



RESULTS OF SEVEN COUNTRIES STUDY ONLINE

# The science of a healthy diet

**We owe our understanding of the link between diet and health to the Seven Countries Study. This study, which Daan Kromhout has been involved in for nearly 40 years, is still coming up with new results. The role of high blood pressure in cardiovascular disease, for instance. Or the value of three cups of coffee a day for keeping the mind sharp.** TEXT NIENKE BEITEMA PHOTOGRAPHY PETER MENZEL/HH



JAPAN

**M**ost of us know by now that the Mediterranean diet rich in vegetables, fruit, pulses, nuts, olive oil and fish, is healthier than traditionally meat-based diets like the Dutch one with its meatballs and gravy. But just two generations ago this was news. At that time nobody was talking about cholesterol and cardiovascular disease, simply because the links between diet, lifestyle and health were not yet known. That changed thanks to a long-running international study which has delivered one revelation after another since the nineteen seventies: the Seven Countries Study. This study, which has a sizable Wageningen component, is now coming to an end. An English-language website, [www.sevencountriesstudy.com](http://www.sevencountriesstudy.com), was launched this spring to present the results of 40 years of research to a broad public. 'I had been pondering the idea of creating a website like that for a long time,' says Daan Kromhout (1950), professor of Public Health Research

at Wageningen University Agrotechnology and Food Sciences and one of the Seven Countries researchers. 'An incredible amount has been learnt over all those years, and about 10 books and more than 500 articles have come out, but the results have never been brought together in an accessible form till now.'

For anyone who takes the trouble to look, there is a wealth of results. And they are still coming. The latest news? High cholesterol levels do raise the risks of a heart attack, but not of other heart diseases. And regular exercise lowers the risk of depression.

#### DIFFERENCES BETWEEN COUNTRIES

The story begins in the early nineteen fifties, says Kromhout. During a sabbatical at Oxford at that time, American professor Ancel Keys became interested in differences between countries regarding diet and cardiovascular disease. So Keys set up the Seven Countries Study in 1958: the idea was to compare men's

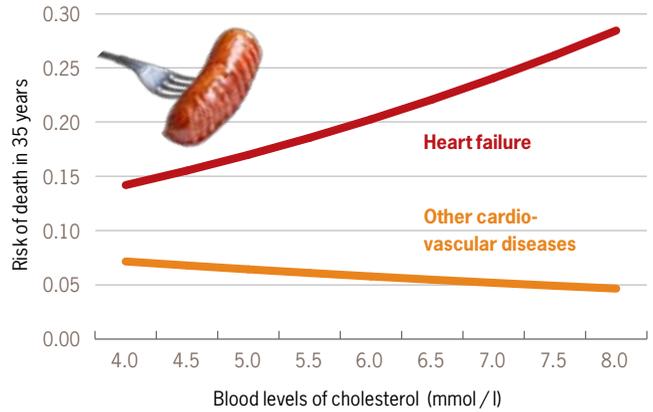
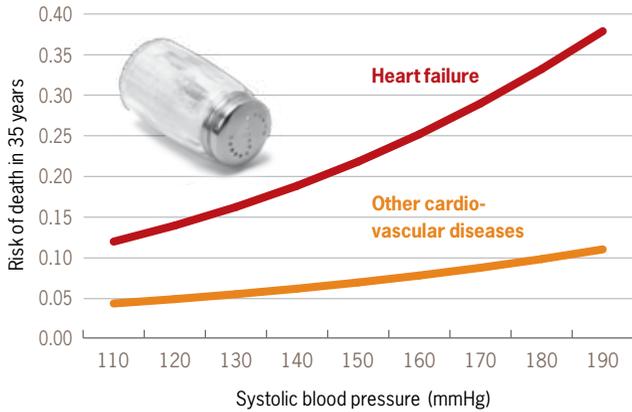
A miner in Kentucky, USA (left) and a sumo wrestler in Nagoya, Japan (right), with their menus for the day. From the book *'Around the World in 80 diets'*, by Peter Menzel.

diets, lifestyles and rates of cardiovascular disease over a long period in the US, Finland, the Netherlands, Italy, Yugoslavia, Greece and Japan. The Netherlands was very much involved, says Kromhout, and the Dutch branch of the study was in the hands of Frans van Buchem, professor of Internal Medicine at Groningen, and Cees den Hartog, professor of Nutrition at Wageningen, who was also director of the Netherlands Bureau for Food and Nutrition Education. The Dutch research organization TNO and the then Nutrition Council joined the research team too.

#### ZUTPHEN STUDY REVIVED

Kromhout himself got involved in the study in 1978. After getting off to a flying start, >

## RISK OF DEATH IN RELATION TO BLOOD PRESSURE AND CHOLESTEROL



Source: Menotti et al

Blood pressure is a bigger risk factor for cardiovascular diseases than cholesterol. Cholesterol is only a risk factor for heart failure, whereas high blood pressure is a risk factor for all cardiovascular diseases such as stroke, thrombosis etc.

the Dutch component, the Zutphen study, had almost come to a standstill. ‘I did my PhD research in the field of human nutrition at Wageningen,’ says Kromhout. ‘I happened to hear about the Zutphen study at a seminar in Mexico, of all places. I immediately thought: the Netherlands should carry on with this. I got in touch with Den Hartog and I could start straightaway. I started fundraising so as to process the existing data and do new research in Zutphen on the elderly, a topic which was new at the time.’

From 1960 on, the Zutphen study followed a group of 878 men who were between 40 and 59 years of age at the start. The study consisted of monitoring their blood, blood pressure and smoking behaviour, and was repeated every year until 1973. Every five years, the men were also interviewed in-depth about their eating habits. ‘That was the first longitudinal health study in the Netherlands,’ says Kromhout. ‘And it was particularly interesting because it was prospective: it tracked people who were still healthy at the start of the study.’

Research on diet and diseases, explains Kromhout, usually starts by comparing healthy people with ill ones. A disadvantage

of this is that when you ask sick people about their diet, their answers are coloured by their illness. ‘That is what makes prospective nutritional research so important,’ he says. ‘You exclude sick people at the start and then find out which healthy people fall ill in the course of the study, and compare them with the ones who stay healthy.’

### CHOLESTEROL AND DEATH

The initial results of the Seven Countries Study started to come in from 1970 on. It quickly became clear that there was a strong link between the consumption of saturated fats (such as those in meat, dairy produce and hard margarines), blood levels of cholesterol and fatal heart attacks. In Finland, 22 percent of the energy intake came from saturated fats, while this figure was only 3 percent in Japan. Cholesterol levels in the blood were one and a half times higher in Finland than in Yugoslavia, and the percentage of heart attacks was ten times higher. ‘Of course that does not necessarily mean that the one causes the other,’ adds Kromhout, ‘but there was a strong suspicion that there was a causal relationship, and that was confirmed later by experiments.’

By 1980 about half the men in the Zutphen study had died. Kromhout therefore decided to add 500 men of the same age to the cohort, so that he could continue with 900 people.

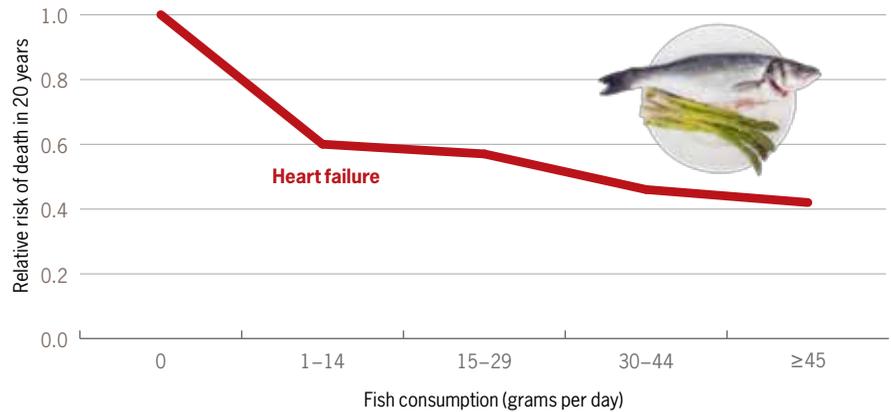
Now that all the men were over 65 years of age, the focus of attention shifted from cardiovascular disease to aging in general. So the study was extended with issues related to physical wellbeing and self-reliance, for instance, mental issues such as cognitive decline and depression, and social issues such as loneliness. ‘And there too, some surprising things came out straightaway,’ says Kromhout. ‘For example, there is a strong relation between how healthy people say they feel and the risk of death.’

### PREVENTION HELPS

One of the key findings of the Seven Countries Study was reported in the *Journal of the American Medical Association* in 2004. It came out of research on men and women of 70 to 90 years of age who were followed by the HALE project, a combination of the aging research in the Seven Countries Study and the European SENECA study by Wageningen professors Wija van Staveren

## 'It is hard to get grants for analysing old data'

### RISK OF DEATH AND FISH CONSUMPTION



The Zutphen study showed that eating fish reduces the risk of dying of heart failure.

### SEVEN COUNTRIES STUDY



and Lisette de Groot.

The publication showed for the first time that the combination of a healthy diet, moderate alcohol consumption, not smoking and regular exercise can largely prevent cardiovascular disease and death in the near future, even among the elderly. This too sounds no more than logical to us now, but it had hitherto only been proven for the middle-aged. It was now clear that prevention was worthwhile even in old age. Surprising new insights have continued to come out of the Seven Countries Study even in the last 10 years. High blood pressure, for example, has been shown to be a bigger risk factor in cardiovascular disease than cholesterol. This discovery has led to a wave of new research around the world. And then there are the recently discovered links between diet, lifestyle and cognitive decline, including the memory. 'People who get regular exercise perform better cognitively into old age,' says Kromhout. 'The same goes for people who drink up to three cups of coffee a day and have a partner. These are very nice results.' Something else he finds interesting is that it is now becoming clearly visible how eating habits have changed in the vari-

ous countries over the last half century.

In Northern Europe, unhealthy fats now make up a much smaller proportion of our diet, whereas in Crete that has gone up. 'Whereas the Cretans used to live on a relatively frugal plant-based diet, with rising wealth their diet has become much less healthy,' says Kromhout. 'The percentage of overweight on Crete now is the highest in Europe.'

The Seven Countries Study is slowly coming to an end now, according to Kromhout, if only because most of the participants have died. The researchers are still working on processing the causes of death since 2000. But there is also a lot of data from previous years that has not yet been analysed. In the Zutphen study, for instance, data was also collected on hours slept and the quality of sleep. 'I would very much like to correlate that with the various diseases,' says Kromhout. But he doubts whether there will be enough funding for that. 'It is very hard to get grants for analysing old data,' he says. 'I would really like to go on for another five to ten years. I expect there is a lot more to be got out of it.' ■

<http://sevencountriesstudy.com>