

The Metabolic Syndrome

Why Obesity is Bad News

Jerry M. Blaine, MD

History

- 1923 Highland: described clustering of hypertension, hyperglycemia, and gout
- 1979 Vague: described association between T₂ DM, C-V disease and male pattern obesity
- 1988 Reaven: Syndrome X; insulin resistance a common denominator
- 1998 WHO: Metabolic Syndrome

Definition

Cluster of Risk factors:

- atherogenic dyslipidemia

- glucose intolerance

- elevated blood pressure

- a pro-inflammatory state

- a pro-thrombotic state

A result of abdominal obesity and insulin resistance

Under-recognized, under-diagnosed and under- treated

NCEP Criteria

Three of the following five:

elevated waist circumference

elevated triglycerides

low HDL

BP over 130/85

fasting glucose >100 (>5.6 mmol/L)

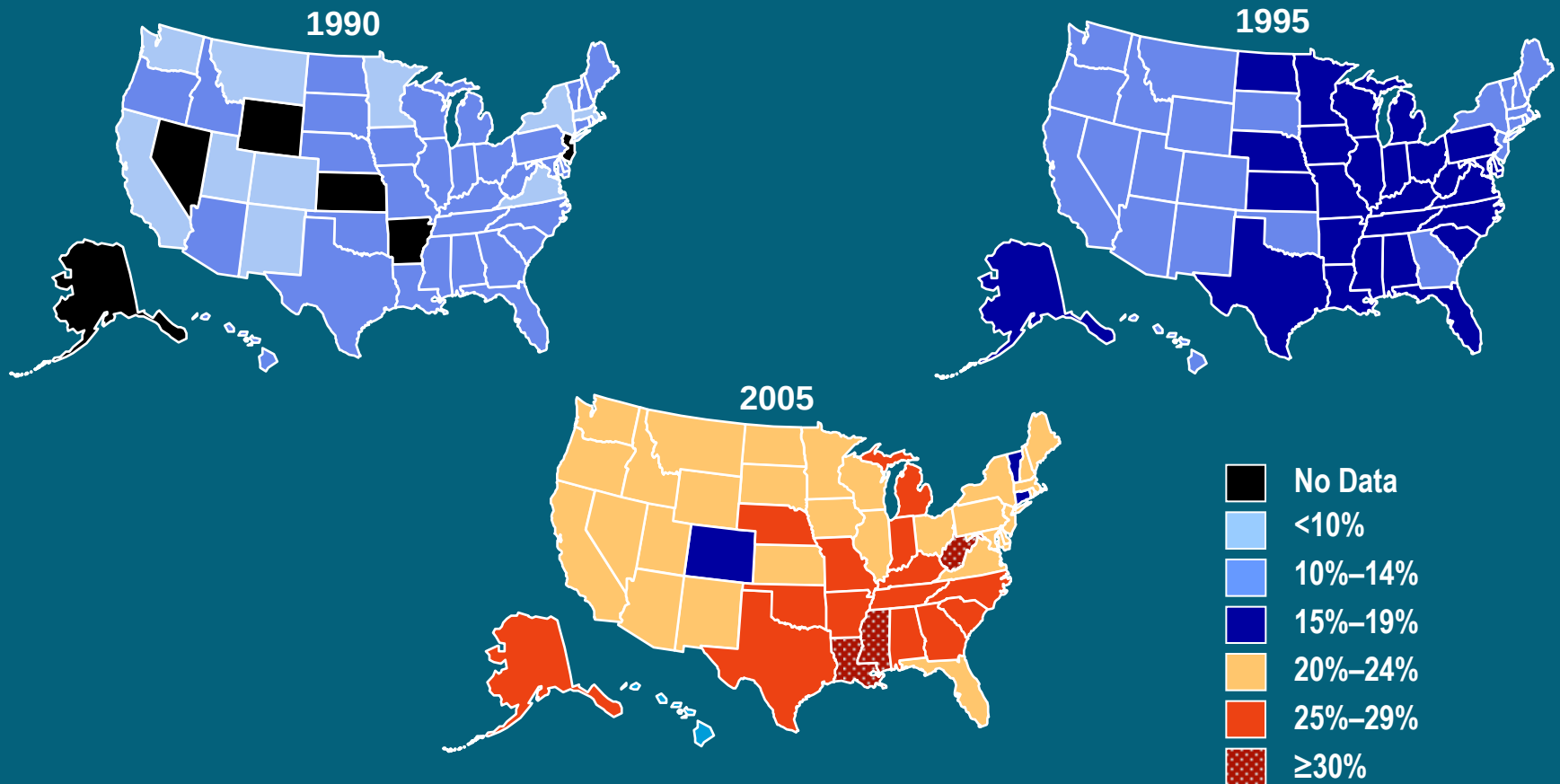
(A₁C not yet included, although now a component of diagnosis of diabetes)

A Shifting Profile for Cardiometabolic Risk

- High low-density lipoprotein cholesterol (LDL-c) levels and hypertension have been and continue to be the primary targets of risk management
- Future treatments need to more effectively address atherogenic dyslipidemia and emerging risk factors associated with abdominal adiposity

Obesity* Trends Among US Adults: BRFSS[†] — 1990, 1995, 2005

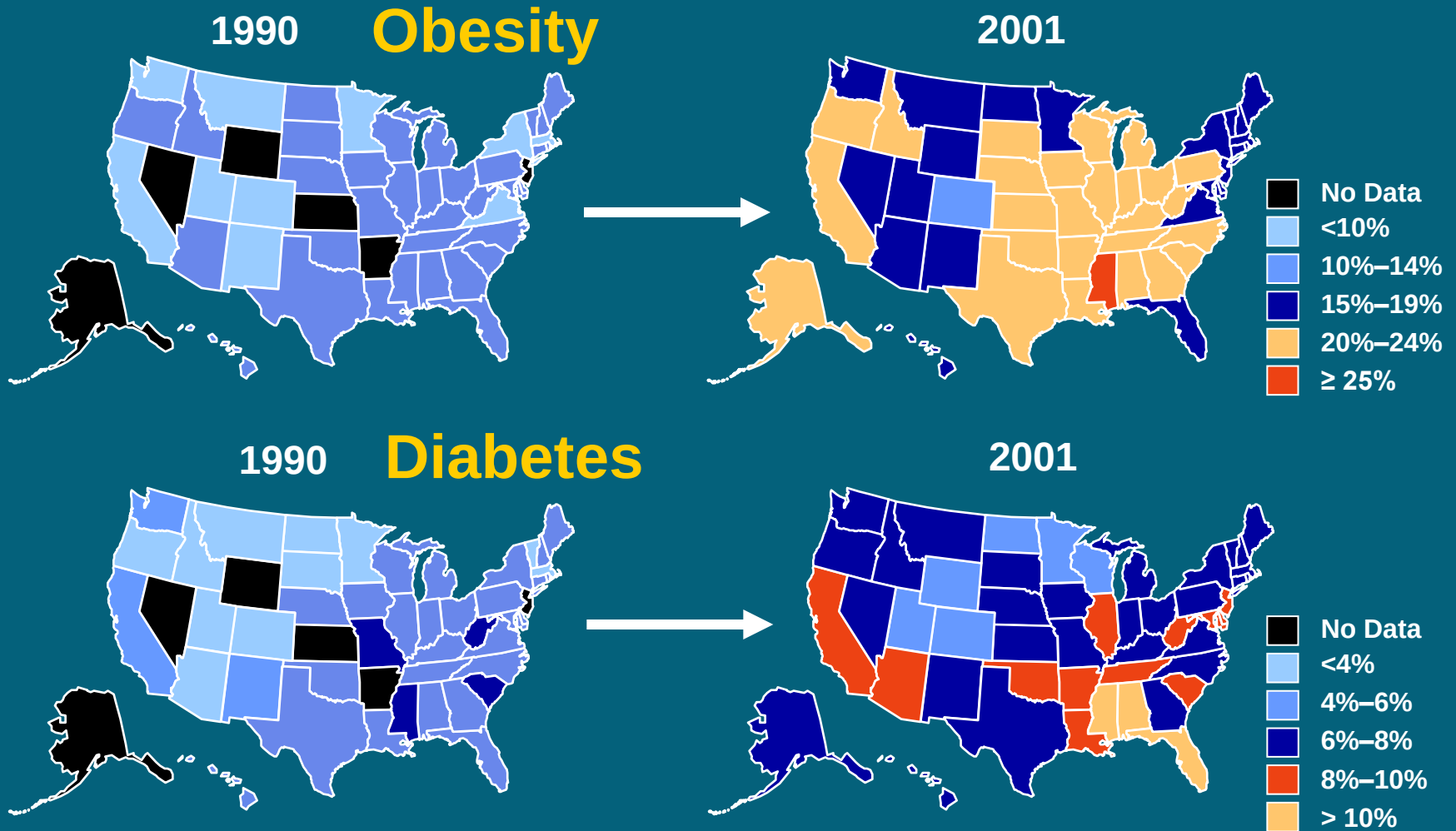
(*BMI ≥ 30 , or about 30 lbs overweight for a 5'4" person)



[†]CDC web site, from: Behavioral Risk Factor Surveillance System (BRFSS).

Available at: <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/5>. Accessed May 28, 2007.

Obesity and Diabetes Trends Among US Adults: BRFSS — 1990-2001



CDC Web site, from BRFSS.

Available at: www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/1 and www.cdc.gov/diabetes/statistics/maps/2.

Accessed May 28, 2007.

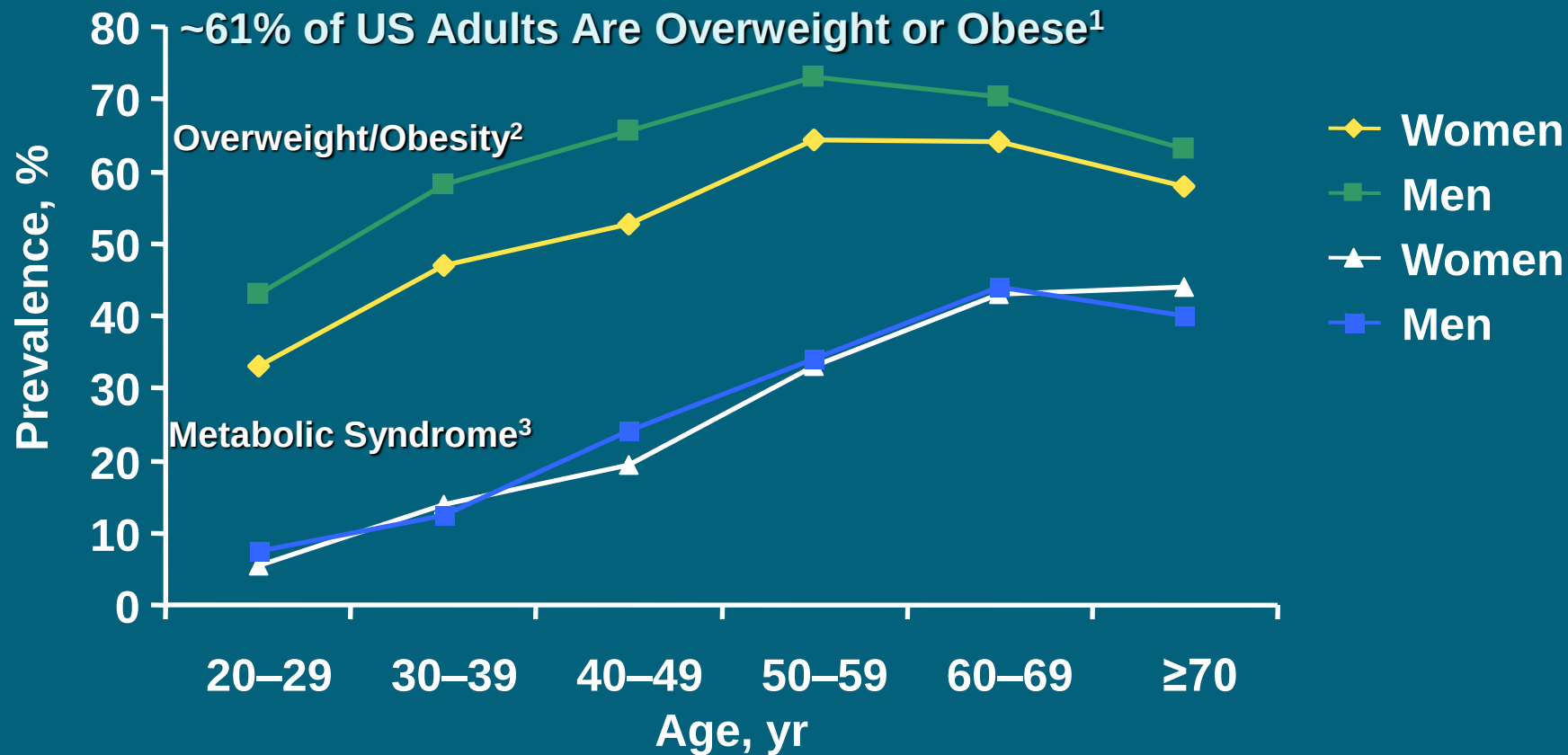
Metabolic syndrome prevalence in a multicultural population in Auckland, New Zealand

- Table 1. Metabolic syndrome prevalences (%) by ethnic group (Maori, Pacific, and Others) in adults aged 35–74 years from the Diabetes, Heart and Health Study 2002–03

		Others	Maori	Pacific
		N (2021)	(1006)	(996)
Metabolic Syndrome (%)	Men	17%	34%	41%
	Women	15%	30%	37%
	All	16%	32%	39%

Twin Epidemics:

Parallels in Prevalence

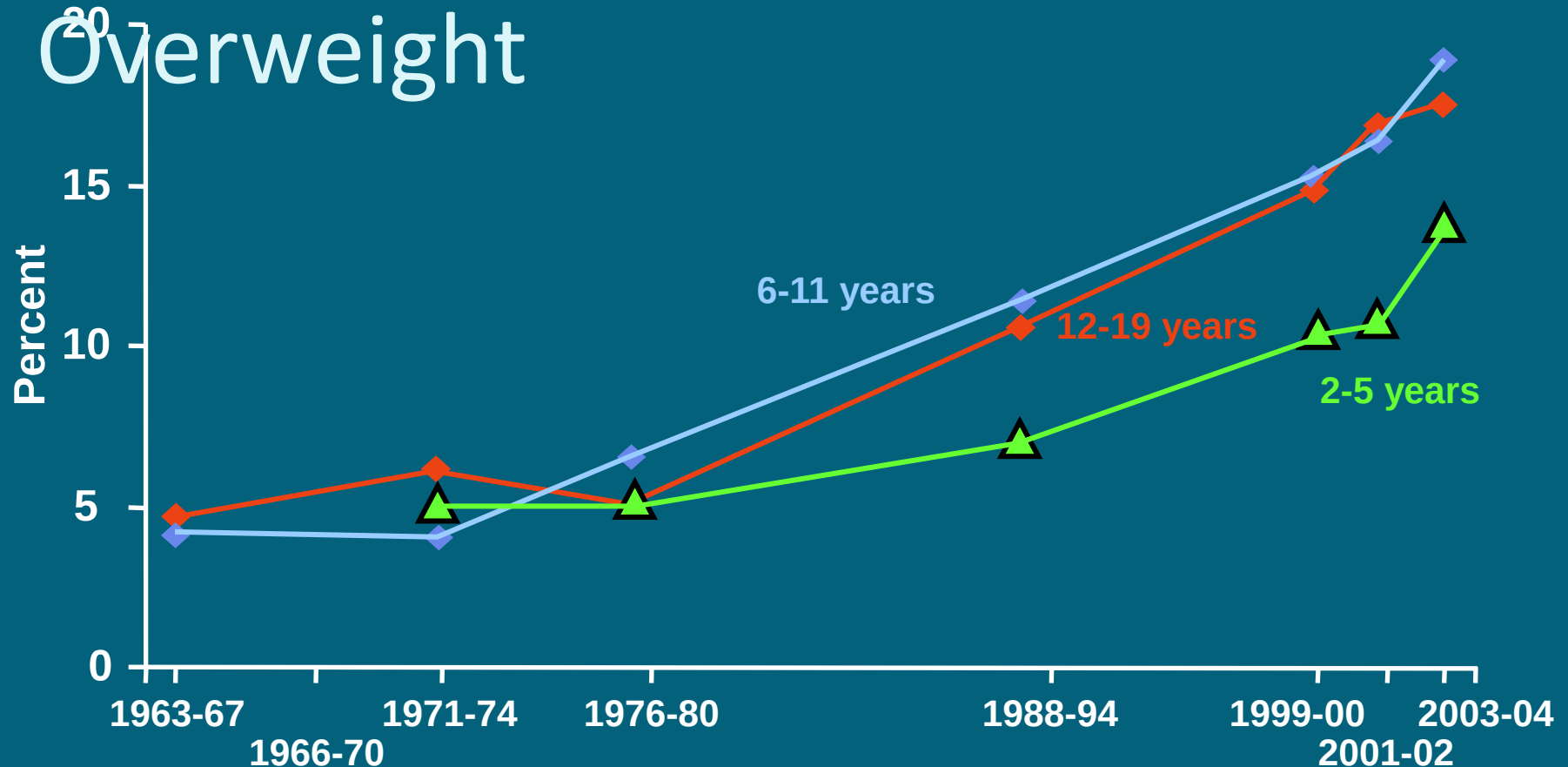


1. Available at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/obese/obse99.htm>

2. Available at: <http://www.cdc.gov/nchs/data/nhanes/overweight.pdf>

3. Ford ES, et al. JAMA. 2002;287:356-359.

Trends in Child and Adolescent Overweight



Note: Overweight is defined as BMI $\geq$ gender- and weight-specific 95th percentile from the 2000 CDC Growth Charts.

Source: National Health Examination Surveys II (ages 6-11) and III (ages 12-17); National Health and Nutrition Examination Surveys I, II, III and 1999-2004, NCHS, CDC.

CDC web site, from Childhood Overweight. Available at <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/HealthEstat1206.gif>. Accessed June 19, 2007.

Atherosclerosis In Youth Is Linked To Obesity and “Early” Insulin Resistance

Fatty Streaks Men: Age 15-24

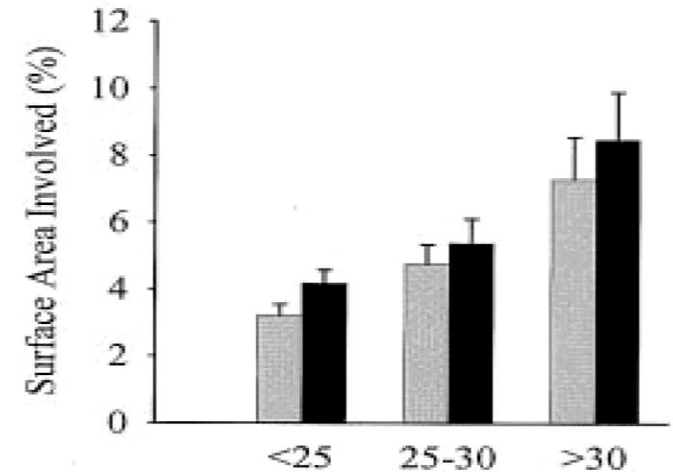
BMI (kg/m²) Aortic Strips



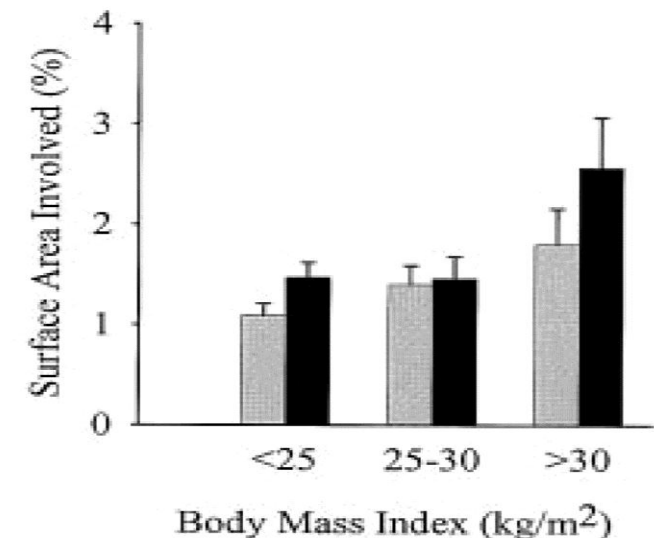
Raised Lesions Men: Age 15-24



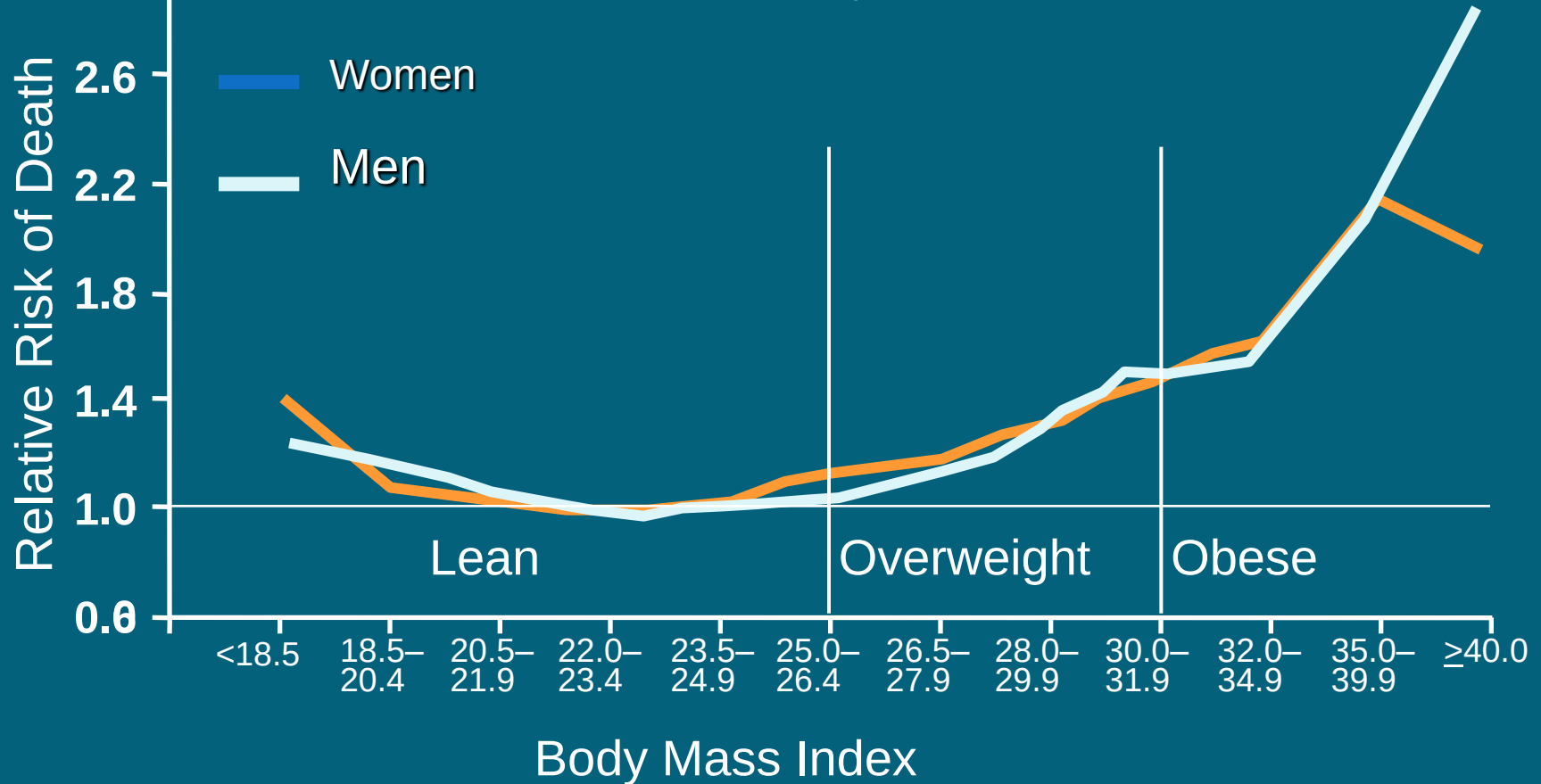
Fatty Streaks



Raised Lesions



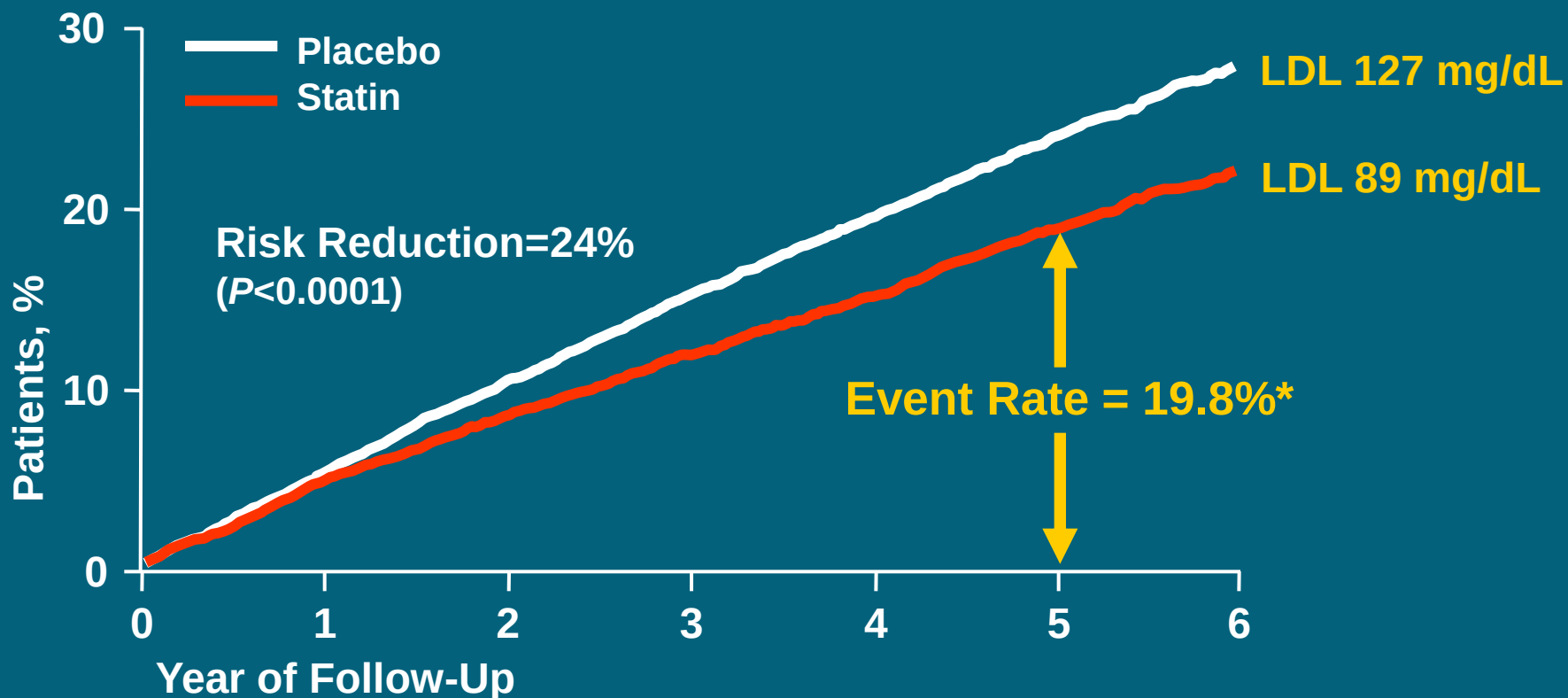
Relationship Between Body Mass Index (BMI) and Cardiovascular Disease Mortality



How Effective Are Current Treatments?

The MRC/BHF Heart Protection Study

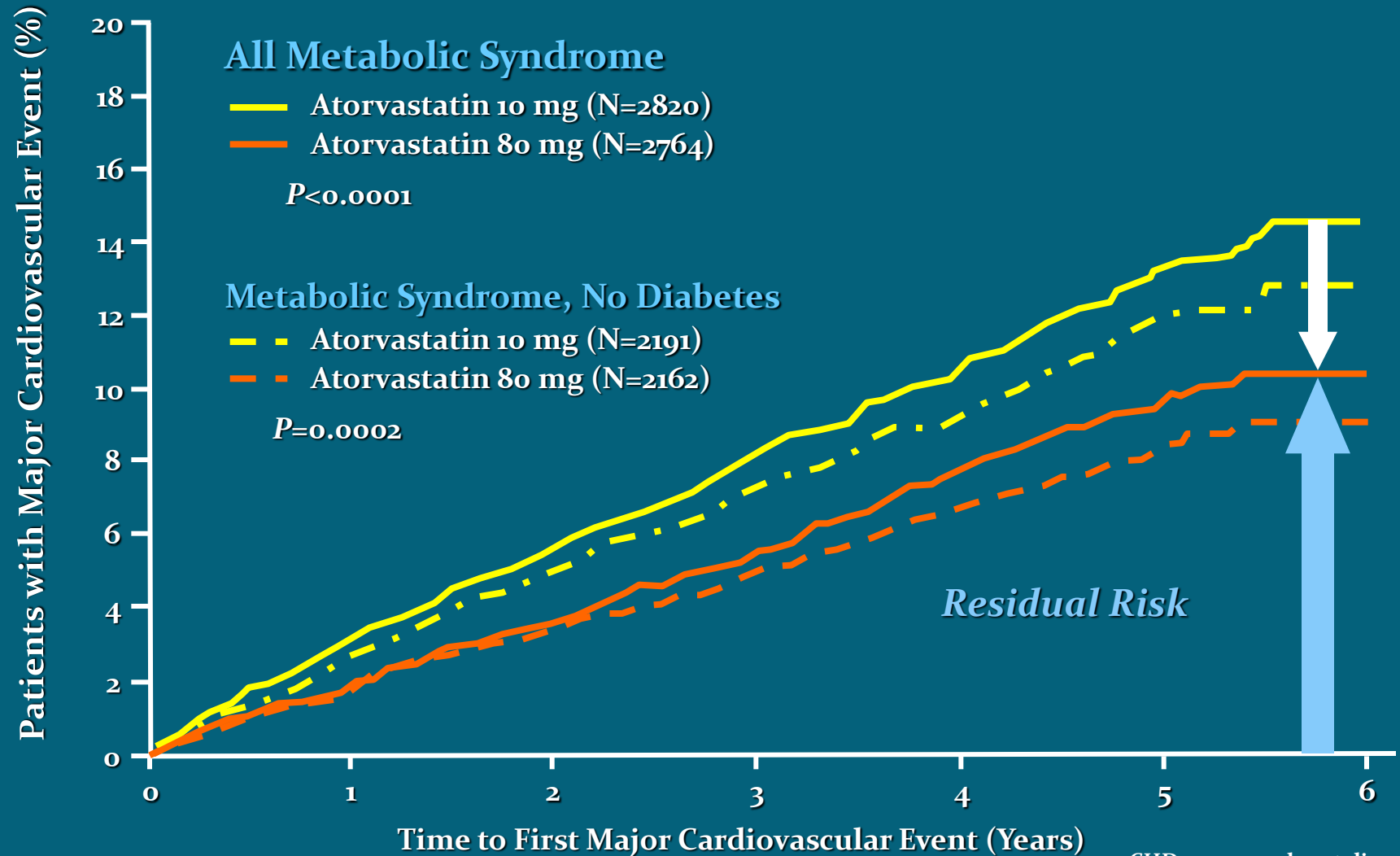
Residual Cardiovascular (CV) Risk in Statin-Treated Patients



***19.8% of statin-treated patients had a major CV event by five years.**

Heart Protection Study Collaborative Group. *Lancet*. 2002;360:7-22.

TNT: Substantial Risk Persists Despite Maximal Dose Atorvastatin in Prediabetes and Diabetes

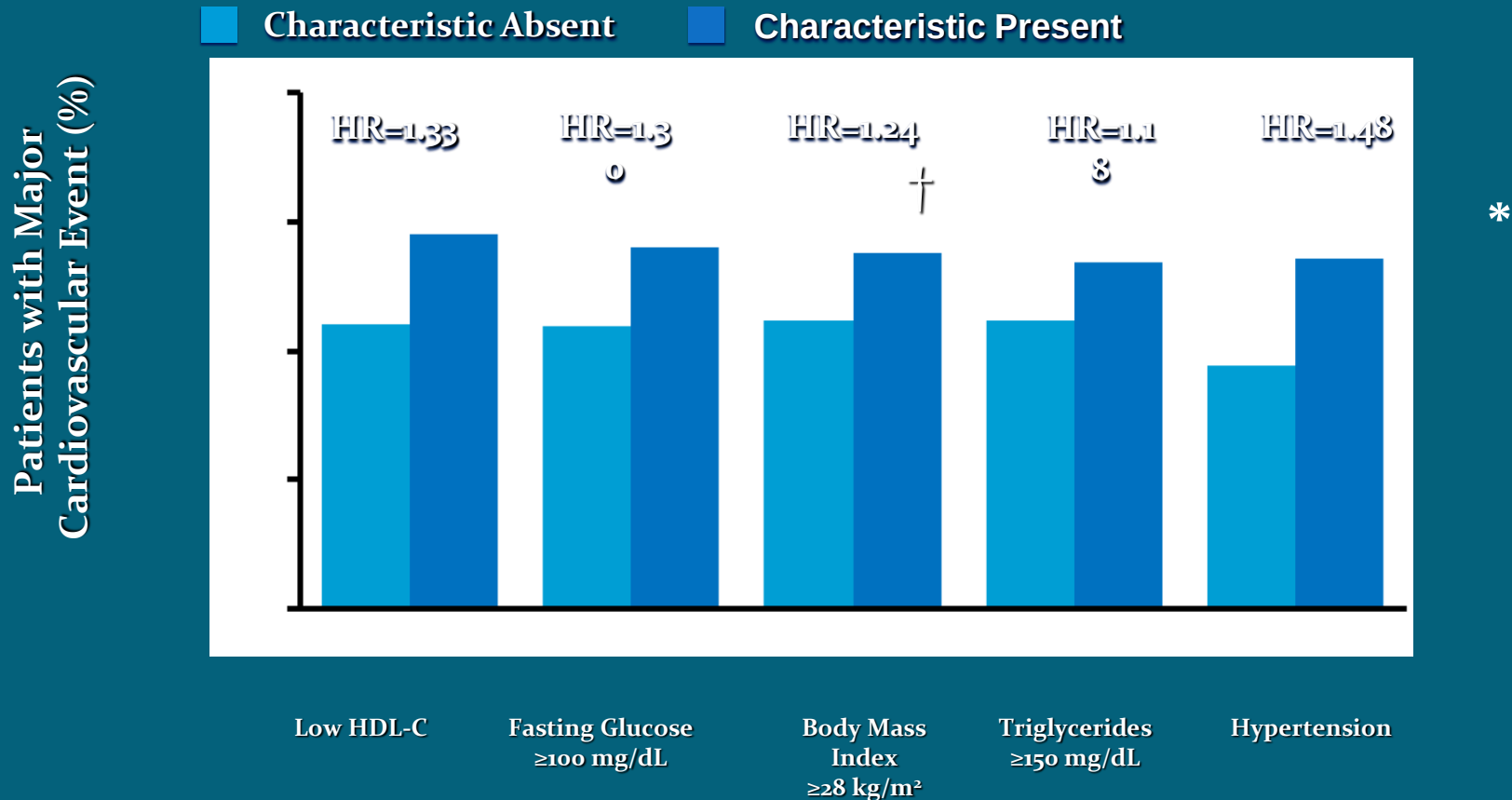


CHD, coronary heart disease.

Deedwania P, for TNT. *Lancet*. 2006;368: 919-928.

Impact of Gluco-Metabolic Characteristics on Risk of Major Cardiovascular Events in TNT

All Patients

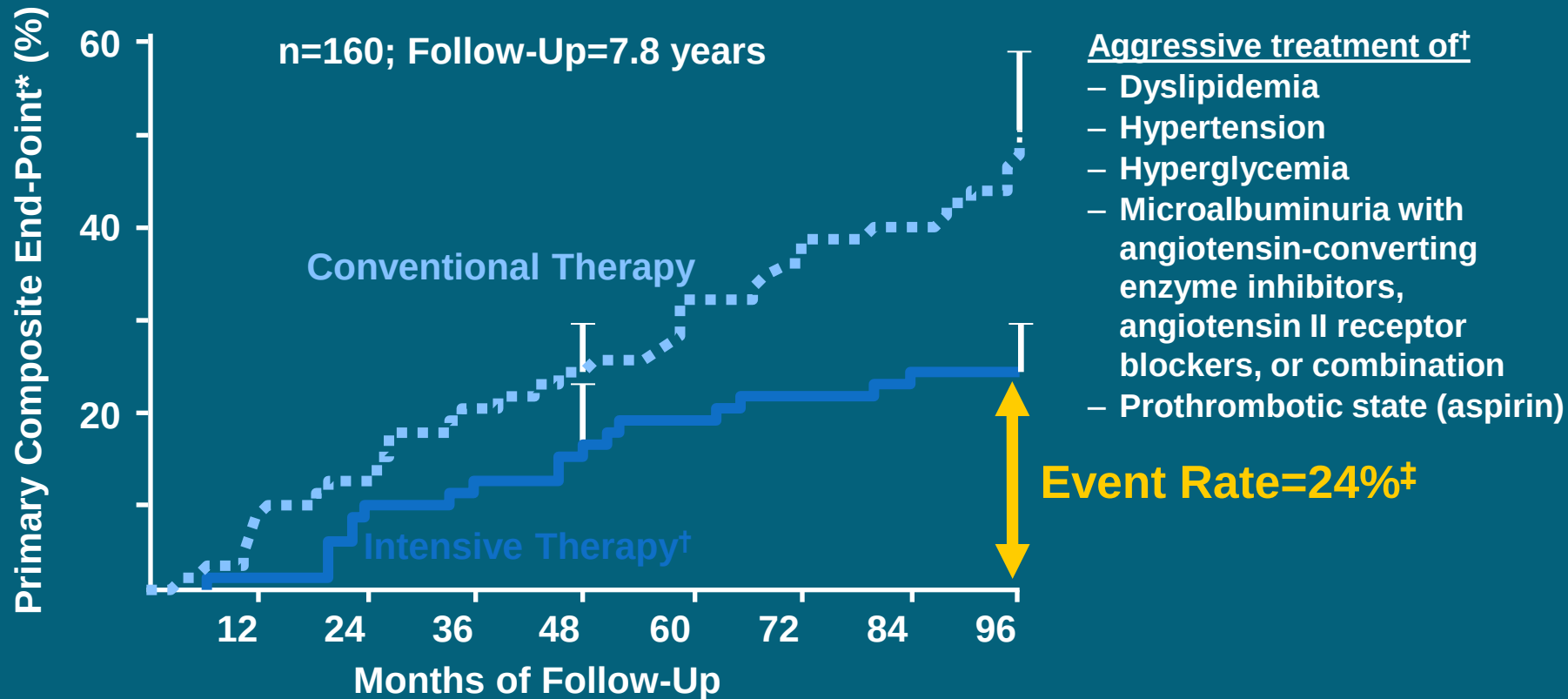


* $P < 0.0001$; $\dagger P = 0.0009$; $\ddagger P = 0.015$.

Deedwania P, for TNT. *Lancet*. 2006;368: 919-928.

The Steno-2 Study

Multiple CV Risk Factor Management in Diabetes: The Best, and Not Enough



*Death from CV causes, nonfatal myocardial infarction, coronary artery bypass graft, percutaneous coronary interventions, nonfatal stroke, amputation resulting from ischemia, or surgery for peripheral atherosclerotic artery disease.

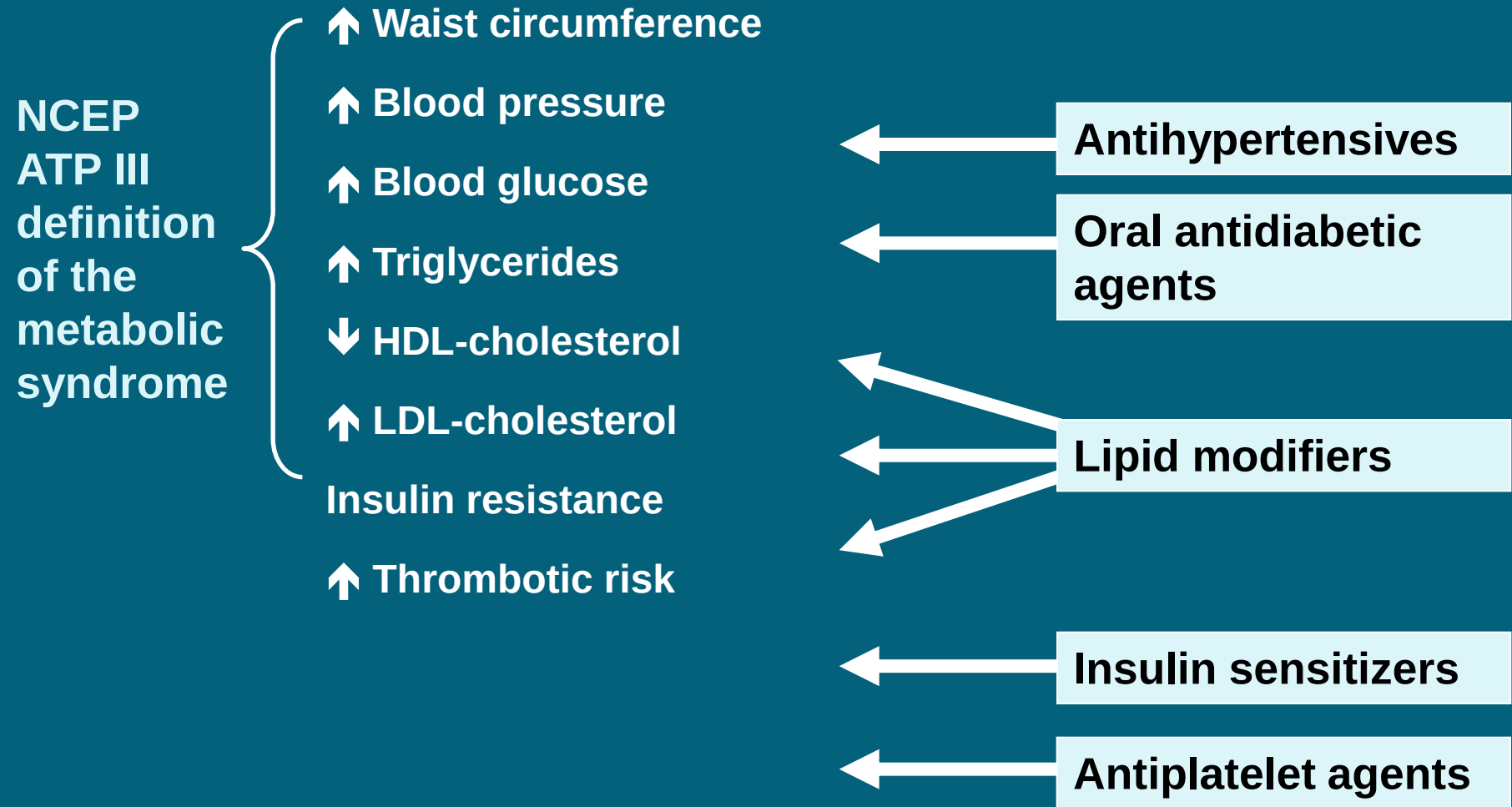
†Behavior modification and pharmacologic therapy.

‡Primary composite end-point: conventional therapy (44%) vs intensive therapy (24%).

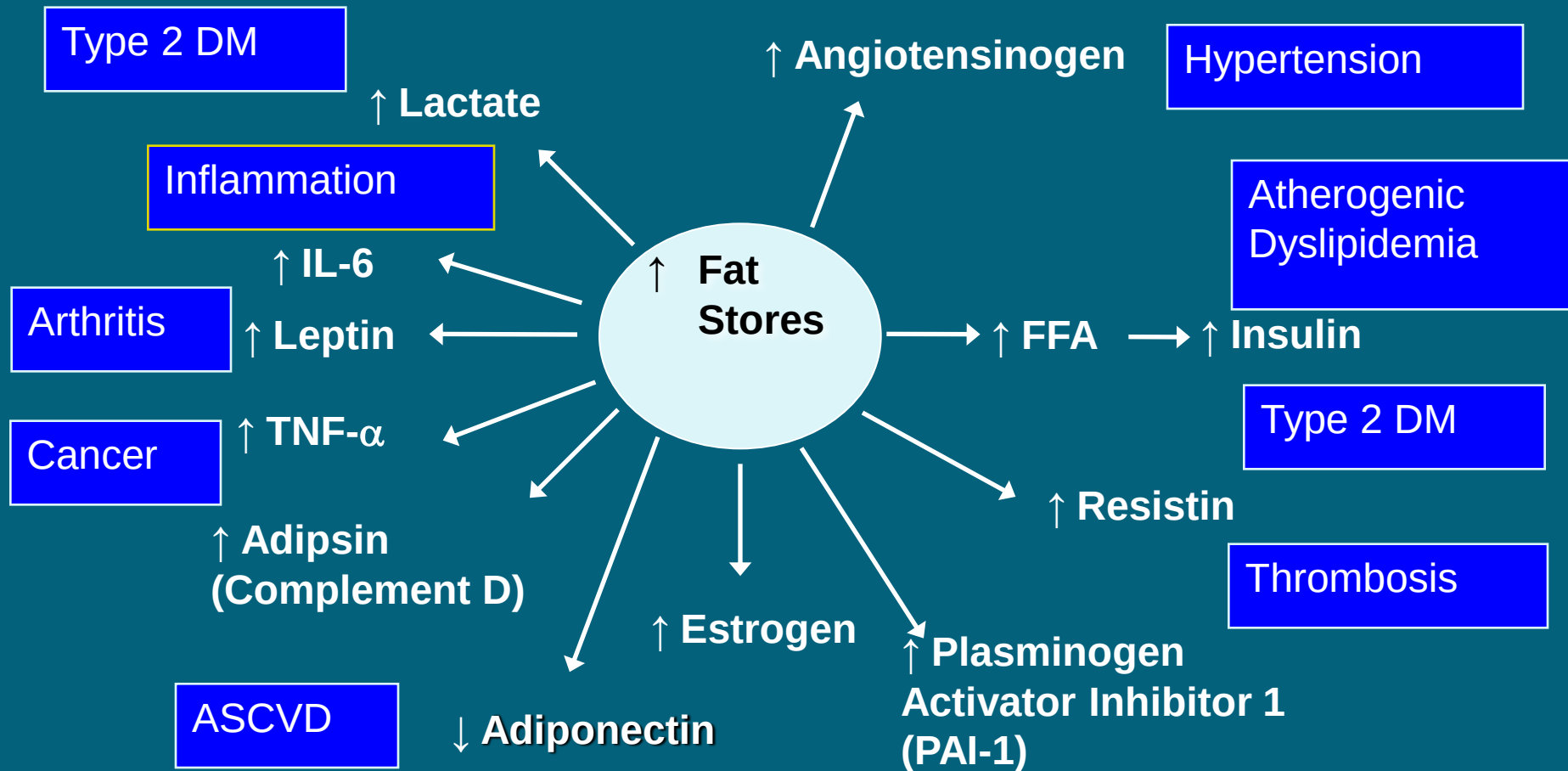
What About Residual Cardiometabolic Risk After Treatment of Established CV Risk Factors?

- Triglycerides
- High-density lipoprotein (HDL) cholesterol
- Inflammation
- Glucose

Current Therapies Often Address Individual Risk Factors



How Obesity Causes Disease: The Fat Cell—A Multi-endocrine Organ



DM=diabetes mellitus; FFA=free fatty acid; PAI-1=plasminogen activator inhibitor-1;
TNF α =tumor necrosis factor-alpha; IL-6=interleukin 6; ASCVD=atherosclerotic cardiovascular disease.

Bray, G. J Clin Endocrinol Metab. 2004;89:2583-2589.

Eckel RH, et al. *Lancet*. 2005;365:1415-1428.

Slide: After Dr. G. Bray.

Metabolic Syndrome and Acute MI in the Young (<45 yrs.)

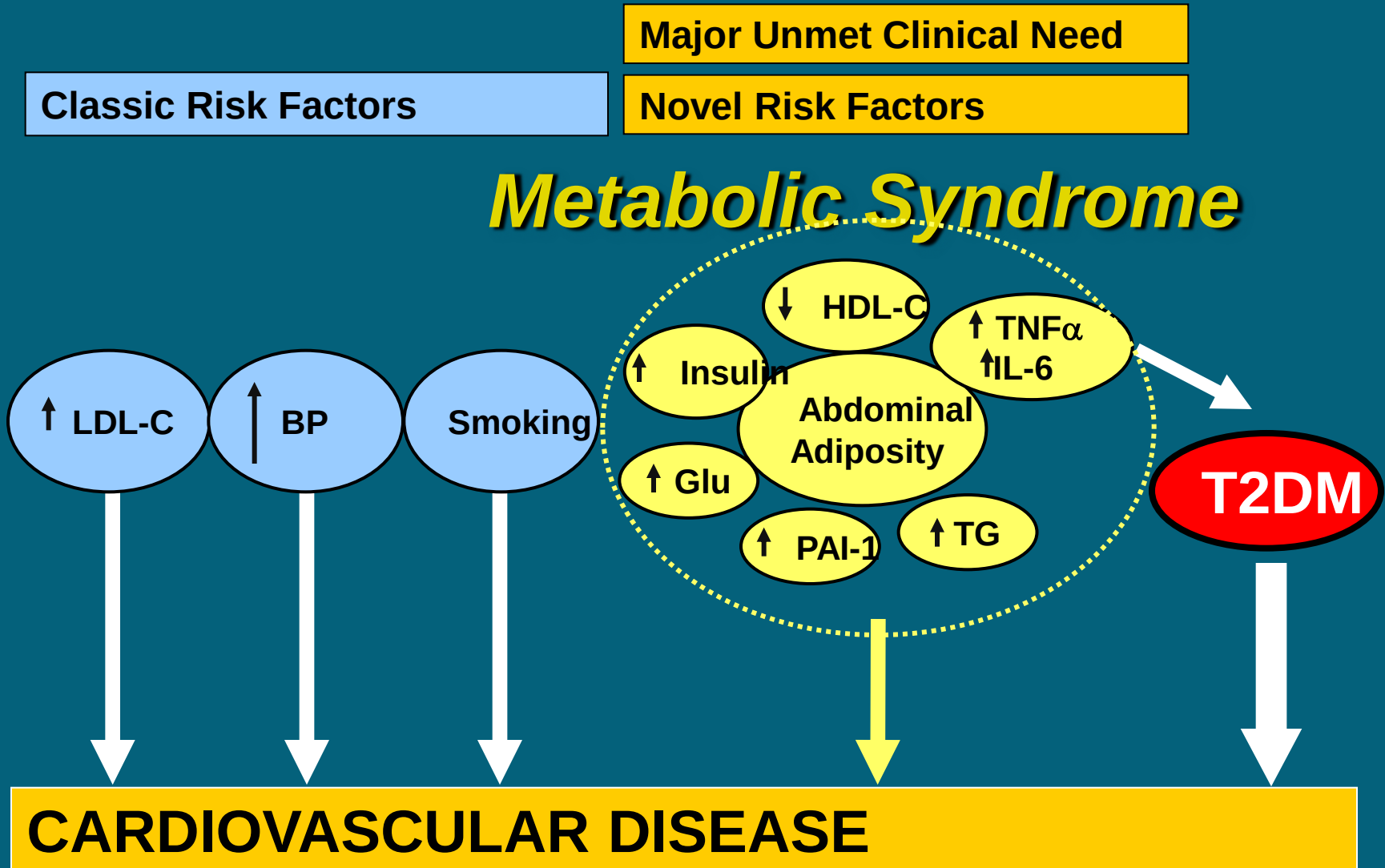
AT LAHEY CLINIC

161 consecutive patients <45 years of age with acute MI transferred for emergency PCI

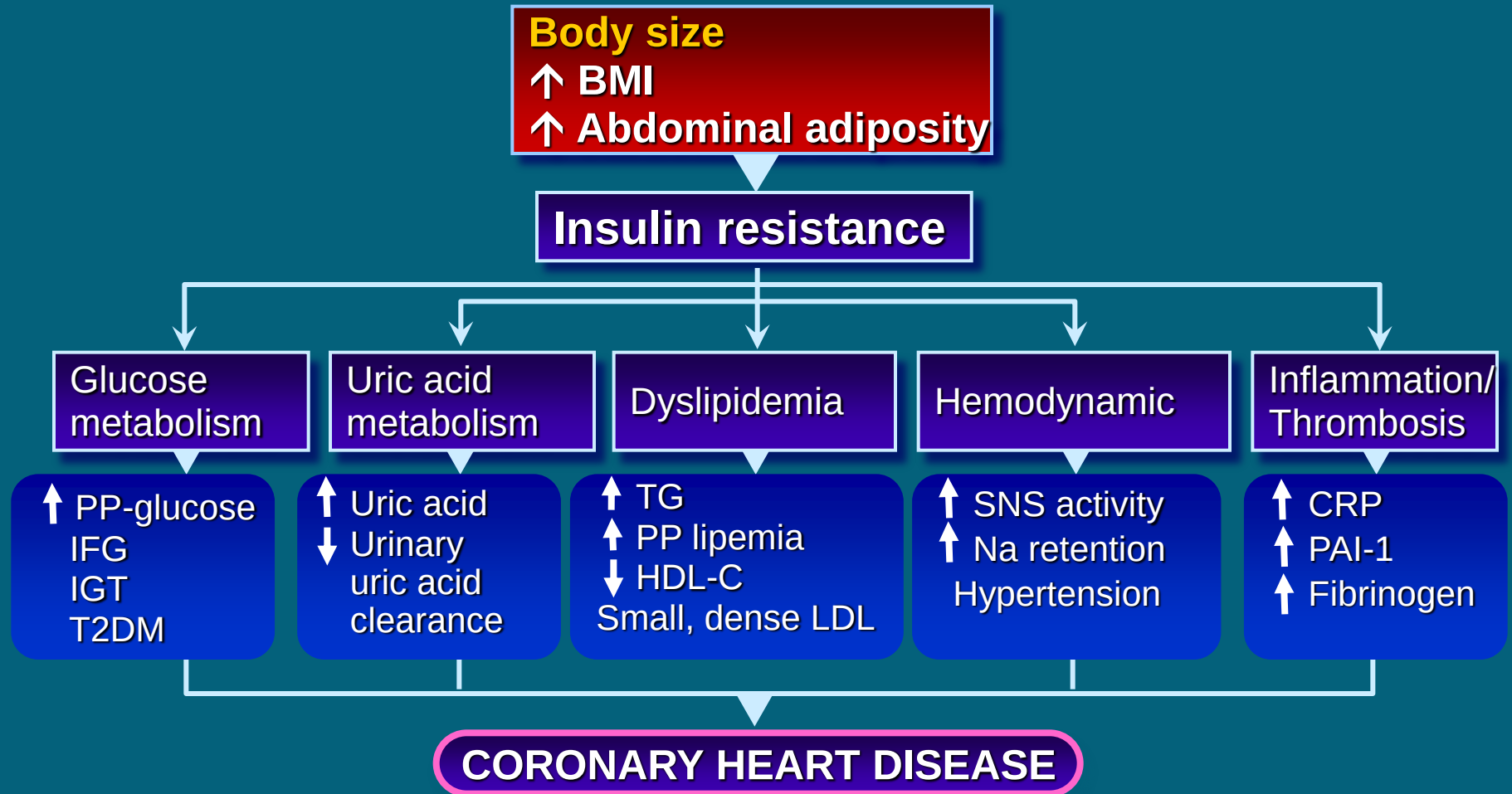
- 76 or 47% met NCEP criteria for Metabolic Syndrome
 - 6 had previous diagnosis of Type 2 diabetes
 - 10 had new diagnoses of T2DM at MI or within 3 months

The Drivers of Cardiometabolic Risk

Unmet Clinical Needs to Address in the Next Decade



Obesity and Abdominal Adiposity Are Leading Drivers of Cardiometabolic Risk



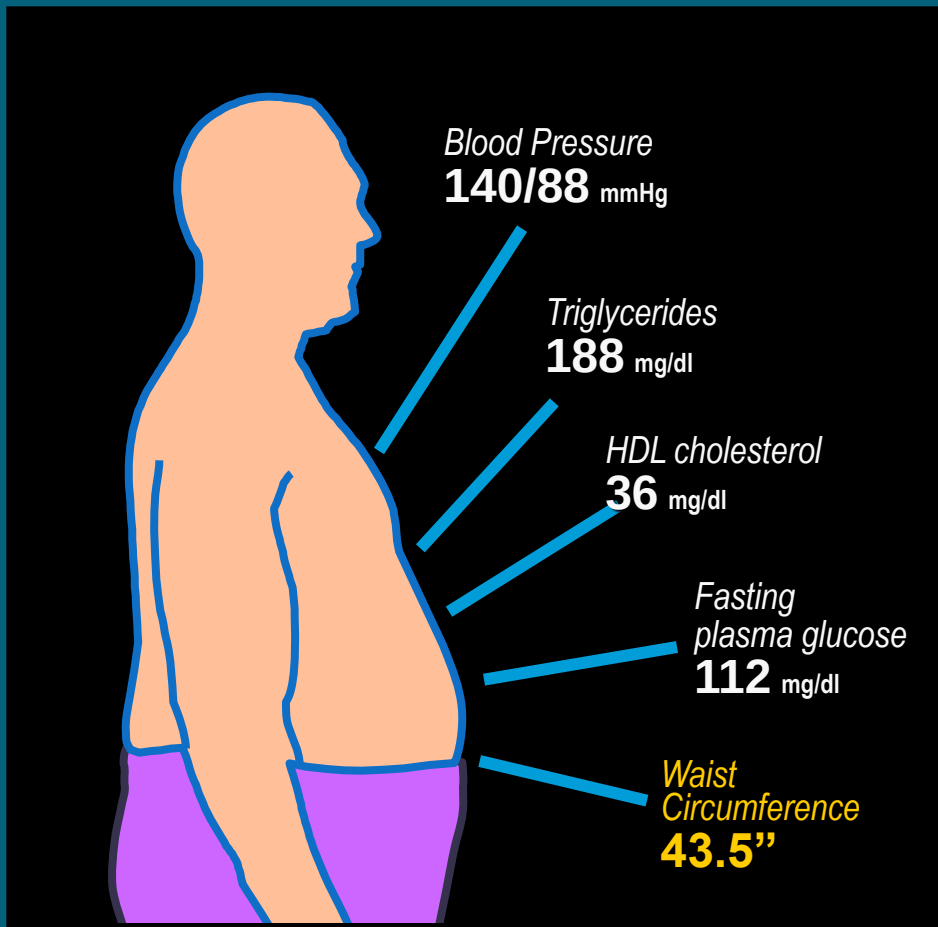
Growing Prevalence of Abdominal Adiposity

US National Health and Nutrition Examination Survey (NHANES)

	NHANES III (1988–1994)	NHANES (2003–2004)	Relative Change
Men	29.5%	42.4%	+44%
Women	47.0%	61.3%	+30%

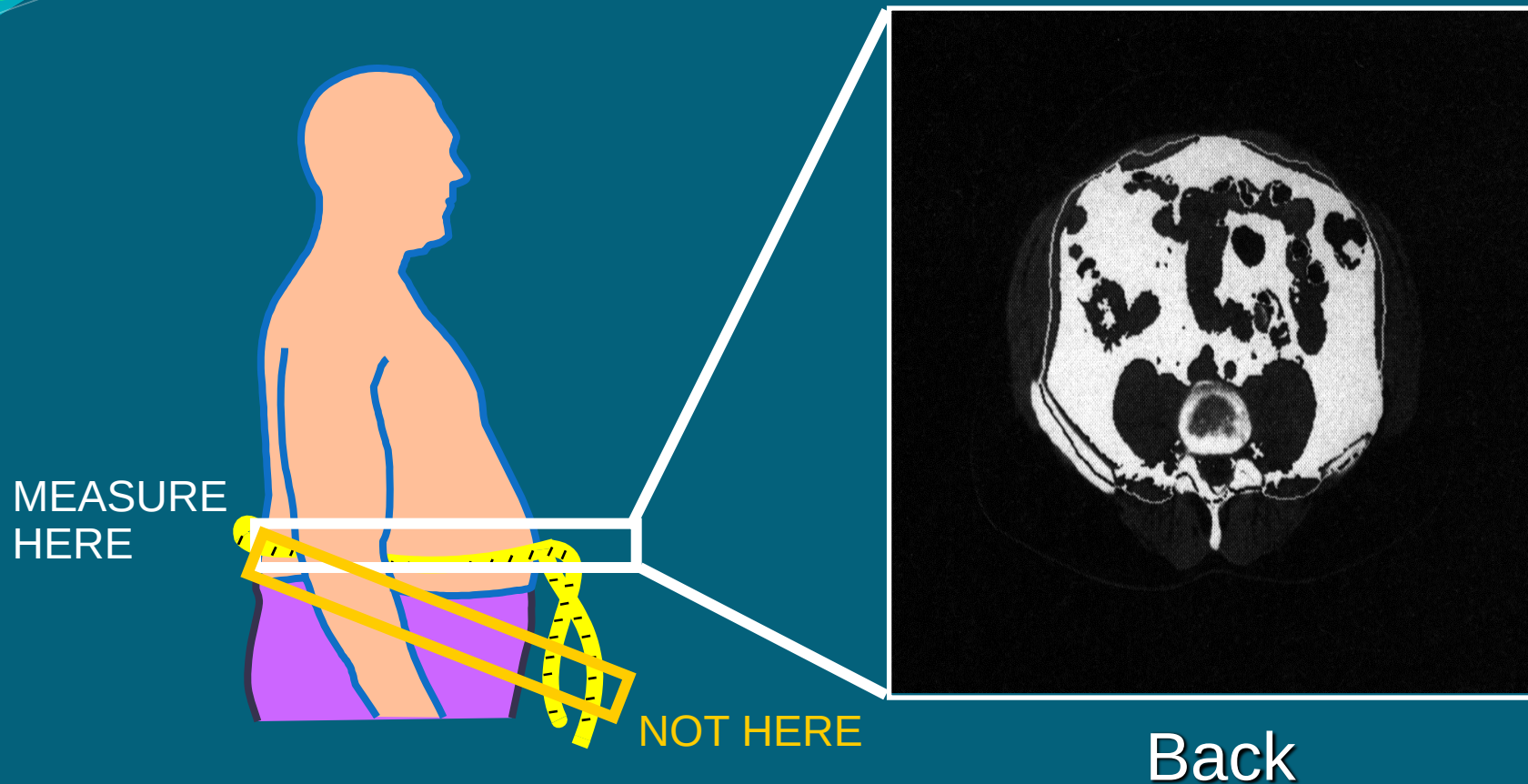
Abdominal adiposity defined as waist circumference:
>102 cm (>40 in) in men or >88 cm (>35 in) in women

Abdominal Adiposity and Associated CVD Risk Factors



Patients with abdominal adiposity (high waist circumference) often present with one or more additional CVD risk factors

Visceral Fat: The Critical Adipose Depot



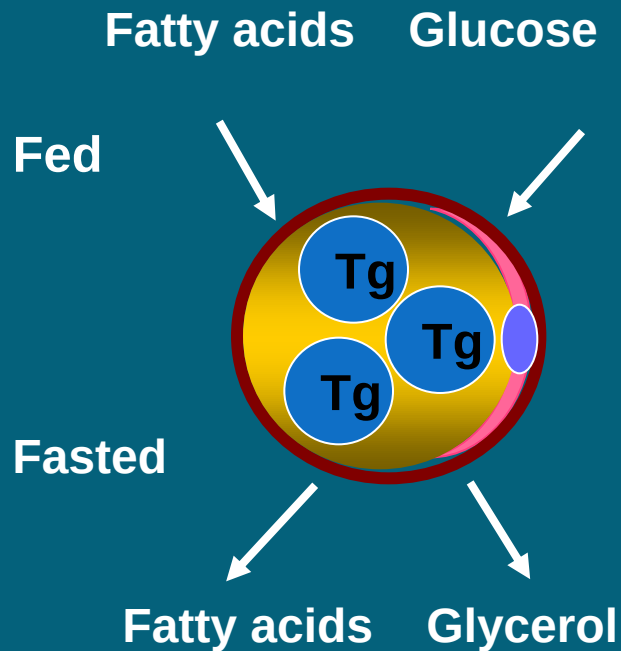
- Place a measuring tape in a horizontal plane at the level of the iliac crest, without compressing the skin
- The value is read at the end of a normal expiration

Why Is Abdominal Adiposity Harmful?

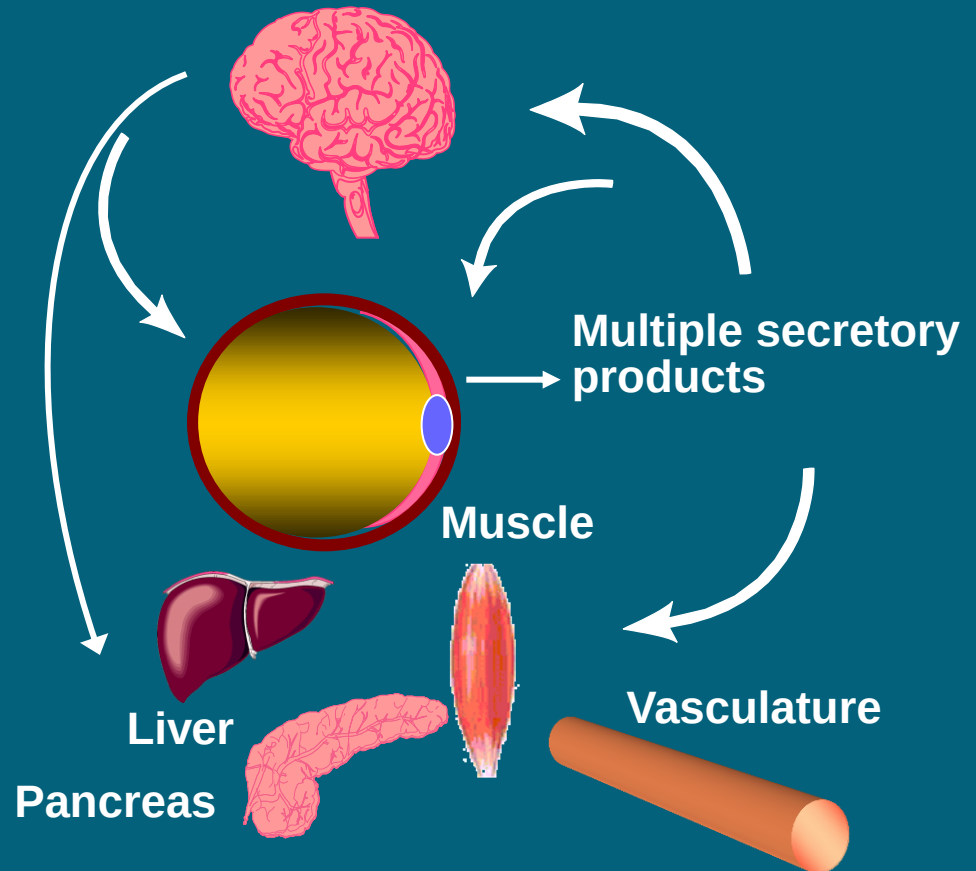
- Abdominal adiposity
 - is often associated with other CVD risk factors
 - is an independent CVD risk factor
- Adipocytes are metabolically active endocrine organs, not simply inert fat storage

The Evolving View of Adipose Tissue: An Endocrine Organ

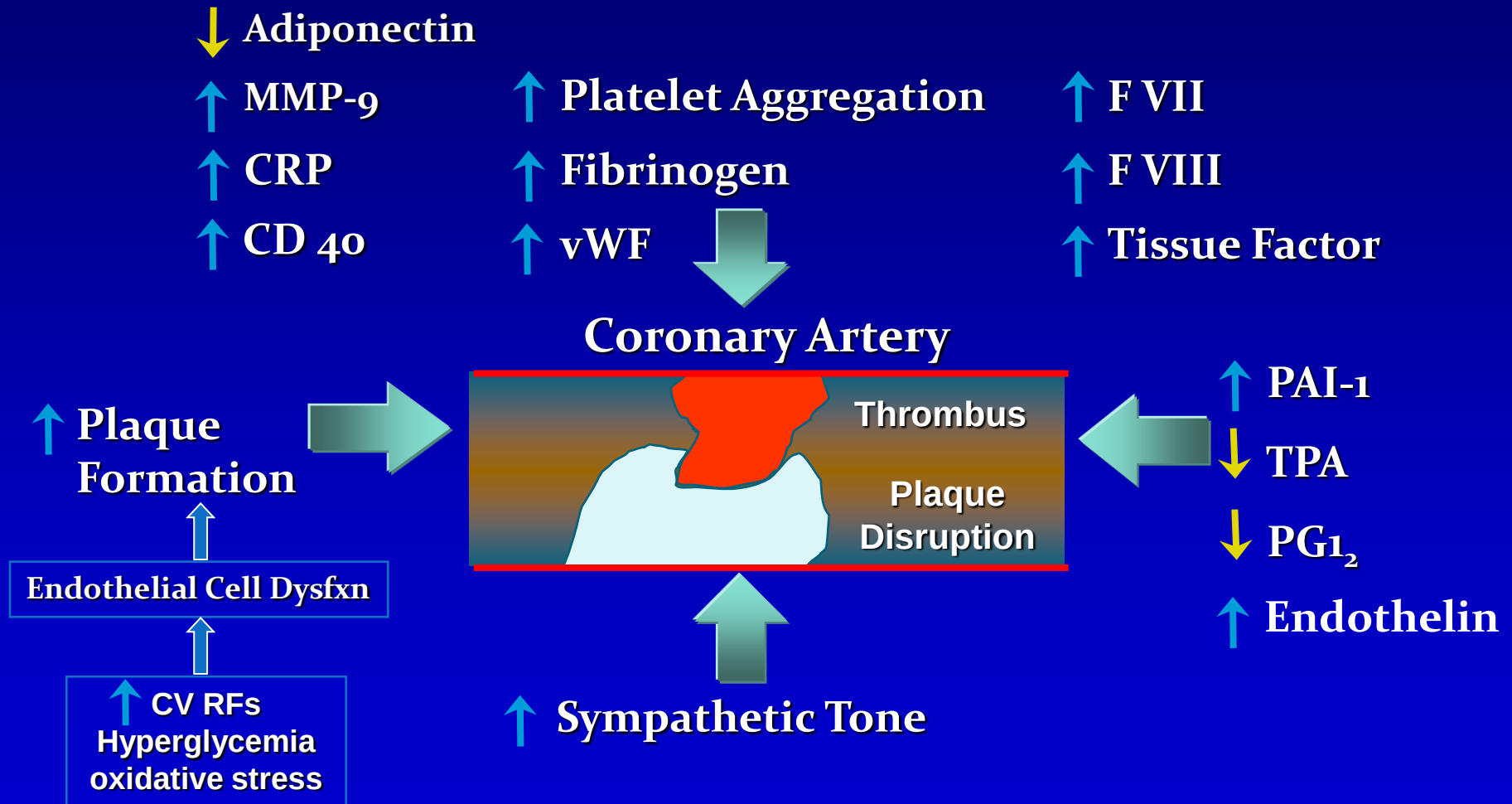
Old View: Inert Storage Depot



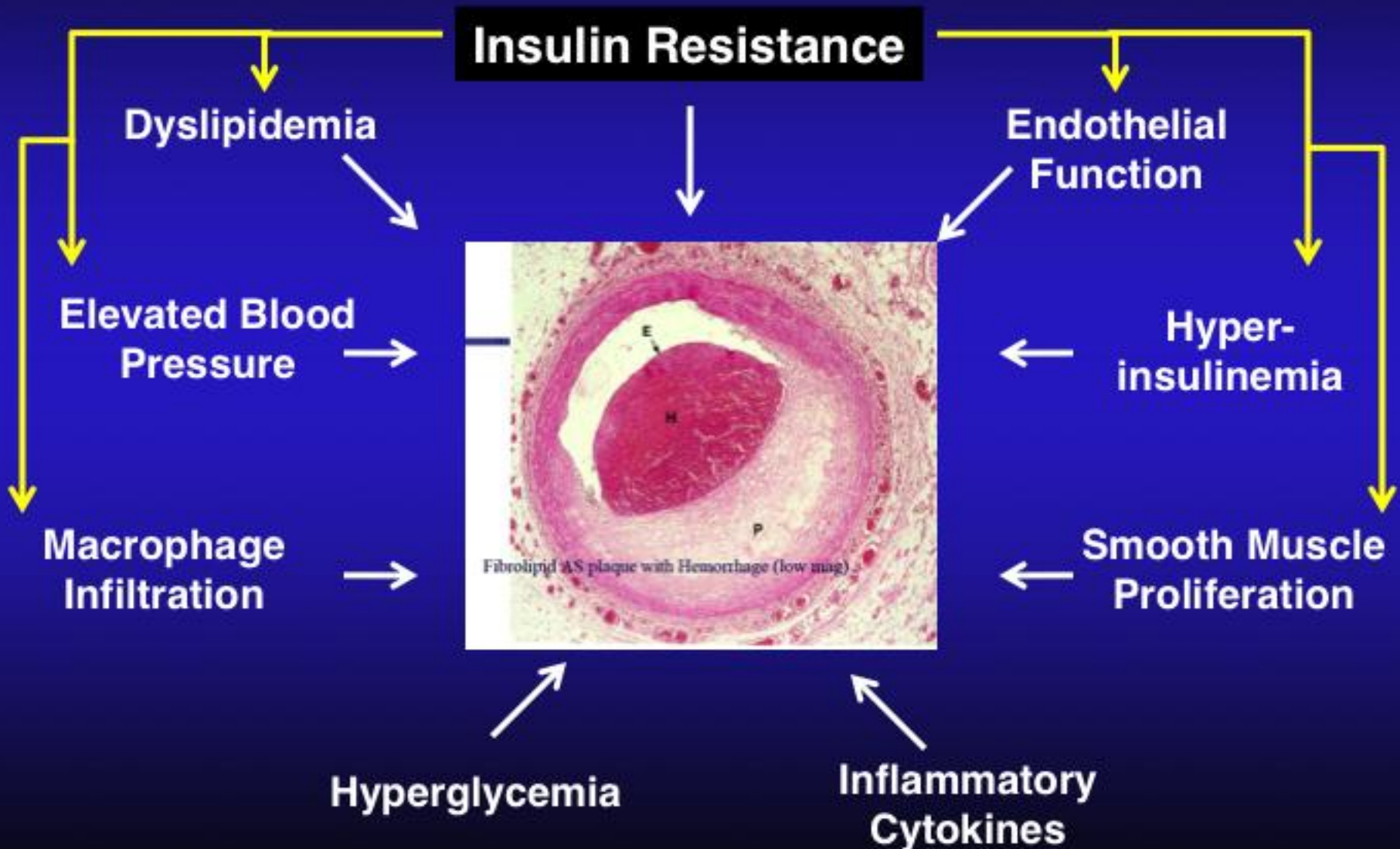
Current View: Secretory/Endocrine Organ



Insulin Resistance is associated with or directly responsible for factors causing atherothrombosis

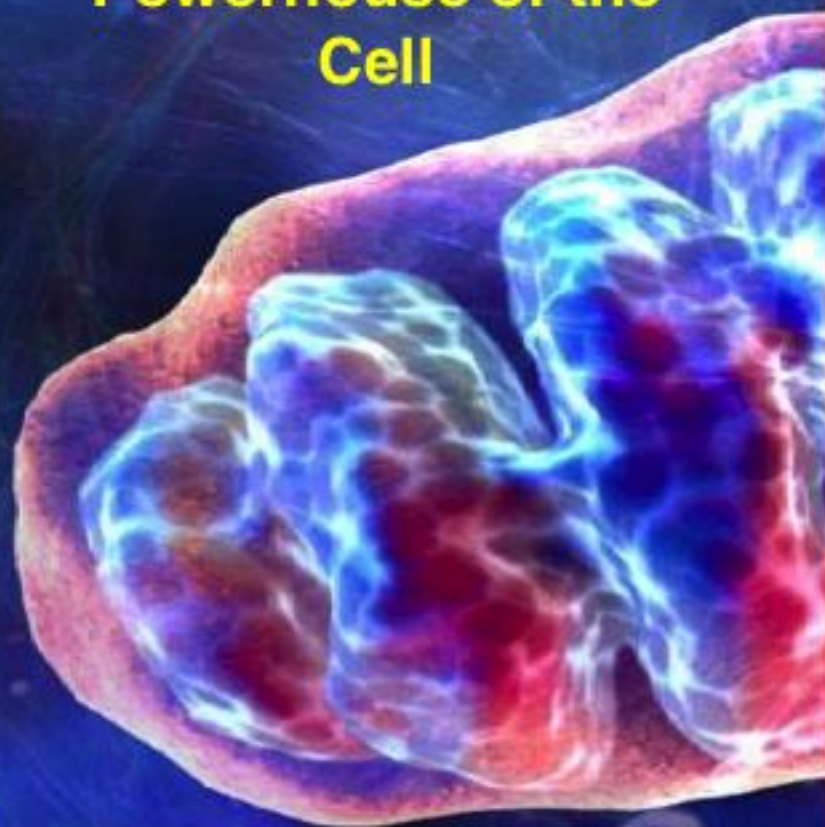


Insulin Resistance – A Major Driver of Atherosclerosis and Cardiovascular Disease



Potential Role of Mitochondria Development of Diabetes, Obesity and the Metabolic Syndrome

Mitochondria – The Powerhouse of the Cell



- Mitochondria are involved in converting all nutritional fuels into energy
- Mitochondrial activity is decreased in aging, obesity and type 2 diabetes.
- Mitochondrial activity is increased with exercise training and dietary manipulations that improve metabolism.

Impact of Weight Loss on Adipose Tissue Hormone Production

Increases

Adiponectin

Decreases

C-reactive protein

IL-6

TNF α

Leptin

FFA

Result:

Improved insulin sensitivity,
reduced inflammation

Reduces risk of type 2 diabetes, ASCVD, other comorbidities

Impact of Weight Loss on Risk Factors

	~5% Weight Loss	5%–10% Weight Loss
HbA _{1c}	 1	 1
Blood Pressure	 2	 2
Total Cholesterol	 3	 3
HDL Cholesterol	 3	 3
Triglycerides		 4

1. Wing RR, et al. *Arch Intern Med.* 1987;147:1749-1753.
2. Mertens IL, Van Gaal LF. *Obes Res.* 2000;8:270-278.
3. Blackburn G. *Obes Res.* 1995;3 (Suppl 2):211S-216S.
4. Ditschuneit HH, et al. *Eur J Clin Nutr.* 2002;56:264-270.

Patient Evaluation and Classification

Traditional Treatment Approach

Dyslipidemia

Hypertension Type 2 Diabetes

Monitor

- Lipid panels

- BP
- Ambulatory BP

- Blood sugar
- Glycosylated hemoglobin

Diet

- ↓ Total fat
- ↓ Cholesterol
- ↑ Fiber

- ↓ Sodium
- ↑ K⁺⁺

- ↓ Sugar
- Distribute CHO, Pro, Fat

Meds

- Statins
- Fibrates
- Niacin
- Resins

- ACEI
- ARB
- Diuretic
- Ca-channel blockers

- Metformin
- Insulin
- TZDs
- Sulfonylureas
- Alpha-glucosidase inhibitors

Weight

Monitoring? Diet? Exercise? Medications?

New Treatment Approach

Adipose Tissue

Reduce BMI and waist circumference

- ↓ Calories, glycemia
- ↑ Daily activity/exercise
- Behavior therapy
- d/c medications causing weight gain
- Current medications, medications in development, combination therapy

Dyslipidemia

Diet

- ↑ Omega-3s
- ↑ MUFA
- ↓ Sat and trans fat
- ↓ Glycemia + ETOH
- ATP III guidelines: TLC diet

Meds

- Statins
- Fibrate
- Ezetimibe

Hypertension

- DASH
- ↓ Na
- ↓ ETOH

- ACEI
- ARB
- Aliskiren

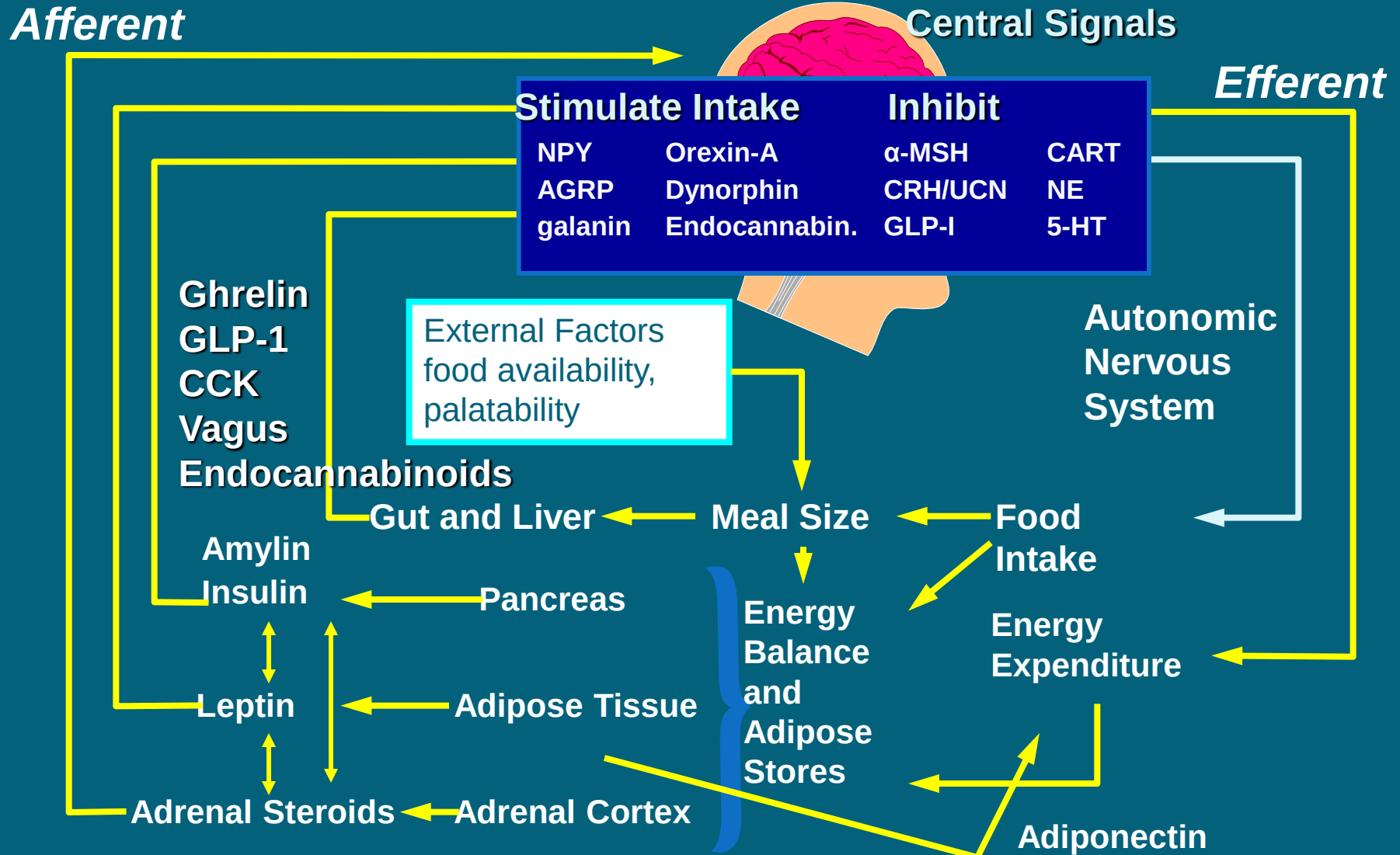
Hyperglycemia

- ↑ Fiber
- ↓ Glycemic diet

- Metformin
- Exenatide
- Pramlintide
- DPP-IV inhibitors

Weight is Controlled by a Feedback System

Weight loss provokes counter-regulatory responses



Assessment and Management

- Measure height and weight, estimate BMI
- Measure waist circumference
- Review the patient's medical condition
 - Assess comorbidities
 - How many are present and how severe are they?
 - Do they need to be treated in addition to the effort at weight loss?

Use a BMI Table

		Body Mass Index (BMI) TABLE																					
		Weight (pounds)																					
Height		120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330
	4'5"	30	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75	78	80	83
	4'6"	29	31	34	36	39	41	43	46	48	51	53	56	58	60	63	65	68	70	72	75	77	80
	4'7"	28	30	33	35	37	40	42	44	47	49	51	54	56	58	61	63	65	68	70	72	75	77
	4'8"	27	29	31	34	36	38	40	43	45	47	49	52	54	56	58	61	63	65	67	70	72	74
	4'9"	26	28	30	33	35	37	39	41	43	46	48	50	52	54	56	59	61	63	65	67	69	72
	4'10"	25	27	29	31	34	36	38	40	42	44	46	48	50	52	54	57	59	61	63	65	67	69
	4'11"	24	26	28	30	32	34	36	38	40	43	45	47	49	51	53	55	57	59	61	63	65	67
	5'0"	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
	5'1"	23	25	27	28	30	32	34	36	38	40	42	44	45	47	49	51	53	55	57	59	61	62
	5'2"	22	24	26	27	29	31	33	35	37	38	40	42	44	46	48	49	51	53	55	57	59	60
	5'3"	21	23	25	27	28	30	32	34	36	37	39	41	43	44	46	48	50	51	53	55	57	59
	5'4"	21	22	24	26	28	29	31	33	34	36	38	40	41	43	45	46	48	50	52	53	55	57
	5'5"	20	22	23	25	27	28	30	32	33	35	37	38	40	42	43	45	47	48	50	52	53	55
	5'6"	19	21	23	24	26	27	29	31	32	34	36	37	39	40	42	44	45	47	49	50	52	53
	5'7"	19	20	22	24	25	27	28	30	31	33	35	36	38	39	41	42	44	46	47	49	50	52
	5'8"	18	20	21	23	24	26	27	29	30	32	34	35	37	38	40	41	43	44	46	47	49	50
	5'9"	18	19	21	22	24	25	27	28	30	31	33	34	36	37	38	40	41	43	44	46	47	49
	5'10"	17	19	20	22	23	24	26	27	29	30	32	33	35	36	37	39	40	42	43	45	46	47
	5'11"	17	18	20	21	22	24	25	27	28	29	31	32	34	35	36	38	39	41	42	43	45	46
	6'0"	16	18	19	20	22	23	24	26	27	29	30	31	33	34	35	37	38	39	41	42	43	45
	6'1"	16	17	19	20	21	22	24	25	26	28	29	30	32	33	34	36	37	38	40	41	42	44
	6'2"	15	17	18	19	21	22	23	24	26	27	28	30	31	32	33	35	36	37	39	40	41	42
	6'3"	15	16	18	19	20	21	23	24	25	26	28	29	30	31	33	34	35	36	38	39	40	41
	6'4"	15	16	17	18	20	21	22	23	24	26	27	28	29	30	32	33	34	35	37	38	39	40
	6'5"	14	15	17	18	19	20	21	23	24	25	26	27	29	30	31	32	33	34	36	37	38	39
	6'6"	14	15	16	17	19	20	21	22	23	24	25	27	28	29	30	31	32	34	35	36	37	38
	6'7"	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	32	33	34	35	36	37
	6'8"	13	14	15	17	18	19	20	21	22	23	24	25	26	28	29	30	31	32	33	34	35	36
	6'9"	13	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31	32	33	34	35
	6'10"	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	34	35

Underweight
Normal
Overweight
Obesity – Class I
Obesity – Class II
Obesity – Class III

$$\text{BMI} = \frac{\text{weight (pounds)} \times 703}{\text{height squared (inches}^2\text{)}}$$

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height squared (m}^2\text{)}}$$

Waist Circumference – Increased risk: >35" for women, >40" for men¹

1. The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. October 2000. NIH Publication No. 00-4084.
 2. International Diabetes Federation. The IDF consensus worldwide definition of the metabolic syndrome. Available at http://www.idf.org/webdata/docs/Metabolic_syndrome_definition.pdf.

For people of Chinese, Japanese, or South Asian descent, and for ethnic South and Central Americans, the cutpoints are 31.5 inches and 35.4 inches for women and men, respectively.²

Assessing Obesity: BMI, Waist Circumference, and Disease Risk

Disease Risk Relative to Normal Weight and Waist Circumference

Category	BMI	Men ≤ 40 in [†]	Men > 40 in
		Women ≤ 35 in [†]	Women > 35 in
Underweight	< 18.5	—	—
Normal*	18.5–24.9	—	—
Overweight	25.0–29.9	Increased	High
Obesity	30.0–34.9	High	Very high
	35.0–39.9	Very high	Very high
Extreme obesity	≥ 40	Extremely high	Extremely high

*An increased waist circumference can denote increased disease risk even in persons of normal weight.¹

[†]For people of **Chinese, Japanese, or South Asian descent**, and for **ethnic South and Central Americans**, the cutpoints are **35.4 inches and 31.5 inches** for males and females, respectively.²

Review Patient Medical History

Many aspects of the history are helpful in managing the obese patient

- Affect outcome
 - Family history
 - Age of onset of obesity
 - Minimum and maximum weight as an adult
 - Events associated with weight gain
 - Recent weight-loss attempts
 - Previous weight-loss modalities used successfully and unsuccessfully, and their complications
 - Cigarette smoking can complicate treatment
 - When stopping, weight is often gained

History

- Contraindications to treatment
 - Active cancer
 - Any severe, acute illness
 - Pregnancy
- Relative contraindications to treatment or need for specialized treatment
 - History of eating disorders, such as binge eating and purging by vomiting or laxative abuse
 - Alcohol and substance abuse
- Guides to treatment
 - Current level of physical activity
 - Understanding of nutrition

Exam

- Blood pressure
 - Use the correct size cuff
- Acanthosis nigricans, skin tags
 - Skin lesions that are darker than the skin around them; velvety feel; form in the folds along the neck, armpits, groin, knuckles and between the legs, at the elbow, under the breasts, and around the umbilicus
- Thyroid
 - Treatment will not help weight loss
- PCOS
 - Hirsutism



Recommended Labs*

- Comprehensive metabolic panel, including
 - Liver function tests
 - Abnormalities may suggest nonalcoholic fatty liver disease
 - Serum creatinine
 - Blood urea nitrogen
- Lipids
 - Triglycerides, high-density lipoprotein, low-density lipoprotein, total cholesterol
- Glucose
 - Fasting glucose
 - HbA_{1c}, two-hour PPG (in patients with diabetes)
- Thyroid-stimulating hormone
- Urinalysis
 - Should also do spot microalbumin[†] if patient has other comorbidities

*Labs should be in a fasting state, unless otherwise noted.

† With albumin-specific dipstick.

Other Labs to Consider

- Glucose
 - Oral glucose tolerance test (in patients without diabetes)
- High sensitivity or “cardio” C-reactive protein
 - Often elevated
 - Good for demonstrating health benefits of weight loss
- Insulin
 - Fasting and two-hour postprandial
- Uric acid

Use a “Weight-Centered” Approach to Manage the Obese Patient

- Look for:
- Obstructive sleep apnea (OSA)
- Medications causing weight gain
 - Substitute alternatives that are weight-neutral or associated with weight loss
 - Example: sulfonylurea to metformin
- Depression
 - Treat or refer to specialist
- Pre-diabetes, hyperinsulinism, IFG, PCOS
 - Use low glycemic, high fiber, low energy density diet
 - Use metformin, acarbose

Obstructive Sleep Apnea

- Often overlooked in obese patients
- History of loud snoring
 - ✓ Cessation of breathing during sleep, which is often followed by a loud clearing breath and then brief awakening
 - ✓ Restless sleeper; some persons find that they can only sleep comfortably in the sitting position
 - ✓ Partner may best describe these symptoms
 - ✓ Daytime fatigue with episodes of sleepiness at inappropriate times

Obstructive Sleep Apnea (cont.)

- CVD is common in patients with OSA
- Increased risk for
 - Cardiac arrhythmias, including severe bradycardias, during apneic episodes
 - Angina and myocardial infarction
 - Dilated cardiomyopathy (reversible with successful treatment)
 - Cerebrovascular events
- In some patients, repetitive severe nocturnal oxyhemoglobin desaturations may lead to persistent pulmonary hypertension and cor pulmonale
 - More common in patients with comorbid COPD
- Psychosocial problems are also common (e.g., mood changes, poor memory, irritability, impaired concentration)

Obstructive Sleep Apnea (cont.)

- Exam
 - Hypertension
 - Pulmonary hypertension (loud P₂)
 - Narrowing of the upper airway
 - Scleral injection
 - Leg edema secondary to pulmonary hypertension
- Laboratory studies
 - May show polycythemia
- Referral to a pulmonologist or sleep specialist is appropriate
- May lead to further weight gain if not treated

Talking to Your Patient

Treat cardiometabolic risk the way you treat other chronic conditions

- Assess weight in an empathetic, nonjudgmental fashion
- Avoid criticizing patients; help them identify and solve problems preventing success
- Discuss success in terms of nonweight outcomes
 - Lipids – Mobility
 - Glucose – Sleep quality/energy level
 - HTN

Treatment of “Metabolic Syndrome” or “Cardiometabolic Risk”

According to guidelines from

- Adult Treatment Panel III (ATP III)*
- The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII)[†]
- American Diabetes Association (ADA)[‡]

**First-Line Therapy = Weight Reduction
With Lifestyle Modification**

*Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *JAMA*. 2001;285:2486-2497. [†]Chobanian AV et al. *JAMA*. 2003;289:2560-2572.

[‡]American Diabetes Association. *Diab Care*. 2004;27:S36-S46.

A Guide to Selecting Treatment: National Institutes of Health (NIH) Guidelines*

Treatment	Body Mass Index (BMI) (kg/m ²)				
	25–26.9	27–29.9	30–34.9	35–39.9	≥40
Diet, physical activity, behavior therapy	Yes, with comorbidities ▲	Yes, with comorbidities	Yes	Yes	Yes
Pharmacotherapy	— — — — —	Yes, with comorbidities	Yes	Yes	Yes
Weight-loss surgery	— — — — —	— — — — —	— — — — —	Yes, with comorbidities	Yes

***Yes** alone indicates that the treatment is indicated regardless of the presence or absence of comorbidities. The solid arrow signifies the point at which therapy is initiated.

NIH/NHLBI, NAASO. *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, Md: NIH; 2000.

Complications: Medications That Cause Weight Gain/Prevent Weight-Loss

- Drugs used to treat the following problems have been shown to cause weight gain and prevent obesity treatment from being effective
 - Depression
 - Schizophrenia
 - Mood disorders
 - Seizures
 - Hypertension
 - Diabetes
 - Insomnia
 - Allergies
 - Birth control
- Weight gain is a cause of abnormal lipid profile

You may need to consider a substitute

Drugs That May Promote Weight Gain

- Diabetes treatments
 - Insulin
 - Sulfonylureas
 - Thiazolidinediones
- Psychiatric/neurologic
 - Antipsychotics
 - Antidepressants
 - Antiepileptics
 - Lithium

Drugs That May Not Promote Weight Gain

- Diabetes treatments
 - Exenatide, pramlintide, sitagliptin
 - Metformin
 - Acarbose, miglitol
- Psychiatric/neurologic
 - Ziprasidone, aripiperazole
 - Bupropion
 - Topiramate, zonisamide, lamotrigine

Adapted from Aronne LJ, Segal KR. *J Clin Psychiatry*. 2003;64(Suppl 8):22-29.

Leslie WS, et al. *Q J Med*. 2007;100:395-404.

Messerli FH, et al. *Am J Med*. 2007;120:610-615.

Drugs or Alternatives That May Promote Weight Gain

- Steroid hormones
 - Corticosteroids
 - Hormonal contraceptives
 - Progestational steroids
- Antihistamines
- α -adrenergic blockers³,
 β -adrenergic blockers
(eg, metoprolol⁴)

Drugs or Alternatives That May Not Promote Weight Gain

- Steroid hormones
 - NSAIDs
 - Barrier methods of contraception
 - Weight loss for menometrorrhagia
- Steroid inhalers
- ACE inhibitors, Ca blockers, diuretics, carvedilol⁴

1. Adapted from Aronne LJ, Segal KR. *J Clin Psychiatry*. 2003;64(Suppl 8):22-29.

2. Leslie WS, et al. *Q J Med*. 2007;100:395-404.

3. Cheskin LJ, et al. *Southern Medical Journal*. 1999;92:898-904.

4. Messerli FH, et al. *Am J Med*. 2007;120:610-615.

DRUG-ASSOCIATED WEIGHT CHANGE REFERENCE

Therapeutic Category	Drug Class	May Cause Weight Gain		Alternatives that Cause Less Weight Gain, Weight Loss or are Weight Neutral	
		Generic	Name Brand	Generic	Name Brand
Psychiatry	Antipsychotic	Clozapine	Clozaril/FazaClo	Ziprasidone	Geodon
		Risperidone	Risperadal	Aripiprazole	Abilify
		Olanzapine	Zyprexa/Zydis		
		Quetiapine	Seroquel		
		Other			
	Antidepressants and Mood Stabilizers	Citalopram	Celexa	Bupropion	Wellbutrin/Zyban
		Escitalopram	Lexapro	Nefazodone	Serzone
		Fluvoxamine	FeVarin/Luvox	Fluoxetine(short term <1 year)	Prozac
		Lithium	Carbolith		
		MAOI's		Sertraline (short term <1year)	Zoloft
		Mirtazapine	Remeron		
		Paroxetine	Paxil		
		TCA's	Tricyclic Antidepressants		
		Venlafaxine	Effexor		
Neurology	Anticonvulsants	Carbamazepine	Tegretol/Carbatrol	Lamotrigine	Lamictal
			Epitol/Equetrol	Topiramate	Topamax
		Gabapentin	Gabarone/Neurontin	Zonisamide	Zonegran
		Valproate	Depacon		
Endocrinology	Diabetes Treatments	Insulin		Metformin	Glucophage/Fortamet
				Acarbose	Prandase/Precose
		Sulfonylureas	Diabinese, Micronase	Miglitol	Glyset
			Glucotrol, Glynase, Amaryl		
		Thiazolidinedione	Actos, Avandia	Pramlintide	Symlin
				Exenatide	Byetta
				Sitagliptin	Januvia
Obstetrics & Gynecology	Oral Contraceptives	Progestational steroids		Barrier Methods	
		Hormonal contraceptives containing progestational steroids		IUD's	
	Endometriosis Treatment	Depot leuprolide acetate	Lupron	Surgical Methods	
Cardiology	Antihypertensives	α -blocker	Minipress	ACE Inhibitors	Lotensin, Vasotec, Zexril
		β -blocker	Toprol	Calcium Channel Blockers	Norvasc, Procardia
Infectious Disease	Antiretroviral Therapy	Protease inhibitors	Saquinavir, Ritonavir, Indinavir	None	
General	Steroid Hormones	Corticosteroids		NSAIDs	
		Progestational steroids			
	Antihistamines/ Anticholinergics	Diphenhydramine	Benadryl/Simply Sleep	Decongestants	
		Soxepin	Aponal/Sinquan/Adapine	Steroid inhalers	
		Cyproheptadine	Periactin		
		Other potent antihistamines			

Losing Weight – The Importance of Physical Activity

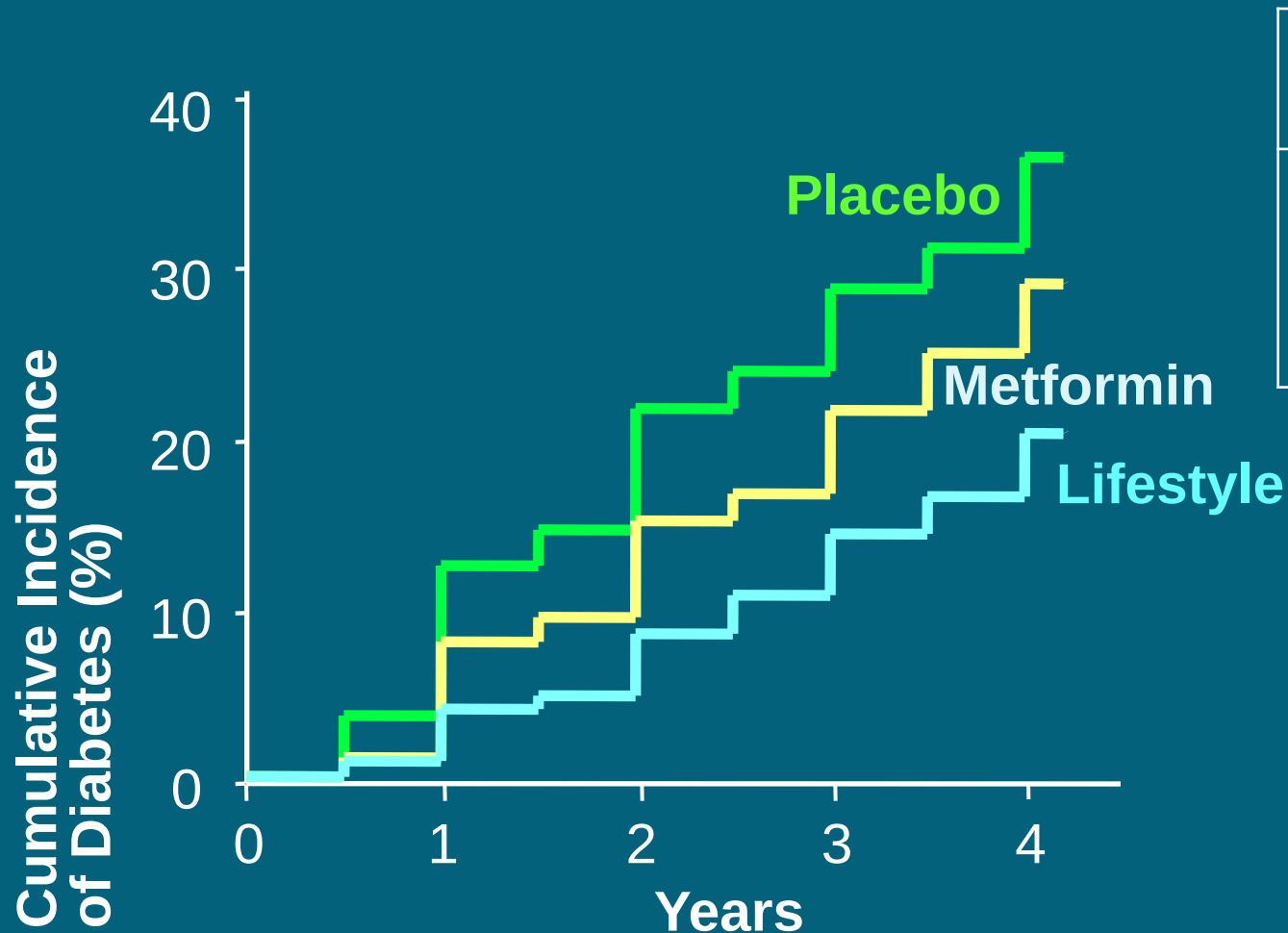
- Physical activity generally **does not**
 - Result in substantial weight loss
 - Increase short-term diet-induced weight loss
- Physical activity **does**
 - Decrease loss of fat-free mass associated with weight loss
 - Improve CV health independent of weight loss
 - Support maintenance of weight loss
- There is also some evidence that physical activity may preferentially reduce intraabdominal fat

Lifestyle Modification in the Diabetes Prevention Program

- Months 1–6: 16 individual sessions with a registered dietitian (RD)
- Months 7–36: Minimum of 1 session every other month with RD
 - Additional support as needed
- Focus of sessions
 - Review food and activity records
 - Problem-solve difficulties
 - Praise participant's effort

Diabetes Prevention Program

Modest Weight-Loss Reduces the Incidence of New-Onset Diabetes in an At-Risk Population



Weight loss	Decrease in risk*
0.1 kg	
2.1 kg	31%
5.6 kg	58%

$P < 0.001$ for each comparison.

*Decrease in risk of developing diabetes, compared to placebo group.

Use a Variety of Tools, Keep it Simple, Keep it Going, Keep it Measurable

- Pedometer
- Food and activity records
- Meal replacements
- Reduce a category of food
- Cut all portions in half

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“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”