution of Maternal Mortality Ratios in the World, 1995. ........................................ 3
Figure 2: Direct and Indirect Causes of Maternal Death, global estimates .................................... 4
Figure 3: Female mortality by age in Viet Nam, 2000-2001 ............................................................ 39
Figure 4: Female mortality by age and geographical area in Viet Nam, 2000-2001 ..................... 24
Figure 5: Female mortality and level of education among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 25
Figure 6: Causes of mortality by ICD-10 classification among women aged 15-49 years in seven provinces of Viet Nam, 2000-2001 ........................................... 26
Figure 7: Estimated MMR for women aged 15-49 years old by age group, Viet Nam, 2000-2001 ...... 28
Figure 8: MMR and education level among women aged 15-49 years, Viet Nam, 2000-2001 ........ 38
Figure 9: Direct causes of maternal mortality among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 40
Figure 10: Indirect causes of maternal mortality among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 49
Figure 11: Age of fetus in antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001 ................................................................. 48
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ASFR</td>
<td>Age Specific Fertility Rate</td>
</tr>
<tr>
<td>CBR</td>
<td>Crude Birth Rate</td>
</tr>
<tr>
<td>CDR</td>
<td>Crude Death Rate</td>
</tr>
<tr>
<td>CHC</td>
<td>Commune health clinic</td>
</tr>
<tr>
<td>FP</td>
<td>Family Planning</td>
</tr>
<tr>
<td>ICD 10</td>
<td>10th Revision of the International Classification of Diseases</td>
</tr>
<tr>
<td>MCH/FP</td>
<td>Maternal and Child Health and Family Planning</td>
</tr>
<tr>
<td>MMR</td>
<td>Maternal mortality ratio</td>
</tr>
<tr>
<td>TBMS</td>
<td>Thai Binh Medical School</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
PREFACE

The tens of thousands of maternal deaths that occur in the Region every year are almost all avoidable. Every woman who dies while giving birth or during pregnancy leaves behind, not only her children and family, but also clues as to why her life ended early. Figures for maternal deaths do not tell the whole story.

In developing countries, such as Viet Nam, pregnancy-related complications are among the leading causes of death and disability for women of reproductive age. Yet, when we look back at why women have died over past decades, there are primarily four key causes. Many are unaware of the danger signs in pregnancy, which leads to delays in deciding to seek care. Health facilities may be inaccessible, causing delays in reaching health services. There may be delays in receiving appropriate care at the facility due to the inadequacy of health care services. And last, but not least, health services may not really be mother-friendly.

In order to minimize the factors contributing to the deaths of mothers, every country needs to have a strong political commitment towards maternal health; a continuum of care which assures the quality of care, especially the capacity to manage complications; a good and well functioning referral system; and an established health information management system to monitor and evaluate mortality and morbidity and provide accurate information.

This maternal death review allows an in-depth analysis of all factors that relate to maternal deaths in seven provinces that represent the seven geographical regions of Viet Nam. It also provides information on community-based maternal death reviews (verbal autopsies); facility-based maternal death services; confidential enquiries into maternal deaths; a survey of severe morbidity (near misses); and clinical audits – all very important for obtaining reliable, accurate, timely and relevant data on why mothers die. The survey covered all levels, including families and communities, which gave individuals the opportunity to express their views concerning the death of relatives.

I hope that this maternal death survey, which provides us with an opportunity to review the current policy towards maternal health in Viet Nam, as well as to examine the quality of health care services at various levels and the existing health information management system, will help us to develop a more effective and efficient strategy to reduce the level of maternal mortality. Other countries in the Region may also find the review helpful in addressing their own maternal mortality situations.

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On behalf of the study group, we gratefully thank the WHO office in Viet Nam and the Western Pacific Regional Office of WHO in Manila, the Philippines, for their financial and technical support in implementing this study. This is the first time that the Ministry of Health of Viet Nam has carried out a maternal mortality study on such a large scale, and the results will be useful for the National Programme for Maternal and Child Health.

We would like to thank our collaborators and the researchers who paid special attention to help make the study a success. We would like to thank the Maternal and Child Health and Family Planning Centres of Cao Bang, Quang Tri, Ha Tay, Quang Ngai, Dak Lak, Binh Duong and Kien Giang who took an active part in this study.

We extend our special thanks to Dr. Oona Campbell, from the London School of Hygiene and Tropical Medicine, University of London, who came to Viet Nam and assisted with correcting the selected data together with us.

Lastly, we would like to thank the National Experts on Safe Motherhood and Ms. Barbara Bale and Dr. Richard Guidotti, who contributed ideas with enthusiasm for designing, implementing, and assisting with the analysis of the results of this investigation.

However, some errors are inevitable during such an investigation. We would welcome any comments from our readers.

Maternal mortality in Viet Nam, 2000-2001

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Collaborating agency: World Health Organization (WHO)

Research Director: Prof, PhD. Tran Thi Phuong Mai, Vice Director of the MCH/FP Department, Ministry of Health

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PART 1: BACKGROUND

1.1 Introduction

Maternal mortality is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, and excluding accidental or incidental causes. More than 580,000 deaths worldwide per year are classed as maternal mortalities, with 98% occurring in developing countries. While many other health indicators have improved over the last two decades, the maternal mortality rate and ratio have hardly changed, and complications of pregnancy and childbirth remain the leading cause of preventable death among women of reproductive age.

Although significant improvements in maternal health have been made in Viet Nam, with the official maternal mortality ratio (MMR) falling from 200 per 100,000 live births in 1990 to 100 per 100,000 live births in 2000, the data are considered unreliable. For instance, an alternative estimate for the MMR in Viet Nam for 1998 is 160 per 100,000 live births.¹ In addition, the national MMR figures obscure large differences between areas and population groups, generally with higher numbers of maternal deaths occurring in mountainous and remote areas. Poor quality data and the wide regional variations make it difficult to assess whether Viet Nam will be able to meet the Government’s target of reducing the MMR to 70 per 100,000 live births by 2010.

The scale of the problem is difficult to measure because accurate figures on maternal death in Viet Nam are difficult to gather. There are several reasons for this. Firstly, maternal deaths are underreported, especially where many deaths occur outside the health system. Secondly, maternal death may be misclassified, as health workers may not know why a woman died or whether she was, or recently had been, pregnant. Even where this is known, the information is not always recorded. Lastly, methods used to calculate maternal death rates are often complex and costly to use, because the actual number of maternal deaths in a specific place at a specific time is relatively small and very large populations must be surveyed in order to make accurate estimates.

The MMR is often confused with the maternal mortality rate, and includes some women in the numerator who are not included in the denominator (those maternal deaths for which there was an abortion or stillbirth). However, the MMR is widely used and is necessary, with the Total Fertility Rate (TFR), in order to estimate the lifetime risk of maternal death.

Maternal death statistics are usually expressed as:

- **A ratio:** The maternal mortality ratio is the number of maternal deaths per 100,000 live births. It indicates the risk of maternal death among pregnant women and those who have recently delivered.

- **A rate:** The maternal mortality rate is the number of maternal deaths per 100,000 women aged 15 and 49 years, per year. It reflects both a woman’s risk of dying from maternal death and her risk of becoming pregnant.

- **A lifetime risk:** A woman’s lifetime risk of maternal death is the probability that she will die from complications of pregnancy or childbirth at some point during her entire reproductive life span. It is often used to illustrate the differences in the risk faced by women in developed and developing nations.

The Government of Viet Nam is committed to improving reproductive health, including maternal

¹ Ministry of Health, Viet Nam. 55% of maternal deaths in Viet Nam can be prevented and 35% can be avoided. Report of the Maternal and Child Health and Family Planning Department, September 2001.
health, as demonstrated by the National Reproductive Health Strategy of the Ministry of Health for 2001-2010, which was approved by the Government in November 2000. The goal of the strategy is to improve the reproductive health status of the population, with particular attention to disadvantaged areas and target groups. There is a specific objective for maternal health which is:

*to improve the health status of women and mothers; to obtain a more even reduction in maternal mortality and morbidity, perinatal deaths and infant mortality between different regions and target groups, with special attention to disadvantaged areas and to beneficiaries of government policies.*

Improving maternal health is a vital component of the National Reproductive Health Strategy and the Government’s newly approved Comprehensive Poverty Reduction and Growth Strategy, therefore it is essential to establish a reliable baseline to monitor progress in reducing maternal mortality. The current data on maternal deaths based on the health management information system (HMIS) have been shown to have a number of constraints, including incomplete reporting and recording, misdiagnosis of cause of death, and no systematic collection of maternal mortality data, especially in remote mountainous areas.\(^2\) Methods to measure maternal mortality that capture those who die somewhere other than in a health facility (therefore outside the HMIS) are complicated and expensive, but a number of studies have been carried out in recent years using a variety of methodologies which are summarized later in this document.

The range of recent estimates of the MMR in Viet Nam drawn from international agencies and the Ministry of Health reflect the challenge of gathering accurate data on maternal death. The national MMR has been estimated at 137 per 100 000 live births,\(^3\) 160 per 100 000 live births,\(^4\) and 105 per 100 000 live births.\(^5\) According to estimates developed by the World Health Organization (WHO), UNICEF and the United Nations Population Fund (UNFPA), the MMR for Viet Nam in 1995 was 95 per 100 000 live births.\(^6\)

Not only do these figures show a wide range in estimated MMR, but they also conceal wide regional and ethnic disparities. Although there was a significant overall reduction in the MMR between 1990 and 1999, wide differences remained among regions and between urban and rural areas.\(^7\)

Updated and reliable data on maternal mortality that are representative for the country and provide an insight into the scale of maternal death in different ecological areas are an essential component of any programme for addressing the causes of maternal mortality. This study is part of a comprehensive safe motherhood assessment of the capacity of the health services to respond to pregnancy and childbirth. The maternal mortality study, funded by WHO, and the other components of the safe motherhood assessment and review, which are funded by the Royal Netherlands Embassy, will help the Ministry of Health Maternal and Child Health and Family Planning (MCH/FP) Department to develop a national five-year master plan for safe motherhood. It is a priority activity of the MCH/FP department and will enable policy-makers and planners to use and distribute limited resources better and increase the effectiveness of the safe motherhood programme.

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\(^3\) Ministry of Health, Viet Nam. 1995


1.2 Review of maternal mortality

1.2.1 Maternal mortality in the world

In developing countries, pregnancy and childbirth are the leading causes of death, disease and disability among women of reproductive age. They account for at least 18% of the burden of disease in this age group – more than any other single health problem. Factors that directly affect maternal health status include access to and availability of health facilities and services, the technical capacity of maternity care providers, and knowledge about pregnancy and childbirth among women and their families.

Maternal health is a concern for a number of international organizations led by WHO, and Gro Harlem Brundtland, the WHO Director - General, stated that mortality caused by reproduction is an indicator to assess not only women’s health status but also the accessibility, sufficiency, and effectiveness of health facilities.

According to the Safe Motherhood Inter-Agency Group, complications of pregnancy and childbirth are responsible for the deaths of 585,000 women globally every year. More than 90% of the deaths are in developing countries (see Figure 1).

Maternal deaths are classified in the following way:

Direct causes of maternal death

The International Classification of Diseases (ICD) defines direct obstetric deaths as those resulting from obstetric complications of the pregnant state (pregnancy, labour, puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above. For example, haemorrhage, infection, pre-eclampsia/eclampsia, obstructed labour, unsafe abortion, ectopic pregnancy, embolism, and anaesthesia-related deaths.

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Figure 1: Distribution of Maternal Mortality Ratios in the World, 1995.

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**Indirect causes of maternal death**

The ICD defines indirect obstetric deaths as those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but was aggravated by the physiological effects of pregnancy. These tend to be fewer in number than direct causes. For example, hepatitis, anaemia, malaria, heart disease, tuberculosis, AIDS and tetanus.

Contributory factors include all the factors that influence the care sought and received during pregnancy, childbirth, and the postpartum period. They are less easy to classify than medical syndromes or diseases but include the following:

- delay in seeking care;
- delay in arriving at appropriate level of care;
- delay in receiving treatment/care at the health facility;
- the availability and quality of resources at the last level of the health services that was reached; and
- the availability and quality of the personnel at the last level of health services that was reached.

Direct causes of maternal mortality make up 80% of global maternal deaths, and the most common cause of maternal death is haemorrhage (25%). The next most common is infection (15%), followed by unsafe abortion (13%) and hypertensive disease of pregnancy (pre-eclampsia and eclampsia) (12%) (see Figure 2). Approximately 5% of pregnant women – 7 million women – need surgery, most often a Caesarean section, and many do not have access to emergency obstetric care. This unmet need results in 500 000 to 1 million women living with a painful disability. Only 58% of women in developing countries deliver with the assistance of a health professional (a midwife or doctor), and only 40% give birth in a hospital or health centre. Most maternal deaths (61%) take place during delivery or in the immediate post-partum period. Some 3.4 million neonatal deaths occur within the first week of life.

![Figure 2: Direct and Indirect Causes of Maternal Death, global estimates](source: WHO Maternal Mortality A global Factbook, Geneva 1991)

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More than 40% of all maternal deaths in the Western Pacific Region of WHO occur in just five countries, despite the fact that they only represent one tenth of the Region’s population. Whereas the estimated MMR in the Region as a whole is 120 per 100,000 live births, the MMRs for the five countries range from 150 to as high as 650 per 100,000 live births (National Safe Motherhood Action Plan 2001-2005, Western Pacific Regional Office, WHO, 2002).

In developed countries, the MMR is uniformly low. For example, the lifetime risk of maternal death is one woman in 3500 in the United States of America. Some developed countries in South-East Asia, such as Hong Kong, also have a low MMR (7 per 100,000) and the lifetime risk of maternal death in Hong Kong is one woman in 9200. Other countries in the Region, such as China, have also been very successful in reducing maternal mortality. The major direct cause of maternal deaths in China is haemorrhage, which is consistent with all other developing countries and accounts for 50% of the maternal deaths in rural areas and 25% in urban areas. Although a community-based research study conducted in 30 provinces of China in 1989 found that the national MMR was 95 per 100,000 live births, the MMR in urban areas was 50 per 100,000, and in rural areas was 115 per 100,000. This demonstrates that differences in access to quality maternity services can have a considerable impact on maternal mortality between different countries, and even between different geographical regions within a country.

Evidence shows that maternal mortality can be reduced independently of achieving high levels of economic development. In fact, maternal mortality itself constrains economic development because of its severe impact on the lives of young children, the family and society in general.

The single most critical intervention for safe motherhood is to ensure that a health worker with midwifery skills is present at every birth, and transportation is available to a more comprehensive level of obstetric care in case of an emergency. Fifteen per cent of all births are complicated by a potentially fatal condition, and women attended by trained attendants are more likely to receive treatment early, when the situation can still be controlled. Yet in the developing world today, only 58% of all deliveries take place with the assistance of a trained attendant.

Experience shows, however, that the training of birth attendants needs to be part of a broader strategy, including functioning referral systems and professional support. Skilled attendants alone cannot reduce maternal mortality effectively – they need to be part of a larger health care system with the facilities, supplies, transport and professionals to provide emergency obstetric care when it is needed.

---

Table 1: Some examples of the correlation between deliveries where a skilled attendant is present, lifetime risk of maternal death and perinatal deaths

<table>
<thead>
<tr>
<th>Country</th>
<th>Lifetime risk of maternal death 1 woman in:</th>
<th>Skilled attended delivery (%)</th>
<th>Perinatal deaths per 1000 births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>4 900</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>21</td>
<td>14</td>
<td>85</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>14</td>
<td>43</td>
<td>80</td>
</tr>
<tr>
<td>Cambodia</td>
<td>17</td>
<td>21</td>
<td>65</td>
</tr>
<tr>
<td>China</td>
<td>400</td>
<td>85</td>
<td>45</td>
</tr>
<tr>
<td>France</td>
<td>3 100</td>
<td>99</td>
<td>10</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>9 200</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>India</td>
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<td>35</td>
<td>65</td>
</tr>
<tr>
<td>Indonesia</td>
<td>41</td>
<td>36</td>
<td>45</td>
</tr>
<tr>
<td>Japan</td>
<td>2 900</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>19</td>
<td>30</td>
<td>90</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4 300</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>Singapore</td>
<td>4 900</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5 100</td>
<td>98</td>
<td>10</td>
</tr>
<tr>
<td>United States of America</td>
<td>3 500</td>
<td>99</td>
<td>10</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>130</td>
<td>79</td>
<td>25</td>
</tr>
</tbody>
</table>

1.2.2 Maternal mortality in Viet Nam

Research on maternal mortality in Viet Nam has so far been limited to a few qualitative and small-scale quantitative studies. Maternal mortality has been estimated using statistics from health facilities, but these only partially reflect the situation because they do not take into account women who die outside the health system.

<table>
<thead>
<tr>
<th>Study</th>
<th>Year(s)</th>
<th>Location</th>
<th>Methodology</th>
<th>MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thai Binh Medical School</td>
<td>1995</td>
<td>Vinh Phu, Quang Ngai, and Song Be</td>
<td>Community based</td>
<td>155 per 100 000 live births.</td>
</tr>
<tr>
<td>Do Trong Hieu (MOH) et al and Thai Binh Medical School</td>
<td>1990-1995</td>
<td>Lap Thach and Yen Lap districts, Vinh Phu Province</td>
<td>Community based</td>
<td>114 per 100 000 live births.</td>
</tr>
<tr>
<td>Dao Quang Vinh (MOH)</td>
<td>1994-1995</td>
<td>Stieng ethnic group in Song Be</td>
<td>Community based</td>
<td>1 018 per 100 000 live births</td>
</tr>
<tr>
<td>Tran Thi Nguyet Quang Tri MCH/FP centre</td>
<td>1995-1999</td>
<td>Huang Hoa and Da Krong districts, Quang Tri</td>
<td>Community based survey</td>
<td>397 per 100 000 live births</td>
</tr>
<tr>
<td>The MMR in Vietnam in 1994-95 by Hieu,</td>
<td>1994-1995</td>
<td>Vinh Phu, Quang Ngai, Song Be provinces</td>
<td>Community based survey</td>
<td>137 per 100 000 live births</td>
</tr>
<tr>
<td>Project VNRHS-95</td>
<td>1991-1994</td>
<td>Ninh Binh, Nghe An, Ha Tinh, Quang Binh, Binh Dinh</td>
<td>HMIS &amp; in-depth interviews</td>
<td>910-20 per 100 000</td>
</tr>
<tr>
<td>Save the Children-US*</td>
<td>2000</td>
<td>Thanh Hoa and Lao Cai</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Qualitative research only, MMR not calculated

The direct causes of maternal mortality mentioned most frequently in the above studies were haemorrhage, infection, and pregnancy-induced hypertension.
1.3 Causes of maternal mortality

The direct causes of maternal mortality in Viet Nam are similar to those in the developing world and elsewhere in the Region, according to survey data published by the Ministry of Health in 1995. The most common causes are haemorrhage, infection, pre-eclampsia/eclampsia, and obstructed labour/uterine rupture. A study carried out by the Thai Binh Medical School (TBMS) and the Ministry of Health in 1995 found the direct causes of maternal death to be haemorrhage 29.7%, infection 17.2%, and pregnancy-induced hypertension 6.3%. Indirect causes of maternal deaths were malnutrition, sexually transmitted infections including HIV, and a high number of previous abortions. Causes of maternal mortality reported by UNICEF (1994) were haemorrhage 30%, infection 17%, and ruptured ectopic pregnancy, abortion, and uterine rupture 6% each. Pregnancy-induced hypertension was 4% and other causes 31%.

1.4 Factors related to maternal mortality

Many studies mention other factors that influence maternal death. Difficulty in accessing quality health care services has a significant impact on maternal outcomes. Poor knowledge about women’s reproductive health, lack of essential medicines and instruments, and limited technical capacity in emergency obstetric care, have also been shown to contribute to maternal death. A study of 718

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14 Save the Children-United States of America. Safe Motherhood: Towards Safe Delivery, Case studies of maternal mortalities and near-miss deaths from obstetric complications in Quang Xuong district, Thanh Hoa province. Save the Children, 1999.
maternal deaths in Egypt found that 92% of them could have been avoided if good quality care had been provided.\textsuperscript{15}

Health centres play a significant role in managing obstetric complications and contributing to a reduction in maternal mortality, especially in providing care during the postnatal period. At least 35% of women in developing countries receive no antenatal care during pregnancy, almost 50% give birth without a skilled attendant and 70% receive no postpartum care in the six weeks following delivery. This lack of care is most life-threatening during childbirth and the days immediately after delivery, since these are the times when sudden, life-threatening complications are most likely to arise (Safe Motherhood Inter-Agency Group).

Rates of delivery at home or at communal health centres depend on the distance to the nearest communal health centre as well as on the family’s perceptions of the quality of care provided, cultural preferences, and user fees. One research study showed that maternal death at home accounted for 19% of the total number of deliveries where women died.\textsuperscript{16} If cases of delivery on the way to health centres were included, this proportion increased to 22%. Studies in Nepal revealed that 67.4% of total maternal mortality cases occurred among those giving birth at home.

Many social and cultural factors affect maternal mortality, such as illiteracy, early marriage, high number of pregnancies and births, and lack of health care for women. The highest rates of maternal death occur among illiterate women (76%), unemployed women (67%) and women in low-income groups (38%).\textsuperscript{17} This research also showed that women aged above 40 years old faced a higher risk of maternal mortality, and that women who have had more than seven deliveries have four times the risk of maternal death than those who have only had two deliveries. The more pregnancies and deliveries a woman has had, the higher the risk of a surgical intervention when compared to her previous deliveries, as number of previous deliveries is closely related to high blood pressure, diabetes, large or abnormal fetus, and haemorrhage.

Delivery methods are also a risk factor for maternal mortality, with the risk of maternal death during or after Caesarean operation four times higher than in normal delivery. However, as many women in developing countries arrive at a first referral health facility in a poor condition and Caesarean section is a life-saving operation, this may be expected.

1.5 Current strategies for preventing maternal mortalities

The global Safe Motherhood Initiative was launched in 1987 to improve maternal health and to reduce the number of maternal deaths by half by the year 2000. It is led by a unique alliance of co-sponsoring agencies who work together to raise awareness, set priorities, stimulate research, mobilise resources, provide technical assistance and share information. Their cooperation and commitment have helped governments and non-governmental partners from more than 100 countries take action to make motherhood safer.

During the Safe Motherhood Initiative’s first decade, the partners developed model programmes, tested new technologies and conducted research in a wide range of countries and settings. These safe motherhood strategies and activities were reviewed at the Technical Consultation in 1997 (Sri Lanka), and the global partners that attended (including Viet Nam) agreed on ten essential actions to improve maternal health over the next ten years. In addition,

\textsuperscript{16} WHO. Regional strategy for reduction of maternal mortality in the South-East Asia Region. WHO Regional Office for South-East Asia, 2000.
\textsuperscript{17} Abdulaziz et al. Personal communication. London School of Hygiene and Tropical Medicine.
international commitments to safe motherhood have been made as part of seven global conferences and conventions held over the last decade, particularly the International Conference on Population and Development (ICPD Cairo 1994) and the Fourth World Conference on Women (FWCW Beijing 1995).

Essential services to achieve safe motherhood have been identified, and these should be readily available through a network of linked community health care providers, clinics and hospitals. The integrated services that policy-makers from around the world have pledged to provide include:

- community education on safe motherhood;
- antenatal care and counselling, including the promotion of maternal nutrition;
- skilled assistance during childbirth;
- care for obstetric complications, including emergencies;
- postpartum care;
- safe abortion, including management of abortion complications and post-abortion care;
- family planning counselling, information and services; and
- reproductive health education and services for adolescents.

For developing or less developed countries such as Viet Nam, reducing maternal mortality still presents many challenges. Long-term and sustainable strategies to reduce MMR include:

- providing continuous training for health workers to improve professional skills and treatment techniques in complicated cases;
- strengthening postpartum care services;
- setting up standards on maternal care; and
- providing health communication and education for women of reproductive age to encourage families to plan for delivery and care of the newborn.

There is a broad consensus on the value of ensuring that all women receive care from a professional health worker (such as midwife, nurse, or doctor) with midwifery skills at the time of delivery, and experts from around the world have identified skilled attendance at delivery as a key intervention and key indicator in safe motherhood programmes. In mountainous and remote areas, the role of the traditional birth attendant in delivery assistance and postnatal care needs to be considered. Traditional birth attendants have the advantage of being close to women from the same community, both culturally and geographically, and prices for services are reasonable and the payment method and schedule is flexible.

The Inter-Agency Group for Safe Motherhood reviewed the effectiveness of training traditional birth attendants and concluded that it was not an effective intervention in lowering maternal mortality levels. Nonetheless, as a social development strategy that strengthens the status of women and recognizes both her productive and reproductive role within communities, some basic training of key community members, such as traditional birth attendants, Village Health Workers and Women’s Union members, is a first step towards safe motherhood. This is particularly relevant for remote and mountainous areas in Viet Nam, and should also be seen as an opportunity to build a closer relationship between local health facilities and the communities they serve.

1.6 Methods used in maternal mortality studies

Much of the information about maternal mortalities in developing countries is based on hospital data, which can be a poor reflection of the extent of the situation in the community, especially in rural areas. Community-based estimates require information on all deaths among women of reproductive age, the cause of death, and also whether the woman was, or had recently been, pregnant at the time of death. Registration of deaths is often incomplete and prospective community-based studies need to be very large to be reliable.
Other approaches have therefore been devised to overcome the absence of data.

Household surveys remain a popular method of measuring MMR by identifying maternal deaths through interviews. This is a conventional method used in cross-sectional studies and is precise, but it is also expensive and time-consuming. For example, in Addis Ababa, Ethiopia, 32 300 households were interviewed and only 45 cases of maternal deaths were found.18

The sisterhood method was developed during the late 1980s, and questions respondents in household surveys about deaths of their adult sisters during pregnancy, childbirth or the puerperium. The advantage of this method is that it requires a relatively small sample size and so is less expensive and time-consuming than a community-based survey. The disadvantage is that it does not provide current estimates but refers to a lengthy time period, with a mid-point approximately 12 years previous to the survey.

Demographic and Health Surveys use a variant of the sisterhood method, adding questions to a continuing survey of a population’s health. This requires large sample sizes and the information generated is rather complex to analyse. It permits the calculation of a ratio but does not provide a current estimate of maternal mortality.

The Reproductive Age Mortality Survey (RAMOS), in which all deaths of women of reproductive age are investigated, is considered the best approach in the absence of high-quality vital registration data. In this type of survey, deaths among women of reproductive age are identified using a variety of approaches including demographic surveillance, health facility records, and interviews with community leaders. Subsequently, for each death, both household members and health care providers are interviewed to classify the cause of death. This method has been used in many studies on mortality in Africa.19

Most recently, WHO and UNICEF, with the participation of UNFPA, have developed an approach to estimating maternal mortality that seeks to both generate estimates for countries with no data and to correct available data for underreporting and misclassification. The approach was first used to develop maternal mortality estimates for 1990, the baseline data year designated by a series of internationally agreed goals and targets, including ICPD. Some adjustments were made in the methodology to develop the estimates for 1995. It should be noted that there are wide margins of uncertainty associated with the estimates and they cannot be used for analysing trends. The extent to which comparisons may be made with other countries depends on which strategy has been used to develop the MMR estimate for each country. The MMR for Viet Nam in 1995 using this methodology was 95 per 100 000 live births.20

Community-based studies of maternal mortality in Viet Nam have used a combination of quantitative and qualitative components. However, using different techniques to collect information within the same study has not been used much, especially in the primary detection of cases of maternal mortality. Difficulties with the data recording, reporting and storing systems at health facilities, together with cultural factors, have created obstacles to collecting accurate data and information. This explains, in part, why estimated and published data from studies are not always consistent and reliable.

PART 2: DESCRIPTION OF STUDY

2.1 Objectives

The overall goal of the Safe Motherhood Master Plan is to:

*Improve the health status of the mother and newborn to achieve a reduction in maternal and neonatal mortality and morbidity through improving the quality of Essential Obstetric Care (EOC), strengthening safe motherhood activities, expanding quality service delivery network for ante-, peri- and postpartum care, with emphasis on women and neonates in marginalised regions and groups.*

This maternal mortality study had the following objectives:

º to estimate maternal mortality ratio in seven provinces, representing diverse ecological areas, thereby extrapolating a national maternal mortality ratio;
º to identify the direct and indirect causes of maternal mortality;
º to identify non-medical causes of maternal mortality; and
º to put forward recommendations for the safe motherhood master plan, including suggestions for the reduction of the MMR in Viet Nam.

2.2 Research methodology

2.2.1 Definitions used in the research

(1) Maternal death: all women who die during pregnancy and up to 42 days after delivery, caused by all direct or indirect factors. This excludes any cases of death due to accident or suicide.

(2) Maternal death, direct causes: those resulting from obstetric complications of the pregnant state (pregnancy, labour, puerperium), from interventions, omissions or incorrect treatment.

(3) Maternal death, indirect causes: those resulting from previous existing disease or disease that developed during pregnancy, or that was aggravated by physiological effects of pregnancy.

(4) Maternal mortality ratio (MMR)

\[
MMR = \frac{\text{Total number of maternal deaths in a year}}{\text{Total number of live births in a year}} \times 100,000
\]

(5) Maternal mortality rate:

\[
\text{MM rate}: = \frac{\text{Total number of maternal deaths in a year}}{\text{Total number of women aged 15-49 years in a year}} \times 100,000
\]

(6) Lifetime risk of maternal death

\[
\text{Lifetime risk} = 1 - (1 - MMR)^{TFR}
\]

Lifetime risk may also be calculated by the product of the total fertility rate (TFR) and the MMR with an adjustment factor of 1.2 to compensate for pregnancy loss, thus,

\[
\text{Lifetime risk} = 1/(1.2*FTR*MMR)
\]

2.2.2 Targeted groups

º Family and relatives of women who died during the above period.
º Staff of health facilities where the women died.
º Local authorities.

21 Campbell, O. et al. [need article title?] International Journal of Gynaecology & Obstetrics, 1995. 48:S33-S52
2.2.3 Sample size and sampling method

Sample size
\[ n = \frac{z_{1-\alpha/2}^2 \cdot (1-P)}{\varepsilon^2 \cdot P} \]

This formula is applied for uncommon diseases, with confidence levels of 95% and relative precision = 0.25% $P$. Maternal mortality ratio from previous surveys is 130 per 100 000 (0.13%) (Sample Size Determination in Health Studies - WHO 1991).

$n = 47,219$ mothers who have live births. In reality, the study collected information on maternal mortality from 61,341 births.

Sampling method

A stratified sample was used to select seven provinces, one from each of seven ecological regions that have different geographical, economic, social, demographic and cultural characteristics.

Total cluster sampling was used to randomly select three districts in each province. All communes in the 21 selected districts were included in the research, giving a total of 326 communes.

2.2.4 Research methodology

A cross-sectional method was used. Information and data were collected from different sources as suggested by WHO. Qualitative and quantitative techniques were combined to collect data.

Data collection techniques

- 2000-2001 data was collected from the population reporting system.
- The Participatory Rapid Appraisal method (PRA) was used to collect information on mortality cases.
- Information was collected by interviewing relatives of women who had died and health staff to define maternal mortality cases, using checklists and a pre-designed questionnaire.
- Mortality data were verified (retrospective medical records of death).
- Professional judgement was used to determine maternal deaths.

Table 4: List of provinces and districts after random selection

<table>
<thead>
<tr>
<th>Region</th>
<th>Province</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Uplands</td>
<td>Cao Bang</td>
<td>Ha Quang, Hoa An, Quang Uyen</td>
</tr>
<tr>
<td>Red River Delta</td>
<td>Ha Tay</td>
<td>Thach That, Thanh Oai, Quoc Oai</td>
</tr>
<tr>
<td>North Central</td>
<td>Quang Tri</td>
<td>Dong Ha town, Vinh Linh, Huong Hoa</td>
</tr>
<tr>
<td>Central Coast</td>
<td>Quang Ngai</td>
<td>Quang Ngai town, Son Tinh, Minh Long</td>
</tr>
<tr>
<td>Central Highlands</td>
<td>Dak Lak</td>
<td>Buon Me Thuot city, Lak, Krong Bong</td>
</tr>
<tr>
<td>South East</td>
<td>Binh Duong</td>
<td>Thuan An, Tan Uyen, Dau Tieng</td>
</tr>
<tr>
<td>Mekong River Delta</td>
<td>Kien Giang</td>
<td>Ha Tien town, Giong Rieng, An Minh</td>
</tr>
</tbody>
</table>
Related information was collected using qualitative research methods (group discussions and in-depth interviews).

**Time frame for information collection**


**Implementation stages**

(a) Information at commune/village levels

- The total number of female deaths in the 15-49 age group was estimated from:
  - population and deaths registration books of villages;
  - death records of commune health stations;
  - registered deaths in the commune recorded by the commune population personnel and reported to district Population Committees;
  - reports from monthly meetings between commune health stations and district health centres; and
  - information provided by the heads of villages.

(b) Information relating to other cases of maternal death

Researchers contacted heads of villages, representatives of the Women’s Union and other mass organization members to learn whether any women had died in their area during the previous two years. This was done through discussions with individuals or groups at each village. Any additional mortality cases were included in the list of deaths for the locality.

(c) Information from district and provincial health centres

Data on all women between 15 and 49 years of age who had died at district and provincial health facilities were collected from death registers. Information was also collected from private clinics where possible.

(d) Identifying mortality cases

Information from registration books of deaths in villages, hospitals and other sources was compared to exclude any cases that were duplicated or where the information was incorrect (for instance, year of death, age, residential address).

(e) Identifying causes of mortality

Two review cycles using specially-designed questionnaires were conducted.

The first cycle was based on the mortality list of women aged 15-49 during the years 2000 and 2001. The objective of the first cycle was to determine the cause of each death, and to tentatively conclude whether that case was a maternal mortality or not. The investigators went to all 21 districts to interview family members, relatives or other people who might have information about the causes of mortality.

All mortality cases that were determined to be a maternal death by the researchers in the first cycle were reviewed in the second cycle by the supervisor. In the second cycle, the health personnel involved in each case were interviewed. Other related documents such as medical records and ‘mortality verifying minutes’ were also used.

The objectives of the second cycle were to confirm that cases identified were maternal deaths, to verify direct and indirect causes of maternal deaths, and to try to identify causes of death and other related factors.

Qualitative research techniques such as group discussions, in-depth interviews and case-studies were implemented in parallel during the second cycle.

Participants who took part in group discussions and in-depth interviews included:

- health workers at health commune stations, and district and province hospitals;
- family members of women who had died;
women of reproductive age; and
the cadres of local authorities.

The qualitative sample included 21 group discussions, 21 in-depth interviews and 7 case studies.

The qualitative research objectives were to determine related factors and other contributory factors that led to a maternal death in order to help identify preventive measures and solutions to avoid similar cases.

A mortality verifying method was also used to identify direct causes of mortality and other related factors, such as delay in identifying a problem, delay in referring and transferring, delay in treatment, and inadequate essential treatment in emergency cases.

(f) Data processing and analysis

Quantitative data were analysed using a medical statistics approach. Collected data were analysed using the software programmes SPSS 10.0, EPI-info 6.04 and Stata 7.0. To ensure accuracy and avoid bias, data were entered twice and checked by a specific programme to discover mistakes. Qualitative data were analysed using the software programme ETHNOGRAPH 4.

2.3 Research implementation

2.3.1 Developing the proposal and questionnaires

The project director and principle researchers discussed the development of the proposal and questionnaires for different target groups. While developing the proposal and questionnaires, international reference materials were used to provide experiences of maternal mortality research. Some reports of maternal mortality research in Viet Nam were also used. Discussions between the research team and WHO’s technical advisers were conducted in Ha Noi and in the Philippines. Finally, the technical advisers on safe motherhood of the Ministry of Health of Viet Nam approved the proposal and questionnaire.

2.3.2 Pre-testing the questionnaires

The questionnaires were designed for different target groups and tested for all groups in the Soc Son Son District of Ha Noi. Some elements of the questionnaires were changed and modified to suit circumstances, to ensure that adequate information would be collected and to avoid any difficulties for interviewees. Lessons learned from the field visits to test the questionnaires were also incorporated into the final research.

2.3.3 Selecting and training researchers and monitors

Central and provincial monitors

Fourteen central research monitors were trained in Ha Noi. They were provided with the theory behind the research and also practiced interviewing in Ha Tay province. Trainers included the project director and technical advisers, and three official researchers who had been involved in designing the research.

Researchers

Nine researchers were selected in each province from among the staff of the provincial MCH/FP centres and district MCH/FP teams who were already experienced in conducting research. Each provincial MCH/FP centre selected one doctor who had experience in practice and also in collecting data as a provincial monitor. They all received three days training conducted by the central research monitors.

2.3.4 Administrative and financial preparation for the research

The official researchers were responsible for technical issues. A support team was set up that included MCH/FP department staff from the Ministry of Health and provincial MCH/FP centre leaders. The support team organised administrative and financial procedures and the network for research. During the research period, local authorities in the selected provinces actively supported the research team.
2.3.5 Field survey

The field survey was implemented at the same time in the seven provinces, during two weeks of May 2002. During the research, the research team faced many constraints in Cao Bang and Quang Tri provinces due to geographic and linguistic difficulties. The project director and the local WHO adviser monitored the research overall and helped researchers and monitors to solve any problems.

2.3.6 Reporting

This report is the result of the efforts of the project director and the designated research team, with the support of the local WHO adviser and Ministry of Health advisers.

2.4 Background of study sites

2.4.1 Cao Bang Province (Northern Mountain)

General information

Cao Bang is a mountainous province in the North with a total area of 669,072 km². There is one town, 12 districts and 189 communes. Transportation is very difficult. Currently, out of 189 communes, 19 communes do not have metalled roads to the People’s Committee Office. The communication system does not cover the entire province. Only 130 of the 189 communes have a telephone connection.

Economic activity in Cao Bang mainly depends on agriculture and forestry activities. Per capita income is estimated at US$ 220 per year. In 2001, there were 3,590 households living in poverty, accounting for 21.6% of the total households (this has decreased by 3.4% compared with the year 2000).

Education levels are low. There are nine communes where illiteracy has not been eradicated. The rate of illiteracy among women is up to 20% of the province’s general illiteracy rate. There are 387 schools in the Province.

The provincial population in 2000 was 491,055, dropping to 483,956 in 2001. There are six main ethnic peoples living in Cao Bang. The provincial strategy on population development for the period 2001-2010 has been completed. The province’s reports showed that the natural population increase rate (NIR) was 1.4%, the crude birth rate (CBR) was 21.2 per thousand, and crude death rate (CDR) was 71 per thousand.

Maternal and child health care and family planning activities

There are 156 communes with a commune health station, the other 33 communes do not have a health care network. Major diseases include malaria and goitre, particularly in remote areas. The malnutrition rate among children is 42.1%. Cao Bang has implemented national health programmes such as immunisation, vitamin A, and malnutrition prevention. In 2001, the number of married women aged 15-49 was 85,277. The number of women who used contraceptive methods was 67,942.

Human resources and provision of reproductive health care services

Maternal and child care and family planning activities have been implemented effectively in Cao Bang. The province has one provincial MCH/FP centre and 12 teams. Reproductive health care has been implemented in 187 communes and attracted 65,607 women (87.5% of the total in the 15-49 age group in the province) to health centres for examination. For the entire Province, there are 36 obstetricians, 77 secondary midwives and 14 paediatric/obstetric assistant doctors. The provincial hospital has three obstetricians and nine midwives. The provincial MCH/FP centre has four obstetricians and seven secondary midwives. The assistant doctors work mainly at the district hospitals.

The shortage of human resources is apparent. There are very few specialized doctors, secondary midwives and paediatric/obstetric assistants working in the obstetrics departments of the district hospitals.
and MCH/FP teams. There are no specialized doctors or paediatric/obstetric assistant doctors working in the inter-commune polyclinics. There is only one secondary midwife in each district health centre. The situation is rather better at commune health stations, where secondary midwives and paediatric/obstetric assistants are relatively sufficient. Only Hoa An District’s health centre has an obstetrician. In the three districts of the study, there are very few private health clinics. These health services mainly focus on every-day health care for the local people.

2.4.2 Ha Tay Province (Red River Delta)

General information

Ha Tay is a northern delta province with a total area of 2 191.6 km². Ha Tay has 12 districts, 2 towns and 325 communes. Transportation is easy and all communes have asphalt roads. At the time the research was conducted, 290 out of 325 communes had a telephone connection.

In 2001, the population of the province was 2 463 000, with 92% of the population living in rural areas. The natural population increase rate (NIR) was 1.19%, CBR was 16.4 per thousand and CDR was 4.5 per thousand.

The economic focus in Ha Tay Province is agriculture, industry and service. The income per capita is US$ 255 per year. The proportion of poor households is 8.9%. In Ha Tay, 95% of people of school age are literate. The illiteracy rate of women is almost 12%.

Maternal and child health care and family planning activities

In Ha Tay, 324 of the 325 communes have a commune health station. In general, the province has implemented national health programmes, such as malnutrition prevention, Vitamin A supplementation, and family planning, effectively. The malnutrition rate of children under 5 years of age is 30%. Reproductive health care and maternal and childcare activities have been implemented well, but the number of obstetric complications in the province was still rather high, at 221 cases in the year 2001 (a decrease of 19 cases compared with the year 2000).

In the year 2000-2001, the province had a total of 82 838 deliveries, with 82 768 live births and 1 718 Caesarean operations.

Human resources and provision of reproductive health care services

Health facilities in the province can provide full maternal and child health care and family planning services. Alongside the government health system, Ha Tay also has a private health care network that can provide some obstetrics, such as normal delivery, ultra-sound, abortion, and IUD insertion. Currently there are 48 obstetricians, 133 secondary midwives, and 63 paediatric/obstetrics assistant doctors. In each obstetric department of the three district hospitals, there are one or two obstetricians.

There is one doctor in each district maternal and child health care team. There are no obstetricians at commune health stations and or at private clinics in the research districts. The number of secondary midwives varies between districts. The proportion of secondary midwives at commune health stations in Quoc Oai and Thach That districts is six or seven times higher than Thanh Oai district, but there are around 30 secondary midwives working in private clinics in Thanh Oai district.

2.4.3 Quang Ngai Province (Central Coast)

General information

Quang Ngai is a central coastal province with enormous economic potential, favourable natural conditions and diverse geographic characteristics. It has a total area of 5131.51 km² and 13 districts. Six of these districts are lowland, one is midland, one is an island, and the other five are mountainous. The transportation network to all communes is good, with mountainous districts also having concrete roads. All communes have a telephone connection.
Quang Ngai is home to four different ethnic groups, the Kinh (Vietnamese), So Dang, Hre and K’hor, with a total population of 1,237,564. The majority of the population live in the lowland area. In 2001, the NIR was 14.08%, CBR was 18 per thousand and CDR was 14.08 per thousand.

In Quang Ngai, 40% of the population earns a living through agriculture, 20% by industry, 20% by aquaculture, 10% by service, and the remaining 10% by forestry. The income per capita is US$ 200 per year. Poor households account for 23.76% of the total.

Literacy among the province’s population is 88.1%, and 14.7% of women are illiterate. There are 390 schools of all educational levels.

Maternal and child health care and family planning activities

In Quang Ngai, there are 13 hospitals, 17 polyclinics, and 169 commune health stations. The most common disease of children is acute respiratory infection (ARI) and the rate of gynaecological infections is very high.

In 2001, the number of married women aged 15-49 was 27,112 and the number of women using contraceptive methods was 16,077. The total number of infant deaths was 36, an increase of 5 cases over the year 2000.

Human resources and provision of reproductive health care services

Quang Ngai Province has many health staff qualified in obstetrics. There are 29 obstetricians, 82 secondary midwives and 17 paediatric/obstetric assistant doctors. Doctors mainly work in the provincial hospital (10 doctors) and district hospitals (13 doctors). However, among the three district hospitals in the study, Minh Long hospital has no obstetrician, and has only two secondary midwives and two paediatric/obstetric assistant doctors.

There are no obstetricians in the MCH/FP teams, polyclinics, commune health clinics or private clinics in all three research districts. In Minh Long district health centre, most of the health staff have only completed the primary medical level. This has a great impact on the quality of the health services provided to local people.

Provision of maternal and child care and family planning services overall is quite effective. However, in Minh Long district, the MCH/FP team, polyclinics and commune health stations cannot provide all services due to shortages of health staff and limited professional knowledge and skills.

2.4.4 Dak Lak Province (Central Highlands)

General information

Dak Lak is a central highland province with 1 city and 18 districts, and a total area of 19,500 km². In 2001, the population was 210,451, consisting of 54 ethnic minority groups. The NIR is 2.74% and the CBR is 28.1 per thousand. There is one university and one pedagogy college in the Province, and a focus on the development of industrial plants.

Maternal and child health care and family planning activities

National health programmes for malnutrition prevention, vitamin A supplementation, and family planning have all been implemented well. In 2001, however, the child malnutrition rate was still high at 45.3%. In the same year, there were 1,887 cases of Caesarean operation and 239 cases of obstetric complications.

Human resources and provision of reproductive health care services

The number of health care providers specialized in obstetrics working in health facilities in the province include 56 doctors, 130 secondary midwives and 20 paediatric/obstetric assistant doctors. However, there is no obstetrician at Krong Bong district hospital.

There is a shortage of specialized obstetric health care providers in the districts, polyclinics and MHC/FP teams. These health facilities do not have professionally educated cadres, although the MCH/FP teams...
FP team have one secondary midwife and a paediatric/obstetrics assistant doctor. The serious shortage in human resources has a great impact on the quality of health care and reproductive health care service provision. In private clinics, there are 19 obstetricians and 9 secondary midwives.

2.4.5 Binh Duong Province (South East)

General information

Binh Duong is a south eastern province with a total area of 2695.54 km², including a town and six districts. The transportation system is good. All communes in the province have a telephone connection.

The population of the province is 787,273 and the population density is 286 people/km². The NIR is 13.88%, the CBR is 18.66 per thousand, and CDR is 4.77 per thousand.

Maternal and child health care and family planning activities

There is one provincial health centre, along with 11 district health centres and 79 commune health stations. Thirty per cent of women suffer from gynaecological infections and nearly 20% of children are malnourished. The immunisation rate is 99% and the rate of taking vitamin A is 100%. In 2001, there were 16 infant deaths, 13 cases more than in the year 2000. However, the number of obstetric complications decreased in comparison with the year 2000, with 13 cases at the time the research was carried out.

Human resources and provision of reproductive health care services

The numbers of obstetricians, secondary midwives and paediatric/obstetric assistant doctors vary greatly among district hospitals. There is no obstetrician, midwife or paediatric/obstetric assistant doctor in Dau Tieng district hospital. There is one obstetrician, seven secondary midwives, and no paediatric/obstetric assistant doctors at Thuan An district hospital. Tan Uyen district hospital has one obstetrician, four secondary midwives and two paediatric/obstetric assistant doctors. There is no doctor, secondary midwives or paediatric/obstetric assistant doctors at any of the polyclinics in the three research districts.

Commune health stations and private clinics in the study districts also have no obstetrician. Most of the secondary midwives and paediatric/obstetric assistant doctors work at commune health stations. In Thuan An district, there is one obstetrician, five midwives and one assistant doctor working in private clinics.

The obstetric department of district hospitals and commune health stations provide sufficient health services to local people. The Tan Uyen district MCH/FP team only provides IUD insertion service and iron supplementation to women.

2.4.6 Kien Giang Province (Mekong River Delta)

General information.

Kien Giang is a province located in the Cuu Long River Delta with a total area of 6269 km². It has 2 towns and 11 districts located in the coastal, delta, island and frontier areas. The transport links are mainly roads and water transport and are all efficient.

The population is 1,574,255, with three ethnic groups, Kinh (Vietnamese) 84.8%, Khmer 12.26%, and Chinese 2.94%. The NIR is 16.18%, the CBR is 20.58 per thousand and CDR is 4.30 per thousand.

People earn a living mainly through agriculture, forestry, and aquaculture. The rate of poor households is 10.11%. The primary schools are in all communes in the province. The literacy rate is 95.7%.

Maternal and child health care and family planning activities

There are 14 provincial and 13 district health facilities. Diseases such as diarrhoea, typhoid, cholera, dysentery, malaria, haemorrhagic fever,
encephalitis, cardiovascular diseases, diabetes and some social diseases all exist in the province. In 2001, 47.51% women had gynaecological examinations. Children often suffer from diseases that are vaccine-preventable, such as diphtheria, whooping cough and tetanus. The malnutrition rate in 2001 was 28.1%, a fall of 1.6% compared to the year 2000. In 2001, there were 57 infant deaths.

**Human resources and provision of reproductive health care services**

The province has relatively strong health staff numbers, including 49 obstetricians, 90 secondary midwives, and 57 paediatric/obstetric assistant doctors. However, there are few health care providers in the three study districts. The district MCH/FP teams do not have an obstetrician or a midwife. Giong Rieng district has two paediatric/obstetric assistant doctors.

### 2.4.7 Quang Tri Province (North Central Coast)

**General Information**

Quang Tri is a central province with a complicated topography and difficult economic conditions. There is 1 town and 9 districts with a total area of 4745 km². The Number 1 and Number 9 highways go through the province, with a total length of 170 km, but 90% of rural traffic routes are rough roads.

The population of Quang Tri is 590 600, with 6 ethnic groups. The population density is 123 people per km². The NIR was 1.38%, the CBR is 17.6 per thousand, and CDR is 3.8 per thousand.

Labour in the province is divided among the industrial and construction sector (7.7%), agriculture and forestry (78.3%), and services (14%). The unemployment rate is 6.5%. The income per capita is US$ 200 per year, and the rate of poor households is 15%.

The rate of illiteracy among women is 20%. There are 136 primary schools, 82 secondary schools, 20 high schools, 1 vocational secondary school, and 1 college.

**Maternal and child health care and family planning activities**

All of the communes in the province have commune health stations. There are two provincial hospitals, nine district health centres, ten polyclinics, one nursing home, one regional maternity home and one cadre’s health care and management office. Women commonly suffer from gynaecological infections. The rate of children who are malnourished and suffer from the effects of war is high. The national health programmes for maternal health and childcare are fully implemented. The total number of births for the year 2001 was 20 460. The number of caesarean operations was 322, and the trend in obstetric complications is down from 88 cases in the year 2000 to 52 cases in the year 2001.

**Human resources and provision of reproductive health care services**

The whole province has 35 obstetricians, 87 secondary midwives and 26 paediatric/obstetric assistant doctors. The obstetric departments of Huong Hoa district hospital and Dong Ha town have one or two obstetricians and secondary midwives. Qualified doctors are not available in other health facilities such as the MCH/FP teams, polyclinics, commune health stations, while private clinics in Dong Ha town have five obstetricians.
3.1 Mortality of women aged 15-49

3.1.1 General information

Calculating MMR requires accurate information on total and maternal deaths among women aged 15 to 49 years. The health monitoring systems in the seven provincial MCH/FP centres were requested to provide all relevant mortality data before the field research was carried out. Researchers cross-checked the lists of female deaths provided by the health monitoring systems against those discovered by Participatory Rapid Appraisal (PRA) and interview to avoid duplication.

Table 5 compares the data for total number of female mortalities provided by the health monitoring systems and the results of the study. Table 3 demonstrates that reported female mortalities amounted to 55.8% of the actual figures as determined by this research. Dak Lak and Kien Giang provinces showed the greatest disparity between reported and actual female mortalities in the study age group.

Table 5: Number of mortalities among women aged 15-49 years from reported and research data, Viet Nam 2000-2001

<table>
<thead>
<tr>
<th>Province</th>
<th>Reported data</th>
<th>Research data</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Discovered from PRA</td>
<td>Discovered by interviews</td>
</tr>
<tr>
<td>Cao Bang</td>
<td>34</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>Ha Tay</td>
<td>133</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Quang Tri</td>
<td>73</td>
<td>42</td>
<td>9</td>
</tr>
<tr>
<td>Quang Ngai</td>
<td>73</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>Dak Lak</td>
<td>26</td>
<td>67</td>
<td>29</td>
</tr>
<tr>
<td>Binh Duong</td>
<td>79</td>
<td>51</td>
<td>8</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>26</td>
<td>73</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>444</strong></td>
<td><strong>292</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>
3.1.2 Some specific indicators of female mortality among women aged 15-49 years

Age at death

Figure 3 shows that the highest number of female mortalities occurred among women aged 45-49 and 40-44 years, followed by those between 35 and 39 years of age. Deaths among adolescent women, aged 15-19 years, also make up a rather high proportion of the total deaths at 12.2%.

These data support the results of the TBMS research, in which the authors emphasised that “the higher the age of women, the more number of mortality.”

The mortality rate among adolescent females in rural areas was double the rate for the same age group in urban areas, at 13.6% and 6.5% respectively. In contrast, the mortality rate among rural women in the 45-49 age group was just over half that of women of the same age group in urban areas, at 17.3% and 30.5% respectively.

Female mortality at all ages was higher in highland areas than in lowland area, and deaths among adolescent women in highland areas were three times higher than in lowland areas (Figure 4). Thus geographical area and its effect on access to health services is a significant factor in mortality.

Figure 3: Female mortality by age in Viet Nam, 2000-2001

Ethnicity

The highest female mortality rate was among Kinh women (78.8%). However, these data are not statistically significant because the populations of ethnic minority groups were very low in all the research communes, and the Kinh population was always significantly higher. However, comparing all ethnic peoples shows that the highest female mortality rates were among the Nung (3.9%), Van Kieu (3.9%), Tay (3.8%) and M’Nong (2.4%).

Education

The highest rate of female mortality (40.3%) was found among women who had finished lower secondary school, followed by those who had finished primary school (24.9%). Illiterate women accounted for 13.4% of female mortalities. This is in accordance with the high literacy rate in Viet Nam, at over 90%. However, the relative risk of death was significant, at 3.25 times higher for illiterate than for literate women (Table 21).

Career/occupation

Women farmers had the highest mortality rate at 58.8%, followed by small-businesswomen and housewives at 12.2% and 11.2%, respectively.

Surviving children

Nearly one third of the female mortality cases left no living children. Two living children were left by 17.1%, three living children by 14.6%, and four living children were left by 11.8% of the cases. Fifty-one of the 796 female mortalities identified were survived by five living children.

Location and topography

Of the female deaths identified, 80.7% were in rural areas and 19.3% in urban areas (grade two cities and towns). Lowland areas accounted for 65.7% of female mortality cases, midland areas 2.8% and highland areas 31.5%.

Figure 4: Female mortality by age and geographical area in Viet Nam, 2000-2001
Medical history

Among the 796 cases, 214 (26.9%) suffered from disease. This number is 12.3% lower than that found in 1996 from the research conducted by Do Trong Hieu et al.23

3.1.3 Health care and causes of mortality among women aged 15 to 49 years

Place of death

The highest proportion of mortalities among the study group occurred at home, with 496 cases (62.3%). Mortalities in hospitals accounted for 22.8%, or 192 deaths, 38 deaths (4.8%) occurred on the way to a higher-level health facility following referral and one woman died in a private health clinic.

Means of transferral to higher-level treatment

Among 190 cases that were referred to a higher-level health facility, 57.9% were taken by car, 31.6% were transported by motorbike and the rest used other means of transportation, such as bicycle, cyclo, palanquin and hammock. In 76.8% of cases, the means of transportation was available directly at the referring health facility, while the remaining 23.2% had to wait for transportation to arrive. Of these, 30.8% cases had to wait for between one and four hours.

Treatment before death

One hundred and seventy four, or 91.5%, of the 190 cases received treatment before death. The treatment providers before death were doctors 62.3%, doctor assistants 17.1%, nurses 27.4%, and midwives 6.3%.

During the 72 hours before death, only 34.4% of 652 cases were given treatment, 61.2% received no treatment, and 4.4% of informants did not know whether the women had received treatment or not. Among the women who received treatment, 47.5% of them were treated directly by doctors, and the rest were treated by others, such as nurses, doctor assistants or midwives, and 53.2% had intravenous infusion of serum or blood.

Presence of health workers at death

Only 31.0% of the women died in the presence of a health worker, 65.5% had no health worker in attendance, and information was not available for the others. There were 44 deaths of pregnant women.

Causes of death under ICD-10 classification

The data in Table 6 shows the ranking of the ten major causes of death among the women in the study group. The most common cause of mortality was excrescence/cancer diseases, followed by circulation diseases and accidents. Diseases relating to pregnancy and the postpartum period accounted for 11.1% of deaths.

Causes of death by province

There were differences in the major causes of death among women across the seven provinces. In Ha Tay province, the main causes of death were accidents (21.1%) and circulation diseases (20.4%). In Binh Duong, suicide, at 15.9%, was an additional major cause of death alongside accidents and circulation diseases. The main causes of death in Quang Ngai were tumour/cancer diseases (26.2%) and suicide (11.7%). In Quang Tri, the main causes included the excrescence diseases (25.8%) and accidents (21.8%). Circulation diseases were the main cause of death in Kien Giang, and circulation diseases and pregnancy (22.4%) were the main

Table 6: Causes of female mortality under ICD-10 classification among women aged 15-49 years in seven provinces of Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Cause of mortality</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excrecence/tumours</td>
<td>181</td>
<td>22.7</td>
</tr>
<tr>
<td>Circulation diseases</td>
<td>141</td>
<td>17.7</td>
</tr>
<tr>
<td>Accidents</td>
<td>131</td>
<td>16.5</td>
</tr>
<tr>
<td>Pregnancy and postpartum diseases</td>
<td>80</td>
<td>11.1</td>
</tr>
<tr>
<td>Infections and parasitosis</td>
<td>65</td>
<td>8.2</td>
</tr>
<tr>
<td>Suicide</td>
<td>65</td>
<td>8.2</td>
</tr>
<tr>
<td>Urogenital diseases</td>
<td>34</td>
<td>4.3</td>
</tr>
<tr>
<td>Endocrine, nutrition and metabolism diseases</td>
<td>22</td>
<td>2.8</td>
</tr>
<tr>
<td>Digestion diseases</td>
<td>23</td>
<td>2.9</td>
</tr>
<tr>
<td>Nervous diseases</td>
<td>19</td>
<td>2.4</td>
</tr>
<tr>
<td>Others</td>
<td>35</td>
<td>3.2</td>
</tr>
<tr>
<td>Total</td>
<td>796</td>
<td>100</td>
</tr>
</tbody>
</table>
causes of death in Cao Bang. Excrescence (27.0%) and pregnancy related diseases (18%) were the main causes of death in Dak Lak.

The provinces where accidents were the main cause of female deaths are all in lowland areas and where transportation is classed as good. The main causes of death in the mountainous and Cuu Long River Delta provinces were circulation diseases and pregnancy-related diseases. These areas are less economically-developed and have poorer health services. High suicide rates in Binh Duong and Quang Ngai provinces must be considered alongside community behaviours toward women.

Causes of death and place of residence

The proportion of deaths caused by infectious diseases, suicide and accident was higher in rural areas than in urban areas. The diseases associated with the deaths of women in urban areas were mainly tumours/cancers and mental diseases. The data show that there is a close relation between the causes of female deaths and where women live. This suggests that specific intervention solutions are needed for each area in order to reduce deaths among women of reproductive age.

Causes of death and topography.

Topography also highlights differences in the main causes of death among women of reproductive age. Table 9 shows that the mortality rates attributable to bacterial contamination, suicide, pregnancy and postpartum were lower in lowland areas than in mountainous areas, but the rate of deaths caused by excrescence/cancer was higher in lowland than in mountainous areas. This has been confirmed by other studies on maternal mortality in Viet Nam.
Table 7: Causes of deaths among women aged 15-49 years by province, Viet Nam 2000-2001

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Caop Bang</th>
<th>Ha Tay</th>
<th>Binh Duong</th>
<th>Dak Lak</th>
<th>Quang Tri</th>
<th>Quang Ngai</th>
<th>Kien Giang</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infection and parasitic diseases</td>
<td>5</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>12</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>7.5%</td>
<td>4.9%</td>
<td>8.0%</td>
<td>12.3%</td>
<td>6.5%</td>
<td>6.8%</td>
<td>12.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>2. Tumours</td>
<td>7</td>
<td>35</td>
<td>26</td>
<td>33</td>
<td>32</td>
<td>27</td>
<td>21</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>10.4%</td>
<td>24.6%</td>
<td>18.8%</td>
<td>27.0%</td>
<td>25.8%</td>
<td>26.2%</td>
<td>21.0%</td>
<td>22.7%</td>
</tr>
<tr>
<td>3. Endocrine, nutrition, and metabolism diseases</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>6.0%</td>
<td>2.1%</td>
<td>2.9%</td>
<td>1.6%</td>
<td>1.6%</td>
<td>5.8%</td>
<td>1.0%</td>
<td>2.8%</td>
</tr>
<tr>
<td>4. Nervous diseases</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.0%</td>
<td>3.5%</td>
<td>1.4%</td>
<td>3.2%</td>
<td>4.9%</td>
<td>1.0%</td>
<td>2.4%</td>
<td></td>
</tr>
<tr>
<td>5. Circulation diseases</td>
<td>13</td>
<td>29</td>
<td>27</td>
<td>21</td>
<td>13</td>
<td>19</td>
<td>19</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>19.4%</td>
<td>20.4%</td>
<td>19.6%</td>
<td>17.2%</td>
<td>10.5%</td>
<td>18.4%</td>
<td>19.0%</td>
<td>17.7%</td>
</tr>
<tr>
<td>6. Gastro-intestinal</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>23</td>
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<tr>
<td></td>
<td>4.5%</td>
<td>2.8%</td>
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<td>5.7%</td>
<td>3.2%</td>
<td>2.9%</td>
<td>1.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>7. Urinary-genital diseases</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>3.0%</td>
<td>4.9%</td>
<td>2.9%</td>
<td>7.4%</td>
<td>4.0%</td>
<td>1.9%</td>
<td>5.0%</td>
<td>4.3%</td>
</tr>
<tr>
<td>8. Pregnancy and postpartum</td>
<td>15</td>
<td>7</td>
<td>5</td>
<td>22</td>
<td>13</td>
<td>7</td>
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<td>80</td>
</tr>
<tr>
<td></td>
<td>22.4%</td>
<td>4.9%</td>
<td>3.6%</td>
<td>18.0%</td>
<td>10.5%</td>
<td>6.8%</td>
<td>11.0%</td>
<td>10.1%</td>
</tr>
<tr>
<td>9. Suicide</td>
<td>5</td>
<td>5</td>
<td>22</td>
<td>3</td>
<td>10</td>
<td>12</td>
<td>8</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>7.5%</td>
<td>3.5%</td>
<td>15.9%</td>
<td>2.5%</td>
<td>8.1%</td>
<td>11.7%</td>
<td>8.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>10. Accident</td>
<td>8</td>
<td>30</td>
<td>33</td>
<td>6</td>
<td>27</td>
<td>13</td>
<td>14</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>11.9%</td>
<td>21.1%</td>
<td>23.9%</td>
<td>4.9%</td>
<td>21.8%</td>
<td>12.6%</td>
<td>14.0%</td>
<td>16.5%</td>
</tr>
<tr>
<td>11. Others</td>
<td>3</td>
<td>10</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>4.5%</td>
<td>7.0%</td>
<td>2.2%</td>
<td>3.3%</td>
<td>4.8%</td>
<td>1.9%</td>
<td>7.0%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>142</td>
<td>138</td>
<td>122</td>
<td>124</td>
<td>103</td>
<td>100</td>
<td>796</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 8: Causes of female mortality among women aged 15-49 years by place of residence, Viet Nam 2000-2001

<table>
<thead>
<tr>
<th>Cause of mortality</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infection and parasitic diseases</td>
<td>10</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>6.5%</td>
<td>8.6%</td>
<td>8.2%</td>
</tr>
<tr>
<td>2. Tumours/cancers</td>
<td>55</td>
<td>126</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>35.7%</td>
<td>19.6%</td>
<td>22.7%</td>
</tr>
<tr>
<td>3. Endocrine, nutrition, and metabolism diseases</td>
<td>4</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>2.6%</td>
<td>2.8%</td>
<td>2.8%</td>
</tr>
<tr>
<td>4. Mental disorder</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1.9%</td>
<td>0.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>5. Nervous diseases</td>
<td>1</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>0.6%</td>
<td>2.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td>6. Circulation diseases</td>
<td>26</td>
<td>115</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>16.9%</td>
<td>17.9%</td>
<td>17.7%</td>
</tr>
<tr>
<td>7. Respiration diseases</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1.3%</td>
<td>0.6%</td>
<td>0.8%</td>
</tr>
<tr>
<td>8. Digestion diseases</td>
<td>3</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>1.9%</td>
<td>3.1%</td>
<td>2.9%</td>
</tr>
<tr>
<td>9. Urogenital diseases</td>
<td>11</td>
<td>23</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>7.1%</td>
<td>3.6%</td>
<td>4.3%</td>
</tr>
<tr>
<td>10. Pregnancy and postpartum</td>
<td>11</td>
<td>69</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>7.1%</td>
<td>10.7%</td>
<td>10.1%</td>
</tr>
<tr>
<td>11. Suicide</td>
<td>6</td>
<td>59</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>3.9%</td>
<td>9.2%</td>
<td>8.2%</td>
</tr>
<tr>
<td>12. Accident</td>
<td>18</td>
<td>113</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>11.7%</td>
<td>17.6%</td>
<td>16.5%</td>
</tr>
<tr>
<td>13. Others</td>
<td>39</td>
<td>179</td>
<td>218</td>
</tr>
<tr>
<td></td>
<td>2.8%</td>
<td>2.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
3.2 Maternal Mortality

3.2.1 Epidemiological indicators

**Maternal mortality ratio and maternal mortality rate**

The MMR was calculated using the number of maternal mortality cases and the number of live births in the surveyed areas during the years 2000 and 2001, which amounted to 80 maternal deaths and 61,341 live births. The number of children was collected from two sources, from the provincial MCH/FP centres and from health sources, to compare and check accuracy. These data were also checked at each commune in the 21 surveyed districts.

Table 10 shows both the MMR and the maternal mortality rate for the surveyed areas. There is an obvious difference between the lowland and mountainous provinces.

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Lowland</th>
<th>Highland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infection and parasitic diseases</td>
<td>36</td>
<td>29</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>6.9%</td>
<td>10.6%</td>
<td>8.2%</td>
</tr>
<tr>
<td>2. Tumors/cancers</td>
<td>139</td>
<td>42</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>26.6%</td>
<td>15.4%</td>
<td>22.7%</td>
</tr>
<tr>
<td>3. Endocrine, nutrition, and metabolism diseases</td>
<td>13</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>2.5%</td>
<td>3.3%</td>
<td>2.8%</td>
</tr>
<tr>
<td>4. Nervous diseases</td>
<td>10</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>1.9%</td>
<td>3.3%</td>
<td>2.4%</td>
</tr>
<tr>
<td>5. Circulation diseases</td>
<td>96</td>
<td>45</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>18.4%</td>
<td>16.5%</td>
<td>17.7%</td>
</tr>
<tr>
<td>6. Respiration diseases</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1.0%</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>7. Digestion diseases</td>
<td>9</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>1.7%</td>
<td>5.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>8. Urogenital diseases</td>
<td>25</td>
<td>9</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>4.8%</td>
<td>3.3%</td>
<td>4.3%</td>
</tr>
<tr>
<td>9. Pregnancy and postpartum</td>
<td>34</td>
<td>46</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>6.5%</td>
<td>16.8%</td>
<td>10.1%</td>
</tr>
<tr>
<td>10. Suicide</td>
<td>40</td>
<td>25</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>7.6%</td>
<td>9.2%</td>
<td>8.2%</td>
</tr>
<tr>
<td>11. Accident</td>
<td>93</td>
<td>47</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>17.8%</td>
<td>17.2%</td>
<td>16.5%</td>
</tr>
<tr>
<td>12. Others</td>
<td>4.3</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>523</td>
<td>273</td>
<td>796</td>
</tr>
</tbody>
</table>
Ha Tay and Binh Duong both had a very low MMR, both are lowland provinces and each is close to a major city, Ha Noi and Ho Chi Minh respectively. By contrast, the MMR in the three mountainous districts of Cao Bang was nearly ten times higher than in the lowland provinces. Similarly, the maternal mortality rate was directly proportional to the MMR in the surveyed provinces, with Cao Bang having a rate that was ten times higher than Binh Duong.

The average MMR across three provinces (Song Be, Vinh Phu and Quang Ngai) from the TBMS study was found to be 155 per 100,000 live births. The average MMR from this study, covering seven provinces, was 130 per 100,000 live births, indicating that after five years the MMR has not changed significantly.

Table 10: Maternal Mortality ratio and maternal mortality rate in the surveyed areas

<table>
<thead>
<tr>
<th>Province</th>
<th>Total of maternal deaths</th>
<th>Total of live births</th>
<th>MMR (per 100,000 LB)</th>
<th>Total of women aged 15-49</th>
<th>MM rate (per 100,000 women)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cao Bang</td>
<td>15</td>
<td>3645</td>
<td>411</td>
<td>75,754</td>
<td>19.8</td>
</tr>
<tr>
<td>Quang Ngai</td>
<td>7</td>
<td>3509</td>
<td>199</td>
<td>39,875</td>
<td>17.6</td>
</tr>
<tr>
<td>Dak Lak</td>
<td>22</td>
<td>12325</td>
<td>178</td>
<td>110,044</td>
<td>20.0</td>
</tr>
<tr>
<td>Quang Tri</td>
<td>13</td>
<td>8010</td>
<td>162</td>
<td>189,277</td>
<td>6.9</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>11</td>
<td>7698</td>
<td>143</td>
<td>188,977</td>
<td>5.8</td>
</tr>
<tr>
<td>Ha Tay</td>
<td>7</td>
<td>15112</td>
<td>46</td>
<td>198,430</td>
<td>3.5</td>
</tr>
<tr>
<td>Binh Duong</td>
<td>5</td>
<td>11042</td>
<td>45</td>
<td>174,834</td>
<td>2.9</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>61,431</td>
<td>130</td>
<td>977,191</td>
<td>8.2</td>
</tr>
</tbody>
</table>

**Lifetime risk in the surveyed areas**

Lifetime risk is the risk that a woman might die because of any reasons caused by pregnancy and childbirth between the ages of 15 and 49 years. Table 11 presents the figures on lifetime risk in the surveyed areas.

The average lifetime risk across all seven provinces in this study was 334. This means that for every 334 women between the ages of 15 and 49 years, there is a risk of one maternal death in a woman’s lifetime. The highest lifetime risk was in Cao Bang province, with one maternal death for every 101 women of reproductive age. Dak Lak showed a lifetime risk of 1 in 148 women, and Quang Ngai and Quang Tri have similar lifetime risks at just over 1 in 201 and 220, respectively.
Table 11: Lifetime risk in the surveyed areas.

<table>
<thead>
<tr>
<th>Provinces</th>
<th>MMR</th>
<th>TFR</th>
<th>Lifetime risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cao Bang</td>
<td>411</td>
<td>2.4</td>
<td>101</td>
</tr>
<tr>
<td>Quang Ngai</td>
<td>199</td>
<td>2.5</td>
<td>201</td>
</tr>
<tr>
<td>Dak Lak</td>
<td>178</td>
<td>3.8</td>
<td>148</td>
</tr>
<tr>
<td>Quang Tri</td>
<td>162</td>
<td>2.8</td>
<td>220</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>143</td>
<td>2.1</td>
<td>332</td>
</tr>
<tr>
<td>Ha Tay</td>
<td>46</td>
<td>2.0</td>
<td>1086</td>
</tr>
<tr>
<td>Binh Duong</td>
<td>45</td>
<td>1.9</td>
<td>1176</td>
</tr>
<tr>
<td>Total 7 provinces</td>
<td>130</td>
<td>2.3</td>
<td>334</td>
</tr>
</tbody>
</table>

Note: The Lifetime risk formula:

\[ (1 - \text{MMR})^{TFR} = \text{lifetime risk (MMR = Maternal Mortality Ratio)} \]

(TFR = Total Fertility Rate - Information from the population census in 1999)


This is the first time that lifetime risk has been calculated in a maternal mortality survey in Viet Nam, so there are no other data for comparison.

MMR by residence and geographical areas of death women

Table 12 shows that there is a significant difference (p<0.001) between MMR in rural and urban areas.

Table 12: Maternal Mortality Ratio by area of residence

<table>
<thead>
<tr>
<th>Total number of maternal deaths</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>69</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total number of live births</th>
<th>13905</th>
<th>47436</th>
<th>61341</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMR (per 100 000 live births)</td>
<td>39.79</td>
<td>113.184</td>
<td>103.162</td>
</tr>
</tbody>
</table>

* 95% confidence intervals (binomial parameter p) calculated using Stata 7.0

Table 13: Maternal mortality ratio by geographical area

<table>
<thead>
<tr>
<th>Highland/midland</th>
<th>Lowland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total of maternal deaths</td>
<td>43</td>
<td>37</td>
</tr>
<tr>
<td>Total of live births</td>
<td>15946</td>
<td>45395</td>
</tr>
<tr>
<td>MMR (per 100 000 live births)</td>
<td>269</td>
<td>81</td>
</tr>
<tr>
<td>Confidence intervals</td>
<td>195-363</td>
<td>57-112</td>
</tr>
</tbody>
</table>

Table 14 shows that the MMR in ethnic minority groups is very high, at 316 per 100 000 live births, whereas in the Kinh group, the MMR is 81 per 100 000 live births. Women in ethnic minority groups therefore have a relative risk of maternal death 3.92 times higher than Kinh women (see also Table 21).

Table 14: Maternal mortality ratio by ethnic group (per 100 000 live births)

<table>
<thead>
<tr>
<th>Ethnic groups</th>
<th>Kinh people</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of maternal deaths</td>
<td>41</td>
<td>36</td>
</tr>
<tr>
<td>Total number of live births</td>
<td>12693</td>
<td>48378</td>
</tr>
<tr>
<td>MMR (per 100 000 live births)</td>
<td>316</td>
<td>81</td>
</tr>
<tr>
<td>Confidence intervals</td>
<td>227-429</td>
<td>57-112</td>
</tr>
</tbody>
</table>

Maternal mortality ratio by each surveyed district.

Table 15 ranks MMR by district for all 21 districts surveyed to allow easy comparison between areas.

There is a significant difference between highland and lowland districts. Quang Ngai town was the only location with no maternal mortality cases in the years 2000 and 2001. At the other extreme, the MMR in Son Tinh (Quang Ngai) was 916 per 100 000 live births, and in Ha Quang (Cao Bang), the MMR was 743 per 100 000 live births. These figures are equivalent to those of some African countries. The lowest MMRs were found in districts of Ha Tay and Binh Duong provinces, followed by Dong Ha and Ha Tien towns.
Table 15: Maternal mortality ratio by district.

<table>
<thead>
<tr>
<th>No</th>
<th>Districts</th>
<th>Number of live births</th>
<th>Number of maternal deaths</th>
<th>MMR</th>
<th>Confidence intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Son tinh/ Quang Ngai</td>
<td>546</td>
<td>5</td>
<td>916</td>
<td>298 - 2124</td>
</tr>
<tr>
<td>2</td>
<td>Ha quang/ Cao bang</td>
<td>1076</td>
<td>8</td>
<td>743</td>
<td>322 - 1460</td>
</tr>
<tr>
<td>3</td>
<td>Minh Long/Quang Ngai</td>
<td>390</td>
<td>2</td>
<td>513</td>
<td>62 - 1840</td>
</tr>
<tr>
<td>4</td>
<td>Huong Hoa/ Quang tri</td>
<td>2574</td>
<td>10</td>
<td>389</td>
<td>186 - 713</td>
</tr>
<tr>
<td>5</td>
<td>Hoa An/ Cao bang</td>
<td>1380</td>
<td>5</td>
<td>362</td>
<td>118 - 844</td>
</tr>
<tr>
<td>6</td>
<td>Lak/Daklak</td>
<td>2469</td>
<td>7</td>
<td>284</td>
<td>114 - 583</td>
</tr>
<tr>
<td>7</td>
<td>Krong Bong/Daclak</td>
<td>3633</td>
<td>7</td>
<td>193</td>
<td>78 - 397</td>
</tr>
<tr>
<td>8</td>
<td>Quang uyen/Cao bang</td>
<td>1189</td>
<td>2</td>
<td>168</td>
<td>20 - 606</td>
</tr>
<tr>
<td>9</td>
<td>Buon Ma Thuat town/Daklak</td>
<td>5131</td>
<td>8</td>
<td>156</td>
<td>67 - 307</td>
</tr>
<tr>
<td>10</td>
<td>Giong Rieng/Kien Giang</td>
<td>4821</td>
<td>7</td>
<td>145</td>
<td>58 - 299</td>
</tr>
<tr>
<td>11</td>
<td>An minh/Kien Giang</td>
<td>2702</td>
<td>3</td>
<td>111</td>
<td>23 - 324</td>
</tr>
<tr>
<td>12</td>
<td>Quoc oai/Thanh Oai</td>
<td>4450</td>
<td>4</td>
<td>90</td>
<td>25 - 230</td>
</tr>
<tr>
<td>13</td>
<td>Ha tien town/Kien Giang</td>
<td>1258</td>
<td>1</td>
<td>79</td>
<td>2 - 442</td>
</tr>
<tr>
<td>14</td>
<td>Dong Ha town/Quang tri</td>
<td>2540</td>
<td>2</td>
<td>79</td>
<td>10 - 284</td>
</tr>
<tr>
<td>15</td>
<td>Tan Uyen/Binh Duong</td>
<td>4280</td>
<td>2</td>
<td>47</td>
<td>6 - 169</td>
</tr>
<tr>
<td>16</td>
<td>Thuan An/Binh Duong</td>
<td>4382</td>
<td>2</td>
<td>46</td>
<td>6 - 165</td>
</tr>
<tr>
<td>17</td>
<td>Dau Tieng/Binh Duong</td>
<td>2380</td>
<td>1</td>
<td>42</td>
<td>1 - 234</td>
</tr>
<tr>
<td>18</td>
<td>Thanh Oai/Ha Tay</td>
<td>5649</td>
<td>2</td>
<td>35</td>
<td>4 - 128</td>
</tr>
<tr>
<td>19</td>
<td>Vinh Linh/Quang Tri</td>
<td>2905</td>
<td>1</td>
<td>34</td>
<td>1 - 192</td>
</tr>
<tr>
<td>20</td>
<td>Thach That/Ha Tay</td>
<td>5013</td>
<td>1</td>
<td>20</td>
<td>1 - 111</td>
</tr>
<tr>
<td>21</td>
<td>Quang Ngai town/Quang ngai</td>
<td>2573</td>
<td>0</td>
<td>0</td>
<td>0 - 143</td>
</tr>
</tbody>
</table>

Table 16: Estimated MMRs for seven provinces in Viet Nam, 2000-2001.

<table>
<thead>
<tr>
<th>Provinces</th>
<th>MMR</th>
<th>MMR in 7 provinces</th>
<th>Confidence Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cao Bang</td>
<td>411</td>
<td>306 - 516</td>
<td>230 - 677</td>
</tr>
<tr>
<td>Quang Ngai</td>
<td>199</td>
<td>128 - 270</td>
<td>80 - 410</td>
</tr>
<tr>
<td>Dak Lak</td>
<td>178</td>
<td>146 - 210</td>
<td>112 - 270</td>
</tr>
<tr>
<td>Quang Tri</td>
<td>162</td>
<td>117 - 207</td>
<td>86 - 277</td>
</tr>
<tr>
<td>Kien Giang</td>
<td>143</td>
<td>111 - 175</td>
<td>71 - 255</td>
</tr>
<tr>
<td>Ha Tay</td>
<td>46</td>
<td>45.4 - 46.2</td>
<td>18 - 95</td>
</tr>
<tr>
<td>Binh Duong</td>
<td>45</td>
<td>43.5 - 46.1</td>
<td>15 - 106</td>
</tr>
</tbody>
</table>
Estimated MMR for seven provinces across seven ecological areas

Statistical methods were used to estimate the deviation in MMR and extrapolate to the seven provinces and seven ecological areas based on stratified sampling and whole clustered sampling methods.

The confidence interval of 95% permits comparison of MMR across the ecological regions. The highest MMRs are found in the northern mountainous areas and the Central Highlands from this analysis, which agrees with the data from the surveyed areas as well as the judgement of colleagues.

Comparing reported and surveyed MMR

Table 17 demonstrates that the MMRs estimated from this study are higher than those from local health reports, with Quang Ngai and Dac Lac showing the greatest disparity. The smallest difference between reported and surveyed MMR was found in Quang Tri, but reported data still only account for 60.5% of the surveyed MMR. The reporting system for maternal mortality in Viet Nam is clearly very weak and data reported in this way do not give a true picture of the maternal mortality situation.

Table 18 compares MMR data collected in 1990 (UNICEF) with the data from this research, although it must be recognized that differences in

Table 17: Comparing reported and surveyed MMR

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Cao Bang</th>
<th>Ha Tay</th>
<th>Binh Duong</th>
<th>Quang Tri</th>
<th>Quang Ngai</th>
<th>Kien Giang</th>
<th>Daklak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of live births</td>
<td>3645</td>
<td>15112</td>
<td>11042</td>
<td>8010</td>
<td>3509</td>
<td>7698</td>
<td>12325</td>
</tr>
<tr>
<td>Surveyed MMR</td>
<td>411</td>
<td>46</td>
<td>45</td>
<td>162</td>
<td>199</td>
<td>143</td>
<td>178</td>
</tr>
<tr>
<td>Reported MMR</td>
<td>76</td>
<td>13</td>
<td>8</td>
<td>98</td>
<td>6</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Reported MMR as % of surveyed MMR</td>
<td>18.5%</td>
<td>28.3%</td>
<td>17.8%</td>
<td>60.5%</td>
<td>3.0%</td>
<td>17.5%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

Table 18: The MMR in seven ecological regions in 1990 (UNICEF) and in 2000-2001 (MCH/FP Department)
classifying the ecological regions in the two surveys mean that the comparison is not direct.

Table 18 suggests that the MMR in all ecological regions except the northern mountainous area fell during the ten years between 1990 and 2000. The reduction is significant in the Red River Delta and the South East regions, where there have been many changes in socioeconomic conditions and health infrastructure in recent years. This trend is in accordance with changes in the health and diseases indicators for those areas. Living conditions in the northern mountainous areas are still difficult, education levels are low and traditional customs and behaviours persist, and in these areas mortality indicators in general, as well as MMR, have not changed significantly.

Estimated MMR for Viet Nam

Based on the estimation of the MMR in the seven ecological areas surveyed, and Crude Birth Rates (CBR) and Crude Death Rates (CDR) from the 1999 census\(^{24}\), the maternal mortality ratio for Viet Nam is estimated to be\(^{25}\): 165 per 100,000 live births (according to point estimation method of stratified sample). This ratio varies between 124 and 206 per 100,000 live births (based on the estimation of standard error of stratified sample, see annex for calculations). This research gives a lower MMR than the overall figure for Asia in 1995.

Table 19: Figures compared among areas in 1990 and 1995

<table>
<thead>
<tr>
<th>Regions classified by UN</th>
<th>1990</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>430</td>
<td>400</td>
</tr>
<tr>
<td>More developed countries</td>
<td>27</td>
<td>21</td>
</tr>
<tr>
<td>Less developed countries</td>
<td>480</td>
<td>440</td>
</tr>
<tr>
<td>Least developed countries</td>
<td>---</td>
<td>1000</td>
</tr>
<tr>
<td>Africa</td>
<td>870</td>
<td>1000</td>
</tr>
<tr>
<td>Asia</td>
<td>390</td>
<td>280</td>
</tr>
<tr>
<td>Europe</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>190</td>
<td>190</td>
</tr>
<tr>
<td>North America</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>


\(^{25}\) Ha Noi Medical College. *Medical epidemiology*. Medical Publish House 1990
Estimated lifetime risk in Viet Nam

The lifetime risk of maternal death for the whole country is 248, that is, one mother will die out of every 248 women aged between 15 and 49 years. This risk fluctuates between 427 and 175, and is slightly lower than lifetime risk for the region of East Asia and the Pacific in 1995 (Table 20). Every 248 women aged between 15 and 49 years. This risk fluctuates between 427 and 175, and is slightly lower than lifetime risk for the region of East Asia and the Pacific in 1995 (Table 20).

3.2.2 General characteristics of maternal mortalities

Age at death

Table 21 gives the calculated MMR for each five-year age group between 15 and 49 years of age, estimated using the age at death of the mother and the age-group cohort provided by the 1999 population census.

<table>
<thead>
<tr>
<th>Regions classified by UNICEF</th>
<th>MMR 1995</th>
<th>Lifetime risk 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>400</td>
<td>75</td>
</tr>
<tr>
<td>Industrialized countries</td>
<td>12</td>
<td>4 085</td>
</tr>
<tr>
<td>Least developed countries</td>
<td>1 000</td>
<td>16</td>
</tr>
<tr>
<td>Developing countries</td>
<td>440</td>
<td>61</td>
</tr>
<tr>
<td>Sub-saharan Africa</td>
<td>1 100</td>
<td>13</td>
</tr>
<tr>
<td>South Asia</td>
<td>430</td>
<td>54</td>
</tr>
<tr>
<td>East Asia &amp; Pacific</td>
<td>140</td>
<td>283</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>190</td>
<td>157</td>
</tr>
</tbody>
</table>

Table 21: Estimated MMR for women aged 15-49 years by age group, Viet Nam, 2000-2001
The highest MMR was found in the 40-49 group, at 475 per 100,000 live births, followed by the 35-39 age group, at 400 per 100,000 live births and the 30-34 group with 191 per 100,000 live births. The lowest MMR was in the 20-24 years age group, and this group has the lowest lifetime risk. Theoretically, the group aged 15-19 years has the high risk of maternal death, and this survey found three deaths and a higher MMR than for the group aged 20-24 years.

Table 22 provides epidemiological values for relative risk of maternal death. The most significant risk factor is age, and women aged over 35 years have a relative risk of maternal death 4.61 times higher than those aged below 35 years. The second most important risk factor is ethnic minority group, with mothers from ethnic minority groups having a relative risk of maternal death 3.92 times higher than the Kinh group. The third risk factor is literacy, with illiterate women having a relative risk of maternal death 3.25 times higher than literate women. Another risk factor is place of delivery, with women who deliver at home having a relative risk of maternal death 2.33 times higher than those who give birth at a health facility.
Table 22: Risk factors that influence MMR among women aged 15–49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Relative risk</th>
<th>Confidence Interval (95%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (over 35 years of age, below 35 years of age)</td>
<td>4.61</td>
<td>2.93 - 7.25</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Ethnic (ethnic group, Kinh group)</td>
<td>3.92</td>
<td>2.53 - 6.08</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Occupation (farmer, others)</td>
<td>3.61</td>
<td>1.99 - 6.54</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Region (highland, lowland)</td>
<td>3.31</td>
<td>2.13 - 5.12</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Education (illiterate, literate)</td>
<td>3.25</td>
<td>2.07 - 5.11</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Place of delivery (at home, health facility)</td>
<td>2.33</td>
<td>1.50 - 3.63</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Children (more than 2, fewer than 2)</td>
<td>2.16</td>
<td>1.39 - 3.34</td>
<td>p&lt;0.05</td>
</tr>
<tr>
<td>Place of residence (rural, urban)</td>
<td>1.64</td>
<td>0.97 - 3.47</td>
<td>p&gt;0.05</td>
</tr>
</tbody>
</table>

Ethnicity

Kinh women accounted for the highest proportion of maternal deaths at 48.8%, which was appropriate given the proportion of the Kinh population among the women surveyed. Among the ethnic minority groups, there was a high proportion of maternal mortality among the Nung people at 11 cases (13.8%), H’Mong people had 8 cases of maternal mortality (10.0%), Van Kieu had 7 cases (8.8%), Mnong 6 cases (7.5%) and other ethnic groups 9 cases (11.1%).

Education level

As the total number of maternal deaths recorded here was 80, it is impossible to draw statistically meaningful conclusions regarding maternal mortality and education levels. However, the research estimated the MMR for women of reproductive age and calculations were made based on data on the education levels attained by women from the population census of 1999.

Table 23: MMR and education level among women aged 15-40 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Education level</th>
<th>Number of maternal mortalities</th>
<th>Number of women</th>
<th>% of total female population</th>
<th>MMR as their education</th>
</tr>
</thead>
<tbody>
<tr>
<td>None/illiterate</td>
<td>30</td>
<td>173 654</td>
<td>15.6</td>
<td>17.3</td>
</tr>
<tr>
<td>Primary school</td>
<td>29</td>
<td>445 560</td>
<td>40.0</td>
<td>6.5</td>
</tr>
<tr>
<td>Secondary school</td>
<td>16</td>
<td>283 699</td>
<td>25.4</td>
<td>5.6</td>
</tr>
<tr>
<td>High school</td>
<td>5</td>
<td>211 679</td>
<td>19.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>1 114 592</td>
<td>100.0</td>
<td>7.2</td>
</tr>
</tbody>
</table>
The highest MMR was found among illiterate women, and MMR fell as educational level rose. Women in mountainous and remote areas tend to be poorly-educated, possibly because economic difficulties prevent them from attending school.

**Occupation**

The highest number of maternal mortalities occurred among peasant women, at 83.3% (67 women). The next highest number of maternal mortalities occurred among small businesswomen 12.5% (10 women), followed by government employees 2.5% (2) and housewives 1.3% (1).

The number of maternal mortalities among peasant women in this study was lower than that found by Do Trong Hieu and et al in the Lap Thach and Yen Lap districts of Vinh Phu province in 1995. However, the maternal mortality among small businesswomen and government employees was higher (15% and 6.2%)\(^{26}\). This could be due to higher urban populations in the current study.

There are no estimates of maternal death according to occupation over the wider population, but the results indicate that there are more maternal deaths among women living in mountainous or remote areas with low education levels or who are peasants. However, this needs further data for statistical verification.

### 3.2.3 Clinical epidemiology

**Direct and indirect causes of maternal mortality by province**

Among the 80 cases of maternal mortality identified, 76.3% had a direct cause and 23.8% had indirect causes. In the seven surveyed provinces, Cao Bang, Quang Ngai and Dak Lak had a higher proportion of direct causes than indirect causes at

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\(^{26}\) Research Center for Rural Population and Health, Do Trong Hieu et al, *Findings of the survey on maternal mortality in Lap Thach and Yen Lap districts, Vinh Phu province*, Thai Binh Medical University, 1995 pp12.
86.7% direct and 13.3% indirect; 85.7% and 14.3%; and 81.8% and 18.2%, respectively.

Comparing provinces, Cao Bang had the highest proportion of maternal mortalities attributable to direct causes, and Kien Giang had the highest proportion of maternal mortalities with indirect causes. The TBMS study gave a lower figure for direct causes, at 65.8%, and a higher figure for indirect causes at 34.2%. In a survey in Quang Tri over the five years from 1995 to 1999, the direct causes were higher at 82.4% and indirect causes were lower at 17.5%.

Estimated global figures for direct and indirect causes of maternal mortality are about 80% and 20% respectively, as mirrored by the figures estimated for Viet Nam.

The data imply that the causes of maternal mortality mainly relate to pregnancy management activity, along with prenatal, delivery and postpartum care. This study found that the highest proportion of direct and indirect causes of maternal mortality were found mainly in the mountainous area, the Central Highland area and the Cuu Long River Delta.

**Direct and indirect causes of maternal mortality by place of residence**

Rural and urban areas show a clear difference between direct and indirect causes of maternal mortality, with direct causes being much higher in both rural and urban areas (86.9% and 84.2% respectively) than indirect causes (13.1% in rural areas and 15.85% in rural areas). However, the differences in the numbers of mortalities demonstrate that the health situation, level of diseases, and prenatal, delivery and postpartum care in rural areas are worse than in urban areas.

Table 25: Direct and indirect causes of maternal mortality by place of residence among women aged 15 to 49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Causes</th>
<th>Urban/town</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>8</td>
<td>53</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>13.1%</td>
<td>86.9%</td>
<td>76.3%</td>
</tr>
<tr>
<td>Indirect</td>
<td>3</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>15.8%</td>
<td>84.2%</td>
<td>23.7%</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>69</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>13.7%</td>
<td>86.3%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Direct and indirect causes of maternal mortality by topography**

Different topographies show different causes of maternal mortality. Direct causes of maternal death in mountainous areas were higher than in lowland areas (59% and 41%), and indirect causes of maternal mortality were higher in lowland areas (63.2% and 36.8%). In each region, maternal

Table 24: Direct and indirect causes of maternal mortality in seven provinces of Viet Nam among women aged 15-49 years, 2000-2001

<table>
<thead>
<tr>
<th>Causes</th>
<th>Cao Bang</th>
<th>Ha Tay</th>
<th>Binh Duong</th>
<th>Daclak</th>
<th>Quang Tri</th>
<th>Quang Ngai</th>
<th>Kien Giang</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>13</td>
<td>5</td>
<td>3</td>
<td>18</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>86.7%</td>
<td>71.4%</td>
<td>60.0%</td>
<td>81.8%</td>
<td>76.9%</td>
<td>85.7%</td>
<td>54.5%</td>
<td>76.3%</td>
</tr>
<tr>
<td>Indirect</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>13.3%</td>
<td>28.6%</td>
<td>40.0%</td>
<td>18.2%</td>
<td>23.1%</td>
<td>14.3%</td>
<td>45.5%</td>
<td>23.7%</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>7</td>
<td>5</td>
<td>22</td>
<td>13</td>
<td>7</td>
<td>11</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
deaths were more often the result of direct causes rather than indirect causes.

Table 26: Direct and indirect causes of maternal mortality by topography among women aged 15 to 49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Causes</th>
<th>Lowland</th>
<th>Highland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>25</td>
<td>36</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>41.0%</td>
<td>59.0%</td>
<td>61</td>
</tr>
<tr>
<td>Indirect</td>
<td>12</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>63.2%</td>
<td>36.8%</td>
<td>23.8%</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>43</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>46.3%</td>
<td>53.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Direct causes of maternal mortality

Among the direct causes of maternal mortality, haemorrhage/inertia uterus accounted for the highest rate at 41%, next were pre-eclampsia (hypertension) at 21.3% and infection at 16.4%. Quang Tri, Dak Lak and Cao Bang provinces had the highest proportions of haemorrhage, at 60.0%, 55.6% and 46.2%, respectively. The rate of pre-eclampsia was highest in Kien Giang at 27.5%, followed by Dak Lak at 22.7% and Binh Duong at 20.0%.

Infections as a direct cause was highest in Quang Ngai at 42.9%, followed by Cao Bang at 33%, Kien Giang at 18.2% and Ha Tay at 14.3%.

There were three cases of uterine rupture, one in Cao Bang and two Dak Lak, and seven cases (11.5%) of maternal mortality caused by unsafe abortion, in Ha Tay, Cao Bang, Dak Lak, Quang Ngai and Quang Tri. There were also three cases of ectopic rupture, in Ha Tay and Cao Bang.

The proportions of direct causes of maternal mortality found were different to the TBMS results. The TBMS study found a higher rate of haemorrhage (53.1%), a similar rate of pre-eclampsia (16.1%), and a lower rate of infection (10.9%). The rate of complicated delivery/uterine rupture was twice as high at 12.3%, and abortion lower at 5.2%. Global figures for direct causes of maternal mortality found by WHO in 1999 were haemorrhage 25%, infection 15%, unsafe abortion 13%, and hypertensive disease of pregnancy (pre-eclampsia and eclampsia) 12% (See Figure 2).

Seven (11.5%) cases of maternal mortality resulted from unsafe abortion. One death was due to haemorrhage and lack of essential treatment during an abortion that was carried out in a private clinic. The woman was five months’ pregnant at the time. The other four cases of mortality resulted
from inappropriate professional procedures leading to retained placenta and infection. Two cases were identified where death resulted from using traditional medicines or techniques to abort at home, and both died from haemorrhage.

Two cases of maternal mortality due to uterine rupture were identified in Dak Lak. One was a transverse presentation that the nearest health facility was unable to treat. The patient was referred to hospital some distance away, and died on arrival. The other woman also died on the way to hospital, due to the distance involved. The third uterine rupture led to death from cardiac collapse during a caesarean operation at the district hospital.

Of the three deaths attributed to ectopic pregnancy, two women died on the way to the hospital, and the third died at home due to shock and lack of treatment.

Direct causes of maternal mortality by province

The most common direct causes of maternal mortality across the provinces were haemorrhage/inertia uterus, infection, hypertension and eclampsia. The proportion of death caused by haemorrhage/inertia uterus was highest in Dak Lak at 40%, then Cao Bang and Quang Tri at 24% each. Dak Lak also had the highest rate of mortality caused by infection and hypertension at 30.7%, then Quang Ngai at 23.10% and Quang Tri at 23.4%. Ha Tay and Dak Lak had the highest rate of mortality caused by unsafe abortion. All of these direct causes of maternal mortality were found mainly in the northern highland and central highland areas.

Direct causes of maternal mortality by place of residence

In urban areas, no maternal deaths were caused by infection, hypertension, uterine rupture or ectopic rupture. The proportion of total maternal deaths that occurred in urban areas was 13.1%, of which 8.8% were due to haemorrhage/inertia uterus, and only one death was caused by unsafe abortion.

In rural areas, where 86.9% of the total maternal mortalities were found, the most common causes were infection, hypertension and uterine rupture. Rural areas accounted for 100% of all maternal mortalities attributable to these causes and 72% of all mortalities attributable to haemorrhage.

There were 18 maternal deaths caused by haemorrhage/inertia uterus among mothers living in rural areas. Four of these occurred before delivery, nine occurred during labour and five occurred during the postpartum period. It is hard to diagnose these cases exactly, as most of the deaths occurred on the way to the hospital, at home or because the patient arrived at the hospital too late. In some cases, the haemorrhage diagnosis resulted from pre-term placenta release, placenta praevia or inertia of the uterus, causing severe bleeding.

Table 27: Direct causes of maternal mortality by province among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Causes</th>
<th>Caobang</th>
<th>Hatai</th>
<th>Binh Duong</th>
<th>Dac Lac</th>
<th>Quang Tri</th>
<th>Quang Ngai</th>
<th>Kien Giang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemorrhage/inertia uterus</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Infection</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension/eclampsia</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
<td>20.0</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Uterus rupture</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ectopic rupture</td>
<td>10.0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Unsafe Abortion</td>
<td>14.3</td>
<td>28.6</td>
<td>28.6</td>
<td>14.3</td>
<td>14.3</td>
<td>14.3</td>
<td>14.3</td>
</tr>
</tbody>
</table>
In Dak Lak, two cases of uterine rupture were attributed to lack of antenatal care. Both pregnant women did not attend antenatal check-ups, so the abnormal presentation of their babies was not identified. Both delivered at home without the support of a health care provider, and therefore did not receive the necessary essential obstetric intervention on time to prevent their deaths.

Deaths caused by unsafe abortion were due to two main reasons, haemorrhage without any essential intervention (two cases) and infection without treatment (four cases). Four of the abortions were carried out at private clinics, and the patients then came to Government clinics when complications occurred.

**Direct causes of maternal mortality by topography**

Haemorrhage and inertia of the uterus were common obstetric complications and caused maternal deaths in both lowland and highland areas, but there were differences among other causes of maternal death between the two areas. The rate of infection was higher in mountainous areas than in lowland areas, demonstrating that hygiene around pregnancy and childbirth was worse in mountainous areas than in lowland areas. However, the rate of hypertension/eclampsia was lower in the mountainous areas, and the number of deaths attributable to hypertension in lowland areas is of concern.

The number of deaths caused by abortion or miscarriage in lowland areas was five times higher than in mountainous areas, suggesting that unsafe abortion is quite common in lowland areas.

**Indirect causes of maternal mortality**

Indirect causes were responsible for 23.8% of the maternal deaths found in this study. Of these deaths, 21.1% were due to obstetrical heart disease, chronic hepatitis accounted for 10.3%, cerebrovascular troubles 10.7%, and pulmonary tuberculosis 10.5%. Malignant malaria was responsible for

---

**Table 28. Direct causes of maternal mortality by place of residence among women aged 15-49 years, Viet Nam, 2000-2001**

<table>
<thead>
<tr>
<th>Causes</th>
<th>Urban/town</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage/inertia uterus</td>
<td>7</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>28.0%</td>
<td>72.0%</td>
<td>41.0%</td>
</tr>
<tr>
<td>Infection</td>
<td>10</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>16.4%</td>
</tr>
<tr>
<td>Hypertension/eclampsia</td>
<td>13</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>21.3%</td>
</tr>
<tr>
<td>Uterus rupture</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Ectopic rupture</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Unsafe Abortion or miscarriage</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>14.3%</td>
<td>85.7%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>53</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>13.1%</td>
<td>86.9%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Table 30: Direct and indirect causes of 16 antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Causes</th>
<th>Lowland</th>
<th>Highland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhage/ inertia uterus</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Infection</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Hypertension/eclampsia</td>
<td>6</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Uterus rupture</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ectopic rupture</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Abortion/miscarriage</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>34</strong></td>
<td><strong>61</strong></td>
</tr>
<tr>
<td><strong>44.3%</strong></td>
<td><strong>55.7%</strong></td>
<td><strong>100.0%</strong></td>
<td></td>
</tr>
</tbody>
</table>

15.8% of maternal deaths, and other diseases such as asthma, cancer, poisoning, mental illness, and encephalitis accounted for a rather high proportion of 31.6%.

The obstetrical heart disease figures are comparable to those found by the TBMS study (26.3% vs. 26.4%). The main disparity is in the appearance of two new diseases as indirect causes of maternal mortality, which were not identified in the TBMS study27.

**Direct and indirect causes of mortal cases before pregnancy termination**

Of the 80 identified maternal deaths, 16, or 20%, were antepartum, occurring before the natural end of the pregnancy. Among these, 62.5 % were directly due to the pregnancy and 37.5% died through indirect causes.

Hypertension/eclampsia was the main cause of antepartum mortality, accounting for eight of the cases (50%). Heart disease accounted for three cases and infection accounted for two cases. Asthma, tumour on the brain and pulmonary tuberculosis each accounted for one case of antepartum mortality.

The major cause of antepartum mortality was hypertension/eclampsia. Most of the women involved had one or no antenatal check-ups, so the progress of their pregnancy was not monitored. When complications occurred, they did not go to health facilities for treatment but treated themselves...

Table 31: Causes of 16 antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Cause</th>
<th>Quantity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension/eclampsia</td>
<td>8</td>
<td>50.0</td>
</tr>
<tr>
<td>Heart disease</td>
<td>3</td>
<td>18.8</td>
</tr>
<tr>
<td>Infection</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Asthma</td>
<td>1</td>
<td>6.2</td>
</tr>
<tr>
<td>Tumour (brain)</td>
<td>1</td>
<td>6.2</td>
</tr>
<tr>
<td>Pulmonary tuberculosis</td>
<td>1</td>
<td>6.2</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100.0</td>
</tr>
</tbody>
</table>

using herbs or traditional medicine. Lack of antenatal care led to haemorrhage because complications such as placenta praevia were not identified. Abortion at private clinics resulted in haemorrhage and infection.

3.2.4 Pregnancy factors relating to maternal mortality

Number of previous deliveries

Maternal mortality ratios against delivery numbers were calculated using data from the 1999 population census to provide epidemiologically useful information, as shown in Table 33.

Figure 11 shows that MMR increases in direct proportion to the number of previous deliveries. Women with five previous deliveries had the highest MMR, followed by those with four previous deliveries and so on. These figures matched those of international studies that show that the risk of maternal mortality increases with the number of deliveries.

Age of fetus and antepartum mortalities

Figure 12 shows that most (66.2%) of the antepartum maternal mortalities occurred when the fetus was aged 25-40 weeks. Six to twelve weeks,
Table 33: Estimated MMR against number of previous deliveries among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Number of previous deliveries</th>
<th>Number of maternal mortalities</th>
<th>Total estimated number of live births</th>
<th>MMR</th>
<th>Confidence intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>21,651</td>
<td>46</td>
<td>22 - 85</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>8,669</td>
<td>127</td>
<td>63 - 226</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>11,579</td>
<td>164</td>
<td>99 - 256</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>7,985</td>
<td>175</td>
<td>96 - 295</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>5,321</td>
<td>226</td>
<td>117 - 393</td>
</tr>
<tr>
<td>5 or more</td>
<td>14</td>
<td>6,136</td>
<td>228</td>
<td>125 - 383</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>61,341</td>
<td>130</td>
<td>103 - 162</td>
</tr>
</tbody>
</table>

Figure 10: Number of previous deliveries and MMR among women aged 15-49 years, Viet Nam, 2000-2001
account for 20.5%; and 13 – 24 weeks, account for 9.1%.

**Age of fetus at time of termination of pregnancy**

There was a link between the age of fetus and the risk of mortality, the higher age of fetus, the higher possibility of mortality. Fifty-eight, or 72.5%, of maternal mortalities occurred when the fetus was aged between 25 and 40 weeks. Twelve mortalities, 15.0%, occurred when the fetus was aged between 13 and 24 weeks, and 10 (12.5%) when the fetus was aged 6 to 12 weeks (Table 34).

**Forms of pregnancy termination**

Sixty-four cases, or 80.0% of the mortalities, occurred during or after delivery. Normal delivery accounted for 48.4% of these cases. Other mortalities were associated with Caesarean operations, 12.5%, miscarriage, 9.4% and abortions, 7.8%. There are two main forms of early termination of pregnancy, menstruation regulation and forceps or vacuum extractions.

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**Figure 11: Age of fetus in antepartum maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001**

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**Table 34: Age of fetus at termination of pregnancy**

<table>
<thead>
<tr>
<th>Age of fetus</th>
<th>Before pregnancy termination</th>
<th>During or after pregnancy termination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>6 – 12</td>
<td>4</td>
<td>25.0</td>
<td>12</td>
</tr>
<tr>
<td>13 – 24</td>
<td>3</td>
<td>18.8</td>
<td>7</td>
</tr>
<tr>
<td>25 &gt;= 40</td>
<td>9</td>
<td>56.3</td>
<td>49</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>20.0</td>
<td>64</td>
</tr>
</tbody>
</table>
“More than 3/4 of the maternal mortality cases have pregnancy termination by “giving birth” and it is an unusual one. Several physiological deliveries change to pathological ones with the reason relating to many factors such as: insufficient health care conditions for birth given by medical equipment, medicines and health workers, no timely emergency, and no correct diagnosis and treatment.”

### Antenatal check-ups

Check-ups during pregnancy are very important for identifying any danger signs early, before they become serious.

Table 35: Forms of pregnancy termination among 64 mortalities among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Form of pregnancy termination</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention due to ectopic pregnancy or ruptured ectopic pregnancy</td>
<td>3</td>
<td>4.7</td>
</tr>
<tr>
<td>Menstruation regulation</td>
<td>1</td>
<td>1.6</td>
</tr>
<tr>
<td>Abortion</td>
<td>5</td>
<td>7.8</td>
</tr>
<tr>
<td>Miscarriage</td>
<td>6</td>
<td>9.4</td>
</tr>
<tr>
<td>Still birth</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Forceps, vacuum</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Caesarean operation</td>
<td>8</td>
<td>12.5</td>
</tr>
<tr>
<td>Normal delivery</td>
<td>31</td>
<td>48.4</td>
</tr>
<tr>
<td>During labour</td>
<td>3</td>
<td>4.7</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>64</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

---

become life-threatening. This study showed that nearly 33.3% of women on average had check-ups during pregnancy, with Quang Ngai having the highest rate at 71.4%, and Cao Bang the lowest.

Approximately 50% of the total maternal mortalities were women who had no check-ups at all during their pregnancy, and there was no information on antenatal care for another 16.3%.

Detailed examination of the data showed that women living in lowland and urban areas had the highest proportion of pregnancy check-ups.

The TBMS study found that 62.9% of mothers had no check-up at all during their pregnancy, and the numbers of women who had one, two or three check-ups during pregnancy was lower than in this study, suggesting that the pregnancy care situation has improved in general over the five years between studies.

3.2.5 Treatment and care before death

Treatment in obstetric emergencies is crucial, and in this case provides a basis for identifying reasons for death, for example the availability of health care in terms of necessary medical equipment, medicines and the professional skills of health workers. Information on treatment before death was available for about 49.0% of the maternal mortalities identified, and for 87.2% of these, it was reported that the women received treatment before they died. This raises the very important question of why so many pregnant women died even though they received treatment.

The TBMS study found 53.9% of maternal mortalities had received treatment before death, again suggesting that maternal health care has improved over the last five years.

<table>
<thead>
<tr>
<th>Number of check-ups during pregnancy</th>
<th>First trimester</th>
<th>Second trimester</th>
<th>Third trimester</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>48.8%</td>
<td>51.3%</td>
<td>52.5%</td>
</tr>
<tr>
<td>1 or more</td>
<td>35.0%</td>
<td>32.5%</td>
<td>30.0%</td>
</tr>
<tr>
<td>Unknown</td>
<td>16.2%</td>
<td>16.2%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 36. Number of antenatal check-ups among maternal mortalities, women aged 15-49 years, Viet Nam, 2000-2001

Previous disease

Only 27.5% of the maternal mortalities identified (22 cases) had previous diseases, although for a further 11 cases it was not clear whether they had previous diseases or not. The results showed a relationship between previous diseases and maternal mortality due to indirect causes.

This demonstrates that lack of or very little antenatal care is very common and a significant risk for maternal mortality. It also demonstrates poor knowledge about pregnancy monitoring and antenatal care.
Type of health care provider

It was found that 64.7% of health care providers who treated the women before they died were doctors, 29.4% of them were midwives, 14.7% were doctor assistants and nurses, and an insignificant number were traditional birth attendants.

Type of treatment

Information on treatment was available for 53 cases. Of these, 45.0% had intravenous infusion, with 7.5% blood transfusion and 57.0% solution infusion.

Place of death

About 43.7% of the women died at home, down from 52.0% as found by the Thai Binh Medical School study. However, 25.7% of those who died at home had been treated in health facilities and asked to return home when their condition worsened. A high number of deaths at home were of women who were not able to access modern health clinics. Dac Lac, Kien Giang and Cao Bang provinces had the highest number of maternal mortalities occurring at home.

Among 35 cases (43.7%) of the women who died at home, 22 (62.9%) were home deliveries and 5 returned from health facilities. Eight cases (22.9%) died before the end of their pregnancy, and these were due to asthma, tumour in the brain, pulmonary tuberculosis, blood infection, heart failure and unknown causes.

Thirty per cent of maternal mortalities occurred in provincial hospitals. Although these cases were being treated in good health facilities, several reasons contributed to the fact that they could not be saved, such as late arrival at the hospital and being already in a dangerous health condition where chances of survival were limited.

Ten per cent of maternal mortalities occurred in district hospitals. Though the infrastructure conditions and the professional skills of health workers are not as good as in the provincial or central hospitals, the major reason for these mortalities was delay in arriving at the hospital, which was due to distance, late referral from lower-level health facilities or late decision by the families to seek health care.

Delay in transferring women to higher-level health facilities accounted for 7.5% of cases dying on the way to receive treatment. This occurred not only in the mountainous provinces, but also in Ha Tay, where 1.3% of mortalities were attributable to haemorrhage without timely treatment in private health clinics.

Women living in highland areas have higher rates of mortality at home and in hospitals than those living in urban areas. All of the mortalities that occurred during transportation to a health facility or in a private clinic were of rural women.

The number of deaths at home among women living in mountainous areas was twice that of women living in lowland areas, again demonstrating how difficult it is for women in mountainous areas to access health facilities.

3.2.6 Non-medical factors relating to maternal mortality

In recent years, obstetric complications have been a great concern, not only in mountainous area but also in the country as a whole. The World Health Organization estimates that about 15% of pregnancies have obstetric complications. In Viet Nam, the rate of obstetric complications was 72 per 10 000 births in 1997, and 73 per 10 000 births in 1998. The number of maternal mortalities increased from 190 cases in 1997 to 272 cases in 1998. The data comes from the Health Statistics year book.29

The results of in-depth interviews and group discussions with health workers at grassroots levels, district doctors, leaders of local authorities and mass organizations, and family members and relatives of the dead women, indicate that the main factors relating to maternal mortality were: delay in deciding to seek health care, delay in accessing health
Table 37: Place and timing of death for maternal mortalities among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Place of death</th>
<th>Before pregnancy termination</th>
<th>During or after pregnancy termination</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Private clinic</td>
<td>1</td>
<td>1.6</td>
<td>7</td>
</tr>
<tr>
<td>District hospital</td>
<td>1</td>
<td>6.3</td>
<td>7</td>
</tr>
<tr>
<td>Provincial hospital</td>
<td>5</td>
<td>31.3</td>
<td>19</td>
</tr>
<tr>
<td>Central hospital</td>
<td>4</td>
<td>6.3</td>
<td>4</td>
</tr>
<tr>
<td>Other health facilities</td>
<td>1</td>
<td>6.3</td>
<td>1</td>
</tr>
<tr>
<td>At home</td>
<td>8</td>
<td>50.0</td>
<td>27</td>
</tr>
<tr>
<td>On the way to a health facility</td>
<td>1</td>
<td>6.3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>20.0</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 38: Place of death and place of residence among women aged 15-49 years, Viet Nam, 2000-2001

<table>
<thead>
<tr>
<th>Place of death</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Private clinic</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td>District hospital</td>
<td>2</td>
<td>18.2</td>
<td>6</td>
</tr>
<tr>
<td>Provincial hospital</td>
<td>5</td>
<td>45.4</td>
<td>19</td>
</tr>
<tr>
<td>Central hospital</td>
<td>4</td>
<td>5.8</td>
<td>4</td>
</tr>
<tr>
<td>Other health facilities</td>
<td>2</td>
<td>2.9</td>
<td>2</td>
</tr>
<tr>
<td>At home</td>
<td>4</td>
<td>36.4</td>
<td>31</td>
</tr>
<tr>
<td>On the way to a health facility</td>
<td>6</td>
<td>8.7</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>13.4</td>
<td>69</td>
</tr>
</tbody>
</table>
facilities, poor health facilities, poor living conditions, level of education, religion, gender issues, low awareness and lack of sources of information on family planning, and reproductive health care, and other cultural and socio-economic factors that reduced access to health care services.

Delay in deciding to seek health care

Deaths of pregnant women and their babies can be prevented if they and their families understand that they need to be brought to health facilities in time for life-saving treatment to be successful. The results of this research demonstrate that there are many reasons why the decision to access health care for pregnant women might be delayed, including lack of knowledge about complications and their indicators, attitudes of the husbands of pregnant women, and poor economic status.

Lack of knowledge about complications means that signals are not recognized and the need for expert health care is not understood.

In 2001, in Nguyen Hue commune, there was a case of maternal mortality with an identified cause. The woman’s mother asked her to give birth at home without knowing her heart disease, and when there was complication her mother did not know what to do. When the family brought the woman to the commune health clinic, she was too weak to be saved (a case in Nguyen Hue commune health clinic – Hoa An – Cao Bang).

The case studies in Annex 1 provide further illustrations of how delay in deciding to seek health care for family or economic reasons contributes to maternal mortality.

Late arrival at health facilities

Delay in reaching health facilities can be due to several reasons, including distance, lack of first aid equipment and means of emergency transportation,
local traditions of self-care at home, and not going to health clinics for regular check-ups.

One health care provider in Quoc Oai hospital, Ha Tay, pointed out that some people believe that abortion shames their family. These people are more likely to seek abortion at private health clinics, which tend to be poorly-equipped both in terms of medical equipment and the professional skills of staff. When complications of abortion occur, which happens more often in private clinics, the women are then referred to the Government health system, but by this time it may already be too late.

The transportation system in Viet Nam is still poor, especially in areas where the main means of transportation is by boat. Fast means of transportation are not available in some health clinics, and there are cases where pregnant women die because an ambulance cannot reach them in time and there is no other means of transport in the locality. For instance, Ms. Nguyen Thi Chung (in Kien Giang) haemorrhaged after birth and died three hours later because there was no means of transporting her to hospital for emergency treatment.

Poor transportation also means that pregnant women are more likely to give birth at home or at traditional birth attendants’ houses, and this is associated with increased risk of maternal mortality.

Conditions at health facilities

The greatest difficulties facing many health clinics at present are the shortage of professional health workers, lack of medical equipment and medicines, and lack of specialty information to support treatment activities. These problems have a great impact on maternal and child health care activities, and are indirect causes of maternal mortality.

A case in Khanh Xuan ward of Buon Ma Thuot is a typical example. The ward has a population of nearly 24,000 people in an area of 20 km² and transportation is complicated, but there are only three permanent official staff working in the health clinic that serves this area.

Many maternal mortalities are attributable to lack of knowledge among health care providers. In health facilities, it is the midwives who directly manage pregnancies, but they are unable to diagnose complications such as heart disease. Training programmes and courses for health workers tend to focus on areas such as malaria, dengue fever prevention and leprosy prevention, and rarely on obstetrics or internal medicine. Lack of diagnosis or incorrect diagnosis can lead to maternal mortality.

Professional health workers must not only have the appropriate knowledge to monitor pregnancy and childbirth, but must also demonstrate responsibility towards the health of their patients.

“In my opinion, the most important reason leading to maternal mortality can be the poor responsibility of health staff. When checking a pregnant woman’s health, they cannot make a correct diagnosis and do not ask them to have regular check-ups. For example: in the first trimester, the health workers do not know about diseases of pregnant women; in the second trimester, there may be some diseases relating to pregnancy, but they don’t remind pregnant women to have regular check-ups; and in the last trimester, in case of too big or unusual fetus, the mother may need to be taken to higher level health facility, and the decision to transfer is late, the mother can die on the way. In addition, after birth, if we do not take good care of the mother, she can suffer haemorrhage. If the health worker is not good at taking blood pressure and temperature, a mother can get infection after birth but health worker might not realise and might not know how to give treatment on time.” (Group discussion at Dai Dong health clinic, Ha Tay).
In recent years, health care has been implemented at commune level, and some communes provide adequate management of pregnancy, including check-ups, identification of potential problems and timely referral where necessary. However, this has not yet been well implemented in mountainous and remote areas, where living conditions are more difficult.

Many health clinics have sufficient human resources and professional management skills but lack the necessary medicines and equipment to treat more unusual cases.

Poor infrastructure, equipment and medicines affect health care services and can sometimes lead to death. A doctor in Krongno commune, Krongpong district, Dac Lac province said:

“Yesterday, there was an operated case and luckily the patient survived, despite the problem of lack of blood. A doctor must sign for using blood and pay his own money for it. I myself have to pay quite a lot of money for blood, and if patients die, we still have to pay for blood. Two weeks ago, there was a pregnant patient who was anaemic and had transverse presentation. After having internal version she had to have a caesarean operation. She bled too much, but there was no blood for her. If there had been just one bottle of blood for her, she would have not died. Thus, it means that we are very poorly equipped and it has great impact on patients’ life”.

Another difficulty that health clinics face is the heavy and time-consuming administrative procedures required for recording and report management.

“You see, a health record is noted by a doctor, a nurse and a midwife. Too much time is spent recording so they have less time for taking care of patients. Legal monitoring of a health record must be in writing, and even if we did not look after the patient, we still have to invent a record. It is said to have 12 hours of duty but in fact in the next morning we have to write records until 8 – 9 a.m. There are often only two people on duty and if there are two deliveries, there will be nobody to receive patients and the doctors must take full responsibility for this situation. In case of maternal mortality, we feel having responsibility for it but the work load has made us too tired. And we cannot be perspicacious when we are tired. Thus, it is necessary to improve the administrative procedures and to save more time for patients’ caring” (an interview in Dac Lac).

Economic status

Economic conditions have a great impact on health care in general and mothers in particular. Pregnant women need suitable working and nutritional conditions but many women, particularly in rural and mountainous areas, still work up to the time of delivery, transferring to lighter work if they are unable to continue their normal work. Nobody takes maternal leave. According to health workers in Tinh Hoa commune, Quang Ngai province:

“Socio-economic factors greatly affect the mortality of mothers. For example, we advise them not to do hard work or not to work in harmful environment but many do not follow. For example if they do a very hard work, we can just give advice but can not force them to stop working”. (Health workers in Tinh Hoa commune, Quang Ngai province).

Pregnant women need appropriate diet and supplements, but difficult economic conditions mean that many women do not get the nutrition they need. Many families in the study eat salted fish, and cannot
afford meat or fresh fish. Health workers in Eatrul commune, Krongno district, Dac Lac province said, "We would like to request the State to pay more attention to remote and mountainous areas so that the economy can be further developed. Improved living standards would lead to better health and decrease of diseases. Pregnant women once can access to full nutritious system can reduce the mortality rate".

Economic conditions also affect the selection of health posts. Mortalities were identified among women who attended private health clinics because they could not afford the treatment costs on State-owned health facilities. Private health clinics are more likely to be poorly equipped and lacking in staff qualified to cope with difficult complications. The case of Mrs. Chung in Dong Thanh commune, Kien Giang Province is an example:

“She gave birth had many children, and lived in poor economic’ conditions. She had a check-up in commune health station, she was referred to upper level health facility. However, due to difficult economic circumstances, she decided to deliver at the hamlet health post. She had hemorrhage and then died”. (a case study in Dong Thanh commune, Kien Giang)

Women may seek abortion due to poor economic conditions or ill-health. Unsafe abortion can increase the mortality rate of mothers, and the procedure can have dangerous complications, including failure to remove the fetus, infection and bleeding due to retained placenta, and secondary infertility due to sticky uterus or oviduct. These can affect health, sexual life and reproduction, and may have long-term consequences for the women.

Level of education

Level of education has a major impact on the lives of women. As society develops in Viet Nam, levels of education are increasing. However, the ratio of literate and well-educated women is still very low in comparison with men, particularly in rural, mountainous and remote areas.

Interviews in Krongno commune, Krongpo District, Dac Lac Province, revealed that more people were literate than illiterate. Nevertheless, those who were literate had only finished the first or second grade of school education. Very few people had finished lower secondary education.

Low education levels are associated with women having inappropriate perceptions of self-care. Health workers in Dai Dong commune, Ha Tay Province were interviewed about the factors that affected reproductive health care behaviour in the locality, and cited “the major reason is that pregnant women have limited knowledge of prenatal reproductive health care.”

Most of the women who died had low education levels, as determined by in-depth interviews and group discussions with family members. For instance, Mrs. Thu in Hoang Ngo commune, Quoc Oai district, Ha Tay province, had only completed the third or fourth grade, and a mother in A Sinh commune, Huong Hoa district, Quang Tri province, had only finished the first grade.

Religion

The rate of women giving birth to their third child was higher in areas where there was a high population of Catholic people than in areas where the Catholic population was low. The Catholic Church does not permit abortion. Some women were found to have given birth seven or eight times, with very short spacing between births. This greatly affects the health of both mother and child. Women
in poor health and living under constrained economic conditions are more susceptible to disease and therefore have a higher risk of mortality.

Gender

Considerable progress on gender equality has been made in Viet Nam in recent years. Nevertheless, gender discrimination still exists in rural areas in relation to jobs, incomes, household work and child care. Every family wishes to have a son to continue the line, which can have a great impact on decisions about giving birth.

“Another reason for regrettable case of pregnant women is that older women insist on giving birth to a son in spite of explanations and advice of health workers” (Group discussions in the Health Station in Dai Dong commune, Ha Tay province).

Gender discrimination issues are often found in rural areas where life is based around agriculture and work and circumstances are hard. Some families treat sons very differently from daughters, taking greater care of the sons and their education. There were cases where the wife was rejected because she could not give birth to a son.

According to health workers in Tinh Hoa commune, Quang Ngai province, on the 21st April 2000, a woman died because of postnatal infection. “She was in good health while carrying her fourth child. After having ultrasound, she knew that the fourth child would be a daughter. She was so sad and still went to work without taking proper care. When delivery time came, she felt headache and fever, and then was taken to the provincial hospital but it was too late.”

Information on family planning and reproductive health care

Communication and information about family planning and reproductive health care are very important factors in the mortality of women and mothers. Communication has direct and strong impacts on the perceptions of women about health care.

Health communications to villages, mass media, radio and television have helped to raise knowledge considerably.

“In the past, we had to repeat many times but now it is very easy as sometimes, their knowledge is better than that of village health workers. They even go to health stations for health check without notice from workers. Formerly, they gave birth at home but now they decide to go to stations instead”.

Information activities around reproductive health care are carried out annually. Women of reproductive age are invited to share information and their experiences of pregnancy, and taught about the dangers of abortion, and the importance of proper nutrition, regular check-ups, and mother and childcare.

Mass media play an important role in communicating information about family planning and reproductive health care. For example, the importance of regular health check-ups for pregnant woman is stressed, particularly for identifying potential problems, such as dystocia, uterine rupture and other complications. These communications encourage women to visit the doctor more frequently, talk with health workers and hopefully contribute to a decrease in maternal mortalities.

“I think that funding for communications should be increased in order to limit the mortality rate as this is an essential and decisive issue. Once people are all equipped with knowledge of reproductive health care and health services, they will understand problems, risks and complications that might happen” (Group discussions in Quoc Oai hospital, Ha Tay province).
However, communication activities can be very difficult for health workers and collaborators to implement. Methods of communication are sometimes a constraint, for instance where radio coverage is sparse or geographical conditions are difficult.

“For instance, people in the Fourth Ward, Dong Ha town usually live on boats, sailing here and there. Whenever we conduct communications, we have to hire boats to go to their places and thus, the results achieved are not very efficient” (Group discussions in Dong Ha Health Center, Quang Tri province).

Oral methods of communication are not always able to reach their targets, and communication materials are often in short supply and cannot be distributed widely. Women may be unable to attend meetings because they have to work and cannot spare the time.

“They are busy so they have no time for meetings. They cannot understand so they do not want to listen. We also raise the problem of giving birth at home but there are some cases where they do not think about it and they give birth en route” (Health Station in Vinh Trung commune, Vinh Linh district, Quang Tri province).

Consultations are another important activity for promoting safe motherhood and reproductive health care, but these are also constrained by a range of factors, including lack of training and experience.

“We have no experience on consultation. Consultation requires skills and enthusiasm. If someone is equipped with skills but does not have enthusiasm, he or she does not want to give consultations. And it is not efficient if vice versa.” (Group discussions in Quoc Oai hospital, Ha Tay province).

Family, culture and customs

A range of cultural factors and traditions affect the reproductive health care of women.

“Some women still went to work though their fetus were already too big. They got a cold and after half of a month, they had haemorrhage. This is a burning problem in rural areas.” (Group discussion in Dai Dong health clinic, Ha Tay province)

In some rural areas it is traditional for a woman to have a diet of only vegetables and eggs after delivery. This can lead to asthenia and increased susceptibility to disease, and their health can be badly affected.

Some ethnic minority women do not let anyone in their family know of their pregnancy.

“My wife did not say anything to me even when she was going to give birth as she was too shy” (A Xinh commune, Huong Hoa district, Quang Tri province).

Others are expected to give birth to sons. Many women do not have prenatal health checks, and some believe:

“God gives birth to elephants and grass at the same time”. “No need for health check”. Sometimes, they take traditional medicines to keep their fetus small for easy birth.” (Group discussions in Quang Ngai hospital).

Birthing customs can also increase the risk of maternal mortality.

“Following the customs of her ethnic minority people, Mrs. Krinto in Krongno commune, Krongpong district, Dac Lac province, went into the forest to give birth alone. However, she already had malaria during her pregnancy, and after birth she
developed a high fever. In addition, she did not have food or medicines. Finally, she died 14 days after giving birth.”

Improper traditional care, such as lighting a fire under the mother’s bed, is still practised among some groups.

3.2.7 Outcomes for the children of maternal mortality cases

Out of 64 cases of maternal death during or after delivery, 41 children were born. The remaining 23 cases were ectopic pregnancy, MR, abortion, miscarriage, still birth or unknown.

Eleven children (26.8%) died after the death of their mothers, 54.5% of these died in the first week, 27.3% in the first month and 18.2% in the first six months. Out of the children who died, 73% were from mountainous areas, mainly from the provinces of Cao Bang, Dac Lac and Quang Tri. The main reasons for death were suffocation, innate defects, infant pneumonia, and malnourished fetus.
4.1 Conclusions

4.1.1 Epidemiology index

The estimated maternal mortality ratio (MMR) nationwide was **165 per 100,000 live births**. The ratio ranged from **124 to 206 per 100,000 live births**.

The overall calculated MMR for the seven Provinces in the study was **130 per 100,000 live births** and varied from **103 to 162 per 100,000 live births**.

The lifetime risk, (the risk of an individual woman dying from pregnancy or childbirth during her lifetime), using the MMR at the seven study sites was **1 in 334**. The estimated lifetime risk of the seven provinces ranged from **1 in 1,204 to 1 in 81**. The estimated lifetime risk of the country as a whole was **1 in 248** and ranged from **1 in 427 to 1 in 175**.

4.1.2 Medical causes of maternal mortality

Direct causes accounted for 76.3% of maternal mortalities and indirect causes 23.7%. The direct causes were haemorrhage, 41%, pre-eclampsia 21.3%, infection 16.6%, complications of abortion 11.5%, uterine rupture 4.7%, and ruptured ectopic pregnancy 4.8%.

Indirect causes of maternal mortality were: heart disease 26.3%, hepatitis 10.3%, cerebro-vascular diseases 10.7%, tuberculosis 10.5% and malaria 15.3%. Other causes that were related to a maternal death were asthma, poisoning, malaria, cancer, mental disorders and encephalitis.

4.1.3 Contributory factors relating to maternal mortality

A delay in the decision to seek health care due to a lack of knowledge about pregnancy and childbirth, and a delay in reaching a health facility, accounted for 46.3%. Other reasons were distance from health facilities, lack of means of transportation, and local people’s habits and customs in choosing to take care of the woman at home instead of going to a health care provider.

A delay in referral and transfer of the woman to a health facility accounted for 41.3%. These late decisions were often due to long distances, poor roads or lack of transportation, all of which have a negative influence on maternal deaths.

Delays in providing essential treatment on time accounted for 40.0%. Most were due to difficulties within the health facilities, such as shortage and quality of professional health workers, and lack of emergency medical equipment and medicines.

Poor economic conditions also have an impact on maternal deaths. In addition, lack of information and insufficient information were a factor in some localities, particularly in remote and mountainous areas.

Apart from the above causes, cultural, traditional, family and other economic factors also hinder the access of women to reproductive health care services.

In conclusion, this maternal mortality study has shown that the pattern of maternal deaths in Viet Nam is similar to that found in other developing
countries. It has also highlighted the constraints of the official health information management system in accurately reporting and recording maternal deaths and obstetric complications. The results of this study provide a baseline national maternal mortality ratio against which to measure future progress.

4.2 Recommendations

**Community mobilization:** Strengthen information, education and communication for all women aged 15 to 49 years and their families to help them recognize the danger signs of complications during pregnancy, childbirth, and postpartum, and encourage them to attend an antenatal check-up at a health facility at least three times during pregnancy. Encourage women to give birth at a health facility or to have a health worker attend the delivery. Promote information, education and communication for women about safe motherhood and newborn care.

**Quality of maternity care services:** Improve the counselling skills of maternity service providers, especially for first level staff. Strengthen the obstetric and midwifery skills and knowledge of staff at district and commune levels. Provide training in obstetric first aid, normal delivery, and timely referral for village health workers and Traditional Birth Attendants. Ensure all health facilities providing midwifery and obstetric services have an adequate supply of essential equipment, medicines, and emergency surgical capacity. Promote timely referral of obstetric complications. Establish an obstetric best practice committee to review the evidence periodically.

**Supervision and monitoring of health services:** Use death audits and clinical audits to improve the quality of care.

**Remote areas:** Promote the outreach activities of both the district and commune level teams to improve access for women to health care services. Explore the establishment of a communication network, from commune to district and province, in order to respond to emergencies. Promote clean delivery.

**Health systems development:** Set up a National Safe Motherhood Programme that is integrated into all health care activities, and especially links with the objectives of social development programmes, such as poverty reduction and enhancing women’s role and status.

**Health Information Management System:** Complete the standardization of the health data system to provide reliable information about health of women and children, including registration of births and deaths.

**Political commitment:** Promote the care of women before, during and after birth within their communities. Stimulate the necessary commitment from local authorities, nongovernmental organizations and the health system to implement a safe motherhood programme to improve women’s reproductive health and the health of their babies. The programme should be based on local people’s needs and implementation should be with the active participation of the community.

**Suggestion to the Ministry of Health:** Set up a qualitative study to understand more about the childbirth practices of people in poor and remote areas in order to identify how best to reach those with the greatest need.

4.3 Lessons from the research

This was the first time that the Ministry of Health in Viet Nam had conducted a community-based research project on maternal mortality on such a large scale. Although funding was limited, remarkable results were obtained, thanks to thorough preparation and active support of the local communities and government authorities.

It is hoped that the information from this research will contribute to the understanding of maternal death among colleagues and concerned agencies in safe motherhood programmes and in any future surveys on maternal mortality.
4.3.1 Key points on the identification of data sources

Use several data sources to identify maternal mortalities.

Review health records retrospectively to identify maternal mortalities and avoid missing any deaths of women of reproductive age.

When conducting household surveys, use different ways of collecting information to eliminate duplication, as a woman may use several names.

4.3.2 Key points on development of the research plan

Make a careful estimate of costs before conducting the survey. Finance is the basis for the selection of appropriate techniques (sampling method and sample size). The survey should not be carried out if there are insufficient funds, as this will have an impact on the quality of the survey and the results.

Early contacts and discussions with the targeted areas are essential in the planning process, as this contributes greatly to successful implementation in the field.

Health workers should be used as investigators in order to obtain sufficiently detailed information. Proper training and monitoring of researchers is essential for obtaining good results.

All maternal deaths caused by abortion or childbirth, whether the woman is married or not, must be investigated.

Pre-testing the research instruments is mandatory.

4.3.3 Key points on data analysis

Double entry of data is essential.

The involvement of obstetric experts is vital when decisions about causes of maternal mortality are made.

Information gained from case studies has the greatest value when analysing non-medical factors that relate to maternal deaths.
REFERENCES


Abdulaziz et al. (1995) N. Personal communication. London: London School of Hygiene and Tropical Medicine


Assessing Safe Motherhood in the Community – Mother Care/JohnSnow, Inc – 1998


General statistics office - General survey on demographic and household, 1999.

General Statistical Office, 1999 population and housing census of Viet Nam, Statistical Yearbook, 2000


The Ha Noi Medical College. Medical epidemiology. Medical Publish House 1990


Maternal mortality in Vietnam, Medicine publisher 1997

Maternal and Perinatal Infections a practical guide – WHO – 2001


MOH - Workshop on analysis and intervention recommendations to reduce maternal and newborn mortality and morbidity - Hanoi, 4/2002

MOH - UNICEF: Interview to find maternal mortality causes - 12/2000


NCPFP vµ GTZ; VNRHS-95, Hµ Néi 1995


Off to rapid start: appraising maternal mortality and services – Oona Campbell; M. Koblinsky; P.Taylor – 1995


Qualitative designs and data collection

Research Center for Rural Population and Health, Do Trong Hieu et al, Findings of the survey on maternal mortality in Lap Thach and Yen Lap districts, Vinh Phu province, pp12, Thai Binh Medical University, 1995.

Sample Size Determination in Health study – WHO 1991


Save the Children-US 1999, Safe Motherhood: Towards Safe Delivery, Case studies of maternal mortalities and near-miss deaths from obstetric complications in Quang Xuong district, Thanh Hoa province


UNICEF 2000 The Situation of Children and Women in Viet Nam

Viet Nam reproductive Health Policy to 2001
Vietnam Demographic Health Survey 1997

WHO - Safe Motherhood Programme - Studying Maternal Mortality in Developing countries - Rate and Causes - A guidebook.


WHO maternal mortality A global Factbook, Geneva 1991


WHO Reduction of maternal mortality. World Health Organization, Geneva 1999

ANNEXES

Annex 1: Case studies

1. A case of maternal mortality in Ha Tay Province, Viet Nam

Surveyed site: Huu Bang commune, Thach That district, Ha Tay province. 35 km from Ha Noi.
Maternal mortality case, the year of 2000: Mrs. Nguyen Thi Hang, 30 years old with 4 children.
Cause of mortality: hemorrhage
Interviewee: Ms. Phan Thi Quy, 46 years old, the aunt of the victim’s husband.
Date of interview: 25 July 2002

We met family members of the woman who died, right on the day she died two years ago. Her aunt could not hide her sorrrows when telling us her story. She repeated: “on this day Hang died”.

Hang was still young, only 30 years old. Like other women in Huu Bang, she worked very hard everyday with her husband to bring up their children. She was always busy. In early mornings, together with her mother, Mrs. Vai, she went to the district town, 7 km from the commune, by bicycle to take rice for husking. They worked together for many years. Mrs. Quy still remembered on the day before she gave birth to the youngest child, she rode in front of her house asking her if she wanted to have good rice. She rejected and advised her niece to take of herself and the fetus. Mrs. Hang told her to worry too much as she would give birth at the end of the month.

Few days before that day, Hang’s husband took her to Hanoi for fetus checking because she got stomachache. Doctors of the C Hospital said that she would give birth at the end of the month and told her to go to Hanoi for birth giving. She got home and still worked as usual. Sometimes she felt hurt in stomach.

Her aunt still remembered her image of carrying 200 kg of rice from the district every morning. The road is in very bad condition and usually flooded when it rains. “Her bike is fluctuating. The road is too bad”. Her aunt shook her head when seeing her niece working too much. At the beginning of the year, the couple built a house and bought some land. After such a big investment, the family had to work very hard to stabilize its economic conditions. She husked rice while her husband worked in the carpenter’s from day to night.

In the morning of the 25th September, she felt hurt and told her mother to go to the district by herself. Her mother advised her to go to the communal health clinic for checking. She went straight to the clinic and there, Ms. Lan, obstetric assistant doctor examined and said that Hang would give birth soon. Health workers told her to stay at the clinic and asked family members to bring clothes to the clinic. Mrs. Quy just arrived at the clinic at that time and then got back home to tell her sister-in-law to bring clothes to the clinic.

After sometime Mrs. Vai also went to the clinic. She arrived just when Hang gave birth. Placenta fell down from the tray the assistant doctor was carrying. At the time, Ms. Lan guessed that Hang could have a hemorrhage and she decided to inject her. Then, Ln phoned the Hospital of Thach That district to send the ambulance to the commune. While waiting for the ambulance, Lan gave Hang another injection and
sat beside her. It seemed that Hang was bleeding and Mrs. Quy said that when she got back to the clinic she saw Hang’s blood under the bed “as water is poured”.

They put her in the ambulance and then went to the district hospital. Her husband also got on the car. There were two assistant doctors named Nhung and Lan, the husband and the mother of Hang and herself in the car at that time.

En route to the hospital, Hang groaned because of pain. Lan advised her not to worry as doctors at the hospital could save her with sufficient equipment. She was still groaning.

After sometime, she stopped groaning. When the ambulance reached the gate of the hospital, doctors rushed into it and examined the patient right in the car. After examination, the doctors shook head and said that she passed away. The car took her back home again.

Mrs. Quy said that things had happened too fast. It was only two hours since she went to the clinic and then was taken back to the village.

The child had to stay at the hospital for three days. Fortunately, the child could suck Hang’s younger sister as she had given birth. The elder brothers of the child kept crying and asked for mother.

Hang’s husband kept silent and did not make any complaints. When the car stopped for Lan’s getting off, he told her that he would return the day after to pay for the medicines.

Two years have passed, four children have grown up and looked healthy. The eldest one is at the 6th grade while the youngest can walk. But villagers are still in shock. Mrs. Quy said that probably due to Hang’s case, fewer people go to the health clinic. They want to go directly to the district hospital to be cured timely.

Mrs. Quy finished her story with a series of souvenirs of the father and his children. She hopes that there will not be any cases like her niece’s.

2. A case of maternal mortality in Binh Duong Province, Viet Nam

Mrs. Nguyen Thi Lanh, 36 years old

Tan Hiep village, Phu Chanh commune, Tan Uyen district, Binh Duong Province.

Causes of mortality: hemorrhage and uterus rupture

From the communal health clinic of Phu Chanh, we went to Lanh’s house. We crossed an earth road of 4km’s long with rubber trees on the both sides and turned into a small path. We saw in front of us a newly-built house with brick walls and iron roof. Next to the house there stands a no-door-kitchen made of wood pillars and thatch roof. Two cows were attached to the pillars. Her house was surrounded with bamboo. We waited for a while with the sister of Lanh’s husband and then met with Mr. Nguyen Van Hanh, 37 years old, Lanh’s husband and Mrs. Luong Thi Hoi, 58 years old, Lanh’s mother-in-law. Mr. Mai, younger brother of Lanh’s husband also talked with us while Lanh’s three children were playing around.

Lanh died at the age of 36 and she only finished the 3rd grade. She was an orphan and her family’s circumstances were very hard when she was carrying her fourth child. Her husband was an assistant building worker, earning VND 700,000/month. She stayed at home and peeled cashew, earning from VND 200,000 to VND 300,000/month. With the average income of VND 1,000,000/month, they had to bring up three children. Besides, the couple owed to neighbors VND 9,000,000 for house construction.
After giving birth to three daughters, her husband, the eldest son of a big size family (8 children), still wanted a son to maintain his race. According to family members, Lanh was in a good health when she was pregnant looked “fatter” than previous pregnancies. As economic conditions of the family were difficult, she only ate a little more than usual. Cashew peeling was also less harder than what she did in the previous pregnancies. This time, she frequently went to the communal clinic for checking and vaccination. She was also checked with the ultra machine and knew that the fourth child would be a son. This made the whole family happy and she decided to give birth at the general provincial hospital as Ms. Quy, the pediatric/obstetric doctor assistant of the commune health clinic, advised her.

Lanh had symptoms of birth giving at 7a.m on the 23rd June 2002 with bellyache. According to Mr. Mai, Lanh told her husband, her mother-in-law and Mr. Mai that she was very painful. Mai took her to the provincial hospital by motorbike and she was hospitalized at 8 a.m. Dr. Hoi examined and checked with the ultra machine and said that the fetus was in good health and there were no problems at all. She was re-examined at 10 a.m on the day after and doctors said that symptoms were good and she would give easy birth. Mrs. Hoi told us that she had requested doctors to let her be operated but doctors said that was not necessary. While telling the story, all members were very moved and this made us crying. From 10 to 12 a.m on the 24th, the uterus was just opened 3cm. Lanh was still in good health then. At 13h00, she was taken to delivery room. At 14h00, the child was born and weighted 3.2 kg but rather weak due to suffocating. The child was electrically shocked and separated. At 17h00, doctors said that the child was dead and told the family to take the child back home. Also, according to doctors, Lanh had a hemorrhage and her uterus was broken after birth giving. Her health was in danger. Therefore, doctors decided to operate and sew her uterus. Lanh’s mother-in-law said that on the way to the operating room, she shouted “Mum, I am going to die”. During the operation, her family had to buy many things: injection needles, serum and 10 bags of blood according to doctors’ description. After two hour operation, doctors asked to take her to Tu Du hospital. Lanh was hospitalized at 20h00 and was given first-aid but finally she died at 21h15 on the 24th June 2002.

At present, Mr. Hanh has to bring up three children so his plight is very difficult. The eldest daughter, 12 years old, has to work in cashew factory in summer vacation to earn money. After the death of his wife, he had to sell furniture to pay back the debt. We visited his house, there were only a bed, a wardrobe, a black and white TV, a tape player and a dim neon light.

3. A case of maternal mortality in Dak Lak Province, Viet Nam

Case study on maternal deaths at Yang Mao Commune, Krongbong District, Dak Lak Province.

Dead mother : HPon - Birth year 1965 - Death Year 2000

Interviewee: A Ma Loan – H’Pond’s father – Quanh village, Yang Mao commune, Krongbong, Daklak.

By 1.30 PM, 25 July 2002, two health staffs of Yang Mao commune led our way to A Ma Loan’s family whose daughter unluckily died 10 days after giving birth.

We reached Quanh village after a dimly dusty walk of more than two kilometers, under the sun and the wind of dry season on Central highland We all burst out laughing to see each other smeared with dust, like having just dug out water wells. On the right of narrow pathway stands a small, simple stilt house, surrounded by large grounds of maize. An about-60-year old man with austere appearance came to welcome us. My colleague, Bul, told him the purpose to our visit, then we were invited to his floor. The 70 square meter room was made from dry bamboo with articulated small wild trees. The house was simply furnished with
three vases of “Can” wine, some pans, a bamboo bed, and things that they called “clothes” lying untidily at the corner of the floor. Six persons were roughing under that roof; a seventy-year-old woman, a four-year-old child, three young men, and “A Ma Loan”. (A way to call “Father” among ethnic groups)

We sat on the floor, a young man brought out some cups, a kettle and sat down next to us. Ma Loan filled the cups with green tea and invited us. He began talking about his unfortunate daughter.

Born in 1965, H’Pond was the first daughter of Ma Loan. After finishing elementary school, she stayed home to help her family with milpa works. Seventeen years old, she got married and a year later (1983), she followed her husband (he is a policeman) to Krongd village – Hoa Son commune - near Krong bong district.

Ma Loan told us the story of his daughter with melancholy: in the year of 2000, H’pond was pregnant of her seventh child. During her pregnancy, both the mother and fetus were healthy. “What was the reason of her death and how did it happen?” we asked. The miserable man said he even didn’t know about that. When his family was informed, H’pon had already given birth ten days before and was in the hospital. However, when they came there, she passed away.

When asked about H’pond’s death, her father just knew that she did not go to health clinic. Like her previous deliveries, which were successful, she had home delivery with the help of a traditional birth attendant. This time H’pond born as usual, but after three days, she had continually high fever, she didn’t eat anything, her body was puffed with oedema. After five days, she was taken to the health clinic for medical treatments, she died five days later. Doctors said that there was a clot of blood which blocked inside and caused such high fever and oedema.

We asked him more about her bearing period and disease contracting, but Ma Loan said when she gave birth, no one in her family knew. They were announced of her situation after she was taken to the health service station. When they came there, their daughter had passed away. They knew nothing more than taking her home for funeral.

- “How is the newly born baby now?” I asked:
- “She’s a girl, three years old already. She’s still healthy and staying with her father.”

We could not ask for more information about this case as HPond gave birth and died in different location from her family. That was everything her father knew.

Leaving A Ma Loan family, we continued our trip to Kieu Village with the hope that we could get more information.

It was 3 p.m. and we continued on the same road. Bul and I had to keep far from the front car as it was too dusty. 15 minutes later, we arrived at Kieu village, turning to Mi Hao’s house. Mi Hao is a health worker in Kieu village. She was feeding a baby and very happy to see us. Bul told her to take us to H’Ly’s (the victim of a mortality case). She accepted with pleasure.

We walked from My Hao’s to H’Ly’s (around 500 meters).

This is a small and simple house on stilts, made from bamboo and roofed with leaves. In front of the house, there was a group of 10 children aged from 5-6 looking at us. They looked not very healthy and clean, some were not wearing clothes. After climbing on stairs made from a small tree, we entered the house with several children following. In the house there were an aunt and a younger sister of H’Ly. Each of them was carrying a 1 year old baby. I found that the house was in a mess. Bowls, pans, wood were scattering around a cooker. There was nothing precious in the house except some cooking utensils. There
was no bed. Mi Hao got a torn mat to lay on the floor and invited us to sit on. She introduced us and spoke with the aunt of the sister of H’Ly the goals of our visit. Mi Hao said that the sister of H’Ly replaced H’Ly to take care of children and also as the wife of H’Ly’s husband. According to the local customs, once the wife died, the husband had to stay in his wife’s house and marry elder or younger sister of his wife, sometimes even his wife’s aunt.

We invited them to sit close to talk. I told H’Ly’s aunt that I wanted to hear the story of H’Ly, from her pregnancy till her death.

H’Ly got married when she was 18. One year after she was pregnant. However, as the family was too poor, she had only eaten vegetables and rice and even rice was not always sufficient. She had to work as usual till birth giving. She was not affected with any diseases when she was pregnant. After 9 months of pregnancy, she gave birth with the assistance of her mother.

She got bellyache from 12 p.m. till 9 a.m. and then gave birth. She was normal at the time and still talked. But after a while, placenta did not come out. Her belly distended and she hurt very much. She shouted and wanted to take placenta out with her hands. She was very much bleeding. H’Ly’s mother sat behind her and did not do anything as she was afraid of touching blood. According to the local customs, midwives should not touch blood of patients. After one hour, placenta still did not come out. The child was still lying on the floor, and the navel was not yet cut. The child was not bathed and put on clothes. Pursuant to the local customs, the child’s navel was not cut when placenta was still inside. H’Ly was still bleeding but she could not shout anymore. Her mother was still sitting behind her. Neighbors were standing around and worried but did not know what to do. After that, someone called Mi Hao because she was Kinh and she knew many things though at that time, she was not yet a village health worker. Mi Hao decided to take H’Ly to hospital and cut navel by herself to save the child. She cut the navel, bathed and then put clothes on the child. However, when the ambulance not yet arrived, H’Ly stopped bleeding. She yawned and then did not know anything. Placenta was still in her belly.

“Where was she giving birth? In the house or in the yard? Was the delivery site well prepared?” I asked.

“Women here are not allowed to give birth in the house. A small house was set up in the garden for H’Ly’s childbirth. A mat was laid on the floor. H’Ly sat on a small chair, bending backwards. Her mother sat behind her”. H’Ly’s aunt answered.

“Who delivered the child?”

“No one. The child came out and laid on the floor. It’s very popular here”.

“Was H’Ly’s husband around when she gave birth?”

“Not around initially. But when placenta did not come out, he also went to the site with other neighbors, but he could not help anything”. A Mi Di said.

H’Ly’s aunt told the story in tears. I asked:” Why H’Ly was not taken to hospital for childbirth?” A Mi Di said” The family has no money”. I asked again:” But why was she not taken to hospital when placenta did not come out and she was bleeding?”. A Mi Di said: “The family is too poor. We had no money then so we dared not to take her to hospital. We had no money for hiring motorbike, either”.

So does everyone in the family give birth at home?

Yes, no one goes to the clinic.
The child is a girl. Now, she is sucking her aunt and stays with her father and her aunt. She is now 6 but looks like a 3 year old child.


After saying goodbye to A Ma Di and H’Nhi, we left with mercy for ill-fated mothers. We ask ourselves if there will be other unlucky cases like this anymore?
### Annex 2: Calculating country-wide MMR for Viet Nam

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<th>CBR (region in 1999)</th>
<th>CDR (region in 1999)</th>
<th>Pop in 1999</th>
<th>No of births in 2000</th>
<th>Crude deaths in 2000</th>
<th>Pop in 2000</th>
<th>No of births in 2001</th>
<th>No of births (00+01)</th>
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<td>7.5</td>
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<td>119361.9</td>
<td>30449.5</td>
<td>4148840.4</td>
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<td>1.79</td>
<td>4.2</td>
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<td>1.89</td>
<td>5</td>
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\[
\text{MMR} = \frac{\sum(a \times i)}{\sum(e + h)} \times 100,000 = 165
\]
Annex 3: Contents of in-depth interviews conducted with family members and other people related to cases of maternal mortality

Research question: In maternal mortality cases, which factors, besides medical causes, affected the maternal deaths?

Objective: Identify how the following factors affect the specific maternal death cases

- Late in making decision and accessing health care facilities
- Relation between education, religion, and maternal mortality cases
- Relation between household economy and women deaths and maternal deaths
- Gender issues related to the maternal deaths
- Difficulties in health facilities. Barriers to accessing reproductive health care services: family factors/cultures/economy
- Information and sources of information on family planning and reproductive health care

INTERVIEW CONTENTS

1. Backgrounds of dead women (family/occupation/family relations/number of births/education…)

2. This pregnancy or this birth: which birth/how was pregnancy care/working/nutrition/medicines/diseases during her pregnancy…


4. Interventions from health care facilities: how was examination/treatment/referral…?

- Lack of professional health care providers?
- Lack of medical equipment/medicines to provide in time emergency care?
- Lack of information on health facilities?

5. Family’s subjective opinions about factors related to the death of the woman

   Was it due to the lack of knowing dangerous signs?
   Due to financial difficulty?
   Due to family’s restrictions?
   Refuse treatment/social reasons
Living far away from health facilities/difficult geography/transportation?

Lack of transportation means/ambulance to get in-time care?

6. Current status of the dead woman’s child?

7. To avoid such a regrettable consequence, what should the family and the pregnant women do?

8. To avoid such a regrettable consequence, what should health facilities do?

9. What can local authorities do to reduce difficulties for women and health facilities?
Annex 4: Guidelines for group discussions and in-depth interviews with health care providers at grassroots level and in hospitals

General situation of pregnancy care in the areas.

Factors related to local women’s reproductive health care behaviours.

Causes of maternal deaths in the areas (medical causes: direct and indirect)

Affecting factors of the maternal deaths:
- women themselves
- family decisions
- accessibility to health facilities
- transportation means
- professional level
- medicines
- hygiene/sterilization
- health care provider’s attitudes...

What should health facilities do to prevent maternal deaths in the future?
- sufficient information of health facilities/health services which are available for reproductive aged women
- health education and communication to change incorrect health care behaviours
- reducing home deliveries
- reducing abortions
- strengthening health care providers’ capacity
- role of traditional birth attendants - refresh training for grassroots health care providers
- making reproductive health care services available: immunization/abortions/ion pills...
- providing sufficient medical equipment and medicines for emergent care in health facilities
improve health service quality
ensure emergency transportation means/ambulance

What do local authorities and social mass organizations do?

participate in communication activities
support health facilities’ proposals
mobilize society’s participation in reproductive health care activities
Annex 5: Form for report of death by relatives or friends

Form sequence number: ____________ FAM

Ministry of Health of Vietnam
Maternal Mortality Study
Report of death from relatives or friends

Q1. ID number ______________________

Q2. Name of the deceased women: ______________________

Q3. Address:

Village: ________________
Commune: ________________
District: ________________
Province: ________________

Q4. Could family members be located to give information about the woman’s death?

0 No
1 Yes (SKIP to Q6)

Q5. Could people other than family members (such as neighbors or friends, but not medical personnel) be located to give information about the woman’s death?

0 No (SKIP to Q7)
1 Yes
Q6. People giving information about woman’s death (circle more than one if necessary):

(1) Husband
(2) Father
(3) Brothers or sisters of husband
(4) Brothers or sisters of wife
(5) Neighbor(s)
(6) Friend(s)
(7) Other(s), (specify) ___________________

Q7. Religion of the deceased

(0) No religion
(1) Buddhist
(2) Catholic
(3) Cao dai
(4) Hoa hao
(5) Tin lanh
(6) Other, (specify) ___________________

Q8. Ethnic group of the deceased

(1) Kinh
(2) Muong
(3) Dao
(4) Stieng
(5) Khome
(6) Bana
(7) Ede
(8) Giarai
(9) Other, (specify) ___________________

Q9. Education of the deceased

(1) Did not attend school: illiterate
(2) Did not attend school: literate
(3) Primary school (from 1-4, 10/10 system, 1-5 12/12 system)
(4) Basic secondary school (from 5-7, 10/10 system, or from 6-9, 12/12 system)
(5) Secondary school (from 8-10, 10/10 system or from 10-12, 12/12 system)
(6) Professional secondary school
(7) College, university

Q10. Occupation of the deceased

(1) Farmer
(2) State employee
(3) Business
(4) Craft worker
(5) Housewife
(6) Other, (specify) ___________________

Q11. Date of death

Q12. Age of deceased at death
Q13. Number of children ever-born of the deceased

Q14. Number of living children of the deceased

Q15. Description of the circumstances of the death (Write what happened according to the reports of the relatives, friends and neighbors in Q6)

____________________________________________________________
____________________________________________________________
____________________________________________________________
____________________________________________________________
____________________________________________________________

Q16. In addition to the health problem(s) described in Q15, did the deceased have a history of other diseases?

(0) Don’t know
(1) No
(2) Yes

If yes, specify the diseases

____________________________________________________________
____________________________________________________________
____________________________________________________________
____________________________________________________________

Q17. Place of death:

(0) Don’t know (SKIP to Q30)
(1) Communal health center: (name: _______ - ______ - __)
(2) Private health facility (name: ________________)
(3) Intercommunal polyclinic  (name: ______________)
(4) District hospital  (name: ______________)
(5) Provincial hospital  (name: ______________)
(6) Central hospital  (name: ______________)
(7) Other health facility  (name: ______________)
(8) Home (SKIP to Q30)
(9) On the way to another place
   Specify where ____________________ (SKIP to Q30)
(10) Other place (not a health facility):
    Specify where ____________________ (SKIP to Q30)

Q18. Before she came to name of the place in Q17, where was she? ____________________________

Q19. How far is name of the place in Q18 from name of the place in Q17?
   Kilometers ____.

Q20. How long does it take to get from name of the place in Q18 to name of the place in Q17?
   Minutes ____.

Q21. By what means of transportation did she come from name of the place in Q18 to name of the place in Q17.
   0) Don’t know
   1) Bus
   2) Bicycle
   3) Cyclo
   4) Walking
   5) Hammock
   6) Other, (specify) ________________
Q22. Was the transportation to name of the place in Q17 available immediately when needed?

(0) No
(1) Yes
(2) Don’t know

Q23. If no, how long did she have to wait before the transportation was available?

_______ Minutes

Q24. Was she admitted to the name of the place in Q17 immediately when she arrived, or did she have to wait?

(0) Don’t know
(1) Immediately
(2) Had to wait

Q25. If had to wait, ask how long did she have to wait before being admitted to name of the place in Q17?

_______ Minutes

Q26. After she was admitted to name of the place in Q17 did the deceased receive treatment?

0 No (SKIP to Q30)
1 Yes
2 Don’t know (SKIP to Q30)
Q27. What kind of medical personnel treated her? (Circle one or more)

(0) Don’t know
(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Midwife
(5) Traditional birth attendant
(6) Other, (specify) ___________________

Names of medical personnel, and where they can be found, if available:

_________________________________________________
_________________________________________________
_________________________________________________
_________________________________________________

Q28. After the deceased was admitted to name of the place in Q17 did she receive treatment immediately, or did she have to wait?

(0) Don’t know (SKIP to Q32)
(1) Immediately (SKIP to Q32)
(2) Had to wait

Q29. How long did she have to wait before receiving treatment?

_______ Minutes

SKIP TO Q32
Q30. During the 72 hours before she died, did she receive treatment?

(0) No (SKIP to Q34)

(1) Yes

(2) Don’t know (SKIP to Q34)

Q31. If yes, ask Who treated her (circle as many as apply)?

(0) Don’t know

(1) Doctor

(2) Assistant doctor

(3) Nurse

(4) Midwife

(5) Traditional birth attendant

(6) Other, (specify) ___________________

Names of people who treated her, and where they can be found, if available:

_________________________________________________

_________________________________________________

_________________________________________________

Q32. During the 72 hours before she died did the deceased receive an intravenous transfusion?

(0) No

(1) Yes

(2) Don’t know
Q33. If yes, was it fluid or blood?

(1) Fluid
(2) Blood
(3) Don’t know

Q34. Was the deceased attended by medical personnel when she died?

(0) No
(1) Yes
(2) Don’t know

Q35. If yes, ask What kind of medical personnel? (Circle one or more)

(0) Don’t know
(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Midwife
(5) Traditional birth attendant
(6) Other, (specify) ____________________

Names of medical personnel, and where they can be found, if available:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Q36. Was the woman pregnant at the time of the death?

(0) No (Skip to Q38)
(1) Yes
(2) Don’t know (Skip to Q38)

Q37. How many weeks pregnant was she when she died?

______  weeks

SKIP to Q40

Q38. Was she pregnant six weeks before her death?

(0) No (SKIP to Q67)
(1) Yes
(2) Don’t know (SKIP to Q67)

Q39. How many weeks was she pregnant when her pregnancy ended?

______  weeks

If 1-3 months, ask Q40. If 4-6 months ask Q40 and Q41. If 7-9 months, ask Q40, Q41 and Q42.
Q40. During this pregnancy did she have a pre-natal examination during the first three months?

(0) No
(1) Yes
(2) Don’t know

Q41. During this pregnancy did she have a pre-natal examination during the second three months?

(0) No
(1) Yes
(2) Don’t know

Q42. During this pregnancy did she have a pre-natal examination during the third three months?

(0) No
(1) Yes
(2) Don’t know

Q43. If the answer to Q40, Q41 or Q42 was “yes”, ask

On the (final) pre-natal examination what was the qualification of the person who examined her?

(0) Don’t know
(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Midwife
(5) Traditional birth attendant
(6) Other, (specify) ___________________
Q44. On the (final) pre-natal examination in what kind of facility was she examined?

(0) Don’t know
(1) Communal health center: (name: _______ - ______ - __)  
(2) Private health facility (name: ______________)  
(3) Intercommunal polyclinic (name: ______________)  
(4) District hospital (name: ______________)  
(5) Provincial hospital (name: ______________)  
(6) Central hospital (name: ______________)  
(7) Other health facility (name: ______________)  

Q45. During the pregnancy did the deceased have pale skin?

(0) No  
(1) Yes  
(2) Don’t know

Q46. Did she have abnormal bleeding?

(0) No  
(1) Yes  
(2) Don’t know
Q47. If yes, was the bleeding spotting, or mild bleeding, or heavy bleeding?

(1) Spotting
(2) Mild bleeding
(3) Heavy bleeding
(4) Don’t know

Q48. Did she have any convulsions (fits)?

(0) No
(1) Yes
(2) Don’t know

Q49. Did she have a high fever?

(0) No
(1) Yes
(2) Don’t know

Q50. Did she die before a pregnancy outcome, or during a pregnancy outcome or after a pregnancy outcome?

(1) Before the pregnancy outcome (SKIP to Q 67)
(2) During or after the pregnancy outcome
Q51. Place of pregnancy outcome:

(1) Home
(2) Any level hospital
(3) Communal health center:
(4) Intercommunal polyclinic
(5) Private health facility
(6) In the field or on the way
(7) Other, specify ____________________

Q52. What was the pregnancy outcome?

(1) Operation for ec-topic pregnancy (SKIP to Q57)
(2) Menstrual regulation (SKIP to Q57)
(3) Abortion (SKIP to Q57)
(4) Abortion for a mole pregnancy (SKIP to Q57)
(5) Miscarriage (SKIP to Q57)
(6) Stillbirth (SKIP to Q57)
(7) Forceps delivery
(8) Caesarian section
(9) Normal birth
(10) Don’t know
(11) Other, (specify) ____________________

If “don’t know” or “other”, give the details and then SKIP to Q67:
__________________________________________________
__________________________________________________
__________________________________________________
Q53. Date of birth of the baby

(Day/month/year)

Q54. Is the baby still living?

(0) No
(1) Yes (SKIP to Q57)

Q55. Date of death of the baby

Day/Month/Year

Q56. Describe the circumstances of the death of the child:

______________________________________________
______________________________________________
______________________________________________

Q57. During the outcome specified in Q52 did the deceased have abnormal bleeding?

(0) No
(1) Yes
(2) Don’t know

Q58. If yes, was the bleeding spotting, or mild bleeding, or heavy bleeding?

(1) Spotting
(2) Mild bleeding
(3) Heavy bleeding
(4) Don’t know
Q59. During the outcome specified in Q52 did the deceased have any convulsions (fits)?

(0) No
(1) Yes
(2) Don’t know

Q60. Did she die during the outcome specified in Q52 or after?

(1) During (SKIP to Q67)
(2) After
(3) Don’t know (SKIP to Q67)

Q61. How long after the pregnancy outcome did she die? (if over 72 hours record by day)

___ hours ___ days

Q62. After the outcome specified in Q52 did the deceased have pale skin?

(0) No
(1) Yes
(2) Don’t know

Q63. After the outcome specified in Q52 did the deceased have abnormal bleeding?

(0) No
(1) Yes
(2) Don’t know
Q64. If yes, was the bleeding spotting, or mild bleeding, or heavy bleeding?

(1) Spotting
(2) Mild bleeding
(3) Heavy bleeding
(4) Don’t know

Q65. After the outcome specified in Q52 did the deceased have any convulsions (fits)?

(0) No
(1) Yes
(2) Don’t know

Q66. After the outcome specified in Q52 did she have a high fever?

(0) No
(1) Yes
(2) Don’t know

Q67. Do you know of any other women in this province who died in 2001?

0 No (SKIP to Q69)
1 Yes
Q68. What was her (were their) age(s) when the woman (or women) in Q67 died?

If aged 15-50,

Name _________________________
Address ________________________________
Age ____

Name _________________________
Address ________________________________
Age ____

Q69. Interviewer: What is your diagnosis of the cause of death of the deceased (that is, the woman in Q2)?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Q70. Interviewer: Based on the information so far obtained was this death a maternal death (that is, “the death of a woman, while pregnant or within 42 days of termination of pregnancy, from any cause except accident or suicide”).

(0) No

(1) Yes

If yes, recommendations for prevention of deaths like this one:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
(2) Not certain

If not certain: What additional information would be useful to determine if the death was a maternal one?

_________________________________________________
_________________________________________________
_________________________________________________
_________________________________________________

Name of the interviewer who prepared form: __________________

Job title: _______________________________

Signature ___________________________ Date ___________________
Q71. Opinion of the Study Committee:

Based on the information of the FAM form, we conclude that

(1) This was a maternal death (Complete a MEDPER form)

(2) This was not a maternal death.

(3) The evidence is not sufficient to decide:

—> Complete another FAM form, with different respondent(s)

—> Complete a MEDPER form

Try to get the following additional information:

_______________________________________________

_______________________________________________

_______________________________________________

_______________________________________________

_______________________________________________

Name of the chairman of the Study Committee: __________________

Job title: ___________________________

Signature _________________________________ Date ___________________
Q72. Final decision of the Study Committee:

Based on the information in all the forms, we conclude that

(1) This was a maternal death.

    The medical cause of death was:

    ___________________________________________________
    ___________________________________________________
    ___________________________________________________
    ___________________________________________________

(1) This was not a maternal death.

(2) The evidence is not sufficient for the following reasons:

    ___________________________________________________
    ___________________________________________________
    ___________________________________________________
    ___________________________________________________

Name of the chairman of the Study Committee: ____________________________
Job title: ____________________________
Signature _________________________________ Date ___________________
Annex 6: Form for report of death by attending medical personnel

Form sequence number: ____________  MEDPER

Ministry of Health of Vietnam
Maternal Mortality Study
Report of death from attending medical personnel

Q1. ID number ______________________

Q2. Name of the deceased women: ______________________

Q3. Form sequence number of the FAM form: _________

Q4. Name and position of the medical person giving information about deceased’s death (Interviewer: try to interview one of the medical people on the FAM form who was actually with the woman when she died):

   Name ______________________  Position ______________________

Q5. Date of death

Q6. Age of deceased at death

Q7. Description of the circumstances at death (Write what happened according to the reports of the medical person in Q4)

________________________________________________________________________
________________________________________________________________________
Q8. In addition to the health problem(s) described in Q7, did the deceased have a history of other diseases?

(0) Don’t know
(1) No
(2) Yes

If yes, specify the diseases

________________________________________________

Q9. Was the woman pregnant at the time of the death?

(0) No (Skip to Q11)
(1) Yes
(2) Don’t know (Skip to Q11)

Q10. How many weeks pregnant was she when she died?

_____ weeks

SKIP to Q13

Q11. Was she pregnant six weeks before her death?

(0) No (SKIP to Q51)
(1) Yes
(2) Don’t know (SKIP to Q51)
Q12. How many weeks was she pregnant when her pregnancy ended?

______ weeks

If 1-3 months, ask Q13. If 4-6 months ask Q13 and Q14. If 7-9 months, ask Q13, Q14 and Q15.

Q13. During this pregnancy did she have a pre-natal examination during the first three months?

(0) No
(1) Yes
(2) Don’t know

Q14. During this pregnancy did she have a pre-natal examination during the second three months?

(0) No
(1) Yes
(2) Don’t know

Q15. During this pregnancy did she have a pre-natal examination during the third three months?

(0) No
(1) Yes
(2) Don’t know
Q16. If the answer to Q13, Q14 or Q15 was “yes”, ask On the (final) pre-natal examination what was the qualification of the person who examined her?

(0) Don’t know
(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Traditional birth attendant
(5) Other (specify): ____________
(6) Don’t know

Q17. On the (final) pre-natal examination in what kind of facility was she examined?

(0) Don’t know
(1) Central hospital (name: ____________)
(2) Communal health center: (name: _______ - _______ - ________)
(3) Private health facility (name: ____________)
(4) Intercommunal polyclinic (name: ____________)
(5) District hospital (name: ____________)
(6) Provincial hospital (name: ____________)
(7) Other health facility (name: ____________)

Q18. During the pregnancy did the deceased have pale skin?

(0) No
(1) Yes
(2) Don’t know
Q19. Did she have bleeding?

(0) No
(1) Yes
(2) Don’t know

Q20. If yes, was the bleeding spotting, or mild bleeding, or heavy bleeding?

(1) Spotting
(2) Mild bleeding
(3) Heavy bleeding
(4) Don’t know

Q21. Did she have any convulsions (fits)?

(0) No
(1) Yes
(2) Don’t know

Q22. Did she have a high fever?

(0) No
(1) Yes
(2) Don’t know
Q23. Did she die before a pregnancy outcome, or during a pregnancy outcome or after a pregnancy outcome?

(1) Before a pregnancy outcome (SKIP to Q38)
(2) During or after a pregnancy outcome

Q24. What was the pregnancy outcome?

(1) Operation for ec-topic pregnancy (SKIP to Q29)
(2) Menstrual regulation (SKIP to Q29)
(3) Abortion (SKIP to Q29)
(4) Abortion for a mole pregnancy (SKIP to Q29)
(5) Miscarriage (SKIP to Q29)
(6) Stillbirth (SKIP to Q29)
(7) Forceps delivery
(8) Caesarian section
(9) Normal birth
(10) Don’t know
(11) Other

If “don’t know” or “other”, give the details and then SKIP to Q38:

Q241 ___________________________________________ - ___
Q242 ___________________________________________ - ___

Q25. Date of birth of the baby

(Day/month/year)
Q26. Is the baby still living?
   (0) No
   (1) Yes (SKIP to Q29)

Q27. Date of death of the baby

Day/Month/Year

Q28. Describe the circumstances of the death of the child:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Q29. During the outcome specified in Q24 did the deceased have abnormal bleeding?
   (0) No
   (1) Yes
   (2) Don’t know

Q30. During the outcome specified in Q24 did the deceased have any convulsions (fits)?
   (0) No
   (1) Yes
   (2) Don’t know

Q31. Did she die during the outcome specified in Q24 or after?

   (1) During (SKIP to Q38)
   (2) After
   (3) Don’t know (SKIP to Q38)
Q32. How long after the operation did she die?

___ hours ___ days

Q33. After the outcome specified in Q24 did the deceased have pale skin?

(0) No
(1) Yes
(2) Don’t know

Q34. After the outcome specified in Q24 did the deceased have abnormal bleeding?

(0) No
(1) Yes
(2) Don’t know

Q35. If yes, was the bleeding spotting, or mild bleeding, or heavy bleeding?

(1) Spotting
(2) Mild bleeding
(3) Heavy bleeding
(4) Don’t know

Q36. After the outcome specified in Q24 did the deceased have any convulsions (fits)?

(0) No
(1) Yes
(2) Don’t know
Q37. After the outcome specified in Q24 did she have a high fever?

(0) No
(1) Yes
(2) Don’t know

Q38. Place of death:

(0) Don’t know (SKIP to Q45)
(1) Central hospital (name: ____________)
(2) Communal health center: (name: _______ - _____ - __)
(3) Private health facility (name: ____________)
(4) Intercommunal polyclinic (name: ____________)
(5) District hospital (name: ____________)
(6) Provincial hospital (name: ____________)
(7) Other health facility (name: ____________)
(8) Home (SKIP to Q45)
(9) Other place (not a health facility):
    Specify where ___________________ (SKIP to Q45)
(10) On the way to another place
    Specify where ___________________ (SKIP to Q45)

Q39. Was she admitted to the name of the place in Q38 immediately when she arrived, or did she have to wait?

(0) Don’t know
(1) Immediately
(2) Had to wait
Q40. If had to wait, ask How long did she have to wait before being admitted to name of the place in Q38?

_______ Minutes

Q41. After she was admitted to name of the place in Q38 did the deceased receive treatment?

0   No (SKIP to Q45)
1   Yes
2   Don’t know (SKIP to Q45)

Q42. What kind of medical personnel treated her? (Circle one or more)

(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Traditional birth attendant
(5) Other (specify): _____ - ____________________
(6) Don’t know

Q43. Names of medical personnel, and where they can be found, if available:

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
Q44. After the deceased was admitted to name of the place in Q38 did she receive treatment immediately, or did she have to wait?

(0) Don’t know
(1) Immediately
(2) Had to wait

Q45. If had to wait, How long did she have to wait before receiving treatment?

_______ Minutes

SKIP TO Q47

Q46. During the 72 hours before she died, did she receive treatment?

(0) No (SKIP to Q49)
(1) Yes
(2) Don’t know (SKIP to Q49)

Q47. If yes, ask Who treated her (circle as many as apply)?

(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Traditional birth attendant
(5) Other (specify): _____ - ________________
(6) Don’t know
Names of people who treated her, and where they can be found, if available:

_________________________________________________
_________________________________________________
_________________________________________________

Q48. During the 72 hours before she died did the deceased receive an intravenous transfusion?

(0) No
(1) Yes
(2) Don’t know

Q49. If yes, was it fluid or blood?

(1) Fluid
(2) Blood
(3) Don’t know

Q50. Was the deceased attended by medical personnel when she died?

(0) No
(1) Yes
(2) Don’t know
Q51. If yes, ask What kind of medical personnel? (Circle one or more)

(1) Doctor
(2) Assistant doctor
(3) Nurse
(4) Traditional birth attendant
(5) Other (specify): 
(6) Don’t know

Names of medical personnel, and where they can be found, if available:

_________________________________________________
_________________________________________________
_________________________________________________
_________________________________________________

Q52. Interviewer: What is your diagnosis of the cause of death of the deceased?

_________________________________________________
_________________________________________________
_________________________________________________
_________________________________________________

Q53. Interviewer: Based on the information so far obtained was this death a maternal death (that is, “the death of a woman, while pregnant or within 42 days of termination of pregnancy, from any cause except accident or suicide”).

(0) No
(1) Yes
If yes, recommendations for prevention of deaths like this one:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

(2) Not certain

If not certain: What additional information would be useful to determine if the death was a maternal one?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Name of the interviewer who prepared form: ________________________

Job title: ___________________________

Signature _________________________________ Date ___________________
Ministry of Health of Vietnam

Maternal Mortality Study

Records from hospital or other health facility

Q1     ID number ______________________

Q2     Name of the deceased women: ______________________

Q3     Address:
       Village: ________________
       Commune: ________________
       District: ________________
       Province: ________________

Q4     Form sequence number of the MEDPER form ________________

Q5     Name of health facility from which these records are taken.
       ______________________

Q6     Description of the circumstances at death (transcribe these directly from the records, including an
       autopsy report of death certificate, of the health facility, or attach photocopies):

Name of person who prepared this form: ______________________

Job title: ________________________________________________

Signature _______________________________ Date ___________________

Notes for the HOSP form