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**Based on German and international recommendations, sodium intake of large parts of the German population is too high.**

## Sodium intake in Germany

### Abstract

For many years, a high sodium intake has been discussed as a potential risk factor in the development of hypertension and, consequently, cardiovascular diseases. As part of the German Health Interview and Examination Survey for Adults (DEGS1), which was conducted between 2008 and 2011, sodium excretion in casual urine samples was used as a biomarker to measure sodium intake. DEGS1 observed that the median daily sodium intake of women (3.4 g) as well as men (4.0 g) exceeds the levels recommended by German and international organisations. Among other factors, men's higher sodium intake could be explained by their higher energy intake. In addition, DEGS1 demonstrates an association between women's sodium intake and age; however, no equivalent correlation was identified for men. Furthermore, although high socio-economic status is associated with lower sodium intake in men, no comparable correlation was observed among women.

📌 NUTRITION · SODIUM · HEALTH SURVEY · DEGS1 · GERMANY

### Introduction

Sodium is an essential nutrient with important functions in the body [1]. It is a component of table salt, which is added to foods during processing, preparation, and immediately before eating. As such, processed foods, and especially bread, prepared meat products, and dairy products such as cheese, are the primary sources of sodium [2, 3].

A high sodium intake is associated with a risk of high blood pressure (hypertension) and is thereby indirectly related to the development of cardiovascular disease [4–10]. However, not all people respond with elevated blood pressure to high salt intake (salt sensitivity) [11, 12]. Further negative effects of a high sodium intake have also been discussed: these include a possible higher risk of stomach cancer and osteoporosis [13].

In order to compensate for daily losses of sodium, a minimum intake of 0.55 g per day for adults and young

people is recommended [1]. The German Nutrition Society (DGE) has defined a guidance level of up to 6 g per day for table salt [14]. This is comparable to a teaspoon of salt and corresponds to a daily sodium intake of about 2.4 g.

A representative and regular assessment of the population's sodium intake in Germany is an important means of assessing and developing practical approaches for the future.

### Indicator

The amount of sodium that is excreted throughout the day is assumed to roughly correspond to a person's daily sodium intake; as such, the amount of sodium measured in the urine constitutes a suitable biomarker to measure sodium intake. Casual urine samples were collected as part of the German Health Interview and Exam-

**Men tend to have a higher sodium intake than women; this is linked to men's higher dietary energy intake.**

ination Survey for Adults (DEGS1), which was conducted by the Robert Koch Institute between 2008 and 2011 [15]. The measured sodium concentrations were converted to estimates of daily sodium excretion based on creatinine concentrations [15]. The results on sodium intake are analysed according to gender, age, and socio-economic status.

#### Reflection of the results

The German adult population has a median sodium intake of 3.7 g per day. The median intake of women (3.4 g) is lower than men (4.0 g) (Table 1). This means that 50% of the adult population in Germany has a daily sodium intake that is higher than this level. Sodium intake of 25% of women is 5.0 g per day or more; 25%

of men have a sodium intake of 5.7 g per day or more (Table 1, 75<sup>th</sup> percentile); 5% of women consume more than 8.1 g of sodium per day; and 5% of men consume more than 8.8 g of sodium per day (Table 1, 95<sup>th</sup> percentile). The mean estimated daily sodium intake (3.8 g for women and 4.5 g for men) is higher than the corresponding median values. Men's higher sodium intake could be explained by their higher energy intake. In terms of units of energy, men and women in Germany have a similar sodium intake [16].

Women's sodium intake does increase until the 40-to-59 age group and decreases slightly in the older age groups. No such age-related trends have been observed among men.

	P5 g/day	P10 g/day	P25 g/day	Median g/day	P75 g/day	P90 g/day	P95 g/day
<b>Women (all)</b>	<b>1.1</b>	<b>1.5</b>	<b>2.3</b>	<b>3.4</b>	<b>5.0</b>	<b>6.7</b>	<b>8.1</b>
<b>Age</b>							
18–29 years	1.0	1.3	2.0	2.9	4.2	5.9	7.0
30–39 years	1.3	1.5	2.3	3.3	4.7	6.4	7.8
40–49 years	1.3	1.6	2.6	3.8	5.2	7.1	8.5
50–59 years	1.1	1.5	2.4	3.7	5.4	7.0	8.0
60–69 years	1.1	1.5	2.1	3.4	4.8	6.7	7.9
70–79 years	0.9	1.3	2.1	3.1	5.0	6.6	8.6
<b>Men (all)</b>	<b>1.2</b>	<b>1.7</b>	<b>2.7</b>	<b>4.0</b>	<b>5.7</b>	<b>7.6</b>	<b>8.8</b>
<b>Age</b>							
18–29 years	1.5	1.8	2.6	3.9	6.0	7.9	8.7
30–39 years	1.1	1.8	2.9	4.2	6.1	8.2	9.2
40–49 years	1.0	1.5	2.6	3.8	5.3	6.9	8.6
50–59 years	1.3	1.9	2.7	4.1	5.9	7.8	9.0
60–69 years	1.3	1.7	2.7	4.1	5.7	7.6	9.6
70–79 years	1.2	1.7	2.6	3.9	5.5	7.6	8.6
<b>Total</b>	<b>1.2</b>	<b>1.6</b>	<b>2.4</b>	<b>3.7</b>	<b>5.3</b>	<b>7.2</b>	<b>8.6</b>

P=percentile

**Table 1**  
Estimated sodium intake (percentile) for 18- to 79-year-olds according to gender and age (n=3,626 women, n=3,333 men)

Source: DEGS1 (2008–2011)

**Table 2**  
**Estimated sodium intake (median) among 18- to 79-year-olds according to gender and socio-economic status (n=3,602 women, n=3,309 men)**  
 Source: DEGS1 (2008–2011)

	Women g/day	Men g/day
<b>Socio-economic status</b>		
Low	3.4	4.0
Medium	3.5	4.1
High	3.4	3.7

There is no association between women's socio-economic status and sodium intake (Table 2). In contrast, men with a high socio-economic status consume slightly less sodium than men with a mid to low socio-economic status (Table 2).

Estimates of sodium intake in Germany based on sodium excretions in urine are consistently higher than those gained from dietary surveys [2, 3, 11, 17, 18]. Differences in methodology probably account for the discrepancies between the results. The German National Nutrition Survey II determined sodium intake using dietary history interviews (software: DISHES) and two 24-hour recalls [3, 17]. The study found women's median daily sodium intake to be 2.4 g and 1.9 g depending on the specific method and men's median sodium intake at 3.2 g and 2.8 g. The German National Health Interview and Examination Survey 1998 (GNHIES98), which also used DISHES to estimate sodium intake, estimated the daily median sodium intake to be 2.2 g for women and 3.0 g for men [2, 11].

The estimated international average daily sodium intake varies between 2.6 g and 4.8 g and the mean value (calculated using all of the included studies) is 3.7 g [19]. Compared with international levels, the mean daily sodium intake in Germany – 4.1 g – (estimated using sodium excretion) is in the mid to high range.

Compared with recommendations made by national and international organisations, large parts of the German population consume too much sodium: 73% of women and 80% of men in Germany exceed the guidance level defined by the German Nutrition Society [14] of up to 6 g of table salt per day (equivalent to 2.4 g of sodium). Furthermore, 80% of women and 86% of men in Germany exceed the World Health Organization's (WHO) [20] recommendation of a sodium intake of less than 2 g per day.

Since the daily sodium intake in many EU member states is higher than recommended levels, the WHO's Action plan for implementation of the European Strategy for the Prevention and Control of Noncommunicable Diseases 2012–2016 declared the reduction of sodium intake to be one of its five priority areas for intervention [21].

#### Note

This fact sheet is based on information that appeared in the chapter "Sodium" published in the German Nutrition Society's 13<sup>th</sup> Nutritional Report [22].

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**Women's sodium intake is lower among younger and among the highest age groups.**

**Men with a high socio-economic status tend to have lower sodium intakes.**

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