Module 1
Nutritional Role in Health

Understanding Nutrition's Role on Health

Good nutrition can positively impact & influence the following:

➢ **Weight regulation**

➢ **Mental & physical performance**

➢ **Overall energy level**

➢ **Reduced risk of short and long term diseases**

➢ **Increased quality of life**

➢ **Healthier & stronger immune system**

Health Benefits of
Healthy Eating and Active Living

Helps control weight

Reduces the risk of cardiovascular disease

Reduces the risk of type 2 diabetes and metabolic syndrome

Reduces the risk of some cancers

Increases the chances for living a longer and healthier life

Poor Nutrition

Risks related to following a bad diet:

- Weight gain
- Heart disease
- High blood pressure
- High cholesterol
- Diabetes
- Cancers
- Sleep apnea & other respiratory conditions
- Decreased performance and overall work production
- Shorter Quality of Life

A Closer Look at Weight Gain

- **American population**
  - ➤ **~66% overweight**
  - ➤ **~27% obese**
    - *~15% were obese in 1980*
      Reported by Centers for Disease Control and Prevention (CDC) 2012: http://www.cdc.gov/

Q: Why have so many people become overweight and obese over the past 3 decades?

Overweight and Obesity—Adults

Body Mass Index (BMI) is a number calculated from a person's weight and height.   BMI is a fairly reliable indicator of body fatness for most people.

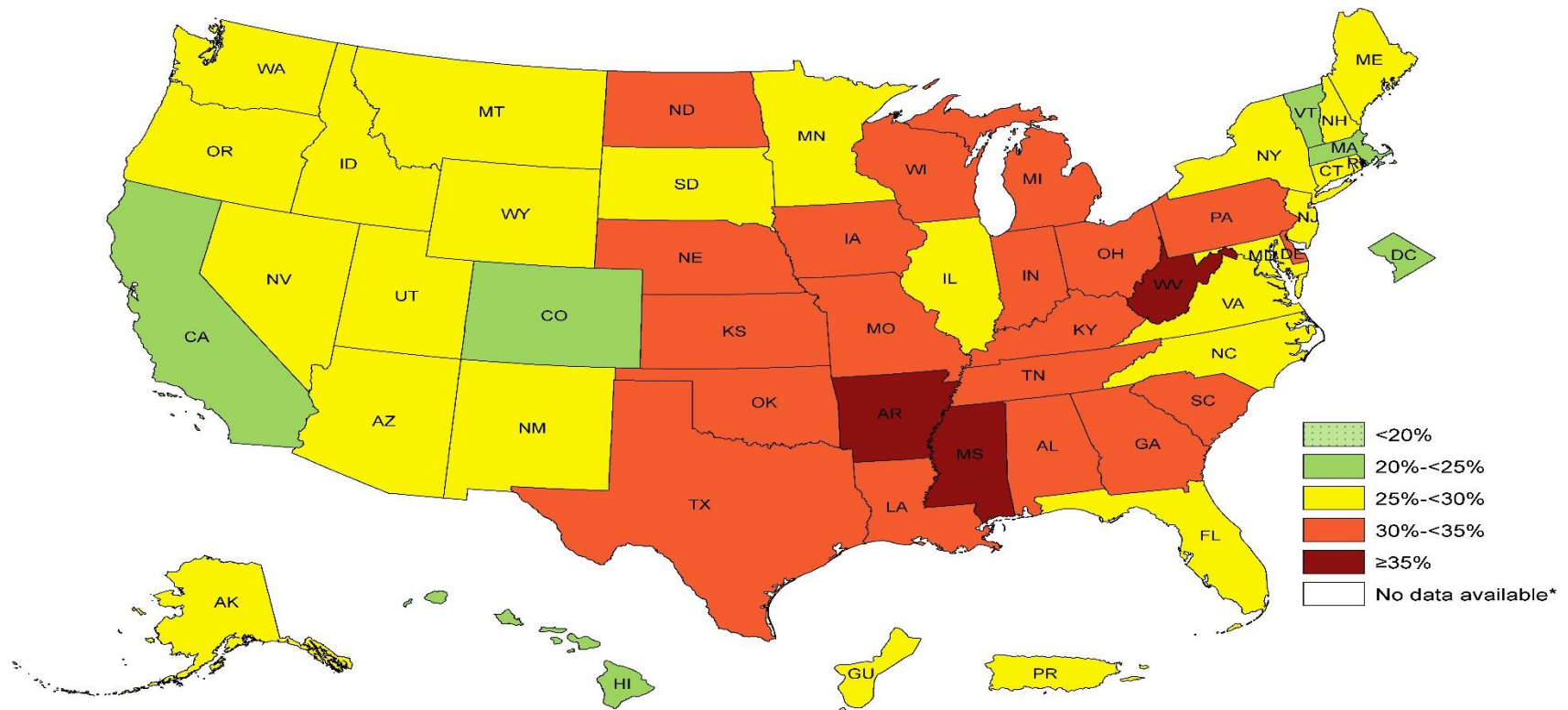| BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 and above	Obese

For a BMI calculator, go to: WWW.CDC.GOV/HEALTHYWEIGHT

Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.
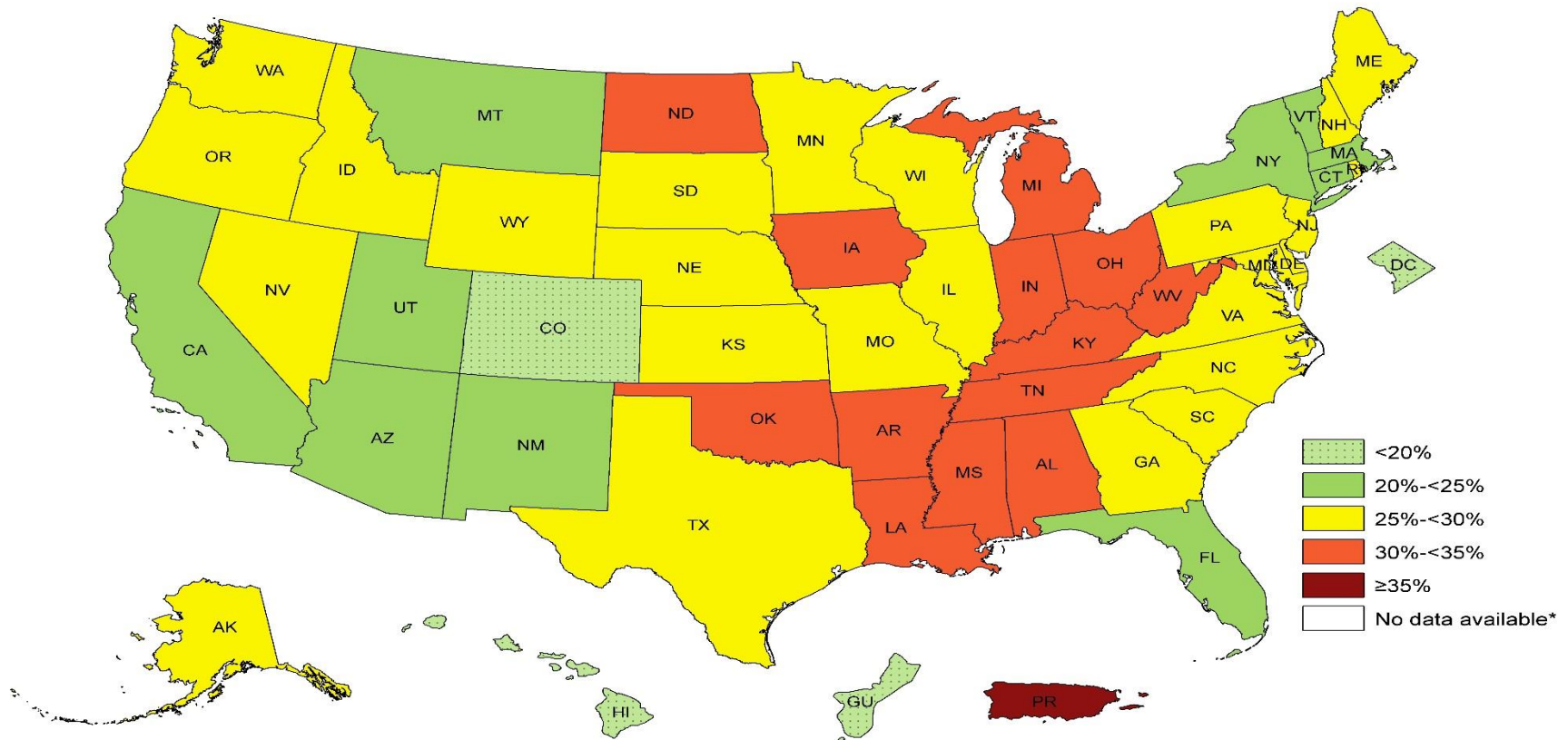

Legend:
- <20%
- 20%-<25%
- 25%-<30%
- 30%-<35%
- ≥35%
- No data available*

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.

Prevalence of Self-Reported Obesity Among Non-Hispanic White Adults, by State (BRFSS, 2012-2014)

Legend:
- <20%
- 20%-<25%
- 25%-<30%
- 30%-<35%
- ≥35%
- No data available*

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.

Prevalence of Self-Reported Obesity Among Non-Hispanic Black Adults by State (BRFSS, 2012-2014)
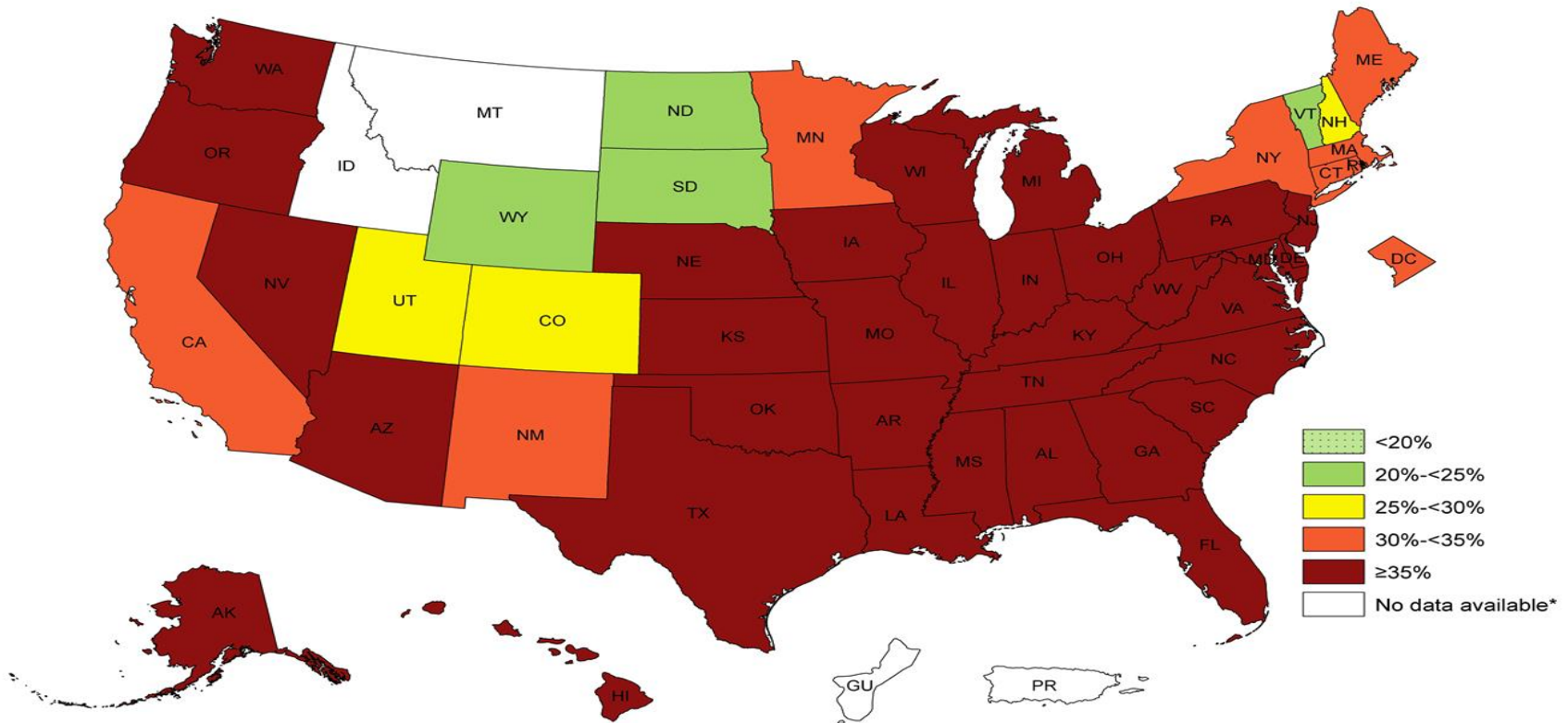
Legend:
- <20%
- 20%-<25%
- 25%-<30%
- 30%-<35%
- ≥35%
- No data available*

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.

Prevalence of Self-Reported Obesity Among Hispanic Adults, by State (BRFSS, 2012-2014)
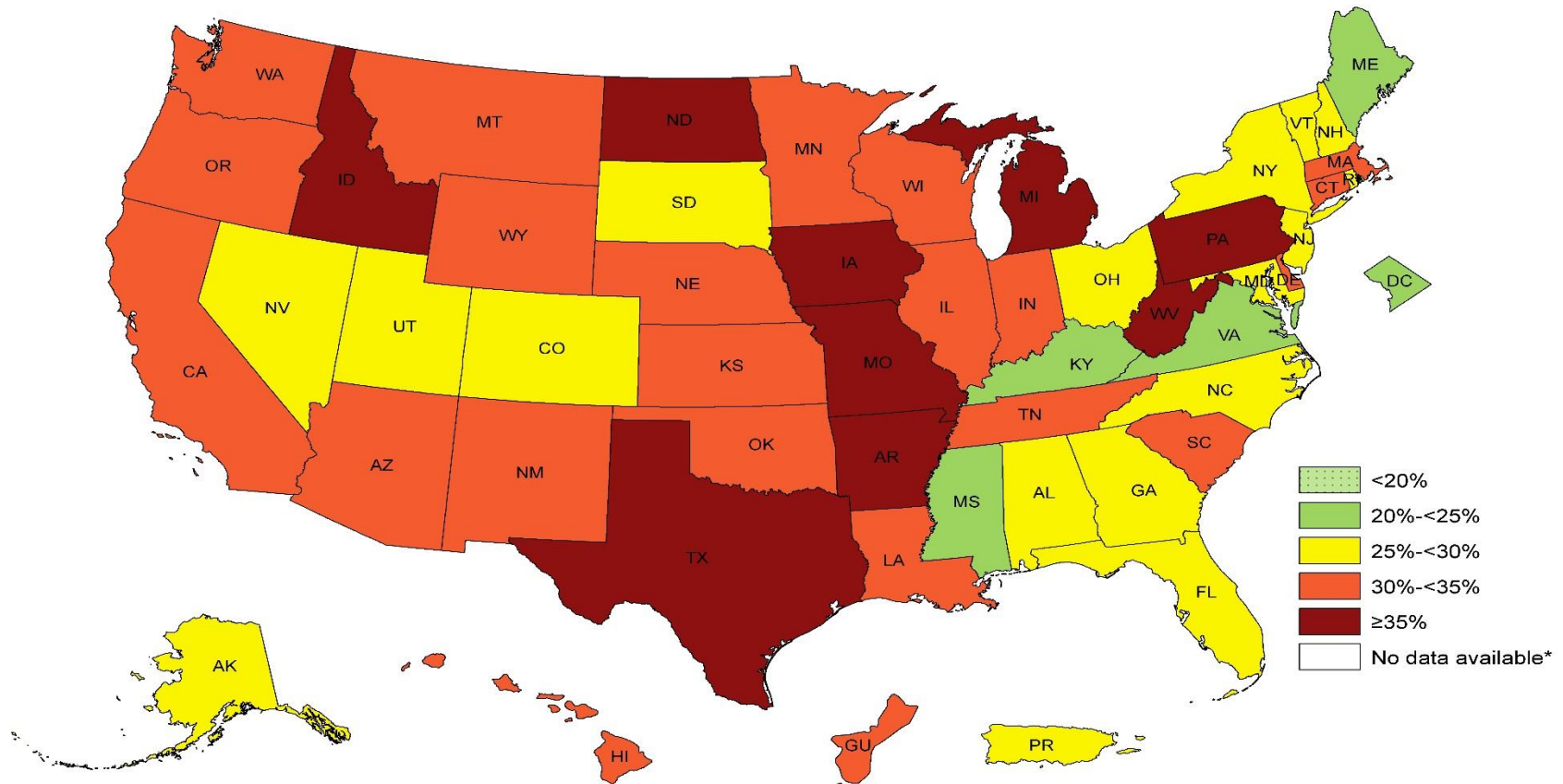
Legend:
- <20%
- 20%-<25%
- 25%-<30%
- 30%-<35%
- ≥35%
- No data available*

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.

Obesity is common, costly, and serious

More than one-third of adults
(78.6 million)have obesity.

Since 1970, there has been a dramatic increase in obesity in the United States. Recent data suggest a slowing or leveling off of this trend.

The annual medical costs for obesity among adults in the U.S. are estimated to be $147 billion per year in 2008 dollars.

Obesity is associated with the leading causes of death in the U.S., including Type 2 diabetes, cardiovascular disease, and some cancers.

Medical Costs for Adults With Obesity Are Rising

	1998 *(in 2008 dollars)*	**2006** *(in 2008 dollars)*
Total Costs	**$74 billion/yr**	**$147 billion/yr**
% of U.S. Medical Costs	**6.5%**	**9.1%**

Increased prevalence, not increased per capita costs, was the main driver of the increase in costs.
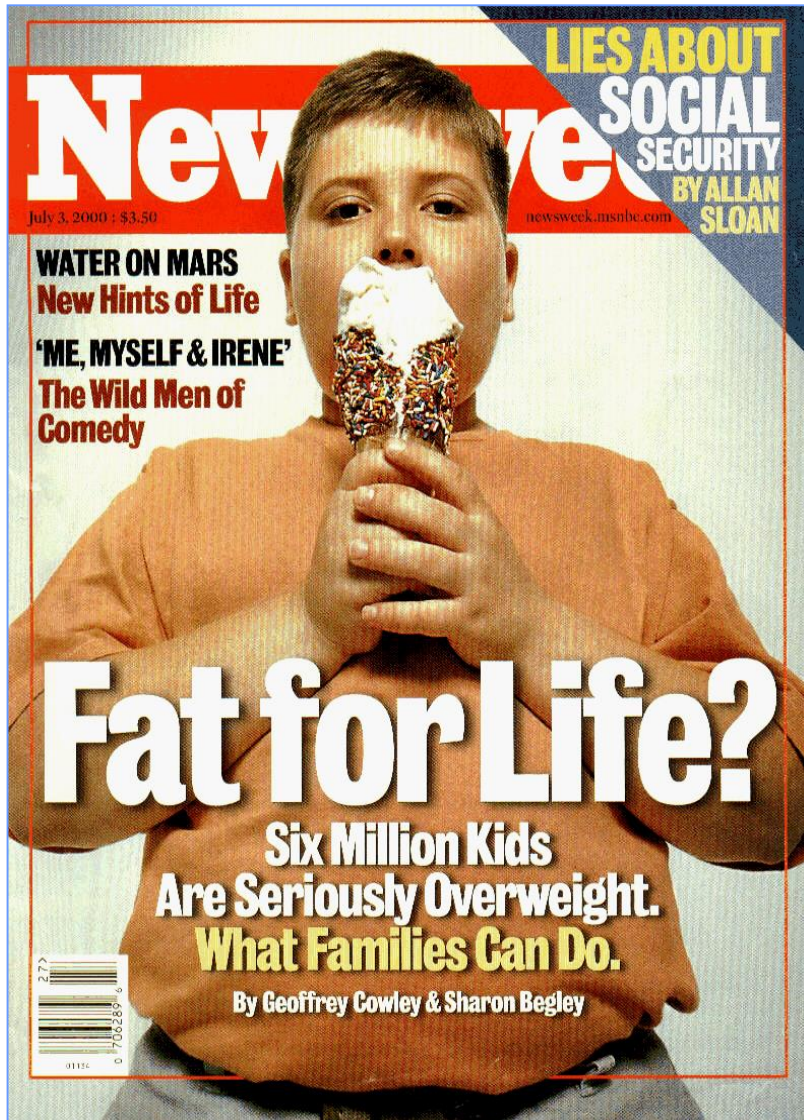
Finkelstein et al. Health Affairs 2009; 28:w822.

Current Habits

- *Over-Eating*

  - **Larger Portions**

- **Lack of Physical Activity**

Habits being developed at a very young age

"the first generation where children will die before their parents"

- **In the US, over 12 million children & adolescents are obese**

- **1 in 3 children are overweight**

- **Over the last two decades, the rates for overweight adolescents have tripled!**

Reasons for Obesity Epidemic

- **Longer work hours: Both parents working or single parent families: Less time to PT/shop/cook**

- **Americans drive instead of cycle or walk**

- **More sedentary/computer focused jobs**

- **Video games replaced recreation**

- **Fried cooking is popular where higher obesity rates exist**

- **High calorie drinks**

  - **Soft drinks, sports drinks, "energy" drinks, specialty coffees**

- **More high calorie foods conveniently available**

  - **Fast food/gas stations/convenience stores/vending machines are located on every corner**

Military Not So Different

Military Personnel Health Behaviors Survey

- **2011: 65.3% of all military personnel are overweight, while 13.0% are classified as obese**
  - **2008: 61.8% were overweight**
  - **1995: 51.2% were overweight**

Military Dependents 2005 Health Behaviors Survey

- **19% of DoD dependent adolescents are obese**
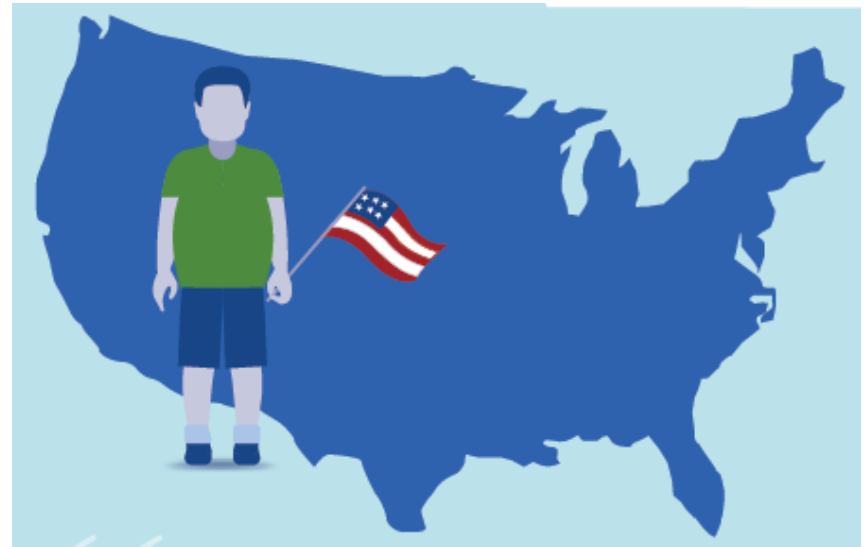 - **More than any age group of non-DoD adolescents**

There continues to be a clear pattern of increase and there is need for attention

Impact on Military Readiness

Nearly 1 out of 4 young adults are too heavy to serve in our military.

Impact on Military Readiness
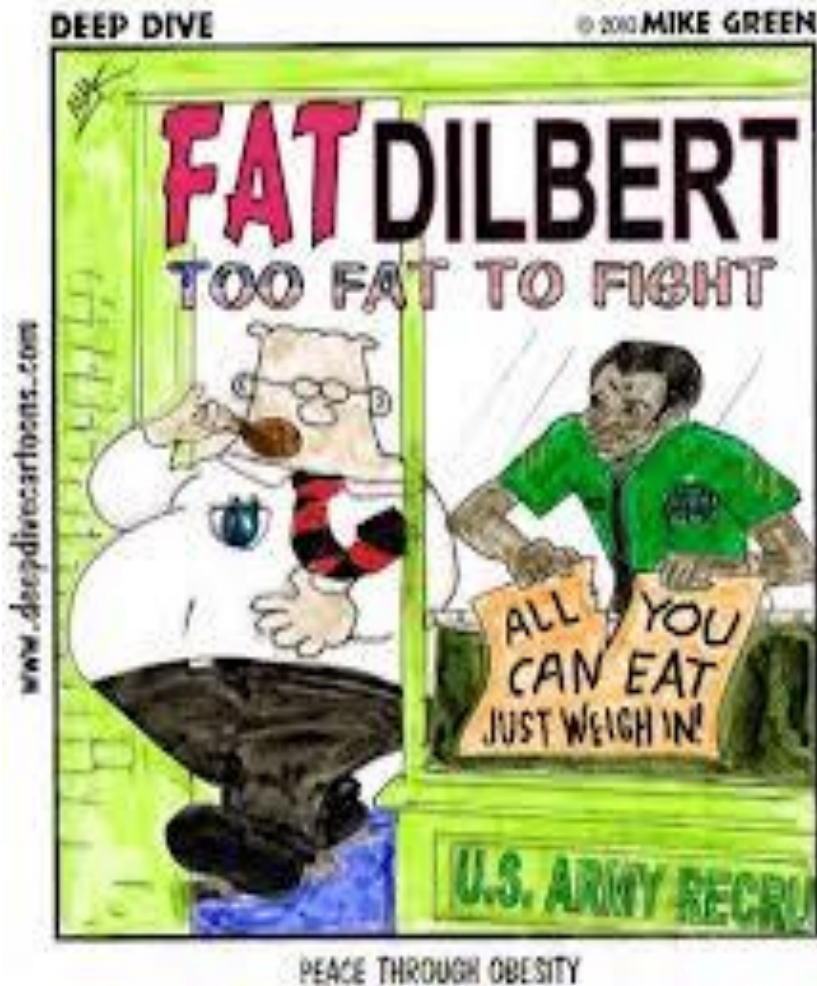
Mission: Readiness is an organization of retired senior military leaders who presented to Congress:

- As of 2012, over nine million 17- to 24-year-olds in the United States are <u>too fat or physically unfit</u> to serve in the military
- That is 31% of all young adults

 (Source: DoD)

<u>http://www.missionreadiness.org/</u>

10 Major Public Health Issues
Health People 2010

1. **Lack of Physical activity**
2. **Overweight and obesity**
3. **Tobacco use**
4. **Substance abuse**
5. **Responsible sexual behavior**

6. **Mental health**
7. **Injury and violence**
8. **Environmental quality**
9. **Immunization**
10. **Access to health care**

2012: Leading Causes of Death in U.S.

*4 of the top 7 causes of death are impacted by nutrition

- **Heart Disease***   597,689
- **Cancer***   574,743
- **Lung Disease**   138,080
- **Stroke***   129,476
- **Accidents**   120,859
- **Alzheimer's Disease**   83,494
- **Diabetes***   75,119

Medical Complications of Obesity

Pulmonary disease
abnormal function
obstructive sleep apnea
hypoventilation syndrome

Nonalcoholic fatty liver disease
steatosis
steatohepatitis
cirrhosis

Gall bladder disease

Gynecologic abnormalities
abnormal menses
infertility
polycystic ovarian syndrome

Osteoarthritis

Skin

Gout

Idiopathic intracranial hypertension

Stroke

Cataracts

Coronary heart disease

Diabetes

Dyslipidemia

Hypertension

Severe pancreatitis

Cancer
breast, uterus, cervix
colon, esophagus, pancreas
kidney, prostate

Phlebitis
venous stasis

Americans Living with Diet & Inactivity Related Diseases

Overweight/obese	**203,000,000**
High blood pressure	**80,000,000**
Diabetes	**19,700,000**
Coronary heart disease	**16,700,000**
Cancer	**12,300,000**
Osteoporosis	**11,450,000**
Stroke	**8,300,000**

- American Heart Association (AHA). *Heart Disease and Stroke Statistics - 2013 Update At-A-Glance.*
- National Osteoporosis Foundation. *Osteoporosis Disease Statistics, 2011*
- American Diabetes Association. *All About Diabetes. Alexandria, VA: ADA, 2010*
- American Cancer Society (ACS). *Cancer Facts and Figures 2012.*

Cost of Diet & Inactivity Related Diseases

Cardiovascular Disease	$312 billion
Cancer	$226 billion
Diabetes	$180 billion
Coronary Heart Disease	$160 billion
Obesity	$147 billion
High blood pressure	$69 billion

CDC estimates that if all physically inactive Americans became active, we would save $55 billion (2008 dollars) in annual medical costs.

- American Heart Association (AHA). *Heart Disease and Stroke Statistics -- 2013 Update At-A-Glance.*
- American Cancer Society (ACS). *Costs of Cancer. 2011.*
- American Diabetes Association. 2012
- http://www.nhlbi.nih.gov/about/factbook/chapter4.htm#4_7

Other Costs of Obesity

Medical Costs in 2012

- ~ $1500 per year increase for an obese person compared to non-obese
- +30 – 50% more employers can charge obese workers for health insurance if they decline to participate in a qualified wellness program, per the U.S. health care reform law of 2010

Transportation Costs

- $5 billion annually for additional jet fuel to fly heavier passengers
- $4 billion annually for additional gas in cars carrying heavier passengers.
  - ➢938 million gallons is the additional amount used per year

Consumer Spending

- $40 billion annually spent on diet products in 2008.
- $7.5 billion estimated amount clothing stores will bring in for plus size clothes in 2012.

Cawley J, Meyerhoefer C. The medical care costs of obesity: an instrumental variables approach. *J Health Econ*. 2012; 31:219-30.

Colditz GW, Wang, YC. Economic costs of obesity. In: Hu F, *Obesity Epidemiology*. New York: Oxford University Press, Inc., 2008.

Dor AF, Langwith C, Tan E. A heavy burden: The individual costs of being overweight and obese in the United States. The George Washington University School of Public Health and Health Services Department of Health Policy, 2010.

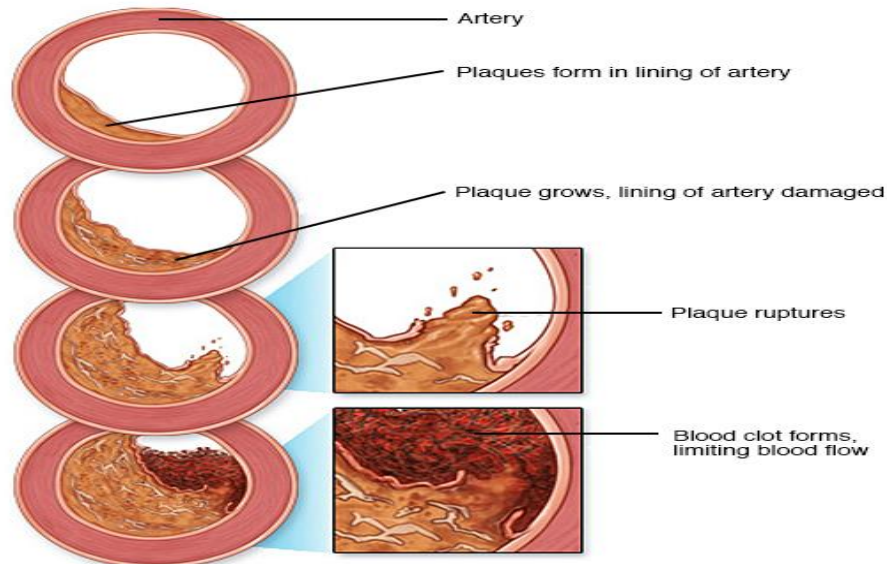http://healthandwellnessmagazine.net/content/features/the-actual-numbers-of-the-cost-of-obesity/

Cardiovascular Disease

#1 killer in the U.S.

➢ <u>Heart attack:</u> rapid fall in heart function caused by loss of blood flow through the heart's blood vessels

➢ <u>Stroke:</u> "brain attack". Loss of brain function due to a disturbance in the blood vessels supplying blood to the brain

Artery

Plaques form in lining of artery

Plaque grows, lining of artery damaged

Plaque ruptures

Blood clot forms, limiting blood flow

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http://www.cdc.gov/nchs/fastats/deaths.html , 2010

Cardiovascular Disease Risk Factors

- *Age*
  - *Men over 45*
  - *Women over 55*

- *Alcohol*

- *Family history*
  - *Premature death of family member due to heart disease*

- *Obesity*
  - *Emphasis on waist circumference*

- *Inactivity*
  - *Lack of adaptation to physical stress*

- *Cholesterol*
  - *(Part of Lipid Panel)*

- *Diabetes*

- *Hypertension*

- *Smoking*

- *These four risk factors make up 90% of the total risk for developing Cardiovascular disease*

Cardiovascular Disease Treatment and Prevention

- **Healthy eating pattern**

  ➢ **Include fruits, vegetables, whole grains, low-fat dairy, fish, legumes, poultry and lean meats**

- **Appropriate body weight**

- **Desirable cholesterol profile**

  ➢ **Limit foods in saturated fat, *trans* fats and cholesterol**

  ➢ **Choose fats from vegetables, fish, legumes and nuts**

- **Desirable blood pressure**

  ➢ **Limit salt and alcoholic beverages**

  ➢ **Optimize body weight and follow diet with plenty of fruits, vegetables, and low-fat dairy**

Lipid Panel

- ## Total Cholesterol

  ➢ **Optimal level is below 200 mg/dl**

    - *Below 100mg/dl may indicate malnutrition*

- ## LDL Cholesterol

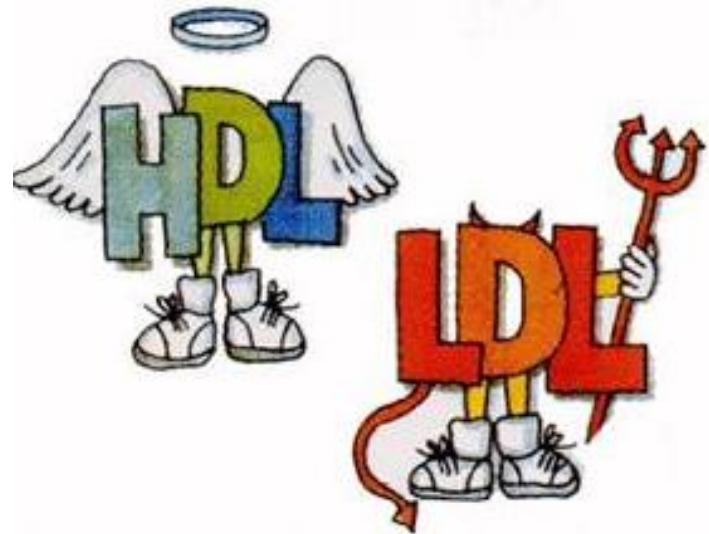 ➢ **Optimal is below 100 mg/dl**

- ## HDL Cholesterol

  ➢ **Optimal is above 60 mg/dl**

- ## Triglycerides

  ➢ **Optimal is below 150 mg/dl**

High Blood Pressure

- **Blood Pressure is the pressure of the blood exerted against the walls of the arteries**

- **High blood pressure increases the risk for**

  - ➤ **Heart attack**

  - ➤ **Heart failure**

  - ➤ **Angina**

  - ➤ **Stroke**

  - ➤ **Kidney failure**

  - ➤ **Peripheral artery disease (PAD)**

  - ➤ **Developing fatty deposit in arteries (atherosclerosis)**

Reductions in Sodium Intake Can Reduce High Blood Pressure

Too much (excess) sodium intake ⟹ increased blood pressure ⟹ increased risk of heart disease and stroke.

About 9 in 10 Americans consume too much sodium.

About 1 in 3 adults have high blood pressure (only about half have it under control).

Heart disease, stroke and other cardiovascular diseases are the #1 killer in the United States.

Lowering sodium intake lowers blood pressure.

CDC, Trends in the prevalence of excess dietary sodium intake – United States, 2003-2010.
MMWR Morbidity and mortality weekly report. 2013 Dec 20;62(50):1021-5.

Blood Pressure Categories

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Estimated Effects of Sodium Reduction on Hypertension Prevalence and Related Costs

Reducing average population intake to 2300 mg per day (current recommended maximum) may…

> **Reduce cases of hypertension by 11 million.**
>
> **Save $18 billion in health care costs.**

Reducing average U.S. population sodium intake as little as 400 mg daily (11%).

> **Prevent >28,000 deaths.**
>
> **Save $7 billion health care dollars annually.**

Palar K, Sturm R. Potential societal savings from reduced sodium consumption in the U.S. adult population. Am J Health Promot. 2009;24(1):49–57.

Bibbins-Domingo K, Chertow GM, Coxson PG, et al. Projected effect of dietary salt reductions on future cardiovascular disease. NEJM. 2010;362:590-9)

UNCLASSIFIED

Dietary Approaches to Stop Hypertension (DASH)

- **DASH Diet is an excellent method to prevent and treat hypertension**

  ➢ **Focus on limiting sodium (salt) intake and increasing the amount fresh, low processed foods.**

- **Review the DASH Diet Fact Sheet Guide**

  *Found on the next few pages of workbook

- **For the entire 60+ plus page handout, go to:**

  ➢ **http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf**

Diabetes Mellitus (DM)

- **4 Types**
  - **Gestational, Pre-diabetes, Type 1, Type 2**
    - ***Impacted/caused by diet**
  - **Type 1 & Type 2 once diagnosed, are not reversible**

- **Fastest growing disease in this country**
  - ***Specifically Type 2 diabetes**
    - *Americans with diabetes has risen to more than 25 million people*
      - *9% of the U.S. population*

- **#1 cause of amputations and blindness in US**

Diabetes Mellitus (DM)

- # Primary Types
  - ➢ **Type 1**
  - ➢ **Type 2**
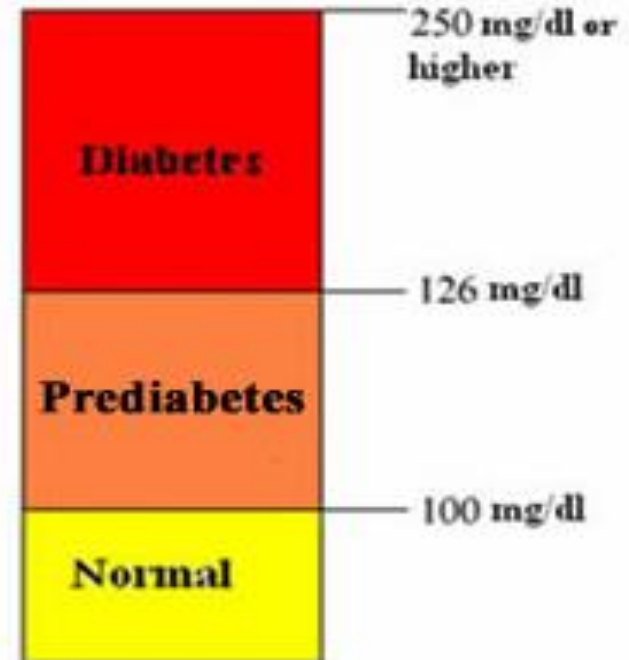   - *Pre-diabetes is first indicator*

- # Fastest growing disease in this country
  - ➢ **Americans with diabetes has risen to more than 25 million people**

    *9% of the entire U.S. population

    *Directly related to diet

Fasting Blood Glucose Levels
(taken when you have not eaten)

Diabetes	250 mg/dl or higher
	126 mg/dl
Prediabetes	
	100 mg/dl
Normal	

Type 1 Diabetes Mellitus (DM)

- **The body does not produce insulin, so insulin injections are required**
  - ➢ **Insulin takes glucose from blood and delivers it to cells**

Treatment

- **Meticulously regulate diet and insulin**

- **Blood sugars should be measured pre- and post meals, snacks and exercise**

- **Exercise guidelines:**
  - ➢ **Eat snack if blood sugars are below 100 mg/dl**
  - ➢ **Do NOT exercise if blood sugars are above 250 mg/dl**

- **Avoid hypoglycemia (low blood sugars)**

Type 2 Diabetes Mellitus (DM)

- **Characteristics and related risks**

  - **Insulin resistance and deficiency**
    - *May or may not require daily insulin therapy*

  - **90-95% of all diagnosed cases**
    - *80% are obese*

  - **Hispanic and African Americans have increased risk**

  - **Older age**
    - *Non-obese individuals too*

  - **Family history**

  - **History of gestational diabetes**

  - **Lack of physical activity**

Treatment for Type 2 DM

Disease cannot be reversed, must be managed

- **Goal is to regulate blood glucose**

- **Changes for a lifetime**
  - ➢ **Nutrition therapy**
  - ➢ **Medications**
  - ➢ **Exercise**
  - ➢ **Blood glucose monitoring**
  - ➢ **Self management education**
    - • *Foot care, vision checks, infection control*

Other common diseases or situations related to nutrition

- *Female Athlete Triad*

- *Bulimia Nervosa*

- *Anorexia Nervosa*

- *Post Traumatic Stress Disorder (PTSD)*

- *Bone breaks*

- *Sprains*

- *Tears*

- *Gestational diabetes*

- *Celiac disease*

- *Gunshot wounds to stomach/intestines*

- *Burns require nutrition therapy for healing*

- *Amputation*

- *Depression*

- *Traumatic Brain Injury (TBI)*

Discussion