# Personality and Prevention in Public Health

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Preventive Medicine

- Prevention preferable to treatment
  - Pre-empt or reduce suffering, mortality, individual and systemic costs
- Targeted: Aimed at a certain group of individuals at risk for an undesirable outcome
  - More cost effective, conditional on correct identification of at-risk population segment
- Increasing emphasis on prevention to reduce individual and societal burden
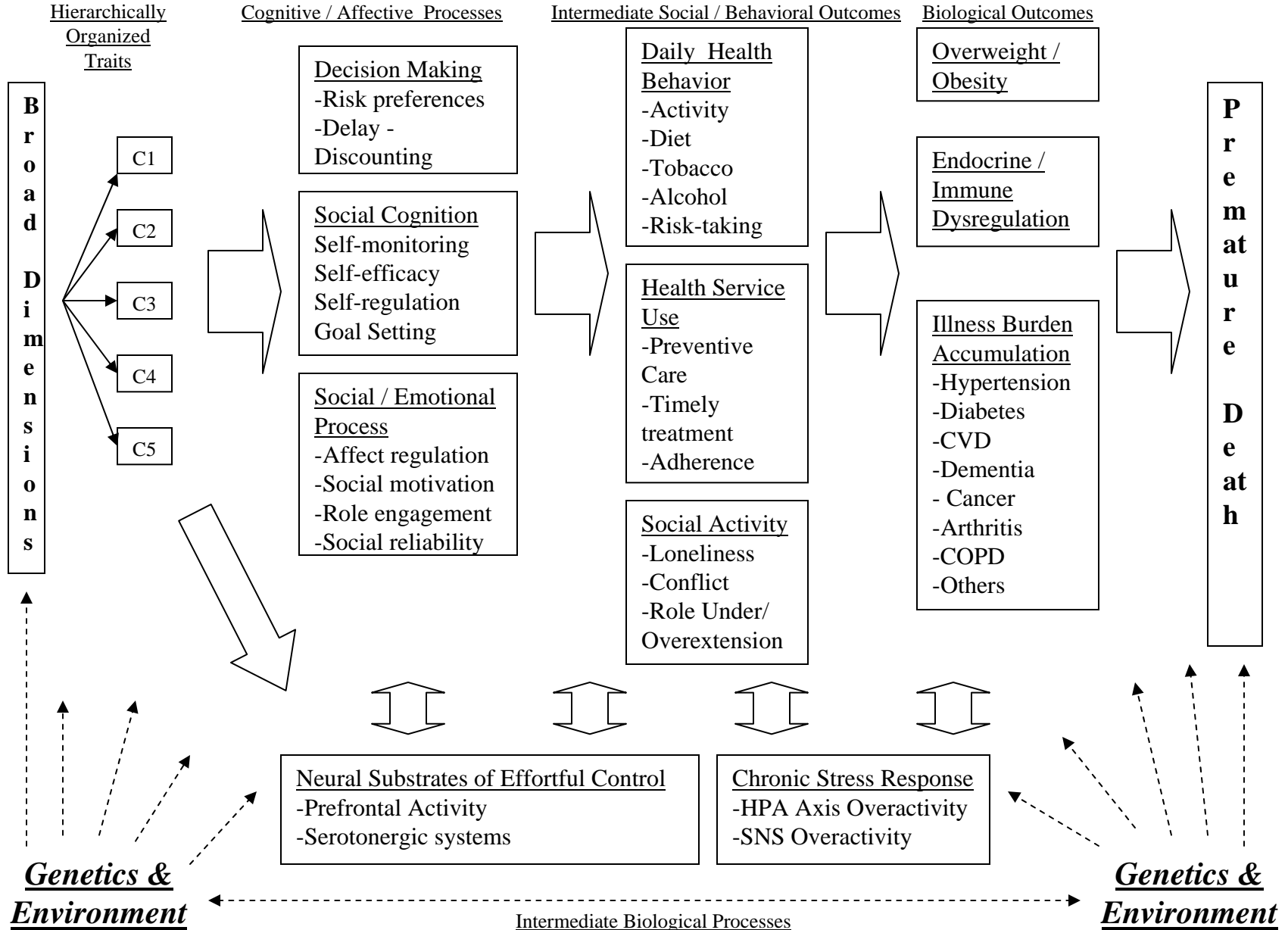
Prevention and Public Health
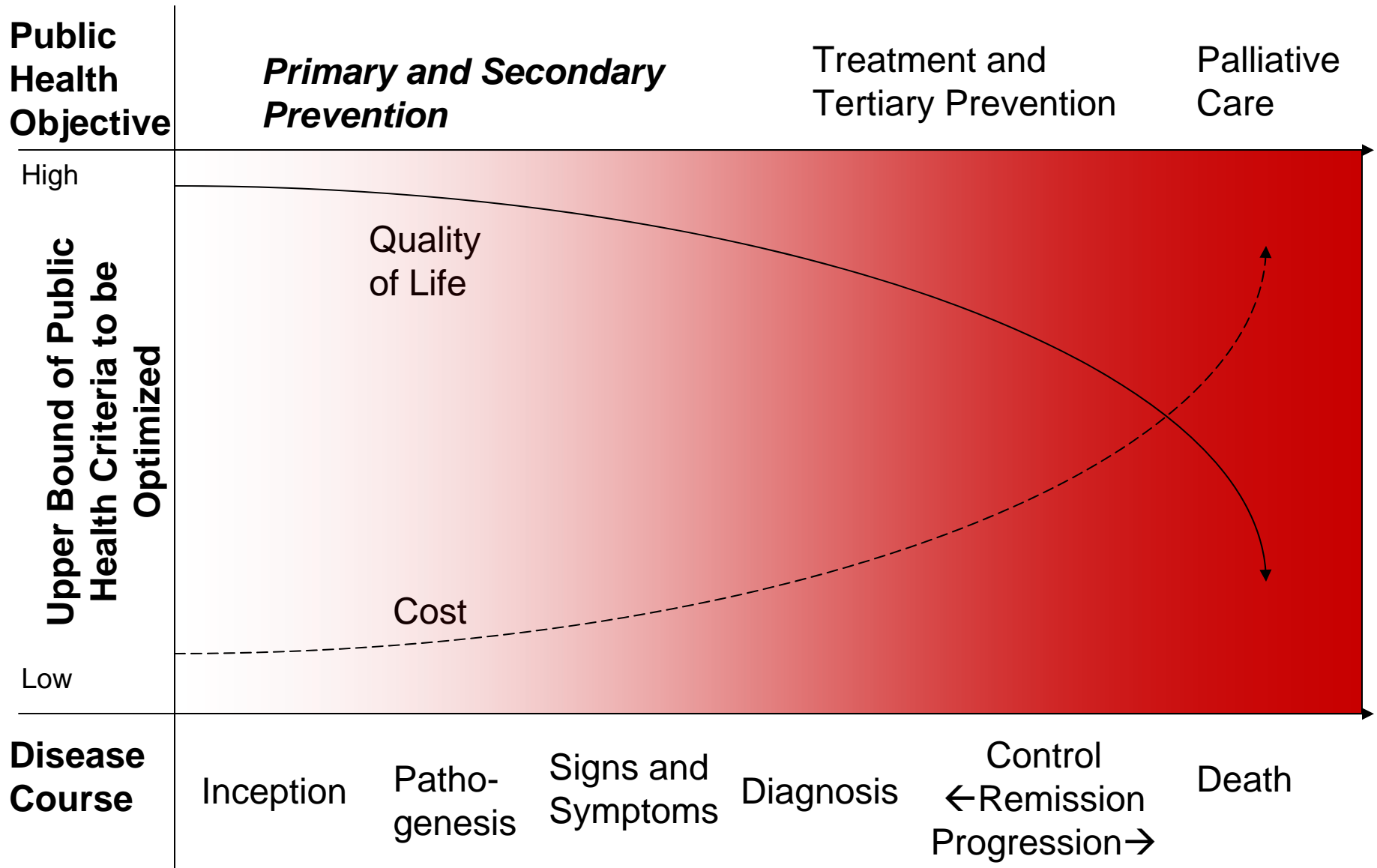
Personalized Medicine

- Hinges on individual risk assessment
  - Accomplished through screening/testing
- Need an accurate picture of potential outcomes for a particular patient
- Enables closer surveillance, pre-emptive action, earlier detection, treatment tailoring
- Risk profiling depends on available information, capacity to predict outcomes from that information, and costs of getting the information

Personalized Medicine Tools

- Genetic testing (costly)
  - BRCA gene for breast cancer
- Health behavior (cheap)
  - Smoking for lung cancer / cardiovascular disease (CVD)
- Basic clinical biomarkers (cheap)
  - Systolic blood pressure, lipids for CVD
- Demographics (SES rarely) (cheap)
- Personality?
  - Broadband information, maximal predictive power for minimal cost

Health Information Indexed by Personality

Hierarchically Organized Traits

Cognitive / Affective Processes

Intermediate Social / Behavioral Outcomes

Biological Outcomes

Broad Dimensions

C1

C2

C3

C4

C5

Decision Making
-Risk preferences
-Delay -
Discounting

Social Cognition
Self-monitoring
Self-efficacy
Self-regulation
Goal Setting

Social / Emotional Process
-Affect regulation
-Social motivation
-Role engagement
-Social reliability

Daily Health Behavior
-Activity
-Diet
-Tobacco
-Alcohol
-Risk-taking

Health Service Use
-Preventive Care
-Timely treatment
-Adherence

Social Activity
-Loneliness
-Conflict
-Role Under/ Overextension

Overweight / Obesity

Endocrine / Immune Dysregulation

Illness Burden Accumulation
-Hypertension
-Diabetes
-CVD
-Dementia
- Cancer
-Arthritis
-COPD
-Others

Premature Death

Neural Substrates of Effortful Control
-Prefrontal Activity
-Serotonergic systems

Chronic Stress Response
-HPA Axis Overactivity
-SNS Overactivity

Genetics & Environment

Genetics & Environment

Intermediate Biological Processes

The Person in Personalized Medicine

- Personality tendencies are usually distal in etiologic chain leading to outcome
  - Convey information on the probability of intermediate and more proximal risks before they develop
  - Ideal for screening and prevention
- Personality phenotype captures broad bandwidth of health relevant information
  - Underlying behavioral processes (self-regulation)
  - Social cognitive processes relevant to health (risk evaluation, emotion regulation)
  - Genetic endowment in conjunction with environmental history (product of gene*environment interaction)

Conventional vs. Personalized Medicine: Target of Assessment

Conventional Medicine: Diagnosis for Treatment of Specific Outcome

Proximal: Negative Outcome Imminent

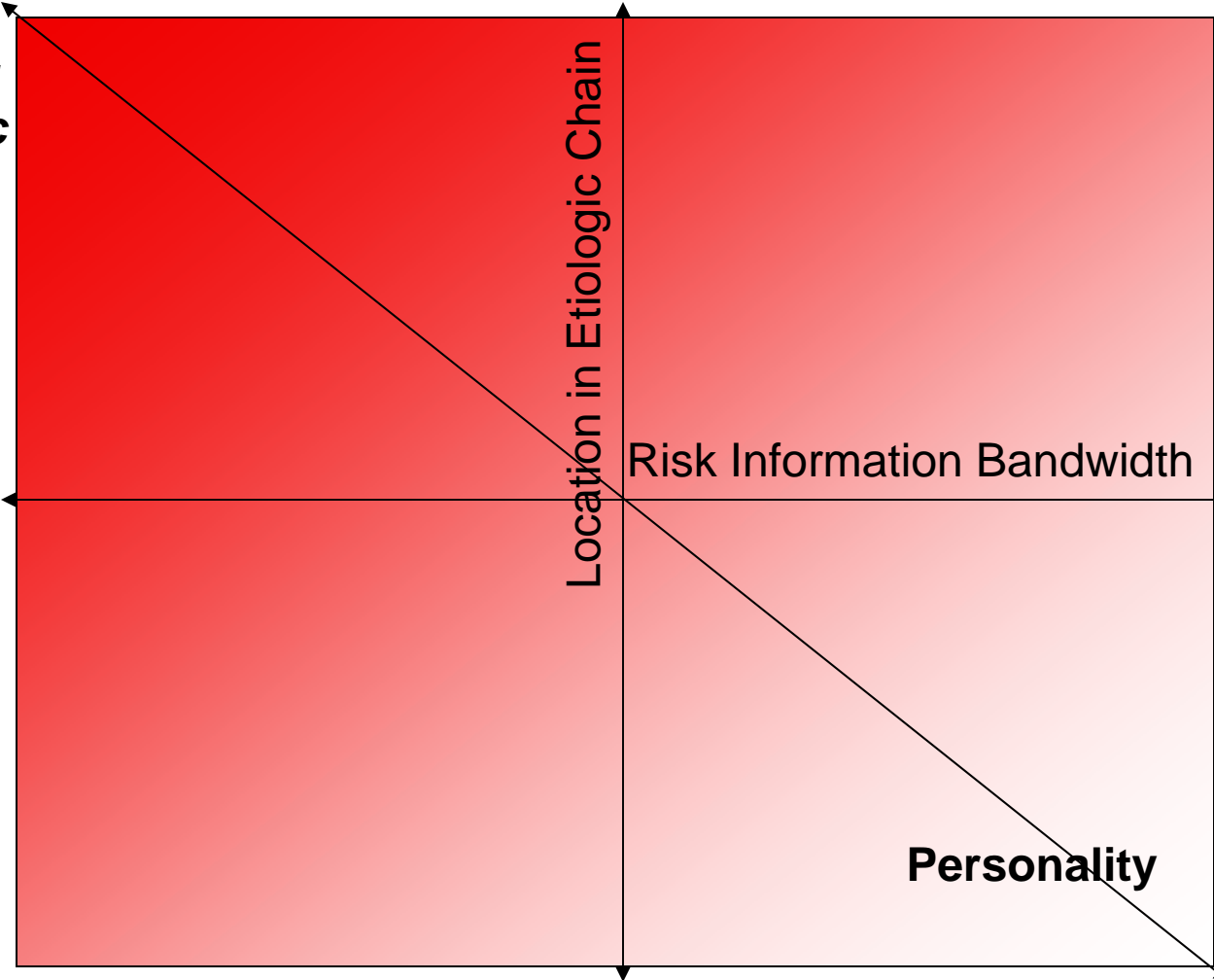Location in Etiologic Chain

Low: Single Domain

Risk Information Bandwidth

High: Multiple Levels and Biopsychosocial Domains

Personality

Personalized Medicine: Early Risk Profiling for Prevention

Distal: Negative Outcome Imminent

Incorporating Personality Information into Risk Profiling

- Factorial / structural approach—intact unifactorial scales: Factorial validity
  - Internally consistent, limited number of well-understood constructs, not optimized for particular predictive power (but de-facto general predictive power)
- Criterion-keying approach: Predictive Validity
  - Infinite number of scales each optimized to predict a particular outcome, each hybrids of multiple traits
- Get both with general item set
  - Maximize description and prediction

Translational Science Challenges

- Time vs. information trade-off: feasible in real-world public health and medicine
  - Serial testing (general brief, followed by selective in-depth assessment)
- Comparative effectiveness in vs. conventional and genetic risk scores in predictive trials
  - Specific outcomes
  - Versatility / breadth of predictable outcomes
- Incremental effectiveness over conventional scores
  - Cost effectiveness
- Translation of scores into meaningful information for practitioners