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**The Capstone Committee for David Patrick Darrow Certifies that this is the
approved version of the following capstone:**

Health Promotion for the Community Advocate

Committee:

Karl Eschbach, Ph.D

Christine Arcari, Ph.D.

John F. Thomas, Ph.D.

Dean, Graduate School

Health Promotion for the Community Advocate

by

David Patrick Darrow, M.D., B.S., B.S.

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Dedication

I dedicate this work to the Galveston Community for everything that I learned from the suffering of my patients and friends and to my wife for her incredible support and encouragement during a difficult transition in my life.

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Health Promotion for the Community Advocate

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Supervisor: Karl Eschbach

The aim of this capstone is to review social and behavioral factors relevant to health promotion for obesity and chronic diseases in impoverished communities. Obesity and chronic diseases have displaced infectious diseases as the most immediate threat to morbidity and mortality in the United States. As a product of a sedentary lifestyle and a diet of overabundance, obesity and chronic diseases have evaded sustainable medical treatment to date. The social determinants of health contribute to disparities in the burden of chronic disease. Public health promotion may provide a methodology and precedent for eliminating health disparities. The focus on health outcomes in recent health reforms may prompt health professionals to examine the role of community advocacy in health promotion in impoverished communities.

In this capstone, I provide a review of relevant literature from epidemiology and the social and behavioral sciences relevant to health promotion to reduce the burden of chronic diseases in impoverished communities. I begin with a tailored review of obesity and its ramifications. Then I discuss theoretical foundations and precedents for successful community-based public health promotion. I introduce the PRECEDE-PROCEED Model as a useful framework for health program planning. I address disparities in impoverished

communities specifically in the context of barriers to success of initiatives. A guided case study illustrates the way that concentrated poverty contributes to the production of health disparities. Finally, I integrate obesity and chronic disease health promotion in impoverished communities through a guided case study of the use of the PRECEDE-PROCEED model for a childhood obesity initiative by a health professional.

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List of Abbreviations

BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Center for Disease Control
CRP	C-Reactive Protein
FDA	Federal Drug Administration
GDP	Gross Domestic Product
GSBS	Graduate School of Biomedical Sciences
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
NCHS	National Center for Health Statistics
NHANES	National Health and Nutrition Examination Survey
PPM	PRECEDE-PROCEED Model
SES	Socioeconomic status
TDC	Thesis and Dissertation Coordinator
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
UTMB	University of Texas Medical Branch
VMT	Vehicle Miles Travelled
WHS	World Health Survey

Chapter 1: Introduction

At the start of the 21st century, in most parts of the more developed economies of the world, chronic diseases have replaced infectious diseases as the chief immediate threat to health, well-being, and longevity of human populations. While infectious pathogens such as HIV and malaria continue to ravage some populations, especially ones with large socioeconomic gaps, public health has ushered in a new era of chronic disease burden in much of the western world.¹ The new challenges are largely rooted in changing human behaviors.² In particular, the transmission of chronic diseases emerges along with the emergence of a sedentary lifestyle.³⁻⁵ The most prominent diseases in modern western societies such as the United States relate to cardiovascular disease and the impairment of mechanisms guaranteeing adequate perfusion to vital organs, namely the heart and brain.² Life in the 20th and 21st centuries in the West has afforded the benefits of excess caloric resources, compared to need, matched with a reduced requirement for physical activity, leading to increases in obesity and related metabolic and cardiovascular morbidity. As a result, while longevity has increased rapidly in developed societies in the past century, preliminary analysis suggests that humans are unlikely to find substantial additional gains in longevity in the near future.⁶

The burden of chronic disease is increasing, yet adequate methods of converting knowledge about optimal lifestyles into helpful behavior modifications do not currently exist.² This knowledge comes from both observational studies and randomized controlled trials. There is little disagreement about which behaviors and associated resources optimize health.⁷ Most studies agree that the best way to maintain a healthy existence is to exercise regularly, eat an appropriate amount of calories and nutrients to maintain a healthy weight, avoid contact with environmental toxins, and have access to medical care.⁸ However, current research is unable to identify techniques to effectively promote

these healthy behaviors within the entire population of even one nation, much less across a broad range of cultures.

Obesity and chronic disease are now prevalent in all socioeconomic strata in the United States. In impoverished communities, the rising prevalence of these conditions compounds the struggle to achieve the basic goals of a healthy life. Poverty plays a significant role in health, and impoverished communities carry a disproportionate burden of disease.⁹ Reducing the incidence and prevalence of chronic disease in these settings requires an understanding of the contribution from the social determinants of health.¹⁰

Since current healthcare reforms in the United States are beginning to focus on health outcomes as a basis of funding and reimbursement, it is likely that a growing number of interested students and practitioners will invest time in understanding and intervening in communities in the context of public health. Because the social determinants of health are now known to play a significant role in increasing the burden of chronic diseases in disadvantaged communities, health advocates will increasingly need to grapple with challenges of promoting health in this context. A clear guide that reviews the most salient findings within the applicable fields of medicine, poverty, and sociology will be a necessary resource towards efficient implementation of effective public health programming.

With respect to a traditional scientific education, community advocacy can often be unfamiliar territory. The goal of this text is to act as a supplement through which students and health professionals can become more familiar with some of the topics critical for a thorough understanding of the forces surrounding chronic disease and obesity in the United States, in order to better prepare them for health promotion.

The first specific aim of this capstone is to review literature about obesity and obesity epidemiology in order to provide a scientific foundation for chronic disease interventions. Second, a review of the most salient aspects of health promotion will provide a basis through which to assess communities and design programs. Disparities are briefly

introduced in chapter 2 to provide a basis for examining how health promotion could potentially close gaps in health outcomes by engaging at-risk communities. Next, precedents for successful public health interventions as well as the theoretical underpinnings of current understanding of health behavior will be introduced in chapter 3. The PRECEDE-PROCEDE Model (PPM) will be offered as a useful program planning framework, developed to complement health behavior models. Third, a review of the sociology and epidemiology of poverty and disparities informs approaches towards program design in impoverished communities in chapter 4. A case study will illustrate influential factors relevant to impoverished communities. Chapter 5 will then integrate the previous chapters by focusing on a case study of health promotion through a childhood obesity prevention program conducted in an impoverished community by a health professional. Finally, the entire review will be concluded in Chapter 6 by contextualizing the aims and addressing limitations and future considerations.

Chapter 2: Obesity

INTRODUCTION

Obesity is a challenging frontier for modern medicine and public health, particularly in the United States.¹¹ Following the revolution in infectious disease control during the 19th and early-20th centuries, the most morbid and mortal diseases remaining in the West result from modernity and modern lifestyles.¹² Cardiovascular disease and stroke, or cerebrovascular accidents, represent a significant threat to health. High mortality from cardiovascular disease and significant morbidity from stroke are driven by sedentary lifestyles.² While individual cases of obesity may be related to genetic or spurious etiologies, the climbing rates of obesity are a direct result of lifestyle changes associated with increasing affluence. Because of these changes, the plight of metabolic syndrome will likely continue for the inhabitants of privileged countries like the U.S., as well now as many people in developing countries.^{13,14}

In this chapter, I will introduce obesity, its historical context, and review its characteristics and contributory metabolic state. Subsequently, I will review the salient epidemiology of obesity and introduce a focus on disparities, which will be more thoroughly addressed in Chapter 4. I will describe reports of basic science research on the pathophysiology of obesity, as well as the health implications of obesity, and include a discussion of the estimated economic burden of obesity in the United States. I will conclude the chapter with progress of the medical treatment of obesity and the implications for obesity in the future.

DEFINING AND UNDERSTANDING OBESITY

The optimal method of defining obesity depends on the context and scope of the problem to be researched. It is now known that obesity is a multifactorial disease.¹⁵ Furthermore, there are several different morphologies and subtypes of obesity.¹⁶ Since

questions surrounding obesity concern many different health implications, certain characteristics of obesity matter variably to different questions.

Persons with high levels of fat or adipose tissue relative to body mass tend to die earlier and endure higher morbidity.¹⁷ From a population perspective, even simple heuristics for body fat percentage, such as body mass index (BMI), are correlated with mortality, as shown in Figure 1.¹⁸

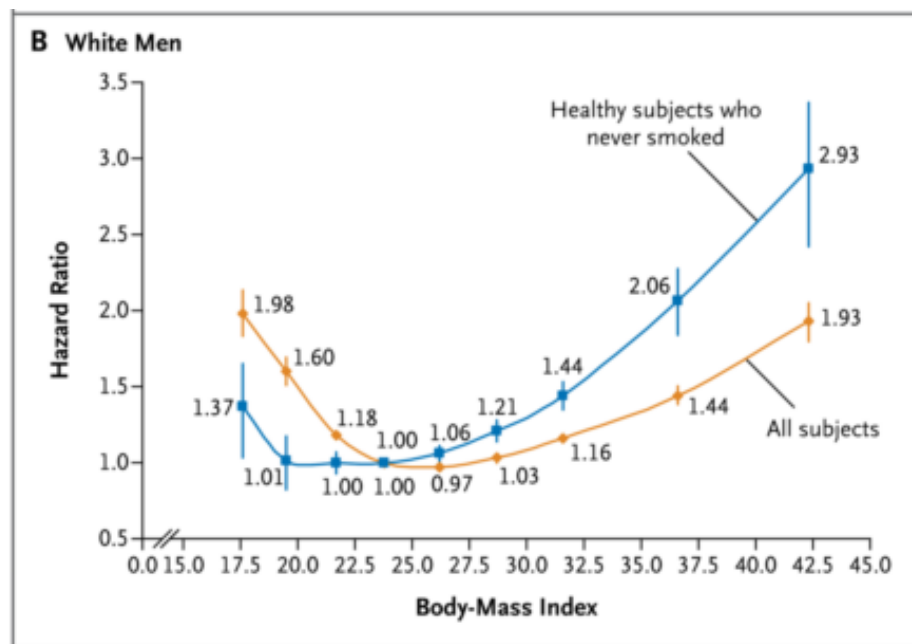


Figure 1 Estimated Hazard Ratios for Death in White Men from Any Cause According to Body-Mass Index for All Study Participants and for Healthy Subjects Who Never Smoked.^{18 *}

Figure 1 depicts the hazard ratios for death in white men by BMI. The two curves show the hazard ratios for healthy non-smokers and for non-smokers, respectively, comparing each BMI to the optimal BMI within each subset. The shape of each curve demonstrates that there is a minimum mortality for both strata. The data for women (not shown) follow a similar pattern. This minimum is important because it suggests that it

* Reproduced with permission from Berrington de Gonzalez, A. *et al.* Body-mass index and mortality among 1.46 million white adults. *The New England journal of medicine* **363**, 2211–9 (2010), Copyright Massachusetts Medical Society.

might be possible to minimize risk of death by optimizing BMI. Other studies have extended this observational result to other populations, demonstrating significant reductions in mortality risk through weight loss.¹⁹

Measurement of rates of population rates of elevated BMI has been important tool for characterizing the prevalence of population of health risks associated with obesity. The utility of examining obesity from a population perspective fades as the focus of research narrows. This is to say that measuring adiposity, or the quantity of fat tissue, in the simplest way fails to explain differences in observed health in individuals, especially as the variation in mass narrows.²⁰

BMI was invented by Adolphe Quetelet in the 1830's as a convenient heuristic for explaining and normalizing variation in weight by height.²¹ Specifically, in order to compare the mass of humans of various heights, BMI assumes that there exists a normal weight for each given height. Until the mid-twentieth century, neither the measures of weight used in population surveys nor the actuarial tables used by insurance policy holders included the relative size of the people they were recording.²¹ It wasn't until after World War II when cardiovascular disease moved into the spotlight as a major contributor to mortality in the United States, that this normalized heuristic for adiposity became popular.²¹

While BMI is superior to using weight alone in research about population health, it does have some problematic components.²¹ The construction of BMI implies that in general, healthy, taller people are composed of a greater mass than healthy, shorter people, and the assumption which underlies this line of reasoning is that height is not associated with health within the normal population. More specifically, the model assumes that one's mass should be proportional to the square of one's height; hence BMI is defined as one's weight divided by the square of one's height, in metric units. There are now numerous studies that have described the shortcomings of BMI as a measure of

adiposity. However, there have been few and incremental improvements to BMI, given the small amount of data the model requires.²²

In Caucasian populations, BMI has been found to correlate well with body fat percentage.²³ The real benefit to BMI as a population measure rests in the simplicity with which information can be obtained and computed.²⁴ Although self-reported BMI can be prone to error, its measurement and computation require no complicated protocol or expert knowledge.²⁵ This convenience means that despite the questionable accuracy of its application, threshold values of BMI continue to be used to define obesity in population-based studies today.¹⁸

Estimates of adiposity could be improved by including anthropometric variables such as waist circumference, but anthropometrics have limitations as well.²³ Waist circumference has been shown to improve the correlation between BMI and health outcomes and disease risk estimates, but it requires a specific protocol and fails to account for different body geometries.²⁶ The gold standard for measuring body fat is most likely whole-body MRI, since fat is easily discernible from surrounding tissue due to the contrast in proton density between fat and other tissue.²⁶ Aside from the expense, calculating the total amount or percentage of body fat begs the question about the dynamic between body fat and health. BMI is used as a surrogate for determining excess body fat within the regime of discovering causal links between health and the metabolic state that produces the obesity at a population level.

More focused research is beginning to investigate aspects of adiposity that contribute to health including distribution of fat as well as its type, such as large versus small adipocytes.²⁷ These results might help to explain some of the genetic contribution to obesity and health. Despite scientific progress in understanding the specific position of obesity as a manifestation of disease, the more relevant perspective about obesity is often unheeded. Obesity is a product of nature and nurture, genetics and cumulative behavior.

A microscopic examination of obesity through genetics or the environment misses the larger picture of current evidence in public health and medicine.

The gap of knowledge missing from culture remains the mystery of how to guide at-risk or currently obese individuals and communities to change course toward healthier lifestyles to reduce the health risks associated with obesity.²⁸ More important than crossing some arbitrary threshold of BMI is fostering habitual behavior and education to teach individuals how to maintain a sustainable energy profile and cardiovascular health. In practice, this translates to maintaining appropriate and conscientious eating habits as well as consistent exercise.²⁹

ROLE OF OBESITY

Despite the current demonization of obesity and fat, in historical perspective, obesity was often seen as a sign of health and vitality.³⁰ Fat, or adipose tissue, plays many essential biological roles, which have protected humans from almost certain death and even extinction throughout human history.³¹ Adipose tissue provides an efficient method of storing energy for future use. It provides an evolutionary advantage by facilitating a system in which humans and animals can survive periods of resource scarcity.³¹ For example, many animals hibernate during winter months, when food is nearly unavailable, by catabolizing fat stores built-up from months of eating in excess of daily energy expenditure. While humans are not afforded the exact same mechanism for surviving periods of scarcity, adipose tissue does serve the same purpose of hedging abundant periods.³¹ Interestingly, there are case studies of strict fasting in morbidly obese individuals for months to years.³² In fact, extreme fasting was listed as an accepted therapeutic practice in the pages of some medical texts.³³

For much of recorded history, the majority of humans lived close to the point of starvation by modern standards, and the variation in body fat percentage was smaller.³⁴ With the invention of modern, agrarian society, large human populations were for the

first significant time faced with continuous abundance of calories.³⁵ After millennia of evolution, widespread obesity is now one of the newest pathologies known to man. With its emergence comes a host of volatile genetic expression. Increased rates of genetic recombination without the traditional evolutionary pressure to naturally select individuals that thrive in abundant environments may lead to chronic diseases that result from previously unselected states of metabolic genetic expression.³⁶

METABOLIC STATE

Scientists are beginning to understand why the variation in body fat percentage cannot fully explain the variation in health. Obesity, or a state of excessive adipose tissue, is literally a marker of abundance, or taking in more calories than is expended. This is a product of the history of a dynamic equilibrium within the body, or the metabolic state. The content of adipose tissue does not provide information about how the metabolic state is changing over time, how it arrived, nor the exact forces driving the condition. Research has shown that if an obese individual changes the general trend of the metabolic state of their body, even slightly, the health implications can be significant.³⁷ In other words, the rate of change as well as quantity of percent body fat can affect one's health.

Metabolism is a complicated dynamic governing the utilization of energy stores within the body. Fundamentally, a human's metabolic expenditure is limited to the amount of potential energy taken in, which is primarily through the gastrointestinal tract for those outside of the womb and a hospital.³⁸ The potential energy of the human diet comes through chemical bonds composing carbohydrates, proteins, and fats. Carbohydrates and proteins are very similar in their potential energy (17kJ/g or 4 kcal/g) and use, though they have distinct but overlapping cycles of metabolism, while fats provide a long-term storage mechanism (37 kJ/g or 9 kcal/g). Fats are not as easily mobilized for energy expenditure and, in fact, require some carbohydrates or protein to

be used properly. Carbohydrates are kept close at hand within the body in a few forms in order to provide the necessary fuel in a more volatile metabolic environment.

The second important contribution to metabolism is exercise, or more accurately muscular energy expenditure. Technically, most fundamental energy drain of the body, which fuels movement and all other processes in every cell of the body, is the sodium-potassium pump. Movement is a product of the organized twitching of muscle fibers, which require a basal supply of energy plus the energy required for movement throughout the day. In fact, if the muscles within the body are not being used, they will be reduced in size to lower the basal amount of energy utilized. A sedentary lifestyle literally means remaining in one place or pertaining to sitting, implying a life of minimal movement. Minimal movement requires less energy expenditure and less muscle twitches, to which the body responds by reducing the muscle mass and basal energy expenditure. A corollary is the importance of modifying behavior in environments of abundance to increase average muscle twitching, or exercise, in order to provide another pathway for further energy expenditure.

Energy intake (diet) and exercise are the primary drivers of metabolism within the population. While this conclusion is obvious, the interplay between diet and exercise is not.³⁹ Diet and exercise are driven by a mixture of conscious and unconscious regulation of activities, which are in turn affected by a tangled web of environment and circumstance. How all of these factors play into how much humans eat and how much humans exercise is the background question for much of public health and medical research.

EPIDEMIOLOGY OF OBESITY

Obesity rates in human populations appear starkly higher today than in past centuries.³⁵ Nationally representative time-series data is not available to trend the prevalence of obesity prior to the middle of the 20th century.⁴⁰ However, estimation of

BMI trends by birth cohort from National Health Examination and Nutrition Examination Surveys by Komlos and Brabec suggest that the prevalence of obesity has dramatically changed.⁴⁰ Their data suggests a surge in obesity after each World War and a dip during the Great Depression of the 1930s.⁴⁰ Following WWII, the rate of change of average BMI rose until approximately 1965. Birth cohort data was collected only until 1986, which explains the paradoxical trend post-1965, as described by the authors.⁴⁰ Obesity since the 1960's has continued to rise, monotonically.¹¹ In white males, the average BMI in the late 19th-century was 22.8 kg/m², compared to 28.0 kg/m² in 2000.⁴¹

Currently, more than 66% of adults over 20 years old are overweight or obese, and over 32% are obese with BMI > 30 kg/m² in the United States.¹¹ Moreover, adult BMI increased 3 kg/m² from 1971 to 2001 on average.¹¹ While there is some evidence that the incidence of obesity is stabilizing within certain populations, the overall trend remains staggering, with implications for healthcare and the economy.⁴²

Disparities

The prevalence of overweight and obese populations varies significantly between subsets of the population stratified by gender, race/ethnicity, socioeconomic status, education, geography, and more.¹¹ Disparities in health have long been recognized, but they have only received national attention since the late 1990s.⁴³ Disparities in obesity by race or ethnicity have been evident since at least the end of the 19th century.⁴⁰ A recent publication by Wang and Beydoun highlights these disparities and their trends since the 1970s. The most significant disparity between ethnicities or races then and now is evident with further stratification by gender, shown in Figure 2.¹¹ Black females have a much greater burden of obesity with a prevalence of 53.9% in 2003-2004 when compared to their white counterparts at 30.2%.¹¹ Women that identified at Mexican-American also saw rises in obesity, arriving at 42.3% in 2003-2004.¹¹ The prevalence of obesity for

women rose significantly over the 30 years of data collection in the National Health and Nutrition Examination Survey.¹¹

The disparity in gender is also evident in Figure 2. In the early 1970s, the prevalence of obesity in men was lower than the prevalence for women, except for white women, who maintained a similar prevalence.¹¹ The prevalence of obesity rose in both men and women over the following 30 years, but the prevalence for all men rose in close association with each other to the low 30s. Black males experienced a slightly larger increase. In contrast, a 14% difference in the prevalence of obesity for Black compared to White women in the early 1970s grew to more than 23% by 2004.¹¹

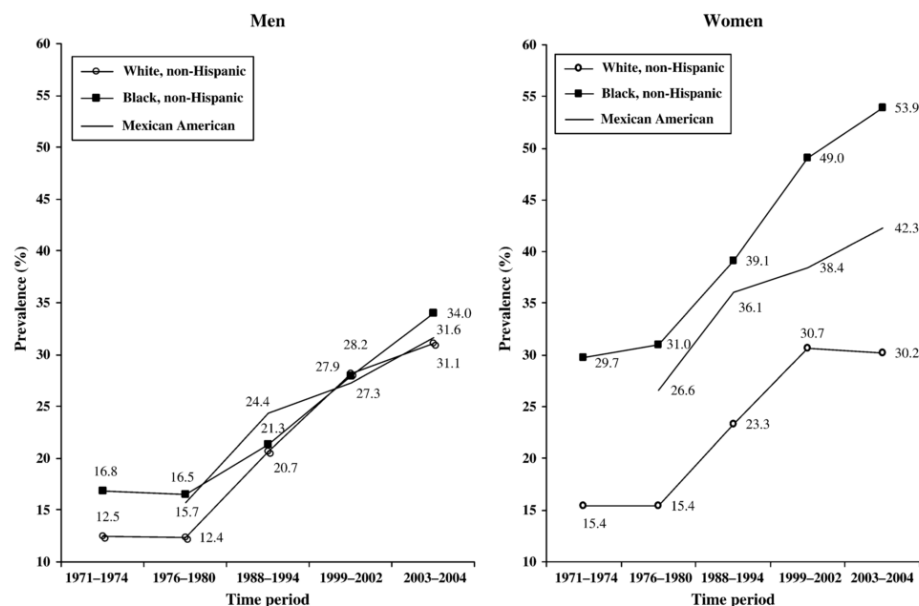


Figure 2 Trends in prevalence of obesity (body mass index $\geq 30 \text{ kg/m}^2$) in US adults, by gender and ethnicity. National Health and Nutrition Examination Survey, 1971—2004.^{44 *}

The interaction between ethnicity and gender demonstrates how fragile the implications of ethnicity can be. In this observational study of trends in a nationally

* Wang, Y. & Beydoun, M. a The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiologic reviews* 29, 12 (2007) by permission of Oxford University Press

representative sample, it appears that ethnicity is relevant only for females. All ethnicities have added on extra pounds. Especially pertinent is the near doubling in the prevalence of obesity as measured by BMI in only 30 years.

Another category of disparity is socioeconomic status (SES). Disparity in obesity by SES may also play a direct or indirect role disparities by race.⁴⁵ Again, Wang and Beydoun provide a glimpse into the changing prevalence between low, medium, and high strata of SES as shown in Figure 3.¹¹

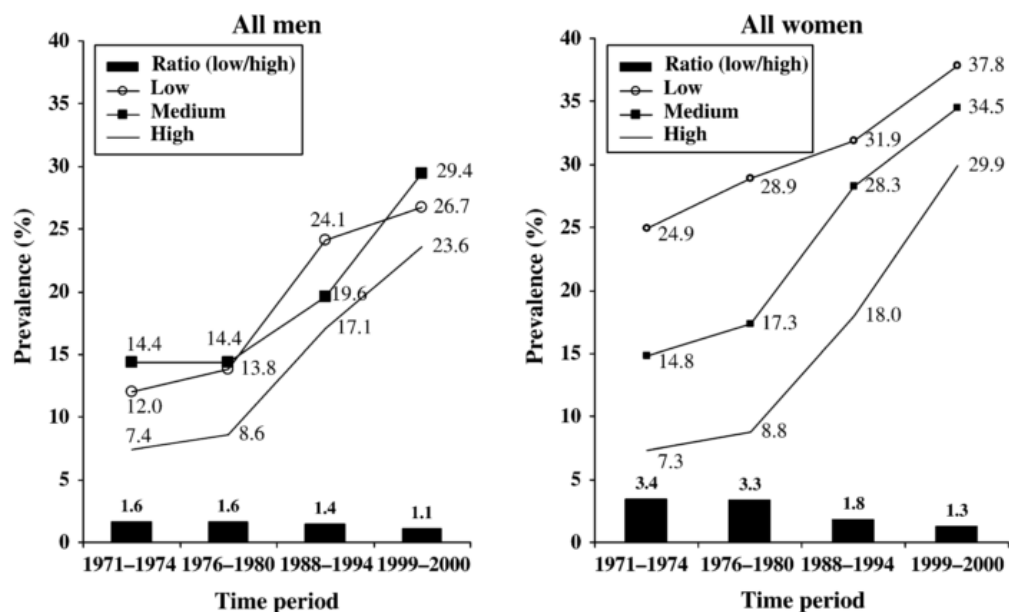


Figure 3 Trends in the socioeconomic status (SES) disparities of obesity in US adults during the National Health and Nutrition Examination Survey, 1971-2000, by gender, prevalence of obesity (body mass index ≥ 30 kg/m²) and low to high-SES ratio^{44 *}

The data reported in Figure 3, show that SES affects obesity in women more than men. This is evidenced by greater variability in prevalence between SES strata and greater variability over time. Interestingly, the variation in prevalence between strata diminishes over time for women and remained similarly diminished for men. The

* Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2002-2010.

complicated interdependence between gender, ethnicity/race, and socioeconomic status continues to challenge methodology and explanation.¹¹ Most important are the implications of these findings that a changing environment over time plays a critical role in the prevalence of obesity, and even those with high SES and thus the resources to change behavior, are not immune to the influences present in the United States today.

There is also variation in obesity prevalence over the geography of the United States, as shown in Figure 4. Figure 4 renders the topographic and temporal variation of obesity prevalence from 2002 to 2010.⁴⁴

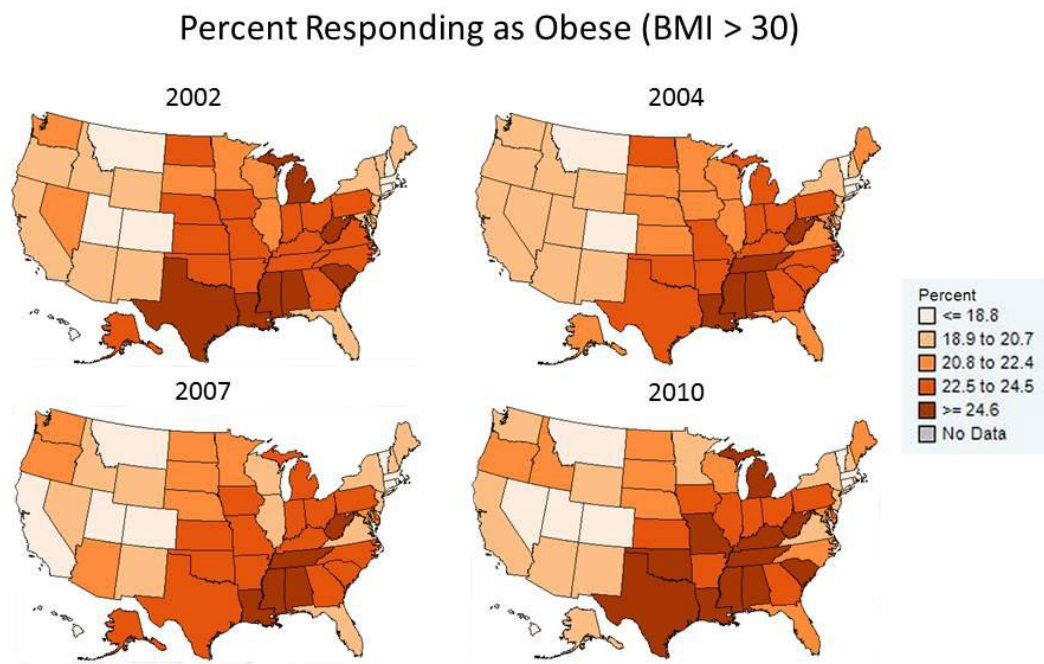


Figure 4 Percentage of responding as obese (BMI >30) in the Behavioral Risk Factor Surveillance System surveys from 2002 –2010 by state *

While the prevalence of obesity is rising throughout the United States with few exceptions, the trend is more marked in the South.¹¹ This variation in obesity prevalence across the United States generates further questions about the contribution of the social

* Source: Online BRFSS Database ¹⁶²

environment towards variation. If the humans that live in these different areas are genetically similar, then the remaining variation in observed differences in the prevalence of obesity may have something to do with the environment in which they live. Disparities such as these exist in many forms, and many are linked.⁴⁶ Discovery and analysis of these disparities is the first step in understanding the multifactorial and interdependent etiology of obesity.

Data from other countries shows that the association between disparities and obesity is remarkably variable. In fact, even the direction of the relationship between obesity and SES varies with social and economic development. A study by Pampel et al. using data from the World Health Survey (WHS) found that in countries with low GDP, BMI correlates positively with SES, and in high-GDP countries, BMI correlates negatively with SES.⁴⁷ This has been termed the reversal hypothesis. While this observation is at the moment ecological, there is mounting data from cohorts of countries undergoing economic transition.

Disparities in health mark an important method for understanding the powerful effects that social determinants have on health. Understanding SES, gender and racial disparity as a source of health inequality may help when designing community interventions to improve population health.

PATHOPHYSIOLOGY

As I have already discussed, obesity results from a historical imbalance between energy taken in and energy expended. Both of these variables are under regulation by the body, and both contribute to the etiology of an obesigenic state.³⁹ Current and recent research into the various factors that contribute to obesity is voluminous with interaction models, tying tens of regulatory pathways together.³⁹

On a basic level, the regulation of glucose within the body hinges directly on insulin. Insulin is released from the pancreas when food is processed by the adjacent

digestive tract in order to command the cells of the body to absorb glucose. Without such a control mechanism, cells would greedily pull glucose from the blood stream, leaving other parts of the body without equitable nutrition. Insulin helps to regulate the absorption of glucose from the blood stream in an orderly fashion. Without insulin the cells of the body eventually starve after being unable to regulate the pH and the potassium content in blood after surviving on a special type of compensatory fat product. With too much insulin, the body is unable to provide enough glucose to the entire body, which can be fatal. Insulin is tightly regulated, but when there exists a large excess of body fat, the hormones produced by these fat cells wreak havoc on the messaging system of cells.³⁹ The cells within the body of those becoming more and more obese become unable to respond properly to the command of insulin. This condition is called insulin resistance or insensitivity, and leaves excess glucose within the blood stream.

Formation of an obesigenic state is multifactorial. Genes are known to play a significant role in the development or protection from obesity in certain individuals.³⁹ In particular, variation in the genetic contribution to certain regulatory pathways for energy expenditure, such as the uncoupling protein, have been found to help explain variation in populations like African women.³⁹ Complicating a clear understanding of the role of genetics is the profile and variation of genes found in obese individuals. Molecules that govern the immune system, growth, and fat transport are found to be different from those in healthy adults.³⁹ Furthermore, increases in sympathetic tone and inflammation are also more commonly found in obese individuals.³⁹ These associations give clues to possible mechanisms of interaction.

The role of the nervous system in obesity is beginning to come to light. While cognitive components are often sought as sources of intervention, strong evidence suggests the importance of the nervous system as a mechanism of pathology.³⁹ For example, perinatal factors have been repeatedly found to explain significant variation in obesity.⁴⁸ Some authors posit that perinatal factors, including the health of the mother,

play a role in programming the hypothalamus and the corresponding neurotransmitters.³⁹ Along the same lines, the vagus nerve has been found to connect the central nervous system with the digestive tract and mediate regulatory information about energy balance.³⁹ Mounting evidence exists for the gut and liver as prominent participants in the neuroendocrine axis.³⁹ Significant and parallel channels of metabolic regulation have been found, and current evidence points towards multiple systems of regulation contributing to satiety or hunger.³⁹

Obese and obesogenic states are also pro-inflammatory, which may contribute to associated disease processes such as diabetes.³⁹ This chronic, low-grade inflammation exhibits elevated C-Reactive Protein (CRP), which predicts increased risk for diabetes.³⁹ Surprisingly, inflammation and potentiation of regulatory immunological molecules also seem to play a role in the microbial composition within the gut.³⁹ Mice with sterile guts have been shown to be immune to overeating and obesity, but after normalization of their gut flora, they regain the ability to become obesogenic.³⁹ Regulation of the gut biome might prove to be a critical pathology in obesity, but research has only just begun to uncover this mystery.

As the forces affecting the regulation of metabolism and obesity come to light, their interaction with environmental factors remains largely unstudied. The possible culminations of specific events necessary to become obese still remain to be found, and while these areas of research will continue to present possible sources of intervention, the regulation of the cognitive component to obesity requires continued attention and consideration.

HEALTH IMPLICATIONS

High rates of obesity have been associated with a rising prevalence of diabetes and hypertension.⁴⁹ The causal link between obesity and hypertension has not been fully identified, which most likely reflects the complexity of the relationship. Resistance of

cells to insulin is often found to predate diagnoses of diabetes and predicts future diabetes.³⁹ Unfortunately, obesity also seems to worsen insulin resistance, and their linkage remains unclear.² Current theories suggest one possible mechanism for diabetes follows insulin resistance, which eventually exhausts the ability of the pancreas to compensate for rising levels of glucose.⁵⁰ If cells become resistant to insulin, then glucose will rise, and, in turn, insulin secretion will increase. This process could brew until the point at which either inflammation or regulated cell death leads to insufficient pancreatic secreting cells.⁵⁰ Without proportional rises in insulin, higher than normal levels of glucose persist within the vascular system. In turn, glucose becomes non-enzymatically attached to all tissues, including the walls of blood vessels, kidney cells, red blood cells, and the contents of red blood cells, including hemoglobin, the basis of the Hemoglobin A1c test. Eventually, the attached glucose damages the cells and results in the associated problems of type II diabetes: blindness, renal failure, nerve damage, and cardiovascular disease (heart attacks and stroke).

As mentioned previously, obesity also affects the neuroendocrine system.³⁹ Regulatory hormones especially estrogen, which is secreted by adipocytes, are found to be abnormal.⁸ As a result, men have been found to have problems with fertility and women are found to be at an increased risk of hormone-associated cancers, such as endometriosis.⁸ Obese individuals have been found to be at a higher risk for cancer overall.⁵¹

Independent of the increased probability for hypertension and diabetes, obesity confers a higher associated mortality.²⁰ Furthermore, the likelihood of disability and nursing home care is increased with obesity.⁵² Cardiovascular disease is more common among the obese, as is dementia.³⁹ While a small amount of excess weight offers no increased mortality, obesity follows a dose-response J-curve with respect to mortality.¹⁷

ECONOMIC BURDEN

The economic impact of obesity is difficult to calculate. The best attempts add together the health spending on its most common complications.⁵³ The result of such studies conclude that the economic burden of obesity is nearly the same as that of diabetes, approximately \$100 billion per year in the United States in 1995.⁵³ Such calculations raise complex questions such as how overeating affects the health of a consumerist economy, or if society benefits economically from higher mortality rates shortly after retirement because of the reduced burden placed on government-sponsored healthcare. Such a difficult issue hinges heavily on the efficacy of treatment.

TREATMENT

The treatment of obesity has a long history.⁵⁴ There have been no pharmaceuticals that can offer significant and sustained weight loss without adversely affecting the health or the mind of a patient.⁵⁵ For good reason, the innate hunger and eating system is difficult to unhinge in order to induce weight loss. From the medical point of view, treatments for obesity fall into a few categories: pharmaceuticals, surgery, diets, or physical activity. The medications used for weight loss, approved by the FDA, all have small effect sizes, on the order of ten pounds or less, or they have serious side-effects and have been withdrawn from the market, such as phen-fen.⁵⁵ Surgery for weight loss is becoming increasingly prevalent, and the evidence base for evaluating its effects is increasing.⁵⁶ Some studies are converging to show reductions in overall mortality, but surgery is relatively expensive and harbors real risks.⁵⁷ Furthermore, surgery is reserved mostly for the morbidly obese, which excludes the majority of obese persons.⁵⁶ Studies of diet and exercise demonstrate that while both methods work, results are short-lived.⁵⁸ Even with desirable incentives, these studies suffer from remarkably high dropout and selection biases.⁵⁹ Despite a high prevalence of nonprescription weight-loss pills⁶⁰ and intense interest within the medical field, there is no proven way to motivate obese people

to diet and exercise sufficiently and sustainably to dramatically improve their health. While there will almost certainly be future interventions with improved risk profiles, the amount of time and money necessary to fuel systematic research may not prove to have a positive return on society's investment.

OBESITY AND THE FUTURE

Obesity presents a complex and difficult problem for the future of humanity.⁶¹ Scientific studies will likely continue to investigate bio-medical interventions to reduce obesity or its effects. Ironically, the drive for scientific progress has been the most important contributing cause of the current obesity epidemic.⁶¹ Because of these advances, humans need to expend less energy than ever to survive in an environment of abundance and plummeting prices per kilogram of food energy.

From a public health and medical perspective, the question must be asked how society can change to encourage eating less while exercising more. Might there be a method of organizing individuals, neighborhoods, and communities to conscientiously develop social, cultural, and environmental systems that reinforce healthier behaviors? It is this question and the ideas of community health advocates that linger in the overwhelmingly dismal picture painted by population studies showing the rising prevalence of obesity.⁴⁹

Chapter 3: Health Promotion

INTRODUCTION

Health promotion offers a methodology with precedent for addressing public health issues. In this chapter, I will introduce relevant components of the field of health promotion by reviewing popular examples and their effectiveness. I will also introduce the role of social determinants of health in producing health disparities. Health disparities and the social determinants that give rise to them are important to health promotion, because they identify targets and barriers for promotion interventions. I will then introduce the theoretical foundations of health promotion models relevant to the design of obesity interventions. These include one of the earliest health behavior models, the Health Belief Model, as well as a more recent model, the Theory of Reasoned Action and Planned Behavior. These will be discussed as part of an evolving dialogue in sociology to recognize the complexity of health behavior and improve the utility of its theoretical foundation. Subsequently, I will introduce the PRECEDE-PROCEED Model as a framework for health initiative planning, developed from a practical need to address program design requirements. I will conclude the chapter by relating health promotion to obesity as a challenging frontier.

PUBLIC HEALTH INTERVENTIONS AND HISTORICAL EXAMPLES

Public health has a long history of success modifying the burden of disease.⁶² The field of public health encompasses efforts to reduce the burden of diseases that affect significant portions of the public. Societies as far back as the Romans understood the importance of separating human waste from water sources.⁶³ Across subsequent centuries, various contributors to the health and disease of the people such as the environment and infectious diseases were identified and sometimes addressed.⁶⁴ Techniques such as quarantine were used as a method to control the spread of infectious

diseases, though a lack of accurate understanding of disease vectors prevented this from being an effective measure.⁶⁵ The identification of common diseases amongst the population, first documented by Hippocrates, stemmed directly out of early attempts to document the emergence of disease, giving birth to the field of epidemiology.⁶⁶ Much later in 17th century London, John Graunt documented vital statistics, which led to his attempts to provide a method of warning against outbreaks of the bubonic plague.⁶⁷ As epidemiology advanced, its application matured as a tool of public health.⁶⁷ John Snow's attempts to document outbreaks of cholera in mid-19th century London made use of geographic maps coupled to vital statistics, which eventually revealed the source of cholera.⁶⁶ His work is now regarded as seminal to public health and the germ theory of infectious diseases.⁶⁶

As the scientific revolution took hold, the field of public health emerged out of the consilience of epidemiology, biostatistics, and medical knowledge and services. Public health became the natural byproduct of increasingly frequent medical discoveries and began to encompass interventions implemented through policy and society. The introduction of vaccines was an important contribution to purposeful intervention to improve public health.⁶² For example, Jonas Salk's involvement in the scale of the polio vaccine from discovery to research to fundraising and finally to implementation marked a new era of public health where the scientific approach to the abolishment of a highly morbid disease won widespread trust for public health interventions.⁶⁸

Public health today has increasingly turned to a focus on prevention of chronic diseases. While public health still focuses avidly on the prevention of diseases, the end of the vaccine and antibiotics era brought the burden of infectious diseases to a minimum. Though there exists a new challenge through resistance, the health of the public is now especially challenged by diseases attributed to the sedentary lifestyle of a modern society.^{44,69}

Today, the list of the most common causes of mortality include heart disease, cancer, chronic lower respiratory diseases, and stroke, of which at least three of the four are driven by what can be considered preventable etiologies.⁷⁰ Heart disease and cancer have led the lists for the past 75 years.⁷¹ Eight of the top ten most common causes of mortality, including heart attack, stroke, accidents, kidney disease, and pneumonia, fall directly within the auspices of public health, and each and every one of them garners the attention of thousands of researchers within medicine and public health.⁶²

EFFECTIVENESS OF PUBLIC HEALTH

The impressive increase in life expectancy during the 20th century, “from 47.3 years in 1900 to 76.8 in 2000,” has been directly attributed to public health interventions.⁷² This increase is due to numerous advances, but the CDC has highlighted some of the most important, which include motor vehicle safety, safer work places, control of infectious diseases, reduction of modifiers for coronary disease and stroke, safer and healthier foods, healthier mothers and babies, family planning, fluoridation of drinking water, and control of tobacco use.⁷² In just one hundred years, an explosion of scientific knowledge and its application through policy and culture via public health has pushed life expectancy to unprecedented heights.⁷² For most persons alive today, imagining life at the turn of the 20th century is nearly impossible.⁷³

SOCIAL DETERMINANTS OF HEALTH

Even within the United States, there still exist prominent health disparities.⁷⁴ Evidence shows, persuasively, that most disparities are rooted in social determinants of health that place an increased burden of disease on disadvantaged populations.⁷⁵ For example, there are significant differences in life expectancy between the populations of different nations,⁷⁶ from 50 years in some African nations, to over 80 years in Sweden and Japan.⁷⁷ Within the United States, the difference in life expectancy at birth between

Hispanic females, with greater than 15 years of education, and Black males, with less than 12 years of education, is nearly 20 years.⁷⁸

Many social variables are associated with differences in life expectancy. The best documented of these in the United States is race, a social construct without true genetic definition. There is also strong evidence that socioeconomic status and education underlie sharp differences in health and mortality.⁷⁹ Clearly, many of these social influences are linked together. For example, in the United States a repugnant history of discrimination plagues the African-Americans with persistently lower wages and lower education, and in turn with increased morbidity and decreased longevity.⁸⁰

One approach towards understanding some of the social determinants of life expectancy in the United States divides the country into eight subsets, using a combination of race/ethnicity, geography, and socio-economic status, as shown in Figure 5.⁸¹

America	General Description	Population (Millions)	Average Income Per Capita	Percent Completing High School	Definition
1	Asian	10.4	\$21,566	80%	Asians living in counties where Pacific Islanders make up less than 40% of total Asian population
2	Northland low-income rural white	3.6	\$17,758	83%	Whites in northern plains and Dakotas with 1990 county-level per capita income below \$11,775 and population density less than 100 persons/km ²
3	Middle America	214.0	\$24,640	84%	All other whites not included in Americas 2 and 4, Asians not in America 1, and Native Americans not in America 5
4	Low-income whites in Appalachia and the Mississippi Valley	16.6	\$16,390	72%	Whites in Appalachia and the Mississippi Valley with 1990 county-level per capita income below \$11,775
5	Western Native American	1.0	\$10,029	69%	Native American populations in the mountain and plains areas, predominantly on reservations
6	Black Middle America	23.4	\$15,412	75%	All other black populations living in counties not included in Americas 7 and 8
7	Southern low-income rural black	5.8	\$10,463	61%	Blacks living in counties in the Mississippi Valley and the Deep South with population density below 100 persons/km ² , 1990 county-level per capita income below \$7,500, and total population size above 1,000 persons (to avoid small numbers)
8	High-risk urban black	7.5	\$14,800	72%	Urban populations of more than 150,000 blacks living in counties with cumulative probability of homicide death between 15 and 74 y greater than 1.0%

Figure 5 Definitions and Basic Sociodemographic Characteristics of the Eight Americas*

Using these eight different subsets of Americans, Murray et al. calculated life expectancy at birth from data from the Bureau of the Census population estimates, and National Center for Health Statistics mortality statistics, as shown in Figure 6.

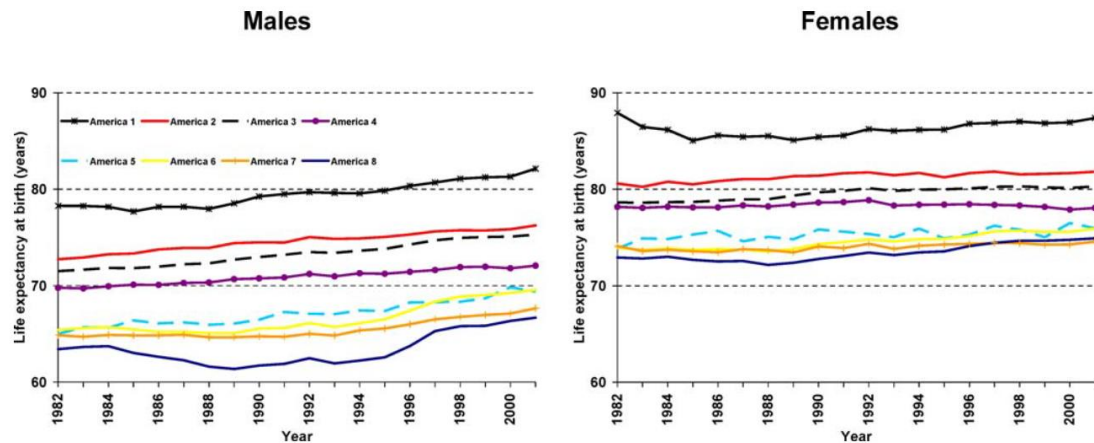


Figure 6. Life Expectancy at Birth in the Eight Americas (1982-2001)*

Figure 6 highlights the continued disparities between the eight different American populations. While the life expectancy continues to rise over the period studied, many of the disparities between populations are maintained across the two decades of mortality patterns that were analyzed.⁸¹ Most obvious is the significant advantage in life expectancy within the Asian subset of the population, with nearly a 6 year advantage for males and females over rural White populations and a 7 year advantage over Middle American populations in 2001.⁸¹ More disturbing is the disparity in life expectancy between the Asian population and high-risk urban Black populations in 2001. These differences were 15.4 years for males and 12.8 years for females, respectively.⁸¹ The disparity in gender is also quite evident between left and right graphs in Figure 6, with

* Reproduced from with permission Murray CJL, Kulkarni SC, Michaud C, et al. Eight Americas: investigating mortality disparities across races, counties, and race-counties in the United States. *PLoS medicine*. 2006;3(9):e260. By Murray et al. under the Creative Commons License⁸¹

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significantly greater life expectancies for women. The significant disparities within race/ethnicity and gender at different locations across the United States provide evidence for the role that environment and circumstance have on health.

The existence of disparities provides a roadmap of where to begin to close gaps in population health. In order to successfully address disparities, it is necessary to understand the underlying dynamics that produce them. Creating an accurate model of the various contributions to the health behavior of individuals or communities creates a platform for teasing apart the effect sizes and relationships of these factors to identify avenues for intervention and change.

MODELS OF HEALTH BELIEFS AND BEHAVIORS

Understanding the interplay between psychology and behavior has been at the core of interventions of public health.⁸² The psychological determinants of health behavior choices are extremely complex, and may be influenced by an uncountable number of variables. Social scientists and psychologists have attempted to abstract this dynamic by inventing and using models of health psychology and behaviors. The object of these models is to account for and simplify the various forces upon the decision to behave or not behave in a certain way.⁸²

One of the simplest and most widely used models today is the health belief model (HBM), created by Rosenstock in 1966.⁸³ This common-sense model assumed that human behavior depended primarily on two “variables:(1) the value placed by an individual on a goal; and (2) the individual’s estimate of the likelihood that goal.”⁸⁴ Thus, in the context of a particular disease, individuals will vary in their perceived risk of contracting the disease, perceived severity of the disease, perceived efficacy of treatments, and perceived barriers to obtaining such treatments. Public health professionals who use the Health Belief Model recognized that demographic and socio-

originally proposed by Icek Ajzen and Martin Fishbein in 1975.⁸⁶ It is based on two assumptions: 1) health behavior is under voluntary control, and 2) people are rational.⁸⁸ The Theory of Planned Behavior was developed by Icek Ajzen in 1985. The TRB extended TRA by introducing the concept of perceived control, providing a mechanism to account for decisions that might violate what would be considered rational.⁸⁸

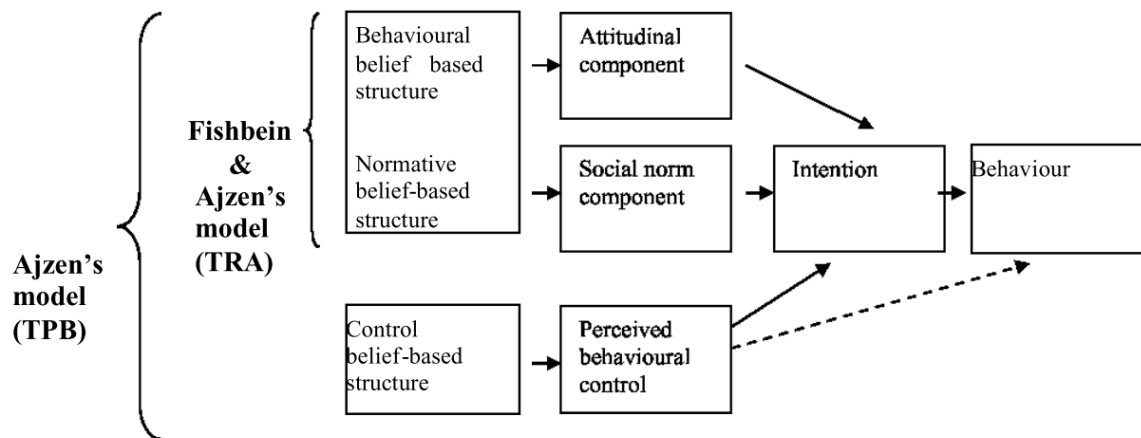


Figure 8 Theory of reasoned action/planned behavior*

While social and psychological models of health behaviors are able to explain some of the variation in these behaviors, there is substantial residual variance.⁸² Proponents of the TRA/TPB suggest that these models improve explanation of variation in behavior,⁸⁹ though Hardemann et al. found that the usefulness of these theories in designing health promotions is limited.⁹⁰ Each of these models provides a rough approximation of the actual dynamics composing human health behavior.⁸⁸ Evidence suggests that more recent models do a better job explaining behavior than simple early models like the Health Belief Model,⁸⁸ creating a framework for improved efforts at health promotion.⁹¹

* Reproduced from Taylor et al.⁸⁷ as part of the public domain

PRECEDE-PROCEED MODEL

A very different method toward developing a health intervention model arose out of an approach towards cost-benefit analysis of health education programs in 1974 by Lawrence Green and collaborators. This approach evolved to be the PRECEDE-PROCEED model (PPM).⁹² While many of its components are implicitly based on similar assumptions as the other health behavior models, PPM takes a comprehensive approach towards implementing a health intervention and evaluating its performance.⁸² PRECEDE was the original form of the model and stood for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation.⁸² This model emerged in response to criticisms of health education practice that suggested that educational interventions focused too much on implementing programs while forgoing rigorous planning in their development.⁸² The addition of the PROCEED component to the model stemmed out of the recognition of the need for public health interventions to address policy and environmental components.⁸² PROCEED stood for Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development.⁸²

The PPM is organized in a temporal sequence of phases (see Figure 9).⁸² The first four phases of the PPM focus on a comprehensive assessment of the community in the context of their goals. Phase one focuses on the social assessment of the community, integrating multiple objective and subjective sources to identify a community consensus about goals for health promotion.⁸² Phase two identifies the environmental and behavioral context of health deficiencies in the community. Phase three identifies predisposing, reinforcing, and enabling factors underlying health behaviors. Phase three should also begin to identify the most likely interventions to address each of these factors. Phase four selects interventions likely to be successful in the context of the administrative and policy environment. Phase five governs implementation of the program, and phases six through eight concern different scopes of evaluation to be built into the design of the program.

Phase six specifically addresses the evaluation of the actual process of implementation. Phase seven addresses evaluating the impact of the program, and phase eight addresses the final outcome within the community.

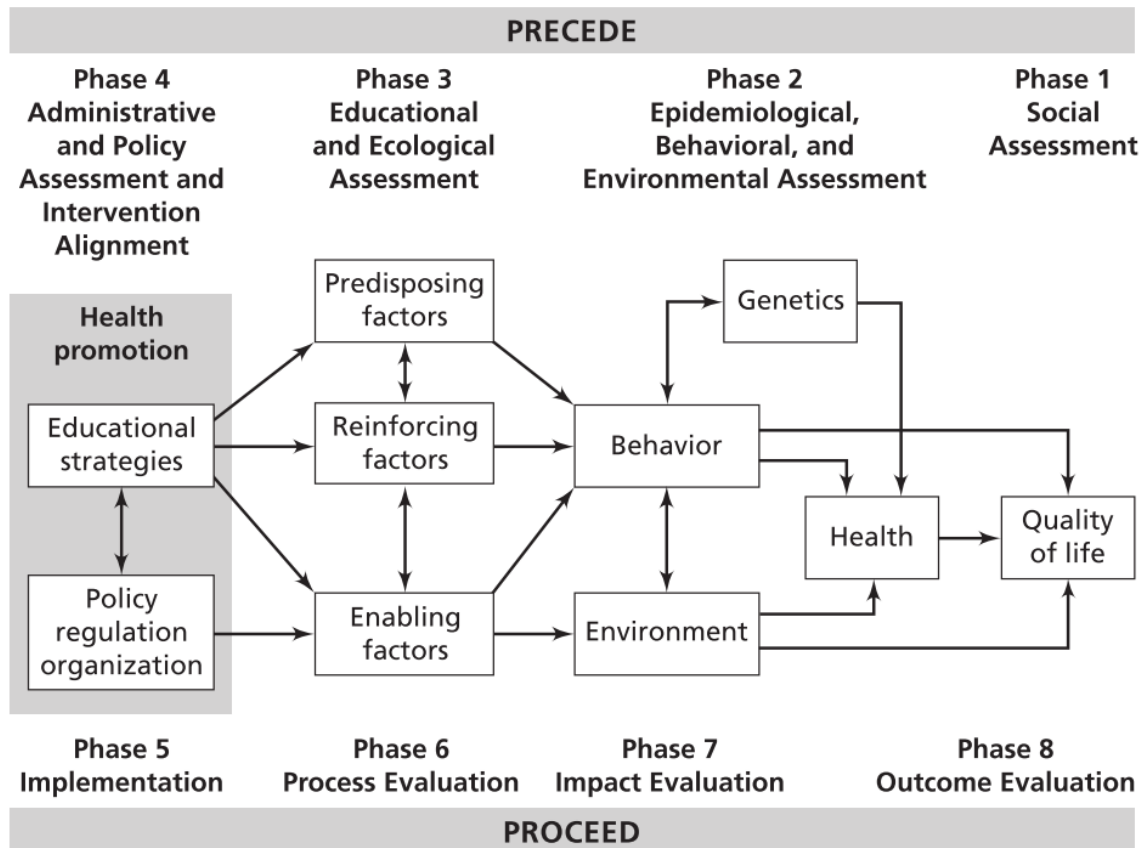


Figure 9 PRECEDE-PROCEED Model *

PPM provides a framework for health promotion program development, identifying a comprehensive checklist of possible influences on behavior.⁸² Some studies report positive results from the application of PPM. For example, the PPM was able to inform which factors were important for improving self-management behaviors of parents with asthmatic children in Taiwan.⁹³ The PPM has been implemented for use online in specific fields, and its adoption by national organizations such as the CDC has

* Reproduced from Glanz K, Rimer B, Viswanath K. *Health behavior and health education: theory, research, and practice.*; 2008. Page 410 Figure 18.1 with permission from John Wiley and Sons⁸²

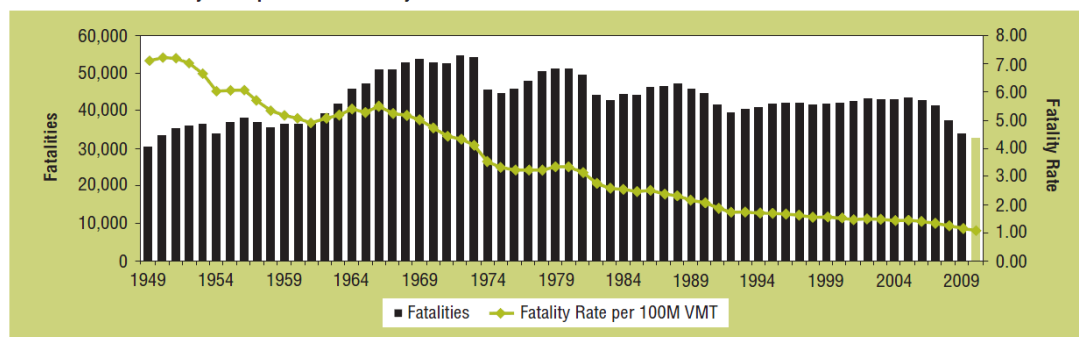
bolstered its visibility.⁸² However, the effectiveness of the PPM has not been established through rigorous evaluation. PPM remains an abstract framework without details about specific methods of implementation.⁸²

CHALLENGE OF OBESITY

Public health has a history of remarkable successes affecting changes in health risks in the United States.⁷² The last 50 years of public health has seen successes in areas beyond infectious diseases, including reduction in smoking rates, accident rates, and mortality from accidents. It remains unclear how obesity and chronic diseases will fit into public health practice, which evolved from a model addressing infectious diseases.

As the era of infectious diseases diminished, society faced challenges related to social and technological progress. For example, as cars gained popularity during the early 20th century, automobile accidents became one of the top ten causes of mortality in the United States.⁷¹ As statistics surrounding vehicle safety accumulated, reports of manufacturer-specific data embarrassed manufacturers into safety modifications.⁹⁴ While manufacturers rarely offered an optional seat-belt, the tide of unnecessary deaths did not begin to recede until Congress passed several laws to improve the safety requirements for automobile.^{95,96} Figure 10 shows the drop in the fatality rate per 100 million vehicle miles traveled (VMT) from 1949 to 2009, as well as the maintained absolute number of fatalities during the same time period. From 1975 to 1978, automobile safety standards were estimated to have prevented 36,000 deaths.⁹⁵ Even after manufacturers were forced to provide improved crash dynamics and seat-belts, public health interventions were necessary to modify the behavior of drivers and passengers to include the regular use of seat-belts at all ages.⁹⁴ Public health initiatives have continued to contribute to the reduced fatality rate through regulation of permissible concentrations of blood alcohol while driving.^{94,97,98}

Fatalities and Fatality Rate per 100M VMT by Year



1949–1974: National Center for Health Statistics, HEW, and State Accident Summaries (Adjusted to 30-Day Traffic Deaths by NHTSA)
FARS 1975–2009 (Final) 2010 Annual Report File (ARF); Vehicle Miles Traveled (VMT): Federal Highway Administration.

Figure 10 Automobile fatalities and fatality rate per 100M VMT from 1949 to 2009*

Another relative success of public health concerns the use of tobacco. The contribution of habitual smoking to cardiovascular and lung disease is now unquestioned.⁹⁹ While the first use of tobacco by humans dates more than a thousand years ago and introduction to Europe by Christopher Columbus was in 1492, the popularization of a widely accessible form dates only to the 18th century in Europe. Use increased after the mechanization of cigarette rolling in the 19th century.¹⁰⁰ The first hints of the dangers surrounding smoking were confirmed from increased rates of lung cancer in London.¹⁰¹ Lung cancer is a very fatal disease with poor prognosis. Approximately only 10% of those diagnosed with lung cancer can expect to survive 5 years.¹⁰² Since the most common presenting symptom is cough, diagnosis of lung cancer generally implies a late stage, and medical interventions such as surgery or chemotherapy provide little extension of life in most cases.¹⁰³

In order to investigate the source of rising lung cancer mortality, Doll and colleagues interviewed patients with new diagnoses of lung cancer within the London area, leading to the first large study examining the role of smoking in increasing lung cancer mortality. Findings were published as a preliminary article in the British Medical Journal in 1950.¹⁰¹ Later studies confirmed his findings, most notably through an

* Reproduced from a report titled “2010 Motor Vehicle Crashes: Overview” revised February 2012 by the National Highway Traffic Safety Administration’s National Center for Statistics and Analysis⁹⁶

examination of the smoking habits and mortality of British Physicians over ten years, and later after 50 years.^{99,104}

With thousands of medical publications highlighting the deleterious effects of smoking by the early 1960's, the U.S. Office of the Surgeon General released its report about the dangers of cigarette smoking in 1964.¹⁰⁵ A new era of campaigns to reduce the prevalence of smoking began.¹⁰⁵ The stage was set with clear scientific research and a message to dissuade the public from smoking. This new challenge provided the foundation for what would become an essential repertoire of tools for the modern practice of public health. Congress responded immediately to the mounting evidence and surgeon general's report by passing initial legislation concerning the labeling and advertising in 1965.¹⁰⁵

The stage was also set for a defensive reaction from tobacco companies that had a vested interest in the continuation of smoking behavior. Tobacco companies invested to safeguard creating a conflict with public health advocates who attempted to reduce the prevalence of smoking. Cigarette manufacturers fought back with direct efforts to discredit the underlying science of the anti-smoking campaign.^{106,107} Lobbying efforts by the tobacco industry played a large role in watering down the legislation passed.¹⁰⁵ Mass media and innovative marketing campaigns by tobacco corporations conflicted with education and regulatory efforts by public health advocates.^{105,106}

Eventually, regulation did tighten around tobacco, and health advocates were able to use several initiatives as the mainstay of relatively effective interventions. These included tobacco taxes, the erection of state-wide tobacco control programs, reducing access to tobacco by minors, restricting exposure of smoking to nonsmokers, regulation of nicotine by the FDA, and increased financing and availability of tobacco cessation programs.¹⁰⁵ Cigarette excise taxes are considered to be the most effective tobacco health initiative to date, which set a precedent for future public health initiatives being considered for the treatment and prevention of obesity.¹⁰⁵

The success of health initiatives at reducing the prevalence of tobacco use is relative but significant. Adult smoking prevalence had decreased from 42% in 1965 to 25% by 1990.¹⁰⁸ In 2010, this prevalence dropped to a record low of 19.3%.¹⁰⁹ After nearly 50 years of efforts to control the prevalence of smoking, each percentage point has become more difficult to obtain. The effectiveness of interventions surrounding smoking cessation via public health continues to be studied, and the efforts to create optimized, multifaceted approaches remain. From 1975 to 2000, an estimated 790,000 lives have been saved by the reduced prevalence of smoking.¹¹⁰ It is unknown how many lives were sacrificed by the efforts of the tobacco industry to stymie smoking cessation within the general public.

The lessons to be learned from 50 years of efforts to reduce smoking are numerous. Many of the tactics used in the anti-smoking campaign have become part of the standard repertoire of health advocates today. One of the most important facets of the experience of these efforts concerns the conflict between corporations invested in encouraging behavior known to be in conflict with public health.¹⁰⁶ The partial success of anti-smoking campaigns provides precedents for future public health campaigns. However, it is important to remember that these successes were in the context of an unnecessary behavior, smoking, and strong scientific evidence linking smoking to large increases in mortality and morbidity.

Obesity is a fundamentally different problem in this regard. Obesity remains a challenge to public health advocates because it is an interdependent marker of a disease state with variably expressed comorbidities.³⁹ Eating is in many respects different from smoking. Eating is essential for life. Since most of human evolution existed during times of at least relative famine, humans are built to enjoy meals of significant caloric intake.¹¹¹ Most people eat multiple times every single day from the day they are born to the day that they expire. What and how a person eats is rooted in his or her first two decades of practice under the auspices of his or her parents/guardians, including poor habits that

predispose to diabetes and obesity.¹¹² While nutrition research can identify eating behavior patterns that are more or less healthy, in contrast to smoking, it is impossible for the health promoter to advocate that the public just say no to eating.

From the most fundamental point of view, obesity and associated obesigenic states are generated by consuming more calories than are expended on average. It has been shown that caloric restriction and/or exercise can reverse obesity and eventually return metabolism to a normal state.³⁷ Because of the availability of high caloric foods and the efficiency of the human body, reasonable exercise alone cannot reverse or stop rising obesity prevalence.¹¹³ For example, a single 16-oz bottle of soda (roughly 200 kilocalories) takes one hour of moderate-paced walking to expend. Regular exercise does improve the risk for cardiovascular disease, but diet or diet plus exercise remain the most powerful methods of weight loss and risk reduction.¹¹³ This simple deduction carries no mystery, but modifying the behavior of an individual to reduce caloric consumption and to increase exercise is so difficult that many studies and reviews only address modifications to the environment through policy as possible interventions.¹¹⁴ There is growing evidence for the efficacy of policy approaches that increase the cost per calorie of available foods.¹¹⁴ Policy changes should complement more primary interventions to address the social determinants of health and a more sustainable educational approach.¹¹⁵

At first glance, the lower relative cost of food because of the efficiency of modern society seems to be a benefit. It makes some economic sense that if food prices are lower, fewer will go hungry. However, even in the United States, hunger or food insecurity remains a sizeable problem, estimated at nearly 12% in 1995.¹¹⁶ This occurs despite the growing prevalence of obesity. Recent research suggests that food insecurity and obesity may be closely related, especially in children.¹¹⁷ Disadvantaged populations are polarized between obesity and hunger, as evidenced by the appearance of a gradient effect between obesity/hunger and SES and education.¹¹⁸

In the new regime of significant abundance, two related phenomena affect public health. First, the overall prevalence of obesity is rising within all strata of SES, indicating an effect that overrides the privileges that education and socioeconomic status afford.¹¹⁹ Second, disadvantaged or impoverished communities experience disproportionate rises in obesity, diabetes, and associated morbidity and mortality.⁴⁴ To be effective, obesity interventions need to address both aspects of obesity. That is, anti-obesity interventions need to be broadly targeted, while also ensuring consideration of the differences faced by impoverished and disadvantaged communities.

SUMMARY

Public health promotion has provided a useful series of behavior models and programming planning frameworks for understanding, designing, and implementing health behavior initiatives. Historically, these models were developed for interventions to address infectious diseases, followed by behavioral risks such as automobile accidents and smoking. Extension to obesity prevention presents new challenges because of the complexity of behavior change with respect to eating and exercise.

New models in the psychology of health behavior have improved the predictive power of these models while they have not so far produced confirmable results in modifying chronic disease risks. The PRECEED-PROCEED planning model provides a tool for developing and implementing community health promotion interventions.

With an increasing focus on chronic diseases and obesity in the community, it is important to understand influence of the social determinants of health disparities, and in particular the complex relationship between SES, race/ethnicity, and both obesity and hunger.

Chapter 4: Impoverished Communities and their Barriers

INTRODUCTION

The influence of the social determinants of health plays out in part through a complicated web of interdependent factors that are tied to poverty. In this chapter, I will discuss the prevalence and health impact of poverty in the United States. I will use an illustrative case study of a typical member of an impoverished community, based on ethnographic accounts and mixed-methods data, and will review the role of prisons and social networks in impoverished communities. I will conclude the chapter with a dialogue to bridge the gap in evidence from social network theory with the practical requirements of community advocacy.

POVERTY

Impoverished communities are not simply neighborhoods of accumulated destitution. They are, like all communities, composed of networks of people with families, who aspire to fulfill the ubiquitous needs of humans.¹²⁰ Impoverished communities are not homogenous.¹²⁰ It is important to understand the history and characteristics of these communities to inform effective public health initiatives in them.

Poverty has been defined in terms of absolute standards—that is, against an objective benchmark—and relative standards—against locally relevant reference populations. These definitions are not completely independent of each other. The variation in absolute standards between countries can be stark, as highlighted by the percentage of those that live on less than \$1.00 per day between Sub-Saharan Africa and Central Europe in 2005, 41.09% and 0.95% respectively.¹²¹ However, poverty is most often defined in accordance within a national or sub-national comparison.

Different national and sub-national contexts have different distributions of wealth, In comparing countries, the shape of the income distribution affects the welfare of the

impoverished significantly.¹²² Income distribution also correlates with life expectancy. The more unequal the distribution of wealth within a society, the more disadvantaged are those at the bottom of the SES distribution. Specifically, the poor will be unable to do well when most of the economic wealth is concentrated within a population distant from their own SES. When the boundaries between rich and poor are less sharply drawn, it is easier to climb the SES ladder relative to that society at large.⁷⁶

POVERTY IN AMERICA

In 2011, the 15% of Americans met the official criterion for poverty as defined by the U.S. Bureau of the Census and used in many policy discussions.⁹ The official “Poverty Threshold” is based on extrapolations of the cost of food and percentage of income spent on food.⁹

Figure 11 reports data on the prevalence of poverty by race/ethnicity as officially defined from the 2011 American Community Survey, the most comprehensive snapshot of socio-economic conditions produced in the Federal statistical system.⁹ Certainly, the distribution of poverty between races/ethnicities is not equal. Populations that identify as Black or Hispanic have more than twice the prevalence of poverty than those that identify as White or Asian. Since this data is sourced from a representative survey of the U.S., these percentages can be extrapolated to project the total number of people in poverty in the U.S. by race/ethnicity in 2011, shown in Figure 12. While Americans that identify as Black have the highest proportion of poverty, there are far more Americans that identify as White and slightly more Americans that identify as Hispanic in poverty present within the country.

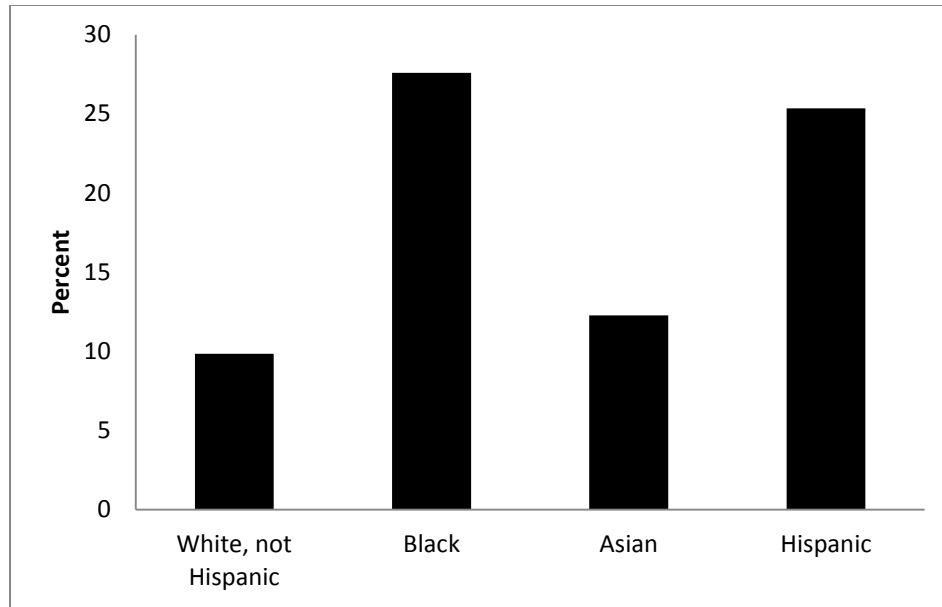


Figure 11 Percentage in poverty by self-reported race/ethnicity in the American Community Survey 2011⁹

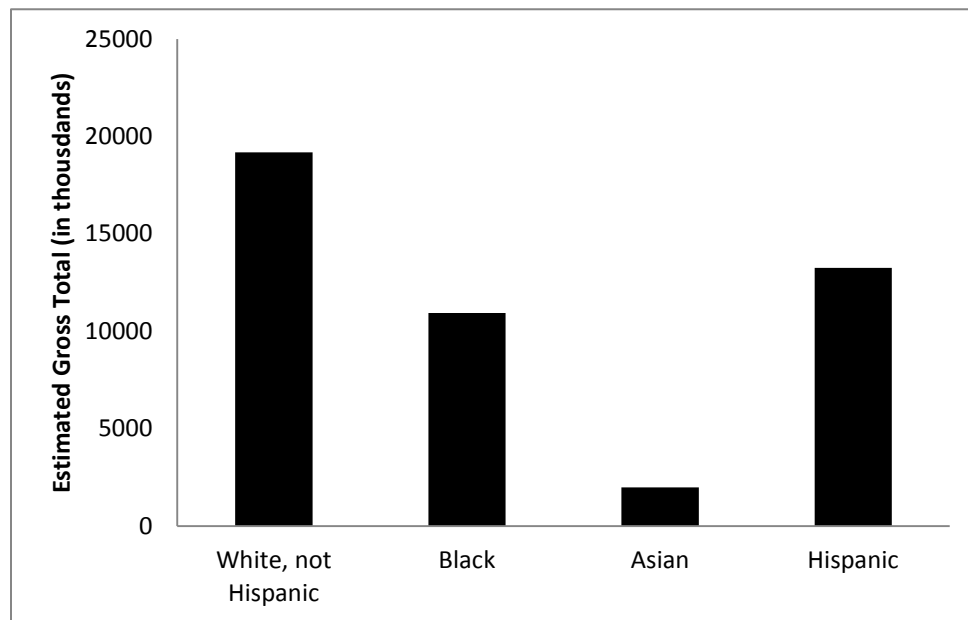


Figure 12 Number of Americans in Poverty extrapolated from American Community Survey 2011⁹

Many Americans share the “American Dream,” which, succinctly characterized, suggests that if an American works hard, he or she will prosper.¹²³ The popular nature of

this sentiment resulted in the pervasive but logically flawed sentiment of the negative converse statement, “Those that do not prosper, do not work hard.”¹²³ As Figure 11 shows, impoverished Americans make up a significant percentage of the national population, particularly among Black and Hispanic minorities. In this way, popular culture and modern day policy has frequently demonized the poor.¹²³ However, contrary to popular belief, by far the largest segment of the impoverished communities of America is the working poor—that is, persons whose paid employment does not generate enough pay to cross the officially defined poverty threshold.¹²³ The working poor fill the positions most of society looks down upon, while enduring long hours and low wages.¹²³

Because of the disparity between the average wage for this stratum of society and the cost of living, many take on multiple jobs and pool resources between extended families in order to survive. In urban centers, the households of the working poor are often populated by brothers, sisters, and grandparents cramped in small apartments in order to adequately pool monetary and household resources, such as childcare, required for a bare minimum level of survival.¹²³ Even with every household member working minimum or sub-minimum wage jobs, the volatility of the job market can provide constant barriers to achieving sustainable levels of income above the poverty line.¹²³

When the job market does not provide a wage that will offset the cost of rent, a small proportion of the working class will rely on social services such as food stamps or welfare. In an in depth analysis, Kathryn Edin and Laura Lein analyzed the dynamics of one of the most disadvantaged strata of society, minority single mothers in urban centers.¹²⁴ These authors found that the majority of single mothers spent welfare or job income as optimally as possible. These mothers were found to rely on welfare as a last resort. When faced with stiff tradeoffs implicit in welfare policies that created strong disincentives for work among welfare recipients, many mothers would choose to work due to a strong belief in deriving respect from work, sometimes forgoing desperately needed support.¹²⁴ The evidence from in-depth qualitative studies such as this one is

overwhelming that the poor operate in an extreme and unforgiving environment while maintaining many of the same values of their wealthier counterparts.^{123,124}

The small differences in the beliefs and value systems between the poor and the rich raise the question: “what are real differences between these two populations beyond monetary resources?” Most obvious is the race/ethnic composition, evident in Figure 11. Many analysts conclude that discrimination still persists today despite strides towards equality.¹²⁵ The color of the skin of a person is a poor marker for the underlying genetics of a person.¹²⁶ While there is evidence that there is some variation in intelligence between people—based on both nature and nurture—skin color explains none of it.¹²⁷ Since skin color is irrelevant with respect to intelligence and other markers of productive capacity, then the conclusion must be that the discrepancy in rates of poverty between “racial” groups must lie in social content of their construction, with discrimination likely playing a significant role.

The historical fact of the enslavement of African Americans has generated a persistent legacy of inequality and discrimination.⁷⁵ A family starting from the point of slavery was disadvantaged in almost every perspective, such as obtaining sustainable jobs, obtaining an education, weathering trauma, and gaining access to medicine.¹²⁸ This legacy was perpetuated by a legal infrastructure of racial inequality that only began to be dismantled in the Civil Rights era of the 1950s and 1960s. While some normalization of race relations has occurred, there remain inter-generationally transmitted cycles of poverty affecting many impoverished communities.¹²⁸ How poverty is transmitted through generations is not completely understood, but the basic idea that disadvantages at birth persist throughout the life course in poorer opportunity, differences in perception and treatment by others, and differences in outlook is an obvious corollary.¹²⁸

COMMUNITIES

As already discussed, research has shown that persons in impoverished communities lack resources compared to others in the same society, but share the basic values that exist in other communities. Difference in their behavior lie in the challenges associated with the poverty environment. Poverty encompasses many aspects of a community and its inhabitants. The attitudes and behaviors of each individual is different, depending significantly on the unique experiences of each.

Narratives describing common shared experiences can provide an essential and nuanced examination of the various factors playing into the everyday lives of those within an impoverished community. Some studies using both qualitative and quantitative—mixed method— approaches have described certain aspects of impoverished communities that help to understand the behavioral choices of their inhabitants. Influential examples include *No Shame in my Game: The Working Poor in the Inner City* by Katherine Newman and *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work* by Kathryn Edin and Laura Lein.^{123,124} The following theoretical case study draws on these accounts to guide the reader through the life of “Sara” and her family to illustrate essential considerations commonly addressed by such work.

INTEGRATED CASE STUDY

Sara is a 27 year-old Black female living in an urban community with her mother and three children. Every morning at 5:00 AM, Sara wakes the children—her own three as well as four 4 brothers and sisters still living at home—and pushes them through the routine of dental care and breakfast. She works at a local fast food restaurant that pays minimum wage, starting at 6:00 AM. Her paycheck from this work only covers the rent of the small apartment all nine of them share. She does not qualify for food stamps because of her income, but her mother is able to stretch a welfare check to just feed the

family. Sara grew up in this household with her mother, barely managing to complete high school while working fulltime to supplement the mother's \$400 per month welfare check.

PRISONS

Sara never had a relationship with her father, whom was sent to prison in his 20's for possession of crack. His involvement with the harsh penal system during the 1980s war on drugs essentially eliminated the possibility of Sara's father playing a role in the lives of his children. While it might be easy to dismiss the father's lack of support as inevitable, the impact of the American prison system on many impoverished minority communities is devastating, but is not known by most Americans who live in other settings. The total number of inmates incarcerated in all prisons and jails in the United States during 2007 was nearly 2.5 million. This figure represents 0.7% of the entire U.S. population.¹²⁹ Compared to the rest of the world, the U.S. ranks as the highest incarcerator, with Russia coming in as a distant second.¹³⁰ Nearly 50% of the prisoners in the entire world are in the United States.¹³⁰

Figure 13 shows the composition of state and federal prisoners in the United States by race.¹²⁹ The data shows a predominance of inmates identifying as Black and White, 41% and 37%, respectively. Despite representing a similar proportion of prisoners to those that identify as Black, and a much higher proportion of those prisoners that identify as Hispanic,¹²⁹ White prisoners are clearly underrepresented relative to their share of the U.S. population (Figure 14). demonstrates a stark difference in the percentage of the American public imprisoned between White and Black races/ethnicities, nearly seven times more Black than White. Even the Hispanic population garners more than twice the percentage of imprisoned Whites.

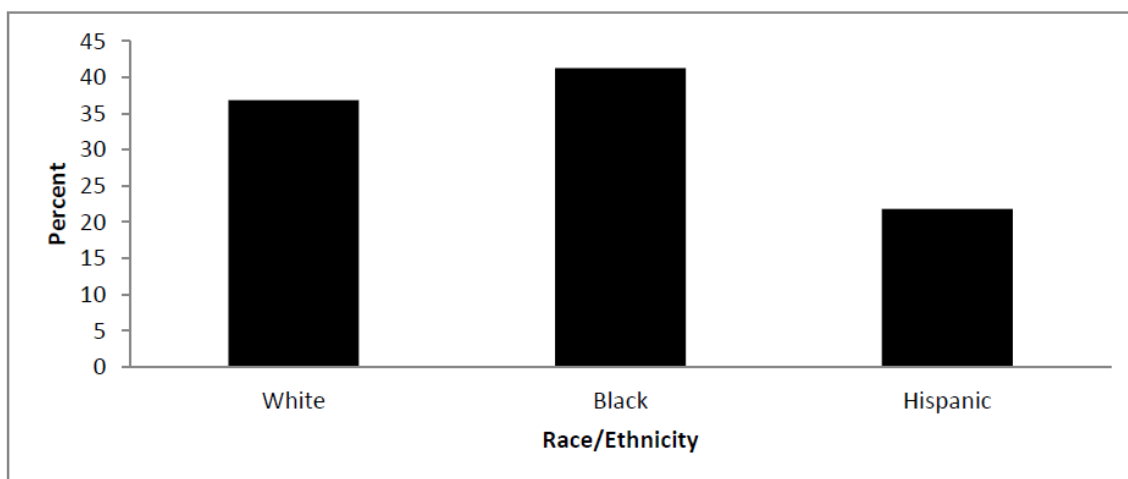


Figure 13 Percentage of total prisoners under state or federal jurisdiction by race/ethnicity in 2008 *

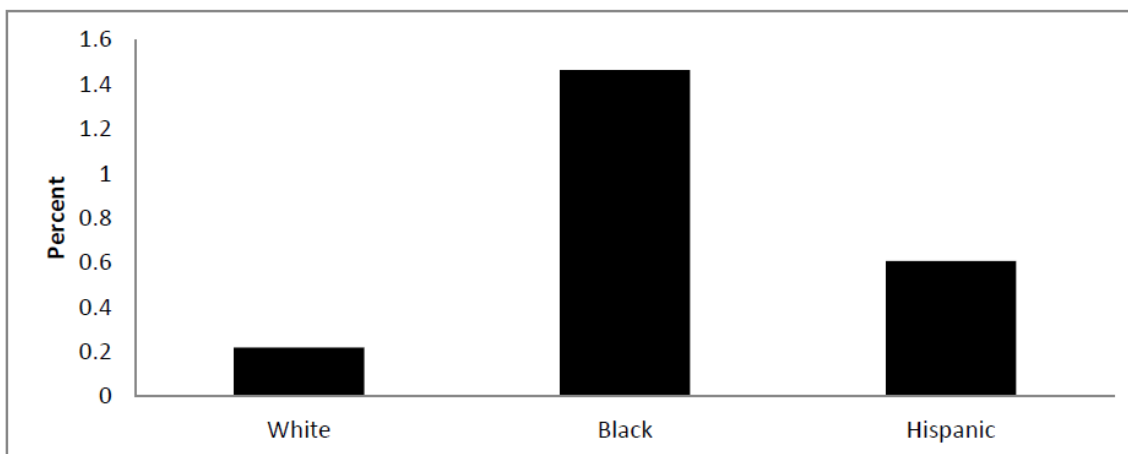


Figure 14 Imprisoned percentage of the United States population by race/ethnicity in 2008*

There is also disparity in incarceration by education (Figure 15).¹³¹ Most marked are the differences between persons without a high school diploma, and persons with postsecondary education. Only 12% of inmates report any postsecondary education, compared to almost 50% of the general population. Similarly, only 18.3% of the general

* Sourced from the 2008 report from the Bureau of Justic Statistics¹²⁹

* Sourced from the 2008 report from the Bureau of Justic Statistics¹²⁹

population has less than a high school diploma, compared to 41.3% of the total prison population.

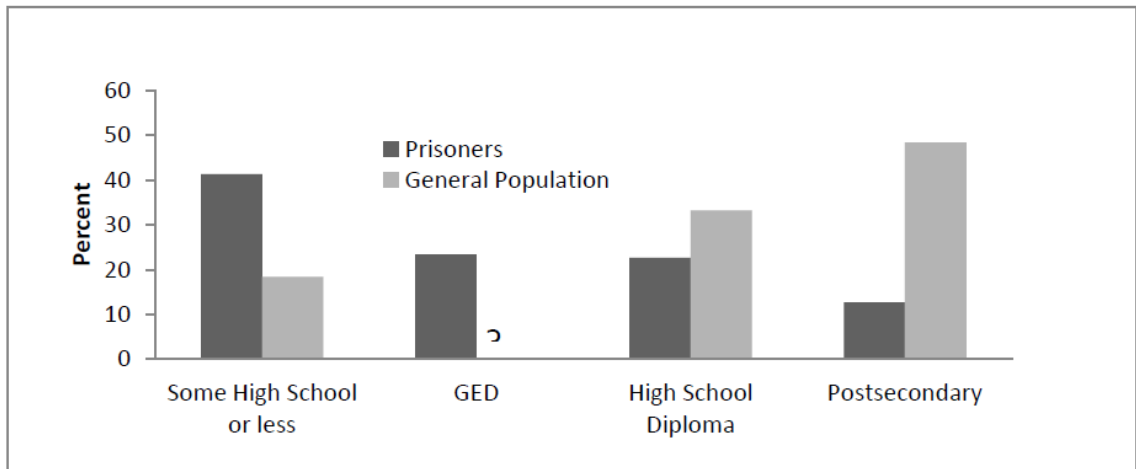


Figure 15 Distribution of Educational Attainment between Prisoners and the General Population*

Even more devastating is the link between poverty, race, and prison. “The incarceration rate for Black 25- to 29-year-old males, for example, is 13 percent, compared with 2 percent of the White and 4 percent of the Hispanic populations in that age group. For young Black males without a high school diploma, about as many are in prison as are employed.”¹³² If the normal age-group of potential partners for Sara are just as likely to go to prison as not, then it is no surprise that the father of her children remains in a federal prison.

For Sara, this reality is all too obvious, because without the support of another able-bodied adult within the household, each month the family comes dangerously close to not being able to purchase even the cheapest available food, not to mention clothing and luxury items. Since Sara does not live in a cold climate, she does not need to worry about purchasing costly outdoor winter clothing for her and her children, a requirement for impoverished families in the north. Since her state does not completely fund the state

* Sourced from a 2003 publication by the Bureau of Justice Statistics titled “Education and Correctional Populations.”¹³¹

Medicaid program, her children do not always qualify for coverage. This means that beyond the required vaccines for public school, her children are unable to obtain regular well-child examinations or visit a healthcare provider when sick.

The lynchpin, keeping Sara and her children from absolute destitution, is her mother. Because she is still eligible for welfare, her mother provides a small monthly income as well as something much more valuable: child-care. Sara's monthly gross income would be insufficient to pay for even one of her children in daycare, but with the help of her mother her two infant sons and her mother's infant daughter are under constant care. Her mother is also able to keep tabs on the older children when they return from school while Sara is still at work. In the neighborhood in which they live, gangs fill a prominent role influencing many of the youth, generating economic incentives through the drug trade. Sara is vehemently opposed to contact with any of the neighborhood gang members, having known many of them in high school. She completely understands the risk she places her children and siblings in by living in proximity to gang activity. In fact, for Sara, moving out of the neighborhood is one of her primary objectives to safeguard her children.

Sara's mother has a different opinion on the matter. Her mother watches children day and night. In order to do so, she relies heavily on her support network of similarly aged mothers and grandmothers who live within the neighborhood. Without this support network, she would be unable to continue the task of raising seven children. This topic is frequently debated between Sara and her mother, and Sara is starting to understand that this will not change. If Sara wants to move her family to a safer neighborhood, she will have to find a way to generate more income. In fact, she would need to generate almost four times her current income in order to afford a higher rent and pay for the services supplied by her mother.

Sara truly appreciated the importance of her mother last year when she found her mother incoherent on the bathroom floor. Despite being just 52 years old, her mother

suffered a stroke that left the family without a full-time caretaker and a mountain of debt to pay. Through what seemed only a miracle, the local hospital forgave the medical debt, but it took nearly six months before Sara's mother was able to safely take care of the children. Two of the older siblings had to drop out of school to help take care of the children and obtain supplemental income. Sara was able to find a job for her eldest sister, still living at home, through her social networks built from working for years in fast food. Since that time, Sara has been plagued by anxious feelings about the possible death of her mother. She does not believe she would be able to manage the family on only her small salary. If even a single child gets sick, the family faces almost certain financial catastrophe, because they are still paying the back rent from the period when her mother was in the hospital. Her mother was unable to afford physical therapy and still walks with a limp and partially obscured vision.

The narrative of Sara's life is not unique, and it is evident that she prioritizes the immediate welfare of her family over her own needs. This is a basic value shared by many across socio-economic strata. With only a high school diploma, she has found it nearly impossible to find jobs that will pay anything more, despite the hundreds of applications and resumes that she has submitted. She completely understands the dangers that confront her children, living in the same impoverished neighborhood in which she grew up.

Because of her long hours, she is unable to spend the amount of time that she wishes she could with her children and siblings, and she worries that her mother is not the best of influences. With little free time, her social network consists mostly of her mother and old social contacts along with the people whom she works with at the fast food restaurant. Because of their similar backgrounds, her social networks are homogenous, which leaves little room for advancement or placement in better jobs.

The schools where her child and siblings attend are not able to provide a safe atmosphere. Gangs are active and shootings routine, but she is left with no other choice.

She perceives the schools as worsening since even her graduation, but she is informed only by her child, siblings, and previous friends, since she does not have enough time to participate in school functions or boards. She feels that if anything else goes wrong, she and her children will be destitute. She carries significant anxiety throughout the day, sometimes becoming careless with difficult customers. Because she has held down a job for nearly 11 years, she stands apart from most of her childhood friends. Because of this difference, she was unable to continue to foster old relationships, which have all but evaporated. Many of her previous friends even chastise her about working at such a demeaning job, but Sara sees no other option. She has lost many friends to gang violence and/or prison.

While “Sara’s” story is certainly not the narrative of the average person in every impoverished community, the reality of persistent crisis and frustration for many people living in these settings is common.^{133–136} Low socioeconomic status is correlated with causes of psychological distress such as undesirable family and social outcomes, adverse health events, or economic problems.¹³³ Furthermore, minority race may interact with low socioeconomic status to increase its effects.^{133,136} This is the situation in which many community advocates approach a community. While Sara would be thrilled to have support for the future health of her children, a careless approach towards a community with these types of struggling mothers could easily incite a degree of suspicion and defensiveness. Understandably, adding an additional task to Sara’s already fragile routine could prove to be the last straw added on to a large burden of stress and crisis. If Sara or her mother had ever had a bad experience with a community advocate or researcher it might lead them to quash any efforts to include them or their children in a program, as a measure of self-protection. Revelations about unethical treatment of people living in impoverished or vulnerable communities medical or public health initiatives—for example the Tuskegee and Guatemala syphilis studies—creates the possibility of mistrust

in impoverished communities and extraordinary barriers to overcome by researchers.^{137–}

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SOCIAL NETWORKS

As previously mentioned, the social networks of Sara and her mother play a critical role in the life of their family in different ways. Sara's mother seems to find a sense of meaning and fortitude through her social network while Sara was able to leverage her contacts to obtain a job for her sister. In all strata of society, social networks can be a critical part of success from obtaining jobs to finding financial or emotional support in times of crisis.¹⁴⁰ Sara and her mother lack any possibility of financial support from their extended social networks, but the immediate family is able to pool resources in order to survive destitution. The role of social networks and social capital in impoverished communities is largely unexplored, but some evidence is emerging.¹²⁰ The relationships between community, social capital, poverty, and health are acknowledged to be complex. There is not consensus among experts about the basic definitions that describe these relationships.¹²⁰

Higher socioeconomic status provides social networks with increased range and diverse composition.¹⁴¹ By contrast, poverty often relegates sufferers to small networks whose members share similar characteristics.¹⁴¹ Thus, with less variation in a social network, a member of an impoverished community might need to utilize available relationships more efficiently. While restricted and homogeneous social networks can negatively affect members because such networks tend to lack of resources, they do provide a mechanism of bounded reciprocity.¹²⁰ More heterogeneous social networks may provide mechanisms of active coping. Differences in network organization even within impoverished communities may contribute to the variability in health outcomes.

¹²⁰ In either situation, social networks provide some advantage to members with mechanisms for overcoming temporary individual setbacks.¹²⁰

Social networks also provide the basis of status attainment within the community, and status supports power.¹⁴¹ Extensive participation in social networks in impoverished communities provides an awareness of the power structure in the community. Frequency of interaction has been found to play a role in the strength of the relationship and the probability of crime.¹⁴²

SUMMARY

Health care professionals and public health advocates working in impoverished communities need to be sensitive to the special pressures experienced by persons who live in these settings. Popular stereotyping of these communities suggests that they are characterized by prevalence of different beliefs and values than those shared by more mainstream middle class communities. However, mixed methods research contradicts these assumptions. Aspirations for successful work and family lives are similar in poor and non-poor communities. What distinguishes poorer communities is a more challenging environment, more limited resources, and a constant threat that any hard-won stability will vanish in the face of what would be small setbacks in other settings. Network resources are more limited, although vitally important to coping with the challenges of daily living. Community residents are forced to accept difficult tradeoffs, such as the need to remain in high crime neighborhoods in order to draw on the instrumental support available through personal relationships and informal exchanges in those neighborhoods. Coming to such communities from the outside, health promoters need to understand the pressures and limits that community members live with on a daily basis, and the resulting psychological adaptations that strike many who live in more privileged environments as unhelpful at best, destructive at worst.

Responsible entry and participation in impoverished communities is frequently accomplished by conscientious planning. The challenges of planning a health initiative in the context of active community participation require familiarity with program

framework, such as the PRECEED-PROCEDE Model. Chapter 5 will guide a possible approach towards beginning the process of designing and implementing a health initiative in disadvantaged settings.

Chapter 5: Moving Forward

INTRODUCTION

Following a short introduction to recent and relevant examples in public health, I will integrate the concepts introduced in the previous chapters—obesity, health promotions, and poverty—by guiding the reader through a case study of the implementation of a health initiative in an impoverished community using the PRECEED-PROCEDE Model (PPM). Each phase of the PPM will be introduced with further detail, organizing the narrative of the case study. I will conclude the chapter by introducing a possible connection between community social networks and game theory and specifically address barriers inherent in the relationship between community advocates and impoverished communities.

FRAMEWORK FOR PROGRESS AND DEVELOPING THE MODEL

Now, more than ever, there exist the tools for public health professionals to affect health behavior in community settings. Public health practice applies scientific information to the behavior of humans in the hopes of improving quality of life through reductions in morbidity and mortality. Scientific findings with implications for public health are not automatically integrated into cultural norms or affect the behavior of individuals as might be wished. The dissemination of relevant knowledge is not sufficient to change the health outcomes of people, and a large component of public health today is concerned with translating research findings into behavioral changes.

The first modern and statistically supported findings about the health ramifications of smoking have been known for nearly 60 years, beginning when Dr. Richard Doll published his famous paper in the British Medical Journal, “Smoking and Carcinoma of the Lung”.¹⁰¹ In fact, because many of the ideas behind public health find their origins in a relatively distant past, modern culture has adopted them into a

normative dialogue (e.g. smoking is bad for health, or seat belts save lives) after decades of public health initiatives.

By construction, public health is concerned with maladies that are studied at a population level, in order to identify interventions that can favorably affect the health behaviors of significant segments of the population. Design of community-based interventions requires understanding the current state of research in the hopes of designing effective interventions. There exist stacks of supplements to guide a community advocate through the process of intervention. There is with an increasing presence online, and information technology is truly poised to revolutionize future approaches.¹⁴³ Even now, one of the most useful methods in influenza epidemiology is the search engine Google, and its utility is spreading to areas which are considered underserved.^{144–147} Even with these new resources, health interventions still require the advocate to provide the groundwork necessary to coordinate collaborative assessment and implementation for each community. This role of the health advocate is not likely to change, especially since impoverished communities frequently lack access to these avenues of change.¹⁴³

The motivation to become an often advocate begins with a personal connection: a person or a people, suffering while the potential advocate suffers from frustration. It continues with hopes of a better outcome and ideas of a better system.¹⁴⁸ The call for change increases with every similar patient or friend that experiences similar needs, until it becomes clear that something tangible has to be done. The momentum built-up by the knowledge that there *has* to be a better way for things to work, and a brighter future for those who are suffering, is a tremendous and under-utilized asset.¹⁴⁸ Many find the transition from frustrating observation to action to be an insurmountable barrier, especially as they consider the bureaucratic obstacles ahead. In contrast, there are the few who find jumping into the field of community health to be liberating and rewarding. Most important for this purpose of this body of work are those who simply cannot stand-by and

“watch the world burn” any longer, and look for successful models to instruct interventions.

Both public health and medicine have seen many unsuccessful initiatives. One example is D.A.R.E., undertaken as part of the 1980s “War on Drugs.”¹⁴⁹ No matter how well intentioned, changing the behavior of the public is difficult. Understanding the community in great detail is a prerequisite for many of the models and planning frameworks.¹⁵⁰ With a health change in mind, such as losing weight or smoking cessation, a good first step is to develop a model that integrates the various forces affecting community members and their behaviors. A conscientiously developed model can not only help identify methods of intervention, but, perhaps more importantly, it can help identify unseen influences on behavior as well.¹⁵¹ Humans are affected and manipulated by many different forces, and each community has its hidden players and lobbyists who can erect major roadblocks if not dealt with appropriately.

In short, having a true assessment of the community will inform an intervention. A carefully implemented intervention also needs a structure to evaluate the outcome and sustain positive results.¹⁵² Intervening in a community, regardless of the specific intervention, is never trivial, and it is not always helpful. There are many examples of research interventions where researchers collected data while damaging social networks and the relationship of their institutions to the community.^{153,154} Avoiding harm to a community requires the acknowledgment that it is possible, as well as the foresight to interact in a sustainable and ethical way with the community.

As discussed previously, there are quite a few models of social cognition or health program design to choose from. The PRECEDE-PROCEED Model is an excellent starting point as a method of comprehensively accounting for the forces affecting the choices and behaviors of a community.¹⁵² As discussed in Chapter 3, this model is frequently used by public health advocates, and it provides a guided and broad approach. In essence, its construction follows a chronological order, divided into eight phases.

Since many community health advocates come from relatively privileged backgrounds and are foreign to the community for which they advocate, it is necessary to emphasize the need to enter the specific community of interest respectfully. It is important to engage a variety of community members about their daily routines and the forces that come into play frequently in their day-to-day lives. A community advocate is only able to successfully advocate for a specific community if he or she is familiar with it. The PRECEDE-PROCEED model helps to identify areas of knowledge that still need to be obtained as well as to conciliate the perspective of the advocate with the community. The process of accounting for the dynamics of the community and integrating the necessary applications of scientific rigor can not only help the community, but it can help the community advocate obtain grants and provide accountability for his or her actions. Without a rigorous scientific methodology to the research aspects of a program, the burden of a study can prove to be ineffective or even harmful and prevent future community advocates from entering the community.⁸⁰ On the other hand, a well planned study can provide the critical framework for obtaining grants or and for instilling the confidence of the community in the possibility of improvement.

Most of the revisions to the PRECEDE-PROCEED model since its inception in the 1970's have been in the recognition of a large range of possible sources of influence over community health. The latest revision in 2005 follows the same logic as the original but has a more polished design by merging the behavioral with the environmental assessment.^{82,155} In the latest revision, there is a recognition of intentional interdependence between programs or advocates.⁸²

Similarly to the case study in Chapter 3, an illustrative case study based upon actual cases of PPM implementation will familiarize the reader with tangible strategies for using PPM for chronic disease or obesity programs in an impoverished community setting. The following case study is particularly geared towards a health professional or student. Through this example, readers should be able to begin tailoring each phase of the

PPM and approach towards the specific chronic disease of initial concern, while understanding the implications of the barriers to success within a particular community. The case follows “Dr. Joe Smith”, a pediatrician, on his quest to address childhood obesity more comprehensively for his patient population and their community. His quest is organized along phases of the PPM with more detailed information provided to supplement his story.

CASE STUDY:

Joe has been treating the maladies of obese children for a few years in a low-income Medicaid practice. He is becoming increasingly frustrated about his inability to affect any perceived change in the overall BMI of the patients within his clinic. He feels that it is nearly impossible to initiate change within the 15-minute timeframe he is allotted for each visit. Joe is now three years out of residency, and between his salary of \$135,000 and his spouse's, their household income is about \$265,000. Even though Joe has a great deal of debt to repay from his education, he and his spouse make nearly \$235,000 more than the median household in the neighborhood he serves.

Joe's formal education extended from age 5 until age 26, a total of 21 years. In comparison, the average number of years of education in the city of Averagetown, the community in which he serves, is 10 years. That means that Joe has more than twice the number of years of education and makes 4-5 times as much each year as the head of household of his average patient. As a result, 30-year-old Joe finds himself frustrated and unsure of how he, who grew up in an upper-middle class, white family, can successfully approach a largely impoverished, minority community in such a way as to make a drastic change in the health of the children he serves.

Phase 1: Understanding the goal

The first phase of the PRECEDE-PROCEED model embodies the journey of understanding the community through the perspective of the members, as well as the initial transition of a distinct foreigner to as close a feeling for the community as possible. In addition, in phase one the health promoter should seek to understand the strengths and readiness of the community to change. This study may use both qualitative and quantitative methods.¹⁵⁵ In Joe's case, he interacts with the parents of children in the community in his professional setting. He is privileged to hear stories of the lives in which his patients live. From what he has heard, he is frustrated by the lack of education and the often dangerous conditions in which many of the patients live. How will Joe more honestly get in touch with the community he is trying to serve?

Joe doesn't know if the perspectives of the parents of his patients truly represent the consensus of the community at large. Joe wants to find out what people think about childhood obesity and why they think it is becoming increasingly common, and now that he has made some initial connections in the community, he can go about trying to collect their answers to that question. He knows that any intervention will require widespread support. In this phase, Joe needs to communicate with the community at large and mine available objective data about health status. Not having much time outside of his busy practice, Joe has to be efficient in connecting with the community and obtaining the necessary information. He begins by attending some community meetings and interviewing a few of his friendliest patients about possible ways in which he might be able to meet community members outside of the office. Joe has heard numerous stories about the influential members of the community, and how they have supported certain families in their times of needs. He has a basic understanding about available resources through the advice of previous practitioners at his office, as well as through patients who have discovered them within their own social networks.

Joe creates a survey drawn from prior research to explore the various perspectives about childhood obesity, including the most commonly seen sources of reduced activity and increased consumption within low-income communities.¹⁵⁶ Joe submits the survey to his local Institutional Review Board (IRB) at the University with which he is involved in order to make sure that his plans are in no danger of ethical conflict. He designs the survey as both a paper version and an internet version. He distributes the survey to patients with extra copies to give to neighbors. While his survey distribution will not give him a representative sample of the community, distributed by convenience and through a snowball methodology, he hopes to be able to obtain a mixed-methods data set which will give a picture of the state and goals of the community and identify possible interventions to explore.

Joe begins to understand the overarching opinion and perspective about childhood obesity in the community. He learns that parents in particular are concerned about the health of their children, but feel helpless in the face of debilitating 80-hour work weeks. They blame the schools for exacerbating the problem with fatty and high-calorie foods but have no consensus about what should be done. There is, however, nearly uniform consensus among parents that they want their children to be healthy and that something needs to be done.

Joe's survey enjoys early success followed by a long period of sparse submissions. Most importantly, he feels that his presence at community gatherings has provided access to numerous families and neighborhoods which he might not have otherwise reached. The parents he interviews inquire about his progress in finding ways to help their kids get better, and he begins to understand the lives of his patients better. A few of the people with whom he discusses the issue become his champions, introducing him to others because of their fervor to change the fate of their children. He is lent their credibility and bypasses many of the social barriers to discussing such a sensitive issue. Joe seeks the advice and credibility of some of the influential leaders mentioned by his

patients and friends. He meets with church leaders, who are supportive but overwhelmed, as well as directors of outreach programs from faith-based organizations, who are prominent in this community. He obtains valuable information from one well-respected community leader, who has garnered the attention of the community by overcoming conflicts during the civil rights movement. He learns about the history of the local school district and the continuation of segregation and unequal distribution of resources to schools in the community.

Joe's case makes it clear that there are many tools to use during phase one. Interviews with existing community advocates can help to identify different subgroups or subcultures within the community and influential leaders.^{112,156} If resources allow, focus groups can be organized or surveys administered to representative samples of community members. Regardless of the method, it is important to be confident about understanding the goals and needs of the members of the community. While Joe's concern about childhood obesity may be shared by many, there are often times when the concerns of the advocate do not ring true with the community. In these cases, moving forward can be challenging if issues perceived by the community to be more pressing or not addressed. Often, advocates will find that a community might be unwilling to change because the perceived costs outweigh the perceived benefit. For example, Joe might learn that while the community supports weight loss, families are unwilling to abstain from fast food as a primary source of nutrition, because parents are too tired to cook at home after a 12-hour shift.

Phase 1 should also begin to identify any existing resources, including pre-existing programming, government support, or nonprofit organizations working or available to work in the community. Strategically involving these types of resources can go a long way to sustain an intervention. Through discussions and focus groups, it is also possible to identify the strengths and weakness of the community. Joe might learn for

instance, that the community supports a local sports team, but has no organized youth league sponsored by it.

Phase 2: Epidemiological, Behavioral, and Environmental Assessments

The second phase of the PRECEDE-PROCEED model entails identifying the chief health issues that might be addressed by an intervention, and identifying ways to break a long-term goal such as obesity reduction into more manageable objectives, such as a specific calorie reduction in school lunches by the following year.¹⁵⁵ The second phase is also geared towards identifying the behaviors and environmental factors that are contributing to the health issues and goals identified.¹⁵⁵ Through this process, the advocate works to achieve visible consensus with the community about what the program will target and entail. The advocate must reconcile any stark differences in goals that may be present between large constituents of the community.

Since most modern maladies are chronic diseases with complex multifactorial causes and long latency periods, interventions must sustain themselves until past the point of a local paradigm shift that fundamentally alters prevalent risks. The dream of any advocate is to transform a threatening intervention into a norm that is taken for granted as the years go on. An advocate should be realistic about the possible timeline available for supporting an effort to intervene. A pre-planned departure to meet the career objectives of the advocate before a realistic completion date of the entire process may be unethical without plans for sustaining the program. It is likely to be counterproductive to the cause at large.¹⁵⁰ In Joe's case, while he does not need to promise his undying effort to change the community, he should be honest with his supporters about his role.

Through his discussions with the different members and key players within the community, Joe is able to identify childhood obesity as an important issue. Reducing calories consumed during school and at home and increasing exercise at school and after school both emerge as possible target behaviors. Thus, Joe is able to divide the target

environments into school, after school, and home, as three milieus that may require different approaches. Joe also finds that the community is torn between reducing caloric intake, eating a healthier diet, and exercise, among three potentially modifiable behaviors. As consensus around the need for an intervention within the community builds, the goal is set to reduce the prevalence of childhood obesity in the community within five years.

Specific suggestions for implementation of the second phases assessment in the PPM are available from didactic materials produced by the models authors.¹⁵⁵ For example, behavioral factors can be broken down with respect to proximity of control by individuals in the population. The newest version of the model also begins to account for possible genetic determinants as a method of implementing stratification by risk into program design.¹⁵⁵ While not applicable to Joe's case, genetics may be a necessary consideration for some public health issues.

Phase two also provides room for secondary analysis from objective data sources such as demographic profiles, and crime or vital statistics. If important variation is observed in a subset of the originally identified community, then it might be important to incorporate adaptable strategies or to redefine the target population. Previous studies might also exist that highlight important features of the community. Information about the historical roots of the location and its inhabitants could contextualize certain perceptions or behaviors.

Phase 3: Behavioral and environmental diagnosis

The third phase of the PRECEDE-PROCEED model continues the second phase by more closely examining the behaviors and environments contributing to the problem.¹⁵⁵ Green identifies three dynamics surrounding behaviors and environmental factors that are important to account for: predisposing factors, reinforcing factors, and

enabling factors.¹⁵⁵ For example, why do children take in too many calories at school? What predisposes increased eating, and what reinforces it?

In Joe's case, he discovers that most of the children in this community eat subsidized meals, which means that a significant portion of their nutrition comes from institutional cafeteria food. He finds that the cafeteria food is sourced from a distributor and only warmed on-site. Regulations allow large portions of fried chicken and calorie-rich bread products, while limiting vegetable options to a few poorly-rated selections. In addition, Joe discovers that available beverages consist almost exclusively of high-calorie juices and milk. By observing school lunches, he also realizes that many children use change brought from home to purchase soda. After lengthy conversations with school officials, Joe learns that the vending machines around campus bring revenue into the school that is used to pay for a sizeable percentage of supplies. He also discovers that, while the children who bring their lunches from home sometimes use the vending machines, the children who buy lunches at school frequently supplement school lunches with vended products. It seemed that since most of the school lunches were already heavily subsidized, parents would supply funding for supplementation. In this way, Joe discovers that children with sack lunches were less likely to supplement from vending machines, because their parents were less likely to give them money for this purpose.

The third phase identifies the forces supporting the behaviors and environments highlighted in the second phase. While the interaction between various contributions to behaviors cannot always be delineated so neatly, it is useful to categorize and search for effects that fall within predisposing, enabling, and reinforcing factors. Generally, predisposing factors encompass population norms or characteristics. For example, relative to a child, he or she may be predisposed to overeating because of the normal behavior of his or her family, such as the tendency to not pack a lunch or disliking vegetables. Some predisposing factors, such as limited family income to buy fresh produce, might seem insurmountable. However, such limits may be addressed creatively.

For example by partnering with a local farm or starting a school garden, seasonal produce can provide cost-effective, healthy alternatives.¹⁵⁷

Enabling factors result from environmental processes that encourage behaviors, unhealthy or otherwise. Part of the program design process involves construction of enabling factors to improve healthy behaviors. In Joe's community, vending machines in the schools enable unhealthy behavior. Other examples might include poor access to nutrition information and subsidies from soda corporations for housing vending machines. In order to introduce an enabling factor that might improve healthy choices, Joe might work with the school to communicate clearly the caloric and nutritional value of foods in a manner appealing and relevant to children.

The rewards and punishments associated with behaviors compose reinforcing factors. Quite literally, the children in Joe's community are rewarded, through the dopaminergic reward pathway in their brains, by spending available money on soda. The combination of media-driven associations of soda branding and the physiological reward of high fructose corn syrup provides a consistent reward-feedback mechanism which increases caloric intake.^{158,159} In addition, there unfortunately exist no rewards for eating most healthy foods. Peer-pressure and habituation play a vital role in maintaining the unhealthy status-quo.

In combination, the second and third phases of PPM are geared towards identifying possible sources for intervention. Part of the art of advocacy revolves around efficiently assigning weights to each of the possible interventions. In Joe's case, if he blindly devises interventions, such as banning vending machines, he risks driving financial support for fragile educational programs away. Instead, Joe might find more sustainable support through discussions between school officials, soda distributors, and other sources of funding. In turn, for example, Joe might be able to balance a reduction in the calories administered by soda machines with water or reduced calorie products, while transitioning supplemental income for the school to less obesogenic sources.

It is important to note that as each of the phases unfolds, the apparent complexity of the problem is likely to mount rapidly. In Joe's case, he is now addressing three different environments and three different behaviors to accomplish a difficult long-term goal. With care and forethought, Joe might be able to design a program that eases these pressures, by addressing multiple environments and behaviors with few programmatic subdivisions. In order to sustain his efforts, Joe will need to be open to crossing connections and opportunities, while focusing his efforts for early success. Achievement can always be parlayed into extended programs. Given the practical concerns for funding, it may be important to demonstrate initial success by focusing efforts on a more manageable initiative. With a top-down understanding of the community, its health issues and goals, and the underlying dynamics of behaviors and environmental factors, Joe is ready to begin evaluating these possible sources of intervention against the many layers of governing bodies and restrictions.

Phase 4: Administrative and Policy Diagnosis

The fourth phase of the PRECEDE-PROCEED model more closely accounts for the administrative constraints on possible interventions, as well as the organizational barriers or relationships that should be resolved before widespread implementation.¹⁵⁵ In essence, the overall goal of this phase is to determine the best subset of interventions according to the most realistic model of the community reality. Normally, interventions require the support of whatever body or organization governs the target. For example, it would be necessary to understand the limits of support from the elementary school and the majority of parents. In a larger sense, consideration of every stakeholder will be necessary for each possible subset of interventions. There may be obvious, strict barriers to certain interventions, such as inability to disrupt the class schedule of the elementary school students. Thus, it may be possible to narrow down certain interventions, accordingly, and to optimize the synergy from multipart interventions.

By phase four, the possible set of interventions should be established, and the advocate should be preparing an initial budget. The budget should address all aspects of the intervention and subsequent evaluation. The exact mechanism of implementation should be addressed through strengthened relationships with identified partners. For example, if Joe were to target an after-school physical education program, he would need to obtain funding for equipment and possibly a coordinator to organize parent volunteers and distribute curriculum. He would need to factor in how the program would interface with the current physical education program given by the school, and to develop processes to recruit students while reassuring parents about the safety of their children's participation. His program would need to be prepared to handle a range of participants, while incorporating mechanisms by which progress could be measured. This aspect would be critical for his process evaluation in phase six, and may be necessary to support appeals for a continuing funding stream. If Joe begins working with a nonprofit or other agency, it might be necessary to evaluate the interventions and programming critically in order to make sure that his plan fits well within the scope of the organization. If not, Joe might risk losing the support of the organization, as well as the sustainability of his project.

There are potential organizational barriers to the program which need to be identified and addressed. In Joe's intervention, one such barrier might be difficulty with obtaining consents from parents due to unfamiliarity with the program, or competition with other after-school activities, which may be seasonal. He should verify the strength of his relationships with critical partners while also finding new ways in which his program might gain successful support and future resources. Unfortunately, every step of program development, implementation, and evaluation is linked with each other and can only be guided by vigilant attention to each of the details in parallel. In the best case scenario, Joe's program will be implemented and received as intended, but Joe must be prepared for unexpected barriers to emerge at inopportune moments. The more attention to

planning he allocates at the beginning, the more likely it is that Joe will be able to focus on emergent barriers while other aspects of the program succeed.

It is also important that Joe refrains from taking on all aspects of the workload by himself. Joe might find that, as is often the case, much of the necessary framework needed to implement and evaluate his program may already exist through preexisting programs. Joe would be wise to build on the success of others, especially early on, until he truly understands the dynamics of each environment in which he plans to intervene. By establishing a presence, Joe will begin to build trust between each of the partners and the community, which will help open doors for further progress.

Phase 5: Implementation

The fifth phase of the PRECEDE-PROCEED model involves the actual implementation of the designed program.¹⁵⁵ All aspects of the program should be tested and ready for use. In Joe's case, he decides to begin by implementing an afterschool exercise program in the local elementary school. A final hardcopy draft of the entire program plan is sent to and signed by all partners involved. Joe then provides a detailed list of the goals and objectives, as well as copies of all forms and documents used. He is careful to ensure that his partners remain fully aware of his intentions, as well as the expectations of each partner involved.

His program will be offered as a preparatory course for football and volleyball, the two most popular high school sports for boys and girls respectively. The program is scheduled to run every day after school, from 3:00 PM until 4:30 PM, for the entire spring semester for 4th and 5th graders. Fortunately, the school offers its full support, and Joe is able to recruit one of the Physical Education teachers, Sally, as a volunteer coordinator. Sally agrees to recruit students as well as parents to help in the activity. During the fall semester, the program is heavily advertised, which results in 40% of each class signing up, roughly 100 students, along with 30 parents. Curriculum is borrowed

from a successful elementary school running program in another state and tailored towards football and volleyball. The school makes certain required resources available, such as balls and weight scales. Permission slips and research consent forms are sent home and returned. Regular weigh-ins are scheduled, along with measures of running stamina. Joe is fortunate to be able to contact and recruit a professional football athlete to come speak at the debut of the program, which lends much credibility and notoriety to both Joe and the program.

Joe officially sets out to reduce the average BMI of the cohort of 100 students by 1 point. He asserts that since overall weight during this time frame is likely to continue to rise in the cohort, a reduction of 1 point would be a significant contribution. Plans have already been set to apply for major funding upon success of the program, in order to insure sustainability and expansion to other grades.

Joe is also planning to implement the program in a second, nearby elementary school next semester. After speaking with the second school, he is able to convince them to recruit students early, and in doing so, he is able to use the second cohort of students as a control group for the first. In this way, Joe may now be able to demonstrate a difference between similar cohorts of students, and this difference may be a stronger argument for future funding. In addition, by limiting data collection in the second cohort to only weight, Joe now has the potential to more accurately assess the effectiveness of his specific program.

Phase 6: Process Evaluation

The goal of phase six is to provide mechanisms of internal control to the program in order to verify that the program is being implemented effectively and according to the original or adapted design. In programs where many partners are involved, it might be necessary to track activity between partners in order to inform a global report of implementation. It is also advisable to schedule regular meetings between all involved

parties to quickly solve problems and reinforce relationships. It may also be relevant to partnerships to provide regular updates about success, as well as to solicit suggestions for the future.

Unfortunately, many programs suffer from a lack of continued communication between partners. Traditionally, programs might have encouraged most of the communication during the planning phase, but interventions and programs are never perfect. They will always require tweaking during the process. After an intensive planning phase, partners are usually excited by the communication. The health of the program, as well as the relationships between partners, requires continued bi-directional communication in order to encourage a sense of ownership and commitment.

In order to evaluate the program's process effectively, Joe builds into the timeline and numerous internal controls. For example, attendance for students and parents is taken each day and tracked, enabling individual follow-up with students and families. Regular updates are provided to Joe from Sally about issues that arise and possible suggestions to deal with them, which they discuss in detail at biweekly meetings. These meetings not only serve to solve problems that have arisen throughout the week, but they also provide a method of adapting the program whenever it is needed.

With assurance of program implementation through these mechanisms, Joe also needs to think about how to assess the impact of the program on the original objectives and goals for changes in both behavior and environmental factors. Success of implementation does not imply successful impact, since ineffective programs can be carried out perfectly.

Phase 7: Impact Evaluation

Phase seven of the PRECEDE-PROCEED model, similarly to phase six and eight, acts as a reminder to design a program in such a way that it is possible to assess the impact of the program. In this context, impact refers primarily to the behaviors or

environmental changes that actually occur as a result of the project. While the hypothesis of the intervention was that program implementation will cause change, this phase delineates how to verify that change has taken place. In addition, phase seven should also evaluate changes or contributions of the program towards changes in the predisposing, enabling, and reinforcing factors that were previously identified. It is possible that an intervention might change the landscape or relative effect of these factors, either positively or negatively. For example, Joe might learn that his program increases the use of vending machine supplementation at lunch by those enrolled. By assessing the changes of effects within the model, it may be possible to implement measures to reduce the effect of unanticipated responses that reduce the beneficial impact of the intervention.

Through the regular weigh-ins and updates from Sally, Joe is able to determine that while the students do begin to lose weight at the beginning of the intervention, as time goes by, the children do not feel challenged enough by the curriculum and are not on track to lose enough weight to meet the goal of -1 kg/m^2 by the end of the year. As a result of this intermediary evaluation, Joe and Sally are able to design a modification to the program which helps to excite the students and increase the overall activity level. By regularly assessing the impact of the program, Joe is able to adapt the curriculum accordingly. As this example shows, the design phase should incorporate methods that examine impact on a timeline short enough to make such changes possible. Interventions such as these have many variables, and the impact must be assessed regularly in order to overcome unforeseen forces or approximated calculations.

Phase 8: Outcome Evaluation

Phase eight of the PRECEDE-PROCEED model highlights the importance of evaluating the overall effect of the program, relative to the goals identified by the community. In Joe's case, the community hopes to reduce the prevalence of obesity in children by increasing their activity while at school, in the hopes that such a change will

ultimately help improve the overall health of the children. Joe understands that this one program is not unlikely to completely change the children's health by itself, nor will it be capable of enacting a permanent change within such a short time period. If the program proves successful with respect to the predetermined outcome, and with respect to the community, then he hopes to garner further support to create more programs to leverage this success.

In the design phase, Joe decided to create a take-home survey for the parents of the students involved to complete at the beginning and the end of the program. The survey was designed to assess all areas of health, including physical activity, diet, sleep, perceptions of the program and effects, along with an area for suggestions or comments. The survey will serve to inform the perceptions about the changes in the health of the students, as well as the effectiveness of the overall program by parents who respond. With suggestions from the parents, Joe hopes to find interest for new methods of communication in addition to other ways of bringing the program into the home.

GAMING THE MODEL

By working through the phases of the PPM or a similar model, the community advocate will begin to have a working familiarity for strengths and weaknesses of certain methods of change. Program design and evaluation requires a constant attention to the prevailing sentiment and milieu. Opportunities will come and go, and potential partnerships are not always clearly demarcated. For example, in Joe's instance, he sensed palpable anxiety from school administrators about modifying agreements with soda vendors, so he chose to begin his efforts with an exercise program. With each meeting, Joe was able to obtain a greater understanding of the dynamics surrounding the identified behaviors, as well as a working understanding of the environmental factors affecting the health of the children in the community. Joe's job now is to take that information and begin strategizing how to game the model and system in order to achieve the end goals

identified by the community. While this may sound deceptive, the reality is that programs geared towards public health are often at odds with many forces. The struggle to stay afloat boils down to finding ways to insure the sustainability and effectiveness of the program in both the short and the long-term.

While certain forms of purposeful strategy may be necessary, it is important to emphasize that this process need not be aggressive or hostile. In fact, one useful method for avoiding conflict is the utilization of thoughtful strategy. The best methods of informing this strategy are experience, communication, and adequate time spent in the design phase. With each potential program or intervention, hundreds of possibilities emerge, and the community advocate should spend much time discussing potential strategies. With limited monetary resources, the most efficient and prudent approach is to focus efforts on strategy and planning.

Up-cycling available resources can also be an effective strategy. This simply involves applying resources that might be seen as waste or unnecessary, to build the program into something bigger. For example, during his project, Joe is approached by teachers at the school who seek to help with his initiative. While his program is not geared towards the classroom, Joe realizes that it would be foolish to pass up a free resource. Instead, Joe decides to task the teachers with developing curricula that will supplement the fitness program. As a result, history teachers create lessons focusing on the development of various sports, as well as the lives of heroic athletes, while English teachers task their students with identifying and writing about their personal goals and dreams surrounding health. In this way, Joe's initiative not only expands to attack the problem of childhood obesity on multiple fronts, but he gains important advocates who may prove vital later on. Potential partnerships and resources exist everywhere and can come in the form of virtually anyone or anything. The most creative community advocates can see the potential where others get frustrated, and this constitutes a large part of the art of public health.

A toolbox of negotiating strategies can be useful in this process. For example, partnerships are based on trust and reputation. Sometimes partners might be reluctant to participate or invest in an idea, due to the unknown reputation of a nascent community advocate. It is often the case that larger partnerships require trust and reputation built up from smaller pre-existing partnerships. This principle could be extrapolated to imply that an efficient strategy might be to target partners who are just within an advocate's reach, based on accrued reputation, in order to maximize the associated trust and reputation of the community advocate.

While this guideline might not always be necessary, the same principle can also be applied to grants. Some organizations are more willing to give a grant when another organization has already given one. Major funding organizations are more willing to participate when there is evidence that others also believe in the initiative. For this reason, advocates should avoid burning bridges, no matter how toxic the relationship may prove. Healthy contacts can make or break a program.

THE VOICE OF THE COMMUNITY

It is important to remember that many of the people who attempt to steer the course of a community, even though they may have the best intentions, are outsiders looking in. In fact, it would take a very unique and special person to be able to come from a low-income community to become a health advocate. Inspiring exceptions certainly do exist,¹⁶⁰ but even their situations are complex, since the process of becoming a health advocate has a tendency to distance individuals from the communities which they are trying to help. Community advocates often find that it is best to enter a community while maintaining a low profile, discover the processes underlying an unhealthy behavior, and work to inconspicuously inspire a community to choose itself to adopt new behaviors.

Major corporations have faced similar challenges to modifying behavior, often in opposition to the goals of community advocates. Soda companies, for instance, have

successfully infiltrated nearly every community, transforming the act of drinking soda into a virtual source of identity. No tactic has gone unused, from expensive television campaigns, to political lobbying. Many of these campaigns have been successful.¹⁶¹ As a result, much of the job laid out by public health leaders entails unraveling many of the damaging behaviors that have come from these types of promotions.

Realistically, the gap in socioeconomic status between an advocate and the community, which he or she serves, will always be a barrier, and no attempt to dismiss the disparity will abolish the perception of difference. In fact, trying to hide socioeconomic status can prove devastating to an advocate's relationship with a community. Openness and honesty are vital in these interactions. Trust and the truth combine to empower health advocates beyond any trick available, however, maintaining trust is not always an easy task.

One of the most pertinent issues to the missions of health advocates is a perception of consistent behavior. Too often, health promotion researchers and advocates promise change and continuing support, even though such promises cannot be kept because their efforts are usually constrained by timelines of education or grant funding. It is important to be honest and adapt to public responses. Not every community will agree to be studied without a realistic hope of reward or improvement. It is important to avoid over promising when one is ill-equipped to support the expected outcomes. That being said, a community motivated to change is a powerful force. By understanding the players within the community and inciting inspirational proponents of health change, there may be a natural progression to bounding barriers once thought impossible.

SUMMARY

The promotion of public health in impoverished communities remains a difficult but important field. Community advocates must make decisions about how and when to intervene, often without the support of a rigorous body of evidence. Even with the

countless anecdotes gleaned from other public health practitioners, community advocates must continue to navigate uncharted waters. The PPM provides a useful method for comprehensively accounting for the requirements of an effective health initiative. Beyond a conscientious plan, it would be wise for community advocates to invest time in order to connect with the community and possible resources, in the hopes of better understanding the prevailing dynamic and identifying potential resources.

Chapter 6: Conclusion

The health of today's public rests on the trajectory of chronic disease and obesity. The progress of society has unintentionally resulted in unprecedented rises in obesity and correlated mortality from cardiovascular diseases. While medical innovation and research continue to chip away at the underlying disease processes, the immediate threat of increased disability, morbidity, and mortality in current and future generations requires intervention. The current body of evidence supporting the existence of significant health disparities and their resiliency into the 21st century as a manifestation of environmental factors suggests interventions that address health issues and goals comprehensively. Furthermore, the existence of disparities across different settings supports community intervention as a potentially viable methodology.

With healthcare reform beginning to address health outcomes as benchmarks for development of payments made to organizations accountable for care outcomes, the role of the healthcare student or professional as an advocate for the community becomes more important. As models of health behavior and frameworks for program planning continue to evolve, a balance between successful theoretical models and battle-tested frameworks for community intervention should inform the necessary foundation for public health practitioners. To date, the PRECEDE-PROCEED model has become a widely used health program planning framework. Through this model, community advocates will become familiar with a data-driven and community-participatory methodology for comprehensively addressing health issues.

Familiarity with intervention methodology will be insufficient to participate responsibly in programming for obesity and chronic disease prevention and treatment. Understanding the social determinants of health relevant to local communities will begin to inform community advocates about the complex interdependency of health outcomes known today. More specifically, understanding the history of poverty and discrimination

in the United States are necessary prerequisites to approaching vulnerable communities. Similarly, a basic understanding of the health disparities by gender, age, socioeconomic status, and geography remain essential factors when considering chronic disease or obesity programming for a community. Case studies and ethnographic treatments of certain disadvantage populations are complementary to rigorous population and medical studies that do not attend to these disparities.

Public health promotion in impoverished or disadvantaged communities remains difficult. Work in such settings increase responsibility for ethical considerations and efficient resource use towards effective outcomes. The chapters provided here aimed to provide a rudimentary basis for approaching relevant subjects surrounding community health advocacy today. Obesity, health promotion, and poverty were reviewed as an introduction such that readers would be able to review in-depth material more relevant to their work and their community. Consistent with current approaches towards complex sociological mixed-methods research, a case study was provided to efficiently familiarize readers with relevant aspects of poverty and disparity. Furthermore, in order to integrate these subjects into a practical example, a case study of health promotion for a prototypical health professional in an impoverished community was reviewed, incorporating specific use of the PRECEDE-PROCEED framework.

Ideally, this guide can serve to briefly introduce interested health professionals and to health promotions for chronic disease and obesity, serving to efficiently contextualize current practices and evidence. Readers would be encouraged to consult more focused resources in areas of interest or need and seeking mentorship from those with experience in the appropriate field.

LIMITATIONS

The current body of work is limited by its superficial but wide treatment of subjects relevant to health promotions. The work is also limited by the necessity of

extrapolating findings specific to certain populations because the dearth of rigorous research available to integrate ideas for practical decisions in programming. While it is the author's wish to treat community advocacy rigorously, there remains many unanswered questions that are required to make practical decisions. Because of these limitations, public health promoters should recognize current work as an art, similarly to medicine, and as such, subjective sources of information will continue to provide meaningful answers to inform trajectories.

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Vita

David Darrow was born in Flagstaff, Arizona in 1985. He grew up in Plano, Texas under the care of his parents, Larry and Heather Darrow. He attended Texas A&M University and earned a Bachelors of Science in Physics and a Bachelors of Science in Mathematics in 2008. His research as an undergraduate concerned inverse problems, in particular novel medical tomography. He matriculated at the University of Texas Medical Branch in 2008 to earn a Medical Degree and Masters of Public Health. While in Galveston, Texas, David had the opportunity to address the health of the public following Hurricane Ike in 2008 through leadership at the St. Vincent's Student-run Free Clinic and efforts to use community gardening as a platform for health promotion. Through his involvement in the community and student organizations such as Frontera de Salud and Students Together for Service, David was awarded numerous awards, including the Martin Luther King Jr. Award, Schweitzer Fellowship, the Galveston Daily News Everyday Hero Award, Alpha Omega Alpha, the Gold Humanism Honor Society, and the John P. McGovern Osler Student Award. David also pursues research in functional neurosurgery and neuroscience in preparation for a career in cognitive and behavioral functional neurosurgery. David matched to the University of Minnesota Neurosurgery Program, where he will remain a resident until 2020.

Permanent address: 3624 Cedar Ave S, Minneapolis, MN 55407

This capstone was typed by David Darrow