Noncommunicable Diseases
Risk Factor Surveillance in
South-East Asia Region

Report of a Workshop
Bali, Indonesia 10 - 13 June 2003

WHO Project No: ICP NCD 002

World Health Organization
Regional Office for South East Asia
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## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1. Background</td>
<td>1</td>
</tr>
<tr>
<td>1.2. STEPS Framework</td>
<td>2</td>
</tr>
<tr>
<td>2. OBJECTIVES OF THE WORKSHOP</td>
<td>3</td>
</tr>
<tr>
<td>2.1. General Objectives</td>
<td>3</td>
</tr>
<tr>
<td>2.2. Specific Objectives</td>
<td>3</td>
</tr>
<tr>
<td>3. UPDATE ON GLOBAL AND REGIONAL SURVEILLANCE ACTIVITIES</td>
<td>4</td>
</tr>
<tr>
<td>4. DATA MANAGEMENT, ANALYSIS AND REPORTING</td>
<td>5</td>
</tr>
<tr>
<td>5. GLOBAL, REGIONAL AND NATIONAL NCD INFOBASES</td>
<td>7</td>
</tr>
<tr>
<td>6. CONCLUSIONS</td>
<td>8</td>
</tr>
<tr>
<td>7. RECOMMENDATIONS</td>
<td>9</td>
</tr>
<tr>
<td>Annexes</td>
<td></td>
</tr>
<tr>
<td>1. List of Participants</td>
<td>10</td>
</tr>
<tr>
<td>2. Programme</td>
<td>12</td>
</tr>
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</table>
1. INTRODUCTION

1.1. Background

Noncommunicable diseases (NCDs) are increasingly becoming a major cause of morbidity, mortality and disability in the WHO South-East Asia Region. The rapid changes in the economic, social, and demographic determinants of health as well as adoption of unhealthy lifestyles (e.g. consumption of tobacco and alcohol, unhealthy diet, physical inactivity) by large segments of population are contributing to the observed shift in the pattern of prevailing diseases and causes of death in the Region. In 2001, they accounted for 50 per cent of deaths and 42 per cent of the disease burden measured in terms of disability-adjusted life years lost (DALYs). Further increases are projected in the future.

In order to support Member Countries in improving the evidence base for developing NCD prevention and control programmes, surveillance activities in the Region need to be strengthened, including risk factors, morbidity and mortality data as well as information on existing national capacity. Ascertaining causes of death in the Member Countries suffers from poor coverage with medical certification and lack of appropriate verbal autopsy tools for adult deaths. The national disease surveillance systems focus on communicable diseases and are collecting health related information from the public health sector. However, most NCDs are being managed in the private sector. This is not being captured by the national health information systems.

In this scenario, focusing on risk factor surveillance and reduction is regarded as a feasible and valid approach. A review of the limited data in the Member Countries showed that information on NCD risk factors currently available suffers from the use of different definitions, application of various instruments and different reporting formats. Therefore, use of a standardized methodology by the Member Countries would greatly facilitate generation of valid and comparable data.
1.2. **STEPS Framework**

The Regional Officer has adopted a standardized methodology for collection of information on NCD risk factors known as the STEP wise approach. This globally promoted approach to NCD risk factor surveillance was developed by WHO/HQs in close collaboration with regional offices including SEARO, WHO collaborating centres and national centres of excellence.

STEP-wise approach to NCD Surveillance consists of a hierarchy of information which can be collected using standardized instruments and protocols to ensure comparability over time and across locations. It is based on sequential levels of surveillance of different aspects of NCDs, allowing flexibility and integration at each step. STEP 1 consists of collection of information by interview alone. This includes questions on tobacco and alcohol use, dietary and physical activity patterns. STEP 2 adds measurement of blood pressure and anthropometry. STEP 3 requires blood collection for estimation of blood sugar and cholesterol levels. At each level, there are core, expanded and optional questions. While core questions are mandatory for all users, the expanded and optional questions can be used depending upon local requirements.

NCD risk factors targeted by STEPS approach have been chosen because they are measurable and modifiable. Also, available evidence indicates that reducing these risk factors is feasible and would have a major impact on the disease outcomes.

In 2003, Member Countries endorsed the Regional Strategy for NCD Surveillance that calls for adoption of STEPS approach for NCD risk factor surveillance. The strategy targets NCD risk factors surveillance for early integration with national health information systems. Experts from seven Member Countries were trained in implementing STEPS protocol in April 2002. Bangladesh, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand have already initiated STEPs surveys or are planning to conduct these surveys in 2003.

This Workshop was aimed at promoting and facilitating application of uniform methods of NCD risk factor data management, analysis and reporting. In order to provide statistical support during the conduct of these surveys in the Region, it was decided to constitute a Regional Statistical Support Group (RSSG), consisting of four experts- one each from premier institutions in Bangladesh, India, Indonesia and Thailand. The Regional
Director approved the formation of this advisory group in May 2003. The first meeting of the members of RSSG was held in conjunction with this Workshop.

Representatives from ten Member Countries of the Region participated in the Workshop. In addition, faculty from Menzies Centre for Population Health Research, University of Tasmania, Australia along with WHO staff from HQ, SEARO and the country offices also attended. See Annex 1 for list of participants.

2. OBJECTIVES OF THE WORKSHOP

2.1. General Objectives

The general objectives of the workshop were to strengthen capacity of Member Countries to manage, analyze and report data arising out of standardized NCD Risk Factor Surveillance activities based on the WHO STEPwise approach.

2.2. Specific Objectives

Following were the specific objectives of the workshop:

(1) To share experiences of implementation of NCD risk factor surveys in Member Countries;
(2) To demonstrate to the participants the standard protocols for data management, analysis and reporting using common statistical softwares;
(3) To provide an opportunity for interaction between RSSG and Member Countries on statistical issues related to NCD Risk Factor Surveillance; and
(4) To introduce concepts and inform about the current status of work done on establishing Regional NCD Risk Factor Infobase and discuss measures for developing country level infobases.
3. UPDATE ON GLOBAL AND REGIONAL SURVEILLANCE ACTIVITIES

Dr Tim Armstrong, Global STEPS Coordinator, WHO/HQ reviewed the current progress on the conduct of STEPS surveys in the world. A total of thirty-two countries in four regions: AFR (10), EMR (7), SEAR (8) and WPR (7) are currently conducting NCD risk factor surveys using the STEPS approach. As a part of efforts to make the STEPS approach applicable to cover surveillance in other health areas, separate modules are being developed for injuries and mental health.

Dr Jerzy Leowski, NCS, WHO/SEARO acquainted the participants with the burden of disease due to NCDs and their major risk factors in the SEA Region based on the World Health Report 2002. He explained the Global Strategy for the Prevention and Control of NCDs, on which the regional programme is based. Surveillance is an important component of this strategy. He also presented the progress in implementing NCD surveillance programme in the Region starting from publication of the document “NCDs in SEAR – a profile”. A surveillance network was established in the 2002 and the Regional Strategy for Surveillance of NCDs finalized in consultation with the Member Countries. Eight SEAR countries are undertaking STEPS NCD risk factor surveys with WHO support. This support consists of providing methodology and tools, assistance in adapting the instruments to local needs, training of the principal investigators and the survey teams, statistical advice on sampling and other statistical issues, loan of equipments and providing funds to conduct the surveys. At least three countries in the Region are working towards integration of the risk factor surveillance using the STEPS approach in the national integrated disease surveillance or health information systems. The progress achieved in implementing the regional NCD surveillance programme is the result of the excellent collaboration and meaningful partnership established between various stakeholders including national NCD focal points in Member Countries, WHO Collaborating Centres and other institutions, and all levels of WHO (HQ/RO/Country Offices).

The participants of the Workshop presented the progress in their countries on the planning and conduct of the surveys. The country reports are summarized in Tables 1-3, which compile information on sampling methodologies applied, areas and subjects covered, instruments and approaches used, as well as on selected operational aspects of the surveys. Indonesia and Thailand are incorporating the STEPS approach into national health surveys whereas seven countries are doing sub-national level surveys.
Indonesia is conducting both national and sub-national surveys. A total of 23 urban and rural sites are conducting these surveys. Four countries have included the STEP 3 (biochemical tests) as a part of surveys. More than 200,000 subjects are being examined/interviewed. These demonstrate a strong commitment and a huge effort made by Member Countries to collect standardized information on NCD risk factors.

4. DATA MANAGEMENT, ANALYSIS AND REPORTING

The technical sessions on data management, analysis and reporting for STEPS NCD risk factor surveys were held by the Members of the RSSG and the faculty from Menzies Centre of Population Health Research, Hobart, Tasmania (a WHO Collaborating Centre). The Menzies Centre team, in collaboration with WHO/HQ had already developed manuals for these subjects, which were used in a similar workshop held in WPRO in January 2003. The manuals were provided to participants as soft copies on CDs during the Workshop.

After the presentations made by the participants, the sampling plans adopted by the countries were critically reviewed by RSSG and appropriate advice was given. During this process, it was emphasized that the sampling design should ensure that a representative sample is selected from the study population and that during the analysis of data, appropriate mechanisms for handling the sample design should be available and used. The resource constraints and the problems of not having an ideal sampling frame were recognized. Methods to address these problems were discussed.

The following session covered issues related to data management. The need for proper handling and storage of survey forms and collecting information on response rate were emphasized. The door knock recruitment protocol was discussed. It was also reminded that the survey data must be kept confidential by storing all identifying information in a separate database.

For data entry, a double entry of data using EpiData to perform the first round followed by EpiInfo 6 to perform the second round of data entry was recommended.

However, the countries are free to choose appropriate statistical and database software for managing data keeping in mind basic standards and requirements for data entry and analysis. The participants were explained the process of creating databases and the method of data entry using the above
mentioned two packages. A practical session followed, which was used by the participants to familiarize themselves with the process. All the countries were given a CD with the necessary statistical packages and the Core STEPS survey entry forms as QES files. The countries could modify these files to fit in the expanded and optional questions included by them in the surveys.

The need to investigate for outliers and missing data in the dataset and the processes available for handling them was also discussed. For data analysis, EPIINFO 2002 was used to demonstrate the use of statistical software for handling complex survey designs. These included issues such as weighting, stratification and cluster sampling. The participants were shown how to perform the analysis using data of STEPS survey conducted in Fiji. Based on the sampling design of a survey, choosing appropriate method of analysis and performing the necessary analytical procedures were demonstrated. They were shown that using an appropriate method of analysis resulted in narrow confidence intervals around the mean value.

Data reporting protocols for the STEPS were then reviewed. The format for data reporting depends upon the target audience. The audience could be divided into three broad categories as (i) common public or policy makers, (ii) health care professionals, and (iii) researchers. The need for details increases as the hierarchy increases. The uniform data reporting dummy tables were then shown. It was also demonstrated how the results of the STEPs surveys could be directly fed into the Global NCD Infobase.

While reporting information on risk factors, two approaches are recommended. The first is to describe the distribution in terms of means and variances and the second is to present it as a categorical variable of proportion of people having the risk factor. For example, for blood pressure, this would be in the form of mean systolic and diastolic blood pressure and as prevalence of hypertension (blood pressure > 140/90). The threshold for defining people “at risk” is often arbitrary and keeps changing as more evidence is gathered. The use of means is therefore important. This is also important as the strategy for risk reduction in the community focuses on population approach, which attempts to shift the entire distribution of the risk factors. The participants were taken through the definitions used in the STEPS protocol and their rationale. It was pointed out that the cut-off points for some risk factors might be different in some countries, requiring presentation by both cut-off points.

Dr. Bonita then presented the important findings of the World Health Report 2002 “Reducing risks, promoting healthy life” The report identified major risk factors for health in the world. Of the leading risk factors identified
globally, six are related to NCDs (high blood pressure, tobacco consumption, alcohol consumption, indoor smoke, high cholesterol and obesity). Surveillance is linked to action and therefore, data collection on risk factors in the countries has to lead to action. The action would be at the individual, community and policy levels. Many of the interventions require policy changes, as for tobacco, alcohol. The role of governments and industries (tobacco, alcohol, food) are crucial. Illustrating with examples of the alcohol industry, she showed how the industry targets youth using subliminal messages in the advertisements.

5. **GLOBAL, REGIONAL AND NATIONAL NCD INFOBASES**

As a measure towards collecting and sharing available information on NCD risk factors in order to support advocacy and research efforts as well as planning and monitoring of NCD prevention programmes, WHO is supporting development of infobases at the global, regional and national levels. The Global NCD Risk Factor Infobase along with the Surveillance of Risk Factor (SuRF) Report was officially launched on 12 May 2003 at Geneva. Global Infobase was regionally launched in Bali by the Regional Director on 10 June 2003 in conjunction with the Workshop.

NCD risk factor information included in the SuRF report comes from a variety of sources ranging from peer reviewed journal articles to reports and unpublished data from ministries of health. All this information is held in the WHO Global NCD Infobase, designed as a one-stop resource for data needs. The focus of the report is on recent nationally representative data. It covers the same eight risk factors that are covered under STEPS (tobacco and alcohol use, patterns of physical activity, low fruit and vegetable intake, obesity, blood pressure, cholesterol and blood glucose). Much of the data gathered for the country profiles has been provided by the data focal points in the WHO Regional Offices.

The report provides country-level risk factor data stratified by age and sex with complete source and survey information. The format of SuRF 1 consists of a report booklet and CD-ROM attachment. It contains over 45 000 data points from more than 1 300 sources from 166 of 192 Member States. The second step will be to produce harmonized prevalence estimates from the existing country data. The NCD Infobase will become a web-based tool for data users in late 2003. The Infobase is being updated continuously. After the introduction, the participants were taken through the CDs so as to view the information from Member Countries in the SEA Region.
During the Intercountry Meeting on NCD Surveillance in Colombo held in October 2002, the participants desired that regional and country NCD databases should also be developed to assist Member Countries for advocacy and policy development. Keeping in mind this request and the development of the Global Infobase, Dr Anand presented the possible future ways of developing regional and national infobases. In order to maintain compatibility between the three levels of Infobase and as a resource saving measure, it was decided that the structure of Global Infobase would be used at all the three levels. WHO/HQ will evolve ways of how these could be taken up further. HQ proposes to give the regional offices an MS Access 2000 licence to set up Regional Access Database. The already available regional data could be downloaded and new entries made using the same codes. Videoconferencing would be used to train the Regional Office staff. The Regional Office will take up the training of the national level staff in use of Infobase. All the data entered at any level would be sent to the higher level along with the source of data for verification each level will be maintained separately and all sources shared. Such a system would ensure completeness of database and a sense of ownership and better use of information at all levels.

6. CONCLUSIONS

(1) Eight SEAR countries viz. Bangladesh, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand are conducting NCD risk factor surveys using the standard WHO approach.

(2) During the Workshop, the sampling methods adopted by the countries were reviewed and appropriate expert advice provided.

(3) In order to facilitate implementation of STEPS surveys in the Region, the participants received training in data management, analysis and reporting.

(4) The Regional Statistical Support Group (RSSG) creates a useful mechanism for providing technical support to Member Countries in implementing NCD surveillance activities.

(5) The Global NCD Infobase is a useful tool for advocacy for NCD prevention and control.

(6) The STEPwise approach provides a useful framework for planning of NCD interventions.
7. **RECOMMENDATIONS**

**For Member Countries**

(1) Support in conducting STEPS surveys and keeping to the agreed timeline should be provided.

(2) Development of national NCD infobases should be planned.

(3) Integration of NCD surveillance into national health information systems should be planned.

(4) The results of the STEPS NCD Risk Factor surveys should be disseminated and appropriately utilized.

(5) Appropriate use of RSSG advice in the process of implementing STEPS surveys should be made.

**For RSSG**

(1) Member Countries should be provided with expert statistical support and advice on developing sampling plans, and in data management, analysis and reporting.

(2) Simplified, user-friendly guidelines on sampling, data management, analysis and reporting for NCD surveillance activities implemented in the SEA Region should be prepared.

**For WHO**

(1) The activities of RSSG should be sustained and strengthened.

(2) The activities of the Regional NCD Surveillance Network should be coordinated.

(3) Regional NCD Risk Factor Infobase should be established.

(4) Support for development of national NCD databases in the Member Countries should be provided.

(5) Regional NCD Risk Factor Profile should be prepared to assist in advocacy and policy development.

(6) Capacity building for NCD surveillance, in particular for utilization of results of NCD risk factor surveys, should be promoted.

(7) A post for regional NCD Data Focal Point should be established.
Annex 1

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Global STEPS Coordinator

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STP-NCS  
Country Offices  
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WR Indonesia  
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Indonesia  
Dr M Mostafa Zaman  
Bangladesh  
Dr Paramita Sudharto  
Nepal
Annex 2

PROGRAMME

Monday, 9 June 2003
0900 – 1700 hrs. Preparatory Meeting of Regional Statistical Support Group (RSSG), WHO Secretariat and Menzies Centre (MC) Team

Tuesday, 10 June 2003
0930 – 1030 hrs. Inaugural Session
1100 – 1730 hrs. Plenary Session:
   Regional Launch of Global NCD Infobase – Dr R Bonita
   Global STEPs Update – Dr T Armstrong
   Regional NCD Surveillance Update – Dr J Leowski
   Introduction to RSSG and Menzies Centre Team
   Country Reports on Implementation of NCD Risk Factor Surveys
   Integrating Risk Factors in National Surveys in India, Indonesia, Thailand
1730 – 1800 hrs. Planning and evaluation meeting

Wednesday, 11 June 2003
0900 – 1000 hrs. Plenary Session:
   Summary of country specific designs – Dr R M Pandey
   Survey design, sampling & recruitment – Drs L Blizzard & M Rahman
1000 – 1230 hrs. Data Management - Ms. J Fryer, Dr M Rahman
1330 – 1500 hrs. Workshop on data entry – Group work on computers
1530 – 1700 hrs. Group discussion on country needs and protocol finalization- Dr R.M. Pandey
1700 – 1800 hrs. Planning and evaluation meeting
Thursday, 12 June 2003

0900 – 1030 hrs.  Sampling theory, weighting, stratification, etc.: Dr Y Chaiyapong, & Dr S Soemantri
Software for analysis of complex survey – Ms J Fryer


1330 – 1430 hrs.  Group work on computers

1430 – 1600 hrs.  Group discussion on country specific needs - Dr R M Pandey
Protocol finalization – Dr M Rahman

1600 – 1700 hrs.  Data reporting – Dr R M Pandey, Ms J Fryer, Dr T Armstrong

1700 – 1800 hrs.  From data to advocacy; STEPwise approach to intervention – Dr R Bonita

1800 – 1830 hrs.  Planning and evaluation meeting

Friday, 13 June 2003

0900 – 1030 hrs.  STEPs Infobase Data Transfer – demonstration – Ms J Fryer
Global NCD Infobase & SuRF Report – Dr R Bonita

1100 – 1230 hrs.  Reviewing Regional Data in INFOBASE
Issues in Regional Infobase & Country Databases – Dr K Anand

1330 – 1500 hrs.  RSSG – Future Activities
Conclusions & Recommendations, Closing

1530 – 1700  Wrap-up meeting of RSSG and WHO Secretariat
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<td>66 000</td>
<td>&gt; 10</td>
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<td>Kurahana</td>
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<td>2 200</td>
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</tr>
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<td>Rural</td>
<td>16 subdistricts</td>
<td></td>
<td>75 000</td>
<td>3 250</td>
<td>15-74</td>
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<td>City</td>
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<td>75 000</td>
<td>2 000</td>
<td>25-64</td>
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<td>1 896 411</td>
<td>2 000</td>
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<td>Division</td>
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<td>2 000</td>
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<td>189 400</td>
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* Total Size from which the sample has been taken.

### Table 2. Overview of STEPS NCD Risk Factor Surveys implemented in SEAR Countries. Sampling methodology

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<th>PSU</th>
<th>Method</th>
<th>SSU</th>
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<td>HH</td>
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<td>Wards</td>
<td>Strat. RS</td>
<td>HH</td>
<td>Sys. RS</td>
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<td>Syst. RS</td>
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<td>PPS</td>
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<td>Wards</td>
<td>PPS</td>
<td>HH</td>
<td>Syst. RS</td>
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<td>PHC</td>
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<td>Wards</td>
<td>PPS</td>
<td>HH</td>
<td>Syst. RS</td>
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<td>One person per HH by RS</td>
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<td>Wards</td>
<td>PPS</td>
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<td>HH</td>
<td>Syst. RS</td>
<td>One person per HH by RS</td>
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<td>Multistage</td>
<td>Wards</td>
<td>PPS</td>
<td>HH</td>
<td>Syst. RS</td>
<td>One person per HH by RS</td>
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<td>SRS</td>
<td>Village</td>
<td>PPS</td>
<td>One person per HH by RS</td>
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<td>Indonesia</td>
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<td>Census blocks</td>
<td>Subdistricts</td>
<td>Systematic/PPS</td>
<td>HH</td>
<td>Syst. RS</td>
</tr>
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<td>Multistage</td>
<td>Census blocks</td>
<td>Subdistricts</td>
<td>Systematic/PPS</td>
<td>HH</td>
<td>Syst. RS</td>
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<td>Rukun Warga</td>
<td>Strat. RS</td>
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<td>Strat. RS</td>
<td>Individual</td>
<td>Strat. RS</td>
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<td>Male'</td>
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<td>Wards</td>
<td>PPS</td>
<td>HH</td>
<td>SRS</td>
<td>One person per HH by RS</td>
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<td>Yangon</td>
<td>Multistage</td>
<td>Villages</td>
<td>SRS</td>
<td>Clusters</td>
<td>PPS</td>
<td>One person per HH by RS</td>
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<td>SRS</td>
<td>Clusters</td>
<td>PPS</td>
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<td>Kathmandu</td>
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<td>Wards</td>
<td>PPS</td>
<td>Clusters</td>
<td>All houses</td>
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<td>H-H</td>
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EPI – Expanded Programme on Immunization; HH – House Hold; PHC – Primary Health Centre; PPS – Probability Proportional to Size; PSU – Primary Sampling Unit; RS – Random Sample; SES – Socio Economic Status; SRS – Simple Random Sample; SSU – Secondary Sampling Unit; Strat. RS – Stratified Random Sample; Sys.RS – Systematic Random Sampling
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<td>1.3</td>
<td>Exp &amp; optional</td>
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* 78 teams for NHHS with each team of two medical doctors, one midwife, one laboratory technician and supervisor.

BRFS – Behavioural Risk Factor Surveillance; HH – House Hold; NHES – National Health Examination Survey; NHHS National Household Health Survey; NSES – National Socio Economic Survey, CBI- Community-based Intervention