

Starting a Research Career in the Field of Diabetes

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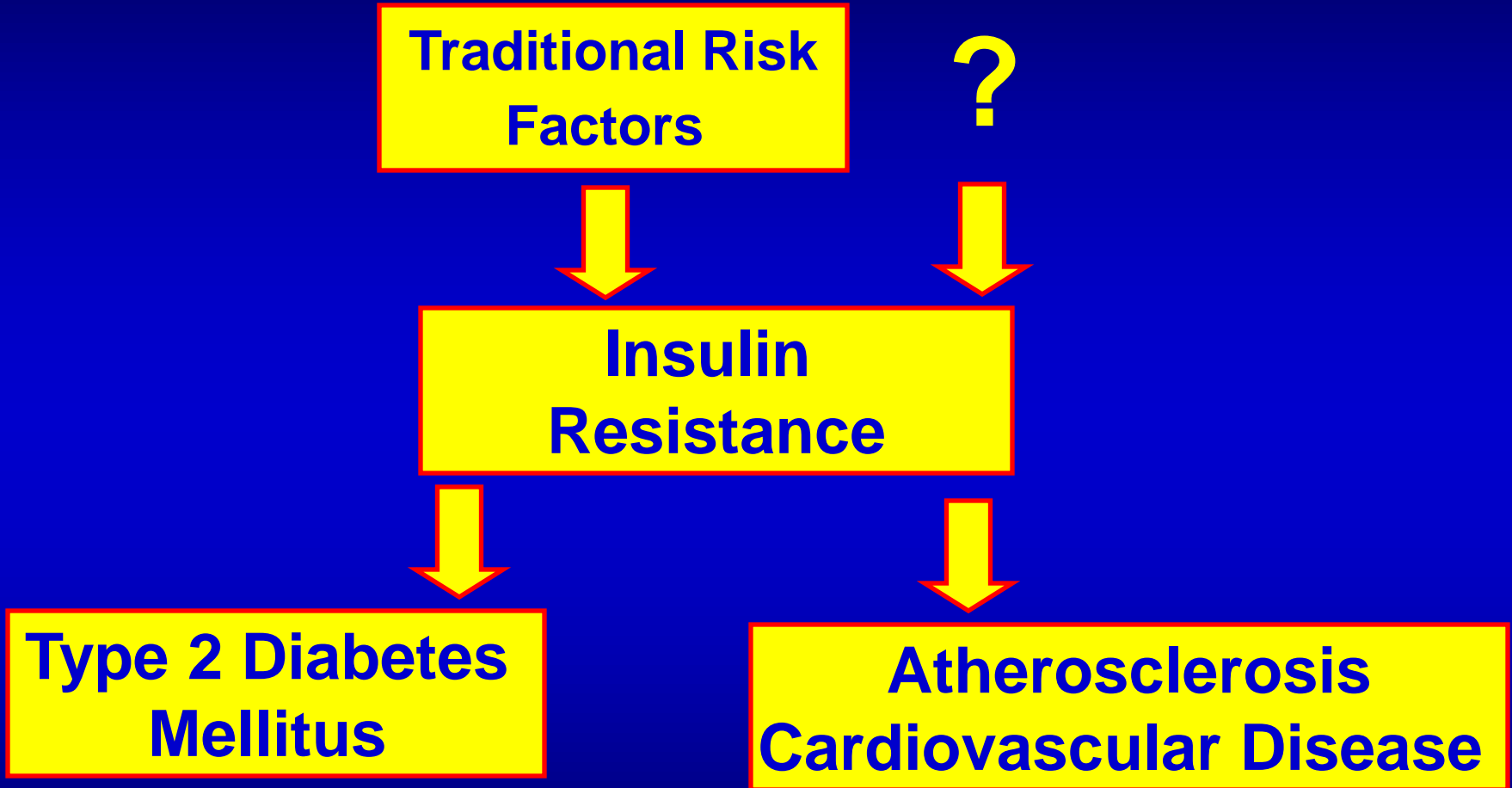
Welch Center for Prevention, Epidemiology, and Clinical Research
Johns Hopkins Center to Eliminate Cardiovascular Health Disparities
Johns Hopkins University School of Medicine

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Outline

- Hot topics in diabetes epidemiology, clinical, and translational research
- Training requirements for career success
- Personal insights
 - Golden career trajectory
 - Pearls of time management

NOVEL RISK FACTORS FOR INSULIN RESISTANCE, DIABETES, AND CVD



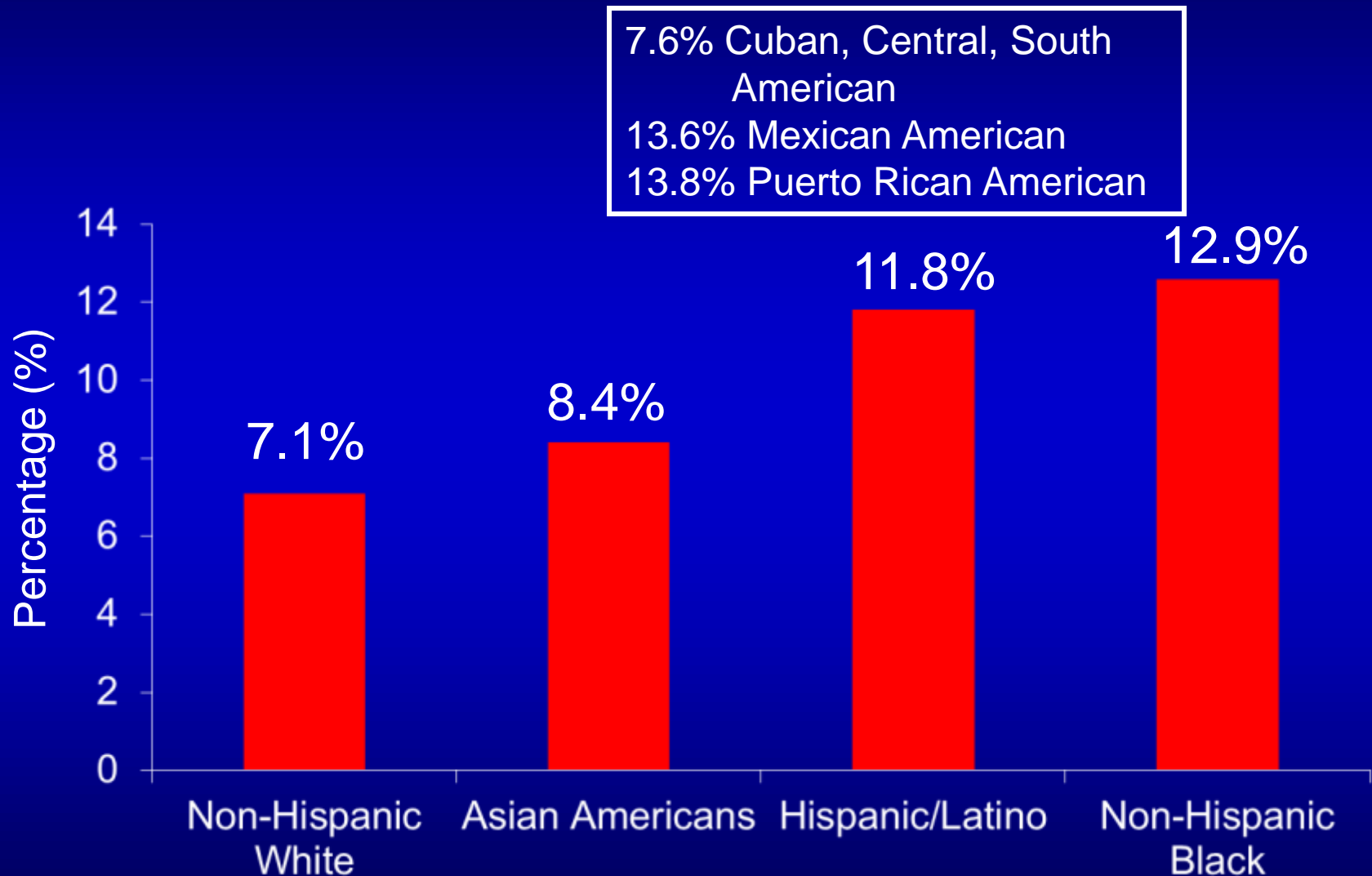
Hot Topics in Diabetes Epidemiology/Clinical Research

- Environmental determinants of diabetes
 - Heavy metals
 - Air pollution
- Health disparities in diabetes
 - Race/ethnic disparities
 - Sex disparities

Race/Ethnic Disparities in Diabetes Mellitus and Obesity

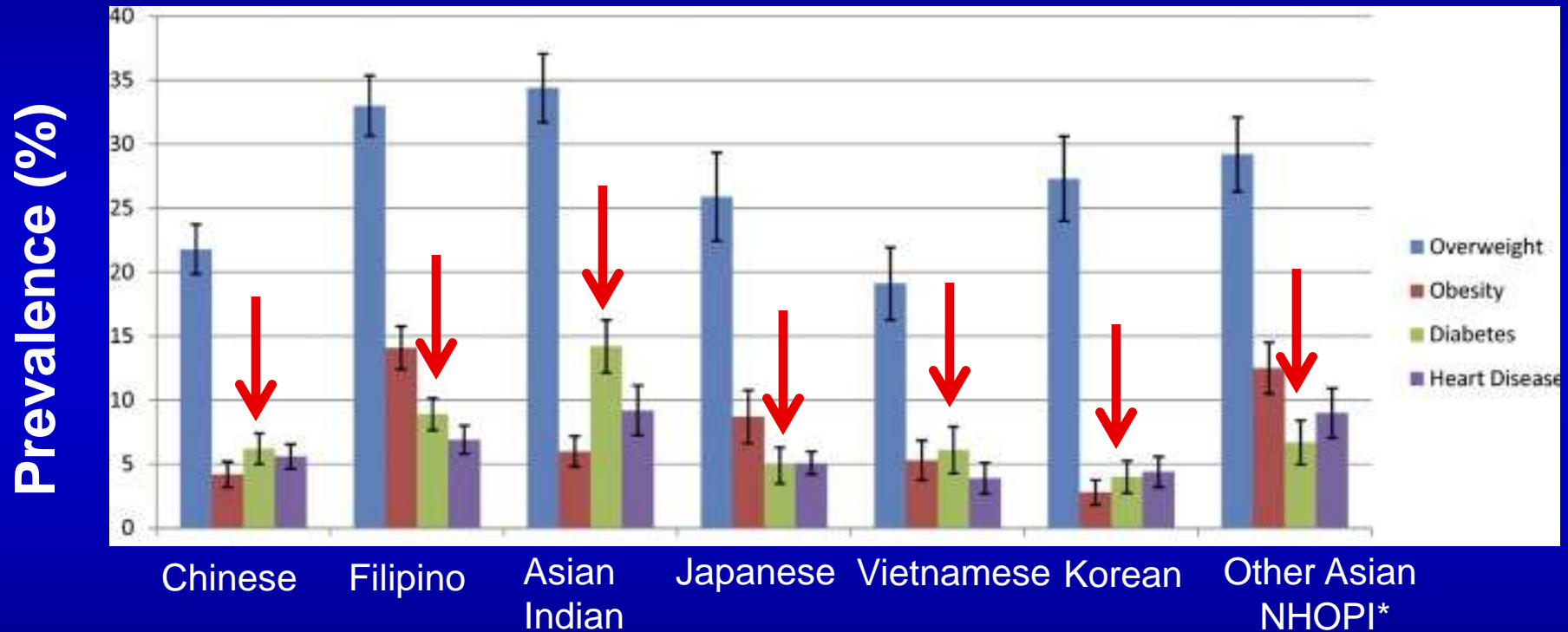


Diabetes Prevalence by Race/Ethnicity



Centers for Disease Control, National Diabetes Fact Sheet, 2011

Heterogeneity in Diabetes Prevalence in Asian-Americans



*Native Hawaiian/Other Pacific Islander

Narayan et al, *J Am Coll Cardiol*, 2010

Sex Disparities in Diabetic Complications

- Microvascular complications rates similar in men and women
- Disparities in macrovascular complications
 - Diabetes increases risk of CHD and CHD mortality in women more than men
 - Peripheral arterial disease and diabetes-related lower limb amputations higher in men



Hot Topics in Diabetes Epidemiology/Clinical Research

- Social determinants of diabetes and obesity

Conceptual Framework for Health and Healthcare Disparities: Social Epidemiology

Adapted from R. B. Warnecke et
al, *Am J Public Health*, 2008;
98:1608-1615

BIOLOGIC-ENVIRONMENT INTERACTIONS

Proximate Factors

Biologic/Genetic Pathways

Allostatic load, genetics, genetic ancestry, epigenetics

Biologic/Responses

Stress, hypertension, obesity, ↑cholesterol, hyperglycemia

Individual Risk Behaviors

Smoking, diet, disease self-management, medication adherence

Individual Demographics and Social Factors

Age, socioeconomic status, education, race/ethnicity, acculturation, social support, language barriers

Intermediate Factors

Physical Context

Neighborhood stability, cleanliness, sidewalks, open space, parks, food availability

Social Context

Collective efficacy, social capital, social network, social cohesion, poverty, racial/ethnic integration, social/economic gradient

Healthcare Context

Access to care, quality of care, provider characteristics, patient-provider relationships, health literacy

Distal Factors

Social Conditions and Policies

Poverty, public policy, prejudice, culture, discrimination

DISPARATE HEALTH OUTCOMES
Diabetes Mellitus and Diabetes Complications

Intermediate Factors

- **Physical context**—neighborhood environment
- **Social context**—neighborhood cohesion, neighborhood socioeconomic status, social network, social capital, racial/ethnic integration



Hot Topics in Diabetes Epidemiology/Clinical Research

- Social determinants of diabetes and obesity
- Diabetes in the elderly
 - Mechanisms of diabetes as a risk factor for cognitive decline, Alzheimer's Disease, and vascular dementia
 - Mechanisms of functional disability in elderly with diabetes

Hot Topics in Diabetes Epidemiology/Clinical Research

- Incorporation of mechanistic biomarkers into epidemiological studies to understand mechanisms of associations
 - Depression and type 2 diabetes
 - Sleep quality, sleep apnea, and type 2 diabetes
 - Understanding mechanisms allows design of novel preventive interventions

Research Training

Quantitative and Clinical Skills

PhDs without Clinical Background

- Formal training in epidemiology and biostatistics—
PhD
- Clinically-oriented public health coursework
 - Diabetes/obesity epidemiology
 - Cardiovascular disease epidemiology
 - Infectious disease epidemiology
- Exposure to clinical diabetes
 - Clinical shadowing/observorship

PhDs without Clinical Background

- Post-doctoral fellowship focused on diabetes or cardiovascular disease epidemiology
 - T32, individual NRSA (F32)
 - K08 or foundation career development award for junior faculty (ADA, AHA, Robert Wood Johnson Foundation)
 - Complimentary training/clinical exposure through affiliation with School of Medicine

MDs with Clinical Background

- Clinical background—general internal medicine, endocrinology, or cardiology
- Formal training in epidemiology and biostatistics
 - MPH, MSc, MHS, PhD
- Incorporate into clinical fellowship or junior faculty training
 - T32, individual NRSA (F32)
 - K23 or foundation career development award for junior faculty (ADA, AHA, Robert Wood Johnson Foundation)

Specific statistical skills for social epidemiology

- Multi-level/heirarchical/mixed effects models
- Statistical models of parameters that vary at more than one level
- Used for research designs where data for participants is organized at more than one level (nested data)
 - Individual level data nested within a contextual unit (e.g. acculturation with the setting of a given neighborhood environment)
 - Allows for repeated measures of individual level data

Assessment of Socioeconomic Status

Individual measures

- Education
- Income (in categories)
- Wealth measures (each receive a point)
 - Owning ≥ 1 car
 - Owning a home or paying mortgage on a home
 - Owning land or an investment (stocks, bonds, mutual funds, retirement investments)

Hajat et al, *Psychosom Med*, 2009

Neighborhood measures

- Derived from census tract
 - Median household income
 - Median value of owner occupied house
 - % households receiving interest, dividend, or net rental income
 - % adults ≥ 25 with high school degree
 - % adults ≥ 25 with college degree
 - % individuals ≥ 16 in professional, managerial, or executive occupations

Chichlowska et al, *Ann Epidemiol*, 2009



Neighborhood Covariates

Construct	Items
Income	Pooled information of individuals living within a neighborhood designated by the use of GIS census tract
Education	Pooled information of individuals living within a neighborhood designated by the use of GIS census tract
Physical Environment	Walking Environment*: <ol style="list-style-type: none">1. Is it pleasant to walk in my neighborhood2. The trees in my neighborhood provide enough shade3. In my neighborhood it is easy to walk places4. I often see other people walking in my neighborhood5. I often see other people exercise in my neighborhood
	Availability of Healthy Foods*: <ol style="list-style-type: none">1. A large selection of fresh fruits and vegetables is available in my neighborhood2. A large selection of low fat products is available in my neighborhood

* Based on a Likert Scale of 1=strongly agree, 2=agree, 3=neutral (neither agree nor disagree), 4=disagree, 5=strongly disagree





Neighborhood Covariates

Construct	Items
Social Environment	Aesthetic Quality*: <ol style="list-style-type: none">1. There is a lot of trash and litter on the street in my neighborhood⁺2. There is a lot of noise in my neighborhood⁺3. My neighborhood is attractive
	Safety*: <ol style="list-style-type: none">1. I feel safe walking in my neighborhood day or night2. Violence is a problem in my neighborhood⁺
	Social Cohesion*: <ol style="list-style-type: none">1. People around here are willing to help their neighbors2. People in my neighborhood generally get along with each other3. People in my neighborhood can be trusted4. People in my neighborhood share the same values

* Based on a Likert Scale of 1=strongly agree, 2=agree, 3=neutral (neither agree nor disagree), 4=disagree, 5=strongly disagree

⁺ These items are reverse coded.



Birth of a Research Career



San Antonio, TX
American Diabetes Association
Meeting 2000



DEPRESSION

Psychosocial
burden of illness,
social support

Treatment
Serotonin reuptake inhibitors
Tricyclics

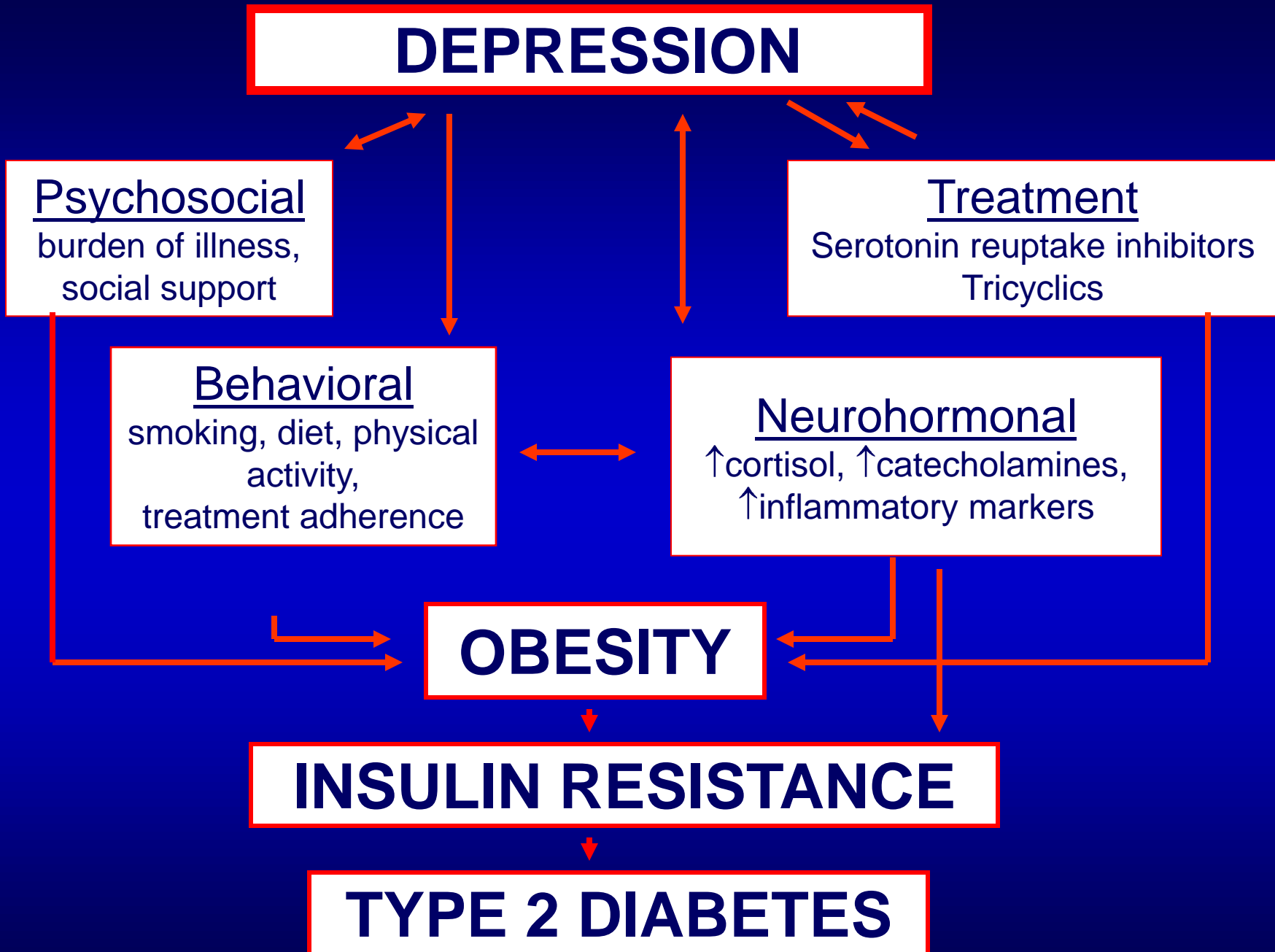
Behavioral
smoking, diet, physical
activity,
treatment adherence

Neurohormonal
↑cortisol, ↑catecholamines,
↑inflammatory markers

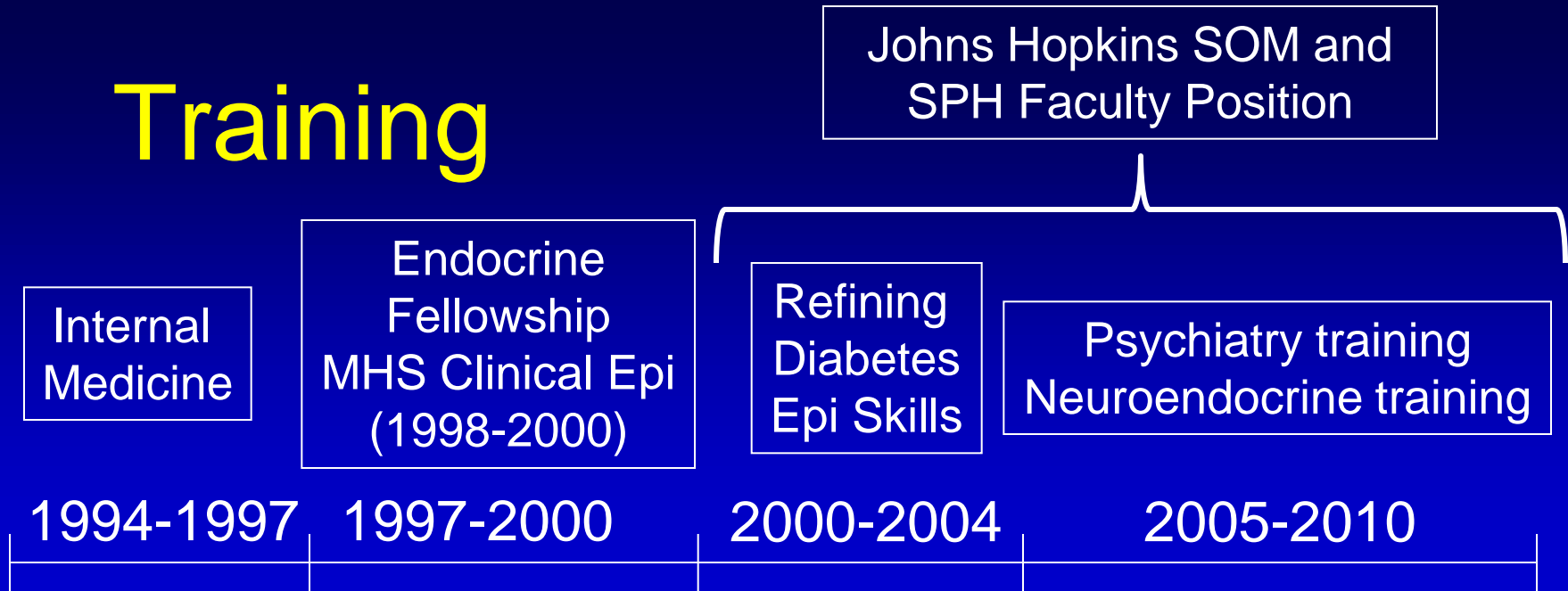
OBESITY

INSULIN RESISTANCE

TYPE 2 DIABETES



Training

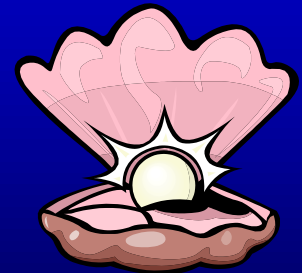


Funding





The Golden Pearls of Time Management



Managing your schedule

- Make a calendar of all of your standing meetings, conferences and clinical commitments
- Block out and schedule time designated for:
 - Research: papers, grants, experiments, clinical studies, data analysis, etc.
 - Clinic follow-up: editing notes, returning phone calls, prescriptions, checking labs
 - Teaching: lecture preparation, test/paper grading
 - Administrative and committee work
 - Meetings

Managing your schedule (con'd)

- Figure out what time of day that you function at your best—protect this time to be devoted to your research
- Figure out what time of day that you start to wind down mentally—use this time for meetings
- Consider working from home one day/week if you find your work environment frequently disrupted—this time is useful for tasks requiring long periods of concentration such as writing, reviewing articles, or analyzing data

Managing your teaching and clinic schedules

- Designate office hours for your students
- Designate a specified call-back time for your patients
- Give your patients a clinic summary document stating:
 - Call-back time
 - When they should expect lab results (consider doing this via a form letter)
 - Who to call for things that do not require a physician—scheduling, billing, etc.

Keeping up with the literature

- Try to attend a regular journal club in your area of research interest
- Designate a couple of hours/week to review abstracts in the journals that you receive regularly

Managing your personal life

- Maintain your hobbies and friends outside of work
- Get at least 7-8 hours of sleep/night
- Exercise regularly to reduce stress/tension
- Determine whether working at home in the evening or at night or on the weekends makes you more or less effective
- Look for reliable daycare that works with your schedule—consider an evening babysitter a couple of days/week
- Get assistance with some household chores—cleaning, laundry, yard work, groceries

Maintain Balance!

