

# Evolution of salt reduction initiatives in Thailand: lessons for other countries in the South-East Asia Region

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## Abstract

Evidence from Thailand indicates that hypertension is an important risk factor for deaths due to cardiovascular diseases including stroke. Available evidence also shows that there has been a significant increase in salt consumption in Thailand, which is one of the important dietary determinants of hypertension. In 1997, the nutrition programme and noncommunicable diseases programme collaborated to revise the recommendations for daily intake of salt and other nutritional risk factors such as sugar, vegetables and fruits into dietary guidelines. A "Nutrition flag" was felt to be an important tool for advocacy with other related programmes and for communication. In 2006, the first specific National Salt Reduction Initiative was started by the Bureau of Non-communicable Diseases because of the striking increase in deaths due to hypertension and stroke, and availability of epidemiological evidence of the association of salt with cardiovascular risk factors and other diseases, especially hypertension and stroke. Successful country experiences, especially those of Japan from 1960 to 1980, were other push factors for undertaking this initiative. A "do no harm" component was added to the campaign to address perceived harmful effects of salt reduction initiatives and a multidisciplinary technical expert working group was set up. The salt reduction campaign targeted the general population, housewives and youth for communication activities, and food policy development for food and nutritional labelling. The interim results from data surveys and available vital statistics showed that the salt reduction programme was effective along with the other measures, and played an important role in decreasing the death rate from stroke and prevalence of hypertension. The Thai experience has shown that national salt reduction initiatives are effective in reducing cardiovascular diseases and should be initiated in other countries with a high death rate due to stroke.

## Nutritional transition in Thailand

Thailand's First National Economic and Social Development Plan (NESDP) was launched in 1961 and Thailand's nutrition programme was one of its components. Since 1977, the National Food and Nutrition Plan (NFNP) became a separate entity from the NESDP. Between 1961 and 1987, Thailand achieved a dramatic reduction in the magnitude and severity of malnutrition in pre-school children and virtually eradicated the severe form of malnutrition.

The traditional Thai diet is rich in rice, seafood and vegetables cooked by grilling, stewing, baking and frying, using fresh spices and herbs.<sup>1,2</sup> Over the years, the food consumption pattern has changed. Consumption of protein, fats and oils, fruits and vegetables increased, while that of rice and cereals decreased. However, due to uneven income distribution, inadequate consumer protection and unmitigated environmental degradation, malnutrition and other deficiency diseases are re-emerging in Thailand along with diseases of affluence.

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## **Epidemiological transition and predominant cardiovascular diseases and risk factors in Thailand**

Along with nutritional changes, the success of public health programmes and improved health-care delivery system resulted in Thailand undergoing a rapid demographic and epidemiological transition.<sup>3</sup> In the 1990s, the epidemiological transition was in the phase of receding pandemics, in which cardiovascular diseases (CVDs) account for 10%–35% of the disease burden, comprising mainly hypertensive heart disease, haemorrhagic stroke, sequelae of rheumatic heart disease, and some infectious and nutritional cardiomyopathies.<sup>3–5</sup> The possibility of an increase in noncommunicable diseases (NCDs) in Thailand was first reported by the World Health Organization (WHO) in 1983. The response to this was largely medical and resulted in the establishment of 15 specific disease-based programmes and some pilot projects. Ten years later, despite the burden of the HIV/AIDS epidemic, deaths due to CVD, cancer and injuries were increasing sharply. The rate of outpatient and inpatient consultations for CVD, including hypertension and diabetes, rose twofold in 1987. In 1997, it was also found that the number of deaths due to stroke was twice as high as that due to ischaemic heart disease. A verbal autopsy-based study during 1997–1999<sup>6</sup> confirmed that hypertension with stroke was the third and second leading cause of death among men and women, respectively, and was the leading contributor to disability-adjusted life-years.<sup>7</sup>

In 1991, the Thai National Health Examination Survey found a hypertension prevalence of ~5% among the population aged  $\geq 15$  years<sup>8</sup> with an increase in blood pressure with age. During the 2000s, Thailand faced rapid industrialization and globalization. This brought about changes in lifestyles and the environment, and resulted in an increase in degenerative and human-induced diseases. The prevalence of hypertension increased twofold every 5–7 years, from ~10% in 1996<sup>9</sup> to 22% in 2003.<sup>10</sup> Moreover, a prospective study in Thailand (EGAT Study) confirmed that hypertension was a major risk factor for stroke and ischaemic heart disease.<sup>11</sup> As the prevalence of smoking had decreased in Thailand since 1986,<sup>12</sup> this meant that addressing salt intake was important for controlling hypertension.

### **Evidence on salt and its health effects**

Since the 1960s, scientists have studied the extent to which increased salt consumption has adverse implications for population health and tried to quantify its contribution to deaths from stroke and CVD.<sup>13</sup> International epidemiological studies such as the WHO MONICA Project<sup>14</sup> confirmed that prevalence of smoking and elevated blood pressure explained a substantial proportion of the variation in stroke rates between populations. High salt, including sodium or sodium chloride intake, was identified as one of the important risk factors for hypertension, CVD, chronic kidney diseases and many other diseases.<sup>15</sup>

The Scientific Advisory Committee on Nutrition (UK, 2003)<sup>16</sup> reviewed the evidence of a link between high salt intake and high blood pressure and concluded that the relationship was stronger than had been thought when the issue had last been considered in the early 1990s. It also concluded that a reduction in the average salt intake of the population would proportionally lower population-level blood pressure levels and confer significant public health benefits by reducing the risk of CVD. Reduction, even by small amounts, is likely to be of immense benefit in preventing both stroke and heart attack over a period of time, especially if it slowed down the rate of increase in blood pressure with age.

## Evidence on salt consumption in Thailand

The first "Salt and Blood Pressure" study by The Kingdom of Thailand Nutritional Survey (October–December 1960)<sup>2</sup> showed that the Thais' mean blood pressure was near the minimum theoretical range (for the population 15+ years ~118/73 mmHg) and also found that the average sodium intake of Thai people was around 2.4 g/person/day.

All the national food and nutrition surveys conducted in Thailand since 1960<sup>2,3,5,7,17,18</sup> provide evidence of increasing amounts of population consumption of condiments and fish sauces, which are the major sources of sodium since 1986. Other major risk factors for high blood pressure and stroke such as low consumption of vegetables and fruits, overweight/obesity and consumption of alcohol have been shown to be increasing over these years. Another important change has been a shift in the age distribution of cardiovascular risk factors from adults to Thai children and youth.

In 2007, the Division of Nutrition, Department of Health Promotion; and Faculty of Public Health, Mahidol University; along with the United Nations Children's Fund (UNICEF) conducted the first household survey of sodium chloride consumption in the Thai population.<sup>19</sup> This was a cross-sectional household survey using stratified, multistage, simple random sampling (region, province, district, sub-district/village/block) with a sample size of 2733 households (urban 842, rural 1891). The instruments used in the survey were diet weighing scale and three survey forms: dietary recall, household survey of sodium chloride consumption by three-day weighed inventory and the food shops survey. The main results were as below:

- Eighty per cent of sodium salt came from the use of flavour enhancers for food preparation – fish sauce (96.39%), salt (91.53%), soy bean sauce (64.59%), monosodium glutamate (61.60%).
- Twenty per cent of sodium salt came from the consumption of cooked food and food products containing salt – instant noodles (59.7%), canned fish (48.9%), steamed mackerel (47.2%), varieties of spicy cooked paste (44.9%).

## Learning from the Japanese experience

In addition to existing country experience at that time, it was observed that the Thais' natural course of CVD was like that of Japan in the 1960s, which had experienced rapid changes in diet and other lifestyles with economic growth between the 1960s and 1980s. Japan's stroke death rate was higher than that of ischaemic heart disease, and high blood pressure was widely prevalent.<sup>20,21</sup> In Japan, blood pressure levels declined due to improvements in drug treatment for hypertension and dietary improvements such as sodium reduction. This occurred despite an increase in the mean values of ethanol intake, body mass index and serum total cholesterol. The age-adjusted mortality rate of stroke declined by 70% between 1960 and 1990. The mortality rates for stroke in the middle-aged population from Shimane Prefecture during the 10 years after the introduction of dietary improvements showed a steeper decline for haemorrhagic, ischaemic and all strokes than the average for Japan.<sup>22</sup> Evaluation of a community-based hypertension control programme for stroke prevention showed a larger decline in stroke incidence in the intervention community (69%) than in the reference community (49%,  $P < 0.001$ ). This stimulated the formulation of the 1982 National Act on Health and Medical Care, in which every municipal government was required to conduct health screening and education for residents aged 40 years and above to prevent CVD.

## Salt reduction initiative in Thailand

### Phase I (1996–2003)

In 1996, despite no clear-cut evidence,<sup>23–29</sup> the Thai Ministry of Public Health started to address high salt in the diet as one of the important dietary determinants of chronic NCDs. There have been many related “high salt reduction” movements since 1996.

In 1990, in order to respond to nutrition-related NCDs, WHO recommended an “avoidable salty diet”.<sup>25</sup> This was addressed in the first set of Dietary Guidelines for Thailand in 1992 in the Fourth NFNP under the Seventh NESDP (1992–1996), and again in 1996, through drafting of the food-based dietary guidelines (FBDGs), the Thai Dietary Guidelines for Better Health.<sup>30</sup> In 1997, the nutrition programme and NCD programme collaborated to provide recommendations for the daily intake of salt and other nutritional risk factors such as sugar, vegetables and fruits. The salt risk dose recommended was no more than 6 g/day in the quantitative part of the Thai FBDGs.<sup>31</sup> It was established as a “nutrition flag” after rigorous testing to understand its acceptability among consumers, and proved to be an important communication tool. Promotion and dissemination of the Thai FBDGs have been carried out at national and community levels through basic health, agricultural and educational services, and training activities, as well as periodic campaigning via multiple communication channels and the media.<sup>32</sup>

During 2002–2003, “high sodium salt diet” was identified as a main focus of intervention by the NCD programme. This message was included under the “Hypertension Awareness Campaign” using the tag line “Taste before adding condiments”. The importance of salt reduction was also highlighted to all partners for integration of this message into their activities aimed at the general population as well as “at-risk” populations.

### Phase II (2003–2008)

In 2003, the responsibility for the prevention and control of NCDs moved from the Department of Medical Services to the Department of Disease Control. Influenced by the *World Health Report 2002*, the Bureau of Non-communicable Diseases changed the approach from a disease-specific to a risk-based approach.<sup>33</sup> This report emphasized the global burden of high blood pressure and that it alone was responsible for 50% of cases of CVD. Many innovative, risk-focused programmes for hypertension and diabetes prevention and control were implemented. The “National Salt Reduction Initiative” was one of the risk-focused programmes started at the end of 2005.

In 2004, the Thai Heart Foundation Under Royal Patronage, in collaboration with the Department of Nutrition, Faculty of Public Health, Mahidol University, developed the “Thai Food, Good Heart” project.<sup>34</sup> They created the slogan “Food Treats Heart” for Thais to identify food items good for the heart, which would enable them to make healthier choices. This campaign also provided an opportunity for collaboration with the processed food industry to voluntarily reduce the salt content of processed foods. Under the “Thai Food, Good Heart” project, low content of salt was included as one of the criteria for labelling a processed food item as “good” for the heart.

Eventually, in 2005, stroke and hypertension were targeted as priority and urgent public health problems; therefore, salt was identified as the one of main dietary determinants. A specific risk determinant awareness and partnership programme, the “National Salt Reduction Initiative”, was started by the Bureau of Non-communicable Diseases based on the following:

- (1) The striking increase in hypertension and stroke death rate since 1999;
- (2) Epidemiological evidence of the correlation or association of salt with cardiovascular risk factors and many diseases, especially hypertension and stroke;
- (3) Successful country experiences, especially of Japan in 1960–1980, in reducing the stroke death rate, and the United Kingdom in the movement to reduce salt intake;
- (4) Specific awareness and activity targeted at addressing the perceived harmful effects of salt reduction – “do no harm”.<sup>35</sup>

Under this specific salt awareness and partnership programme, many new activities related to salt reduction were initiated by this network, as follows:

- A multidisciplinary technical expert working group was formed composed of clinicians, nutritionists, health education and behavioural science experts, social scientists, relevant government departments, the Thai Heart Foundation Under Royal Patronage, Restaurant Association of Thailand, etc. This group met regularly. Later, this group was called “Salt Net”. Its mandate was to review and share knowledge and coordinate the activities of different partners. This net provided comprehensive documentation on different aspects of the situation for the general public, such as “health effects of high salt intake”,<sup>36,37</sup> the existing process of food and nutrition labelling, impact of different cooking styles on the salt content of food, especially the use of condiments, and finally on the influence of marketing and advertising on consumption behaviour. Studies also documented the source of sodium in the Thai diet. The sodium in food that had come from ingredients/condiments on the table accounted for 11%, fresh food 18%, and adding ingredients/condiments during cooking 71%.<sup>36</sup> This confirmed the differences between the sources of sodium in food between industrialized countries and developing countries in Asia such as Thailand. In most of the industrialized countries, sources of sodium in food were processed foods and eating out.<sup>38</sup> Subsequently, a variety of low-sodium condiments were developed by the Nutrition Institute, Mahidol University.
- The salt reduction campaigns targeted the general population, community housewives and youth for communication activities. The main points in the communication message were “causes and health consequences of salt consumption”. The second message was an integrated one of “reduce salt, increase vegetable consumption, keep hypertension far away”. The communication campaigns were intensified during occasions such as World Stroke Day, International Hypertension Day, etc. The Thai community received these messages from multiple sources: mass media, health professionals and health volunteers under the screening and risk communication programme, during special campaigns for risk and diseases reduction in villages and also from nutritional programmes such as healthy menus, and health-promoting hospitals.
- Even though food and nutritional labelling was one of the important activities under this initiative, the progress was slow. The food policy aimed to reduce the amount of salt, fat and sugar in snacks by 25%, and of salt in soy sauce, oyster sauce and other condiments by 20%. But, to date, nutritional labelling has been done for only a few food items and five snacks for children.

### **Phase III (2008 onwards)**

Since 2008, there has been a decrease in the activities of the salt-specific risk determinant awareness and partnership programme because the key programme manager moved out, and due

to an increase in integrated nutritional and lifestyle messages such as “Too much Sweet, Too much Salt, Too much Fats”, “Thais without Big Belly Network” under the Thailand Healthy Lifestyles Strategic Plan, which has focused more specifically on obesity reduction, and a diabetes and hypertension screening programme.

However, in 2011, activities of the specific salt risk determinant awareness and partnership programme for public awareness made a comeback following collaboration with the new “Non-communicable Diseases Net” and “Chronic Kidney Diseases Prevention Group”. This Non-communicable Diseases Net was established in 2010, and was initiated and supported by WHO Thailand, the Thai Health Promotion Foundation and National Health Security Office, Thailand. The message used was “Thais reduce salt by half, keep diseases far away.” During this time, due to changes in the multidisciplinary technical expert and multisectoral working group for salt reduction, another activity was supported by the United States Centers for Disease Control and Prevention, which recommended further options for salt reduction such as providing “warnings” on high-salt foods or using “better choice” labels for low-salt foods, and developed guidelines for food service providers.

## Effectiveness of the measures

Although monitoring and evaluation activities for salt reduction have not been established systemically, there have been some surveys and statistics that were used to assess the effectiveness of the measures. However, though these observations have not been able to definitely conclude that all or some of the following effective results came from only the salt reduction programme, they showed the important role played by the salt reduction programme in combination with other effective measures.

*Sodium consumption (Table 1):* The data from different surveys done over the years showed that sodium consumption had increased from 2.4 g/person/day in the 1960s to 4.4 g/person/day in the year 2007, and then showed a small decline. While the initial surveys were household surveys, since 2008, they are individual-based surveys.

**Table 1. Trends in the consumption of sodium (g/person/day) as determined by different surveys in Thailand**

Year	1960	1975	1986	1995	2003	2008 <sup>a</sup>	2008-2009 <sup>b</sup>
Estimated sodium consumption	2.4	2.4	–	–	4.0	4.4	3.3

Source: Nutrition Division, Department of Health, Ministry of Public Health. *The National Nutrition Survey 1960–2003* (household survey)

<sup>a</sup> Sinawat S (ed). *Report of sodium consumption in Thais’ diet survey in 2008* (household survey)

<sup>b</sup> Aekplakorn W. *The fourth Thai National Health Examination Survey 2008–2009* (population aged 19–59 years)

*Hypertension prevalence (Table 2):* During the same period (from the Third and Fourth National Health Examination Survey in Table 2), the prevalence of hypertension and diabetes remained more or less at the same level. The other related risk factors such as obesity, hypercholesterolaemia, inadequate consumption of vegetables and fruits remained high.

**Table 2. Prevalence of cardiovascular risk factors in Thailand, 2003–2008 in the population aged ≥15 years**

Prevalence (%)	NHES III (2546–2547)	NNES IV (2551–2552)	Change
Hypertension prevalence	~ 22.0	21.4	↔
Inadequate vegetable and fruit consumption	~ 78.0	82.3	↑
Physical inactivity	~ 22.5	18.5	↓
Smoking	~ 25.9	23.7	↓
Moderate alcohol consumption	~9.3 (54)	7.3 (45.3)	↓
Overweight and obesity (BMI ≥25 kg/m <sup>2</sup> )	~ 28.6	34.7	↑
Diabetes	~ 6.9	6.9	↔
Hypercholesterolaemia (≥240 mg/dl)	~ 15.5	19.4	↑

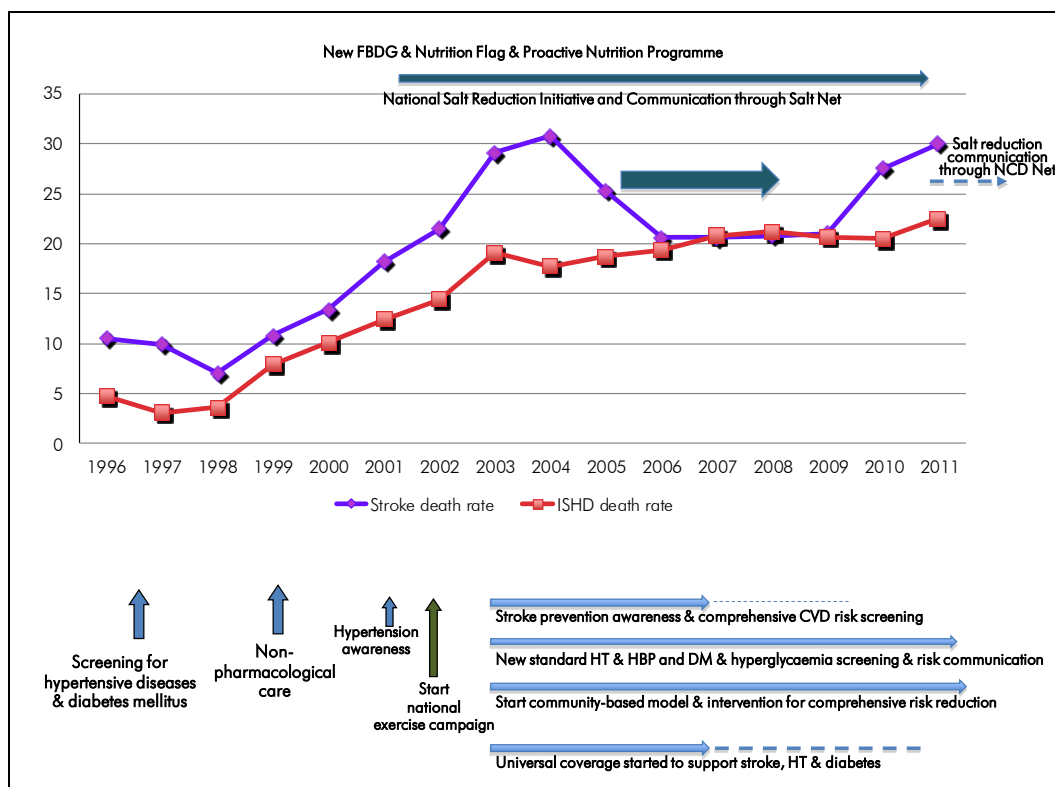
CVD death rates (Figure 1): An additional indicator for measuring the effectiveness of population-level salt reduction is the stroke-related death rate. Figure 1 compares the trend with timelines of the three main interventions (hypertension screening, community risk management and specific risk reduction, especially salt). Data show that the stroke death rate decreased significantly and rates of other diseases (ischaemic heart disease and diabetes) plateaued in the years 2005–2008. Because of resource constraints, the intensive salt reduction initiative was stopped and integrated into a proactive nutrition programme in 2008. This probably resulted in less intensive efforts, which could explain the increase in the stroke and ischaemic heart disease death rates in 2010–2011, despite continuing universal coverage of two other main programmes (screening and community programme).

## Lessons learnt from the Thai experience

The experience of Thailand provides important lessons for other developing countries planning to introduce national salt reduction initiatives. The National Salt Reduction Initiative in Thailand suffered from limited financial support and lack of key human resources. Thailand successfully used available international evidence and generated local evidence for supporting evidence-based decision-making by developing a multidisciplinary and multisectoral partnership. The finding of an increasing stroke death rate with weakening of the programme indicates the need for a sustained programme, which is possible only with political commitment and resource allocation. The key lessons can be summarized as follows:

- An intensive and systematic approach is needed for a sustainable national salt reduction programme.
- A system for surveillance of salt intake has to be established, along with monitoring and periodic evaluation.

**Figure 1. Trends in cardiovascular mortality rate with key salt reduction activities in Thailand, 1997–2011**



Source: Bureau of Noncommunicable Diseases (2006) and edited in 2013

- A multidisciplinary and multisectoral approach is required, which can be established by regular communication among stakeholders, understanding their needs and addressing these effectively.
- There is a need for social mobilization and consumer education focusing on specific risk communication and promoting health literacy and incentives for reformulation of menus at all levels – home, street food, food shops, restaurants and the food industry.
- National legislation for lowering the salt content of foods and compulsory nutritional labelling is needed to protect and promote a healthy environment, especially in urban areas.
- Research is needed to support evidence-based policy formulation and implementation of food and nutritional labelling, as well as risk perception and risk communication strategies.

## Conclusion

Salt or sodium is not a simple risk determinant. Despite several similarities, its nature is different in each country’s context, such as the proportion of the salt-sensitive population, the relative contribution of sodium and other risk determinants to different diseases, sources and patterns of consumption, difficulty in measuring the level of exposure at the population level, the role of important condiments/spices in the community, etc. From a programme manager’s point of view, answers need to be found to questions such as how much investment is required for this



programme, the cost benefit of salt reduction programmes, among others. These reasons make salt an issue that is neglected by policy-makers and programme managers in countries of the South-East Asia Region. However, the Thai experience has shown that such programmes are effective in reducing CVD, which should be sufficient to initiate such programmes, especially in countries that have high death rates from stroke, as in Indonesia.

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