Expert Meeting on Population Sodium Reduction Strategies for Prevention and Control of Noncommunicable Diseases in the South-East Asia Region

11–13 December 2012
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Population Sodium Reduction Strategies
for Prevention and Control of
Noncommunicable Diseases
in the South-East Asia Region

Report of the Regional Meeting

New Delhi, India
11–13 December 2012
# Contents

**Introduction**

- Opening Remarks 1
- Background and Objectives of the Meeting 2

**Background: Setting the Stage**

- Sodium and Health: Evidence for Action 4
- High Blood Pressure and Salt Reduction in the South-East Asia Region 6
- WHO’s Work in the Area of Population Sodium Reduction 7

**Salt Reduction Strategy: What is Required**

- Interventions for Sodium Reduction – What Works and Why it Works 10
- Salt Iodization and Sodium Reduction 12

**Assessing and Monitoring Salt Intake in the Population**

- Recommended Methods for Measuring Population Salt Intake 15
- Methods for Measuring Population Sodium Intake in the Region 16
- Recommended Methods to Identify Main Sources of Sodium in the Diet 17

**National Experiences in Salt Reduction Initiatives in the Region (round table)** 20

**The Singapore Experience**

- Assessment of Salt Intake in Singapore 29
- Public–Private Partnership for Salt Reduction: Lessons from Singapore 30

**Population Sodium Reduction Strategies and Actions for the Region (working groups)**

- Setting up National Strategies and Priority Actions for Population Sodium Reduction 32
- Measuring and Monitoring Population Sodium Consumption and Dietary Sources of Sodium 36

**Conclusion and Recommendations** 39

**Closing Session** 42

**Annexes**

- Annex 1: List of participants 44
- Annex 2: Meeting agenda 46
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNNC</td>
<td>Bangladesh National Nutrition Council</td>
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<td>BSTI</td>
<td>Bangladesh Standard and Testing Institute</td>
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<td>CHD</td>
<td>coronary heart disease</td>
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<td>CVDs</td>
<td>cardiovascular diseases</td>
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<td>DISHA Study</td>
<td>Diet and lifestyle InterventionS for Hypertension risk reduction through Anganwadi workers and Accredited Social Health Activists</td>
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<td>EU</td>
<td>European Union</td>
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<td>FINEST food programme</td>
<td>Functional, Innovative, Nutritious, Effective, Science-based and Tasty Foods</td>
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<tr>
<td>ICCIDD</td>
<td>International Council for the Control of Iodine Deficiency Disorders</td>
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<td>ICMR</td>
<td>Indian Council for Medical Research</td>
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<td>ICDDR</td>
<td>Indian Council of Medical Research</td>
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<tr>
<td>INDEPTH</td>
<td>National health Demographic surveillance systems</td>
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<td>INTERSALT Study</td>
<td>International Study of Sodium, Potassium, and Blood Pressure</td>
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<tr>
<td>KAP</td>
<td>Knowledge, attitude and practices</td>
</tr>
<tr>
<td>MSG</td>
<td>monosodium glutamate</td>
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<td>NCDs</td>
<td>noncommunicable diseases</td>
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<tr>
<td>NGO</td>
<td>Nongovernmental organization</td>
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<tr>
<td>NHRC</td>
<td>Nepal Health Research Council</td>
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<tr>
<td>PAHO</td>
<td>WHO-Pan American Health Organization</td>
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<td>SEAR</td>
<td>South-East Asia Region</td>
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<td>SEARO</td>
<td>Regional Office for South-East Asia</td>
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<tr>
<td>STEPS</td>
<td>WHO STEPwise Approach to Surveillance</td>
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<tr>
<td>UNHLM</td>
<td>United Nations High-Level Meeting</td>
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<td>UNICEF</td>
<td>United Nations Children's Fund</td>
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Introduction

Noncommunicable diseases (NCDs) cause an estimated 7.9 million deaths in the South-East Asia Region (SEAR). Of these, 3.6 million are due to cardiovascular diseases (CVDs) for which hypertension is the leading risk factor. In the Region, hypertension affects one in three adults and kills nearly 1.5 million people each year. Hypertension is largely preventable by adopting lifestyle modifications, and reducing sodium in the diet is known to be highly efficacious for primary prevention of hypertension.

Salt is the major source of sodium in the diet. Salt/sodium intake is believed to be high in the Region. Given the importance of salt reduction in prevention and control of NCDs, a global voluntary target on “mean salt intake per day in the adult population” was recently proposed by the Member States during a formal consultation on the global monitoring framework and targets for prevention and control of NCDs. Measuring and monitoring population salt consumption will therefore be an important step for Member States in the coming years.

In view of the above, and to develop regional strategies for salt reduction and measure population salt intake in the Region, the WHO Regional Office for South-East Asia (SEARO) organized an Expert Meeting on Population Sodium Reduction Strategies for Prevention and Control of Noncommunicable Diseases in the South-East Asia Region for its Member States from 11 to 13 December 2012 in New Delhi, India.

The Meeting was attended by 29 participants representing national governments of 8 Member States of the Region, WHO Secretariat from the Member States, SEARO and WHO headquarters as well as global experts (see Annex 1 for the complete list of participants). The technical deliberations of the three-day meeting included four plenary sessions, round table discussions and two working groups (see Annex 2 for the Meeting agenda).

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1 In the United States of America and Canada, the term “sodium” is used, whereas in most other countries “salt” is used. The two terms are often used synonymously. On a weight basis, salt comprises 40% sodium and 60% chloride. The conversion of different units for sodium and salt is as follows: 1 g sodium = 2.5 g salt, 1 mmol sodium = 23 mg sodium, 1 g salt = 0.4 g sodium, and 1 g salt = 17 mmol sodium. This Meeting Report uses the term “salt” unless otherwise specified.
Opening Remarks

Dr Poonam Khetrapal Singh, Deputy Regional Director, WHO-SEARO, welcomed the participants and highlighted that the burden of morbidity and mortality from hypertension and related NCDs is currently one of the most urgent public health problems globally. NCDs remain the number one killer in the Region causing an estimated 7.9 million deaths every year; of which 3.6 million (nearly half the deaths) are due to CVDs.

In SEAR, hypertension accounts for an estimated 1.5 million deaths each year. Dr Singh mentioned that reducing population salt intake is considered an important and cost-effective measure for improving population health outcomes throughout the world, and is promoted by WHO as a “Best Buy” or a cost-effective intervention even in resource limited settings. Dr Singh highlighted a unique aspect of this Region, which is that traditions and cultural factors play an important role in high dietary sodium consumption, such as regular use of pickles, papads, chutneys and sauces in the daily diet. Added to this, continuing globalization and the growing consumption of processed foods high in sodium, ready-made food purchased from food vendors and changing dietary patterns add to the burden of increased salt intake. She expressed that the Expert Group would have to keep this aspect in mind while formulating recommendations.

There are successful examples from the West where interventions such as labelling sodium content in food products, consumer awareness, development of symbols to identify low salt products, agreements with the food industry to lower the salt content of food products, and regulations have worked to reduce salt intake in populations. Dr Singh reiterated that while in industrialized countries, 75-80% of sodium comes from processed foods and food eaten away from home, in this Region salt added during cooking and in sauces and seasonings contributes to major sources of sodium in the diet. Therefore, strategies that have worked in the West may not be directly applicable to this Region and will need to be appropriately modified.

Dr Singh reminded the Group about a formal consultation organized by WHO headquarters in November 2012 that led to the proposal of nine global voluntary targets for prevention and control of NCDs. Of these, a “30% reduction in mean sodium consumption” target has been considered by regional experts and Member States as possibly too ambitious for SEAR to achieve in the timeframe. Therefore, Dr Singh felt there is a need to deliberate on what could be a more feasible target for sodium reduction in this Region so that Member States can be guided suitably.

Dr Singh recapitulated that in the context of salt reduction, it is pertinent to discuss salt iodization and she was glad this topic finds a place in this meeting. Iodine deficiency disorders are recognized as an important public health problem in this Region. An expert group meeting held in October 2011 in Baroda, India by SEARO on the significance of salt in the context of salt iodization for prevention of iodine deficiency disorders concluded that salt reduction and salt iodization are compatible strategies. She hoped there would be further discussions on how the message of sodium reduction for prevention and control of NCDs can be appropriately communicated to policy-makers and the public, while ensuring that the message of universal salt iodization for prevention and control of iodine deficiency disorders is not lost.

Lastly, Dr Singh highlighted the importance of partnerships for implementing salt reduction initiatives, with governments actively involving nongovernment partners, the media, academia and the food industry for population salt reduction programmes. In this context, the UN Political Declaration on NCDs specifically calls upon the
private sector to work towards reducing the use of salt in the food industry in order to lower sodium consumption.

In conclusion, Dr Singh remarked that WHO places a high priority on population-level salt reduction for prevention and control of NCDs. Population-level salt reduction may be considered as one of the most important public health interventions and can have enormous public health gains. Reducing population sodium consumption is a very important and yet challenging intervention. She wished the Meeting a successful outcome and said that the wisdom and experience of the experts in the Group was required to share best practices and identify effective, practical and regionally relevant strategies for population sodium reduction in SEAR.

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**Background and Objectives of the Meeting**

Dr Athula Kahandaliyanage, Director, Department of Sustainable Development and Healthy Environment, WHO-SEARO, presented the background and objectives of the Meeting. He elaborated that hypertension is the most important risk factor for CVDs and it affects one in three adults in the Region. He emphasized that population-wide reduction in salt intake is the most cost effective means to reduce hypertension with WHO promoting salt reduction as a “Best Buy” and encouraging all countries to reduce average individual salt intake to <5 g/day through the development of national salt reduction strategies.

Dr Kahandaliyanage mentioned that since 2000, a series of resolutions have been adopted by successive World Health Assemblies as well as regional committees, giving WHO a clear mandate to work on prevention and control of NCDs. The Political Declaration of the High-Level Meeting of the United Nations General Assembly on the Prevention and Control of Non-communicable Diseases, adopted in September 2011, specifically calls upon Member States to accelerate the implementation of the global strategy on diet, physical activity and health; promote the development and initiate the implementation, as appropriate, of cost-effective interventions to reduce salt; and to work towards reducing the use of salt by the food industry to lower sodium consumption. Dr Kahandaliyanage said that to fulfill these global and regional mandates and encourage Member States to take strong and sustained actions to reduce population-wide dietary salt intake, WHO-SEARO convened this Expert Group Meeting.

The specific objectives of the Meeting are given below.

- Review current evidence on sodium consumption and health.
- Discuss cost-effective interventions/initiatives for population-level sodium reduction.
- Identify priority actions for monitoring and evaluating population sodium consumption.
- Identify strategic approaches and priority actions for sodium reduction.

Dr Kahandaliyanage anticipated clear and practical recommendations from this Meeting that would provide proper guidance to Member States on how to develop national salt reduction initiatives and identify priority actions in the medium- and long-term which when implemented would lead to reduction in population salt intake over time, and thereby a reduction in mortality and morbidity due to CVDs.
Background: Setting the Stage

Sodium and Health: Evidence for Action

Professor Bruce Neal opened the plenary session with a talk on increased salt intake in human evolution and its effects on the health of the people. The human body is designed for less than a gram per day of salt but there has been an enormous rise in salt consumption during human evolution. There is pretty good evidence that for most of human evolution food was fresh meats, vegetables, berries and nuts, and the salt intake would have been the required fraction of a gram a day. It is only in the past few millennia that average salt consumption has risen to current levels – an average of 8–12 g/day in most countries. While data from many countries is lacking, Global Burden of Disease 2010 data showed that rarely in countries is salt intake less than 4 g/day, and almost never less than 1 g/day.

Increased dietary salt intake increases blood pressure and subsequently the risk of CVDs, causing death and disability in most countries around the world. There is compelling evidence that reduced salt intake lowers blood pressure and risk of CVDs. Moreover, pretty strong associations have been noted between salt intake and gastric cancer and Meniere’s disease. There is a very broad evidence base due to the enormous amount of research in the past 50 years that includes animal, human, genetic, ecological, migrational, observational and experimental studies, on the benefits of salt reduction.

The issues

While there is robust and long-term evidence that reduced salt intake decreases hypertension and other related diseases, a peer-reviewed journal occasionally publishes a paper to the contrary, sparking off unwarranted debate. In addition to the confusing general and academic media reports, there is a strong food industry lobby that does not want salt reduction to occur. This is because added salt, sugar and saturated fats are poor/cheap-quality products and a great way for the industry to make money. The people who continue to win from this kind of debate include the food industry because they do not have to change and can keep maximizing profits; the government because it does not have to fight with the food industry to do what is required; the

Professor Bruce Neal, Chairperson of the Expert Meeting, Senior Director, The George Institute for Global Health, Professor of Medicine, University of Sydney; Chair, Australian Division of World Action on Salt and Health
general media that gets to sell prints; and academia that get to make careers out of it. With such mixed reports and conflicting research publications, it is important from the standpoint of starting a population salt reduction initiative to apprise the policy-makers and public on the lack of robust methodology used in research in such reports.

Systematic, balanced overviews of the totality of data, for example those reported from the United States Institute of Medicine, National Health and Medical Research Council of Australia, United Kingdom Scientific Advisory Commission on Nutrition, and World Health Organization are useful standards for making informed policy decisions. The consensus that emerges from amalgamating data from these organizations is that salt reduction will reduce the risk of vascular diseases and will not cause any harm. More evidence can be obtained from the fact that most national and international guidelines for blood pressure control recommend salt reduction, more than 30 countries around the world have national programmes in place, and many large food manufacturers have started to reduce salt in foods.

Why is salt reduction a good option?

Approximately half of all deaths or disability due to complications of raised blood pressure occur among population with blood pressure \( \leq 140/90 \) mmHg. The clinical approach to hypertension is addressing only a tiny fraction of hypetnsives in countries. It is an effective therapy but is not addressing the vast majority of the population. Hypertension control is cost-effective in most settings, but the total cost for implementation is typically very high because many people need to be treated. For example, in Australia about A$ 1 billion each year is spent on preventing 10% of hypertension-related diseases, A$ 0.5 billion is spent on drugs, and A$ 0.5 billion is spent on salary support for medical practitioners to diagnose, prescribe and monitor blood pressure.

Salt reduction, on the other hand, has the potential to reach everyone easily as everyone eats food. It is projected to be highly cost-effective/cost-saving if based on centralized approaches to changing the food environment where total costs can be kept very low. In Australia, for example, only A$ 10–20 million a year would be needed for a gold standard national salt reduction programme. This is only 1–2% of the sum expended on the hypertension programme.

A very important fall-out of salt reduction that is not widely understood is that the effects of salt reduction increase over time. The INTERSALT Study is a pivotal paper published 20 years ago that showed a great association of excess salt consumption with an increase in age and blood pressure. So, each additional 6 g salt/day resulted in an approximate 0.4 mmHg per year higher systolic blood pressure. This would mean a blood pressure elevation of 20–30 mmHg over the lifetime of an individual, which increases the risk for disease. This has important implications, for example, if in Australia 25% salt is taken out of food supply there would be an immediate drop in population blood pressure and subsequent incremental decreases will be noticed, because blood pressure will not increase as much with increasing age.

Initial major investments in salt reduction measures have been known to cause immediate and significant reduction in blood pressure and risk. In Australia an investment of A$ 10–20 million a year showed a 3–4 mmHg fall in blood pressure over five years and a 10–20% reduction in premature vascular disease. Subsequently, long-term larger and incremental reduction in blood pressure and risk required only minor investment for maintenance, e.g. A$ 5–10 million a year to cause an additional 10–15 mmHg fall in blood pressure over 40–50 years, and a 20–40% reduction in premature vascular disease. Therefore, there is important and incredibly strong evidence underpinning the rationale for salt reduction (despite what is reported occasionally in the media).
High Blood Pressure and Salt Reduction in the South-East Asia Region

Professor Prabhakaran presented an overview of the status of high blood pressure and salt reduction studies in SEAR. There is a triple burden of disease – infectious diseases, NCDs and injuries – in the Region. Member States of SEAR are host to 40% of the world’s poor; the life expectancy at birth is 65 years and healthy life expectancy is 59 years. There is a poor disease surveillance system, and a need for more robust and reliable health statistics, especially for mortality and its causes.

Hypertension

Chronic NCDs, particularly CVD and its principal risk factor hypertension, are increasing in SEAR. Hypertension in the Region varies from 20% (Bangladesh and Democratic People’s Republic of Korea) to 45% (Indonesia, Myanmar). In 2008, of the 7.9 million NCD-related deaths in SEAR, 3.6 million were attributable to CVD alone. This is projected to increase to 12.5 million by 2030. Notably, unlike in developed countries, most of the deaths occur at younger ages with consequent adverse health, economic and social implications. Nearly a third of the population in SEAR has high blood pressure, which is a leading contributor to mortality (1.5 million deaths per year and 9% of all deaths).

Salt intake

Salt intake data from the Member States in the Region is limited and varies depending on the method of assessment. Most countries in SEAR consume more than 10 g/day of salt – Bangladesh 17 g/day; Indonesia 15 g/day; Nepal 10–13 g/day; Sri Lanka 9–11 g/day; Thailand 10.8 g/day. No data are available from Bhutan, Democratic People’s Republic of Korea, Maldives and Timor-Leste. The majority of the salt consumed in the Region is from added salt, either while cooking or on the table and from processed foods. The potential impact of 15% salt reduction in the Region is a reduction of population systolic blood pressure by 1–3 mmHg in 10 years depending on age.

For an individual with hypertension it is important to get their blood pressure down to the lowest possible tolerable level, and at the minimum it should be <140/90 mmHg. Data from a meta-analysis of 61 prospective, observational studies have also provided powerful evidence that throughout middle- and old-age, blood pressure is strongly and directly related to vascular disease mortality. Perhaps the most striking are the practical implications of these data: even a small 2 mmHg fall in mean systolic blood pressure would be associated with large absolute reductions in premature deaths and disabling strokes. A 2 mmHg lower mean systolic blood pressure could lead to a 7% lower risk of ischaemic heart disease death and a 10% lower risk of stroke death. A study has shown that a 2% drop in population-wide diastolic blood pressure would avert 450 000 deaths in China, 300 000 deaths in India and 200 000 in other regions of Asia in 20 years.

Research response and research needs: examples from India

Operational research is important for salt reduction programmes. Despite NCDs being very prevalent in the Region, related publications constitute less than 5% of the overall global

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Professor D Prabhakaran, Executive Director, Centre for Chronic Disease Control, and Public Health Foundation of India

World Health Organization | Regional Office for the South-East Asia Region
publications. Therefore, there is a need for research due to paucity of data on population salt intake, sources and public knowledge; absence of regional evidence on likely effectiveness and potential economic impact of salt reduction efforts; and limited availability of country-specific food tables and food composition databases.

The Public Health Foundation of India is working with George Institute (Australia and India) through translation research to enable implementation of salt reduction in India. The components of the research are a population survey, stakeholder analysis and setting up a nutrient database. The population survey includes estimating mean daily salt consumption among adults (urban, semi-urban and rural areas) using 24-hour urine samples; determining main sources of dietary salt using 24-hour dietary recall; and assessing current population knowledge of effect of salt on health. Stakeholder analyses will include central and state government; food safety and standards authority; salt manufacturing industry; food manufacturers; academia, including public health professionals; nongovernmental organizations (NGOs); and civil societies. A nutrient database would need to be established for baseline levels of sodium; for comparing mean baseline sodium across companies producing similar products; tracking changes over time; annual survey of large chain retailers for three years; and serving size, price, energy, sugar, saturated fat and salt.

Dissemination of research is also important through publications in scientific journals, roundtable discussions with policy-makers and broadcasting through media. The Indian Council for Medical Research (ICMR) is conducting the Diet and lifestyle InterventionS for Hypertension risk reduction through Anganwadi workers and Accredited Social Health Activists (DISHA Study). This is a population-based randomized cluster trial at the grassroots level (n = 3600 in each of the five sites Indore, Junagadh, Puduchery, Shimla and Tanda) that assesses the effectiveness of intense versus usual information, education and communication interventions on diet and lifestyle modifications, delivered by existing community-level health-workers (ASHA or equivalent), on population-level blood pressure.

In conclusion, there is a high burden of hypertension in SEAR and limited data on sodium consumption, although it appears to be high. Surveillance methods for salt intake need strengthening, and operational and policy-relevant research are needed for an effective national salt reduction programme to be instituted.

WHO’s Work in the Area of Population Sodium Reduction

Dr Godfrey spoke on why population salt reduction strategies are important and about WHO’s work in this area. He iterated that NCDs account for 60% of deaths globally and 40–79% in SEAR. This includes 15% of the total number of deaths globally that occur before the age of 60, and 27% that occur before the age of 70. Hypertension is the leading risk factor for global mortality and is ranked first, while physical inactivity is ranked fourth on a global level.

Impact of population salt reduction: expected health benefits

One of the nine voluntary global targets for the Member States, proposed at the formal meeting on the global monitoring framework and targets, is a 30% relative reduction in mean population intake...
of salt/sodium by 2025. The indicator would be age-standardized mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years. The WHO recommendation for sodium consumption is less than 2 g/day per person (5 g salt/day) in adults.

There is strong evidence for the link between health and salt reduction intervention. It is a “Best Buy” for all income countries giving quick value for investment. Salt reduction can save a lot of lives; for example, if implemented as a systematic and sustained campaign it can save 2 million lives in 10 years in India. The Political Declaration of the High-level Meeting of the UN General Assembly on the Prevention and Control of Non-communicable Diseases, held on 16 September 2011, states in Article 43 to promote the development and initiate the implementation of cost-effective interventions for salt reduction, among other food substances.

Many populations have an average salt consumption of 6–12 g/day. Reduction in salt will reduce blood pressure that will subsequently lower the risk of CVDs. A 5 mmHg lower systolic blood pressure is said to cause a 20–25% decrease in stroke and 15–20% decrease in coronary heart disease (CHD). A universal reduction in dietary intake of sodium by 2.9 g/day can lead to a 50% reduction in the number of people requiring antihypertensive treatment; a 22% reduction in the number of deaths resulting from strokes; and a 16% reduction in the number of deaths from CHD.

Successful global intervention programmes

Finland

Finland is a good example of 30 years of systematic work in salt reduction. Mass media campaigns, cooperation with the food industry to reduce salt voluntarily, and education of health-care personnel made the public aware of salt and blood pressure issues. Regular monitoring was established (with population surveys every five years). National labelling decrees were launched. The programme in Finland was successful as it recognized that reducing salt intake in the population requires long-lasting systematic work. A national legislation on setting maximum salt levels for normal products was put in place; consumer education was prioritized; and compulsory labelling of salt was introduced.

United Kingdom

Salt reduction initiatives in the United Kingdom worked on two levels: (1) reformulation through working with all sectors of the food industry, and (2) ongoing public awareness campaigns. The United Kingdom now has the lowest salt intake of any developed country in the world. Salt intakes have fallen in adults from 9.5 g/day in 2005 to 8.1 g/day in 2012; approximately 1.5 g/day/person, saving approximately 8500 lives every year. The success of the United Kingdom salt reduction programme was due to the rigorous setting of voluntary salt targets to be achieved by the food industry.

Requirements of population salt reduction strategies

There are three important requirements for population salt reduction strategies:

1. Creating an enabling environment through consumer education and product reformulation. This will be achieved through the implementation of an education and public awareness campaign and by engaging food/meal producers and distributors to reformulate their products.

2. Monitoring and evaluation achieved through establishing sodium consumption and food composition databases, which will help in monitoring sodium intakes and sources of sodium as well as monitoring consumer knowledge and behaviours.

3. Salt as a vehicle for fortification. This will ensure that iodine fortification and reducing salt intake strategies work complimentarily, as well as identifying alternative vehicles for iodization.
WHO guidelines on sodium consumption for individuals

- WHO recommends a reduction in sodium intake to less than 2 g/day (5 g/day salt) in adults to reduce blood pressure and risk of cardiovascular disease, stroke and coronary heart disease.

- WHO recommends a reduction in sodium intake to control blood pressure in children. The recommended maximum level of intake of 2 g/day in adults should be adjusted downward, based on the relative energy requirements of children.
Interventions for Sodium Reduction – What Works and Why it Works

Professor Campbell presented a review of interventions for normalization of dietary salt intake. He stated that the most ineffective policy would be a “no policy scenario” which is likely to result in increased salt intake, more so with nutrition transformation as multinational food companies are specifically targeting developing economies for growth. Purely voluntary programmes for the food processing industry did not prove to be effective in Australia, Canada, United States of America and elsewhere. Education alone also does not work, as salt intake as part of processed foods is largely outside the control of the consumer (as derived from a Cochrane meta-analysis). Lastly, non-sustained actions and repeating the same ineffective policies/tactics will not work. It is evident that any single-pronged approach is likely to be unsuccessful.

Effective interventions require a multi-pronged approach, including education, reduction in salt added during food processing, use of salt substitutes, monitoring and evaluation, research, as well as coordination with salt iodization programmes and ancillary policies to support healthy eating.

Education and knowledge translation need to be given to policy-makers, health care professionals, the general public and the food industry. It is important to engage and empower nongovernmental organizations (NGOs), civil society and health care organizations. Guidelines for the food industry should be in place for reduction in sodium additives to foods (packaged, restaurant and street food, or even home-cooking) during processing/preparation. Strict yet practical targets and timelines need to be set and adequately monitored and evaluated with defined or inferred consequences. For an effective programme, monitoring and evaluation (including iodine and potassium) of dietary salt intake, sources of salt in the diet, amounts of salt in food, amount of salt added to food at home, as well as knowledge of attitudes and behaviours (of policy-makers, key opinion leaders, food sector, public) are required.

Research should primarily deal with sustaining an up-to-date summary of research with interpretation, health-economic evaluation, and methods to most effectively implement salt normalization programmes and reduce disparity in salt intake. The role of financial/commercial interests in deterring salt normalization need to be studied and clinical
trials on non-blood-pressure related adverse effects of salt need to be carried out.

Ancillary policies would include education on healthy eating (grocery store education), defining of unhealthy food (with added salt, free sugar, saturated fat and trans-fatty acids), deterring marketing of unhealthy foods to children, formulating food procurement policies, assessing cost recovery through taxation for health costs, using clear and easy to understand food labels, providing economic incentives for healthy food, enhancing agricultural programmes for fresh local foods, instituting school and workplace programmes for healthy food behaviours, as well as locating supermarkets near homes.

Effective salt reduction interventions would include national intervention programmes such as those conducted in Japan since the 1960s, Finland in 1970 and United Kingdom in 2003. Japan (1960–1970) was successful in reducing salt consumption, which was found to be associated with reduction in blood pressure and stroke death. Finland and United Kingdom have been successful with multi-pronged programmes (see Box 1).

Very significant and rapid process successes have been achieved, due to sharing of experiences on how to reduce dietary salt and with a large number of countries initiating specific salt reduction programmes simultaneously. A good example is the WHO European Region where the EU Framework for National Salt Initiatives largely focuses on food industry products. Eleven countries in the European Union agreed to reduce salt content of foods by 16% between 2008 and 2012. Salt reduction is one of the five priority interventions in the most recent Action Plan for the implementation of the European Strategy on the Prevention and Control of Non Communicable Diseases (2012–2016).

WHO-Pan American Health Organization (PAHO) has instituted programmes to assess attitudes and behaviours of the food industry and the public; provide advocacy and education using standardized materials and social marketing; examine and advocate for integration of iodine and micronutrients; introduce fortification programmes; develop methodology and increase research on surveillance, monitoring and health economics; share best practices monthly update with the government, industry and NGOs. PAHO is currently working on a template for targets and timelines of food categories for national government and NGO efforts (community, NGOs and food industry).

**Challenges**

The challenges to salt reduction strategies include a lack of clear documentation of programmes; what is being done, what is working and what is not working. There are also commercial conflicts of interest and solutions to commercial interests that have not been addressed. Moreover, a substantial overt and

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**Box 1: Finland and United Kingdom: What worked in salt reduction interventions**

- Education of the industry and public (Finland, United Kingdom)
- Structured reductions in salt additives (setting targets and timelines, United Kingdom)
- Food warning labels on foods high in salt (Finland)
- Salt substitutes (Finland)
- Monitoring of salt intake (Finland and United Kingdom)
- Monitoring of sodium levels in food (Finland and United Kingdom)
- Strong civil society advocacy (United Kingdom).
covert opposition from the salt industry and food industry exists. This, along with a lack of political will, could hamper future salt reduction programmes.

Rough estimates from a Canadian study have shown significant advantages of lowering sodium in diets on prevalence of hypertension. Cutting salt intake to the recommended level caused a 5.2 mmHg reduction in systolic blood pressure and a resultant 30% relative reduction in hypertension prevalence; healthy eating resulted in 80% relative reduction in hypertension prevalence. Thus, there is a need for a shift in thinking by society, so that unhealthy food is considered as a major preventable cause of premature death and disability, and for healthy food to become a core societal value.

Different countries have salt in food from different salt sources and therefore, in part, need different strategies to reduce dietary salt. Thus, one of the major challenges would be that different settings are likely to require different policy interventions. In many settings, salt is often added during cooking and can also come from sauces (e.g. soya sauce).

There are also regional differences in processed foods, and many countries in nutrition transition have dual sources of salt. A model national intervention for a low-income country also in nutrition transition will be a challenge. Incomplete research and surveillance database, low-quality research, poorly designed and/or irrelevant research and intellectual conflicts of interest are going to be major barriers to instituting a suitable salt reduction programme.

### The way forward

Salt reduction strategies can progress effectively and be successful only if there is a paradigm change in how society thinks about food in relation to health and disease (healthy global food strategy). The following steps would prove vital to synchronize and harmonize global efforts in salt reduction.

- Better-organized and systematic efforts with knowledge sharing driven by WHO, NGOs and the food industry.
- Knowledge translation to fully engage healthcare professionals, the public, the food industry and politicians.
- Political will to implement policies that allow for a healthy food supply which supplies optimum levels of salt and other nutrients for good health.
- High priority for research on the health impacts of food and how to optimize health through diet.
- Sharing of information via updates from the PAHO Technical Advisory Group and from Centers for Disease Control and Prevention.

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**Salt Iodization and Sodium Reduction**

Dr Omar Dary spoke about compatibility of salt iodization and sodium reduction programmes. Iodine is an essential element that cannot be synthesized in the body and therefore food products, such as seaweed, are the only natural source. Iodine deficiency produces a variety of disorders, such as goitre, hypothyroidism, brain damage, cretinism, poor pregnancy outcomes and impaired cognitive and physical development. The recommended daily iodine intake in those over two years of age is 100–200 µg/day. Therefore, landlocked countries where natural iodine is not available need to supplement their diet with iodine. WHO recommends iodine supplementation through...
fortification of salt by the “universal salt iodization” method whereby iodized salt can reduce iodine deficiency in populations worldwide.

The current recommendation for population-wide salt intake reduction to lower population blood pressure and associated CVDs, calls for a need to review the recommended level of salt iodization and adjust it to the overall goal of reducing total dietary salt consumption to less than 5 g/day until an alternative vehicle for salt fortification is found. Strategies need to aim at preventing iodine deficiency, but at the same time reducing salt consumption to prevent hypertension and other CVDs. A joint approach to salt iodization and sodium reduction is required such that the implementation of a universal salt iodization programme would not induce individuals to perceive that increased salt consumption is needed to prevent iodine deficiencies. The 1996 WHO/UNICEF/ICCIDD recommendation of 20–40 mg iodine/kg is a range of averages; and not a minimum and a maximum value. However, this was forgotten, and this range has been later interpreted as the iodine contents that the salt should contain at the iodization centres.

The key would be to ensure that groups at the highest risk of iodine inadequacy, i.e. pregnant and lactating women get their required iodine, ≈ 180 µg/day (see Box 2). The minimum salt intake for an adult women equals 5 g salt/day. The groups at the highest risk of receiving excessive amounts of iodine are children aged 1–3 years. For protecting the whole population, adult females should have an iodine intake 0.41 times their corresponding upper limit value of iodine ≈ 500 µg/day. The maximum salt intake for ensuring iodine safety is 12.5 g/day. This means that if salt intake is more than 12.5 g/day, then the content of iodine in salt should be reduced. An alternative solution is to decrease the salt intake.

In conclusion, there is no need to fear that iodine intake will decrease below required levels due to reduced salt intake. Current WHO/UNICEF/ICCIDD recommendations for salt iodine content are adequate for recommended salt intake of 5 g/day in adult populations. However, both discretionary salt as well as salt for use by the food

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**Box 2: The WHO/UNICEF/ICCIDD recommendations for iodized salt**

For avoiding excessive amounts of iodine supply, recommended salt iodine content would be as follows: Assumptions: Iodine need (recommended nutrient intake) = 150 µg/day; Salt intake = 10 g/day; Iodine stability = 70%

- Iodine content at iodization centres = [150 µg/day ÷ 10 g/day of salt] / 0.7 = 21 µg iodine/g = 21 mg iodine/kg = 20 mg/kg

- For protecting the whole population adult females should have an iodine intake 1.87 times higher than their corresponding estimated average requirement of iodine: i.e. 95 x 1.87 = 178 = 180 µg/day and iodine intake 0.41 times their corresponding upper intake level value of iodine: i.e. 1100 x 0.41 = 451 ≈ 500 µg/day.

- The minimum salt to be ingested for an iodine intake of 40 mg/kg assuming 10% losses is 36 mg iodine/kg. *Iodine intake = iodine content x salt intake => salt intake = iodine intake/iodine content = Minimum salt intake for adult women = 180 µg iodine/day ÷ 36 mg iodine/kg salt = 5 g salt/day.*

- The highest intake of salt for ensuring iodine safety is: *Maximum salt intake by adult women = maximum iodine intake ÷ maximum iodine content in salt in households = 500 µg iodine/day ÷ 40 mg iodine/kg salt = 12.5 g salt/day.*
industry must be iodized. Adjustments to the iodine content in salt should be done periodically based on the evolution of urinary iodine excretion (µg/day), or the corresponding of urinary iodine concentration (µg/l) of the vulnerable groups determined by age-, gender-, and physiological status and also probably after considering different climatic environments. The estimation of daily excretions of both iodine and sodium (sodium chloride) are needed to design efficacious and safe iodization programmes. These parameters should be used for monitoring and evaluation of the programmes and not simply the iodine content in salt.
Recommended Methods for Measuring Population Salt Intake

Salt intake measurements help in making informed decisions for any salt reduction intervention programme, with regard to monitoring progress towards target intake, and informing health-economic modelling, policy-makers and public industry to mobilize interventions.

Various methods for measuring population salt intake are in use: (1) 24-hour urine sodium excretion (with creatinine (adherence) correction and with para-aminobenzoic acid (adherence) correction); (2) Spot urine sodium excretion (random, overnight, timed; with or without creatinine correction; with or without other correction factors); (3) dietary intake assessment (duplicate diets and surveys of food intake); (4) food frequency evaluation; (5) food diaries method; (6) food recall method; (7) food disappearance method; and (8) household expenditure data.

In individuals with no illness (e.g. diarrhoea, or on diuretic therapy etc.), more than 90% of sodium ingested is excreted by the kidneys; hence assessment of urinary sodium is a good proxy for salt ingestion in such individuals. For average population salt intake, a single 24-hour urinary sodium excretion assessment is used as the standard of comparison but it does not account for seasonal variation in salt intake. For individual salt intake a series of up to ten 24-hour urine studies are required to account for daily variation in salt intake.

The best estimate of population profile distribution and average level of dietary salt intake is by measuring 24-hour urinary sodium excretion in a representative sample of individuals. This method is considered the “gold standard” to measure intake as it captures >90% of sodium ingested. The use of spot urine sodium excretion for measuring salt intake is not established at this time. The PAHO Protocol provides a standard method for measuring population salt intake. [http://www2.paho.org/hq/dmdocuments/2010/pahosaltprotocol.pdf]

There is enough evidence to lower salt with no need for a baseline level to start any activity. However, assessment of baseline intake is key to motivate policy-makers who are interested in health-economic models that require assessment of intake.

In conclusion, 24-hour urinary sodium excretion method remains the standard for salt intake assessment. Assessing conditions under which the spot-urine method better reflects salt intake than the 24-hour urine method should be a priority. Validated and algorithm-corrected timed-urine sodium (with creatinine) may be viable to assess time trends. Diet surveys may be valid if the food database is comprehensive, accurate and up-to-date but it will not account for discretionary salt. Rigor and care is critical regardless of the assessment method used.
Methods for Measuring Population Sodium Intake in the Region

The South-East Asia Region has a rich and diverse dietary culture, with extensive use of salt and spices being a common point. However, there are very limited contemporary data on population salt intake and in fact no data from Bhutan, Democratic People’s Republic of Korea, Maldives and Timor-Leste.

Most of the data on salt consumption are derived from dietary recall or household salt weighing methods and most of the samples are small and non-representative of the population. Employing the most appropriate method is critical, not only in assessing baseline intake but also to evaluate the impact of potential salt reduction initiatives. The majority of these methods, however, are not ideal, and there are challenges that impair accuracy. While the 24-hour urinary sodium excretion is considered the gold standard method of assessment, this comparatively reliable method is difficult and expensive to implement when assessing salt intake in populations. Simpler methods, such as dietary recall and estimating salt content of food using food consumption tables/databases, are less reliable when assessing salt intake in populations. Notably, there is considerable intra-individual variability in intake and a single day’s measure may not adequately indicate usual intake on an individual basis.

Furthermore, methods that rely on recall do not accurately quantify salt added while cooking or at the table, leading to likely underestimates. This is particularly of concern in SEAR where much of the salt is added during cooking or at the table.

Methods that have been used for assessing salt intake in the Region include 24-hour urinary sodium excretion, spot urine sample, food frequency questionnaire, household salt weighing and 24-hour dietary recall.

Challenges for salt intake assessment methods in the Region

There is low priority and awareness among the public, policy-makers, health care professionals, and the food industry about salt requirements and the need to assess salt intake in populations. Additionally, there are logistic difficulties for collections, transport and storage of 24-hour urine samples. Some of the challenges for salt intake assessment include: high costs of measuring, limited national health surveys, paucity of food tables and food composition databases, ensuring completeness of assessments, lack of measure for added salt, as well as lack of suitable tracking and accountability for local/ethnic foods, restaurant foods, and foods from street vendors.

The road ahead

Evaluation of food sources contributing most to salt intake is a critical first step to develop and subsequently monitor the impact of context-specific salt reduction strategies. It requires assessments using food tables and composition databases that are lacking in the Region. This is particularly important in SEAR, given that most of the salt in SEAR diets is still largely from food made in homes. In addition, as consumption of ready-to-eat meals and processed foods is likely to increase as a result of economic progress, it is necessary to obtain, monitor and track changes in nutritional information about these foods if salt reduction efforts are to be effective.

In conclusion, with the UN global monitoring framework making it imperative to measure salt intake there is a potential to integrate salt intake

Dr Sailesh Mohan, Senior Research Scientist & Associate Professor, Public Health Foundation of India
assessments with national health surveys, demographic surveillance systems (INDEPTH) and NCD risk factor surveys (STEPS). The scale and scope of assessments could be based on feasibility and available resources. Assessments should be periodically repeated to monitor changes and inform policy implementation and evaluation. Joint monitoring with existing iodine monitoring systems could facilitate joint tracking and monitoring at substantially lesser cost.

Recommended Methods to Identify Main Sources of Sodium in the Diet

Total salt consumption can be assessed by type of products consumed (processed foods, foods eaten away from home, salt and other foods, home-grown foods and added ingredients), the quantity consumed and the salt concentration. The quantity consumed depends upon the type of reporting, whether complete, objective or precise. Salt concentration will also depend on the type of reporting – complete, precise and unbiased reporting, or accurate and up-to-date recording. In addition, measurement errors (random or systematic (biases)) also need to be taken into consideration while measuring salt in diet.

Some other considerations include whether more measurements are being taken in the same individual or in different individuals. Measurements in the same individual give a better description of individual characteristics and average spread of data, but there is clustering of data and less coverage of the population. On the other hand, measurements in different individuals has the potential to cover more diverse populations and regions and gives same estimate of mean, though there may be less sophisticated estimates of spread of data.

Professor Bruce Neal, Senior Director, The George Institute for Global Health; Professor of Medicine, University of Sydney; Chair, Australian Division of World Action on Salt and Health

Food consumption database

The optimal design for collecting food consumption data is a food consumption survey that takes a stratified random sample of the entire population and captures all foods consumed under all settings. It records quantities eaten as well as collecting other related data and can report precise and unbiased estimates of sources of sodium in the diet overall and for important population subgroups. This survey has to be periodically repeated.

The challenge with this survey is that it is difficult to cover all geographies, settings and age groups (e.g. access to remote and disadvantaged areas and possible issues while working with older and very young age groups). Also, there is an absence of key data (e.g. census) and the possibility of limited resources. Another challenge is exposure measurement, i.e. it is difficult to record the nature and quantify foods consumed due to subjectivity in reporting of food eaten, and difficulty in measuring serving sizes. Moreover, it is often hard to know what ingredients go into a meal. It is difficult to accurately estimate the ingestion of sodium used in food preparation and variations in consumption patterns over time.

Survey tools

24-hour recall gathers full 24-hour food intake from all sources. It is the current gold standard methodology with sound international experiences. However, it requires intensive effort to get good recall of all foods and would need to be done on many different days over a year to give a good overall estimate for all foods. The estimation
of ‘usual’ intakes requires repeat measurements from each individual, but the recent availability of computer-assisted questionnaires (multi-pass approach) would prove helpful.

*Food frequency* measures how frequently different types of foods are eaten by respondents. This is a relatively easy method that is also amenable to web-based implementation. It can be expanded, contracted or focused to address specific nutrients. However, the method usually requires validation by further analysis in a subset. It can address seasonality issues by questioning about prolonged periods of time, but is prone to greater subjectivity in reporting.

Other survey tools include **3-day or 7-day food diaries** that record all food consumed over the period. In the **duplicate food collection method** two identical plates of food are prepared with one being consumed and the other sent to a laboratory for analysis. The **weighed food method** weighs all foods before consumption. Sodium can also be measured by *indirect assessment* from data collected for other reasons, such as by the departments of finance or agriculture, or by market research companies. These do not make individual assessments of consumption but have been long-used to track nutritional adequacy of the diet. **Household income and expenditure surveys** that assess household level data are fairly easily accessible and have good periodicity, with large samples that are reasonably representative. This forms a comparable method across countries, where individual intake is estimated from knowledge of age and sex of household members. However, foods eaten out of the home are not always captured and it does not account for product wastage leading to the possibility of over-estimation of salt intake.

**Food disappearance method** collects household level data, the before-and-after measurement of salt (and other high sodium products) in the household, and is typically done on a subset of participants in a dietary survey. While being moderately labour-intensive, it only captures salt intake from selected sources.

Individual intake has to be estimated from knowledge of age and sex of household members and may overestimate salt intake. When food disappearance data are collected at the national level using national data on salt manufacture, import and sales, it is often difficult to interpret since salt is a commodity with many different uses (animal food, road de-icing, industrial chemical manufacture, etc.).

**Retail sales data** is collected by market research companies and is often brand-specific. These data may be linked to other food composition data. Often repeated regularly, methodologies are comparable across jurisdictions, but are unlikely to capture all foods sold (retailer-specific) and may be expensive to purchase and include restrictions on usage.

In conclusion, 24-hour food recall is the gold standard. Cross-checking of multiple sources of data would probably be ideal while relatively small surveys will give a fair idea of the main sources of sodium at a population level. Secondary databases, while logistically attractive, may be of limited utility.

**Food composition database**

Food composition databases may be national or regional and can accommodate local traditional foods. Many also include restaurant foods and can often be generalized across jurisdictions (in part at least). The disadvantage is that these are infrequently updated and are incomplete.

A food composition database can be compiled from various sources, such as existing databases, food industry communications, nutrient declarations on labels, corporate Internet sites (especially restaurant chains), and from scientific literature.

There are several challenges to preparing and using a food consumption database. It is difficult to be sure of the salt content of foods eaten; the information is limited and data is mostly
aggregated. Food composition between similar products tends to vary and so do recipes for meals. Terminology and categorization systems tend to vary, which affects data analyses and calculations. Sometimes nutrient declarations are incomplete and so is their currency of data. Also, it can be on a complete set or a subset of foods.

Quantifying added salt requires capturing consumption of sodium from salt added during cooking or at the table, which is problematic. Lithium labelling of salt is considered a gold standard but it can be onerous. Qualitative techniques may give a broad indication. The disappearance method requires weighing of salt containers. Other direct methods for added salt measurement include simulated meals where participants add salt to food models or pictures. This can be simple but limited to representative meals. Another method is to observe cooking practices: this is semi-quantitative, onerous, and with limited generalizability. The subtraction method is an indirect method (24-hour urinary sodium excretion – salt from processed foods – salt from restaurant foods = discretionary salt intake). This requires 24-hour urinary sodium excretion assessment and it is difficult to be sure whether discretionary salt intake will be over- or under-estimated.

Regional/cultural issues in salt measuring methods

Most Member States have a few very high salty foods (soy sauce, fish sauce, tomato sauce, soup mixes, curry pastes, etc.). This extreme saltiness means that even small quantities can deliver a significant proportion of sodium in the diet. However, a range of qualitative or quantitative methods can be used to identify this excess salt. Analysis and reporting of salt in diets can become complex because of sample weighting. Non-standard statistical tools and expertise are required and there is a need to deal with measurement error issues. Moreover, strong vested interests are always willing to cast doubts on unwelcome findings from imperfect data.

**Recommendations for determining salt/sodium in diets**

The recommendations for determining patterns in food consumption include the following.

- Use existing data, if available, including a search for secondary sources (household income/expenditure, etc.)
- Do ‘de novo’ surveys using 24-hour recall or food frequency questionnaires – attach to other survey projects, use representative sentinel sites or other pragmatic approaches
- Conduct a dedicated national survey.

For food composition data it will be essential to:

- Identify existing local data
- Import data from another source (national or regional)
- Update/collate with local data collection and analysis.

To determine the extent of discretionary salt use:

- Consult local nutrition experts and use simple survey questionnaires
- Use focus groups to attain better understanding
- Consider household salt disappearance study
- Consider subtraction method if salt in 24-hour urine and foods is known
- Do lithium-tagging study, if resources permit.

In conclusion, in most settings in the Region, salt is derived from many different types of foods. Existing data and available resources will be key to deciding what is required for a country to move forward. A stepwise approach incorporated into the existing processes will probably be most plausible. Data are being collected to inform action at a policy level for regulation, industry action and health promotion; however the evidence base is imperfect. Professor Neal ended the talk by suggesting a literature source for further review of methods – “A review of methods to determine the main sources of salt in the diet”, prepared by WHO/PAHO Regional Expert Group for Cardiovascular Disease Prevention through Population-wide Dietary Salt Reduction, 2010.
National Experiences in Salt Reduction Initiatives in the Region (round table)

In this session, the current status, issues and future plans for salt reduction in the Region were discussed. Representatives from the following Member States (Bangladesh, Bhutan, India, Indonesia, Myanmar, Nepal, Sri Lanka and Thailand) presented the country scenario to the Expert Group.

Bangladesh

The round table was opened by a presentation from Bangladesh. Dr Sohel Reza Choudhury, Associate Professor, Department of Epidemiology and Research, National Heart Foundation Hospital and Research Institute, Bangladesh spoke about the current epidemiology of hypertension in Bangladesh, dietary habits of the Bangladeshi population, setting up of a salt reduction strategy and salt reduction activities undertaken by the National Heart Foundation of Bangladesh.

Current epidemiology

Nearly 51% of the disease mortality in Bangladesh is due to NCDs; 27% solely due to CVDs. According to the recent report of NCD Risk Factor Survey Bangladesh 2010, 12 million adults have hypertension (6.2 million men, 5.8 million women). The prevalence of hypertension among those aged 25 years or more is higher among the urban population than rural (21% urban men, 19% urban women versus 16% both men and women in rural areas). Despite the high prevalence of hypertension, about 33% of the population had never measured blood pressure in their lifetime. Only about 50% of the diagnosed hypertensives had their blood pressure under control (<140/90 mmHg). Moreover, about 25% of the population had low physical activity level and about 15% were overweight, which could also have contributed to the high prevalence of hypertension in Bangladesh.

Dietary habits and salt intake of the Bangladeshi population

The daily diet of Bangladeshis consists mostly of rice, some vegetables, a small amount of pulses and small quantities of fish, if and when available. Milk, meat, oil and fruit intake is low for the vast majority of the population. Data on salt intake in Bangladesh are scarce. Most of the salt is added during cooking or during the meal as extra table salt. A study by the National Heart Foundation
Hospital and Research Institute of Bangladesh, involving 200 adult healthy subjects, estimated salt intake from 24-hour urinary excretion of sodium. The study reported a daily salt intake of 10–11 g/day in this urban population. Another study that measured salt intake from spot urine sodium excretion assessment reported a very high salt intake of around 17 g/day.

Setting up a salt reduction strategy

There are no specific policies for salt reduction at the population level in Bangladesh. The “Strategic plan for surveillance and prevention of noncommunicable diseases in Bangladesh 2007–2010” adopted by the Ministry of Health and Family Welfare has stressed reduction of salt intake, but with no clear goal being stated. The food-based dietary guidelines by the Bangladesh National Nutrition Council (BNNC) emphasize using iodized salt and avoiding too much salt and salty food. Efforts are being made to raise awareness among the general population and industry through NGOs/civil society such as the National Heart Foundation of Bangladesh.

Bangladesh needs policies/programmes/initiatives that have monitoring and evaluation in place to report salt intake in dietary surveys, and those that address the issue of salt content limit for processed foods by formulating appropriate laws and regulations. Particular attention needs to be given to include various stakeholders for a successful salt intake reduction programme. These should include a specific programme for population salt intake by the government for the public sector; and sensitizing the private sector, e.g. local food industry and restaurants. The academia need to undertake community- and worksite-based CVD reduction programmes which can be scalable for national level implementation.

Strategies for intervention in Bangladesh

Strategies such as raising awareness on harmful effects of high salt intake in relation to hypertension and CVDs among the general population as well as in the catering industry; encouraging self regulation by the industry; as well as formulating relevant legislation regarding salt content limit and monitoring by the Bangladesh Standard and Testing Institute (BSTI) could be introduced in Bangladesh for reducing salt intake in the population.

The activities undertaken by the National Heart Foundation of Bangladesh for salt reduction include raising awareness through organizing seminars in different areas of the country, holding consultative meetings with stakeholders including the food and beverage industry, as well as generating evidence through surveys and studies.

Bhutan

Dr Tashi Wangdi, Head, Department of Medicine, JDW National Referral Hospital, Thimphu presented the results of the STEPS survey conducted in 2007. The data showed that hypertension was prevalent in 26% of the Bhutanese population; 52.4% people were overweight and 82.9% did not engage in vigorous physical activity.

Diet

Bhutanese diet majorly consists of 56.7% salted butter tea, 55.5% salted chili pickle and 25% salted dry meat consumption. Only 1.2 servings of fruit were taken in a day and 66.6% of the population consume less than five fruits/vegetables per day.

Salt reduction strategies

The National Policy and Strategic Framework on Prevention and Control of NCDs, 2009, identified
unhealthy dietary habits as one of the risk factors, with no specific mention of salt reduction. No data on salt consumption are available from Bhutan. The assumption is that salt intake in the country is above the WHO recommendation.

Some short-term strategies for salt intake reduction are in place, such as that of sensitizing the government, undertaking a scientific study about salt consumption, reducing salt intake through media publicity and public health campaigns, holding school health campaigns to emphasize salt reduction, and sensitizing the food industry.

India

Dr Bela Shah, Head (NCD), Indian Council of Medical Research (ICMR), spoke about salt reduction in India. As per the 2001 census the number of hypertensives in the population was 65.5 million, of which 20 million require regular antihypertensive medications. Hypertension prevalence was 19% in urban versus 7.5% in rural areas. Hypertension prevalence has increased from less than 5% to over 25% among urban adults and to 10% among rural adults in India in the past three decades. Moreover, hypertension prevalence is greater among those over 60 years of age. The mean age at onset of stroke was around 60 years.

Salt consumption patterns

Available information indicates that most salt in India is added during cooking and/or at the table, in contrast to the developed world where processed foods contribute most substantially to overall population salt intake. However, with rapidly increasing urbanization, proliferation of multinational food outlets/fast food centres, increasing availability of prepared foods, and increasing frequency of eating out, processed foods are anticipated to become a major source of salt intake.

A multi-centric study conducted in 1996 showed that daily salt consumption varied from 7 g to 26 g per person with an average of 13.8 g per person. Crystallized salt was used in 91.5% of the households and powdered salt was used by 8.5%. The maximum salt consumption was in coastal Orissa and the mountain state of Jammu and Kashmir (20+ g). The most salt-sensitive population was in northeast India where tea garden workers had 60.8% hypertension prevalence while in the indigenous local population it was only 33.3%.

Many food products that are consumed daily in India are high in sodium, such as pickles, chutneys, sauces and ketchups, papads, chips and salted biscuits, savoury items, cheese and salted butter, canned foods (vegetables and meats), bakery products, readymade soup powders and dried salted fish.

Salt reduction actions

There is currently no national policy or strategy on salt reduction. India plans to use WHO’s Three Pillars of product reformulation, consumer awareness and education campaigns and environmental changes to reduce salt intake in the population. The plan is to gradually reduce salt intake in the population, especially among hypertensives; to undertake studies to provide evidence of cost-effectiveness of the wide range of interventions in the country and also to undertake the analysis at the subnational level.
Indonesia

Indonesian representative, Dr Ekowati Rahajeng, spoke on issues in salt consumption and the national strategy for salt reduction in Indonesia. Hypertension prevalence in Indonesia has been on the rise, from less than 10% in 1995 to over 30% in 2007. Eleven provinces have high prevalence of hypertension (32.4–39.6%). However, at the district level, the prevalence is as high as 53.3% for Natuna island, which is famous for its mining industry. Papua has the lowest prevalence of hypertension (Jayawijaya 6.8%).

Between 1995 and 2004, the prevalence of hypertension for both genders increased significantly. In males, the prevalence increased from 7.4% in 1995 to 14.7% in 2001 and 31.6 % in 2004. For women the increase was similar with an increase from 9.1% in 1995 to 17.4% in 2001 and 32% in 2004. In 2007 there was a slight decline in prevalence of hypertension in both men and women.

Dietary intake of salt/sodium

As per the Indonesian national basic health survey (Riskesdas) in 2007, foods with high salt and monosodium glutamate (MSG) are consumed in large quantities by the Indonesian population (aged 10 years and above). The major sources of sodium in the diet are from MSG, salty fish, instant noodles, salty eggs, snacks (chips or crackers), bread and spices used for meals. The weekly average consumption of salt per person in Indonesia is 6% of all the spices, the second highest after MSG. Consumption of MSG is quite high in the country; the weekly average consumption is about 3.8 ounces or about 379 g per capita in a week or equal to 54 g/day/person. The Indonesian national socioeconomic survey showed a decreasing trend of weekly salt consumption per capita from 0.367 ounces in 2008 to 0.298 ounces or about 30 g in a week, or equal to 5 g/day/person.

The national health survey in 2011 showed that both males and females in Indonesia consume flavourings or MSG-containing food once or more in a day, which is about 77% of the population aged 10 years and older. Meanwhile about 24% of the population consumes foods preserved using excessive salt (fish and eggs) once or more in a day.

National policy on salt reduction

The Indonesian Government has placed hypertension as a priority in health programmes and developed a national strategy to prevent hypertension through several approaches, such as health education, particularly in controlling salt intake and for ensuring a healthy and balanced diet. A pocket book for the community, which contains information on health warnings, and dietary guidelines for low salt diets, has been prepared. There is also a salt intake control programme manual or guideline book for health workers. Other strategies are food labelling and regulation related to the food industry and fast food restaurants. Monitoring and supervision of programmes to control salt and sodium intake in the community have been done with collaboration with other related institutions.

Indonesia has six regulations in place related to food, of which two are directly related to salt intake and were introduced in 2005 and 2011. There is a new Ministry of Health regulation in process on regulation of food labelling and health warnings, which are to be compulsory on food packaging for all food industries. The regulation also requires restaurants to provide a balanced and healthy menu. It will also monitor the food industry and restaurants to follow the stipulated regulations. Monitoring activities include supervision, spot checks at the province and...
district levels, as well as routine reporting from health facilities and the community. The responsible units at the national level will be the technical implementing unit, the National Body for Food and Drug Control, as well as the province and district health offices, particularly for monitoring the operations of the programme.

Indonesia is focusing on output evaluation of sodium intake for its community salt consumption survey. The responsible units will be the National Institute of Health Research and Development under the Ministry of Health, in collaboration with Indonesia Statistics Office and universities. Indonesia is also continuously using data from the national socioeconomic survey, which includes data on household food consumption and expenditure using food consumption recall, and from the basic health survey, which is a population-based survey conducted every three years. The 2007 survey used 24-hour dietary recall. However, the plan for the 2013 national survey is to measure sodium urine using atomic absorption spectrophotometric analysis in a nationally representative sample from the community.

The challenges

The challenges related to a sodium intake control programme include difficulty in receiving valid information on individual salt intake in the community. The standard method of sodium intake measurement is very costly. Another challenge is to intervene in the industrial sector particularly in food labelling for health warnings and sodium contents. The most challenging issue is to change the community mindset and behaviours regarding healthy diet, so that people can wisely choose depending on the nutritional content of foods rather than their taste preference. There is no national standard for sodium content yet; the need to address the issue of salt iodization versus sodium in salt is also imperative.

Myanmar

Dr Tint Swe Latt, Rector, University of Medicine, Yangon spoke on the National Salt Reduction Initiative in Myanmar. Myanmar conducted two STEPS surveys in 2003 and 2004, respectively that revealed hypertension prevalence in both rural and urban populations to be 25%. A 2009 nationwide STEPS survey found hypertension prevalence to be 35%, a 10% increase in five years.

Dietary habits

Myanmar is a country with diverse regions, ethnic groups and culture. That said, salt consumption and dietary habits are also varied among the population. The staple food has always been steamed rice with an accompanying dish that is mostly a curry (made from freshwater fish/dried salted fish/meat or poultry), a light soup/sour soup, a salty dish (such as sauce of pickled fish/shrimp to go with fresh or boiled vegetables) and stir-fried vegetables (or) vegetable salad. However, recent transitions in food and lifestyle have been reflected in food consumption patterns. There is a change in quality of food, rice comes highly polished; there is increased consumption of palm oil and adulterated oil as well as processed foods, snacks (chips and crackers) packaged noodles and soft drinks, generalized consumption of MSG, and rice and vegetables contaminated with persistent organic pollutants. More than 95% of the population eats less than five servings of vegetables and fruits per day.

The main sources of salt in diet are dried salted fish, salted pickled fish/shrimp, fish sauce, MSG, table salt and Nga-Pi (a paste made from salted
fermented fish or shrimp or beans). The sources of sodium in diet are added salt, baking soda and various seasonings like MSG, flavoured powders, soy sauce, shrimp paste, bean paste, etc.

**Salt intake**

Data from the Ministry of Mining showed that daily intake of salt was 8.15 g/day/person, while the Department of Health data showed an intake of 6–8 g/day/person. The Myanmar Salt Reduction Initiative aims to raise awareness on the importance of salt reduction through media, health talks and camps on World Health Day and World Diabetes Day. It also has focal NCDs programmes (CVD Project, Diabetes Project) under the Nutrition Department to study salt content of foods and salt consumption in Myanmar (2013–2014).

**Salt iodization programme**

The salt iodization programme in Myanmar aims to provide 150 µg of iodine from salt. It is a highly developed programme and works under aegis of the Universal Salt Iodization strategy and all salt (kitchen salt, table salt, salt used in food production and processing, salt used in animal feeds, domestic salt and imported salt) for human and animal consumption is iodized to the internationally-agreed recommended level. The message for the iodization programme in the wake of salt reduction should be to eat iodized salt and not eat more salt. Iodated salt consumption surveys have shown that iodized salt consumption has increased nearly nine times from 1994 through to 2011. Iodine monitoring is in place in Myanmar at different levels, which can be integrated to salt intake monitoring thereby becoming even more cost effective. This includes:

- Monitoring at the point of production: amount of salt produced, salt quality, iodization process and storage
- Monitoring at the wholesale level: salt quality, transport, storage and packaging
- Monitoring at the retail level: salt quality, storage and packaging
- Monitoring at the household level: salt quality and storage and proportion of households consuming iodized salt.

In conclusion, national initiatives for salt reduction are actually in the early stage of inception and the way forward for Myanmar would be to:

- Develop a national policy on NCDs
- Implement an action plan for healthy diets and physical activity
- Build an enabling environment for the adoption of health lifestyles, including healthy diets and salt reduction activities.

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**Nepal**

Ms Femila Sapkota, Research Officer, Nepal Health Research Council (NHRC), Kathmandu said that salt reduction initiatives are at the beginning stage in Nepal. NHRC has conducted several NCD surveys that have helped shed light on the prevalent risk factors of NCDs in Nepal. Data showed that in the past 25 years (1981–2006) prevalence of hypertension has increased three-fold (6–18.5%) in rural Nepal; salt consumption (≥5 g) has also increased by nearly two-fold (55.9–89.5%); and a positive correlation was noted between hypertension and salt intake as well as obesity.
Salt reduction initiative in Nepal

At the national level there is no sodium salt reduction strategy in place, no national level population salt intake database and no national salt reduction programmes. However, some current initiatives include a national level NCD risk factors survey by the Ministry of Health and Population, NHRC and WHO, and baseline assessments of salt intake.

Nepal aims to conduct advocacy with the help of the Mrigendra Samjhana Medical Trust and sponsor a series of research seminars through the Nepal Hypertension Society. Awareness programmes will be used to educate about the danger of using excessive salt through World Hypertension Day, health camps, articles in national and regional daily newspapers/magazines, talk shows on television channels/radio stations, press meets at various places and messages in calendars, leaflets, etc. The goal of these awareness activities would be to enable consumers to take action in choosing lower salt foods and asking for much less salt to be added to their meals (especially in pickles), and raise awareness that restaurant food, fast foods, street food, canteen food, etc. can contain a lot of hidden salt.

Nepal is struggling with the same issues as other Member States in the Region, i.e. trends that are moving away from traditional diets and towards imported processed foods, growing urbanization, lack of a national salt reduction programme or strategy, and lack of human and financial resources.

Nepal plans to generate national baseline data on salt intake; prepare dietary guidelines; increase advocacy; and implement a salt reduction strategy.

Sri Lanka

Dr Renuka Jayatissa, Head, Department of Nutrition, Medical Research Institute started her talk by mentioning that CVDs were the major cause of death in Sri Lanka (30%). From a WHO study in 2011, it is known that the major risk for CVDs in Sri Lanka is hypertension (19%).

Salt intake

Estimated current salt intake including all sources of salt (cooking, table, natural and processed food) in Sri Lanka is 10.5 g/day (3.8 g sodium). Mean salt consumption in Sri Lanka estimated by 24-hour urinary excretion was 8.3 g/day in urban areas versus 8.9 g/day in rural areas. The results of a recent study revealed that there was significant association of increased salt intake with increased body mass index and abdominal circumference. A study on population salt consumption in Sri Lanka by weighing of salt at household level for a seven-month period showed a population salt intake level of 11.4 g/day.

Salt reduction initiative

The Sri Lanka Ministry of Health started the Salt Reduction Initiative in 2010. This includes development of regulations and enforcement of laws that will be a stepwise process. Work is being done under the following two areas prior to the process of regulation: (1) creating awareness and getting support by working with all sectors of the food industry (retailers, manufacturers, trade associations, caterers and suppliers to the catering industry), and; (2) reducing the salt content of processed food products by working on standardization (mandates on minimum salt required for preservation should be the maximum
allowable limit for intake). The plan of action includes:

- An ongoing public awareness campaign to inform consumers of the issues and provide guidance on how to reduce salt intake.
- Colour labelling process – voluntary/mandatory.
- Regulations on sodium reduction to be started after implementing first two action points, which will take about two to three years.

The future plan for reducing salt in Sri Lanka is to ensure that the food industry reduces salt content of all foods by 40% over the next five years.

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**Thailand**

Dr Sangsom Sinawat, Director of Bureau of Technical Advisor, Ministry of Public Health presented on national salt consumption surveys in Thailand.

**Salt consumption data**

In Thailand, national nutritional surveys have been conducted regularly every 10 years with the sixth survey carried out two years ago. The first cross-sectional salt survey was conducted in 2009 in four regions and 10 provinces. The total samples in this survey were 2733 households through a stratified multi-stage random sampling from region to household level. It was a demographic survey using food list recall (interview) and food frequency checklist of food/condiments containing salt in the past seven days. Three-day weighed inventory for average amount of salt-containing food consumption was also done and a survey form was used to collect the data of salt in food products available in the market. The survey results showed that:

- Thai people on average consume 10.8 g salt or 4.3 g sodium/day/person.
- Recommended daily intake of sodium is not more than 2.3 g/day/person.
- People with kidney and heart diseases should not take over 2 g/day/person.

**Sources of salt in Thailand**

The condiments containing 80% salt in Thailand are fish sauce, soya sauce, anchovy paste and seasoning powder. Food products containing salt (20%) include instant noodles, canned fish, steamed mackerel, chili paste and fermented fish.

**Low Salt Network**

Dr Surasak Kantachuvesiri, Department of Medicine, Mahidol University spoke about the newly set up Low Salt Network in Thailand (October 2012–2017), which has the following action plans:

- Assessment of salt composition in food recipes
- Creating a database of salt composition in food recipes
- Dietary and urine sodium assessment to evaluate sodium intake.

The Network’s development strategy is:

- Health education/social marketing
- Food reformulation
- Food labelling
- Evaluation of the attitude of the food industry to low salt policy and facilitating voluntary involvement
- Developing low salt policy options to suggest to policy-makers.

The Network hopes to develop and reformulate salt-reduced foods by developing knowledge/innovations for food reformulations.
network building/distribution of information for food production, and advocacy to facilitate marketing of reduced salt products. The Network is also campaigning for low salt through food labelling via market food survey, labelling accuracy and warnings issued to the food industry, public education on sodium content through food labelling, and consumer awareness of sodium and its effect on health through food labelling. They have already undertaken various advocacy activities, such as low salt campaigns in hospitals nationwide, increasing patient education on food consumption, introducing public education for food vendors and health personnel, as well as holding low salt food demonstrations. Public advocacy messages are being disseminated through TV, radio and social media.
The Singapore Experience

Assessment of Salt Intake in Singapore

While some improvements in hypertension prevalence have been seen in Singapore over time, around 25% of the population aged 30–69 years and 53.4% of the population aged 60–69 years are still living with hypertension.

Salt Intake Study

National level data collection on sodium intake in Singapore began in 1993 using the 24-hour dietary recall method. In 2010, a more precise measure of sodium intake was employed to assess population level sodium intake using 1-day 24-hour urinary sodium excretion — the ‘gold standard’ to assess sodium intake in the population (exclusion criteria: pregnant women, patients taking diuretics or with known chronic kidney diseases). This Salt Intake Study 2010 (n = 830) was conducted as part of the National Nutrition Survey 2010 (n = 1785), a survey containing other elements, such as a dietary practices questionnaire, a food frequency questionnaire and 24-hour dietary recalls. The National Nutrition Survey itself rides on the platform of the National Health Survey, conducted by the Ministry of Health to collect data on chronic diseases and key health behaviours.

Methodology

Salt Intake Study procedures were comparable to international standards, i.e. field staff were trained to recruit, as well as brief and de-brief participants; participants recorded any spillages or missed collections; and urine samples were analysed in a timely way. The overall response rate was 62%. Ethnic minorities were over-sampled to provide adequate numbers for statistical comparisons between groups. The samples were weighted to the population profile of Census 2010. Salt intake was estimated from urinary sodium excretion — 1 g salt (sodium chloride) to be 17.1 mmol (393.4 mg sodium).

Key findings

Mean urinary sodium excretion was 141 mmol/day; it was higher in males than in females. The estimated daily salt intake was 8.3 g for the population as a whole, with all subgroups exceeding the guideline of 5 g/day. Eight in 10 Singaporeans have salt intake above recommended levels. Sodium intake was slightly higher in the 30–49 year age group compared with...
other age groups. This is reflected not only in the mean daily intake, but also in the proportions of each group exceeding the guideline.

The level of salt intake was consistently high across all sociodemographic groups but the sources of this salt could not be assessed using urinary sodium excretion data. However, the National Nutrition Survey 2010 included a 24-hour dietary recall study which showed that the main source of dietary sodium was salt added during preparation of mixed local dishes both at home and in food outlets, while the National Nutrition Survey Dietary Practices Questionnaire indicated discretionary salt behaviours.

There were some challenges and limitations of the Salt Intake Study: participants had to follow the protocol for urinary excretion collection, completeness of the sample was uncertain although participants reported any deviation from the protocol, urine samples had to be analysed within a stipulated period to prevent sample degradation, and other groups (such as children) were not included.

The next step is to explore appropriate, sustainable assessment methods for monitoring and evaluation, including a calibration of spot urine collection against the ‘gold standard’.

**Strategies in place**

While awaiting further research following the Salt Intake Study 2010, Singapore is strengthening salt reduction strategies and setting targets for reducing salt intake.

Some of these innovative strategies are: (1) Healthier Choice Symbol products, (2) FINEST Food Programme, and (3) Healthier Hawker Programme, which are all being implemented through a public–people–private partnership. While it is too early to assess the success of these interventions, they are slowly making inroads into a healthier way of life for the population.

**Public–Private Partnership for Salt Reduction: Lessons from Singapore**

Prior to the results from the Salt Intake Study, Singapore initiated several strategies to curtail salt in diets. Many public education campaigns were started to increase consumer awareness, including posters indicating the need for less salt and booklets to highlight sources of sodium and ways to reduce sodium in the diet.

In recent years, salt reduction strategies in Singapore have uniquely taken on the approach of 3Ps partnership: Public–People–Private partnership. Public agencies include the Agri-food & Veterinary Authority of Singapore, National Environment Agency, People’s Association and the Hawkers/Merchant’s Association and SPRING Singapore. The private agencies include food manufacturers within networks, such as Singapore Food Manufacturers’ Association and Food Industry Asia, retail (supermarkets and food services), coffee shops, kiosks and restaurants. The third ‘P’ for people encompasses community engagement and a ground-up approach that are key to the success of these strategies. There are three main programmes in place targeting different sectors of the food industry in Singapore: (1) Healthier Choice Symbol Programme, (2) FINEST Food Programme, and (3) Healthier Hawker Programme.

Healthier Choice Symbol (HCS) Programme is a successfully running campaign that uses clear and
easily recognizable food labels with HCS written on them. This initiative started in 1998, and four in five Singaporeans use this symbol to assist them in making healthier food choices. HCS products today span 70 food categories and more than 2800 food products, with 170 labelled “Lower in Sodium” products. The focus is on partnerships with retailers to promote HCS products and creating demand through advertising of HCS products by food companies.

To further engage local food manufacturers and direct new product development, Health Promotion Board (HPB) Singapore initiated the FINEST Food Programme – which promotes the development of “Functional, Innovative, Nutritious, Effective, Science-based, Tasty foods”. FINEST is a collaboration between the participating industry partners and knowledge institution partners to let local food manufacturers see a business case in developing functional foods, which provide a health benefit beyond basic nutritional value. FINEST was launched in July 2012 with grants from HPB and SPRING.

Through this programme, HPB is able to align financing schemes and technology transfer with public health needs, influencing the development of prototypes that would be rapidly adapted and commercialized by companies. Some examples of low sodium products introduced to households and food service establishments are reduced sodium whole-grain yellow noodles, less sodium mineral salt, reduced sodium fishball and reduced sodium seasonings – all products that are commonly used in local dishes.

Healthier Hawker Programme is about making healthier ingredients the default for everyone. Some healthier ingredients include oil with reduced saturated fat, salt with reduced sodium, brown rice, whole-grain noodles (such as bee hoon, kway teow, mee tai bak, meepoh, meekia), etc. To make the programme a success and improve uptake by the hawkers, a public–private engagement was introduced, particularly in the supply chain model. In the old model of supply chain, there were many suppliers supplying to many hawker centres. The new model consists of many suppliers delivering to a one-stop shared services centre that redistributes to the hawker centres, thereby keeping costs low for the hawkers. Singapore is also reaching out to the lower income groups via partnerships with food operators targeting this stratum so that everyone in the population gets to make healthier choices. For example, Rice Garden, a chain of food stalls run by social enterprise NTUC Foodfare that sells budget meals costing less than $2.00 to the lower income group, has worked with HPB to use healthier ingredients at all their outlets.

The Healthier Hawker Programme has evolved from getting consumers to “ask for” healthier modifications to using healthier ingredients as the default. Incremental changes are made to key ingredients like cooking oil, salt and noodles thus preserving traditional recipes with minimal effect to the overall taste of the dishes.

Moving forward, HPB is also targeting centralized kitchens by working with food stall chains to promote the use of healthier ingredients and kitchen solutions with healthier preparation methods in mind.

The Healthier Dining Programme requires that 30–50% of all dishes on the restaurant menu should be healthier and 30% of the dishes on the children’s menu should be healthier. Singapore is working with renowned chefs to create healthier dishes that align with the guidelines of less salt, less fat/oil, less sugar, more fruit and vegetables, incorporating healthier cooking methods and using herbs and spices to enhance flavour. HPB will be building on this current programme to further enhance the capability of the food service sector by providing professional training classes and linking up consultancy services to kitchens that would like to improve their processes and incorporate healthier food preparation methods.

In conclusion, salt reduction requires co-planning and co-creating of joint solutions with the people, public agencies and private agencies working together. The food industry and all parts of the food chain, from food manufacturing and research and development through to marketing, logistics and food service, need to be included.
Setting up National Strategies and Priority Actions for Population Sodium Reduction

**Working group 1** discussed possible national strategies for priority actions for population sodium reduction at the Member State level and put forth some recommendations. When developing strategies and actions to reduce sodium/salt in the population, it is imperative to establish realistic and culturally-relevant goals as well as reasonable timeframes to achieve these.

The main discussion points were to set a goal/target for population salt intake for the Region by 2025 taking into account the global voluntary target on salt reduction; identify relevant strategies to reach the above goal in the Region; identify priority actions for implementing each of the above strategies as relevant for the government, academia, civil society, the private sector and other stakeholders; discuss potential barriers to implementing the above strategies; and discuss possible steps to overcome these barriers and put forth some recommendations on how WHO can support Member States in implementing national strategies and priority actions for population sodium reduction.

**Target**

Taking into account the proposed global target of 30% relative reduction in the mean population intake of salt/sodium intake by 2025, it was recommended that for the SEAR Member States a target to “reduce mean population intake of salt/sodium by 10% over the next five years with the aim of reaching 30% reduction in salt/sodium intake by 2025” should be set. While sticking with the overall goal, this gives a short-term target for countries to follow.

**Priority strategies**

Population sodium reduction strategies identified were: advocacy including raising public awareness through health education campaigns; setting up regulations; setting-based salt reduction interventions; conducting operations research; strengthening monitoring agencies and developing a framework for monitoring compliance by the industry; and implementing a consumer friendly food labelling system.

**Conduct advocacy activities**

Use of local data/evidence is key to advocacy activities and mobilizing political will among senior government leadership. A national multi-stakeholder consultation can help bring together such data/evidence. Existing nationally available data must be reviewed to establish baseline values.
values of salt intake, which can be used for modelling. For countries where no data are available, other sources of data e.g. global burden of disease can be used for advocacy. The WHO Global Status Report on NCDs (2010) can be used to highlight the problem and the upcoming WHO Country Capacity Survey to show the limited achievements in this area for strengthening advocacy.

The fact that many governments see iodine as a success story would help market salt reduction through iodine programmes. The international and national commitments made by the governments in high-level discussion/meetings (such as the High-Level meeting of the UN General Assembly and the formal consultation of Member States on global indicators and targets on NCDs), could help remind governments of the commitments made.

It is important to identify the right target groups and individuals for increasing awareness on reducing salt intake. The presence of a national group of experts in each of the Member States would greatly facilitate achievement of country-specific advocacy goals.

Strategies should include the entire community as a whole for mass mobilization, which means that advocacy messages must be adapted to the national culture, religion, dietary habits, literacy level and gender issues as well as food production and consumption patterns. Messages should encompass vulnerable population groups (pregnant women, children, elderly), as well as rural and urban areas; action groups should pay particular attention to food marketing that promotes poor-quality high-sodium foods to children.

A public awareness health education campaign needs to be initiated with disease prevention as the initial focus, later moving to reduction of risk factors, e.g. Salt (United Kingdom model). This will help increase consumer awareness and bring about the much required behavioural shift to subsequently lead to consumer acceptance of low salt in food.

There is also a need to assess the cost of treatment of NCD versus cost of prevention of disease to highlight the cost-effectiveness of salt reduction in advocacy messages.

There should be widespread dissemination of key messages (through relevant advocacy documents, such as fact sheets, flip charts, posters, etc.) facilitated through country-to-country collaboration and exchange of information and experiences in the Region.

Set up regulations

When developing policies, regulations and standards to address the reduction of dietary salt intake, it will be fundamental for policy-makers and the law to establish culturally relevant goals and targets. Given the past experiences with other health-related regulations in the Region, setting mandatory regulations will be difficult. Also food consumption patterns, traditional cooking methods and local food stalls that are unique to the Region and vary between the Member States would make it difficult to set a single regional standard and apply mandatory regulations across the Region. Each Member State should for now start by setting their own food standards based on their environment and as data and outcomes of initial efforts come to light, the resources and evidence could be pooled to arrive at regional food standards, if felt appropriate.

Regulations need to be also aimed at the processed food industry. Countries can choose to initially adopt a self-regulatory approach to reduce salt content of processed foods, but legislative approaches should be initiated when voluntary measures prove to be ineffective or insufficient.

The most important aspect would be for the countries and governments to create an enabling regulatory and supervising environment that encompasses government policies as well as regulatory frameworks with transparency.
Implement settings-based interventions

Action in multiple settings is required for effective policy implementation. So a holistic mode that has an interdisciplinary, integrated and multi-stakeholder approach is required. Setting-based programmes would help in assessing the progress, identifying the constraints for early corrective action, and help measure effectiveness and efficiency of desired outcome of interventions.

There are various entry points available for setting-based interventions, such as schools, workplaces, and public institutions. As a first it would be easiest to implement standards and policies in government institutions, such as government schools and institutions, armed forces, hospitals and government workplaces.

Conduct operations research

Current scientific evidence strongly urges WHO Member States to develop policies and implement interventions aimed at population-wide salt intake reduction. However, there are some research gaps that need to be filled. An important area for research is evaluating salt substitutes with regards to their composition, acceptability and effectiveness.

Strengthen monitoring agencies and develop a framework for monitoring compliance by the industry

In addition to monitoring dietary salt/sodium intake, it is imperative to monitor ongoing activities to assess progress and identify constraints, as well as to measure effectiveness and efficiency of the desired outcome of legislations/regulations on the food industry. Therefore, during policy development, a detailed framework needs to be developed for monitoring compliance with processes in place to strengthen the relevant monitoring agencies.

Implement and participate in Codex

The Codex Alimentarius lists harmonized international food standards, guidelines and codes of practice to protect the health of consumers and ensure fair trade practices in food trade; including labelling. SEAR Member States should attend Codex meetings to provide their inputs in its formulation and share their barriers and challenges to applying the Codex in their country.

Consider consumer friendly food labelling using a colour-coding system

Colour-coded labels are one of the ways to improve healthy food choices. But consumer friendly food labels are not yet in place in the Member States of the Region. All Member States can consider putting in place a colour-coding system and share their experiences with it.

Identify priority actions to implement strategies

The first step for achieving the goals and strategies discussed above is to set priority actions at multiple levels, each with its set of activities for the stakeholders.

Governments
- Devise a policy that targets labelling, reformulation and setting-based programmes
- Create regulations to enforce food safety laws
- Set up monitoring frameworks
- Increase public awareness through mass media campaigns
- Engage in multi-stakeholder mechanisms
- Ensure transparency and inclusiveness
- Make salt reduction an integral part of the NCD prevention programme.

Academia
- Generate evidence for policy formulation
- Develop surveillance tools
- Conduct research on food reformulation
- Increase public awareness and work with other partners on advocacy
- Network with technical partners
- Develop and conduct evaluation studies.
Civil society
- Work with policy-makers and the public for advocacy
- Be a watchdog for public and private sector actions.

Private sector
- Reformulate to healthier food options which are available and affordable
- Ensure that self-regulatory policies are in place
- Ensure accurate and mandatory food labelling
- Ensure production of safe food in compliance with health claims
- Develop workplace programmes/interventions
- Conduct responsible marketing of food and beverages to adults and children
- Increase healthy food availability in settings such as schools and offices.

Media
- Take responsibility for accurate reporting on salt-related issues
- Help in raising public awareness on the relevance of salt in disease prevention
- Should help with celebrity endorsement for salt reduction programmes.

Key challenges
Some of the potential barriers for implementing strategies which were identified by the group were:
- A lack of awareness among the population as well as policy-makers
- A perceived threat to the iodine programme
- Inadequate evidence from the Region
- Salt reduction being given low public health priority
- Lack of infrastructure for regulation and monitoring
- Dominating presence of traditional and cultural practices and increasing globalization.

Recommendations for WHO
- Facilitate standardized data collection on population salt consumption including standardization of laboratory methods;
- Provide technical assistance to Member States to implement national population based sodium reduction strategies;
- Advocate to policy-makers, UN agencies, NGOs, etc.;
- Facilitate information exchange and dissemination of best practices on population salt reduction strategies.
Measuring and Monitoring Population Sodium Consumption and Dietary Sources of Sodium

Working group 2 discussed requirements for measuring and monitoring population sodium consumption and dietary sources of sodium. The group specifically focused on identifying priority data that need to be collected to generate baseline information on population sodium consumption, as well as data needed to design suitable sodium reduction programmes; identifying data/information gaps on population sodium intake in the Member States of SEAR; identifying existing and new methods needed for collecting the required data; identifying priority topics for operations research in the areas of population sodium reduction; and identifying recommendations on how WHO can support Member States in measuring and monitoring of population sodium consumption and dietary sources of sodium.

Before proceeding to the discussion, the group identified some key features of the Region related to salt consumption and measurement.

- In at least three countries of the Region (Indonesia, Myanmar and Thailand), consumption of MSG was also identified as an important contributor to sodium intake levels. Therefore, it might be more prudent to focus on measurement of sodium rather than salt consumption in the population of SEAR.
- Iodine deficiency disorders are a priority in most countries of the Region and salt and urinary iodine measurements-based monitoring systems are in place in these countries.

The available evidence points to high population level intake of salt in the Region largely due to consumption of traditional foods rich in salt and discretionary salt added at the table. The situation is being worsened by the incursion of high salt-containing processed foods, which are being rapidly assimilated into the diets of the regional population.

Data collection

The types of data needed to be collected are:

1. Population sodium intake levels: this is necessary to set a baseline for monitoring progress at the national level as well as to report on the global monitoring targets.
2. Main dietary sources of sodium (as from salt or MSG, and whether from home cooked or processed foods, etc.): this is required to guide decisions on the focus area of salt reduction strategies.
3. Knowledge, attitude and practices (KAP) of the community as well as other stakeholders on salt consumption: this is needed for planning population awareness generation and behaviour change strategies.
4. Sodium levels in different food items consumed in the Region: this is needed for estimation of sodium intake by dietary intake methods.

Methods

Sodium intake: The gold standard – 24-hour urinary sample – is a very good proxy for sodium intake. Conducting such a large scale nationally representative sample survey (minimum sample size: 150 per strata; country may decide the number of strata) would pose considerable
challenge to many Member States. The other options are measuring creatinine levels in urine alongside sodium to adjust for 24-hour urine output using creatinine levels and measuring spot urinary excretion (not adjusted to 24-hour urine output). Where nationally representative 24-hour urine sampling is not possible, subnational representative samples can be considered. The 24-hour assay is simple and requires basic training and would be easy for all Member States to implement. It was suggested that a special group be instituted to work out the logistics for conducting these in local laboratories. Creatinine estimation may be questionable but it is the only method available at present, even if it is a rough estimation and not exactly reliable.

**Dietary recall surveys:** In addition, dietary surveys using historical recall can be done. This could include use of food frequency questionnaire (coupled with food composition studies) or 24-hour dietary recall methods. A more detailed three to seven day food inventory (by history or by food weighing) can also be done. If salt is the major source of sodium, then household salt consumption divided by total consumption units in that household could provide a reliable estimate of salt intake.

A comprehensive review of salt intake data sources from all Member States is required, irrespective of the quality of data. Importantly, a food database capture is needed. It was suggested that sodium and iodine programmes be merged and reported together. WHO should help with and share algorithms for validating spot test. It was reiterated that national governments of the Member States in the Region take ownership/responsibility to publish data on their website on an annual or biennial basis.

It was suggested that using the existing approach of stepwise collection of information, salt-related data could also be grouped as (i) core data, and (ii) additional data. Depending on the available resources and capacity of the Member States, they could choose the data requirements. A possible grouping is presented in the box below.

Once data are accumulated there would be clarity if one method can serve as a model. While switching to 24-hour urine sampling, a spot urine sampling can be done in parallel for verification. It would help to also put together spot and 24-hour urine sampling databases.

In-depth stakeholder interviews can help gain insight into the level of knowledge to help make decisions and help sensitize these groups. Political leadership and academic leadership both are important in raising the challenge, and there is a need for academic plus society champions for the cause. There needs to be a change in knowledge and behaviours, and linking of the measurement and relevance of salt reduction to disease would help bring home the message to the population.

The group recognized the twin issues of traditional foods having high salt content and increased intake of salt from processed foods in all Member States, and cautioned the need for immediate action for salt reduction because the Region would face the consequences of increased salt intake in the near future. It put forward some recommendations for the Member States and WHO (see page 38).

<table>
<thead>
<tr>
<th>Core data</th>
<th>Additional data</th>
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<tr>
<td>Dietary intake assessment using 24-hour recall or food frequency questionnaire</td>
<td>24-hour urinary sodium excretion levels</td>
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<tr>
<td>Spot urinary sodium with creatinine levels</td>
<td>KAP of the community and stakeholders on salt consumption</td>
</tr>
<tr>
<td></td>
<td>Food composition database</td>
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</tbody>
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Priority research recommendations

- Develop Region- and country-specific algorithms for validating spot urinary sodium excretion against 24-hour urinary sodium excretion;
- Perform total diet analysis for sodium in which whole food consumed is considered for analysis;
- Examine the importance of MSG as a source of sodium in diet of Member States;
- Assess KAP on salt consumption of community and stakeholders;
- Identify suitable lower sodium products for salt substitution and test their effectiveness;
- Measure salt content of processed foods and its contribution to sodium intake in the SEAR population.

Recommendations for Member States

- Perform spot urine testing with creatinine in a nationally/subnationally adequate sample with 24-hour urine test in a subsample so that algorithms can be developed for adjustment;
- Collect baseline information by the end of 2015 with 24-hour urinary sodium excretion levels using spot urine surveys in between; repeat every four or five years or at least in the beginning (baseline) and at the end (2025);
- Collect salt related information by integrating with STEPS NCD risk factors survey/demographic and health surveys/national nutrition surveys to the extent possible.

Recommendations for WHO

- Compile, publish and share country experiences in conducting population salt intake measurement surveys;
- Publish regional salt report at regular intervals;
- Establish Expert Working Groups to provide technical support to countries;
- Perform capacity-building and networking of institutions;
- Adopt the PAHO sodium measurement protocol for use in SEAR Member States.
Conclusion and Recommendations

Conclusion

The participants of the Expert Group Meeting on population sodium reduction for the South-East Asia Region (SEAR) reviewed global and regional evidence on sodium and health, and discussed regional strategies to reduce population sodium intake and methods to monitor population sodium intake in the Region.

The Meeting concluded that populations in the Region are consuming higher than recommended levels of salt/sodium both due to consumption of traditional foods high in salt and the increasing availability and consumption of processed foods that are high in sodium. Therefore, reducing population salt/sodium intake is a critical and high priority intervention for Member States of the Region for prevention and control of hypertension, cardiovascular disease and other noncommunicable diseases. Limited availability of data should not be a deterrent for initiating salt/sodium reduction programmes. Member States should start interventions alongside efforts to collect data on population salt/sodium intake. The participants reaffirmed that any salt reduction strategy is compatible with salt iodization and that current WHO/UNICEF/ICCIDD recommendations for salt iodine content are adequate for recommended salt intake of <5 g/day in adult populations. The meeting reiterated that both discretionary salt as well as salt used by the food industry should be iodized.

The experts recommended setting up a regional target of 10% relative reduction in population salt intake over the next five years and successive reductions subsequently with the aim of reaching 30% relative reduction in population salt/sodium intake by 2025. In order to achieve the target, the meeting formulated the following recommendations for Member States and WHO.
Recommendations

Recommendations for Member States

1. Advocate to policy-makers and other national stakeholders to raise the priority of salt/sodium reduction interventions for the prevention and control of noncommunicable diseases (NCDs);

2. Engage with a wide range of stakeholders (government, private sector, media, civil society, academia) and establish a national task force or national expert group on salt reduction with clear terms of reference to develop, implement and oversee national salt/sodium reduction programmes;

3. Establish settings-based salt/sodium reduction programmes in government-owned institutions, such as railways and armed forces, as well as in other settings, such as schools, hospitals and work places;

4. Conduct targeted public awareness campaigns for salt/sodium reduction;

5. Develop regulations on marketing of food and beverages for children and adults, and monitor the industry for compliance of these regulations;

6. Introduce and monitor voluntary regulation for the food industry to reformulate lower salt/sodium products, followed by mandatory regulation if needed;

7. Explore the possibility of substituting salt with locally available lower sodium substitutes by evaluating their composition, acceptability and effectiveness;

8. Consider food labeling for salt/sodium using a colour-coding system;

9. Contribute to the development of the Codex Alimentarius and implement it effectively;

10. Increase collaboration between salt/sodium reduction programmes and salt iodization programmes for increased public health gains and higher efficiency in reducing population salt intake;

11. Compile existing salt/sodium data from all available sources and conduct de novo surveys to establish baseline population salt/sodium intake by the end of 2015; if feasible, undertake a nationally representative survey using a range of available methods, including 24-hour urine analyses and/or spot urine analyses in conjunction with food consumption surveys, and food composition assessments, as well as knowledge, attitude and practices of community and stakeholders; conduct repeat surveys every five years;

12. Integrate sodium surveys with existing national surveys, such as NCD risk factor surveys, national health/nutrition surveys, among others;

13. Conduct operations research on priority topics to identify locally appropriate salt/sodium monitoring methods and locally relevant strategies for salt/sodium reduction.
Recommendations for WHO

1. Advocate to Member States to give high priority to salt/sodium reduction programmes for the prevention and control of cardiovascular diseases and other NCDs;

2. Advocate to UN agencies, international nongovernmental organizations and other partners to raise the priority of salt/sodium reduction within existing health and developmental programmes;

3. Provide technical assistance to Member States for setting up and implementing national salt/sodium reduction programmes;

4. Strengthen national capacity in conducting monitoring and evaluation, as well as surveillance and operations research studies on population salt/sodium intake;

5. Facilitate networking and sharing of expertise among Member States for implementing salt/sodium reduction programmes and monitoring population salt/sodium intake;

6. Facilitate standardized data collection on salt/sodium consumption including standardization of laboratory methods;

7. Synchronize and synergize reporting for salt reduction and salt iodization programmes;

8. Compile and publish regional data on salt/sodium as part of NCD reports periodically and disseminate information and best practices through various channels including websites, policy briefs, aide memoires, newsletters, research publications;

9. Organize periodic regional and national consultative meetings on population salt/sodium reduction to review progress in reaching the sodium/salt reduction goal and devise new strategies, as needed.
Closing Session

Numerous activities are happening in many Member States of the Region, however getting things going Region wise and sustaining these activities will be key to achieving the global target on salt reduction.

Next Steps and Vote of Thanks

Dr Renu Garg, Regional Adviser, Noncommunicable Diseases, WHO-SEARO informed the experts about the next steps, which include finalizing the group recommendations as well as the final recommendations, and preparing a detailed report for dissemination to the Member States. The recommendations arising from this Meeting would also be included in the advocacy docket for World Health Day 2013 (theme: high blood pressure) and on the SEARO website. There is also a plan to update country data to add to the background paper for future publication. Dr Garg thanked the SEARO management for their support to the NCD programme in general and to this meeting in particular. She also thanked the Chair and Vice Chair as well as all the experts for their participation and contribution to the meeting.

Final Remarks

Dr Singh, Deputy Regional Director, WHO-SEARO closed the Meeting by stating that it had served as an important platform, with evidence being shared that is going to be useful for developing national policies and strategies for salt reduction. There is agreement for the need to take quick, strong and sustained actions to reduce population salt/sodium intake. This is because traditional diets of the population in the Region are already high in salt, and globalization and easy availability of processed foods is further adding salt to the diet of the population. Regulations are improving in western countries but with multinational companies now targeting developed countries, the Region needs to be adequately prepared.

The Region needs a dual approach, both to educate the public through public awareness as well as to regulate the industry to reformulate food products with lower sodium. Settings-based interventions in schools and at workplaces could potentially be a very effective way to reach a large number of people through existing channels and without much extra investment.
The regional target of 30% reduction in salt intake by 2025 as suggested by the participants will require that countries invest in surveillance programmes. Success in increasing political will for more resources would underpin the implementation of salt reduction programmes and monitoring of sodium intake in the population. In this regards, the UN HLM Political declaration should be a good document to use for advocacy with the policymakers.

Given the limited resources in the Region, it is very important to pick the right interventions for prevention and control of NCDs. Reducing salt/sodium is an evidence-based and cost-effective intervention. It will save lives and save money. However, reducing population salt consumption is not going to be an easy intervention to implement. Therefore it is even more important to double efforts and actively push forward the agenda. Another meeting will be required with stakeholders who can really take this forward to build it into policies in their respective governments. With the next annual budget coming up for the countries, this is the best time to insist and advocate with the governments for a low-resource intensive yet far-reaching influence. An action plan is required for the next meeting so that everything can be handled in a holistic manner such as what is to be done, the effect in 5–10 years, and the investment/resources required for the target.

Dr Singh concluded by saying that WHO is fully committed to supporting the Member States in all their efforts, particularly in the area of advocacy, generating evidence, building country capacity and facilitating information exchange.
Annex 1
List of participants

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Annex 2
Meeting agenda

1 Sodium and Health: Evidence for Action
2 Review of the Situation in the South-East Asia Region
3 WHO’s Work in the Area of Population Sodium Reduction
4 Review of Evidence of Interventions for Sodium Reduction – What Works and Why it Works
5 Compatibility of Salt Iodization and Sodium Reduction
6 National Salt Reduction Initiatives in the South-East Asia Region – current status, issues and future plans
   - Bangladesh
   - Bhutan
   - India
   - Indonesia
   - Myanmar
   - Nepal
   - Sri Lanka
   - Thailand
7 Public–Private Partnership for Salt Reduction: Lessons from Singapore
8 Monitoring Salt Intake in the Population
9 Recommended Methods for Measuring Population – Level Sodium Intake
10 Methods used for Measuring Population Sodium Intake in the Region
11 Assessment of Salt Intake in Singapore
12 Recommended Methods to Identify Main Sources of Sodium in the Diet
13 Working Group Discussions on:
   - Setting up National Strategies and Priority Actions for Population Sodium Reduction
   - Measurement and Monitoring Population Sodium Consumption and Dietary Sources of Sodium
14 Working Group Presentations on:
   - Identifying Priority Actions on Setting up Population Salt Strategy at Country Level
   - Identifying Priority Actions for Measuring and Monitoring Population Sodium Consumption and Dietary Sources in the South-East Asia Region
15 Conclusion and Recommendations
16 Closing
Hypertension accounts for an estimated 1.5 million deaths each year in the WHO South-East Asia Region. Reducing population salt intake is considered an important and cost-effective measure for improving population health outcomes throughout the world and is promoted by WHO as a “Best Buy” or a cost-effective intervention even in resource limited settings.

In view of the above and to develop regional strategies for salt reduction and measure population salt intake in the Region, the WHO Regional Office for South-East Asia organized an Expert Meeting on Population Sodium Strategies for Prevention and Control of Noncommunicable Diseases in the South-East Asia Region for its Member States from 11 to 13 December 2012 in New Delhi, India. This report presents the technical deliberations of the three-day meeting by participants that included representatives from national governments of the Member States, WHO secretariat from the Member States, SEARO and WHO headquarters as well as global experts.