

Pepper or Salt ?

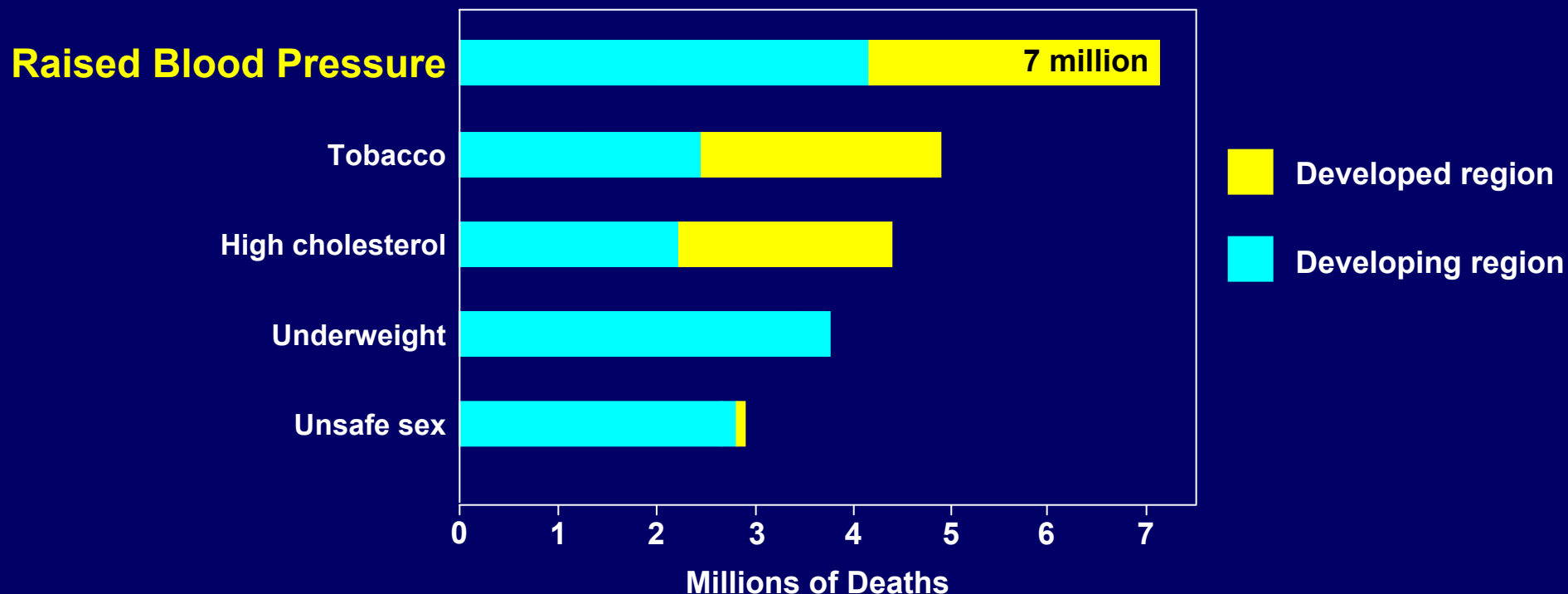
Graham A MacGregor

Professor of Cardiovascular Medicine

Wolfson Institute of Preventive Medicine,

Barts and The London School of Medicine & Dentistry

Major Underlying Factors causing Death - Worldwide

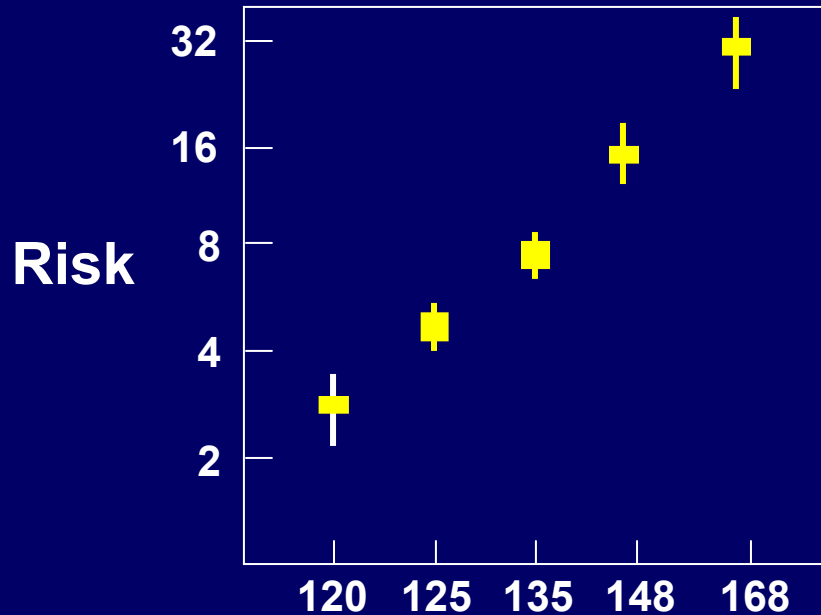


Raised BP is responsible for

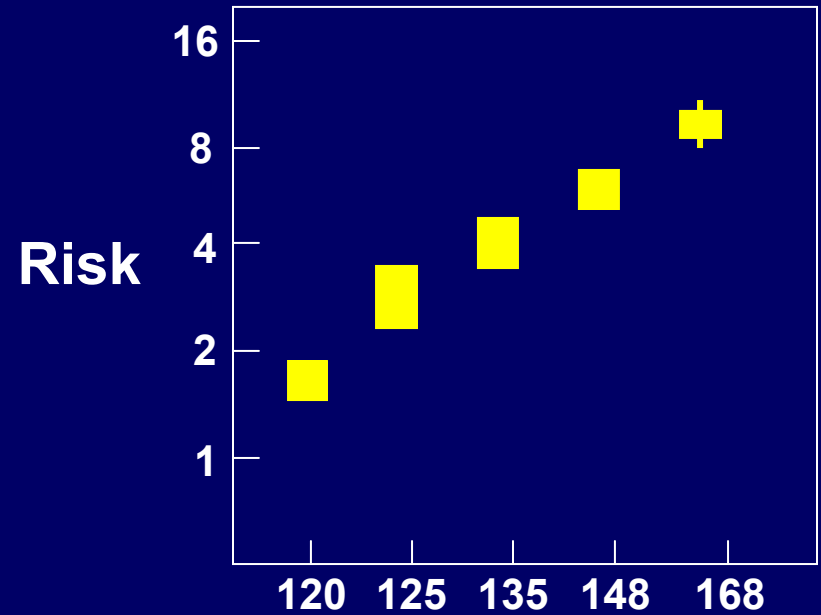
- **62% of all Strokes**
- **49% of all Heart Disease**

Systolic BP and Risk of Death

Stroke Deaths



Heart Deaths



Systolic Blood Pressure (mmHg)

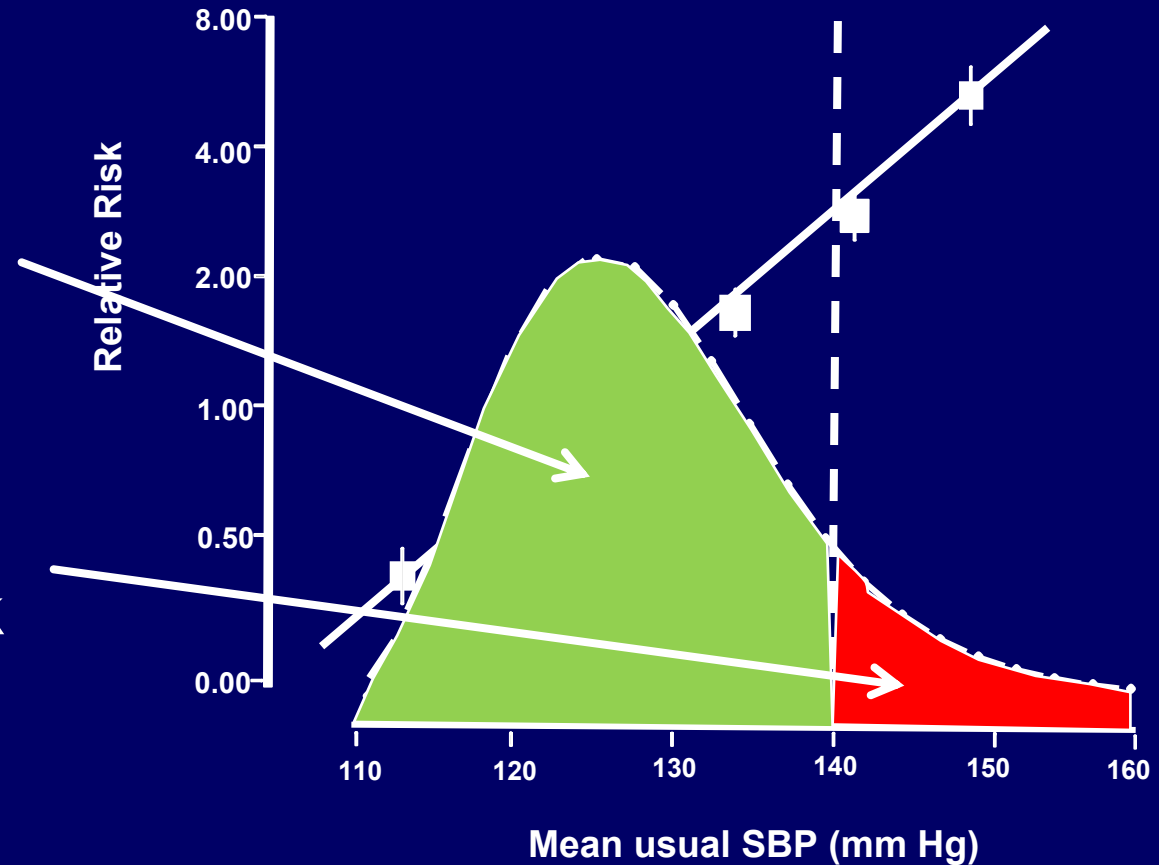
The risk starts at systolic 115 mmHg (83% adults)

Who get the strokes and the heart attacks?

A lot of people
with a low risk

=

A few people
with a high risk



Worldwide Strategy for BP

(The most important cause of death & disability)



**Reduce
population BP**

**Treat raised BP
(>140/90 mmHg)**

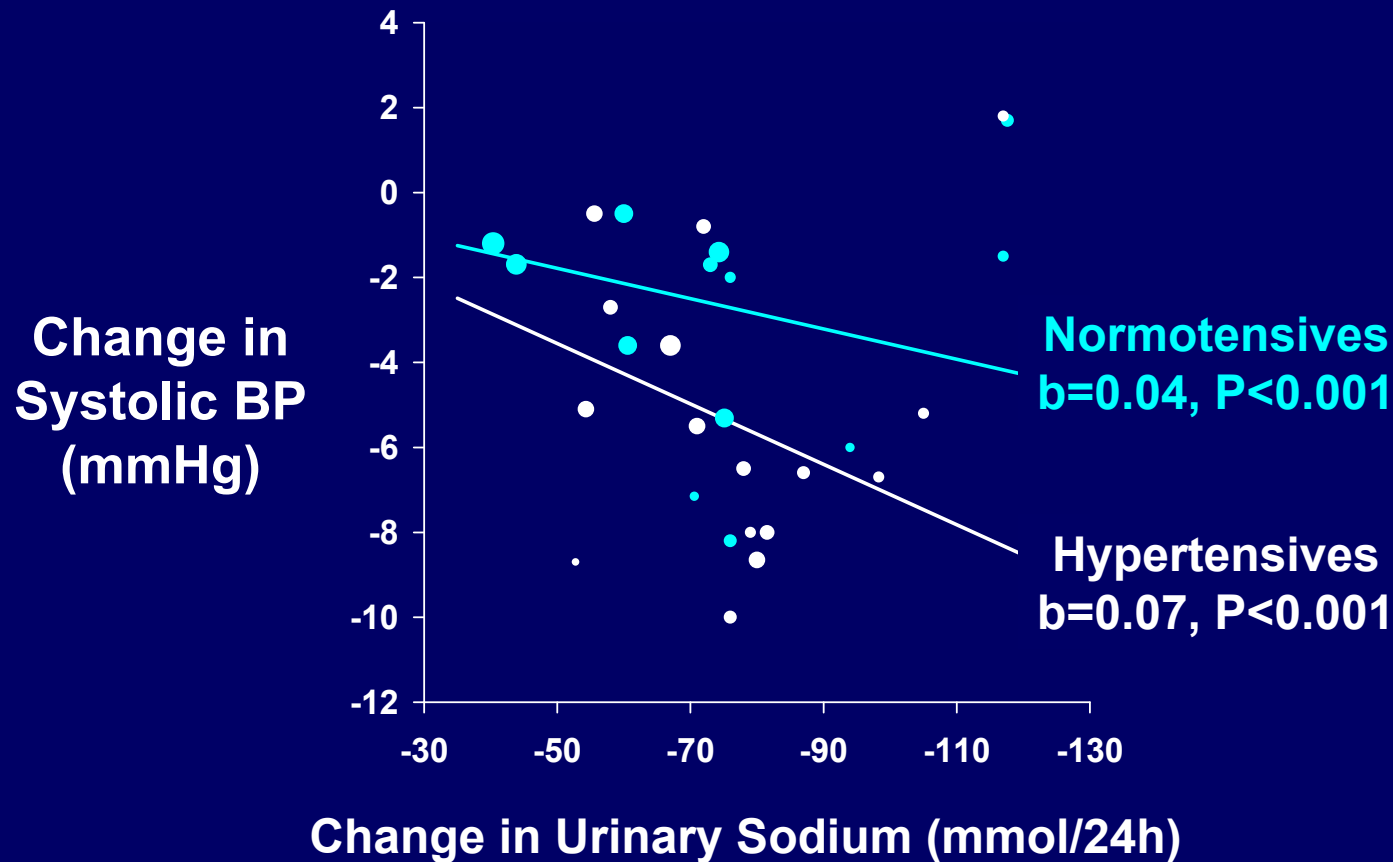
What puts up population BP?

- **Salt intake**
- **Lack of Fruit and vegetables**
- **Weight**
- **Lack of Exercise**
- **(Alcohol excess)**

Evidence

- **Epidemiology** Over 50 population studies and Intersalt
- **Migration** e.g. Kenya
- **Intervention** Portuguese villages. New born babies
- **Genetic** All defects impair ability of the kidney to excrete Na
- **Mechanisms** Plasma Na, corrected volume expansion
- **Animal** BP caused or aggravated by salt (e.g. chimpanzees)
- **Treatment** Meta-analysis. Dose response
- **Mortality studies** Meta-analysis of cohort studies
- **Outcome trials** TOHP, Taiwan (mineral salt: high K, low Na)

Dose Response: Meta-analysis (1 month or longer)



∴ A **6 g/day** reduction in salt intake predicts a **fall in SBP** of:

↓ **7 mmHg** in Hypertensives ($p<0.001$)

↓ **4 mmHg** in Normotensives ($p<0.01$)

↓ **Avg. 5 mmHg**

↓ **Salt intake 5-6g/day**

↓ **Stroke 24%**

↓ **CHD 18%**

He & MacGregor. Hypertension 2003;42:1093-99

UK

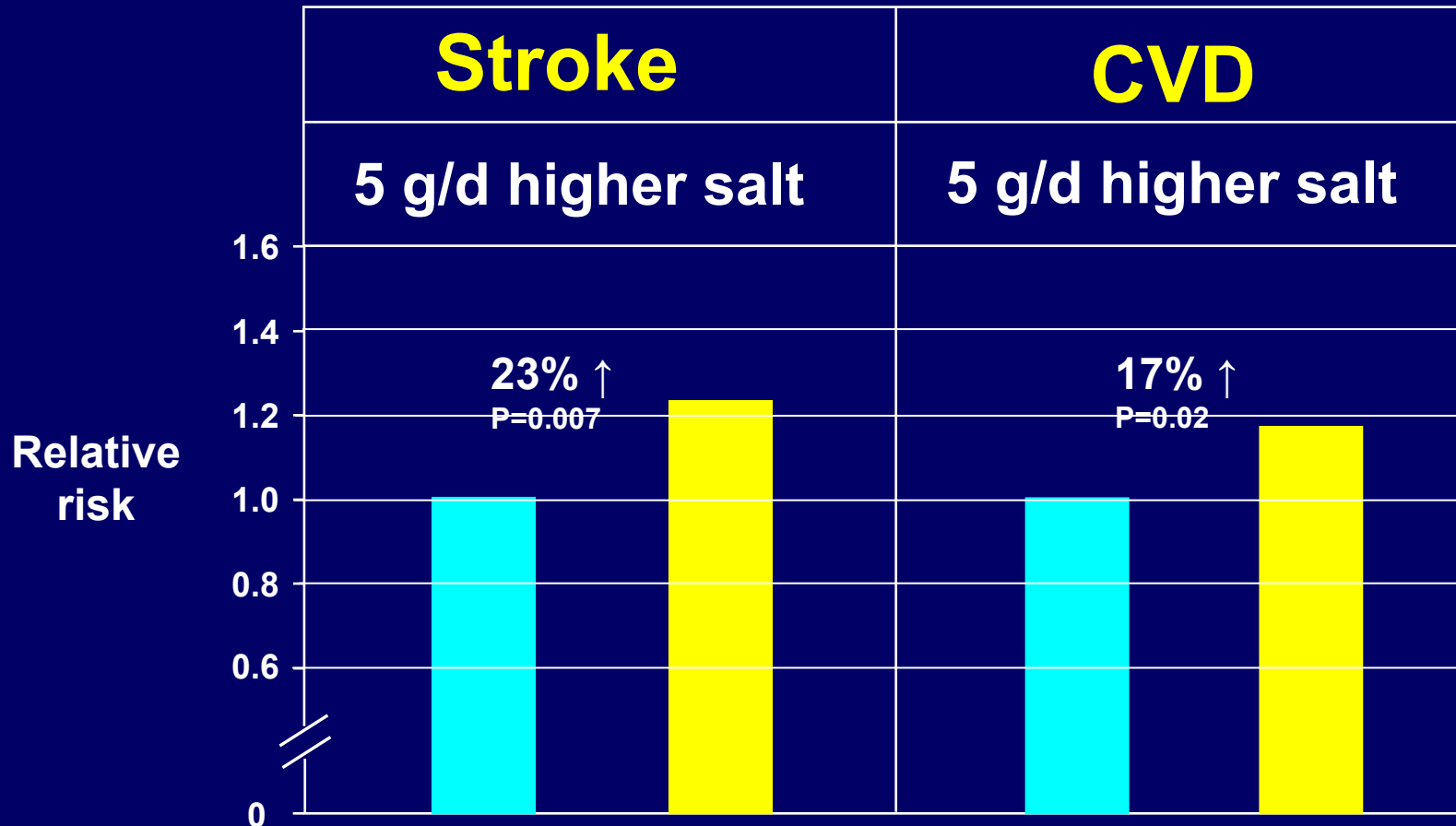
35,000 (approx) **Stroke & heart attack deaths prevented / year**

Worldwide

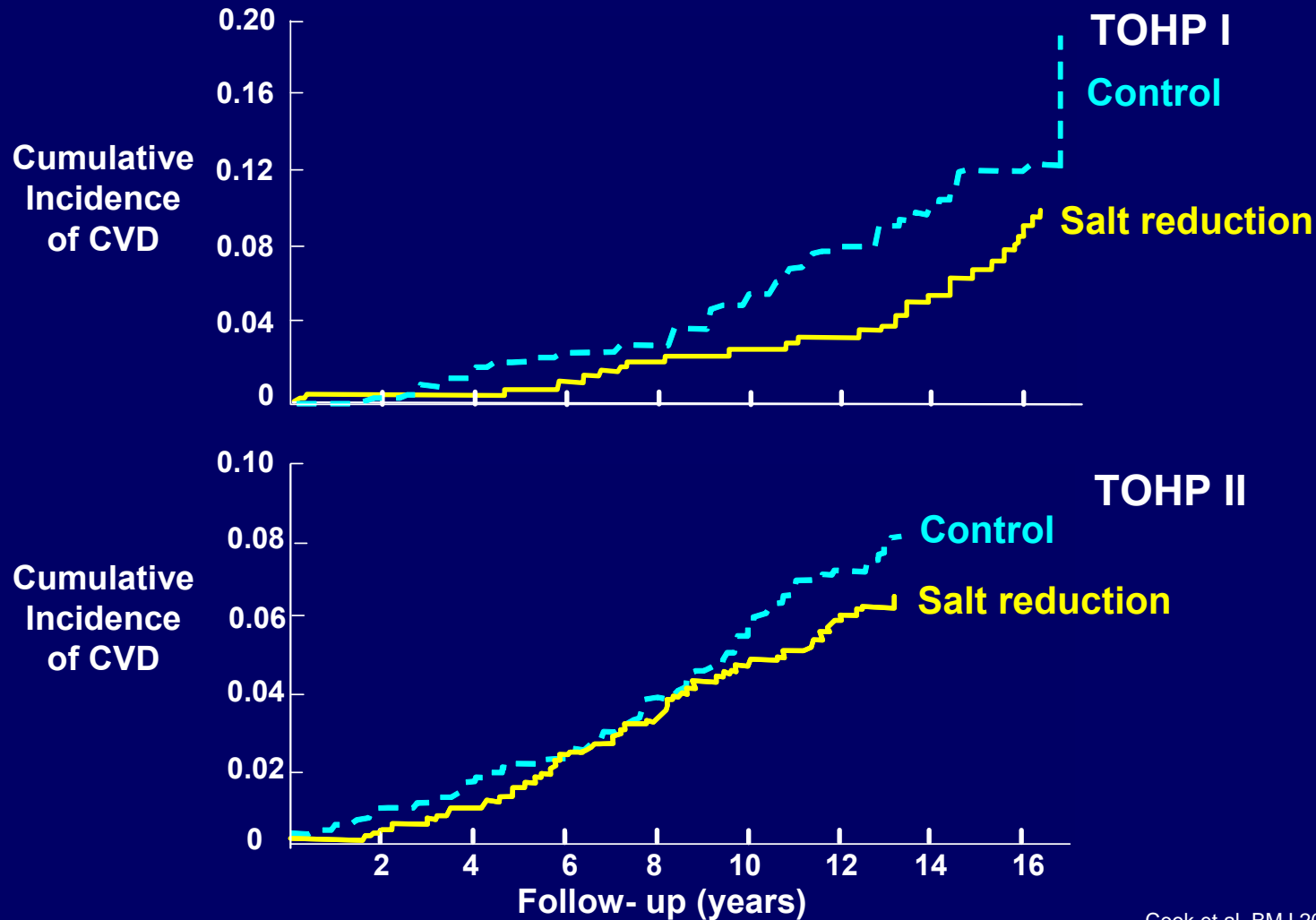
2.5 million (approx) **deaths prevented / year**

Meta-analysis of cohort studies

5 g/d ↑ salt intake is related to 23% ↑ stroke and 17% ↑ CVD



Outcome trial



Cook et al. BMJ 2007;334:885

↓ 25% Salt intake (↓2.5 g/d) → ↓ 25% CVD events

Summary

Salt intake (9-12 g/day)

- Population BP, rise in BP with age, hypertension
- Other effects e.g. stomach cancer, stroke, LVH, kidney disease, osteoporosis etc

Reduce salt intake

- from 9-12 g/day to 5–6 g/day

Reducing salt intake

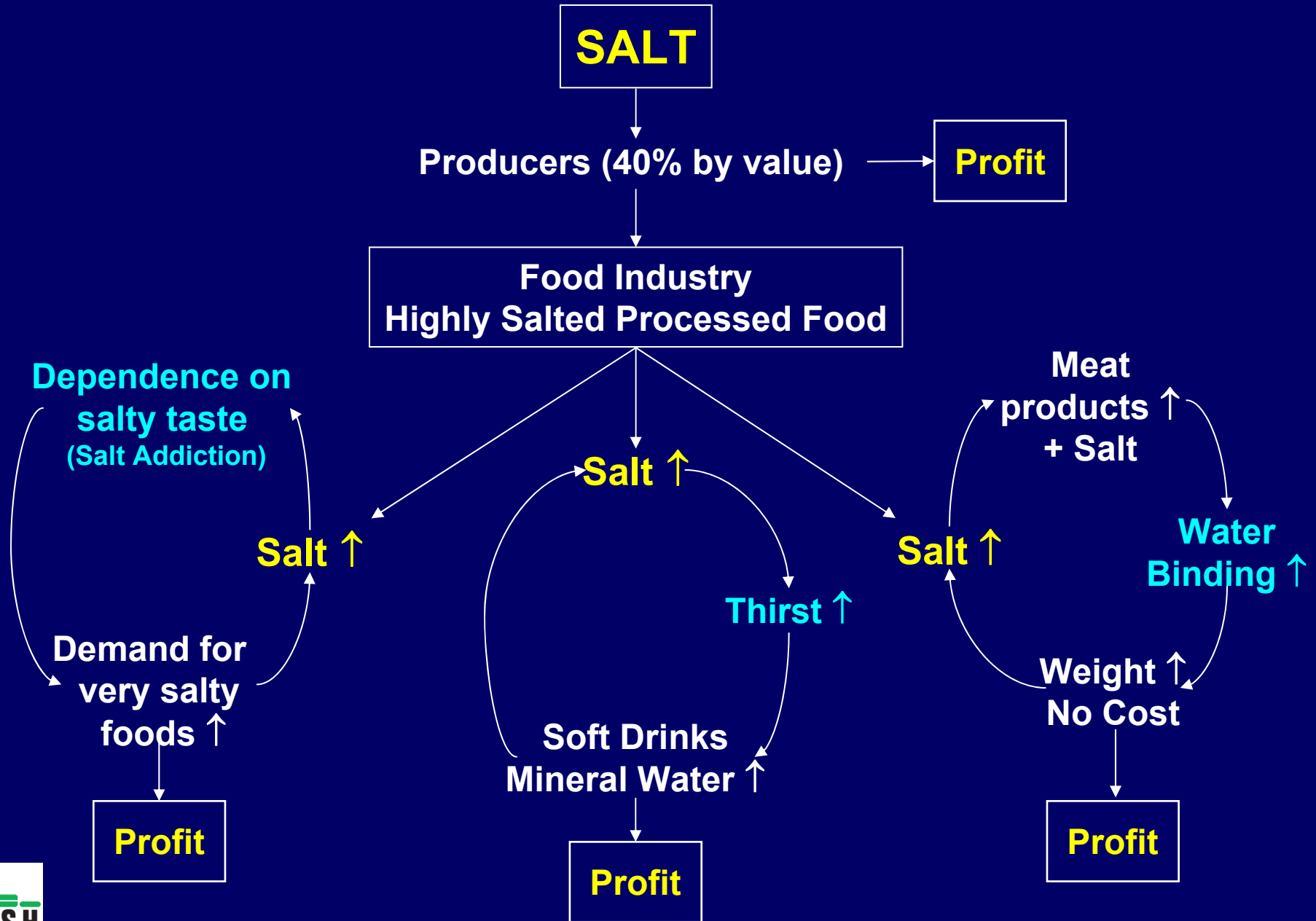
Who is responsible?

- Public
- Government
- Food industry

Developed countries 80% salt passive

∴ Food industry is responsible & must take it out

Hidden Salt – Its Commercial Value



Sea Water Comparison

(1.0 g of sodium / 2.5g of salt per 100g)

Pizza	60%	Medium Sliced White	50%
Chicken Curry	60%	Granary Loaf	60%
Processed Cheese	130%	Crumpets	80%
Bacon	200%	Digestive	60%
Sausages	100%	Cream Crackers	60%
Smoked Fish	190%	Cheddar Cheese	70%
Sweet Pickle	170%	Stilton Cheese	90%
Shepherds Pie	40%	Processed Cheese	130%
Frozen Prawns	80%	Branflakes	100%
Crisps	110%	Cornflakes	110%
Salad Cream	100%	Tomato Ketchup	110%
Savoury Biscuits	70%	Brown Sauce	100%

Above data collected 2001, n.b. most have been reduced by 10 – 30% (2008) UK only

How ?

- **Slowly 10-30% per year**
- **No taste problems**
- **Almost no technical problems**
- **Voluntary but threat of legislation**
- **Clear labelling**

Hidden Salt in food

e.g. processed, fast, takeaway, restaurant food

**Food industry slowly reduce
- No rejection by public**

Fantastic for Public Health

**Very little
cost**

↓ BP

**No need to
change diet**

CASH Strategy for Reducing Salt in UK

Source	Salt intake g/day	Reduction needed	Target intake g/day
Table/Cooking (15%)	1.4 g	40% reduction	0.9 g
Natural (5%)	0.5 g	No reduction	0.5 g
Food industry (80%)	7.6 g	40% reduction	4.6 g
Total 9.5 g			Target 6.0 g

∴ the food industry needs to slowly reduce salt content of all foods by 40% over the next decade

Targets set in UK by FSA & CASH

- **Set targets for industry to achieve from 2005 to 2010. New targets set for 2012 over 80 categories of food**
- **Gradual reduction, 10-20% a year. No rejection by public**
- **Continuous media publicity to ensure industry collaborate**
- **Praise companies achieving targets, name and shame those not**

Success UK by 2008

24h urinary sodium in a random sample of adults has fallen by **2008** (i.e. within 2 years of starting salt reduction)

from 9.5 to 8.6 g/d salt (10% ↓)

(i.e. 26,000 tons/yr salt removed)

≈ 6000 deaths/yr - strokes, heart attacks saved

Salt intake should reach less than 6 g/d target
around 2014

NICE Public Health Guidance

Prevention of CVD at population level

*The voluntary agreement came into force in 2004 and was followed by progressive targets (in 2006 and 2009). **The campaigns, which cost just £15 million, led to ≈ 6000 fewer CVD deaths per year, saving the UK economy ≈ £1.5 billion per annum.***

HIDDEN SALT KILLING 40,000 A YEAR

HIGH levels of salt added to everyday By Victoria Fletcher Health Editor

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STG

The hidden salt that could ruin your child's life



By Sean Poulter
Consumer Affairs Editor

CHILDREN are being put at risk of suffering high blood pressure and strokes in later life by the hidden salt content of many popular foods.

Some brands of baked beans, sausages, breaded chicken and noodles have been labelled potential health hazards.

Some desserts also contain alarmingly high levels of salt.

Certain products contain virtually the entire daily limit for salt for a six-year-old in a single serving, according to research published today by campaign group Consumers Action on Salt and Health.

The Department of Health recommends an upper limit of 3g of salt per day for a child aged seven to ten, 3g for

HOW A SINGLE MEAL CAN SMASH THE DAILY LIMIT

Product name	Amount	Salt per portion (g)	Percentage of daily 3g limit for child aged 4-6
Batchelors Super Noodles to Go	1 pot made up with water	4.05g	135%
Morrison's Southern Fried Chicken Portions	217g (1 drumstick and 1 thigh)	2.8g	93%
Morrison's Baked Beans in tomato sauce	Half a can (210g)	2.8g	93%
Tesco Thick Pork Sausages	2 sausages (grilled)	2.0g	67%
Marks & Spencer Potatoes Croquettes	3	1.9g	63%
Somerfield Spaghetti in tomato sauce	Half a can (209g)	1.9g	63%
Kraft Dairyfree Lunchables Ham 'n' Cheese Crackers	101.9g	1.8g	60%
Chicago Town Triple Cheese Individual small pizza	170g	1.8g	60%
Golden Vale Attack A Snack Ham	100g	1.77g	59%
Tesco quarterpounder beefburgers	1 burger	1.4g	47%
Morrison's salt and vinegar flavour sticks	38g	1.3g	43%
Sainsbury's pork sausage rolls	1	1.2g	40%
Kingsmill Great Everyday Thick White Bread	2 slices	1.06g	35%
Sweet foods			
Butterkist 'The Simpsons' Honey Nut Popcorn	100g	1.25g	42%
Asda Boly Poly Pudding (fresh)	114g (1 pudding)	1.1g	36%
Tesco Banana Flavour Delight	Half pack	1.0g	33%
Heinz Treacle Sponge Pudding (tinned)	Quarter of tin	0.8g	27%
Kellogg's Rice Krispies	30g serving	0.65g	22%
Tesco and Sainsbury's Blueberry Muffin	1 muffin	0.6g	20%

Three Marks & Spencer potato cut higher salt diets have higher sodiums director at the Food & Drink per instead, Professor Martin Wise

Salty bread 'risking 7,000 lives'

HIGH levels of salt in supermarket bread are putting up to 7,000 lives a year at risk, claims a damning study by health campaigners.

By Sean Poulter
Consumer Affairs Correspondent

total of 15 out of 18 Warburton products had a salt content higher than the Government's target, but all the Sainsbury's and Waitrose breads surveyed were below.

Professor Graham MacGregor, chairman of Cash and an expert on cardiovascular medicine, said: 'The BHF would like all breads to contain as little salt as possible. People who are at risk of heart disease caused by high blood pressure need to be able to quickly and accurately choose lower salt options when shopping.'

Scientists prove that salty diet costs lives

- 15-year study shows link to heart disease
- Calls grow louder for nationwide campaign

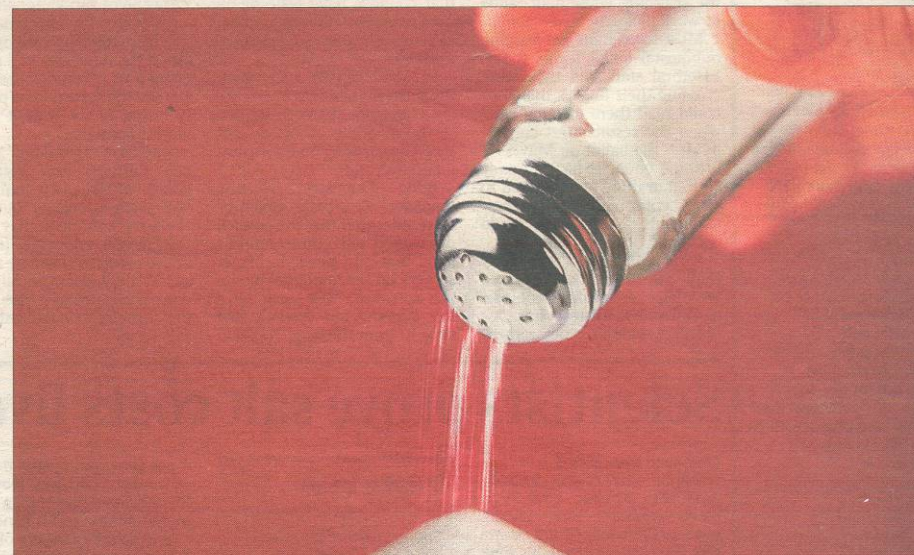
Nigel Hawkes Health Editor

Eating less salt reduces the chances of suffering a heart attack or stroke, the first long-term study of salt's impact on health confirms today.

The findings, from a 15-year study, offer the clearest evidence yet that cutting salt consumption saves lives by reducing the risks of cardiovascular disease. People who ate less salty food were found to have a 25 per cent lower risk of cardiac arrest or stroke, and a 20 per cent lower risk of premature death.

The results, published in the *British Medical Journal*, underline the need for population-wide salt reductions in the diet, the scientists conclude.

Despite campaigns to reduce salt



Salt gives 4-year-olds high blood pressure

By Sean Poulter
Consumer Affairs Editor

CHILDREN as young as four are suffering from raised blood pressure because they are eating too many salty processed foods, researchers say.

Campaigners claim this puts youngsters at increased risk of hypertension in later life – potentially leading to heart disease, strokes and an early death.

The study, by St George's University Hospital in London, drew a direct correlation between the level of salt in the diet of children aged between four and 18 and high blood pressure.

The findings will heap pressure on the manufacturers of children's snacks and ready meals to reduce the salt levels in their

recipes. A single packet of instant noodles can contain more than the recommended daily maximum salt intake for a child aged four to six. A pack of salt and vinegar crisps is likely to have more than a quarter of a child's salt quota.

The study looked at the salt intake of more than 1,600 children and teenagers over a seven-day period and then measured their blood pressure.

The authors, writing in *The Journal of Human Hypertension* today, found that for each extra gram of salt eaten there was a

related 0.4mmHg increase in systolic blood pressure. This is a small but significant increase, according to health campaigners.

Government experts recommend that children aged four to six should not be eating more than 3g of salt a day, while the figure for youngsters aged seven to ten is 5g. However, many children are thought to be regularly consuming 9-10g of salt a day, which is up to three times the recommended maximum.

Nutritionist Jo Butten said: 'It may be difficult for parents to tell their children they can't have crisps every day, or that they need to eat a different breakfast cereal, but surely it's a small price to pay to reduce their risk of a heart attack or stroke when they are older.'

Killing them softly with salt

Strokes, heart attacks, high blood pressure. It's not good news, especially for the young who are consuming up to six times more than they should. **Hugh Davies** reports

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Sean C

Feed children you condemn blood pressure. That's the message from a group of specialists campaigning for awareness about the harmful high-salt diet.

Salt causes the body fluid, and it is thought to volume over time, the hypertension. According to Action on Salt and scientific evidence suggests children should consume no more than 1 gram, or a teaspoon daily (our bodies only need 1 gram). For children the target intake drops while children aged 10 have no more than 2 grams should have no added salt.

However, recent studies have shown not only that a serving between 10 and 20 grams of salt a day — twice the maximum and three times the need — but that children even less, are actually consuming the same amount. This is due to their high intake of salty snacks and even in drinks, some of which are as salty as Atlantic sea water.

According to Graham Mackay, professor of cardiovascular medicine at St George's Hospital, London, and chair of both the British Hypertension Society and the British Blood Pressure Association, "High salt intake at an early age is a serious consequence of the current epidemic of obesity."

"If you load salt to you tend to get irritable that make it much more difficult to lose weight. You will develop higher blood pressure," he says. "If we didn't eat so much salt, humans didn't have high blood pressure until about 5,000 years ago. We would have high blood pressure. Which is why we aim to get salt down in children from birth."

A big stumbling block for the food industry, says Professor MacGregor, has been the fact that 75 per cent of the salt in the UK comes from processed foods (including bread). He doesn't blame the food industry when laying the blame squarely at its door.

"The food industry is the way it markets food to children," he says. "They market extremely useless foods and they then add lots of salt and spend huge amounts of money on advertising."

E.g. Salad Survey



Salad Survey 2010 – Highest and lowest tables

(Data was collected from product packaging in store during August 2010, all figures are based on figures including dressings. See CASH website for further details)

1. Simple Swaps

High product	Salt content (g) / portion	Low alternative product	Salt content (g) / portion	Difference (g)
ASDA Chicken and Bacon Caesar Pasta (240g)	1.9	ASDA Tomato and Chicken Pasta (270g)	0.5	1.4
Boots Delicious... Chicken Fajita Pasta salad (271g)	1.4	Boots Delicious... Honey and Mustard Chicken Pasta Salad (224g)	0.7	0.70
Café Nero Tuna & Cannellini Bean Salad (256g)	1.6	Café Nero Chicken & Orzo Pasta Salad (228g)	0.5	1.10
EAT Spicy Crayfish Noodles	3.51	EAT Superfood (with Dressing)	0.6025	2.91
Marks & Spencers A Taste of Asia. Lochmuir Smoked Salmon Rice Salad. Asian Style Vegetables Salad. Edamame Soya Beans. 2 Cucumber Maki with a Soy & Lime Dressing (258g)	2.83	Marks and Spencer Simply Fuller Longer King Prawns with Mixed Rice & Lentils & a Sweet Chilli & Coriander Dressing (230g)	0.80	2.03
McDonalds Crispy Chicken & Bacon Salad (with Low fat Caesar Salad Dressing)	2.6	McDonalds Grilled Chicken Salad (with Low Fat Balsamic dressing)	1.7	0.9
Pret A Manger Super (Duper) Houmous Salad (with Dressing)	3.2	Pret A Manger No Bread Tricolore (with Dressing)	0.2	3.00
Sainsbury's Greek Salad Tabouleh (277g)	1.59	Sainsbury's Be Good To Yourself Orzo Sunbaked Tomato Salad (270g)	0.26	1.33
Subway Sweet Onion Teriyaki (with Sweet Onion Sauce) (434g)	2.1	Subway Chicken Breast (with Honey Mustard Sauce)	1.3	0.8
Tesco Cheese and Tomato Pasta (300g)	2	Tesco Chicken, Tomato and Basil Pasta (350g)	0.7	1.30
The Co-operative Chicken & Bacon Pasta Salad	1.3	The Co-operative Healthier Choice Sweet Chilli Chicken Noodle Salad (limited edition)	0.6	0.70
Waitrose Special Edition King Prawn Thai Rice Salad (230g)	2.25	Waitrose Special Edition Poached Salmon Pasta Salad (220g)	0.91	1.34



FEELING BLOATED AFTER A SALAD LUNCH? HIDDEN SALT MAY BE TO BLAME.

OPTING FOR A SALAD FOR LUNCH COULD RESULT IN YOU UNKNOWINGLY CONSUMING OVER HALF YOUR MAXIMUM RECOMMENDED DAILY SALT INTAKE AND CAUSING THAT BLOATED FEELING

26.08.10. A survey of 270 salad and pasta bowls from supermarkets, high street cafes and fast food chains found that whilst we should eat less than 6 grams of salt a day, a salad can unexpectedly give you more than half of your daily maximum intake. The new research, carried out by Consensus Action on Salt and Health (CASH), has found surprisingly high levels of salt hidden in salads [Ref 1] with one in ten salads containing more salt than a Big Mac [Ref 2].

The worst offender, a Spicy Crayfish Noodle salad from EAT., contains a massive 3.51g of salt per portion which is over 17 times saltier than a Pret No Bread Tricolore with Balsamic Dressing which contains just 0.2g salt per portion.

The 5 saltiest high street café/fast food salads are:

- EAT Spicy Crayfish Noodles (3.51g salt per portion)
- Pret Super (Duper) Humous Salad with French Dressing (3.2g salt per portion)
- KFC Zinger Salad with Caesar Dressing or Low Fat Vinaigrette Dressing (3.1g salt per portion)

Media coverage



World Action on Salt & Health

>400 members, >80 countries

Worldwide:

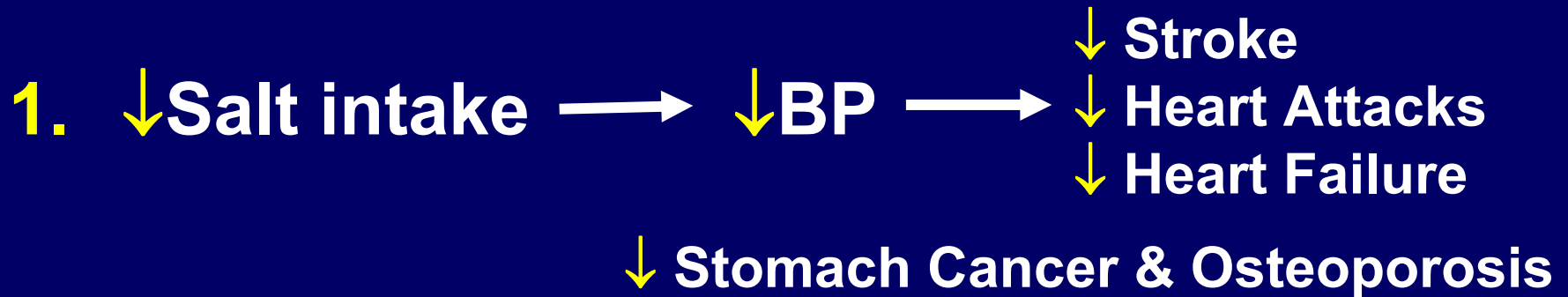
- Highlight foods high in salt
- Implement salt reduction plan
- Working with WHO

Individual Countries:

- Facilitate expert groups (similar to CASH) e.g. Canada, Australia
- Convince government of evidence, action by food industry
- Public health campaign to ↓ salt consumption at home

To join, please contact wash@qmul.ac.uk

Summary



2. ↓ Salt intake (cheap/practical) →
“Biggest improvement in public health
since clean water and drains (19th Century)”

He & MacGregor. Reducing population salt intake worldwide: from evidence to implementation. *Prog Cardiovasc Dis.* 2010;52:363-382.