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The Salt-Health Debate

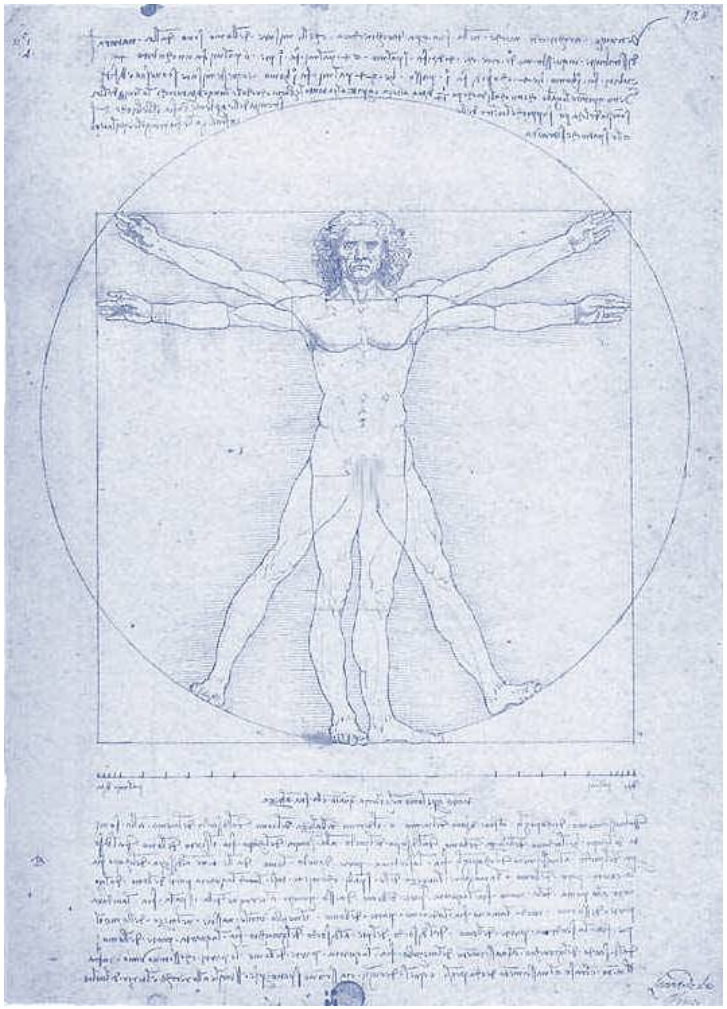
More Salacious than Salubrious

Chicago IFT OctoberFest Meeting
October 10, Chicago, IL

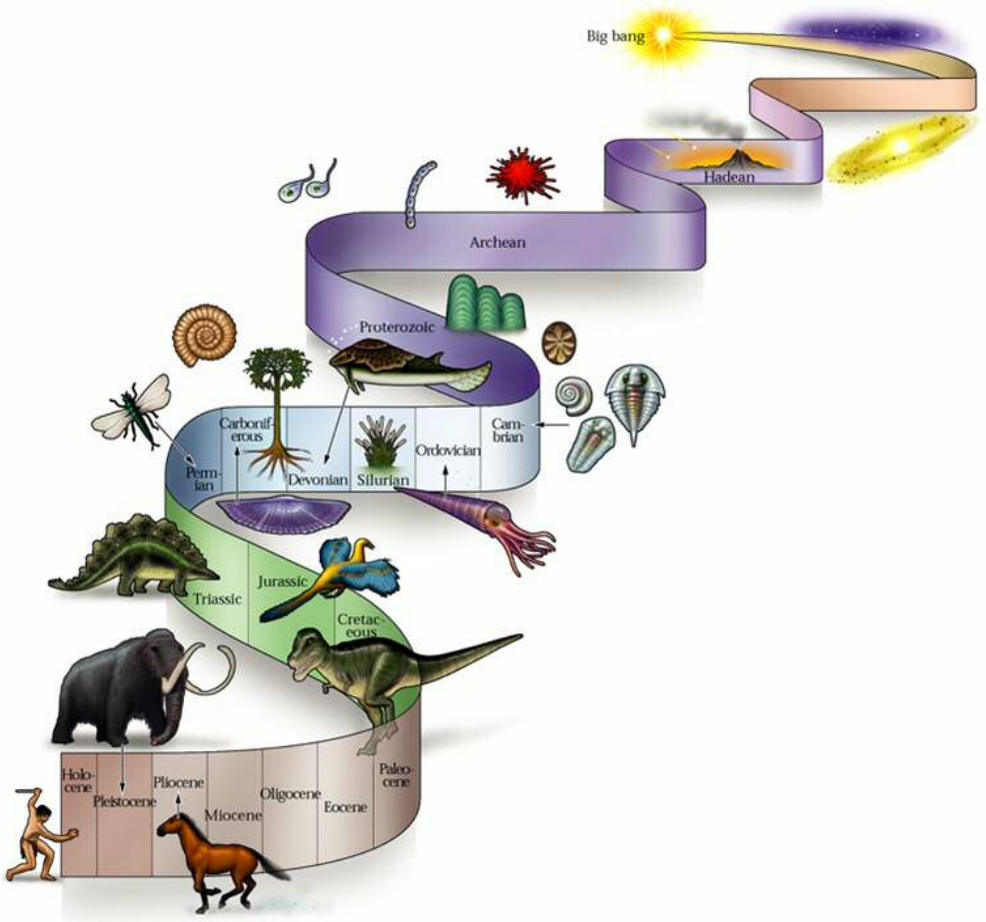
Summary

- The Wisdom of the Body
  - The ability to maintain homeostasis
- Salt and Blood Pressure
  - What is the relationship?
- InterSalt and the DRIs
  - The sparks to ignite the current debate
- 10 Salt Myths
  - Myth-information, myth-perception & myth-understanding
- Key Drivers of the Salt Debate
  - The individuals and interests driving the debate
- Policy Issues

The Wisdom of the Body



Salt – an essential nutrient

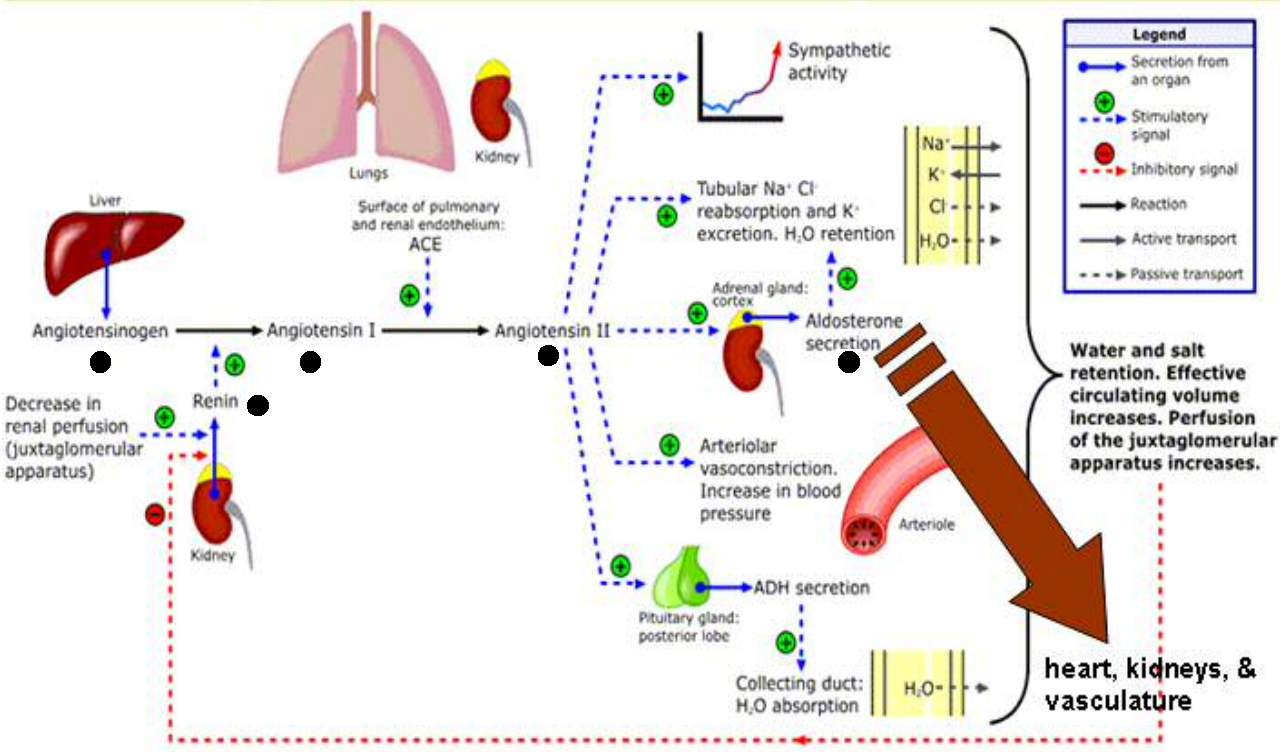


- Sodium has always been the predominant positive ion in extracellular body fluid for all multi-cellular species.

- While evolution has witnessed tremendous diversity in external morphology, our interior milieu has remained constant.

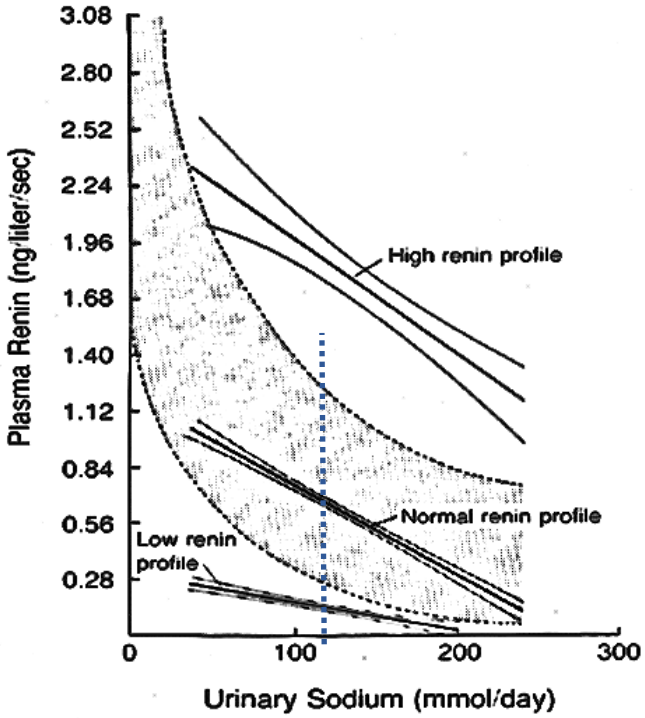
How the body regulates salt

Renin angiotensin aldosterone system



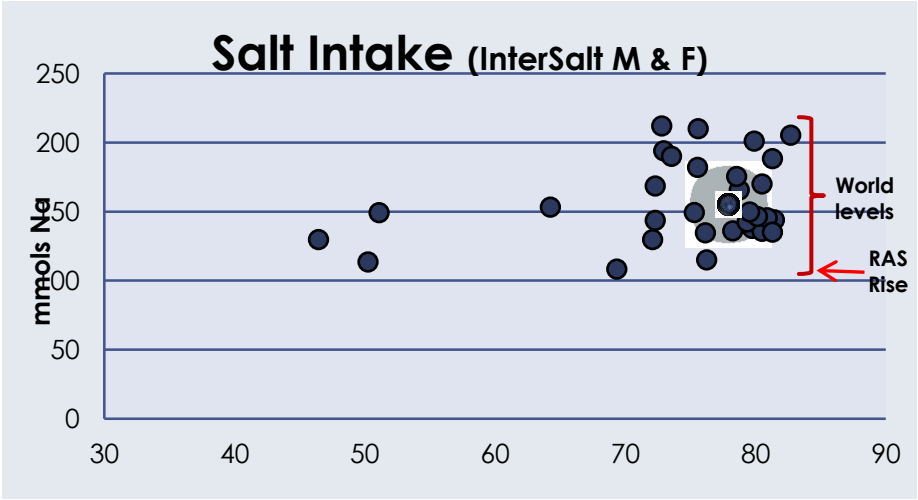
RAS evolved to maintain homeostasis in the event of sodium deficiency, so circulatory system can function.

Worldwide response to low salt intake is consistent



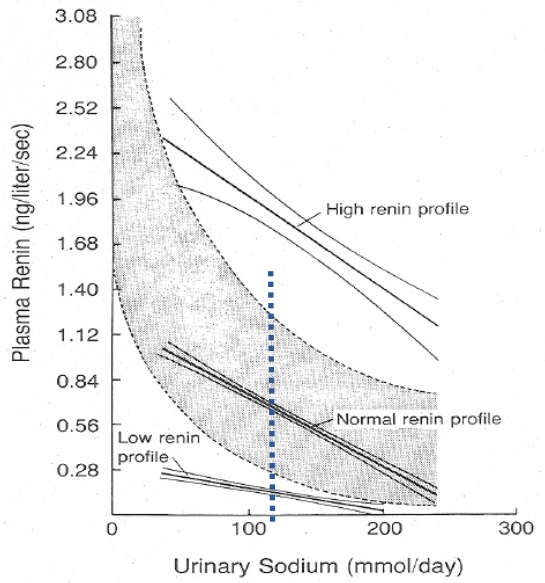
Renin levels start to spike > 120 mmols

Worldwide consumption of salt (120 – 220 mmols)



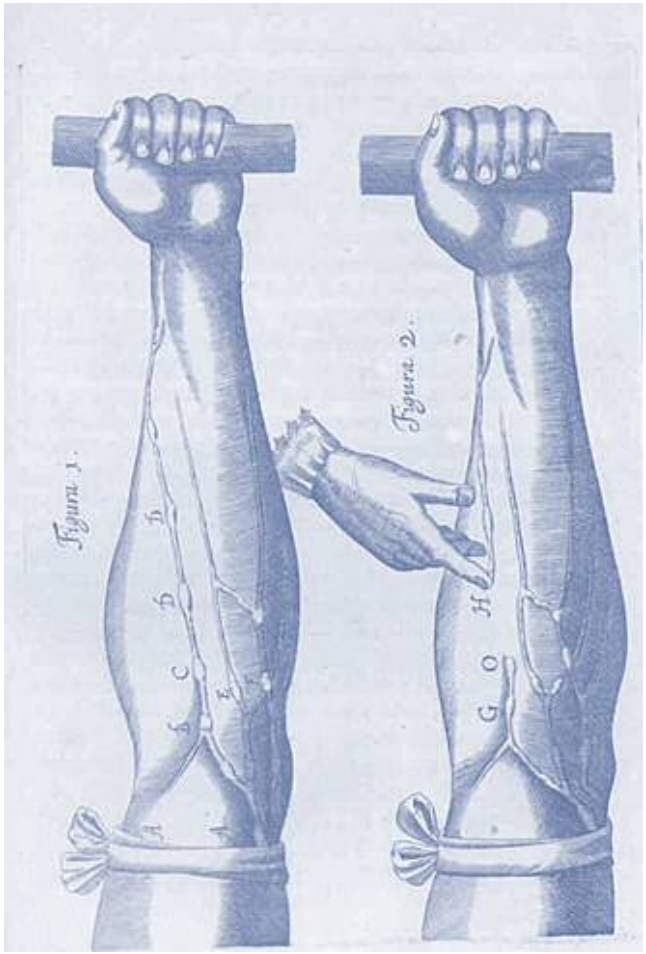
In all countries around the world, except where salt is unavailable, everyone consumes above the RAS stimulation level

What are the outcomes of elevated RAS?

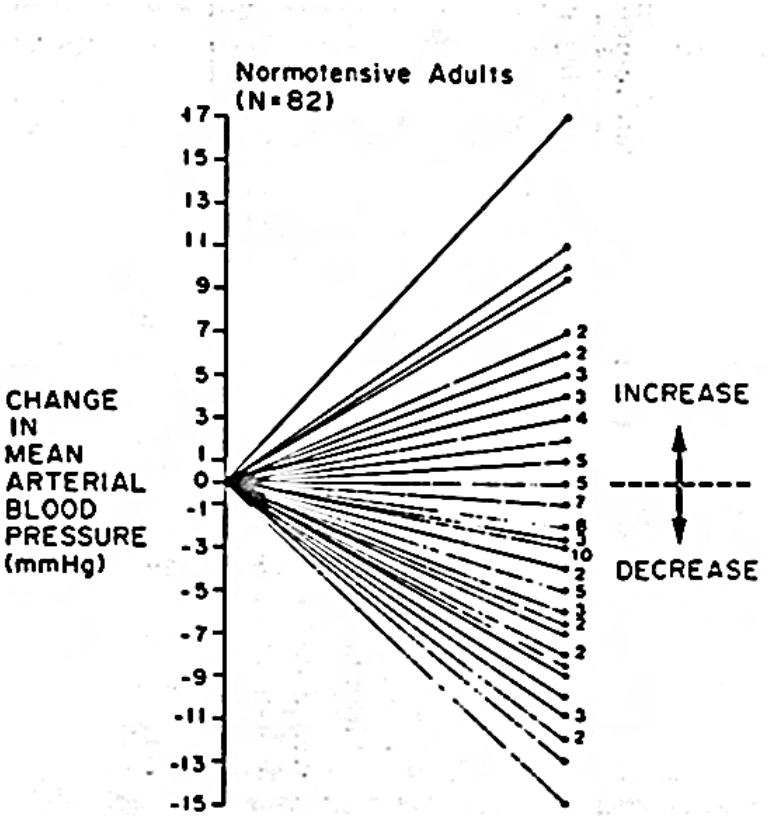


- Insulin resistance (diabetes)
- Metabolic syndrome
- Cardiovascular Disease
- Cognition loss
- Others?

Salt and Blood Pressure



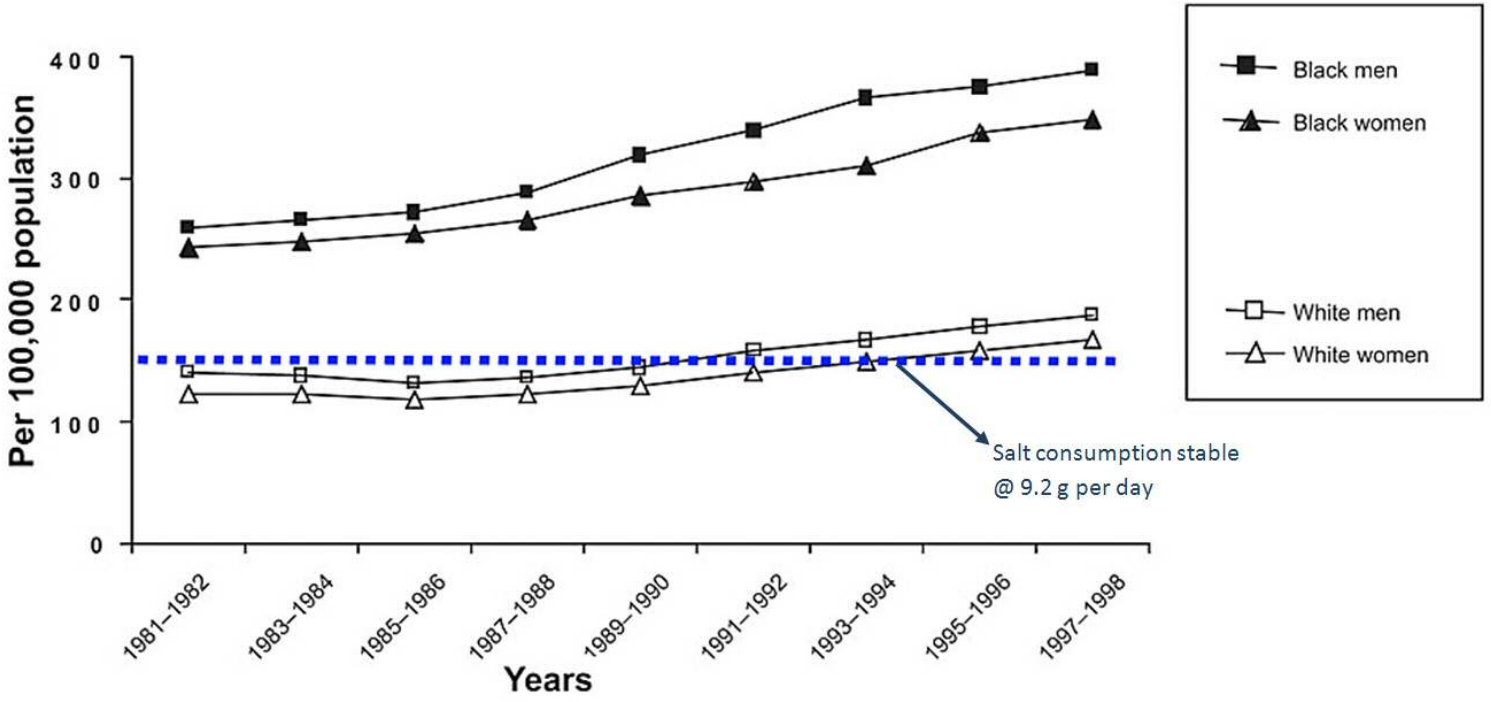
The blood pressure response to salt reduction is heterogeneous



When we reduce Na from 160 mmols -75mmols

~30%↓ ~20%↑ ~50%=

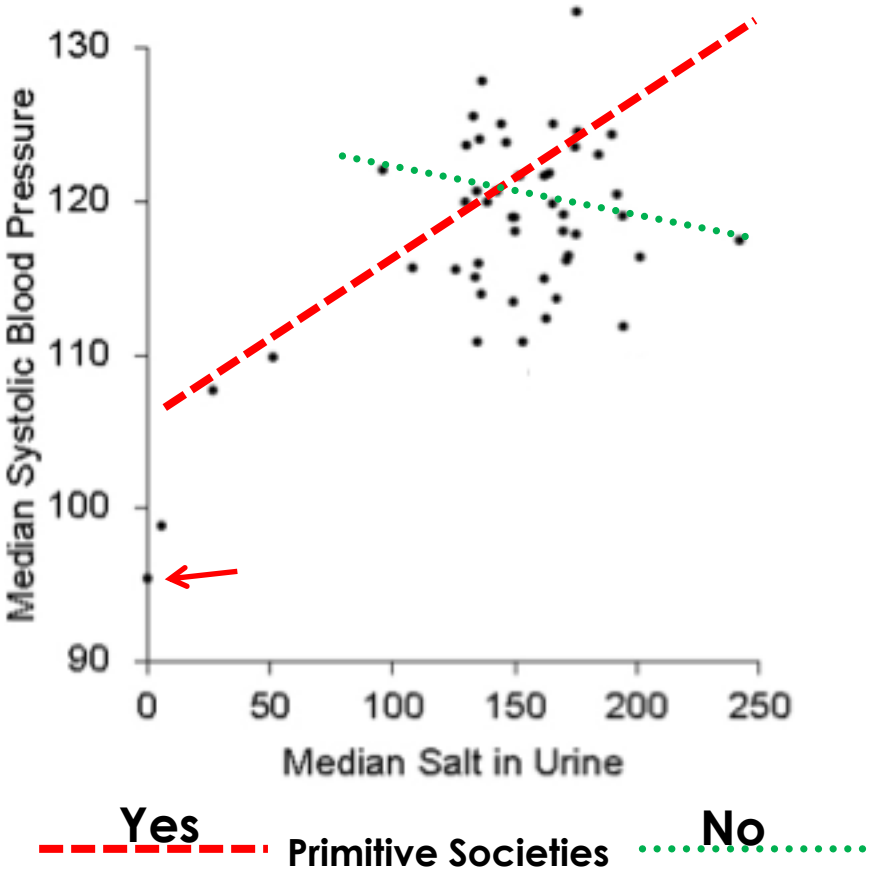
Is there a relationship between salt intake and hypertension rates?



The published evidence.

InterSalt and the Dietary Reference Intakes

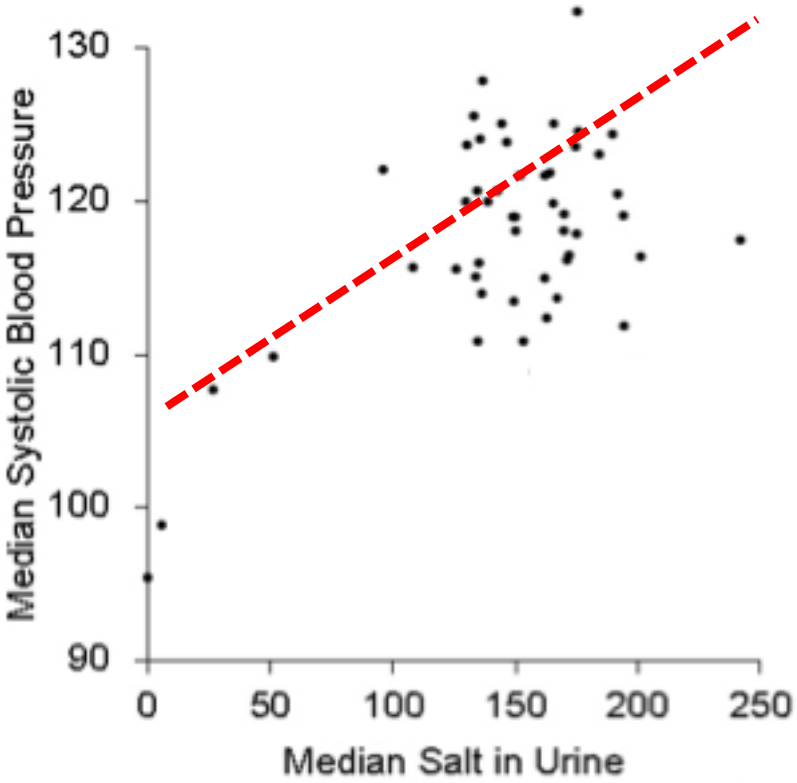
InterSalt decides on a relationship between salt intake and blood pressure



- Yanomamo lack D/D genotype (Hypertension)
- Yanomamo have chronically high RAS
- Yanomamo longevity = 45 years.

Comparing modern societies with those that have vastly different stressors, eat far fewer calories and much more fiber is not considered valid.

The DRIs accept InterSalt with all outliers



Yes

Primitive Societies

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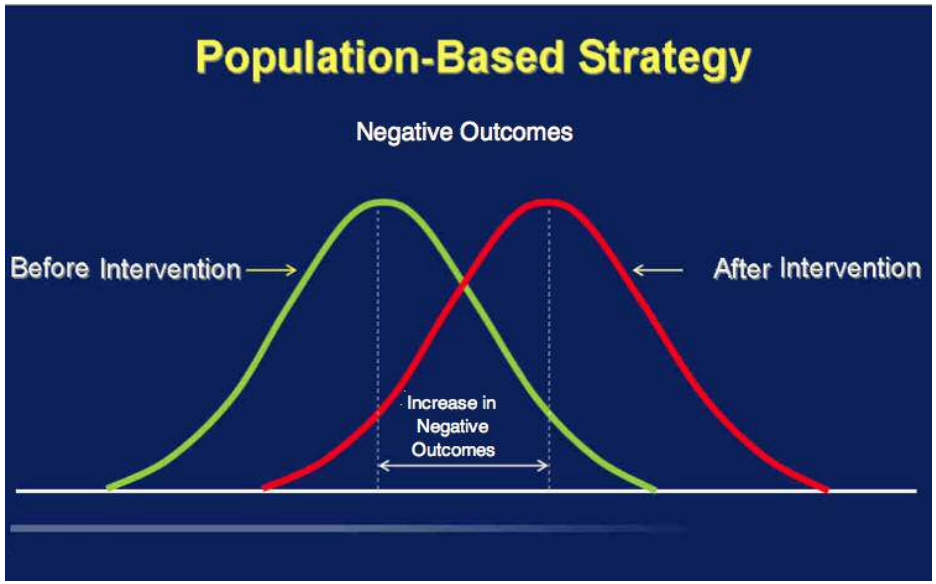
The DRIs accept the Rose Population Strategy



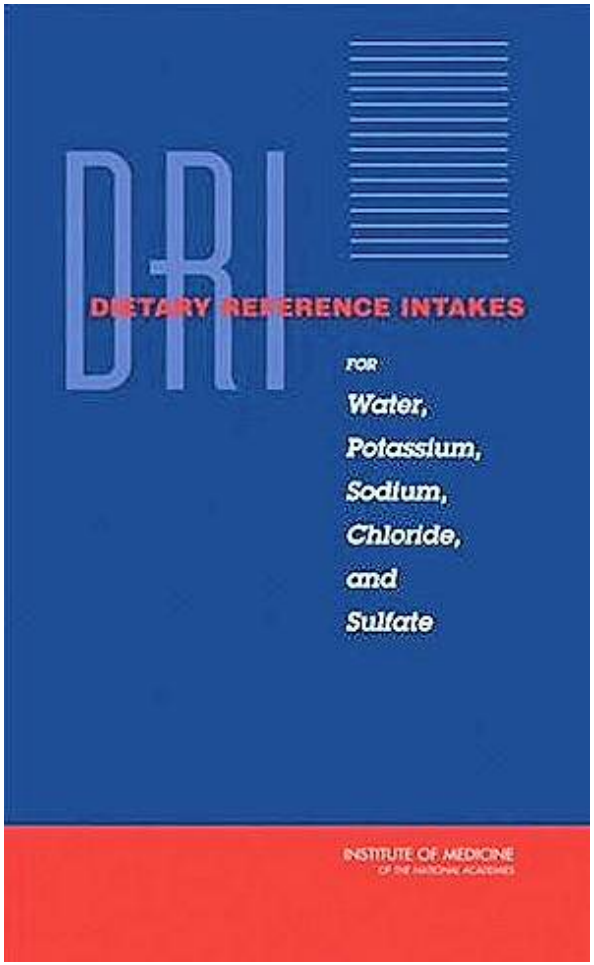
Rose population strategy (risks to health are evenly distributed across a continuum rather than confined to a high risk group) so a very modest risk reduction across the entire population, including 'normotensives', might greatly reduce the population incidence of CVD.

Wrong on several counts

- if the intervention has even a small negative effect, then it will result in greater morbidity and mortality for most and inferior treatment for those at risk
- hypertension is driven by genetics, so risk is not evenly distributed, but highly skewed across population
- an intervention may statistically benefit the public's health but not make any difference to an individual's health – known as the "Population Paradox".

All models predicting hundreds of thousands of lives and $billions saved are based upon this flawed assumption.

DRIs set arbitrary recommendations



"Because of insufficient data from dose-response trials, an Estimated Average Requirement could not be established and thus a Recommended Dietary Allowance could not be derived. Hence, an Adequate Intake (AI) is provided"

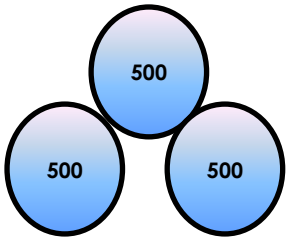
1,500 mg Na/day

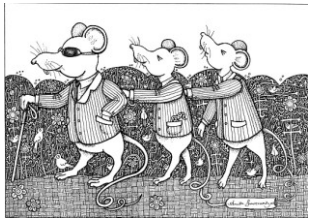
Why adopt an AI of 1,500 mg Na/day?

Why move from a basal rate loss of 500 mg Na/day to 1500 mg/day?

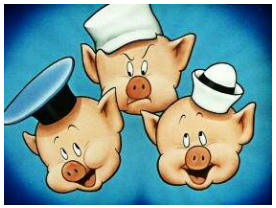
Was it "Omne Trium Perfectum" ?

(Everything in threes is perfect.)





Based upon other well-known precedents, the DRIs assumed three times the basal rate requirement as their adequate requirement.



Why adopt 2,300 mg Na/day as the upper limit?

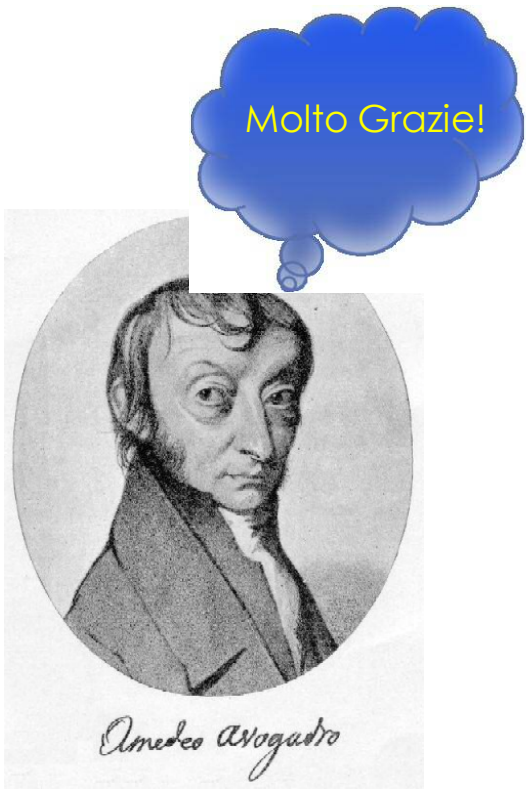
The AI of 1,500 mg of Na is 65.21739 mmols – a difficult number to multiply by and to divide by. All in all, a very inconvenient number.

Since it's all somewhat arbitrary, an upper limit should be a bit easier to work with, like……..

100 mmols! (Easy to divide, multiply and add!)

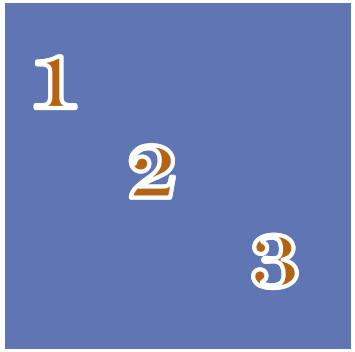
2,300 mg of Na = precisely 100 mmols

(Even old Avogadro would be pleased)



Ten Salt Myths

Ten Salt Myths



Myths	Fact
1. We eat more salt now than ever	▪ Current salt consumption is ½ the amount consumed from 1812 to the end of WWII (18-20g salt/day)
2. The data on sources of salt is very solid (77% from processed foods)	▪ Mattes (1991), a total cohort of 62 people using dietary recall, from which only 20 responses were used.
3. Our salt consumption continues to rise	▪ No change since the mid-1950s (Bernstein and Willett)

Ten Salt Myths

4

4 - Finland a successful model of salt reduction?

The Finnish experience is easily captured in these figures taken from the paper:

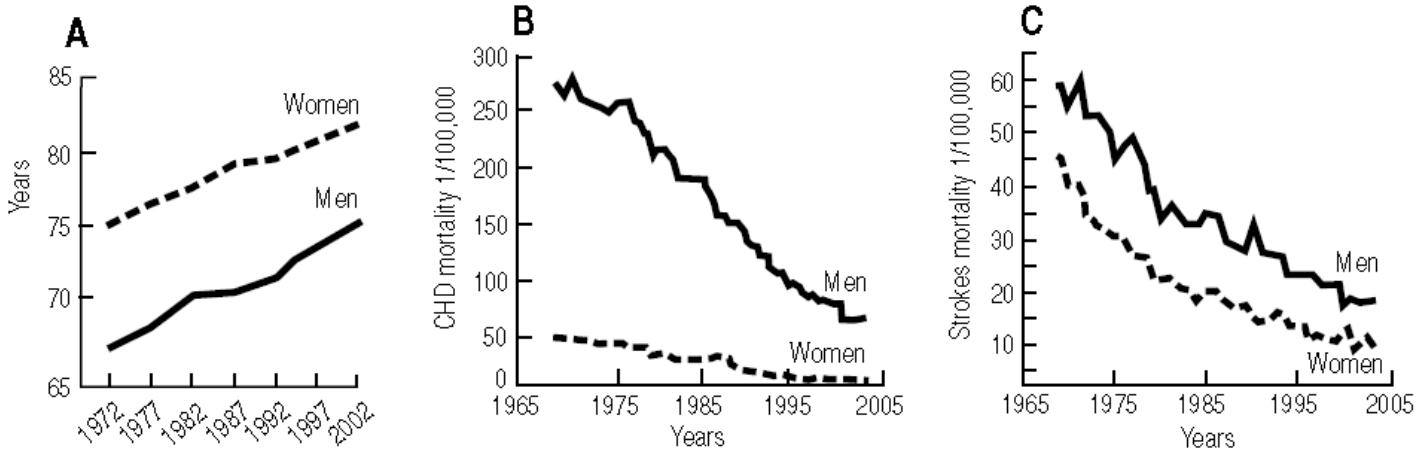


Fig. 1 Life expectancy (panel A), the age-standardized coronary heart disease mortality rate (panel B), and the age-standardized stroke mortality rate in Finland (panel C. Numeric values from Refs. [41, 42] and the Finnish Cardiovascular Disease Register (http://www.ktl.fi/cvdr/) were used for the illustration.

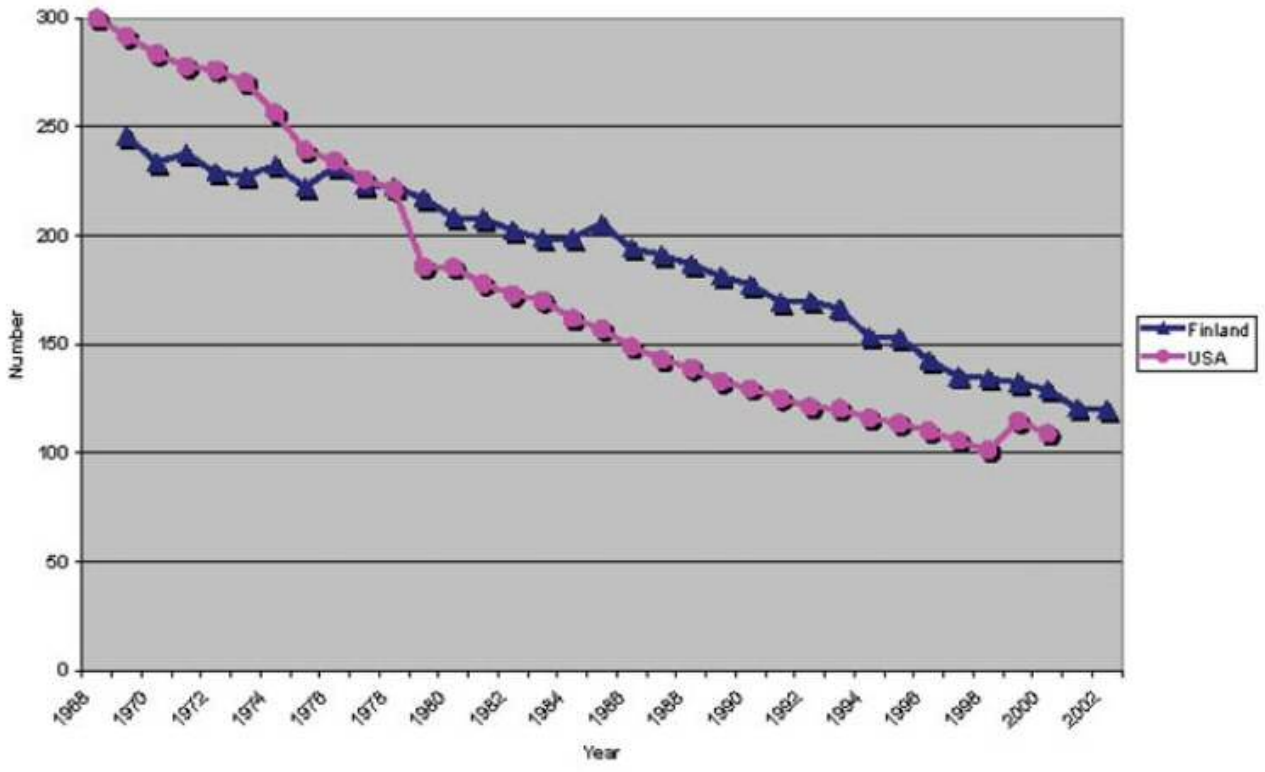
Compared to….?

Ten Salt Myths

4

Finland did not do well compared to other countries during the same time period.

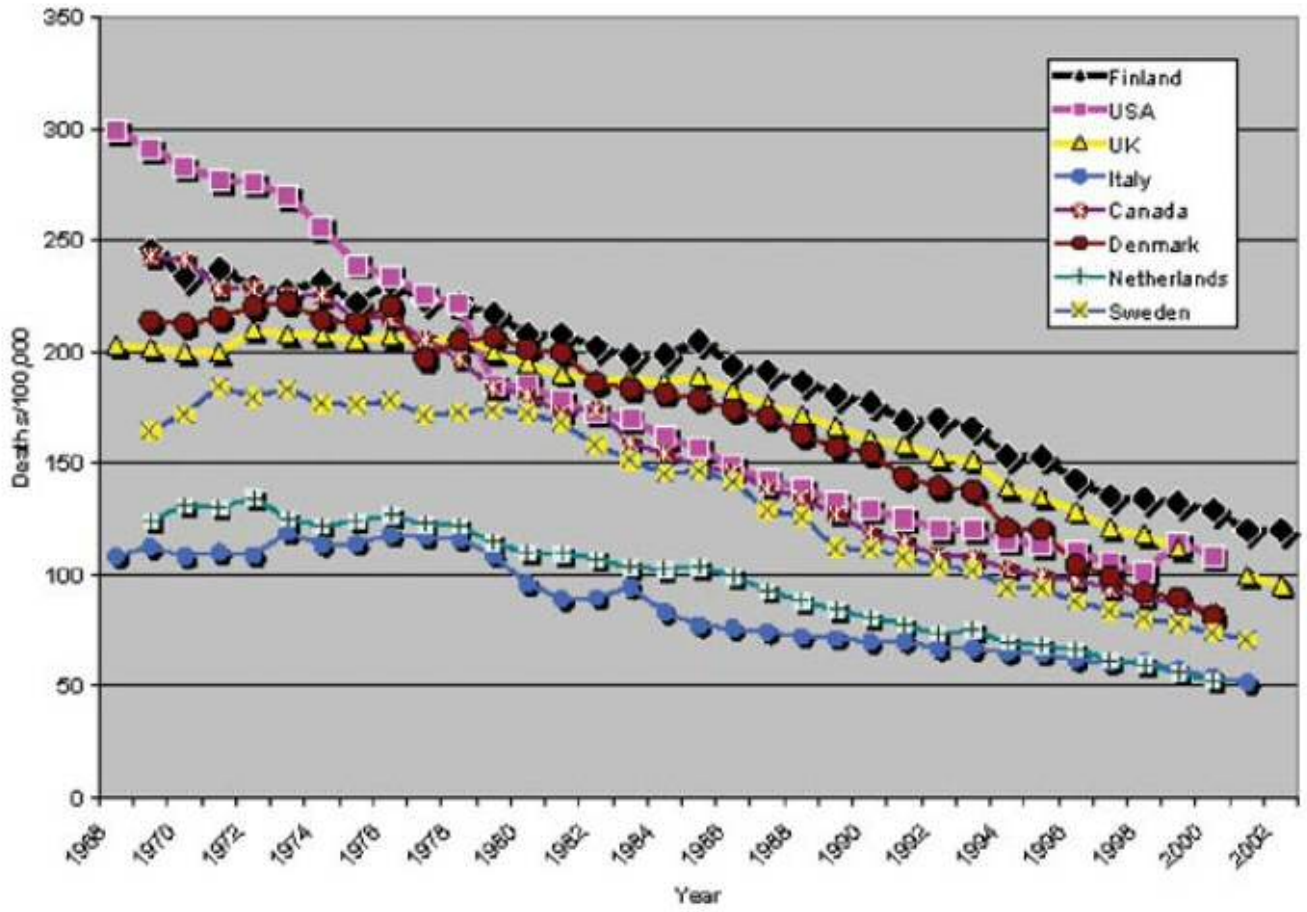
Fig. 3 Age-Standardized Death Rate Ischaemic Heart Disease (per 100,000)



Ten Salt Myths

Finland did not do well compared to other countries during the same time period.

Fig. 5 Ischaemic Heart Disease



Ten Salt Myths

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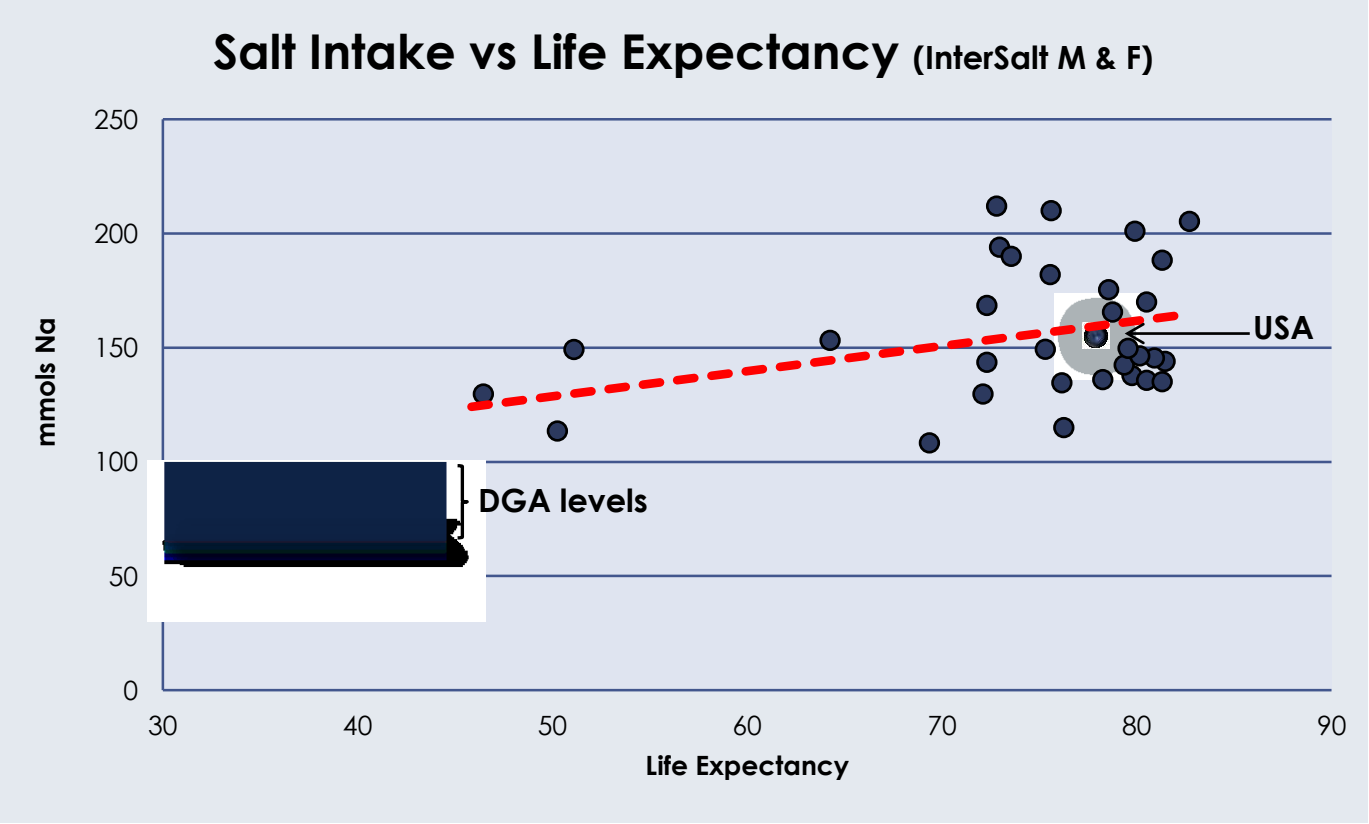
5 - Current levels of salt consumption result in premature cardiovascular disease and death?

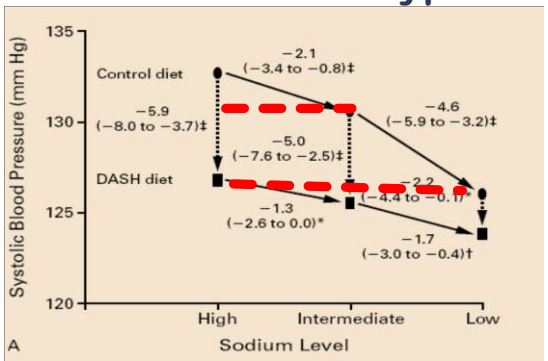


Just where on the line should USA position itself?

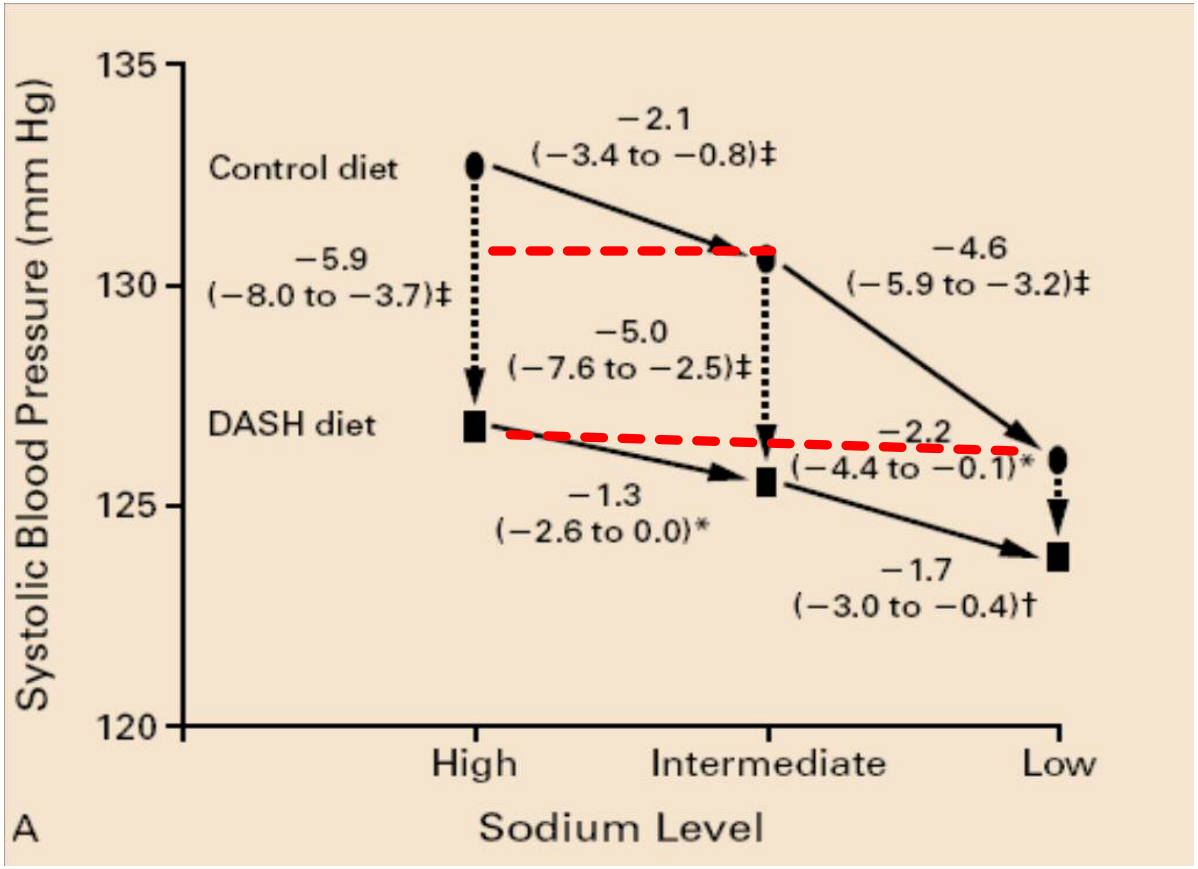
Ten Salt Myths

6 7 8

Myth	Fact
6. Cutting back on salt will improve the overall diet	▪ Salt makes the bitter phytochemicals in salads and vegetables more palatable
7. The heart-healthy Mediterranean diet is low sodium	▪ The Mediterranean diet has 40% more salt than the US diet
8. Low-sodium is key to DASH diet	▪ DASH diet curve ⇧ hypertensives



DASH Sodium Trial



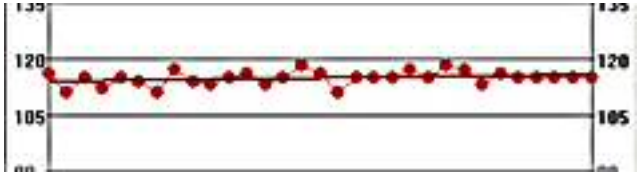
Ten Salt Myths

9

9. Is there a tangible relationship between salt intake and blood pressure?

- 3 liters of 0.9% NaCl/day
  - 27g salt/day + 6 g in food
    =33g salt/day
    = 5 ½ times DG max
- BP checked every 4-6 hrs
  - all is normal

Saline drip



Ten Salt Myths

10

10. Reducing salt intake can do no harm

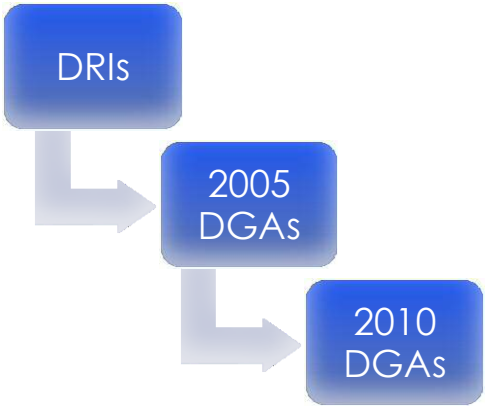
- Insulin resistance (diabetes)
- Metabolic syndrome
- Increased cardiovascular mortality and readmissions
- Cognition loss neonates and older adults
- Unsteadiness, Falls
- Fractures
- Lifelong avidity for salt
- Other…

And an extra myth for good measure

11

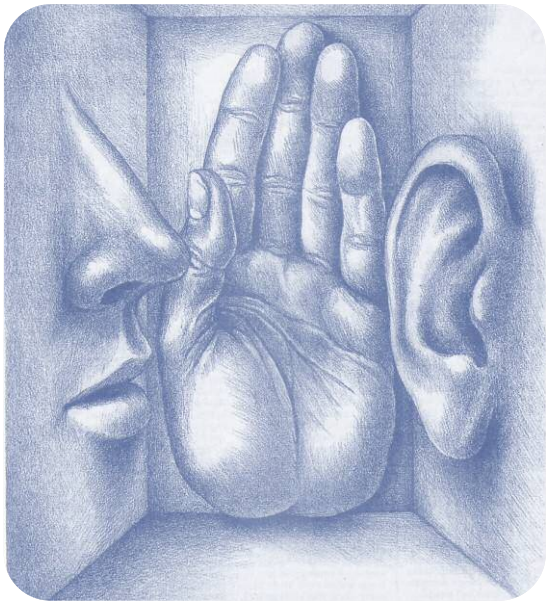
11. The Dietary Guidelines process is objective

Can an objective analytical process feature **one** individual piloting the creation of standards (DRIs) and then being charged with evaluating **his own** recommendations five years later, and then being tasked once again to evaluate **his prior** evaluations?



The key drivers of the salt debate

- Dietary Guidelines?
- Institute of Medicine?
- Centers for Disease Control?
- CSPI?
- Food Industry?
- New York City?
- Salt Industry?



What are the conflicts of interest?

Industry

- **Food Industry**
  - ✧ Unconvinced that science supports salt reduction
  - ✧ Reformulation to take advantage of perceived public opinion
  - ✧ An attempt to turn a lemon into lemonade
- **Restaurant, Foodservice**
  - Salt is the primary ingredient in kitchen
- **Salt Industry**
  - Food salt is 5% of total salt volume produced
  - Skeptical of potential impact (processing salt vs table salt)
  - Unconvinced that science supports salt reduction
  - Limited resources to throw into the debate

-WASH-

World's leading salt-reduction activist group

Science sticks to the letter, but outrage sells much better!

WASH
World Action on Salt & Health

Home | Salt & Health | Evidence | Publications | Media Centre | World Action | Salt Awareness Week | Contact Us

Introduction
History
Our aims
Members
Consensus Action on Salt & Health (UK)
Resources list
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Aims

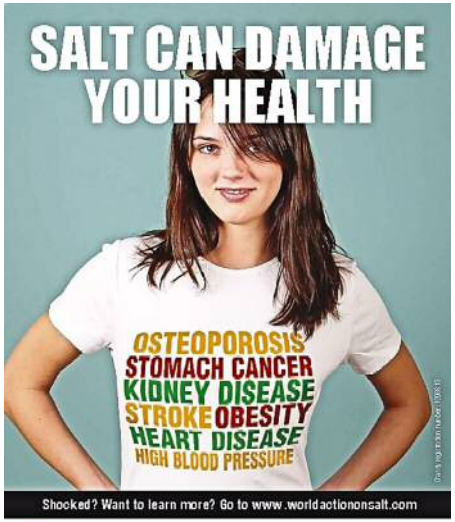
Our Mission

World Action on Salt and Health's mission is to achieve a reduction in dietary salt intake around the world from the current intake of 10-15g/day to the World Health Organisation (WHO) target of 5g/day. This fall in salt intake and the resulting fall in blood pressure would lead to major reductions in both incidents of, and deaths from Cardiovascular Disease (CVD) i.e. stroke, heart failure and heart attacks, with a major reduction in the disability that results from CVD.

Our Aims

Food Industry:

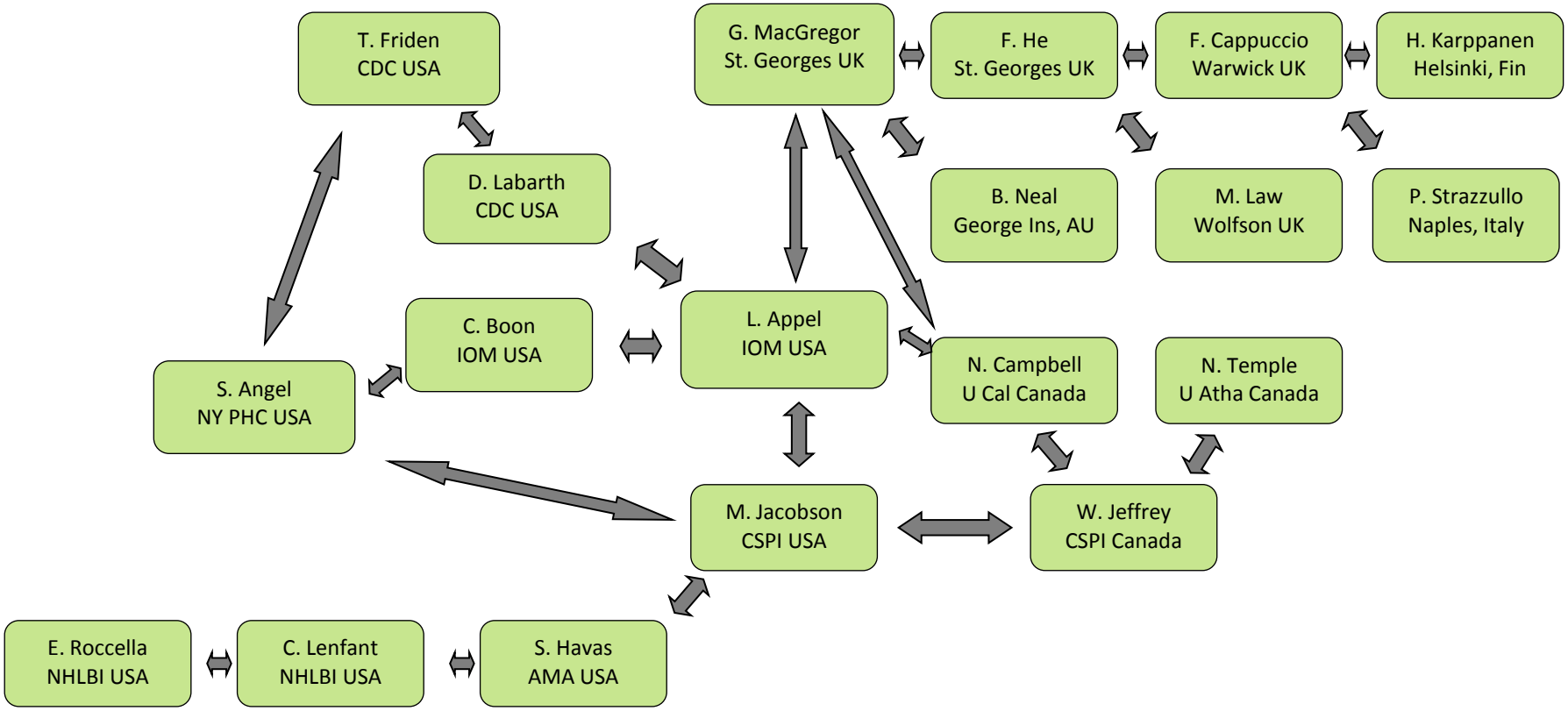
- To reach a consensus with the food manufacturers that there is strong evidence that salt is a major cause of high blood pressure and has other adverse health effects such as osteoporosis and stomach cancer;
- Act as a global monitor highlighting internationally marketed products that are high in salt;
- Persuade international food companies to employ a global salt reduction plan, so that not only will the salt content of their processed food products be reduced but it will be uniform in each country they market in;
- To ensure a standard clear and comprehensive front of pack nutritional labelling system, for



WASH
World Action on Salt & Health

World Salt Awareness Week
February 1st - February 7th 2010
www.worldactiononsalt.com

World's Leading Salt Reduction Researcher/Advocates



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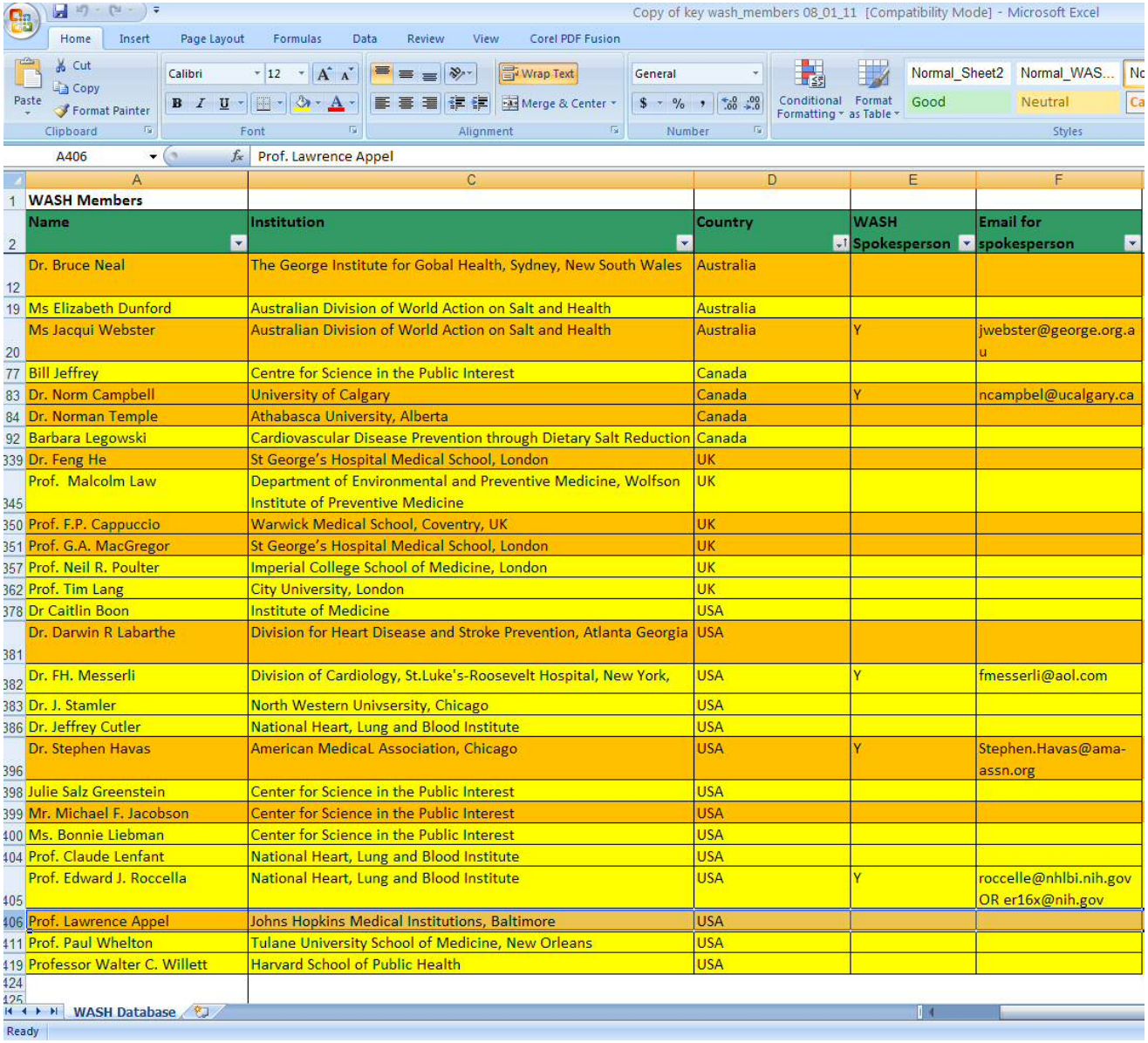

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Cell A406: Prof. Lawrence Appel

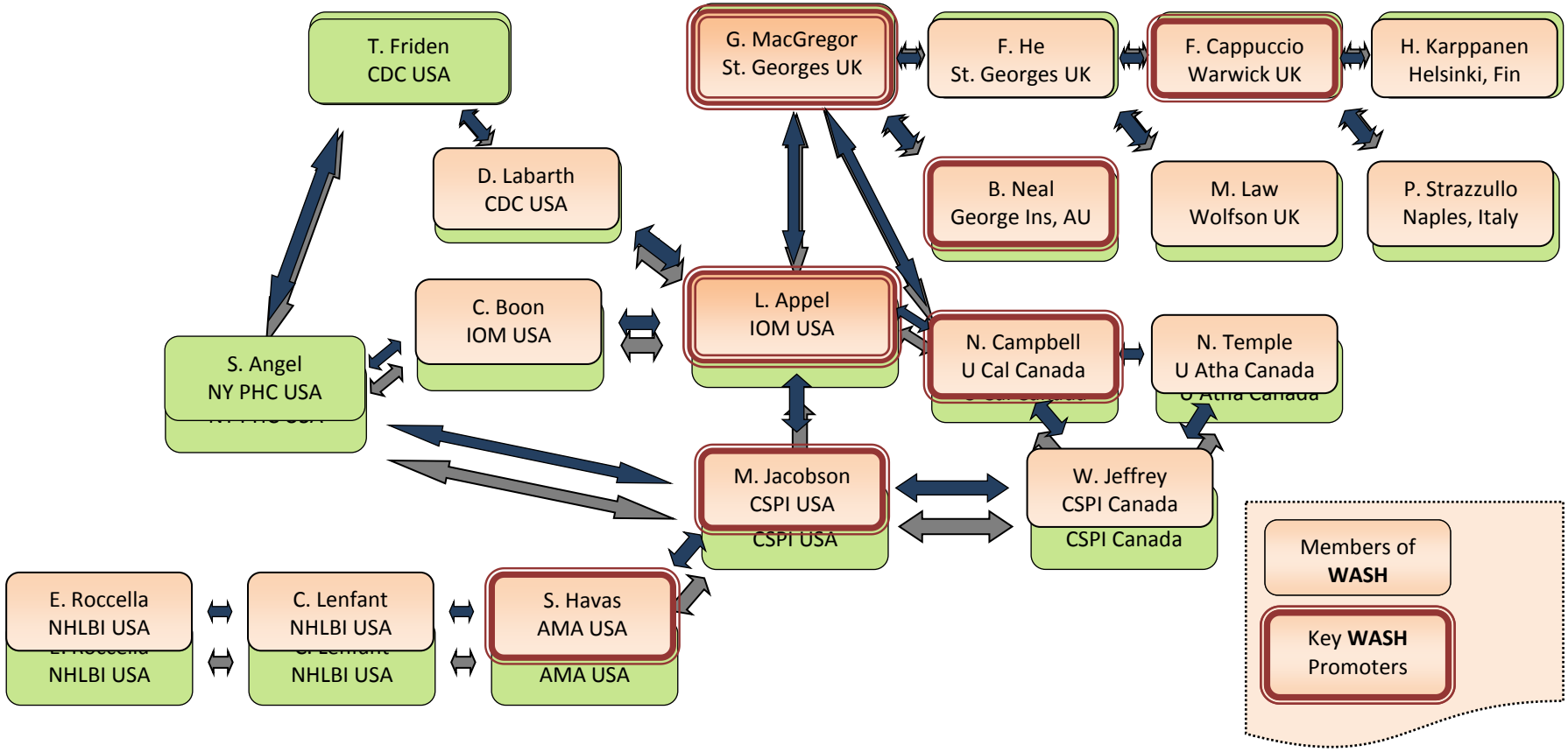
	A	C	D	E	F
1	WASH Members				
2	Name	Institution	Country	WASH Spokesperson	Email for spokesperson
12	Dr. Bruce Neal	The George Institute for Gobal Health, Sydney, New South Wales	Australia		
19	Ms Elizabeth Dunford	Australian Division of World Action on Salt and Health	Australia		
20	Ms Jacqui Webster	Australian Division of World Action on Salt and Health	Australia	Y	jwebster@george.org.au
77	Bill Jeffrey	Centre for Science in the Public Interest	Canada		
83	Dr. Norm Campbell	University of Calgary	Canada	Y	ncampbel@ucalgary.ca
84	Dr. Norman Temple	Athabasca University, Alberta	Canada		
92	Barbara Legowski	Cardiovascular Disease Prevention through Dietary Salt Reduction	Canada		
339	Dr. Feng He	St George's Hospital Medical School, London	UK		
345	Prof. Malcolm Law	Department of Environmental and Preventive Medicine, Wolfson Institute of Preventive Medicine	UK		
350	Prof. F.P. Cappuccio	Warwick Medical School, Coventry, UK	UK		
351	Prof. G.A. MacGregor	St George's Hospital Medical School, London	UK		
357	Prof. Neil R. Poulter	Imperial College School of Medicine, London	UK		
362	Prof. Tim Lang	City University, London	UK		
378	Dr Caitlin Boon	Institute of Medicine	USA		
381	Dr. Darwin R Labarthe	Division for Heart Disease and Stroke Prevention, Atlanta Georgia	USA		
382	Dr. FH. Messerli	Division of Cardiology, St.Luke's-Roosevelt Hospital, New York,	USA	Y	fmesserli@aol.com
383	Dr. J. Stamler	North Western Univsersity, Chicago	USA		
386	Dr. Jeffrey Cutler	National Heart, Lung and Blood Institute	USA		
396	Dr. Stephen Havas	American MedicaL Association, Chicago	USA	Y	Stephen.Havas@ama-assn.org
398	Julie Salz Greenstein	Center for Science in the Public Interest	USA		
399	Mr. Michael F. Jacobson	Center for Science in the Public Interest	USA		
400	Ms. Bonnie Liebman	Center for Science in the Public Interest	USA		
404	Prof. Claude Lenfant	National Heart, Lung and Blood Institute	USA		
405	Prof. Edward J. Roccella	National Heart, Lung and Blood Institute	USA	Y	roccelle@nhlbi.nih.gov OR er16x@nih.gov
406	Prof. Lawrence Appel	Johns Hopkins Medical Institutions, Baltimore	USA		
411	Prof. Paul Whelton	Tulane University School of Medicine, New Orleans	USA		
419	Professor Walter C. Willett	Harvard School of Public Health	USA		

WASH Database

Ready

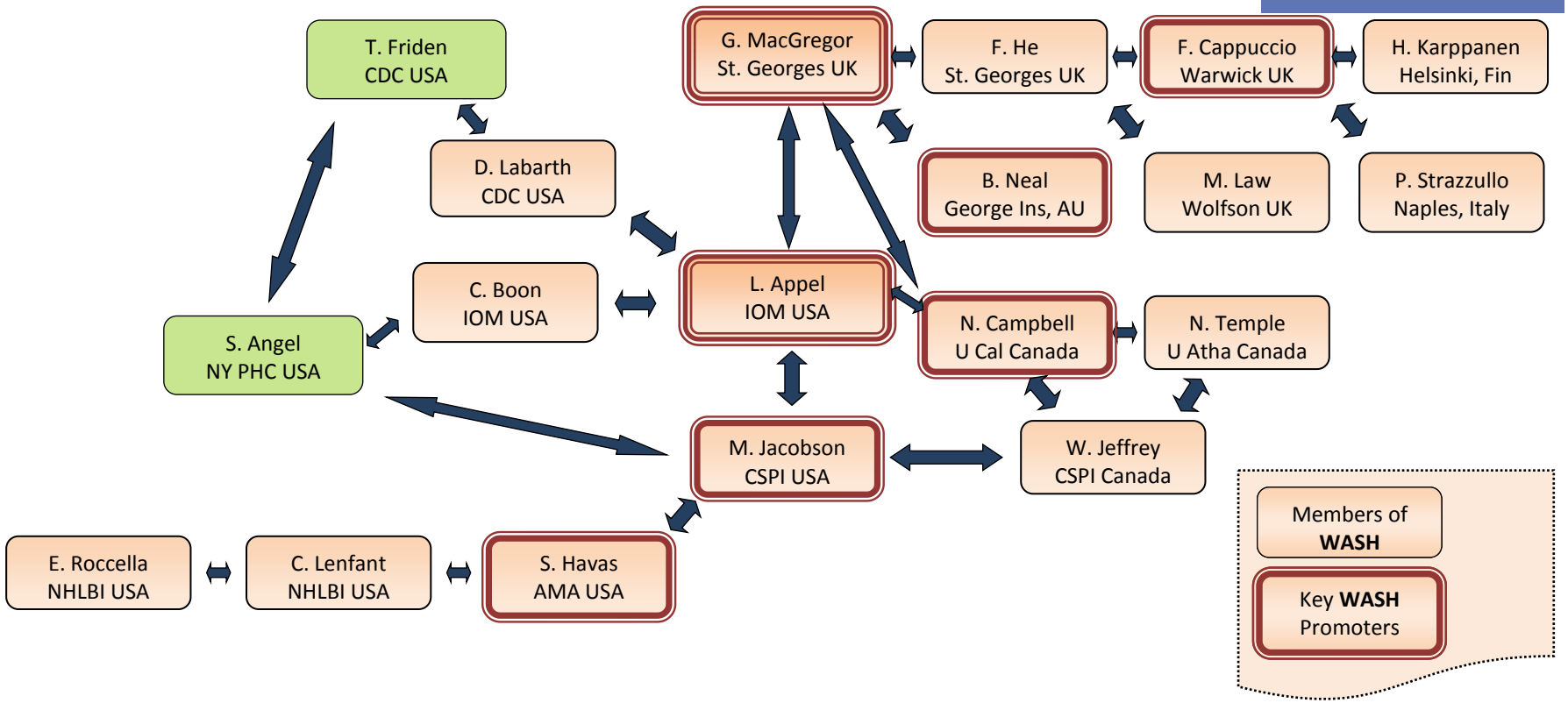
- Anyone committed to a cause should be free to join an advocacy group.
- Commitment to a cause is a reflection of ones' intellectual passion.
- Intellectual passion is now considered to be a prime driver of conflict of interest.

World's Leading Salt Reduction Researcher/Advocates



World's Leading Salt Reduction Researcher/Advocates

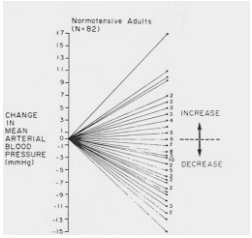
Science may stick to the letter, but outrage sells a lot better!

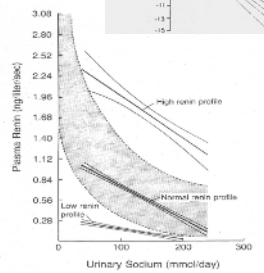


In all of their publications, <u>not a single individual</u> ever lists WASH as a competing interest. They all portray themselves as fully objective researchers on the subject of salt and health.

In preparing the DRIs what did they know and when did they know it?

- *The heterogeneity of BP response to salt reduction - known and ignored in DRIs*
- *The renin response to reduced salt intake - known and ignored in DRIs*
- *Exclusive focus on blood pressure rather than health outcomes - known and ignored in DRIs*
- *Contradictory nature of all the results as expressed in various meta-analyses - known and ignored in DRIs*





Science
or
Ideology?

Policy Issues

- What will salt reduction do to the diet?
- What will be impact on obesity epidemic?
- Is salt reduction a sound public health policy or is it risky?
- When is a population-wide intervention a massive clinical trial?
- Where to go from here?

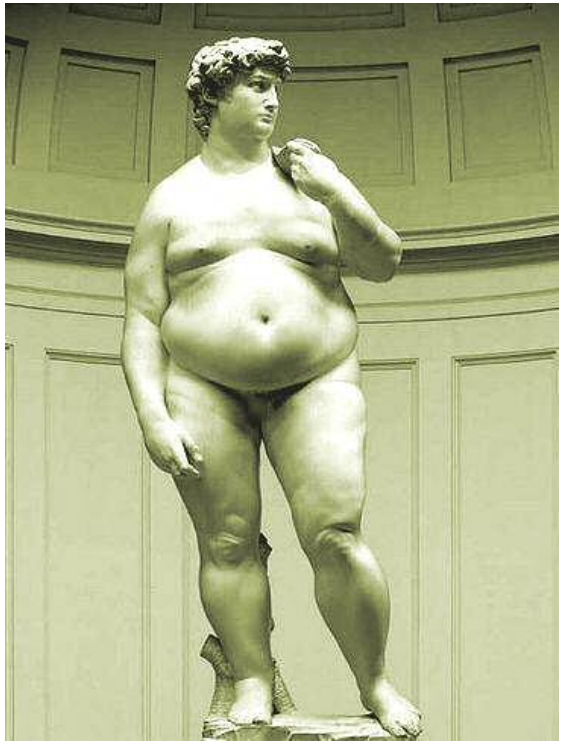
What will the impact of salt reduction be on the diet?

- How will salt reduction affect food choices?
  - Diet improvement or deterioration?
  - *More salads and vegetables or less?*

  - *The word SALad is derived from the Latin root Sal or salt and means salted vegetables. High salt intakes and good CV health are not mutually exclusive*
    - *e.g. Mediterranean diet – high salt, great CVD metrics*

What will be the impact of salt reduction on obesity?

The Mediterranean diet



The Reduced Salt diet?

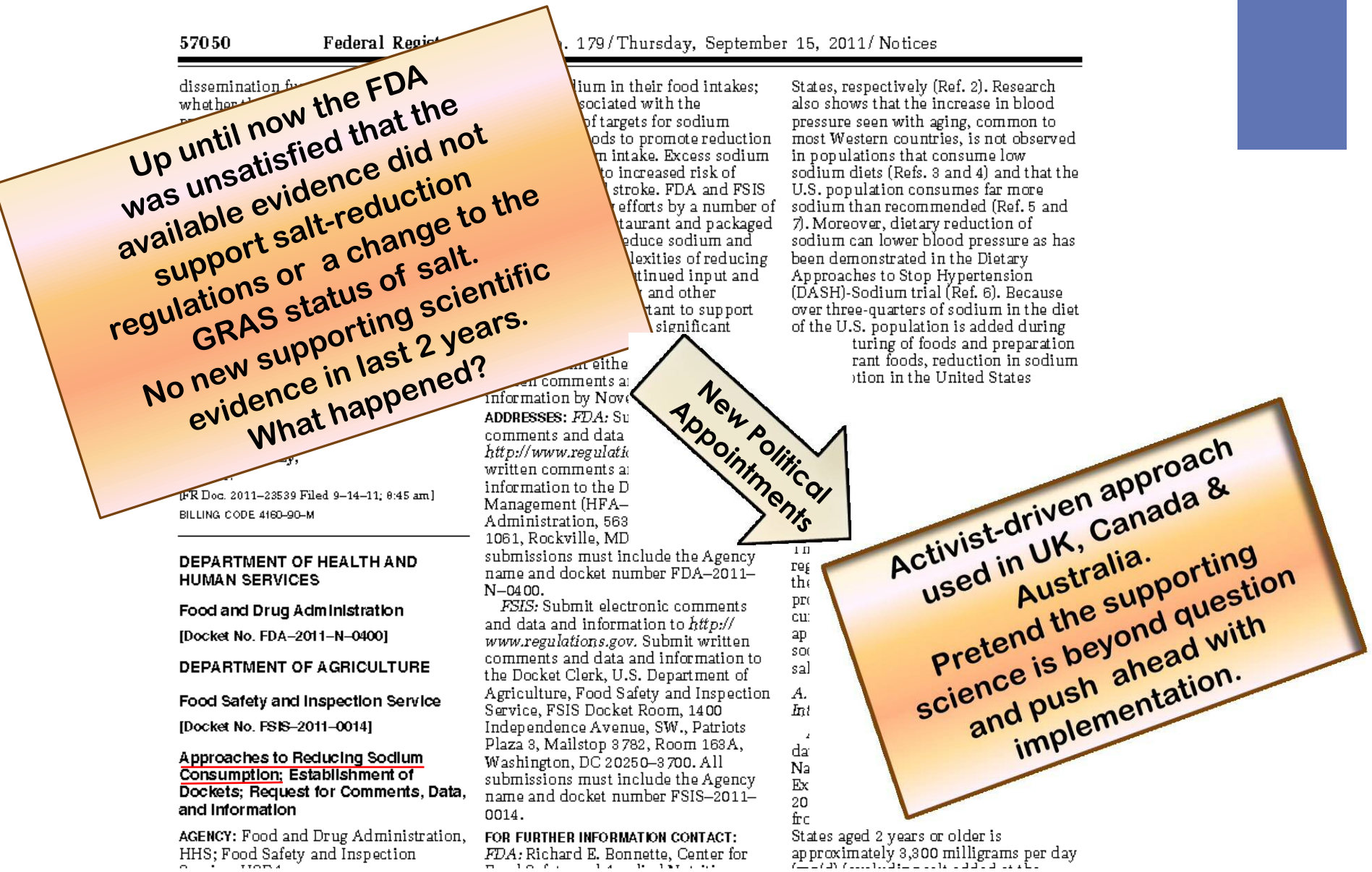
Lite cigarettes ↑
Lite beer ↑
Low Fat Foods ↑
Low Cal Beverages ↑
Reduced salt in animal feed stimulates greater consumption
Low Salt Varieties ?

-Salt Reduction- A Trojan Horse of Dietary Policy

- Attractive on surface
  - 2 - 6mmHg reduction in BP for hypertensives
- Hidden are the risks of elevated renin-aldosterone system (RAS) on overall health outcomes
  - Insulin resistance
  - Metabolic syndrome
  - Cardiovascular Disease
  - Cognition loss
  - Unsteadiness, falls, etc.

Beware of Bureaucrats Bearing Gifts

FDA finally caves in



Implementing a salt reduction strategy

- Will population-wide salt reduction be a trial?
  - There is no precedent for the recommended salt levels anywhere in the world or in recorded history.
  - Even the IOM "Strategies to reduce the sodium intake of Americans" states in their 'stepwise' reduction strategy that an analysis for any unintended consequences be carried out at every stage.

If it looks like a trial, smells like a trial and tastes like a trial

chances are……

It's a trial!

- A trial on 300 million Americans without their knowledge and consent.

Where should we go from here?

It's time to drop the posturing, the finger pointing and the institutional pretense - they are not substitutes for evidence.

It's time for a long-term, large-scale, randomized clinical trial on the impact of salt reduction on overall health outcomes!

Consumers deserve no less.

Thank you!

Mort Satin
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Salt Institute
Alexandria, VA

Chicago IFT OctoberFest Meeting
October 10, Chicago, IL