

The Benefits of Reducing Salt Intake

*LA Health Collaborative Meeting
Thursday, February 26, 2009*

Jonathan E. Fielding, M.D., M.P.H., M.B.A
Director of Public Health and Health Officer
Los Angeles County Department of Public Health



Overview

- Magnitude of the blood pressure problem
- Burden of blood pressure-related chronic disease
- Trends in population salt (sodium chloride) intake
- The impact of reducing population salt intake on blood pressure and related health conditions
- The potential impact of reducing population salt intake on morbidity and mortality in the U.S., and locally in Los Angeles County
- The national initiative to reduce salt intake in the U.S. population



Magnitude of the Blood Pressure Problem

- Lifetime risk of developing hypertension (BP \geq 140/90 mm Hg) is 90%
- 62% of strokes and 49% of cardiovascular events attributed to elevated blood pressure¹
- Cardiovascular risk increases as blood pressure moves above 115/75 mm Hg
- Significant disparities exist in the prevalence and burden of hypertension-related disease by age and other subgroups
- The lower a person's blood pressure, the lower his/her risk of heart disease and stroke (*EVEN IF THE PERSON DOES NOT HAVE HYPERTENSION*)

¹WHO. *World Health Report 2002: Reducing Risks, Promoting Healthy Life*



Consequences of Elevated Blood Pressure

- Increased risk of cardiovascular disease (CVD)
 - ↑ strokes
 - ↑ heart attacks
 - ↑ heart failure
- Increased risk of renal disease
 - ↑ chronic kidney disease (CKD)
 - ↑ progression of proteinuria
(especially among those with diabetes)
 - ↑ end stage renal disease (kidney failure)



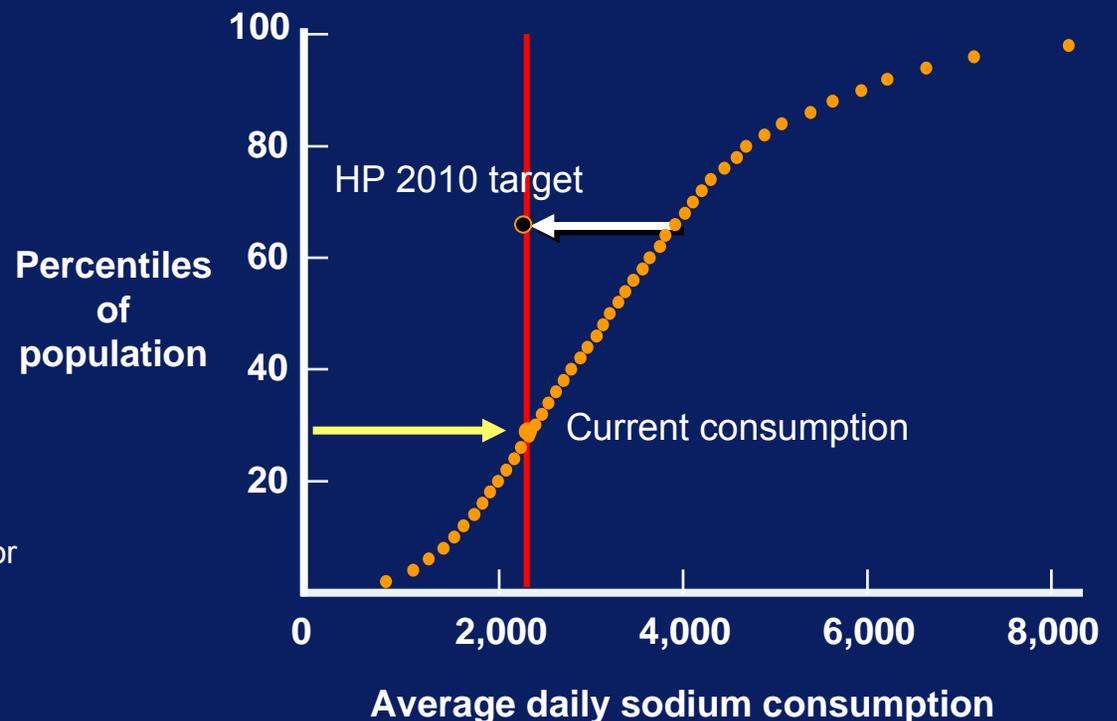
Current salt intake is much higher than recommended

- Average adult sodium intake is $> 3,400$ mg/day*
- Only 30% of adults consume $\leq 2,300$ mg/day**
- Big shift in curve won't happen by itself

*Source: National Health and Nutrition Examination Survey (NHANES), 1999-2004.

**HealthyPeople 2010 Target: $< 2,400$ mg daily for 65% of the population

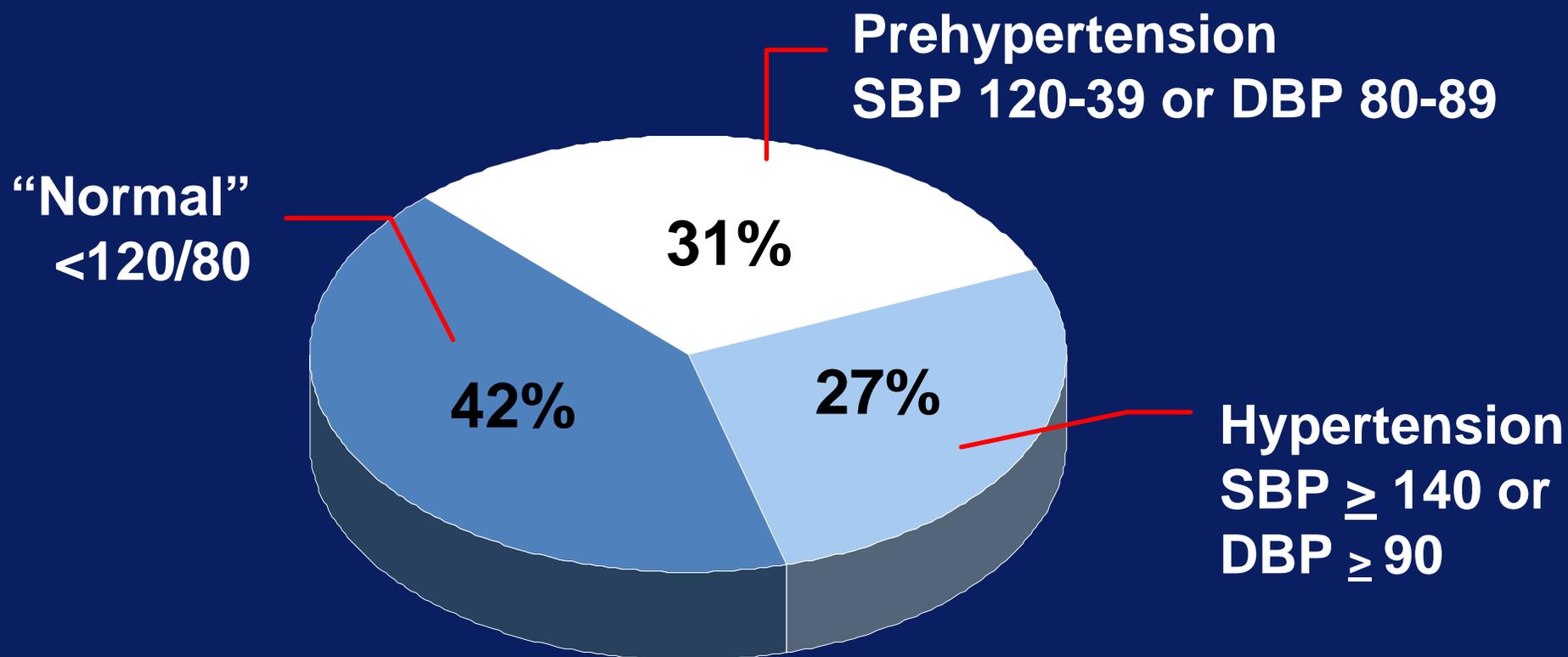
Percentiles of daily sodium consumption among US adults (2004)



Blood Pressure, Cardiovascular Disease, and Stroke



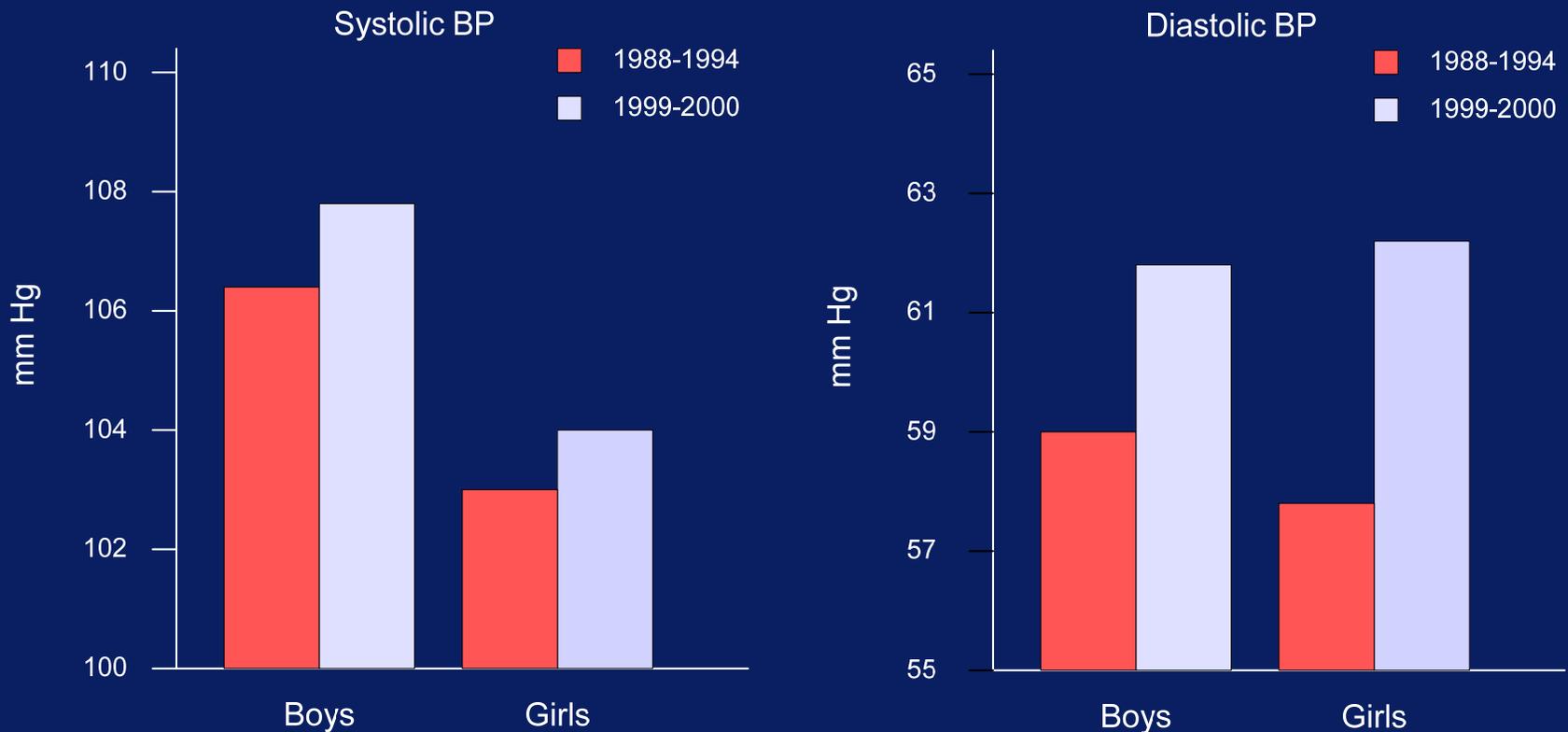
Distribution of BP Levels in U.S. Adults, Ages 18 and Older (NHANES III)



Source: Wang, *Hypertension*, 2004



Blood Pressure Trends: Children and Adolescents, Ages 8-17 Years



Source: Comparison of NHANES III (1988-1994) and NHANES (1999-2000); Muntner et al. *JAMA* 2004;291:2107-2113.



Costs of hypertension-related conditions in the United States

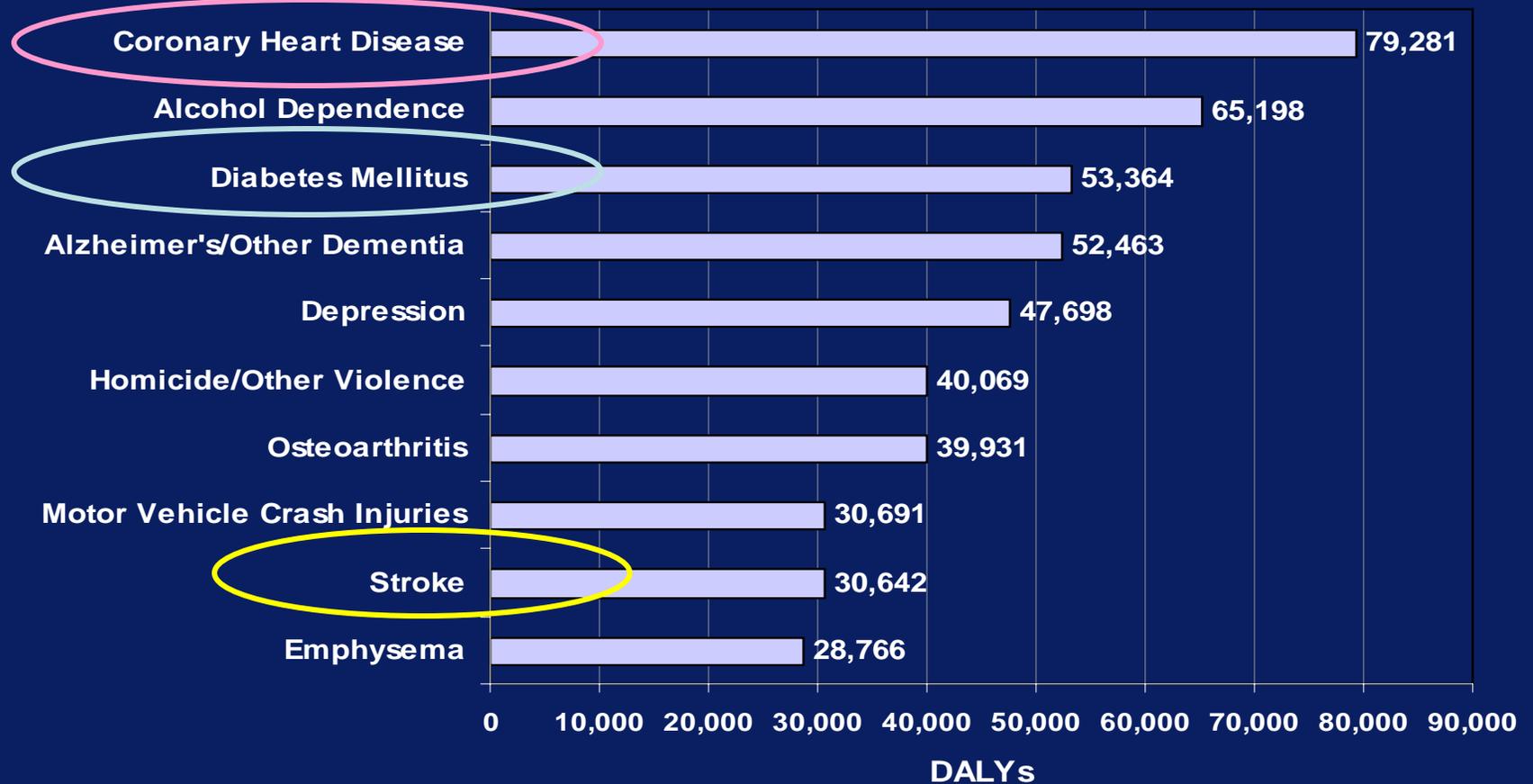
- Direct and indirect costs of cardiovascular diseases (CVD) (United States, 2005)¹
 - ◆ Total: ~ \$400 billion
 - strokes (\$57 billion)
 - heart diseases (\$255 billion)
 - heart failure (\$28 billion)
 - other hypertensive diseases (\$60 billion)
- Annual Medicare costs of renal disease (U.S. Renal Data System, 2002)²
 - ◆ Chronic kidney disease (CKD): \$16,476/person
 - ◆ Kidney failure (on dialysis): \$62,676/person



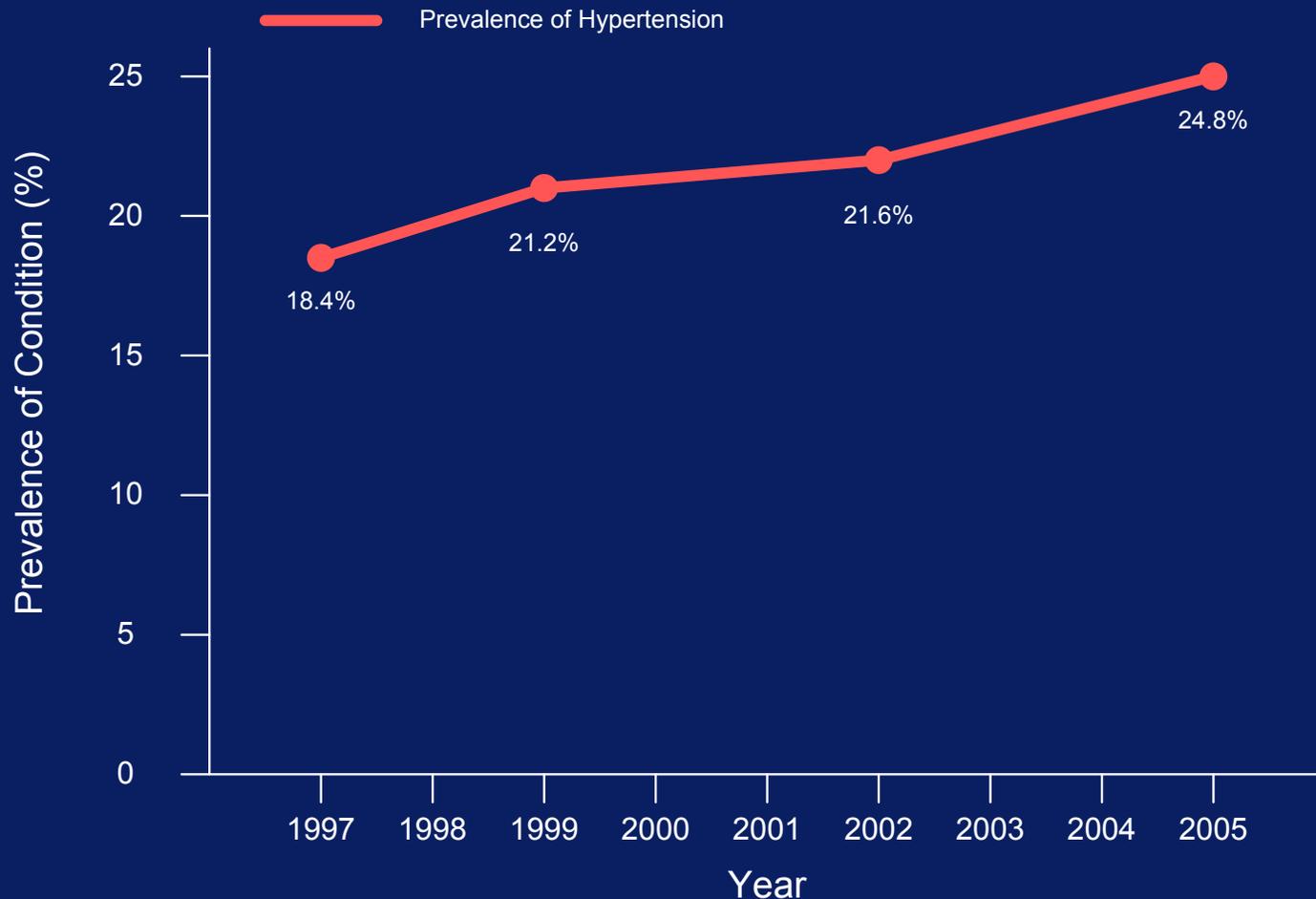
BP-related Morbidity and Mortality in Los Angeles County



Leading Causes of Disability-Adjusted Life Years (DALYs) in Los Angeles County, 2005



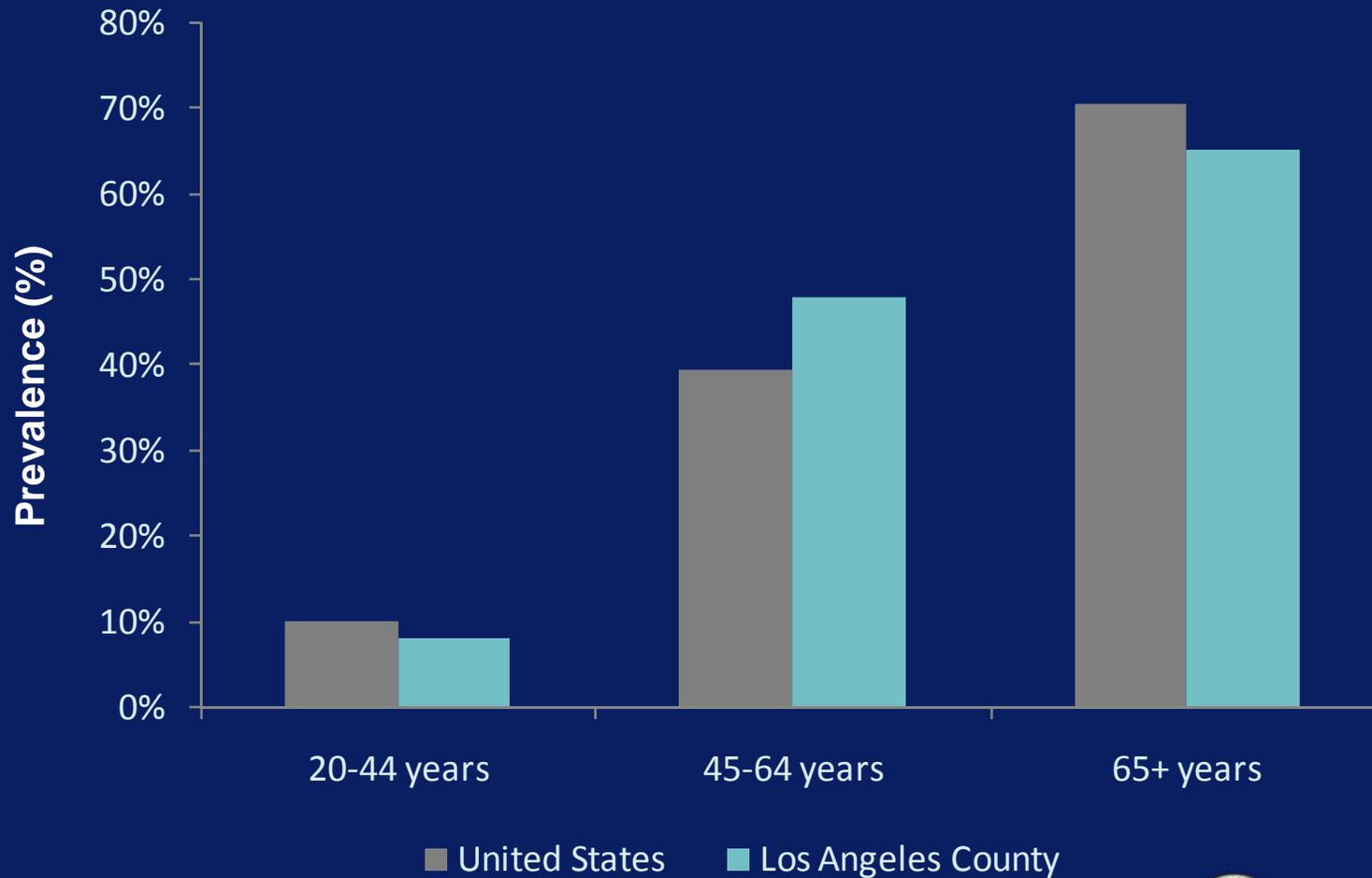
Prevalence of Hypertension among Adults in Los Angeles County: 1997 - 2005



Source: Los Angeles County Health Survey, 1997-2005



Hypertension by Age Group in Los Angeles County and the U.S.



Source: NHANES, 2005



Hospital Admissions for Hypertension-related Conditions in Los Angeles County, 2005

ICD-9 diagnosis	No. admissions	No. mentioned diagnosis during admission
Acute myocardial infarction	14,069	7,994
Coronary heart disease	36,295	145,236
Heart failure	27,320	79,789
Stroke	13,544	12,824
Chronic kidney disease	398	21,235
End-stage renal disease	95	6,805
Total	104,003	324,617

Source: OSHPD, 2005



Salt ***(Sodium Chloride)***

Dietary Sources, Taste, Trends



Forms of Sodium in the Food Supply

- 90% of sodium consumed as sodium chloride (salt)
- Other forms:
 - sodium bicarbonate
 - sodium in processed foods, such as sodium benzoate and sodium phosphate
- “Salt intake” = sodium consumption in the population

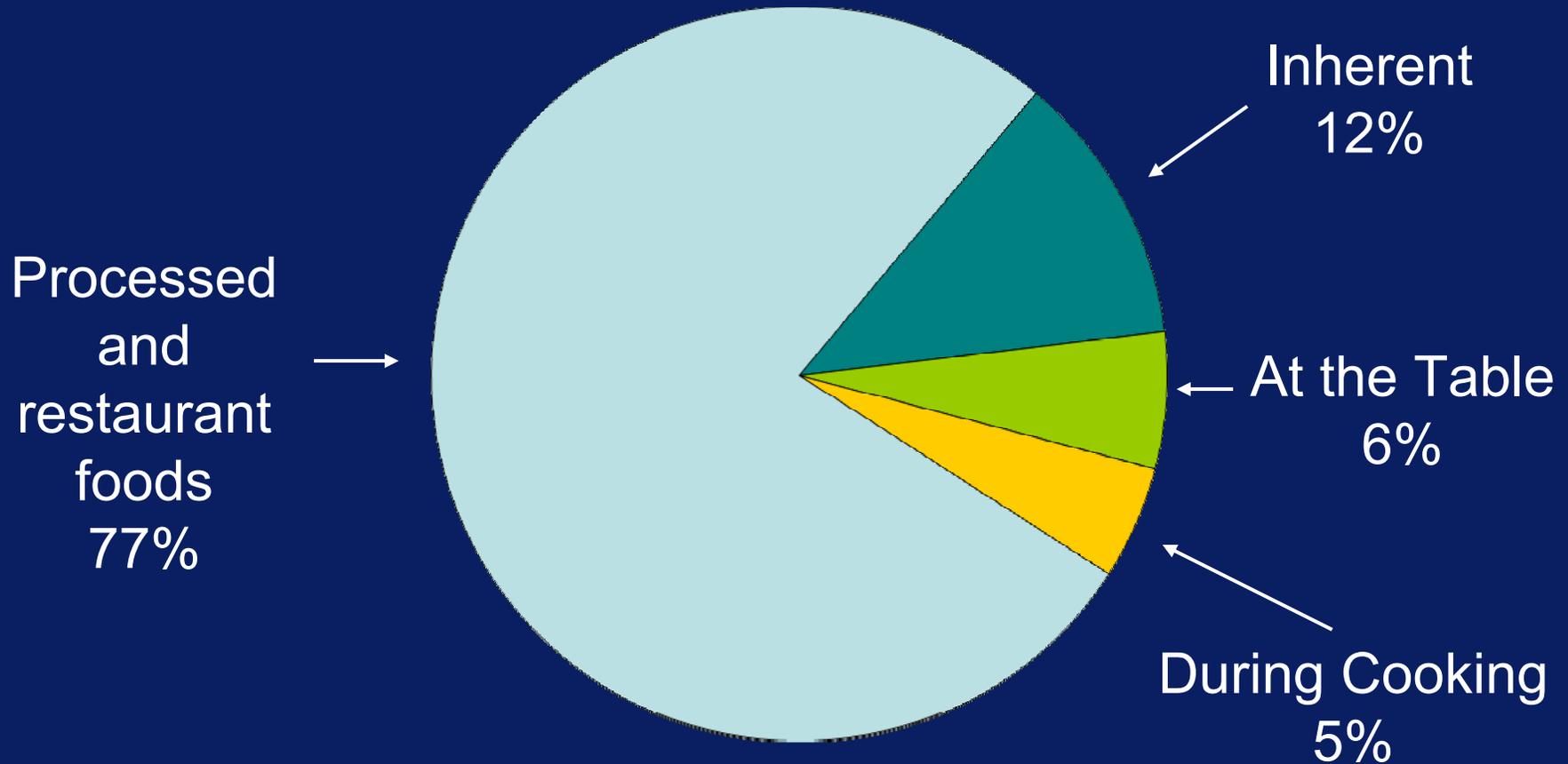


How much sodium is actually needed?

- Minimum needed 500 mg/day
- Dietary Reference Intake for Adults:
 - Tolerable Upper Limit – 2,300 mg/day (100 mmol)
 - Adequate Intake – 1,500 mg/day (65 mmol)
- Average adult sodium intake in U.S. is > 4,000 mg/day
- Sodium content in processed and restaurant foods varies a lot, and may be difficult for consumers to tell...
 - When eating out, low calorie doesn't always mean low sodium
 - Varies for similar products between countries



Sources of Dietary Sodium



(Data from 62 adults who completed 7-day dietary records)

Mattes and Donnelly. *JACN*. 1991;10:383



U.S. Food Grade Salt Sales

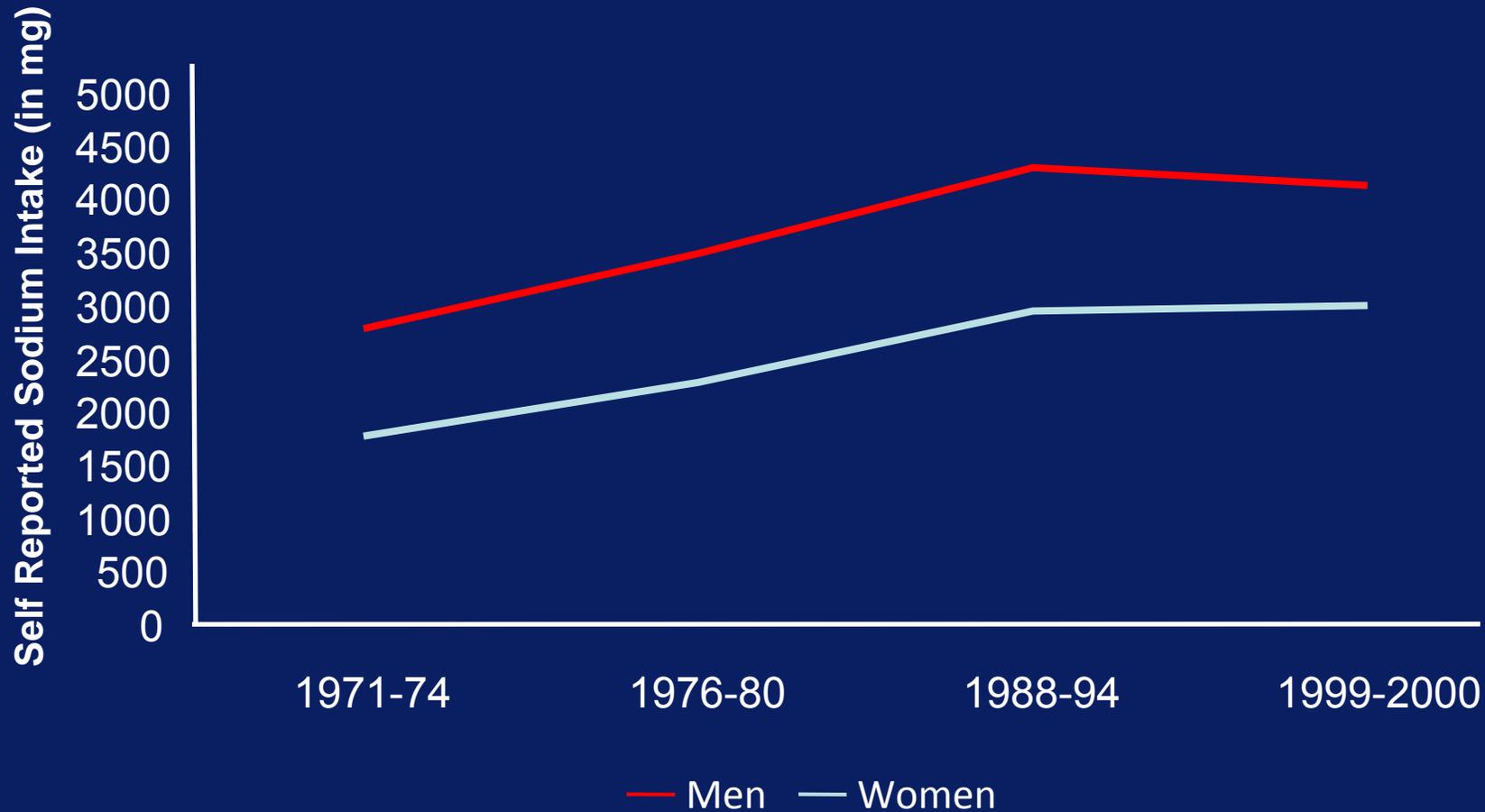
Increasing Use of Salt in the United States



Source: www.saltinstitute.org, accessed Jan. 15th, 2009



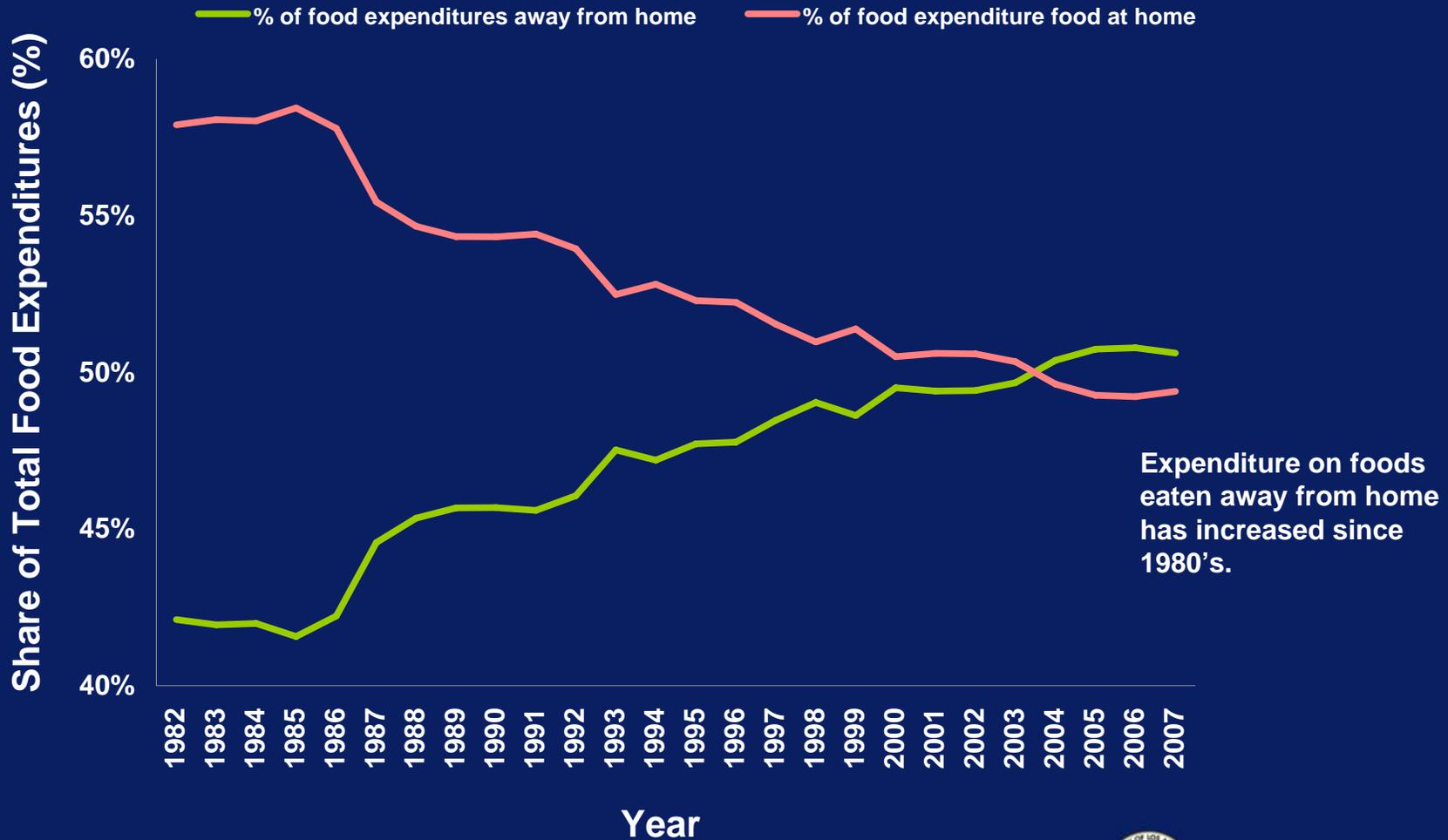
Mean Daily Sodium Intake (in mg) for Men and Women in the U.S., Ages 20-74 Years (NHANES)



Source: NHANES. Estimates are based on self reports and are considered underestimates of mean daily sodium intake for the U.S. population, 1971 to 2000.



Restaurants are an Increasingly Important Source of Food



Source: Food Consumption (Per Capita) Data System, USDA, Economic Research Service.



Eating Out – Low Calorie Doesn't Always Mean Low Sodium



Subway Cold Cut Combo Sandwich (6-inch): 410 calories, **1,530 mg sodium**



Pizza Hut All Natural Pepperoni Pizza (1 slice): 250 calories, **590 mg sodium**



McDonald's Premium Grilled Chicken Classic Sandwich: 420 calories, **1,190 mg sodium**



Eating In – If Cooking or Eating Processed or Pre-Packaged Food



1 serving:
50 calories,
710 mg sodium

Note:
sodium/calories
ratio 14:1



1 serving (1
can):
156
calories,
2,290 mg
sodium



1 serving (1 Tbsp):
10 calories,
920 mg sodium



1 serving (1
container): 300
calories,
1,180 mg
sodium



Sodium Varies for Similar Products between Countries

United States



6-piece Chicken Nuggets
600 mg Sodium
(280 Calories)



United Kingdom



6-piece Chicken Nuggets
280 mg Sodium
(260 Calories)

320 mg less sodium

Is Taste Insurmountable as a Barrier to Reducing Salt Intake?

Potential barriers to adherence to lower salt diets may be hard to overcome...

- Food with less salt affects flavor and palatability
- Salt enhances flavor by suppressing bitterness
- Salt levels are set by the food individuals eat
- Foods that deviate from the customary level of salt may be less preferred

Emerging scientific evidence suggests otherwise...

- Although above factors are valid concerns, recent studies have shown that the level of salt preferred by individuals can be changed gradually over time with relative ease
 - Royal North Shore Hospital Randomized Control Trial
 - Dietary Approaches to Stop Hypertension (DASH) Randomized Crossover Trial

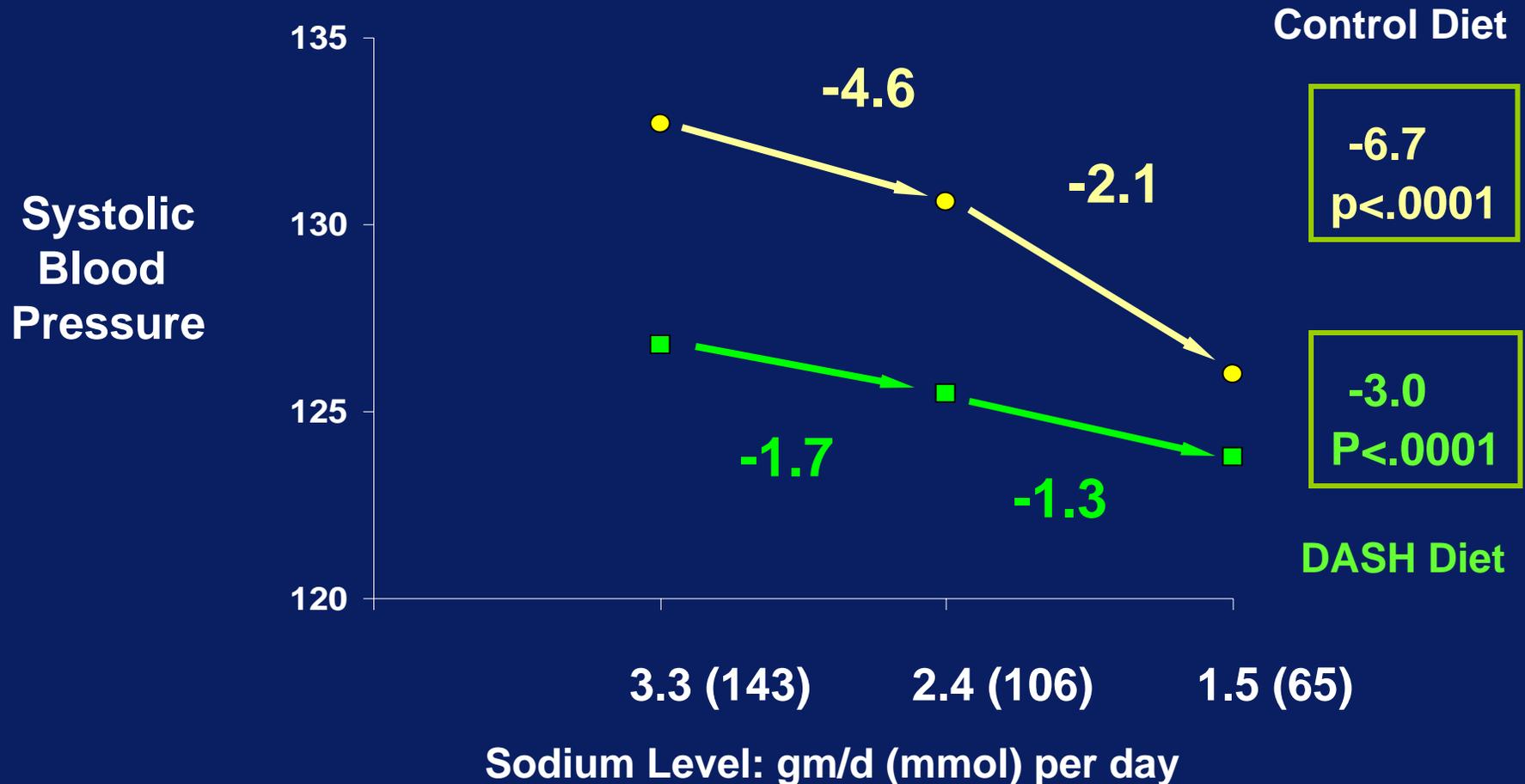
Source: 1) Breslin and Beauchamp. *Nature*. 1997.
2) Bertrino et al. *Am J Clin Nutr*, 1982.



Impact of Reducing Salt Intake in the Population



DASH-Sodium Trial: Effect of Sodium Level on Systolic Blood Pressure, a Dose-Response Relationship



Source: Sacks, 2001 (412 pre- and stage 1 hypertensive adults)



Los Angeles County Dept. Public Health

Health Impact Analysis *(preliminary data)*

- Simulations of scenarios of reduced salt intake and preventable BP rises in the population on stroke, CHD, and total deaths averted



Modeling the Potential Impact of Salt Intake Reduction on Mortality in the Local Population

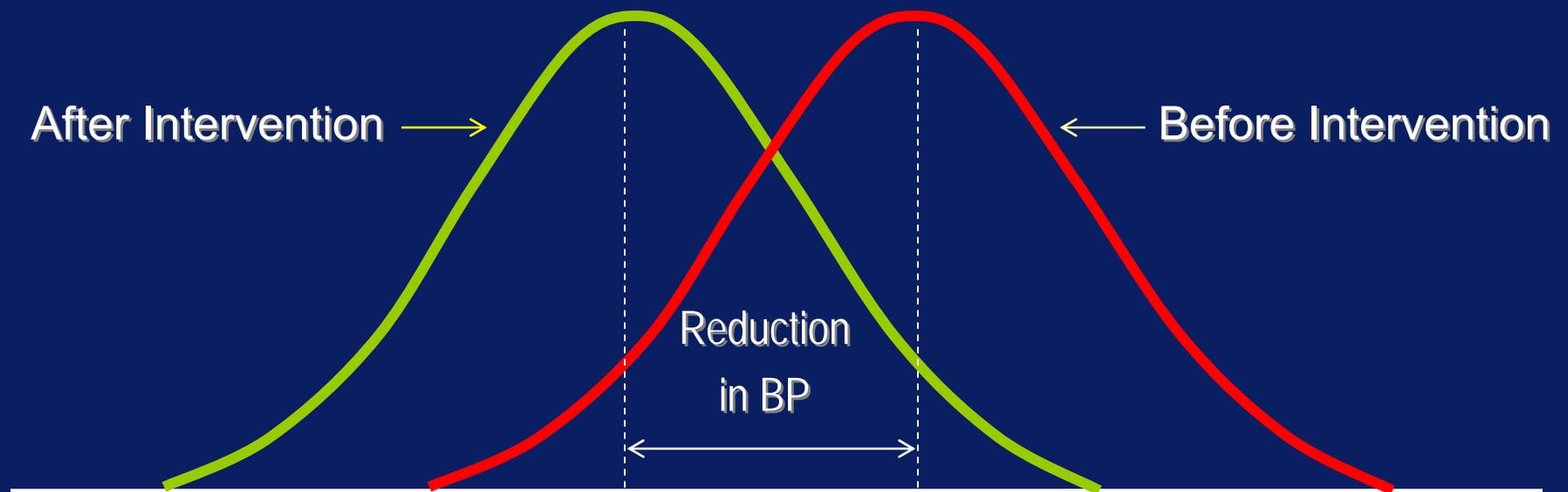
- DPH conducted an analysis to estimate the potential impact of reducing population salt intake on mortality in Los Angeles County
- Outcomes examined: number of stroke, coronary heart disease (CHD), and total deaths averted if different levels of expected SBP rise with age are avoided through population salt reduction
- The analysis examined three scenarios of preventable rises in SBP with age: 5 mm Hg (base case), 3 mm Hg, and 2 mm Hg
- Base case scenario*: a rise of 5 mm Hg in SBP with age in the population would be averted if the industry can achieve the target of 50% reduction in sodium found in processed foods, fast-food products, and restaurant meals. This would represent approximately a 1.3 g/d lower lifetime sodium intake and a 20% reduction in the prevalence of hypertension in the County population.
- Data from multiple sources:
 - Local mortality data
 - Data from NHANES for Los Angeles County (2005)
 - Data from the 2005 Los Angeles County Health Survey
 - Data from the scientific literature

* In a recent study on salt intake and CVD (2007), Drs. Dickinson and Havas conducted a similar impact analysis using this scenario for the U.S. population. They estimated that a 1.3 g/d lower lifetime sodium intake in the population would save 150,000 lives annually in the U.S.



Population-Based Strategy

SBP Distributions



Potential Health Impacts in Los Angeles County

SBP Rise Averted	Potential number of lives saved per year (% Reduction in Mortality)		
	<u>mmHg</u>	<u>Stroke</u>	<u>CHD</u>
2	227 (-6)	606 (-4)	1,804 (-3)
3	302 (-8)	758 (-5)	2,406 (-4)
5	529 (-14)	1,364 (-9)	4,210 (-7)



Agenda for Action



National Effort

Leading agencies and national health organizations have signed on to become partners or have advocated for reducing sodium intake in the population

Organizations

ASTHO

NACCHO

American College of Cardiology

American College of Epidemiology

American Dietetic Association¹

American Society of Hypertension

American Heart Association¹

American Medical Association²

American Public Health Association²

Association of Black Cardiologists

Center for Science in the Public Interest²

International Society of Hypertension in Blacks

Joint National Committee 7¹

Joint Policy Committee, Societies of Epidemiology

National Academy of Sciences³

National Association of Chronic Disease Directors

National HBP Education Program CC¹

National Hispanic Medical Association

National Institutes of Health¹

National Kidney Foundation, Inc.

Preventive Cardiovascular Nurses Association

U.S. Department of Health and Human Services¹

U.S. Department of Agriculture (USDA)¹

World Health Organization⁴

World Hypertension League

¹ < 2,300 mg/day; ²Minimum 50% reduction in processed and restaurant foods; ³< 2,300 mg day under age 50; < 1,500 mg/day for 50-70, hypertensives, and blacks; < 1,200 mg/day for age 70 and higher; ⁴< 2,000 mg/day.



National Effort

(continued...)

States

Alaska Department of Health and Human Services
District of Columbia Department of Health
Division of Public Health, Delaware Health and Social Services
Maine Department of Health and Human Services
Massachusetts Department of Health
Michigan Department of Community Health
New York State Department of Agriculture and Markets
New York State Department of Health
North Carolina Division of Public Health
Oregon Department of Health and Human Services, Division of Public Health
Tennessee Department of Health
West Virginia Department of Health and Human Resources, Bureau for Public Health

Counties & Cities

New York City Department of Health and Mental Hygiene
Los Angeles County Department of Public Health
Chicago Department of Public Health
Philadelphia Department of Public Health
Seattle/King County Department of Public Health



Policy and community interventions to reduce salt (sodium) intake under consideration...

- Removal of sodium's GRAS* status by the FDA
- Gradual vs. steep reductions in the sodium content of processed foods
- Voluntary vs. enforced steps for salt reduction by the food industry
- Social marketing campaigns to educate consumers
- Sodium content postings on restaurant menus and menu boards
- Improved labeling for processed/pre-packaged foods ("traffic light" system used in the U.K.)

*Generally Recognized As Safe.



Lower Salt (Sodium) Intake is Possible: The UK experience

- Food Standards Agency (FSA) – launched major public campaign in 2003 to encourage food manufacturers to reduce sodium levels in their products
- Implemented voluntary program with food category targets, implemented over time in stages
- Goal: to reduce salt intake by 1/3, from 2005 to 2010
- Part of campaign was to publicize widely different levels of sodium in various brands
- Social marketing and public education efforts such as the National Salt Awareness Week, “Sid the Slug”, “Traffic Light” Labeling System were launched





The UK experience: after launching the campaign

- Percentage of people who were aware that they should be eating at most 6 gm of salt (sodium chloride)/day rose from 3% to 34%
- 1/3 of UK adult population (approx. 20 million) reported that lowering salt in the diet became a conscious goal for them
- Reduction of salt intake in the population is encouraging: 9.5 gm in 2000-2001 to 8.6 gm in 2008 (3,800 mg to 3,440 mg of sodium)
- The last 3 years: witnessing a 20-30% sodium content reduction in most processed foods found in supermarkets
- Sodium reductions achieved in processed and restaurant foods
 - McDonald's: 30% ↓ in chicken nuggets
 - KFC: 15% ↓ in baked beans
- Many in the food industry are now fully engaged in the voluntary initiative

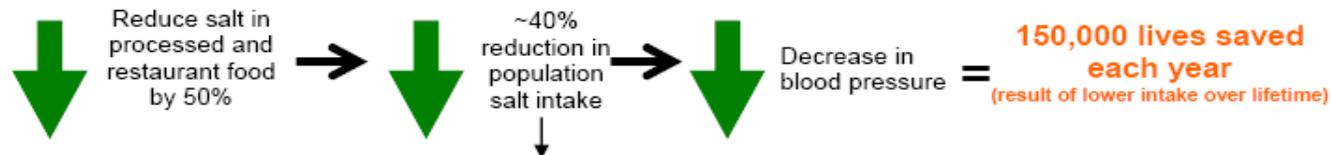


Establishing a Voluntary Framework to Reduce Salt

National Initiative Led by New York City

GOAL

National health organizations call for a 50% reduction in the amount of salt in restaurant and processed food in 10 years.



To ensure progress toward the 40% reduction in population salt intake, we commit to an interim goal of a 20% reduction in 5 years.

STRATEGY

Work with the food industry to set salt reduction targets that are substantial, achievable, gradual, and measurable.

PROCESS

1. Meet with food industry leaders to discuss salt reduction
2. Form national partnership with public agencies and health organizations concerned about salt.
3. Work with food manufacturers and restaurants to establish voluntary targets to reduce salt.
4. Implement targets and timeline for salt reduction.
5. Monitor salt reduction progress.

The National Initiative

- Setting food category targets by:
 1. Defining categories by food type
 2. Prioritizing categories by % contribution to sodium intake
 3. Working with the food industry* to establish targets
- Toward 40% reduction with interim goal of 20% ↓ in population intake over 5 years
- **Collaboration is Key!** (NYC is leading the effort and has started discussions with the industry)

**e.g., National Restaurant Associations, Grocery Manufacturer's Associations, etc.*

Source: New York City Department of Health and Mental Hygiene



Government and Industry Can Work Together to Set Targets That Are:

- ✓ **Substantive**
- ✓ **Achievable**
- ✓ **Gradual**
- ✓ **Measurable**
- ✓ **Voluntary**



Alternative to voluntary salt reduction by the industry is regulation



Source: Throwing the Book at Salt. *New York City Times*. Jan. 28, 2009.



What can be done locally and at the state level?

- Emphasize educational efforts for consumers
 - Public (governmental)
 - Private (proprietary, industrial, CBO's)
- Encourage stakeholders with purchasing power to act or set nutrition standards including standards for sodium content (e.g., County of Los Angeles, LAUSD, cities, the private sector, etc.)



Summary of Key Points

- Daily salt intake in the population is currently too high (Americans eat 55% more salt than they did a generation ago¹)
- Realistically, individuals cannot control how much salt is in the food they eat
- The science has established beyond a reasonable doubt that the current levels of salt intake lead to avoidable high blood pressure, heart attacks, stroke, and other adverse health consequences
- The food industry has made important strides already in other countries; can easily do the same in the U.S.
- There is a benefit when many companies work together to reduce salt at the same time
- Much can be done at the federal, state and local levels
- Strategic policymaking and collaboration with the industry are keys to achieving this *HealthyPeople* goal

¹ Ness R. *AEP*. 2009;19(2):118-120.



Acknowledgements

Some slides adapted from:

- Appel LJ. “The Health Effects of Reducing Sodium and Improving Overall Diet.” (PowerPoint presentation, July 9, 2008).
- Dickinson BD. “Sodium and the Healthy Plate: AMA Perspective.” (PowerPoint presentation, July 9, 2008).
- Diekman C. “Sodium and the Healthy Plate”, Am Dietetic Assoc (PowerPoint presentation).
- Palar K, Sturm R. “The Benefits of Reducing Sodium Consumption in the US Adult Population” (PowerPoint presentation, AcademyHealth Annual Research Meeting, June 9, 2008).
- PowerPoint Presentations from the New York City Health Department

