MetS

A READER'S DIGEST ABOUT METABOLIC SYNDROME

MARCH 2020

THE FRAMING OF AN EPIDEMIC

Biological and Sociocultural Determinants of Metabolic Syndrome

THE SILENT KILLER

The condition that affects over a third of Americans

THE CONTROVERSY OF DISABILITY

Should metabolic syndrome be a qualifier for disability services?

ALYSSA BESSER, SARAH HOLLOWAY, & OLIVIA SCHULIST

CONTENTS

Note from the Authors

Preface

Metabolic syndrome is not a typical disease or disorder. It cannot be simply be defined, but can be conceptualized as a collection of risk factors that intersect with pathophysiology along with social and biological determinants of health. As you will read, you will see that there are various definitions of metabolic syndrome and which risk factors comprise the condition. For the purpose of this magazine, we will define metabolic syndrome as a cluster of metabolic abnormalities typically including abdominal adiposity, dyslipidemia, hypertension, and elevated fasting glucose levels.

Metabolic syndrome affects 75 million people across the United States. The condition affects a multitude of populations over a wide range of the lifespan: from young adults to the elderly. Hence, no one is essentially "safe" from metabolic syndrome in the Westernized climate of fast food, sedentary lifestyles, chronic stress, excess sugar consumption, and the ever-increasing obesity rates in the U.S. However, certain racial and socioeconomic groups may be disproportionately affected or more likely to develop metabolic syndrome, whether that be genetic predispositions for diabetes or sociocultural burdens that impact a person's ability to access adequate health care and proper nutrition. Moreover, failure to provide proper prenatal and postnatal care during critical periods of development, such as in utero and infancy/adolescence, may render an individual more likely to develop childhood obesity and metabolic syndrome.

Metabolic syndrome is a biological issue in that it has its own pathophysiology and disease risks associated with it. Metabolic syndrome is affected and exacerbated by genes, epigenetics, and the environment. It is a physical condition that affects the health and wellbeing of one third of Americans and many others worldwide. It can manifest in diseases such as cardiovascular disease, diabetes, and dementia, and it exacerbates other conditions such as cancer and disabilities. Furthermore, as metabolic syndrome is highly medicalized, it also begs the need for treatment. Medications such as Metformin, statins, thiazolidinediones, and non-Westernized herbal treatments; as well as lifestyle interventions like healthy diets and exercise, are used to combat the condition. Exploring metabolic syndrome as a biological concept entails understanding its pathophysiology, the different demographics it affects, various medications and treatments, and genetic and environmental factors that contribute to the development of the condition.

On the other hand, metabolic syndrome is greatly influenced by society and what it means to construct a body. Through metabolic syndrome, we aim to understand what it means to treat disease and to be healthy. The existence of metabolic syndrome illuminates what kinds of bodies society aims to produce, how people are supposed to consume food, and how people are supposed to access food and exercise. Various institutions who are responsible for taking care of metabolic syndrome patients - the individual, their doctor, society, and the law. We explore what it means to give metabolic syndrome the diagnostic label of "disability, " and what benefits patients diagnosed with the condition should lawfully receive. Metabolic syndrome-affected individuals have autonomy to choose how to live their lives, but it is the responsibility of the state to destigmatize metabolic syndrome patients, empower them, and give them resources/access to resources to live healthy lifestyles.

It is clear that metabolic syndrome is a condition that affects many people worldwide and intersects greatly with both human biology and society. Metabolic syndrome spans pathophysiology, neurology, biology, genetics, epigenetics, epidemiology, environmentalism, nutrition, sociology, politics, and more. At the core of the controversy, however, is whether the term "metabolic syndrome" is a useful term, and whether it should qualify individuals for disability benefits. Flip through the articles in this magazine to understand our take on metabolic syndrome and disability rights!

P.S. - All of the underlined words throughout the magazine are defined and found in a crossword and word search in the back of the magazine. See if you are able to figure out all of the words and their definitions!

Thank You

Thank you to our readers who are taking the time to learn about metabolic syndrome and its health and societal implications!

We would like to thank Chiamaka, Grace, Alex, and Misaki for their in-depth peer review. We would also like to thank Yanina Gori and Dr. Christopher Kelty for their guidance in the creation of this magazine. Thank you as well as the Institute for Society and Genetics for making this project and our college experiences possible!

ALYSSA BESSER

Alyssa Besser is a fourth year undergraduate student at UCLA from West Hills, CA majoring in Human Biology and Society, B.S. with a concentration in Medicine and Public Health and a minor in Global Health. After graduating in Spring 2020, she plans to work as a medical scribe until she attends medical school. She hopes to pursue her MD/MPH and one day work as a pediatrician. She became fascinated in exploring metabolic syndrome due to the controversy in definition, intersection with disability, and diagnostic labels. She hopes that from this magazine, readers are aware of the syndrome and its intersection with other conditions, and that readers are inspired to become activists for patients with metabolic syndrome to reduce stigma and take public responsibility in the care and treatment of affected individuals.

SARAH HOLLOWAY

Sarah Holloway is a fourth year undergraduate student at UCLA from Rancho Cucamonga, CA majoring in Human Biology and Society, B.A. with a concentration in Medicine and Public Health. When she graduates from UCLA, she plans to work as a Physical Therapy Technician back home and apply to Doctorate of Physical Therapy programs. She became interested in learning more about disability law, the gut-brain connection, and how metabolic syndrome and its associated health conditions may perpetuate social categorizations of disability. She hopes that readers may acquire a new perspective that having a disability may be seen as a way of living in the world, rather than a biomedicalized, abnormality of the body.

OLIVIA SCHULIST

Olivia Schulist is a fourth year undergraduate student at UCLA studying Human Biology and Society. Olivia is pursuing a career as an obstetrician in the hopes of promoting health equity by giving newborns across socially-constructed categories optimal health prospects from the start of life. Olivia works as a research assistant in Dr. Molly Fox's Biological Anthropology of Motherhood lab, where she studies the effects of diverse environmental stressors on lifelong and intergenerational health trajectories. Olivia hopes that this magazine and her continued research will aid efforts to (a) decrease the escalating rates of diabetes and cardiovascular syndrome, (b) reduce the stigmatization of those with metabolic "abnormalities," and (c) advocate the importance of prenatal care.

We hope that you will enjoy this magazine and learn thoroughly about metabolic syndrome! Thank you so much for taking the time to digest our magazine and for caring about a condition that affects so many people worldwide.

SYNDROME X

SYNDROME X, AND Y, AND Z . . .

Coined by Dr. Reaven in 1988, Syndrome X, also known as metabolic syndrome, or its shorter acronym MetS, refers to a multi-dimensional disorder that causes an onslaught of “silent killing” health outcomes and illnesses. The political disputes regarding its naming call into question its representation and perception by lay people. The labeling of X attached to a word often denotes a mysterious component to the term that is often unexplainable or unknown, such as X-rated or X factor. Similarly, Syndrome X is a medical term that has become increasingly common, yet its etiology is often confusing because its components are intertwined. However, the cause and effect relationships of its four main components, obesity, insulin resistance, high blood cholesterol and high blood pressure, have become increasingly more clear. Expanding on this term, the author extends Syndrome X into “Syndrome X, Y and Z...” which refers to its consequential constellation of problems or disorders that are life-threatening. For example, it can cause cardiovascular disease, which is the number one killer in the US, along with “other diseases such as female infertility, acne, cystic ovaries, immune impairments, cancer, and chronic inflammation (the concept of “Syndrome X, Y and Z...”)” (Holt, 2002). Relating to the notion of a “silent killer”, the lack of alarm about MetS and its associated health conditions is likely due to the fact that obesity and hypertension are so common that they may be considered “normal” and therefore non-threatening to lay people. In other words, the Westernized complacency about MetS perpetuates the existence of MetS and it highlights why society doesn't feel compelled to act. Thus, the presumably non-threatening nature of MetS characterizes it as a silent killer. bit of body text

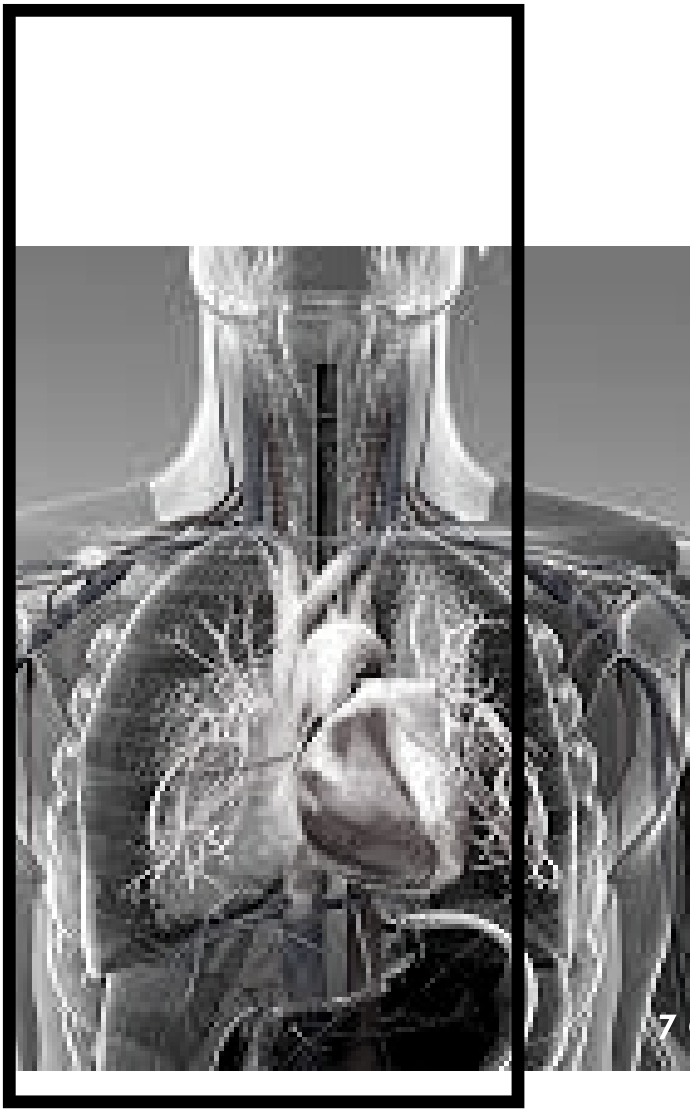
Sarah Holloway
March 2020

WHAT IS METABOLIC SYNDROME?

Olivia Schulist
March 2020

The 20th-century epidemiological shift from infectious to chronic disease in developed nations was described by Abdel Orman in 1971. Orman hypothesized that advancements in healthcare and sanitation associated with socioeconomic development yield declines in infection and increases in longevity that account for the escalating proportions of chronic disease observed in developed nations such as the United States and European nations. The changing nature of disease in developed nations has been met with new prophylactic efforts emphasizing statistical norms and deviations. The changing definitions of metabolic syndrome over the past century show the difficulty of establishing norms within biology, which is characterized by variation.

Today, 60% of adults in the United States have a chronic disease like cardiovascular disease or diabetes. Cardiovascular disease is the leading cause of death of Americans, killing 647,000 Americans per year or 1 American approximately every 37 seconds and costing the US economy $219 billion per year. Type 2 diabetes was named one of the seven major controllable risk factors for cardiovascular disease by the American Heart Association. Diabetes increases an individual's risk of developing heart disease four-fold. The prevalence of diabetes more than tripled between 1990 and 2010. Today 30.3 million Americans, 9% of the population, have the condition and 1.5 new Americans are diagnosed with the disease yearly; by 2050, 29 million Americans may develop type 2 diabetes. Diabetic markers associated with cardiovascular disease risk include high blood pressure, abnormal cholesterol levels, high triglycerides, obesity, and poorly controlled blood sugars. Clusters of these and other metabolic abnormalities have been considered a topic of medical concern since the beginning of the 20th century.



A clustering of interrelated metabolic abnormalities -- hypertension, hyperglycemia, and gout -- was first problematized by Kylin, a Swedish physician, in the 1920s. Another similar host of metabolic conditions affiliated with cardiovascular and diabetes risk were vaguely named "Syndrome X" and later "metabolic syndrome" by Reaven in the 1980s. Metabolic syndrome (MetS) remains loosely defined even today after years of institutionalized attempts to define the concept. The World Health Organization (WHO) created the first working set of criteria for metabolic syndrome in 1988: metabolic syndrome was the presence of insulin resistance, type 2 diabetes, or impaired glucose tolerance along with two or more additional criteria. Over the course of the last thirty years, several institutions have proposed alternate syndrome definitions (see Figure 1). Figure 1 outlines the evolution of the definition of metabolic syndrome. Today the 2001 National Cholesterol Education Program's Adult Treatment Panel III and the 2004 International Diabetes Federation definitions of metabolic syndrome are most commonly used. Both definitions characterize metabolic syndrome as a cluster of metabolic abnormalities characterized by abdominal adiposity, dyslipidemia, hypertension, and high fasting glucose levels. See page 13 to learn about these indicators of metabolic syndrome.

Figure 1:

Definitions of Metabolic Syndrome (1990-Present)

	Reaven (1988)	World Health Organization (1999)	European Group for the Study of Insulin Resistance (1999)	American Association of Endocrinology	NCEP: ATPIII (2001)	International Diabetes Federation (2005)
REQUIRED ELEMENTS	Upper body, especially android adiposity	Diabetes, impaired fasting glycaemia, impaired glucose tolerance, *or* insulin resistance	Insulin resistance	Elevated triglycerides, reduced HDL cholesterol, elevated blood pressure, elevated fasting and postload glucose	Waist circumference, abnormal blood lipids, high blood pressure, fasting glucose	Abdominal obesity
ADDITIONAL		Obesity Dyslipidemia Hypertension Microalbuminuria	Central obesity Dyslipidemia Hypertension High fasting plasma glucose			
NUMBER OF CRITERIA REQUIRED		3	3	1	1	1

"In the history of science, thousands of terms and words have been invented that nobody but the person who invented them ever picked up. Many arcane and obsolete words were fads before they totally disappeared. It is quite meaningful that this term "syndrome X," or "metabolic syndrome," has seen huge uptake.

“Metabolic syndrome gave people a way of saying that obesity, a phenotypic descriptor, is linked as a risk factor to disordered conditions that can look different from individual to individual. We now have a name for correlations that used to be referenced with uncomfortable proxies. Obesity and BMI can be viewed as arbitrary measures that are not helpful to doctors, patients, or the general population. “Metabolic syndrome,” being tied to sets of biomarkers that in turn indicate health conditions, is more helpful to medical professionals and biomedical researchers than previous proxies of metabolic disorder."

“The term has helped researchers see how different bodily systems are connected to one another. Medicine and medical research disciplines have been set up around bodily systems since the early 20th century. When we named hormones in 1905, the discipline of endocrinology grew up around them, as did the classic set of endocrine organs. But now we know that adipose tissue makes hormones. We know that bones make hormones. The gut, the largest endocrine organ in the body, makes hormones. Metabolic syndrome allows us to see lipid metabolism in relation to not only glucose metabolism and pancreatic health, but also cardiovascular health"

"'Metabolic syndrome' is a sort of classificatory box that has been useful for physicians, for epidemiologists, for biologists, and for biomedical researchers who see that lipid imbalance, diabetes, and BMI are all systemically connected. The 'box' is a way people can put different phenomena together to study. The term is an interdisciplinary tool, but that doesn't mean that every person agrees on its definition; everybody doesn't use the tool in the same way."

"The closer you look at a lot of the concepts that we have in medicine and science, the more you'll see that their boundaries are fuzzy too. We often talk around the edges of a core of overlapping phenomena. Our concepts in science and medicine allow us to think we're talking about the same thing, they allow grant applications to be funded, and studies to be designed around them."

An Interview with

Dr. Hannah Landecker

Director of the Institute of Society and Genetics at the University of California, Los Angeles

NORMAL

VS

Following a meal, beta pancreatic cells release insulin in response to increases in blood glucose. This binds to receptors within somatic cell membranes, causing the excitation of insulin receptor tyrosine kinase and thus the recruitment of insulin receptor substrates 1 and 2 (IRS1 and IRS2). Phosphorylation on their tyrosine sites renders them capable of continuing critical downstream signalling cascades. The major pathway conferring the metabolic effects of insulin is the PI3k to Akt pathway. In this pathway, phosphoinositide-dependent kinases PDK1 or PDK2 bind to PIP3 generated from PIP2. Forming the rate limiting step of glucose uptake, the phosphorylation of Akt stimulates the deposition of GLUT 4 glucose transporters into the membranes of muscle and adipose cells, which in turn aids glucose disposal and the phosphorylation of FOXO1. FOXO1 is required by cell nuclei for expression of several gluconeogenic and lipogenic genes. When activated, FOXO1 translocates into the cytosol and promotes beta cell differentiation. This suppresses hepatic gluconeogenesis and promotes further insulin secretion. A protein kinase signalling pathway mediated by RAS instigates mitogenesis and cell growth.

disordered

METABOLISM

A loss of insulin secretion in response to glucose alters the phosphorylation pathways characteristic of normal metabolism. Decreased GLUT4 expression yields dysfunctional GLUT4 cytosolic translocation and, consequently, diminished glucose transport. Glycogen synthesis reduces as a result. The body struggles to suppress glucose uptake by insulin sensitive tissues and further glucose production by the liver and kidney. Postprandial hyperglycemia prompts a dramatic second-wave release of insulin that can cause serine/threonine phosphorylation and eventual degradation via tyrosine phosphorylation of insulin resistor substrates 1 and 2. Dramatic reduction of IRS1 and IRS2 via chronic hyperinsulinemia can result in lasting insulin resistance as pancreatic beta cells, perceiving reduced need for insulin, become apoptotic. Insulin resistance manifests different pathologies in different tissues. Insulin resistance in kidneys impairs proximal tubule salt reabsorption, leading to hypertension. Insulin resistance in vascular endothelial disruptions glucose homeostasis and also yields hypertension. Insulin resistance in cardiac tissue promotes heart failure. Thus, many forms of disease can result from molecular metabolic dysfunction.

Table 1: *MEASURING METABOLIC SYNDROME*

DIAGNOSTIC CRITERION	
ADIPOSITY	• Overweight (BMI over 23, waist-to-hip ratio greater than 0.85-0.9) • Waist circumference (greater than 90-102 cm)
DYSLIPIDEMIA	• Hypertriglyceridemia (HDL cholesterol greater than or less than 1.0 mmol/L)
HYPERGLYCEMIA	• Fasting glucose (100 mb/dL or higher)
HYPERTENSION	• High blood pressure [(35-130)/(85-90) or higher]
INSULIN RESISTANCE	• Hyperinsulinemic euglycemic clamp test • Homeostasis Model Assessment
MICROALUBUMINURIA	• 300 mg albumin per 24 hours

"So, not everybody who is collecting data on metabolic syndrome is collecting the same data. But again, there is a lot of overlap. But given all that variability, I will say that it actually doesn't matter too much what you're collecting statistics on. You can measure BMI, waist circumference, rates of diabetes, dyslipidemia, nonalcoholic fatty liver disease -- they are all trending in the same way. That's why we don't see people saying that the statistics are all over the place. Although we can't quite agree on how to measure metabolic syndrome, all signs are not good, right?"

Dr. Landecker

"We think of obesity and diabetes but not nonalcoholic fatty liver disease (NFLD), which can also be detected with dyslipidemia. Nonalcoholic fatty liver disease is a dysfunction in the processing of lipids; in particular, fat that is usually stored in adipose tissue forms globules of fat in liver cells that can be detected by ultrasound. The liver is the primary metabolic organ. NFLD is an extreme risk factor for steatotic hepatitis and liver cancer. The prevalence of NFLD is about 25%. It is apparent in kids, those who don't drink very much, and those who don't drink. Metabolic dysfunction is on the rise in populations in the United States and around the world. About 25% of the American population has nonalcoholic fatty liver disease."

Which Communities are Affected by Metabolic Syndrome?

ALYSSA BESSER - MARCH 2020

In order to truly understand Metabolic Syndrome (MetS), it is imperative to understand who is affected by the condition and how they are affected. According to the American Heart Association, MetS affects approximately 23% of adults, with the largest affected population beinG the elderly (American Heart Association).

ELDERLY

Metabolic syndrome is greatly correlated with older age and the onset of risks and symptoms are increased with age. (Brenda Penninx et al., 2009). However, the prevalence of metabolic syndrome in an elderly population varies from 11% to 43% according to the WHO, and 23% to 55% according to the NCEP (Denys et al., 2014). While the exact **prevalence** is difficult to measure, it is clear that the elderly are the age group that is most affected. With the aging of the **baby boomer** population, the number of individuals affected by metabolic syndrome will only continue to rise. One interesting study examined to see if there was a correlation between frailty, cognition, and metabolic syndrome. They found that having MetS significantly increased the likelihood of being frail and that performing better on **episodic memory** was associated with a lower likelihood of MetS. Congruently, they found that worse performance on executive function tasks were associated with higher likelihood of being frail (Lin et al., 2014). MetS manifests mainly among an elderly population, and part of its symptoms aggravate conditions that are normally associated with older age such as cognitive impairment and frailty.

CHILDREN

Looking at the other end of the spectrum of age, the categorization and prevalence of MetS in children offers an interesting controversy. Various studies conclude that it is very difficult to classify MetS in children and adolescents as it often is confounded with the obesity epidemic (Al-Hamad & Raman, 2017). However, it is important to identify obesity as a risk factor and to mitigate and treat symptoms early on. Including children in metabolic syndrome diagnoses is controversial because it begs questions of the kinds of bodies that are trying to be produced, whether we should require them for children, and when we should diagnose children with the medical condition. People who support early diagnosis of MetS argue that an early diagnosis can aid children in starting to combat the effects of MetS and start a lifelong commitment to working towards a healthy lifestyle and no disability (Lemeiux et al., 2018). Working towards a healthy lifestyle includes implementing healthy diets from an

early age and placing an emphasis on athletics and exercise (Lemeiux et al., 2018). People who oppose the early diagnosis of MetS are concerned with the consequences of attaching a diagnosis to children that will generate individual stigma and early and excessive concern. Further, both the criteria for diagnosing MetS and the medical praxis to prevent it are extremely uncertain, and may cause an "underestimation or misinterpretation of the 'real' risk" (Lemeiux et al., 2018). Diagnosing metabolic syndrome in children is complicated because while important to prevent symptoms before they progress, it unnecessarily **medicalizes** children's bodies and may misdiagnose for obesity or other symptoms.

GENDER

Another determiner important to look at with prevalence of metabolic syndrome is gender. According to multiple studies, gender does not play a role into metabolic syndrome. Metabolic syndrome increased cardiovascular risk and risk of Type II Diabetes in both men and women equally (Ogbera, 2010). Additionally, one study compared the benefits of high-intensity interval training (HIIT) between men and women with metabolic syndrome (Guio de Prada et al., 2019). While they hypothesized that women's lower capacity to generate muscle power during exercise would reflect in lesser cardiometabolic benefit from HIIT, they found that there was no significant difference between genders (Guio de Prada et al., 2019). Acknowledging the negligible difference in men and women with metabolic syndrome is important, as gender is not a significant factor in metabolic syndrome nor its treatment. However, as different racial and socioeconomic demographics are selected, gender differences become important, as seen in the studies below.

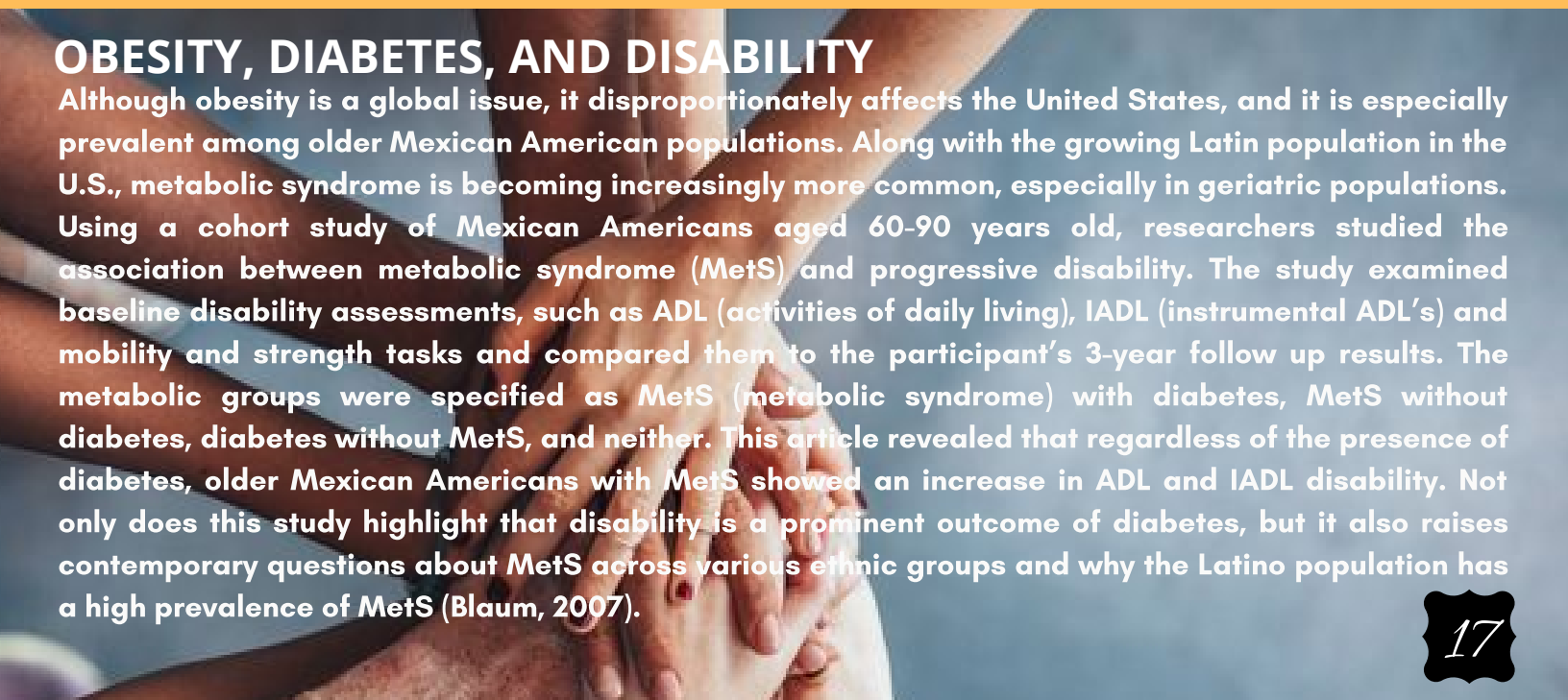
RACE

Furthermore, it is extremely important to analyze the prevalence of metabolic syndrome among races, as many medicalized diseases are categorized and problematized by race. Over the time period of 1988 to 2012, non-Hispanic black men were less likely to have MetS than non-Hispanic white men, but Non-Hispanic black women were more likely than Non-Hispanic white women. (Moore JX et al., 2017). While this statistic seems to contradict the preceding paragraph on gender, the statistical differences between black and white women and black and white men average out to eliminate any gender differences. When race is not a factor, the rates of metabolic syndrome in gender are negligible. However, gender differences do matter when considering who the syndrome affects in different 'racial' categories. 'Race' in biological studies is highly criticized, and it is debated whether it is a valid measure of categorization. Yet, despite the limits of the biological concept of race, systemic racism might impact the access to healthy food or many other risk factors of MetS. Low education level and advanced age were independently associated with an increase in MetS from 2007-2012 (Moore JX et al. 2017). Contradictorily, ethnic differences do not hold true for Hispanic individuals. While Hispanics have a higher rate of elevated waist circumference, they have a lower rate of hypertension and have similar rates of abnormalities as in non-Hispanic whites. (Deboer et al., 2011). Despite this abnormal measure, Hispanics, particularly Hispanic women, are the population most heavily burdened by metabolic syndrome (Mayo Clinic, 2019). Mexican American populations

re most heavily burdened, followed by non-Hispanic whites, and then blacks (NIH: NHLBI, n.d.). Metabolic syndrome began as a Westernized condition, but as more countries globally have become westernized, more countries have found issues with Type II Diabetes, obesity, and metabolic syndrome. South Asian Americans and South Asians have had the highest rates of metabolic syndrome outside of the United States (Saklayen, 2018). Examining race in prevalence of metabolic syndrome is important to see how different racial groups are affected differently by metabolic syndrome as well as access to different foods and treatments.

SOCIOECONOMIC STATUS

Another helpful categorization is to evaluate the prevalence of metabolic syndrome based on socioeconomic status. An individual's socioeconomic status not only contributes to the quality of their health, but it also determines their access to health insurance, care, and treatment as well as their level of adherence to medical practices and treatment. One such study measured socioeconomic status by evaluating each individual's level of education and house income. In this study, they determined that there was an inverse relationship between socioeconomic status and metabolic syndrome risk in men and women, however women had a much steeper inverse association (Kim et al., 2013). In other words, the lower an individual's socioeconomic status (especially that of a woman), the greater likelihood they will develop metabolic syndrome. They interpret this stronger negative association with women being more greatly impacted by poor socioeconomic status than men. As this contradicts the lack of overall difference between genders, the aggregate of men and women do not have significant difference in the syndrome, but when socioeconomic differences are factored in, then women are more greatly influenced by socioeconomic status. Furthermore, a second study states that a lower socioeconomic status in childhood may be associated with a greater risk of MetS, type 2 diabetes, and impaired fasting glucose in adulthood (Juonala et al., 2016). Considering low socioeconomic status is imperative to additionally consider if people will be able to afford health care, medications, and/or a healthy lifestyle (such as fruits/vegetables and gym memberships). It is therefore important to reduce stigma surrounding metabolic syndrome because not all individuals have access to healthy lifestyles, medications, or medical treatment, which perpetuates their symptoms and quality of life. Socioeconomic status is a factor that can be outside of the control of individuals, and it should be factored into the care and treatment of MetS patients. Not only is it important to pay attention to people (especially women) of low socioeconomic status, but it is imperative to pay special attention to children of these families in order to decrease the prevalence of MetS in adulthood.



OBESITY, DIABETES, AND DISABILITY

Although obesity is a global issue, it disproportionately affects the United States, and it is especially prevalent among older Mexican American populations. Along with the growing Latin population in the U.S., metabolic syndrome is becoming increasingly more common, especially in geriatric populations. Using a cohort study of Mexican Americans aged 60-90 years old, researchers studied the association between metabolic syndrome (MetS) and progressive disability. The study examined baseline disability assessments, such as ADL (activities of daily living), IADL (instrumental ADL's) and mobility and strength tasks and compared them to the participant's 3-year follow up results. The metabolic groups were specified as MetS (metabolic syndrome) with diabetes, MetS without diabetes, diabetes without MetS, and neither. This article revealed that regardless of the presence of diabetes, older Mexican Americans with MetS showed an increase in ADL and IADL disability. Not only does this study highlight that disability is a prominent outcome of diabetes, but it also raises contemporary questions about MetS across various ethnic groups and why the Latino population has a high prevalence of MetS (Blaum, 2007).

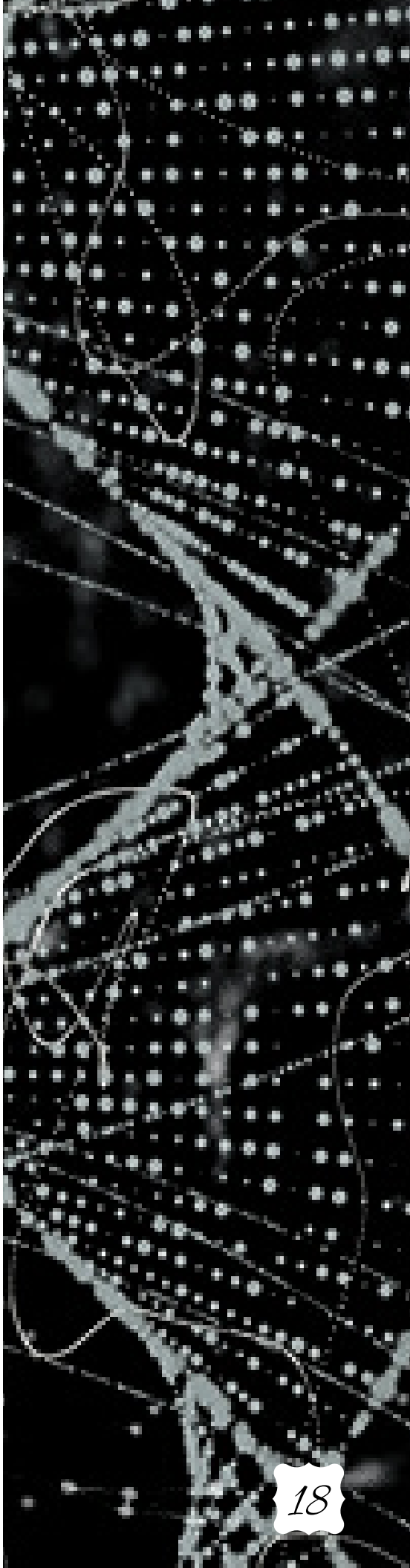
Early Life Predictors of Metabolic Syndrome Diagnosis

OLIVIA SCHULIST

Although the causation of metabolic syndrome is difficult to study due to its complexity and temporal distance from disorder onset, correlative research to date suggests several epigenetic and genetic predictors of disorder diagnosis during adulthood. Together, early life genetic and epigenetic disorder correlates suggest that disorder interventions during perinatal stages of development may be most effective and challenge the prevailing responsibility-based stigmatization of those presenting symptoms of metabolic syndrome later in life.

GENETIC FACTORS

The thrifty genotype hypothesis postulates that genes promoting insulin resistance increased in frequency over the course of human evolution because their energy-maximizing properties conferred competitive advantage in nutrient-deficient environments. In today's calorically-dense America, a mismatch between such genes and their environment prompts more sustained fat storage in our adipocytes and sugar in our bloodstreams relative to our ancestors. Genes encoding peroxisome-proliferator activated receptor λ, lamin A, lamin C, 1 acylglycerol 3 phosphate, O acyltransferase, seipin, beta-2 adrenergic receptor, and adiponectin proteins have all been associated with greater metabolic syndrome risk.



EPIGENETIC FACTORS

Genes are not the sole determinants of one's health trajectory; the environment not only shapes genes over generations but biology over the course of one's development, especially during critical periods of rapid cellular differentiation during gestation and early postnatal life. The predictive adaptive response hypothesis posits that the set points of human metabolism are in consequential part established during the perinatal period extending from gestation to several weeks postpartum in response to placental signals that a fetus interprets as indicators of their future environment. The thrifty phenotype hypothesis articulates that in utero homeostatic alterations evolved to optimize the use of reduced nutrient supply in adverse environments. Redistributing blood flow to favor vital organs, reducing the size of and nutrient delivery to metabolically active tissues and increasing their fat storage capacity, and increasing the speed of reproductive maturation increases an individual's chances of surviving until reproductive age. However, bodies metabolically programmed to favor storage of food intake in anticipation of nutrient deficits are disposed to adiposity in calorically-dense environments.

Maternal stress -- psychological, nutritional, pathogenic, or physiological -- can alter methylation of the promoters of POMC, glucocorticoid, angiotensin receptor, leptin, FTO, MC_4R, PPARα, PPARγ genes. These epigenetic modifications alter the role of adiponectin, insulin, and leptin in the body. Adiponectin is an adipokine with antiatherogenic and anti-inflammatory properties that improves insulin and glucose metabolism. The role of insulin in the body is described on page 13. Leptin is an adipocyte-derived hormone required for normal neuronal and glial cell maturation. Low leptin maintain neural progenitor cells, while leptin surges are affiliated with neuronal differentiation and migration. Leptin fluctuations incited by perinatal nutritional deficits yield lasting hypothalamic changes that begin with decreases in POMC,

AgRP, and CART receptors. Declines in receptor function alter the size and density of neurons in the arcuate nucleus, paraventricular nucleus, dorsomedial hypothalamus, ventromedial hypothalamus, and lateral hypothalamic regions. Increased cell proliferation and decreased neuron counts, POMC expression, NPY cells, and fiber projections to the paraventricular nucleus can then be found in the orexigenic neurons and anorexigenic neurons of the arcuate nucleus. The paraventricular nucleus, in turn, undergoes a decrease in volume and alpha MSH fibers and a decrease in cell proliferation and neuron density. These and other hypothalamic alterations affect energy balance systems by reducing leptin and insulin signalling. When insulin-like growth factor 2 is altered, tissue and organ functions shift to accommodate slowed growth. Peripheral nervous system innervations to adipose and gut tissues program the body to accumulate energy in states of nutritional excess.

A mismatch occurs when the expression of the genes of an individual is optimized in early life for an environment unlike that in which the individual eventually resides. Human biology and society adapt at incompatible rates when the environmental exposures of an individual during the perinatal period of development do not reflect the stressors that the individual will be exposed to over their life course. In other words, early life epigenetic programming is advantageous in environments that remain stable over the life course and when maternal stress responses reflect external nutritional and pathogenic conditions. Maternal stress levels during pregnancy may play a role in the prevalence of chronic metabolic disorders in developed countries such as the United States.

See page 66 to learn about the potential health impacts of the stress experienced by migrant mothers held in United States detention centers.

> "For some people, it is helpful to know that the health conditions that they are suffering from are in significant part due to inherited genetic susceptibility, the conditions under which they were infants (such as whether they were formula fed), or other factors outside of their control. For other people, the sense that we are 'dealt the cards that we are dealt' is less helpful because it leads to feelings of helplessness. The message that metabolic conditions are not an individual's fault (but are rather attributable to one's food environment, for instance), coexists with the message that affected individuals must make extra effort to move more and eat better to combat their disadvantage. As a society, we recognize that metabolic disorders are in large part a social condition but then say that individuals must do something about it."
>
> -Dr. Landecker

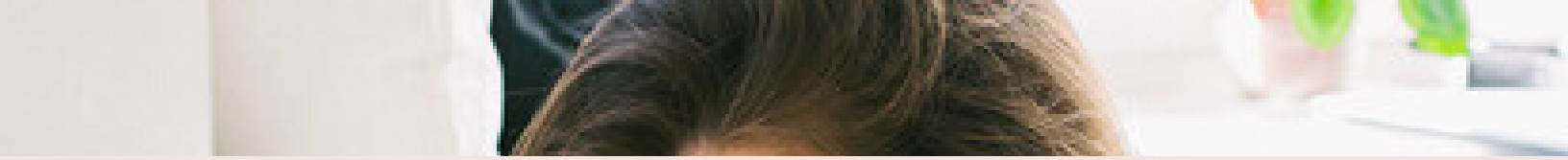
CALLING ALL MOTHERS!

Breastfeeding

A tried and true alternative to baby formula: Breast milk!

Species-specific, environmentally friendly, and always at the right temperature, this immunological and anti-inflammatory substance contains antibodies that effectively protect children from common childhood illnesses

Research backs it up! Turn the page to see how!



Research shows that breast milk protects children from:

Bacteremia
Otitis media
Urinary tract infection
Late-onset sepsis in preterm infants
Lymphoma
Hodgkin's disease

As well as the conditions linked to baby formula:

Acute ear infection
Leukemia
Severe lower respiratory infections
Lower respiratory tract disease hospitalization during first year of life
Sudden infant death syndrome
Necrotizing enterocolitis
Type 2 diabetes
Asthma
Childhood obesity

Readily available to postpartum mothers upon the consumption of a few extra calories!

Try breastfeeding within the first hour of your newborn's life to save more than $1,200-$1,500 in infant formula expenditures over your newborn's first year!

Common side effects include a stronger mother-newborn bond, higher performance on children's intelligence tests, and decreased likelihood of developing metabolic syndrome.

TREATMENTS

How can you alleviate metabolic syndrome symptoms?

BY ALYSSA BESSER

TYPES OF TREATMENT

Metformin
Statins
Thiazolidinediones
Diet Changes
Exercise
YTD Herbal Treatments

Metabolic Syndrome, while highly stigmatized with its components of insulin resistance, obesity, and type 2 diabetes, can be mediated by either clinical treatments or lifestyle interventions. While doctors may prescribe certain medications, such as Metformin, Statins, and Thiazolidinediones, most doctors first and foremost recommend lifestyle interventions such as diet changes and exercise. It is also imperative to consider non-Westernized styles of treatment and medicine, as not all metabolic syndrome patients adhere to a Western/medicalized style of care.

The three main medications that are prescribed to patients affected by metabolic syndrome are Metformin, Statins, and Thiazolidinediones. All three medications treat specific aspects of the syndrome instead of aiding the whole syndrome and patient, and a patient must be weary when taking these medicines that it may not be a holistic form of care. First, Metformin is an antihyperglycemic agent that is largely used to treat type 2 diabetes. It counters the insulin resistance portion of metabolic syndrome by affecting cellular nutrient and energy metabolism without weight gain or risk of hypoglycaemia. In metabolic syndrome patients, Metformin solely stops the worsening of metabolic syndrome rather than treating already existing symptoms (Beck-Nielsen, 2013). Statins, on the other hand, aid in lowering cardiovascular risk by working to reduce cholesterol levels in the blood. Statins have a great effect on metabolic pathways and are useful in lowering cholesterol levels, but do not address the issue of insulin resistance or diabetes (Beck-Nielsen, 2013). Finally, Thiazolidinediones aid in treating type 2 diabetes, and they help individuals with metabolic syndrome target multiple components

TREATMENTS

of the syndrome by improving insulin sensitivity, glycaemic control, adipocyte maturation, and lipid metabolism. However, they have also been associated with adverse outcomes on the cardiovascular system and bone, so Thiazolidinediones have been limited in clinical practice (Beck-Nielsen, 2013). Metabolic syndrome is a condition that is difficult to treat because it is the accumulation of diagnoses, and therefore patients may need multiple medications to fully treat their condition. Patients should be cautious in proceeding forward with treatment, however, because there may be adverse health risks associated with each treatment.

Given the limits of medications, the most recommended solution for MetS is implementing lifestyle changes. Many studies recommend weight loss, regular exercise, and most importantly, a healthy and nutritious diet (Beck-Nielsen, 2013). Diets that are recommended include Mediterranean diets, vegetarian diets, and ones with low carbohydrates. According to one study, all sub-types of vegetarians had lower likelihoods of abnormalities in comparison to non-vegetarians, and the better metabolic profile in vegetarians is attributed to a lower BMI (Robberecht et al., 2017). Furthermore, several foods and additives prevent MetS and disability, including “olive oil, capsaicin, luteolin, curcumin, cinnamon, rosemary, etc” (Saklayen, 2018). Overall, many reviews recommend metabolic syndrome patients to implement lifestyle interventions with diet and exercise, despite considering how feasible these changes may be to an individual and their lifestyle.

Lastly, it is important to consider non-Western forms of medicine and treatment when looking at metabolic syndrome. Not all patients adhere to Western forms of medicine, and some believe in the efficacy of alternative forms of medicine. One such form of medicine is the Chinese herbal formula Yangyin Tiluo Decoction (YTD), which alters the gut microbial composition and decreases the metabolic markers of cerebrovascular disease in metabolic syndrome patients. Treatment with YTD creates an increase of lactic acid bacteria, decrease of butyrate-producing bacteria, decrease in plasma lipoprotein, and increase in overall health (Yongcheng et al., 2018). Treatment through Chinese herbal formulas is interesting because it seems to holistically treat and help metabolic syndrome patients through producing healthy gut microbiota and also decreasing plasma lipoproteins. This is a holistic method because it aids patients by reducing negative effects but also bettering the entire gut system, yet it is not widely accepted by many individuals who prefer Western medications.

Looking at different treatments for metabolic syndrome is imperative, yet it is controversial in thinking about what it means to first medicalize, and second treat a metabolic disease. Medications remove the responsibility and stigma from the patient to the medical system, while lifestyle interventions shift the focus away from the medical system and onto the patient. Considering different treatment options is also interesting to consider who has the control in each situation, whether the individual has control over their own wellbeing in treatment (such as through lifestyle interventions) or an institution has control over their wellbeing (such as with medical institutions through medications and herbal treatments). It is important to note that while larger institutions and society may impose how to conduct the “correct” lifestyle interventions, it is ultimately the individual who must choose whether or not they will adhere to the interventions. Furthermore, individuals may not have access to such medication or treatments, which then shifts the issue back to the state to make healthy lifestyles equitable, affordable, and accessible for all. There is no one correct solution to metabolic syndrome, which further complicates how it should be treated and how an individual and larger [illegible]ns should treat the condition.

MAPPING OBESITY

According to the report Tackling Obesities: Future Choices — Obesity System Atlas, Philippe Vandenbroeck, Dr. Jo Goossens, and Marshall Clemens develop visual representations to help understand the complexity of the obesity system. Although primarily focused in response to the obesity epidemic in the UK, this report is exemplary for the global epidemic of obesity. The purpose of this report was to provide the tools for policy makers to address the obesity epidemic by defining obesity and demonstrating its intersectionality. By mapping the obesity system, the researchers utilized variables and linkages in the form of a causal loop model using boxes and arrows that indicated both positive and negative causal relationships. In addition, the map showcases feedback loops which represent both reinforcing (positive) loops and balancing (negative) loops. For example, a reinforcing loop from the map demonstrates that "if a 'demand for convenience' by consumers increases, the 'convenience of food offerings' from food manufacturers is likely to increase in response" (Vandenbroeck, et. al, 2007). Thus, by giving into convenient food options, consumers will be less likely to cook homemade meals and they will lose their ability to cook. Consequently, "an increase in the 'convenience of food offerings' triggers 'de-skilling' of people. And this, in turn, increases the demand for convenience" (Vandenbroeck, et. al, 2007). This feedback loop then repeats. By using causal loop models, this report aimed to make sense of the complexity of obesity, to communicate its complexity, and to encourage the development of political strategy to address the obesity epidemic.

See Figure 2, 3, and 4 for the Obesity System Influence Maps.

BY SARAH HOLLOWAY

Figure 2: Full Generic Map

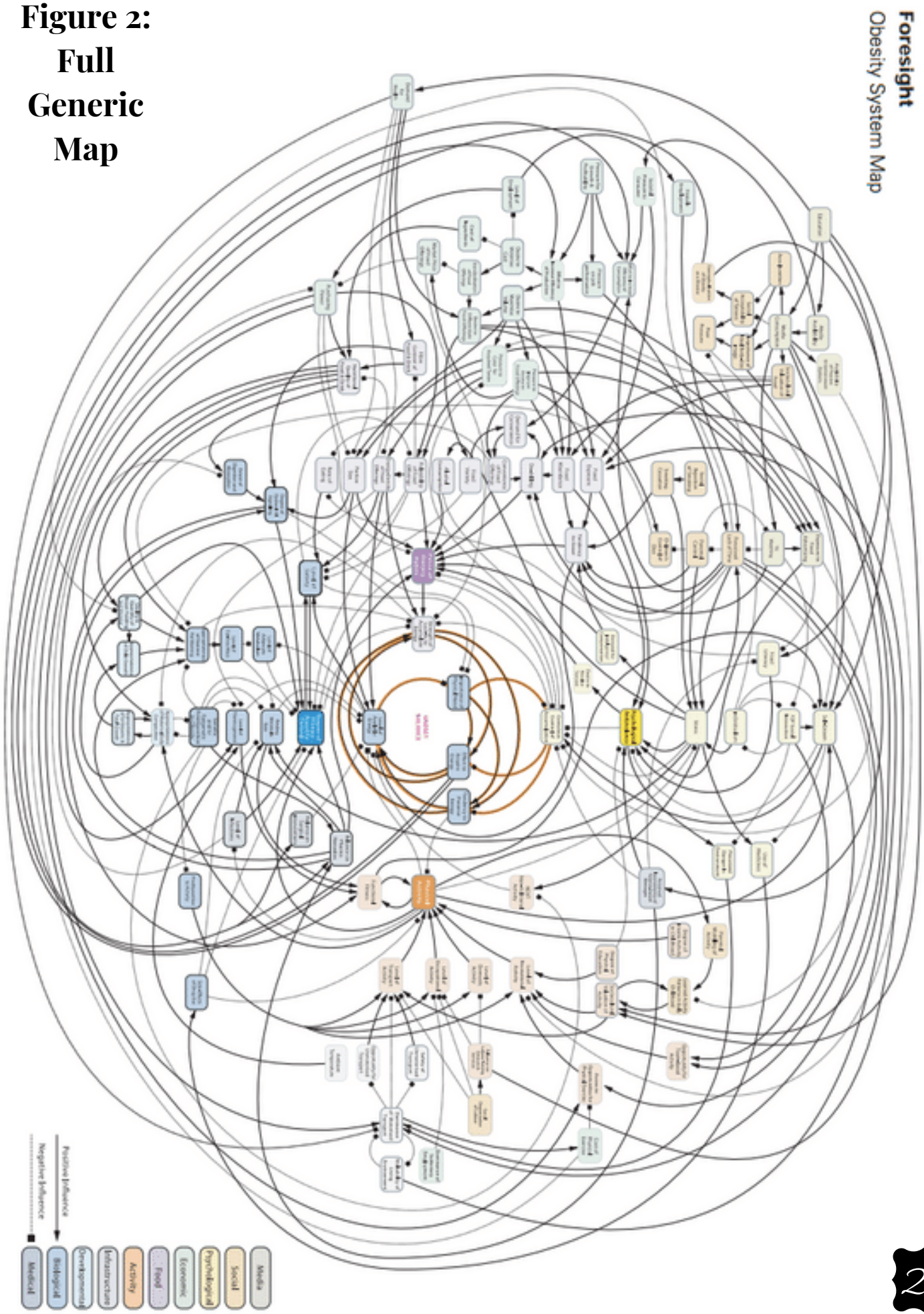


Figure 3: Full Generic Map

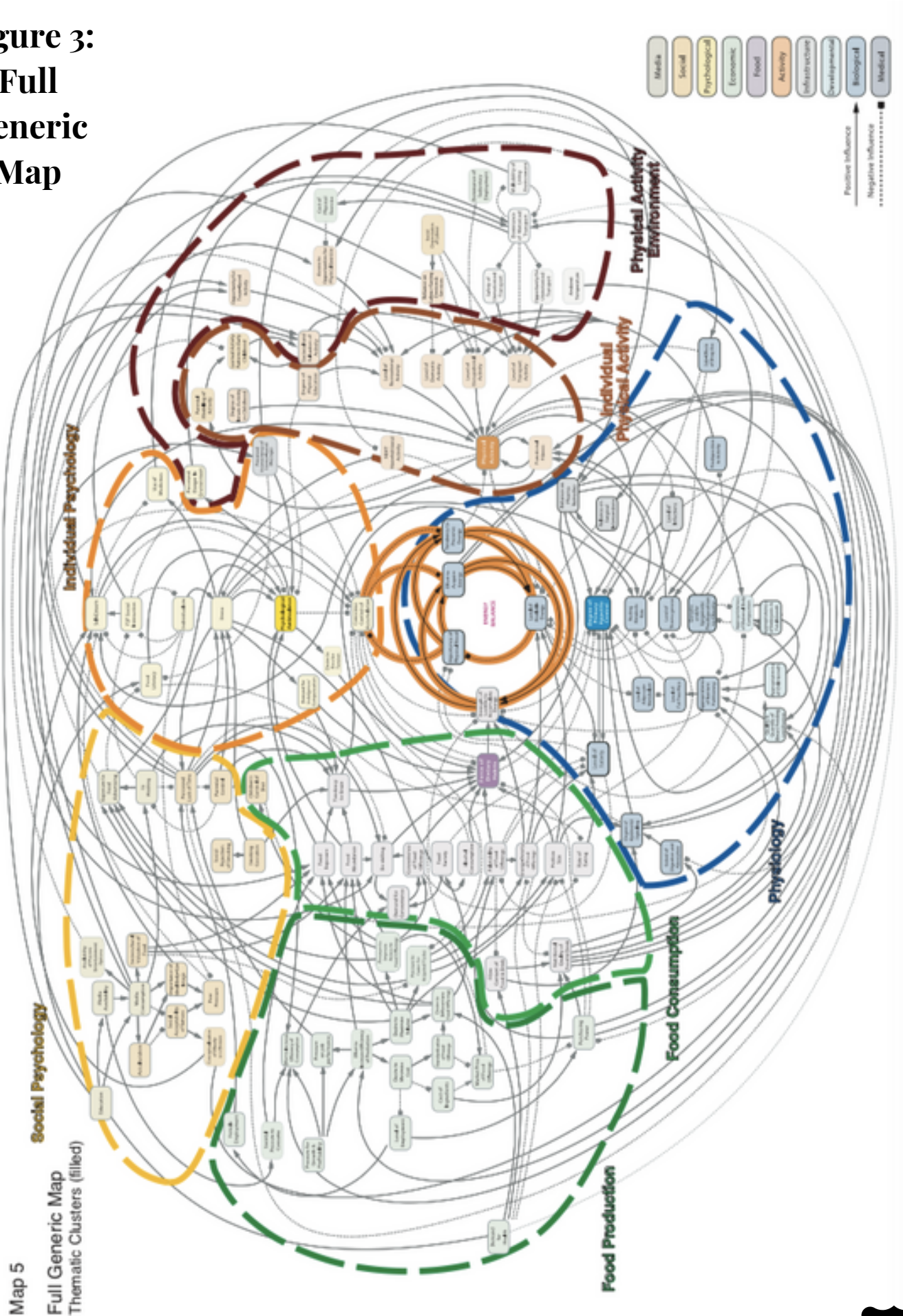


Figure 4: Thematic Clusters

OBESITY SYSTEM ATLAS

The concept of "intersectionality" is essential for understanding obesity because it explicitly demonstrates the behavioral and societal factors that play a role in causing, perpetuating, or meditating obesity. Centered around "energy balance" as the core component of obesity, the report identifies seven key themes: societal influences, food consumption, food production, individual physical activity, physical activity environment, and biology. Within each of these thematic clusters, there are a multitude of linkages that intertwine and influence each other. For example, one linkage between psychology and physiology indicates that stress (within the psychology cluster) has a positive influence on resting metabolic rate (within the physiology cluster). At the same time, stress positively influences alcohol consumption (within the food consumption cluster) which then intertwines with a cascade of adverse dietary habits. Similar to obesity, metabolic syndrome is a complex web of risk factors that intersect on biological, social, psychopathical, and neurological fronts. This report serves as a guide for developing a whole systems approach to metabolic syndrome and understanding the intersectionality of these seven thematic clusters.

Seven Key Themes:

INDIVIDUAL PHYSICAL ACTIVITY

Ex: Frequency of exercise In the workplace

SOCIETAL INFLUENCES

Ex: Influence of the media

PHYSICAL ACTIVITY ENVIRONMENT

Ex: Availability of bike paths

FOOD CONSUMPTION

Ex: Portion Sizes

INDIVIDUAL PSYCHOLOGY

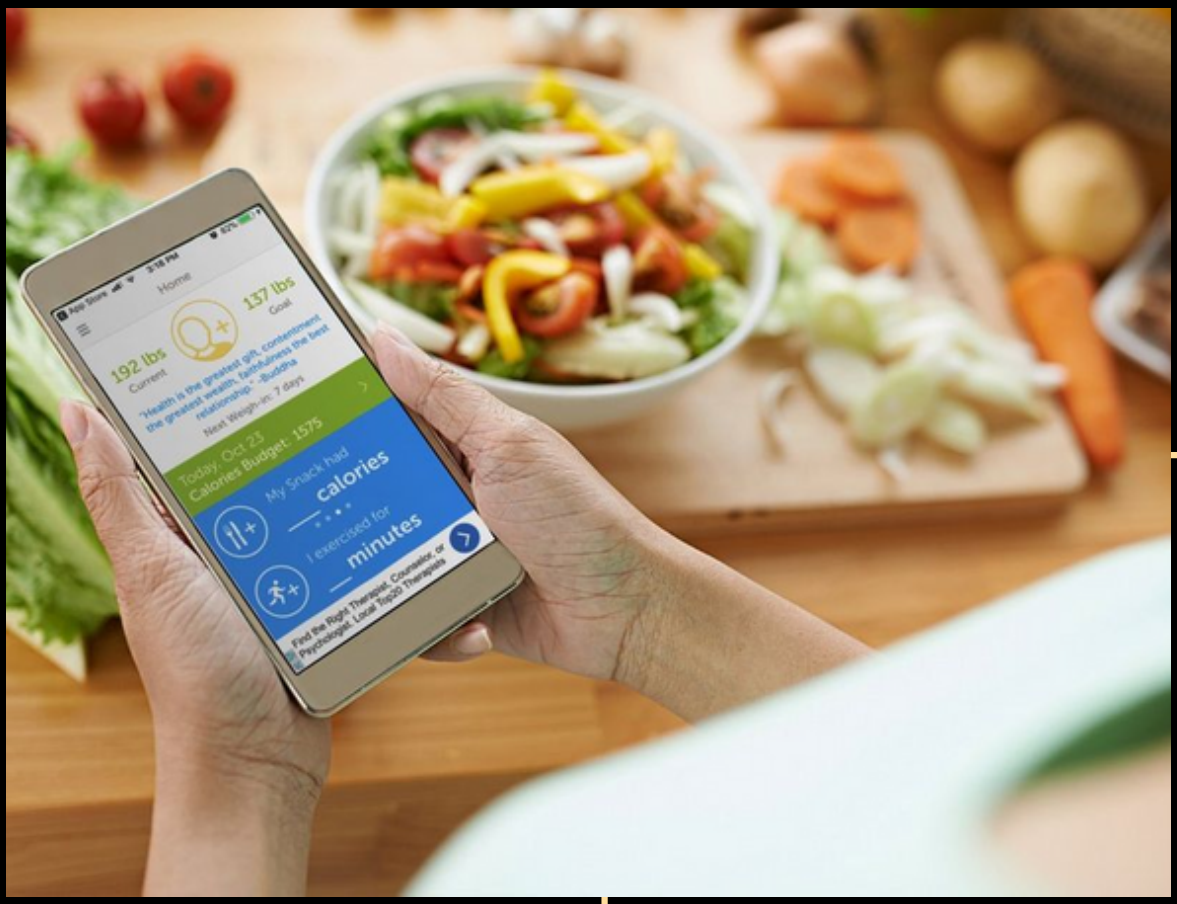
Ex: Self-esteem

FOOD PRODUCTION/ ENVIRONMENT

Ex: Food availability

SOCIAL PSYCHOLOGY

Ex: Peer pressure



BY: ALYSSA BESSER

Should You Count Calories?

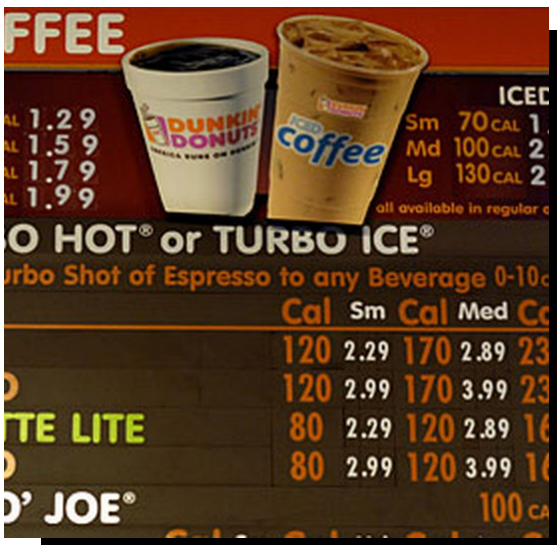
Calorie counting and being conscious of the nutritional information of what we eat has quickly become the largest dieting fad seen across America. With health, fitness, and nutrition on the rise, keeping track of what goes in one's body seems to be the clear answer to ensuring health and wellness. Therefore, not only is it the responsibility of the individual to know what they are consuming, but the nation took matters into their own hands to help consumers make "healthy" decisions. On February 6, 2018, Congresswoman Cathy McMorris spoke about and passed in the House a bill called the Common Sense Nutrition Disclosure Act (H.R. 772). This bill amends the Federal Food, Drug, and Cosmetic Act (FDA) to revise the nutritional information that different restaurants and food establishments must disclose. These businesses are required to disclose the number of calories contained in the whole menu item, the number of servings and number of calories per serving, and the number of calories per common unit of the item. Restaurants and businesses must also have further nutritional information readily available to customers when requested. This caloric information is mandated on chain restaurants, chain coffee shops, bakeries, ice cream shops, self-service food locations, such as buffets and salad bars, movie theaters, amusement parks, and grocery/convenience stores. The bill was

enacted because the government recognized two important diet changes: first, individuals became more aware of their caloric intake and therefore were inclined to choose the healthier options, and second, restaurants were more likely to make their dishes healthier when they noticed the high caloric levels in their dishes. Overall, the FDA implemented this bill to make food and nutrition more accessible to consumers, to make restaurants more transparent with customers, and to trend towards health and nutrition and away from obesity and overeating in the United States.

But is it actually helpful?

Caloric reporting and reduction seems to be a great method for the government to intervene and aid people in making healthier choices. However, calorie counting and reduction proves to be unsuccessful in alleviating metabolic syndrome, obesity, and insulin resistance. One such study reveals that while consuming more calories is part of the initial problem, it does not follow that reducing intake of calories is the best solution to losing body weight or improving metabolic condition. Reducing caloric intake will only help in the short term for weight loss, but it is the continual upkeep of calorie counting and restriction that will help long-term (Benton & Young, 2017). This diet and lifestyle is not very attainable for many people, and therefore, many metabolic syndrome and obese patients end up gaining all of the weight that they lost back. Another study examines the implications of calories as an energy input, and argues that we should not shame people or incur stigma for wanting to consume calories and acquire energy (Camacho & Ruppel, 2017).

First and foremost, the passage of this bill addresses the issue of responsibility – ***whose responsibility is it to take care of people affected by Metabolic Syndrome – is it the patient, or is it the system and the environment around them?*** By enacting the law, some responsibility is shifted to the state in that the nation wants to make people more glaringly aware of the nutritional level of the foods that they consume. It allows patients and people to not have to seek out additional nutritional information on their own based on their medical condition, but allows them to make autonomous choices based on easily accessible information, and therefore takes some stigma away from having to inquire further. However, as seen by various studies, watching and limiting calorie consumption does not resolve metabolic syndrome and obesity. If the nation wants to intervene, then they should support metabolic patients by coming up with a solution that will help their condition and/or destigmatize their bodies. By labeling foods with their caloric levels, society puts expectations of what makes a "healthy" and "normal" body. Furthermore, it expects people to have a certain knowledge about food and calories that some may or may not have due to their upbringing and education level. Instead of incorrectly attempting to "fix" obese and metabolic syndrome people through calorie reporting, the state should implement solutions that destigmatize the conditions, be cautious of the types of bodies they attempt to produce, and help people with metabolic and health issues to realistically alleviate their symptoms.



This destigmatization and improvement on state solutions could be done through two main methods. First and foremost, education of nutrition and metabolic syndrome needs to be better provided to children in school. Focusing on the child will allow for a healthy lifestyle and foundation to be built. While there has been a great push for nutrition education and healthy living in children, such as Michelle Obama's "Let's Move" initiative, the consequences of an unhealthy diet and negative health outcomes are not explicitly discussed. When children are informed in schools, they are more likely to communicate with their family about these matters and encourage the parents to make food and lifestyle changes in the household. By educating and empowering children to prevent future metabolic conditions, children will be further empowered to take control of their own health. Furthermore, expanding access to prenatal care to underserved communities through outreach programs could decrease rates of metabolic syndrome via early intervention to disenfranchised groups. By caring for mothers prenatally, children will be predisposed to healthier lifestyles, and emphasizing this to underserved and unhealthier communities will aid them in guiding them to healthier lifestyles and ones that are not afflicted by disease. By enabling children to make healthy decisions, metabolic syndrome prevalence will decrease, and there will be public responsibility to ensure that children and all people have access to health/nutrition education and nutritious foods and lifestyles.

A DIETICIAN'S PERSPECTIVE

AN INTERVIEW WITH DENA HERMAN

By: Sarah Holloway

Within the Community Health Sciences Department at the Fielding School of Public Health, Dena Herman is an Adjunct Associate Professor at UCLA with expertise in maternal and child health, nutritional assessment with a focus on dietary quality, food security, health disparities of underserved populations, and international nutrition. She is also a pediatric dietician and has done clinical work in the area of childhood obesity. I had the great pleasure of sitting down with her for an Interview!

What are some dietary and sociocultural factors that may predispose a person to developing obesity and metabolic syndrome?

"I think nutrition and social determinants of health go hand in hand. You're predisposed to some degree. For example, if you grow up and you're overweight or obese as a child and then you become a woman of childbearing age, your offspring then are more likely to have obesity or have risks for diabetes or chronic diseases. Thus, you're born into that trajectory, not just from genetics, but also from your social surroundings and your environment, which can be a food environment. I would say all cultures have cultural foods and so it's not that a cultural food is bad; rather, it has to do kind of with the all the circumstances under which individuals live."

With your different clinical studies or even your work as a dietitian as well, who goes to you and who do you wish would come to you to get help?

"So in working clinical, I worked here at UCLA in The Fit for Healthy Weight clinic as a dietitian. We saw children who were overweight and obese, and obviously the family members because they're kids. And I think the key thing is working with the entire family. For instance, I would see individuals who were overweight or obese or even have chronic diseases related to early signs of heart disease, through elevated blood lipid levels or hypertension. We're seeing that in kids more and more today, especially in early adolescence. The solution is really having the whole family on board because whatever we're recommending for that child is probably what the whole family needs to be doing anyway for overall health."

Delving a little bit into microbiome...have you found certain foods that target the gut lining to heal the gut and reduce inflammation?

"I don't think it's any surprise that most of the research supporting healthy eating is based in a diet of fruits and vegetables. As MyPlate shows, half of our plate should be fruits and vegetables at every meal. If people actually ate like that, there'd probably be a lot less inflammation. So if we look at the citrus, for example, we know vitamin C is very healing for epithelial tissues. Also, cabbage and cruciferous vegetables have sulforaphane and other types of phytochemicals that are inflammation reducing. So, it's important to eat from many different groups of fruits and vegetables because they each deliver different kinds of functional characteristics that might reduce inflammation.

Fiber has a lot of good benefits. We can divide them into soluble and insoluble, but you can also look at resistant fibers and things like that. Resistant starches are foods that come into our bodies but we can't digest them. They cause bulking which makes us feel fuller longer. Soluble fibers also have a gel structure, so they press out on the intestinal lining and make us feel fuller. We also know that when they gel to the bottom of the gut and the lower gut, they help form short chain fatty acids, things like propionate and butyrate, and acetate. And those help reduce inflammation and have been actually implicated reducing things like cardiovascular disease and certain cancers. So, you really can't go wrong with fiber, and most people don't get as much as they need. The recommendation for an average person like you or me is around 25 to 35 grams per day. Most Americans, maybe get a third to a half of that maybe. So that would be a great place to start."

What makes childhood obesity, different from later onset obesity?

"What's different about childhood obesity is that it's beginning so early, sometimes even infancy. Kids are born larger for than gestational age. Unfortunately, some of it's genetic, so there will be some predisposition, but worse is the environment that they're being born into. When kids are obese younger, it's very very hard to get to a healthy weight. So what's different is that from a very young age, these kids are dealing with much more inflammation in their bodies, which leads to a much more rapid onset of chronic disease. So, whether it be metabolic syndrome or any of the different conditions that make up metabolic syndrome, these are getting a very early start in someone who's obese at a very young age."

So even if a person develops obesity at an earlier onset, it may not be necessarily worse in outcomes?

"Well worse in outcomes only because that inflammation is happening earlier. So, for example, let's take type two diabetes. So, if you have high blood sugar at an earlier age, your pancreas can only produce so much insulin. If there's lots of fat tissue, then your receptors aren't able to actually notice the insulin is there. Your body will need so much insulin because it's not getting the blood sugar into the cells, so it will have to come from outside, exogenously through a medication. Also, when you're overweight, there's higher output of things like cortisol and other inflammatory hormones. Your body is constantly in a stress state.

If we go to the social side of that, kids in school may be being bullied or treated differently, affecting their own personal self esteem or confidence in what they do. And then ultimately how that affects them over their life trajectory for potential as an adult in the workforce. All of that is very burdensome from a social and emotional perspective. So again, it's not just that the person from a biological physical standpoint, is not as healthy as they could be. They have all this extra external burden from their environments on their mental health. That in turn also puts more stress on the body with more cortisol output and more inflammation. Those cumulative effects will just lead up to a very difficult outcome."

How do you think the early life diet affects your long term metabolism? How important are the critical stages of your life for determining your metabolic system?

"We know we're the result of what our grandparents ate. So, where does it start? Is it the first thousand days of life or is it in utero? It's going to be intergenerational, that's what the life course tells us. And so, pick a point in time. They're all, actually, what we call critical periods. The timing of what we're eating is going to affect us over the timeline, which is our intergenerational effects. So, if we're thinking about the developmental stage and helping children get their best start, then starting with breast milk is absolutely the best we can do because that's a food that's actually developed specifically for that child by that mother. It doesn't get any more specific with all the nutrients that they need. As they start to eat solid foods, we must ensure that they are eating whole foods. We must try to maintain a whole foods approach throughout life from the beginning until forever. If you look at populations like Okinawa Japan, these are some of the most longest living populations and if you look at what they eat, it's actually almost a primarily 98% carbohydrate based diet. They eat rice. They eat purple potatoes. In the former days, they ate meat maybe twice a year. It's a very basic diet. From the very beginning, we know what we need to eat but we just don't do it."

In addressing the stigma of obesity and metabolic syndrome, at what point, is it the responsibility of the individual versus the responsibility of the system?

"I mean, the individual lives in the system or multiple systems. So we're looking at a person's family, where they go to school, the community, the workplace, and then, the larger community like the city, state, and national level. So I think at every level, there should be "responsibility" taken. I think the individual can only do as best they can as their own micro environments. If you ever heard of the socio-ecological model, it's kind of along those lines, really at every level. That's why, even though like I work clinically, one of the things that I'm most passionate about is policy change because then we're affecting many more individuals at one time. So, I don't know that it's any one person or agency's responsibility; rather, it's really for all of us to be thinking about how we can improve our environments."

CAN YOU SPOT THE DIFFERENCE?

In the Supermarket

DIRECTIONS: Circle the major difference between the two side-by-side photos. They will have many similarities, but only one difference! It is up to you to figure out the difference and why it exists.

CAN YOU SPOT THE DIFFERENCE?

In the Supermarket

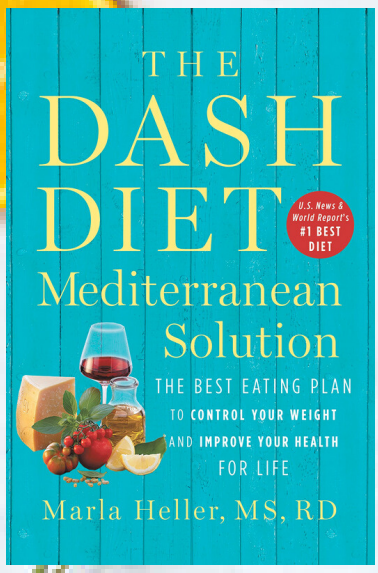
DID YOU FIND IT?

These photos seem to clearly be two different parts of a supermarket - the American junk food section and the produce section. However, in fact, these two markets are from entirely different places. The image on the left is from an American grocery store, whereas the image on the right is from a Spanish grocery store. While yes, they are from two different sections of each supermarket, these two sections are indicative of two different cultures. The American grocery store, along with the types of foods that Americans eat, are laden in high calories and high sugar (as seen through the Twinkies, Pop-Tarts, Aunt Jemima, Hershey's Syrup, and more). American commercialization of food along with high levels of sugar contribute to the nation's poor health and large amount of insulin resistance, type II diabetes, obesity, and metabolic syndrome. On the other hand, Spain was considered to be the healthiest country in the world in 2019 by the Bloomberg Global Health Index, with a life expectancy of 83.5 years, which is expected to rise to 85.8 by 2040 (World Population Review, 2020). Spain's diet is a Mediterranean diet, and they consume many healthy fats, legumes, fruits, and vegetables, they eat less red meat and processed foods, and they walk almost everywhere that they can. Because the quality of the food that they eat is much healthier and more nutritious, Spaniards tend to live healthier lifestyles and are less affected by obesity, type II diabetes, and metabolic syndrome. Americans consume many processed foods and sugars, which contributes negatively to their insulin resistance and metabolic syndrome and perpetuates both an unhealthy lifestyle as well as a lifetime of metabolic disease.

GAPS & DIET MICROBIOME

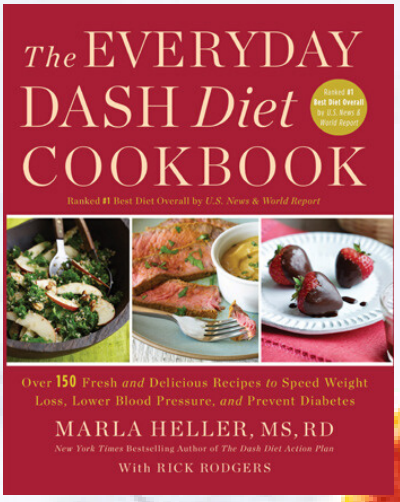
Diet positively or negatively influences metabolic processes. The Gut and Psychology Syndrome and later extended to the Gut and Physiology Syndrome (GAPS) diet has been proven to be immensely helpful for a broad range of neurological and psychological disorders, including autistic spectrum disorders and learning disabilities. Since the gut is the root of many neurological and psychiatric conditions, targeting diet as a means to restore and heal the gut can serve as a natural cure for many of these conditions. Not only can food be a means of rebuilding the gut, but it also can be a source of toxicity. Sources of toxicity in food include antibiotics, artificial hormones, and pesticides that creep into our food. For instance, antibiotics in food disrupt normal gut flora and develop abnormal gut flora, which leads to negative health outcomes such as obesity and diabetes. In order to address gut health for children, it must start with addressing the gut of the parents, especially the mother, who will pass on their microbiota to their child. When the child is born with abnormal gut flora and high toxic load, the child is automatically at risk for a multitude of digestive issues. To fix this, breast feeding instead of bottle-feeding formula is crucial as a first step towards better health. The human body's reaction to food and its influence on gut health and metabolism creates a cascade of physiological and neurological repercussions, including intellectual disabilities. Ultimately, by targeting the abnormal gut microbiota, a proper diet can heal the brain and the gut, which will restore a healthy microbiome and reverse many psychological and physiological conditions (Campbell-McBride, 2018).

BY SARAH HOLLOWAY



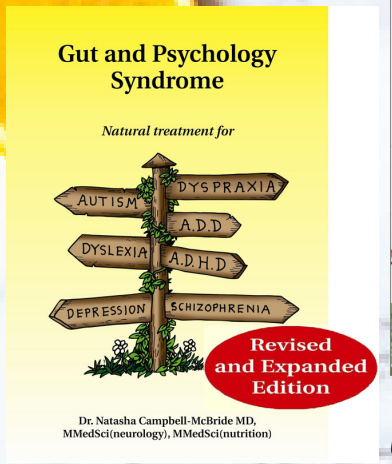
This book offers readers "revitalized guidelines to help lower blood pressure, lower cholesterol, control blood sugar, improve heart health, improve brain health, and banish belly fat for good!" It is "beneficial for people with hypertension, CVD, diabetes, Metabolic Syndrome, PCOS, and post-menopausal weight gain"

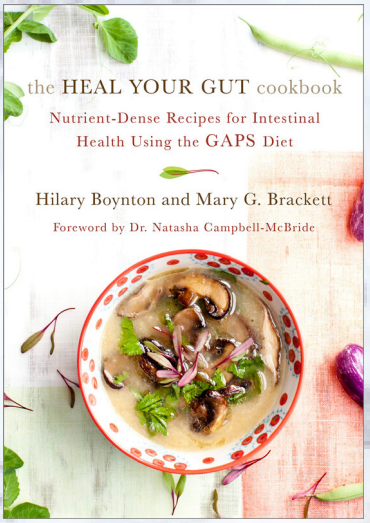
https://dashdiet.org/dash-diet-mediterranean-solution.html



Also check out

Read more about supporting a healthy metabolism with these books!





Also check out

"The GAPS Diet focuses on removing foods that are difficult to digest and damaging to gut flora and replacing them with nutrient-dense foods to give the intestinal lining a chance to heal and seal."

http://www.gapsdiet.com/home.html

Sample Menus from The DASH Diet* Mediterranean Solution

JUMP START PHASE

Breakfast

- 2 to 3 ounces lox (smoked salmon) topped with 1 tablespoon cream cheese or a 1-ounce slice Swiss cheese
- Tomato slices
- Onion slices (if desired)
- Coffee or tea with a little milk if needed

Midmorning snack

- 4 ounces light yogurt
- 20 almonds

Lunch

- Cold cooked skinless chicken breast, with a mixed salad and Vinaigrette
- Additional raw veggies per your preference
- Water with lime slices

Afternoon or before-dinner snack

- 1 ounce light cheese
- Handful of grape or cherry tomatoes

Dinner

- Hamburger (no bun)
- Grilled onions
- Mixed salad
- 1 cup broccoli
- Water with lime

REGULAR MEAL PLAN

Breakfast

- 1 ounce (by weight) whole-grain cereal
- 8 fluid ounces milk
- 4 ounces strawberries
- Coffee, tea (could be lattes), or hot chocolate (with little or no sugar added)

Midmorning snack

- Raw carrots
- 2 ounces hummus

Lunch

- 1 or 2 roll-ups: 1 to 2 ounces turkey, 1 ounce cheddar cheese, and sliced tomato rolled up in a lettuce leaf
- Mixed salad with Vinaigrette
- Plum
- Water with orange slices

Afternoon or before-dinner snack

- 1 ounce mixed nuts
- 4 to 6 ounces light yogurt

Dinner

- 3 to 5 ounces grilled salmon
- Spinach-Arugula Salad with Nectarines with Lemon Dressing
- Water with lemon slices

https://dashdiet.org/med-sample-menus.html

*DASH DIET= (DIETARY APPROACHES TO STOP HYPERTENSION) DIET

The following recipes exhibit the complexity of food choice. They beg us to recognize the symbolic value of food and respect the dietary choices of others. Food can represent comfort, community, history, and autonomy. Do we condemn simple sugars, carbohydrates, fats, and the people we consume them more than the oppression and difficulties that they placate?

War Cake

Shared by M.F.K. Fisher in "How to Comfort Sorrow"

In her cookbook entitled How to Cook a Wolf, M.F.K. Fisher advocates for the indulgence in "selfish comfort" foods as a way of rebuking war. Amid efforts to support the American troops during the Second World War via rationing and restriction, a cake can temporarily satisfy years-long cravings for freedom, hope, and peace.

"

½ cup shortening (lemon grease can be used, because of the spices which hide its taste)
1 teaspoon cinnamon
1 teaspoon other spices . . . closes, mace, ginger, etc.
1 cup chopped raisins or other dried fruits . . . prunes, figs, etc.
1 cup sugar, brown or white
1 cup water
2 cups flour, white or whole wheat ¼ teaspoon soda
2 teaspoons baking powder

Sift the flour, soda, and baking powder. Put all the other ingredients in a pan, and bring to a boil. Cook five minutes. Cool thoroughly. Add the sifted dry ingredients and mix well. Bake 45 minutes or until done in a greased loaf-pan in a 325-350 degree oven.

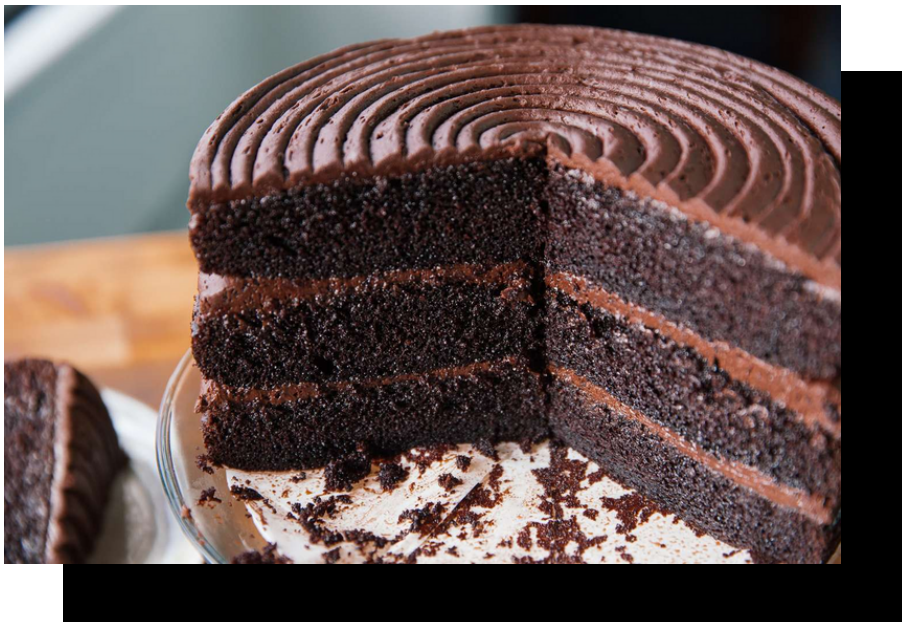
Rich Chocolate Cake

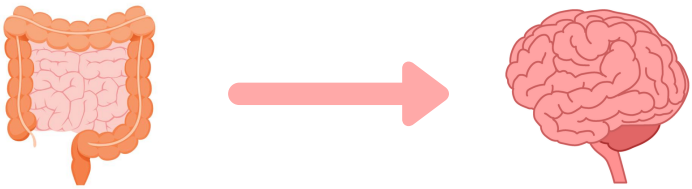
From *In Memory's Kitchen: A Legacy from the Women of Terezin*

In the foreword of In Memory's Kitchen: A Legacy from the Women of Terezin, Michael Barenbaum says, "Food is who we are in the deepest sense . . . -- what we eat, the foods and foodways we associate with the rituals of childhood, marriage, and parenthood, moments around the table, celebrations -- are critical components of our identities." Barenbaum explained that Bohemian and Moravian Jewish communities held captive by German Nazis in the Czechoslovak ghetto and concentration camp of Terezin thought and discussed fondly "Food, memories of it, missing it, craving it, dreaming of it." They called sharing recipes "cooking with the mouth." The following recipe published in a book of translated orally-recounted transcripts shows that food can confer a sense of humanity when it is needed.

”

Beat 10 decagrams butter, 10 decagrams sugar, 4 egg yolks, 14 decagrams softened chocolate. Fold in 4 [egg whites stiffly beaten to] snow, 3 decagrams flour. Bake a thin layer in a cake pan. [Pour] the rest [of the batter] on a baking sheet, [bake] and make crumbs [from it]. In cake pan always put a layer [of] cream, a layer [of] crumbs. Top with glaze or cream. Cream: 14 decagrams choc. with 5 decagrams sugar.





GUT-BRAIN CONNECTION: METS AND NEUROLOGICAL DISORDER

BY SARAH HOLLOWAY

Although the direct link between metabolic syndrome and disability is not clear, there are studies that suggest correlations of pathologies of diseases and disorders that are associated with disability. Research highlights neurological diseases, such as Alzheimer's Disease and Parkinson's Disease, that may be extended to meet diagnostic criteria based on how they are documented for disability benefits. In addition, research highlights the relation of obesity, which is a major component of metabolic syndrome, to the development of intellectual and learning disabilities. As the prevalence of disabilities across the lifespan are increasing, diagnostic criteria for disability and the relationship between disability and metabolic syndrome must be evaluated in order to address these serious public health concerns.

According to Metabolic Syndrome and Neurological Disorders, researchers explore the pathologies of metabolic syndrome in relation to neurological disorders, including Alzheimer's Disease and depression. Parallel to the risk factors of metabolic syndrome, various neurological disorders possess similar molecular mechanisms and risk factors, such as inflammation, oxidative stress, and lifestyle factors. For instance, neurotransmitter abnormalities, such as serotonin levels, involve molecular mechanisms similar to metabolic syndrome that help to explain a neurochemical linkage between metabolic syndrome and neurological disorders (Farooqui, 2013).

In addition to the link between neurological disorders and metabolic syndrome, there is also overlap with disability. Many neurological disorders may meet diagnostic criteria for disability benefits. For example, Parkinson's Disease, a neurological disorder, may be documented as a disability if the individual is documented having bradykinesia, rigidity, or postural nstability. Spanning multiple disciplines, it is imperative to explore metabolic syndrome through an intersectional lens. An understanding of neurological, dietary, medical, and pathological information is necessary in order to explain the development of various disabilities and how they apply to metabolic syndrome. (Farooqui, 2013).

Similar to studies linking obesity or diabetes to metabolic syndrome, Alzheimer's disease is contested as another possible link to understanding metabolic syndrome. According to the vascular hypothesis for Alzheimer's disease, there is evidence that links the vascular etiology of dementia with pathogenic associations to MetS. For instance, MetS involves obesity-induced hormonal abnormalities that are linked to impaired memory function, neuroendocrine disturbances that are associated with brain malfunctions, and inflammation that impair cognitive function. Factors like hypertension, advancing age, and obesity that affect metabolic syndrome can cause a cascade of effects that may lead to dementia. For example, metabolic syndrome causes brain hypoperfusion, then neuroglial energy crisis, then mild cognitive impairment, neurodegeneration, and finally dementia. In the review article "Metabolic syndrome and Alzheimer's disease: a link to a vascular hypothesis?", it provides insight into how diseases like Alzheimer's Disease may overlap with metabolic syndrome through the intersection of pathological, epidemiological, clinical, neurological, and pharmacotherapeutic studies. This demonstrates the complexity with which various experts may debate the etiology of neurological decline and further complicates the blurry line between what is considered a syndrome versus a disease versus a disability (Milionis, 2008)..

CAN YOU SPOT THE DIFFERENCE?

In the Doctor's Office

DIRECTIONS: Circle the major difference between the two side-by-side photos. They will have many similarities, but only one difference! It is up to you to figure out the difference and why it exists.

CAN YOU SPOT THE DIFFERENCE?

In the Doctor's Office

DID YOU FIND IT?

At first glance, these two photos seem very similar. Each photo has a doctor examining and feeling their patients' stomachs. A viewer may initially say that the differences in the photos were that in the first image, the patient is standing up and in the second, the patient is laying down. However, these slight differences are insignificant. Instead notice how the doctor on the left is looking at the male obese patient with disdain while the doctor on the right is looking at his skinny female patient with a smile on his face. These two photos highlight the stigma and stereotype that doctors have against their patients. In the first photo, notice how the obese man has his hands on his hips and is closing himself off to his doctor who is shaming him, whereas in the second photo, notice how the woman has her arms open and to the side for her doctor. The disdain and both explicit and implicit shame of doctors towards their obese and metabolic syndrome patients have an impact on the patient-physician relationship. Doctors are more reluctant to give care, and patients are more reluctant to receive, adhere to, and even seek out care. It is imperative that physicians change their perspectives on treating and aiding their metabolic syndrome patients so that they can have a better patient-physician relationship and so that the patient feels supported by their physician.

***Read more about physician biases and stigma towards their patients in the section "How Clinical Stigma Affects Receiving Care" on page 51.*

CLINICAL PRACTICE PERSPECTIVE

AN INTERVIEW WITH DR. VELINDA PARANAL
BY ALYSSA BESSER

We had the privilege to interview Dr. Velinda Paranal, who is a Family Medicine physician working for Providence St. John's within the Santa Monica Family Physicians Group. She sees many patients for type II diabetes, obesity, hypertension, hyperlipidemia, and more, and she often takes an educational, preventative approach in her practice. Her clinical perspective is very valuable to our knowledge of metabolic syndrome inside of the doctor's office.

How often do you diagnose your patients with metabolic syndrome versus their individual risk factors, like obesity or diabetes?

Never, I only diagnose individual symptoms. We only input individual diagnoses on our problem lists like hypertension, obesity, and type two diabetes with complications. It's interesting because metabolic syndrome is something that we look at that's more integrated. You look at a person overall, and you know that they're moving into a situation where they're at high risk for complications over the long term. I'm a baby boomer doctor. I treat the individual criteria. I look at blood pressure separately, I look at diabetes separately, and I look at obesity separately, but I know they all interact. But, I don't put down on their problem list that this person has metabolic syndrome. I kind of know in my head that they're one of the people that has the "American bad health disease."

What stigma comes from having metabolic syndrome as opposed to these individual problems?

I don't think the general populace looks at, "Oh, I have metabolic syndrome," because I don't think we label people that way. They look at themselves as having diabetes or stigma with diabetes. There is stigma with hypertension, in that if you take medication, people think you're sick. All they have is hypertension, though. And everybody knows what stigma comes with obesity. However, I don't think that stigma comes with triglycerides in particular.

Do you feel that you embody or portray stigma to your patients?

I don't think that I do. I am a family doctor. Well, I think that doctors are very individual in how they communicate with patients. And as a family doctor, I really work from an educational approach. I work from an educational, preventative, and optimistic health approach.

How do you treat these individual symptoms that lead to metabolic syndrome? Do you recommend more lifestyle changes or do you prescribe Western or non-Western medications?

I think we all prescribe lifestyle changes because of the early markers that some patients show. Traditional allopathic medicine is very pharmaceutical-oriented. At some stage, medications become important for someone to not actually deteriorate and progress down the slippery slope of metabolic syndrome. But, the bottom line is that there are a lot of other practices. Life is changing such that

the younger generations are getting an idea that lifestyle is primarily important. That's great. It's come down through the generations, so they have the advantage of the generations before them to understand that. There are more people at the gym, there are more people eating well, and there are people exercising more. They're choosing their foods well. They're understanding about sleep. They have apps for everything. So, I think a lot of it is going to be self-monitored going forward and the doctors are there in a large part to encourage that and to applaud it. And then doctors will be there when things get beyond a certain point and when medications are needed.

Do you think patients of the older generation are reluctant to make these lifestyle changes once they're diagnosed with these conditions?

I see a variety because it depends on what you say is older. As you know, 60 is the new 40. I have a lot of patients who get diagnosed with diabetes in the 40 - 60 age range that make lifestyle changes. It actually is almost like they get a wake-up call when their hemoglobin exceeds a certain point or they get hypertension. So, we also have diabetes educators and nutritionists that work with patients to help them sort out the lifestyle strategies that they need.

Do you refer all your diabetic patients to a nutritionist?

No. I come from the school of thought where I took care of diabetes for 30 years, but this is changing. I'm an educator by training, so I probably do more education than some doctors, but I don't know what people do in their individual practices. Yet, when people are first diagnosed with diabetes, yes; I think that a diabetes educator has much more time to sit down and have a conversation. Doctors used to do it ten years ago, but now insurance pays for diabetes educators and nutritionists, and now we prefer them. We have a really great diabetes educator here at Providence. A lot of people will tend to use diabetes educators more if they know that they're excellent.

How do patients react when they're first diagnosed?

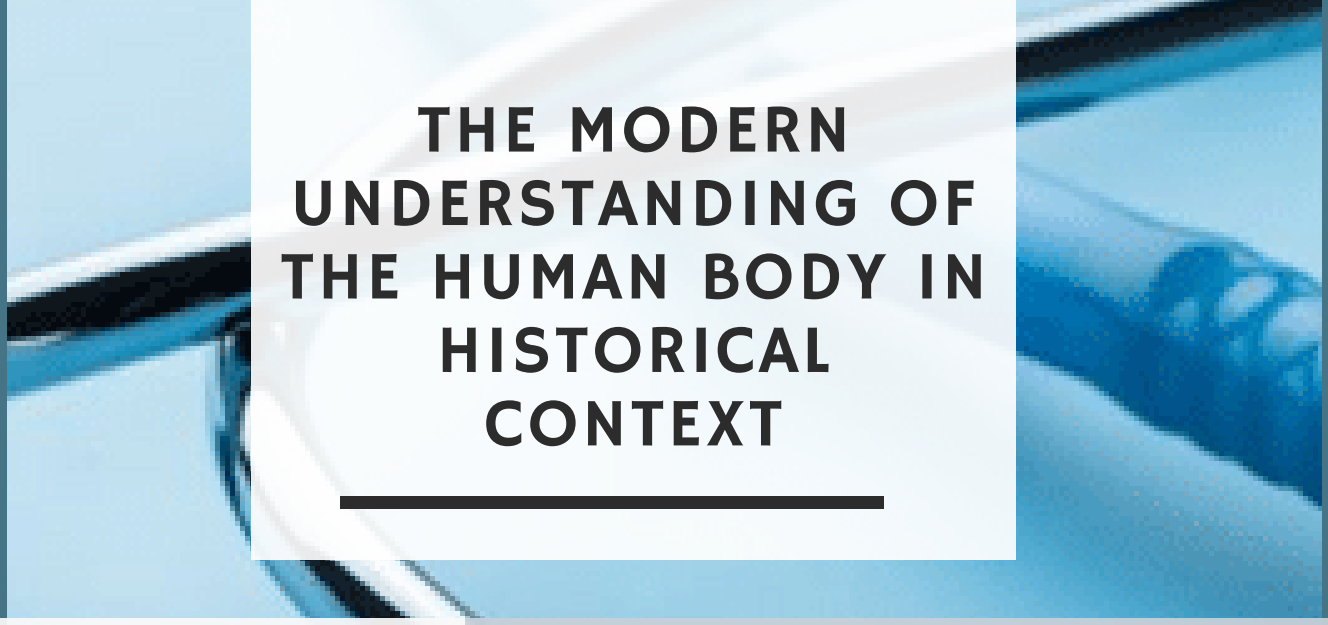
I think most people are in shock. I think most people are in denial for the time up to it. Their Hemoglobin A1c level could be 5.6% to 6.4% for a long time, but then, when they hit the level for diabetes, which is 6.5%, it's like getting doused with cold water. They're in a little bit of shock that they've become "diabetic."

Have you seen cases where it's been reversed or limited in their lifetime? Or, once they have it, do they have metabolic syndrome for their lifetime?

Yeah, absolutely. A lot of people do some radical things where there's been an extreme diet change, or there's been an extreme exercise initiative. People will either look at it as "I'm going to lose a certain amount of weight" or "I'm going to exercise a certain amount" or "I'm going to change my diet." I'm positive about trying new diets, such as intermittent fasting, paleo, or Mediterranean diets. It almost seems like any diet that people do improves their Hemoglobin A1c. Before, there was not much attention to diet and so things just got out of hand. When they pay attention to any diet, that always reels things in. I've had some miracle diets that people have maintained for 5-10 years. And it's not the norm, because by the time one gets diagnosed with diabetes, many people get entrenched in their routines and devolve into resignation. So, they need a lot of coaching and cheerleading. That's probably where a lot of financing could be better used. Instead of paying for expensive doctor visits, we should actually have a lot more insurance for nutrition and coaching. These programs seem to be inaccessible or unaffordable. One of the doctors here is starting a nutrition education program with a series of ten classes which will talk about different kinds of diets. Doing this in their medical home setting will make people feel better about coming here for the classes and finding a new place and a new person.

THE FRAMING OF AN EPIDEMIC: SOCIOCULTURAL DETERMINANTS OF METABOLIC SYNDROME

BY: ALYSSA BESSER, SARAH HOLLOWAY, AND OLIVIA SCHULIST



THE MODERN UNDERSTANDING OF THE HUMAN BODY IN HISTORICAL CONTEXT

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Neoliberalism: Like the term metabolic syndrome, neoliberalism has been defined in different ways throughout history. Introduced to economic discourse by Charles Gide in 1898, this term evolved to connote an ideology today. Embedded in modern neoliberal ideals is the valuation of individual freedom. Agency and, importantly, responsibility are attributed to individuals over institutions in neoliberal frameworks.

Value-laden: Ideological paradigms reflect the interests of the people who create them. Something may be value-laden, or influenced by personal opinion, overtly or inadvertently.

Social Darwinism: Social Darwinism subjects social groups to Darwin's theory of evolution by natural selection. This loose set of ideologies posits that those who are most socially successful possess the most competitive, desirable traits. Historically, Social Darwinist philosophies have been used to justify imperialist, colonialist, and racist social stratification schema.

Self-efficacy: Self-efficacy is a term used by psychologists to describe confidence or, colloquially, "belief in oneself." One who is self-efficacious assesses that they will be able to successfully navigate and guide prospective situations. Self-efficacy strongly influences behavioral choices and plays a key role in the self-management of disease, smoking cessation, pain control, and exercise.

Biological citizenship: The term biological citizenship was first employed in the early 2000s to describe societal belonging, protection, and obligation on the basis of biological condition. Individuals are expected to repay the state for communal investment in individual healthcare with the labor of their lives. Biopower has the potential to exclude non-compliant, non-normative, and disabled individuals from full citizenship.

Charlotte Bunch stated that "There is no private domain of a person's life that is not political and there is no issue that is not ultimately personal." Virtually nowhere can a case demonstrating this assertion be found more readily than in discussion of the autonomy of the human body. Dominant views of the human body have shifted throughout history. Today, the human body is collectively regarded as an instrument of reproduction of which age-old values of strength and beauty, and neoliberal values of discipline, self-control, and tendency to conform, manifested as leanness, are attractive features.

The neoliberal atmosphere that upholds choice-making and freedom in the United States does not liberate citizens from the value-laden judgements of American society. Encouragement of self-actualization is laden by Social Darwinist underpinnings. Self-efficacy and self-control are readily deemed markers of worth that are associated with both individual and collective success and displayed on the body. Thus, self-care is affiliated with not only self-respect but biological citizenship; in nations such as ours that distribute collective resources to protecting health, longevity, and vigor of individuals are matters of communal investment. The productive and reproductive spheres of the human body thus are subjected to calculation as those with strong, beautiful, healthy bodies are deemed most desireable for intimate and collective partnership.

Promotion of individual healthy lifestyle choices surfaced along with New Right advocacy of programs emphasizing individual over institutional regulations and took hold in part due to the 20th-century epidemiological shift in disease from infectious to chronic. Though positively connoted with well-being, the pursuit of health may in some cases reduce individual pleasure for unsatisfactory productive gains.

HOW STIGMA AFFECTS CONSTRUCTION OF IDENTITY

In the article "How is it Not 'Just Like Diabetes:' Mental Disorders and the Moral Psychologist," Nomy Arpaly raises questions of correlating diabetes, which is a metabolic disorder, with a mental disorder and presents an interesting philosophical perspective. Especially in today's society, it presents bioethical challenges of labels and diagnoses and how biological states or behaviors become socially constructed and vice versa. For the purpose of analogy, it is useful to utilize Arpaly's notion of diabetes as a proxy for understanding metabolic syndrome since diabetes is a metabolic disorder and it is correlated with metabolic syndrome. Also, it is useful to understand mental disorders as an analogy for understanding disability in the context of our research.

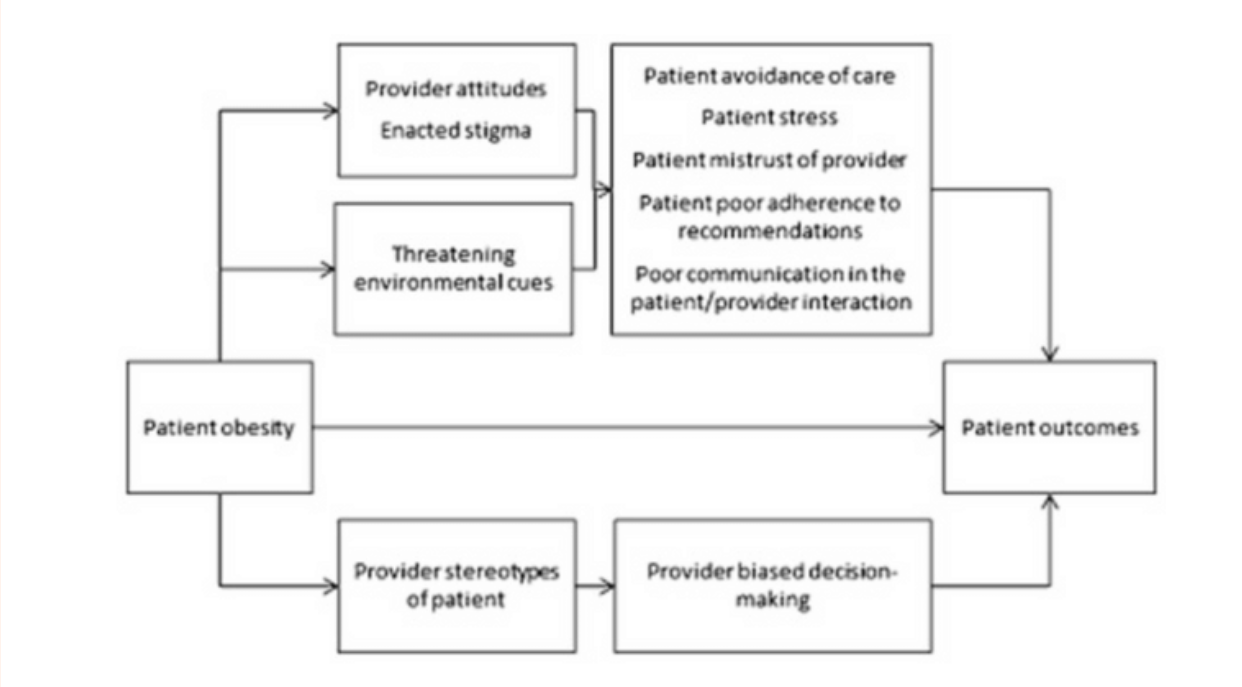
To illustrate the comparison, the author notes, "Diabetes is a physical state of the pancreas, and a mental disorder is a physical state of the brain" (Arpaly, 282). There is also overlap in the sense that both diabetes and mental disorders can be improved by drugs. They can vary in severity from being life-threatening to a mere inconvenience, and they can't simply be "wished away" as if snapping out of a bad mood. By comparing mental disorders to diabetes, it may alleviate some of the societal stigmas that people with mental disorders experience because it compares their mental state to something that is out of their control like diabetes. On the flip side, such leaps in correlation may be detrimental to those who struggle with mental disorders by undermining their psychological state to a mere physiological state of the body and also to those who have diabetes by implicating that their metabolic disorder also adversely affects their mental health.

This introduces the concept of biological diagnoses and their relation to the social construction of identity. Also, this serves as an exemplary lens for examining the intersection of the biological and social aspects of metabolic syndrome. The social controversies or implications of correlating metabolic syndrome to disability, labeling and diagnosing metabolic syndrome as analogous to a disability according to medicalized criteria, and the societal stigma of metabolic syndrome in contrast to disability all culminate to construct identity. Taken together, these shed light on the differing perspectives of lay people and experts, such as medical doctors, to better understand differing viewpoints within society on metabolism and its stigmatization. Similarly, a person with a disability suffers from stigmatization as being "less able" than "normal" members of society whereas metabolic syndrome does not receive the same stigma and may be characterized as someone who simply has a medical condition. By labeling someone with either mental disorders or metabolic syndrome as "disabled," society constructs within the individual that they are "not normal" and therefore creates a negative and disillusioned perception of self. Both metabolic syndrome and disability are ways of living in the world, yet how they are biologically characterized or socially perceived determines how a person constructs their sense of identity.

HOW CLINICAL STIGMA AFFECTS RECEIVING CARE

The doctor's office is supposed to be a place free of judgment, where physicians and other healthcare providers solely are concerned about the health and wellbeing of their patients. However, obesity, one of the characteristics and risk factors for metabolic syndrome, is highly stigmatized by the individual, society, and even their physicians. Clinical stigma affects patient perception of medicine, their diagnoses and symptoms, and their treatment and services. One research study diagrams a process flow (see Figure 1) as to how patient obesity and perceptions affect patient outcomes, where patient obesity, provider attitudes, threatening environmental cues, and provider stereotypes all contribute towards patient stress, mistrust, and avoidance of care along with provider biased-decision making that ultimately concludes with negative health outcomes for the patient.

FIGURE 1: CLINICAL STIGMA PROCESS FLOW (PHELAN ET AL., 2015)



Primary care providers and other healthcare professionals unfortunately have both explicit and implicit negative opinions about patients with obesity and therefore metabolic syndrome. These negative attitudes lead to less patient-centered communication, worse care, and a 19% higher rate of patient non-adherence and mistrust (Phelan et al., 2015). Providers will spend less time communicating with obese patients because they feel that they are less likely to adhere to any recommendations they make. Furthermore, providers have reported lower levels of respect for their obese patients, which serves as a predictor for less positive communication between providers and patients. Providers tend to spend less time with their obese patients than those who have evaluated normal weights. Finally, physicians sometimes over-attribute symptoms to obesity, and may recommend their patients to adhere to lifestyle changes rather than recognizing other necessary treatments. In one study, virtual patients with shortness of breath were more likely to receive lifestyle change recommendations if they were obese (54% vs. 13%), and more likely to receive medication to manage symptoms if they were normal weight (23% vs. 5%) (Phelan et al., 2015). While obesity is being used as a proxy for metabolic syndrome in this case, physicians likely misdiagnose and do the same for patients with metabolic syndrome. According to the interview with Dr. Paranal (see page 46), she, along with many other doctors, mostly refer metabolic syndrome patients to lifestyle changes instead of medication. Furthermore, she treats most of her patients by individual symptoms rather than metabolic syndrome as an encapsulating diagnosis, so looking at obesity as a proxy is beneficial because the doctors will do the same and look to treating individual risk factors/symptoms (such as obesity). Negative perceptions by providers that cause stress in patients that lead to discomfort in the doctor's office, distrust of medical systems, and sometimes avoidance of seeking medical help. More importantly, elevated stress is linked to various long-term physiological health effects, including heart disease, stroke, depression and anxiety disorder (Phelan et al, 2015). The level of stress may explain the link between obesity and chronic illness, and it furthermore may explain the links between metabolic syndrome, obesity, cardiovascular diseases, and disability.

How are patients supposed to trust their physicians when they also stigmatize them?

If a doctor's office is supposed to be a place to help and a place with no judgment, then a doctor who stigmatizes their patients is breaking the Physicians' Oath. As doctors place blame on obese patients for their overweight bodies, they likewise may place the blame on their metabolic syndrome patients. While blame and stigma may be either explicit or implicit, physicians also play into stereotypes placed by society about which bodies are "normal" and "not normal." Creating "normalized" and "not normalized" bodies is a barrier to care for many metabolic syndrome patients. Additionally, this leads to a discussion of whether it is the responsibility of the individual to make lifestyle changes or the responsibility of the medical professional to help take care of the patient. While there is some responsibility for the medical professional to help care for patients with obesity and metabolic syndrome, they usually disseminate that care to the individual by blaming them for their conditions. Physicians and medical professionals must ensure that they do not follow societal stigmas about obesity and metabolic syndrome, or else their explicit and implicit perceptions can lead to non-adherence, mistrust, and even worse symptoms due to stress and lack of care.Add a little bit of body text

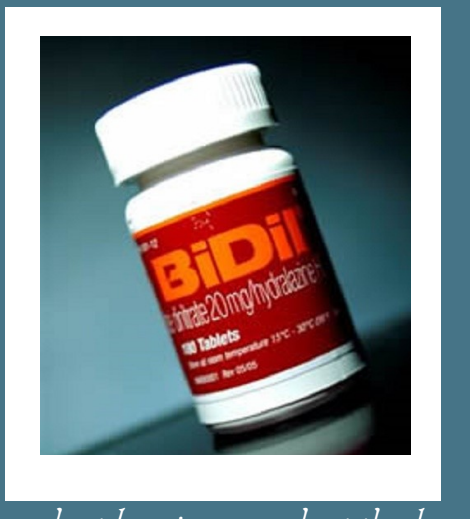
The surgeon Peter Attia demonstrates this medical stigmatization in his TEDMED talk titled "Is the obesity crisis hiding a bigger problem." From a physician perspective, he problematizes the way we think about diabetes and obesity and challenges our conventional wisdom and assumptions within the current medical system. Recounting an interaction with a diabetic patient from early in his career, Peter apologetically expresses his misplaced judgement on her for being obese. She needed to have her foot amputated because she had a diabetic ulcer, yet he treated her with contempt because his misguided assumptions have taught him to believe that this woman had brought this onto herself by eating too much. However, he now acknowledges his wrongful judgment and advises that society should not be blaming the patient. Instead, he suggests that perhaps our healthcare system is at fault. Later in his career, despite vigorous exercise and diet, he developed metabolic syndrome and discovered he was insulin resistant. Because of this eye-opening experience, he now challenges the framework of medicine and his talk raises a call to action for all healthcare and medical providers to reevaluate their assumptions. One such assumption is the pathology of obesity. He hypothesizes that obesity is a coping mechanism for a bigger cellular problem: insulin resistance.

This TED talk problematizes the relation of causality in the case of insulin resistance and obesity. It casts doubts on the cause and effect of obesity. Insulin is necessary for managing how fat is stored and managing blood glucose levels by signaling fat, muscle, and liver cells to take in glucose from the blood for energy usage. When there is insulin resistance, the body doesn't respond to the insulin, which causes an excess amount of glucose in the blood. The cells are no longer able to use glucose for energy, thus the body responds by alternatively storing glucose as fat. So, as he states, "the appropriate response to insulin resistance may actually be to store it as fat." Hence, people are getting fat because of insulin resistance, not the reverse.

Applying this concept of cause and effect, society is encouraged to think differently about the cause and effect of MetS. One way is to examine obesity as a proxy for MetS. Perhaps obesity is just a metabolic response to the more threatening issue of insulin resistance and MetS. Our current beliefs about obesity, insulin resistance, and diabetes may be misguided due to the different opinions by scientific experts on the cause of obesity. Some experts argue obesity is due to too much fat, while others argue it is due to too many calories. It is precedent that we take a multi-disciplinary approach to address insulin resistance. From a nutrition approach, we can attack diet, particularly by eliminating refined grains, sugars, and starches, because these foods trigger the obesity and diabetes epidemic through insulin resistance. On a social level, we must eliminate the stigma surrounding obesity and stop blaming obese and diabetic patients. On a medical level, medical professionals must be open-minded and willing to evolve their old scientific ideas. This leaves the question: If obesity is simply a proxy for metabolic syndrome and insulin resistance, are we fighting the wrong war against obesity? In other words, would changing the terminology from medicalizing 'obesity' to medicalizing 'MetS' (also called Insulin Resistant Syndrome) help in solving the American obesity crisis? Perhaps we must move the responsibility from the individual patient to the broader public by requiring new laws (see below).

HOW STIGMATIZATION OF RACIAL GROUPS AFFECTS TREATMENT

In the article "How is it Not 'Just Like Diabetes:' Mental Disorders and the Moral Psychologist," Nomy Arpaly raises questions of correlating diabetes, whicSociety's stigma towards and perception of metabolic syndrome has implications for its treatment. From the social and political perspectives, it is interesting to analyze the racial pharmacology of metabolic syndrome and how metabolic syndrome is viewed by lay people versus medical professionals or greedy pharmaceutical companies. The "unseen" social and political aspects of metabolic syndrome often manifests itself within vulnerable populations in the U.S., especially black Americans. The disproportionate health disparities, lack of access to appropriate health care, and predisposition to high blood sugar among black Americans further compounds the development of metabolic syndrome. According to Anthony Hatch in his novel Blood Sugar: Racial Pharmacology and Food Justice in Black America, racial pharmacology is "the biomedical study of prescription medications including their effects and how they are metabolized in racially categorized bodies" (Hatch, 2016). This tendency to racially categorize groups of people for prescribing drugs and the ethics of performing clinical trials for drug manufacturing is troubling. For example, the development of a drug called BiDil, used for heart failure and hypertension, was the first FDA drug approved specifically for African Americans. By catering to a specific ethnic group, racial pharmacology reifies racial disparities within medicine and perpetuates misinterpretations that race is purely a scientific and objective category. Pharmaceutical companies capitalize on drugs like BiDil, even though conflicting research has shown that lipid-lowering drugs catered to African Americans are not any more effective at treating heart problems in African Americans than they are effective in European Americans. Hence, the pharmaceutical drugs represent the underlying social and political consequences of racial pharmacology and provide a lens for understanding how metabolic syndrome is both perceived and treated in society (Hatch, 2016).h is a metabolic disorder, with a mental disorder and presents an interesting philosophical perspective. Especially in today's society, it presents bioethical challenges of labels and diagnoses and how biological states or behaviors become socially constructed and vice versa. For the purpose of analogy, it is useful to utilize Arpaly's notion of diabetes as a proxy for understanding metabolic syndrome since diabetes is a metabolic disorder and it is correlated with metabolic syndrome. Also, it is useful to understand mental disorders as an analogy for understanding disability in the context of our research.



If you are curious about learning more about the demographics of metabolic syndrome, see the article entitled "Who is Affected by Metabolic Syndrome?" on page 15.

What is a Disability?

It is clear that metabolic syndrome and obesity are highly stigmatized conditions by the individual, doctors, and society. What, then, goes into the construction of a disability?

According to:

Americans with Disabilities Act (ADA):

> "Disability-a physical or mental impairment that substantially limits one or more major life activities, a record of such an impairment, or being regarded as having such an impairment."

World Health Organization (WHO):

> "Disability has three dimensions:
>
> 1. Impairment in a person's body structure or function, or mental functioning; examples of impairments include loss of a limb, loss of vision or memory loss.
> 2. Activity limitation, such as difficulty seeing, hearing, walking, or problem solving.
> 3. Participation restrictions in normal daily activities, such as working, engaging in social and recreational activities, and obtaining health care and preventive services."

Centers for Disease Control and Prevention (CDC):

> "A disability is any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions)."

AMERICANS WITH DISABILITIES ACT

Not only does the social stigma of disability affect treatment and care for people with disabilities, but it also affects all spheres of daily life. A momentous step towards providing protections and anti-discriminatory laws for people with disabilities was the establishment of the Americans with Disabilities Act.

"The Americans with Disabilities Act (ADA) became law in 1990. The ADA is a civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public. The purpose of the law is to make sure that people with disabilities have the same rights and opportunities as everyone else. The ADA gives civil rights protections to individuals with disabilities similar to those provided to individuals on the basis of race, color, sex, national origin, age, and religion. It guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications. The ADA is divided into five titles (or sections) that relate to different areas of public life" (ADA, 2020).

These five sections list the following:

- Title I (Employment) Equal Employment Opportunity for Individuals with Disabilities
- Title II (State and Local Government) Nondiscrimination on the Basis of Disability in State and Local Government Services
- Title III (Public Accommodations) Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities
- Title IV (Telecommunications)Title V (Miscellaneous Provisions)

The Americans with Disabilities Act Amendments Act (ADAAA) was passed in 2008 and became an effective law in the beginning of 2009. This act redefined and changed the definition of "disability" by expanding the new definition of disability to the first three titles of public life. For the sake of our research, we are particularly interested in the first three sections.

WHAT LEGAL CASES ADDRESS DISABILITY AND PROTECTIONS FOR DISCRIMINATED BODIES?

Certain legal acts and court cases protect obese people from experiencing weight discrimination, which showcases the intersection of metabolic conditions, such as obesity, and disability. In *Cook v. State of RI* of 1993, Bonnie Cook, a 5'2" woman weighing 320 pounds, sued the Department of Mental Health, Retardation, and Hospitals (MHRH) on the grounds that she was denied a job at MHRH due to her morbid obesity. Despite her qualified background and adequate physical exam that rendered her capable of performing the job, MHRH remarked that her morbid obesity impeded her ability to assist patients and her risk of cardiovascular disease would increase worker's compensation claims. Using the "perceived disability theory" under Section 504 of the Rehabilitation Act of 1973, Bonnie defended that regardless of whether or not obesity is considered a disability, the employers perceived her condition to be a physical impairment. Thus, according to her perceived disability, she won the case and was awarded $100,000 along with a guarantee that she would receive the next open job. This court case reveals the employment discrimination and stereotyping of obese people in society. Although there has not been a court case involving metabolic syndrome, it is certainly plausible that metabolic syndrome will eventually be categorized as a perceived disability in terms of affording legal disability benefits and insurance coverage (Cook v. State of RI, 1993).

A second case reviewing disability discrimination and employment was the case *Olmmstead v. L.C.* in Georgia 1999. Jonathan Zimring argued on behalf of two female patients with mental disabilities to challenge Tommy Olmstead, the Commissioner of Georgia's Department of Human Resources, who defended Georgia Regional Hospital's decision to keep these disabled women in psychiatric isolation. Zimring argued that under Title II of the ADA, the women had to be better integrated into the community. This case set the precedent for many others, especially many elderly with disability, in order to better integrate elderly and other disabled individuals better into the community. It had a significant impact on Medicare and Medicaid with an emphasis on long-term care spending and services away from institutions and towards home and community-based services. As metabolic syndrome is a condition that affects many elderly patients and also has implications for disability and elderly rights, this case sets the precedent that ensures that elderly patients are well-integrated and taken care of in society (Olmstead v. L.C., 1999).

The Rehabilitation Act of 1973 law review highlights the controversy over the federal, state, and local laws of employment discrimination as well as the controversy over whether obesity can be defined as a potential disability. Obesity is a disease caused by excessive fatty tissue and it is not a disability by definition. However, it is sometimes characterized as a psychological disorder, a genetic disorder, and a plethora of other medical conditions. Obesity not only negatively affects health, but it also impacts every facet of a person's daily life, including employment, because of the stigma and the social stereotypes of being overweight. Since obese people suffer unemployment and underemployment, they have turned to legal measures to address weight discrimination. Under this act, they are legally protected from weight discrimination on the basis of their "physical or mental impairment." This act provides a pivotal step towards recognizing and addressing how a metabolic condition, like obesity, can be treated as or regarded as a disability (Baker, 1982). Given society's implicit bias against people with disabilities, it is imperative to understand how society perceives metabolic syndrome and acknowledge that people with metabolic syndrome are potential victims of discrimination (Larson, 2008).

METS AS A DISABILITY IS CONTROVERSIAL

As the prevalence of disability and obesity are increasing across the globe, it is prominent that both are serious public health issues. The question of whether obesity is the cause or result of disability is unclear; however, there is a growing amount of research suggesting the undeniable link. For instance, multiple studies suggest that obesity can worsen disabling conditions and vice versa is true: many disabilities can increase the risk of obesity. Such relationships exist between obesity and learning disabilities, mental health, muscular-skeletal disorders, and intellectual disabilities. Given these relationships, obesity can both exacerbate and mediate disability. Because obesity mirrors many health complications that may lead to metabolic syndrome, there is a suggested link between metabolic syndrome and disabling conditions. However, future research is needed to delineate the relationship between metabolic syndrome and learning disabilities. This article aligns well with other articles of our research covering psychopathology and neurology in explaining how the gut communicates with the brain (Ells, 2006).

Despite the associations with MetS and neurological disabilities, the relationship between MetS and physical disability is more contested. In particular, elderly populations are relevant to examine because the disability is more prevalent in these populations. One such study by Botoseneanu examined metabolic dysfunction in elderly populations through a cross-sectional analysis using the LIFE Study (Lifestyle Interventions and Independence for Elders), which included self-rated evaluations. Between the ages of 70 to 89 years old, elders with or without diabetes were examined according to their physical capacity, disability, and self-rated health. Overall, it was found that metabolic syndrome was not a significant contributor to any of these variables despite the fact that geriatric populations are at higher risk of developing mobility disabilities. This contemporary article highlights the ambiguity in research and conflicts in existing literature (Botoseneanu, 2015).

Analyzing comorbidities in patients with multiple sclerosis (MS), current research reveals a rather surprising paradox that conflicts with previous studies concerning the link between MS and increasing prevalence of obesity. It concluded that obesity was actually lower among adults with MS but this did not reflect a similar lower rate in metabolic syndrome. Rather, the prevalence of metabolic syndrome among people with MS reflected the general increase of metabolic syndrome across the general population. In accordance with our research, metabolic syndrome is associated with low-grade inflammation and since multiple sclerosis is a chronic inflammatory disease, a causal link has been suggested between MS and metabolic syndrome. However, the discontinuity among other factors of multiple sclerosis leads to misleading causal associations to metabolic syndrome. The need for more contemporary research in this area of study is crucial for identifying risk factors that may lead to the development of other disabilities as people age (Pinhas-Hamiel, 2015).

CONCLUDING THOUGHTS:

Who is Allowed to Define Themselves as Disabled?

Spanning across multiple disciplines, metabolic syndrome clearly intersects with pathological, medical, biological, social, cultural, and political disciplines. In order to fully understand metabolic syndrome, it is important to consider all of these lenses. By analyzing the stigmatization of metabolic syndrome and "abnormal bodies" within doctor's offices and pharmacology, we examined how metabolic syndrome may be perceived as a disability because it deviates from what is considered to be normal in society. Thus, this stigma affects how people with metabolic syndrome are treated, cared for, and perceived as disabled in the workplace. The labeling and classification of disability has positive and negative sociocultural repercussions, such as legal protections and discrimination. At times, metabolic syndrome and its correlating risk factors such as obesity and diabetes are considered disabilities, and at other times, metabolic syndrome is seen to be heavily correlated with disabilities, such as MS.

In order to further understand the classification of metabolic syndrome as a disability, we spoke to R. Bradley (Brad) Sears in an interview to hear an expert perspective on disability law. Sears is the Associate Dean of Public Interest Law and David Sanders Distinguished Scholar of Law and Policy at UCLA School of Law. He is also a UCLA professor that teaches courses on disability law, U.S. legal and judicial systems, and sexual orientation law. During our phone call interview, we discussed topics on disability law, identity, disability benefits, health care, categorizations and labels of disability, legal protections, deaf culture, and discrimination laws. Drawing upon his extensive research background on gender identity and sexual orientation, he describes disability as another form of identity that has become pathologized and turned it into a medical problem. The disability community is faced with weighing the tradeoffs of having a diagnostic label. On one hand, having a label provides legal protections under anti-discrimination laws and benefits associated with having a disability. On the other hand, having a diagnostic label may conflict with the disability community's sense of pride and identity because it pathologizes disability into something that is seen as an abnormal medical condition. For instance, people within Deaf culture are a group that completely rejects the label of disability because they view deafness as a normal way of living in the world. Along with movements made by the Americans with Disabilities Act, he describes the need to shift the focus away from unhelpful language and labeling in which a person has to reach a certain bar or criteria to receive protection. Instead, the focus should be on protecting people with various disabilities and health conditions without tying benefits to a diagnostic label of disability. Lastly, he points out that unlike health care in other developed nations, the U.S. places more significance on the category of disability. Thus, this categorization is reflected in the laws and policies that provide a social safety net.

This legal background gives context to analyze how disability is categorized in policy and law and how those classifications affect a person's construction of their social and cultural identity. The origins of the definition of disability are rooted in the inability to work. Thus, the safety net in the U.S. related to health care is tied to disability status for receiving health benefits or monetary support. So, understanding the ways in which metabolic syndrome should or should not be considered to be a disability is rooted in the idea of "normal" functioning and participation in society. It raises the question: Who is deserving of receiving disability protections under the law? If metabolic syndrome renders an individual unable to participate in the labor force, it may be reasonable that the individual is deserving of the label "disability" under protection of the law.

To read more from this interview, refer to the Interview with Brad Sears on page 64!

For instance, disability from a legal point of view might give you access to specific entitlements, related to health management, that should render you able to participate in the labor force despite your medical condition. It is not always the case that being disabled disqualifies you from participating, but quite the opposite. Once granted this personhood, bureaucratic and legal institutions have to activate to grant you with particular types of 'rights.' For example, MetS students at UCLA should be granted through the Office for Student with Disabilities with special dietary foods and extra time for assignments if proven this disability causes cognitive impairment, for example. Recognizing that people with disabilities have normal, yet not normative, ways of inhabiting the world requires that bureaucratic procedure and norms adapt to contemplate this difference.

Yet, policies and laws that normalize disability within and across institutions also produce specific types of identities that are often contested by the community of affected. As Dr. Sears explains:

> "while claiming to have a disability or a condition like gender dysphoria offers legal protections under the anti-discrimination laws and maybe benefits under social safety net or medical benefits, it also pathologizes the condition and turns it into a medical problem, as opposed to kind of an identity and a matter of kind of self identity above anything else. It obviously, also transfers powers of who gets to impose a label from the individual to the medical community."

In other words, as the philosopher Ian Hacking explains, institutions make up “disabled people” by creating categories for disability, which then affect how a person develops a sense of personhood and identity as someone that has a disability. This identity then manifests how they see themself and how they experience the world. Thus, this is a looping effect.

Metabolic syndrome as a disability in a sociocultural context complicates what is seen as a medicalized condition versus claiming a disability identity in a sense of cultural pride. *Should a person with metabolic syndrome have the ability to deploy the disability category when it’s useful to them, such as anti-discrimination protection in the workplace, and to disown the disability label when it’s not beneficial for constructing their identity?* According to R. Bradley Sears, any individual should be able to employ the label of “disability” when it is beneficial to them and their identity, but it is up to the individual (more specifically, the metabolic syndrome-affected individual) to decide for themselves.

DISABILITY LAW PERSPECTIVE

AN INTERVIEW WITH BRAD SEARS
BY SARAH HOLLOWAY AND ALYSSA BESSER

We are very grateful to have had the chance to speak to R. Bradley (Brad) Sears to hear an expert perspective on disability law. Sears is the Associate Dean of Public Interest Law and David Sanders Distinguished Scholar of Law and Policy at UCLA School of Law. He is also a professor that teaches courses on disability law, U.S. legal and judicial systems, and sexual orientation law. Our conversation will help frame some of our questions about labeling metabolic syndrome as a disability and what rights metabolic syndrome patients deserve.

From a disability law standpoint, what are the diagnostic labels and categories for disability? How do they affect a person's construction of their identity?

For any group of people, it's a complicated decision whether or not to take on the classification of being disabled or being a person with a disability, even if they have the autonomy to make that decision. I think disability primarily started as a classification based on policy and law. But, it obviously is an identity now, both a social and cultural identity. I think some great examples of this have been, for example, the transgender community's complicated relationship with a disability identity.

While claiming to have a disability or a condition like gender dysphoria offers legal protections under the anti-discrimination laws and maybe benefits under social safety net or medical benefits, it also pathologizes the condition and turns it into a medical problem, as opposed to a matter of self identity above anything else. It also transfers powers of who gets to impose a label from the individual to the medical community. So I think that's just one kind of recent example of the group that's really had to weigh the trade-offs between the legal protections and benefits, and then what it means in terms of an individual identity and a social movement.

Do you think that obesity, which is a risk factor for metabolic syndrome, should be categorized as a disability?

Yeah, I don't have an easy answer to that. And I think part of the answer is: should there be one answer in all contexts? So I think the trade-offs are similar. And there's kind of an intra-community split as well. It's a trade-off between access to protections under disability discrimination law and receiving the benefits that are tied to having a disability versus claiming an identity and pride in that identity, not as something that is seen as abnormal or a medical condition. I also think it's particularly fair for people in marginalized positions to make opportunistic decisions to deploy the disability category when it's useful to them and to disown when it's not. So I think taking those practical, in-context strategies is perfectly legitimate.

Certain disabled people are more greatly disenfranchised with more commonplace diagnostic labels of disability, such as Down Syndrome or autism. How does using the term "disability" more liberally affect them and their labeling? What implications does this have for laws and policy? And how do those create obstacles or barriers?

I think Deaf culture is a good example. Some of the Deaf community rejects the label of disability and the idea that deafness is anything but a normal part of variations, yet they want to preserve Deaf culture. Some individuals even have children who are deaf. That's more of a complete disavow of the disability framework. I think your question is pointed toward: *Is this terminology to disability unhelpful in itself? Should we be looking for something else that isn't as stigmatizing, or is it kind of a universal term that defines an individual's way of being?*

In the most recent Americans with Disabilities Act, along with some other movements, there have been attempts to move away from this language but still recognize the need to protect people with a range of health conditions that need accommodations and no barriers to care. Something similar to the Family Medical Leave Act, which is written in terms of health conditions, temporary or not, moves away from this idea of an identity that is protected. Everyone has certain capacities and limitations on capacity and everyone needs certain protections, either all the time, or sometimes it is a part of human variation as opposed to an entire identity.

What disability benefits or health care/insurance benefits do you think people with metabolic issues (like obesity or diabetes) should be granted, if anything?

At the heart of this is how we think about a safety net in this country. It all starts with health care. Health care is granted if you earn it through participating in the labor force or if not, if you are part of the deserving poor, and if you are very young, very old, or have a disability. In every other developing country, health care is not tied to work or being a deserving category, it is universally available to everyone. That seems like a better way for the population. Part of the issue here is: *Why is disability status the hook for receiving either health benefits or income support/monetary contributions instead of them being universally provided?*

We place more significance on the category. The law also places more significance on the category because the U.S. is an outlier to other developed nations in how we provide a social safety net.

What are some laws and policies that are currently in place?

For medical benefit, there are Medicaid, Medicare, and equivalents in each state. There are triggers for people who are disabled by the definitions of those programs, which tend to be focused on the inability to work to provide the benefit. Social Security is granted depending on how many years (or quarters of years) ago work provided a monthly income. This is again tied to definitions of disability that are really about the inability to work. The legal protections provided by the Americans with Disability Act in state and local equivalents are broader. They cover more people because they are designed to also allow people to continue to work and access different services in the public and private sector. They also provide protections from discrimination and rights to accommodation and accessibility in public spaces.

Do you believe that the wording of laws and policies perpetuate the terminology of "disability?"

Yes, I think that's the origin of a lot of these laws. The definition of disability really comes from benefits for people who are unable to work.

For further thoughts and analysis on this interview, please flip to page 61 for the article "Concluding Thoughts: Who is Allowed to Define Themselves as Disabled?"

AT THE BORDER:

Protect Pregnant Migrant Mothers and Their Offspring

OLIVIA SCHULIST | MARCH 2020

The thrifty phenotype hypothesis postulates that key elements of an individual's metabolism are established during critical periods of life in an evolutionary attempt to prepare bodies for their future environments. Stress during in utero and early postpartum development, especially during the second trimester of pregnancy, increases offspring risk for chronic diseases like cardiovascular disease and diabetes, which are the first and seventh most common causes of death in the United States, respectively. Stress can take many forms, including maternal psychological distress and malnutrition. Immigrant pregnant mothers held in detainment centers at the United States border may be uniquely susceptible to psychological and physiological distress. Because lifetime epigenetic determinants of health and disease can be transferred from parent to offspring intergenerationally, the lack of social support and poor nutrition inflicted upon these mothers may yield adverse epigenetic fetal programming with effects lasting centuries, if not longer.

Fetal programming is the process by which the expression of an individual's genes is modified to reflect environmental demands. These "epigenetic" modifications include histone modifications, DNA demethylation and DNA acetylation; each process can yield long-lasting changes in protein synthesis and function throughout the body. Alterations to metabolic set points are adaptive when the in utero environment prefaces the the types and magnitudes of stressors that a given developing infant will encounter over their lifetime. In contrast, a mismatch occurs when the expression of an individual is optimized in early life for an environment unlike that in which the individual will eventually reside. For instance, maternal undernutrition epigenetically programs offspring propensity for metabolic pathways typifying pre-diabetes and heart disease when affected offspring eventually reside in calorically-dense environments. Calorie and protein restriction during the perinatal period is correlated with altered methylation of the promoters of POMC, glucocorticoid, angiotensin receptor, leptin, FTO, MC4R, PPARα, PPARγ genes. These epigenetic modifications alter the roles of adiponectin, insulin, and leptin molecules in the body, consequently altering the size and density of neurons in hypothalamic regions of the brain. Hypothalamic alterations affect energy balance systems by reducing leptin and insulin signalling. Tissue and organ functions then shift to accommodate slowed growth. Peripheral nervous system innervations to adipose and gut tissues program the body to accumulate energy in states of nutritional excess. Because patterns of histone modification, DNA methylation, and DNA acetylation patterns can be transferred intergenerationally, various types of stressors during pregnancy can have lifelong effects in a woman's immediate offspring and subsequent lineage.

In 2017, federal officials annulled an Obama administration order favoring the release of expectant mothers from migrant detainment centers. The annulment is a cruel facet of a host of policy efforts aiming to deter migrants from the United States border. While officials assure that (a) pregnant women are not generally detained, especially during the third trimester of pregnancy, unless they pose a flight risk or threat to the community, and that (b) health services are provided to pregnant women that must be detained, pregnant women and their offspring remain inadequately protected by current detainment center directives. Rates of miscarriage among detained pregnant women doubled over the last decade, and the numbers of pregnant women forced to cope with prolonged exposure to stressful detainment conditions continues to rise. Arrest and deportation counts increased with detainment duration between 2015 and 2018. In 2016, the United States detained 1380 pregnant women, of which 92 were held for longer than 15 days. Following 2017 Immigrations and Customs Enforcement annulment of what the director Thomas Homan called "the presumption for the release for all pregnant detainees," the number of pregnant women detained in the United States rose to 2098 in 2018 and the number of pregnant women detained over 15 days rose to 615.

Advocacy groups like the Women's Refugee Commission continue to fight for more respectful treatment of pregnant migrant women and their offspring, who are subjected to infections, stress, miscarriages, and chronic disease risk within today's detainment centers. The $12.5 million annual budget that is depleted by some centers five months prior to the end of the fiscal year cannot lawfully be supplemented by donations. Crowded centers are lacking not only in space but also food, sanitation, and healthcare resources.

According to the World Health Organization, overcrowding is a major contributor to disease transmission according to the World Health Organization; it can also increase pathological and interpersonal stressors. 54,000, 20,000, and 11,000 individuals have been held in the custody of United States Immigrations and Customs Enforcement, Customs and Border Protection, and Health and Human Services. In July of 2019, The Guardian reported that some "adults were held in standing room only conditions for a week," and that some "adults were held more than a month in overcrowded cells." The Guardian also shared Image 1 (reproduced above), which depicts the overcrowded conditions of a border patrol facility in Weslaco, Texas in July of 2019. In the same month, USA Today quoted

Image 1: An overcrowded border patrol facility in Weslaco, Texas published by The Guardian in July 2019.

Image 2: Federal detention facilities in Rio Grande Valley taken in July 2019.

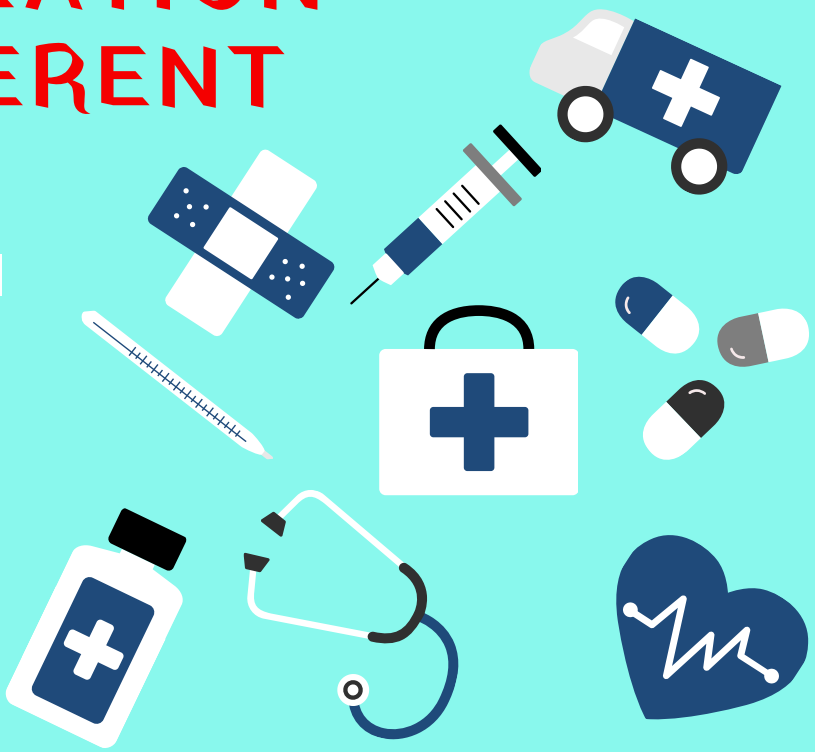
Jennifer Costello: "We are concerned that overcrowding and prolonged detention represent an immediate risk to the health and safety of Department of Homeland Security agents and officers, and to those detained." Overcrowded conditions amplify the effects of the many challenges faced by detained migrants. Detainees are given three meals and several snacks a day, yet meals are calorically inadequate and imbalanced and stored outside of detainee cells. Detainees have reported being served food that is spoiled and that violates their religious beliefs. Babies have been fed with unwashed bottles. The sanitation conditions that the United States provides detainees are no more chivalrous. Fewer bathrooms, showers, laundry facilities, and clean clothes are provided than can accommodate all detainees; children are afforded priority utilization of these limited facilities. Detainees are not provided soap, toothpaste, or diapers.

Given the poor nutrition and sanitation conditions of the United States' distressing and overcrowded detainment centers, it is unsurprising that disease outbreaks in these detainment centers are common. Flu, scabies, chicken pox, lice, measles, and mumps outbreaks have been exacerbated by poor sleeping conditions (ex: sleeping on Mylar blankets on concrete) and scanty healthcare provisions. Detainees have been denied vital medications and medical screenings. As a result, the adverse environmental cues presented to fetuses and infants developing in detainment centers signal nutritional scarcity and pathogenicity, prompt the establishment of homeostatic mechanisms favoring food storage and immune system activation, and place detainees and their offspring at risk for developing obesity, diabetes, heart disease, asthma, and allergies upon entry into nutrient-rich, sanitized conditions later in life.

As Americans, we are responsible for the stressors placed on pregnant migrant women detained in United States border patrol facilities. So too are we responsible for the effects inflicted on their offspring and subsequent descendants. Americans must prioritize bettering conditions within border patrol facilities, especially for pregnant mothers.

BIOMEDICALIZATION ACROSS DIFFERENT CULTURES

By: Sarah Holloway



Across cultures, metabolic conditions are seen at a global scale, and it is interesting to note how metabolism is biomedicalized and politicized in America versus other cultures or countries like Japan. For example, the type 2 diabetes rate in Japan is similar to the US but the biomedicalization of diabetes is approached differently between these 2 distinct healthcare systems. In the book, Biomedicalization and the Practice of Culture: Globalization and Type 2 Diabetes in the United States and Japan, it provides an intersectional understanding of medicine, health and society by examining the diabetes epidemic through a comparative analysis of the United States and Japan, both of which are developed countries experiencing a skyrocket in diabetes rates. Advocating that medicine is a social science, it analyzes the distinctive practices of medicine and strategies for clinical management of diabetes between American and Japanese culture by studying the social, political, ethical, and economic frameworks that influence the ever-increasing biomedicalization and globalization of diabetes. In regards to biomedicalization, the author notes:

"Over the course of the twentieth century, a host of experiences and problems came under the purview of American medicine, including childbirth, alcohol and drug dependence, chronic unhappiness, childhood behavioral problems, sexual difficulties, and obesity. Many of these were previously framed as personal problems, or as moral and social problems managed by other social institutions such as church, the family, or even the justice system. Here, too, Japan proves to be one of the most medicalized societies in the world: alcoholism, menopause, and senility all shifted from being thought of as social problems or social transformations to issues within the purview of medicine over the course of the twentieth century." (Armstrong-Hough, 2018).

In addition to the biomedicalization of diabetes in the US and Japan, politicizing of the human body and its metabolic processes has become a fixation of the political sphere. For instance, in both American and Japanese cultures, "there is evidence of an intensifying prerogative for 'controlling, managing, engineering, reshaping, modulating' humans' vital capacities: what Nikolas Rose calls 'the politics of life itself'" (Armstrong-Hough, 2018, p. 9). In some respects, politicizing the human body can be harmful and perpetuate stigma, such as the case of the antihypertensive drug BiDil. This politicization of diabetic bodies demonstrates a social construction of racial difference that is mapped onto American Americans who have diabetes.* In other respects, politicization and medicalization of metabolism can actually reduce stigma. Similar to diabetes, medicalization of metabolic syndrome demonstrates the variability in how metabolic syndrome is perceived across cultures. Moreover, medicalization of metabolic syndrome has helped to reduce, but not eliminate, its stigma by shifting the responsibility from personal problems to problems under the purview of the medical system. Thus, changing the framework of responsibility through medicalization and biomedicalization can help to mitigate social stigma of metabolic syndrome and its related medical conditions (Armstrong-Hough, 2018).

*See *How Stigmatization of Racial Groups Affects Treatment* to read more about politicizing metabolic syndrome.

CULTURAL REPRESENTATION AND THE ARTS

REVIEWS BY SARAH HOLLOWAY

The number of people with IDD (Intellectual and Developmental Disability) is continuing to grow and representation in the media is becoming more widely seen. Hence, how society understands and perceives disability is vital for people with disabilities and their construction of personhood, identity, and acceptance within society. For example, autism has become more widely familiarized in TV shows, such as The Good Doctor. Whether it's on the big screen or at an art museum, one can see artistic representation of bodies with the risk factors for metabolic syndrome and contrast "healthy" versus "unhealthy" bodies across cultures. Here are a couple reviews that discuss cultural representation in the arts:

Take a Stroll ~IN A MUSEUM~

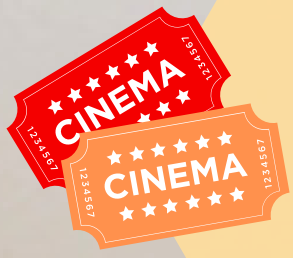
During an exploration of the Through Positive Eyes art exhibit at the Fowler Museum at UCLA, I was struck by the raw emotion elicited from the photographs and artistic videos that showcased the HIV/AIDS epidemic and the individual stories of those who are currently living with this chronic illness. In the documentary videos, the HIV positive individuals spoke up about their distinct perspectives, often recounting the intense shame they felt from not only society but also their own family members. This epidemic is global, yet it has been so stigmatized that its prevalence may often go unnoticed because society outcasts those who are HIV positive.

Embodying the common theme of stigma, this exhibit showcases how a person's condition affects their social acceptance, their sense of belonging in the world, and their construction of identity. Stigma surrounding diseases, disorders, illnesses, and other health conditions impacts every facet of a person's daily life and further compounds their adverse health outcomes. In the United States, 1.2 million people are living with HIV whereas South Africa has the percentage of people affected, reaching 8.2% of the population. Not everyone has access to proper medicine to treat it and the global epidemic is largely variable by cultures across the globe. As the exhibit noted, "AIDS is not someone else's problem." It is the "collective problem" of everyone to help stop this epidemic by eradicating irrational stigmas surrounding AIDS.

As it relates to metabolic syndrome, the book Combat Syndrome X, Y and Z... discussed metabolic syndrome as a "silent killer" by comparing it to HIV/AIDS. Although it is less well known than the HIV/AIDS epidemic, the metabolic syndrome epidemic "carries similar threats, in terms of disability and risk of death, as does an initial diagnosis of many forms of cancer, HIV and other chronic killer diseases" (Holt, 2002). Parallel to HIV/AIDS, metabolic syndrome can incubate for a similar time frame of 10 years before serious medical consequences occur. While metabolic syndrome is equally as life-threatening in severe cases, metabolic syndrome does not hold the same amount of weight as HIV in terms of discrimination and social stratification. Perhaps it doesn't receive the same amount of stigma in American culture because the risk factors of metabolic syndrome, such as obesity, have become so common that it's normalized.

Moreover, there is an interesting dichotomy that differs between HIV/AIDS and MetS. For HIV, it is not usually physically "seen" in society, yet the stigma is more stratifying than metabolic syndrome. In contrast, the physical portrayal of having metabolic syndrome is more "seen" through being overweight or obese, yet it does not provoke as much public revulsion as HIV/AIDS. In addition, the notion of "being seen" is a double edged sword. On one hand, it is important that a person is recognized as having a medical problem that needs to be treated for the sake of their health. On the other hand, it is equally important that people struggling with either HIV/AIDS or metabolic syndrome are not outcasted for being diseased. After leaving the exhibit, I was left contemplating this question: what distinguishes "healthy bodies" and how can we reduce stigma and better understand the epidemic of metabolic syndrome?

Grab your popcorn! ~ON THE BIG SCREEN~



In the film Extraordinary Measures, it highlights the tension between scientists and lay people and who should or shouldn't have the authority over medical bodies. Based on a true story about a family with two children with a metabolic disorder and a stubborn father determined to find a cure, this film portrays an emotional story about their unique struggles to live a normal life despite being hooked up to breathing tubes and confined to wheelchairs. This film does an excellent job of showcasing how medical research conflicts with scientific developments and how it can both perpetuate and hinder progress. In relation to metabolic syndrome, this movie helps to illuminate how metabolic disorder (different that metabolic syndrome) affects home life as well as to discuss the controversy of responsibility for the health of the individual. Should the health of an individual with metabolic syndrome be the responsibility of the researchers/scientists or the individual who has metabolic syndrome? (CBS Films, 2010).

METS: THE SILENT KILLER

OP-ED BY SARAH HOLLOWAY

Abstract: This opinion editorial will serve as a contemporary analysis regarding the obesity epidemic in America as a prominent public health issue. It provides a snapshot from a layperson perspective on how metabolic syndrome not only affects the individual, but societal and institutional public health at large.

Metabolic syndrome is the silent killer of the 21st century. It afflicts 75 million people in the United States and increases the risk of developing cardiovascular disease, type 2 diabetes, coronary heart disease, and stroke (Crichton, 2015). Despite its skyrocketing rate in the U.S., metabolic syndrome is rather unbeknownst to the public due to its lag in onset and ambiguity in diagnosis.

Metabolic syndrome (MetS) is a collection of cardiometabolic risk factors, including obesity, high blood pressure, high triglyceride level, and low HDL cholesterol (Taubus, 2017).

Compounded by the escalating obesity rates and high consumption of sugar in the U.S., this public health crisis may even replace smoking as the leading cause of ischemic heart disease (Taubus, 2017). Through policy changes advocating for heart-healthy lifestyle changes and implementing dietary interventions, it is imperative to educate the public about MetS and reduce America's excessive sugar intake to eradicate the MetS epidemic.

MetS robs the health of millions and the ever-increasing obesity rate in the United States perpetuates this health crisis. Abdominal obesity as a prominent risk factor for MetS is diagnosed as having a "waist circumference ≥ 88 cm for women or 102 cm for men" (Crichton, 2015). According to the Center for Disease Control and Prevention, the prevalence of obesity in American adults was 39.8% in 2016 and its rates continue to increase yearly (Hales, 2017).

The prevalence of risk factors like obesity highlights the complacency of Americans to overlook MetS and its life-threatening consequences because its symptoms, such as hypertension and hyperglycemia, are perceived as "normal" in today's society (Holt, 2002).

One step towards conquering the MetS epidemic is changing the Westernized diet, particularly by mitigating the excessive sugar intake of Americans. Sugar consumption can serve as a proxy for the development of MetS because evidence suggests that sugar is a dietary trigger of MetS (Taubes, 2017).

In a fast food consuming nation, sugar is a significant ingredient that pervades nearly every food and beverage of the typical American diet. For instance, soft drinks, which contain about eight teaspoons of sugar, are the leading cause of added sugar intake in Americans (Johnson, 2009).

In fact, the recommended sugar intake according to the American Heart Association is no more than six teaspoons for women and nine teaspoons for men, yet the average American consumes 22.2 teaspoons of added sugar each day (Johnson, 2009). Growing evidence supports that increased consumption of added sugar, notably studied in the form of soft drinks, parallels obesity rates, which contribute to the impaired "glycemic control and abnormal lipid profiles characteristic of metabolic syndrome" (Narain, 2017).

People may argue that MetS is irreversible or even inevitable in our fast food nation. In fact, its incubation period of MetS manifests over a period of ten years before serious health consequences occur (Holt, 2002). Thus, critics speculate that once a person realizes that they have MetS, it is often too late to reverse the symptoms or make any significant changes in health outcomes.

However, studies have shown that the reduction of sugar consumption, heart-healthy lifestyle changes, and nutritional programs, such as the Pritikin Program, can actually reverse MetS (Roberts, 2006).

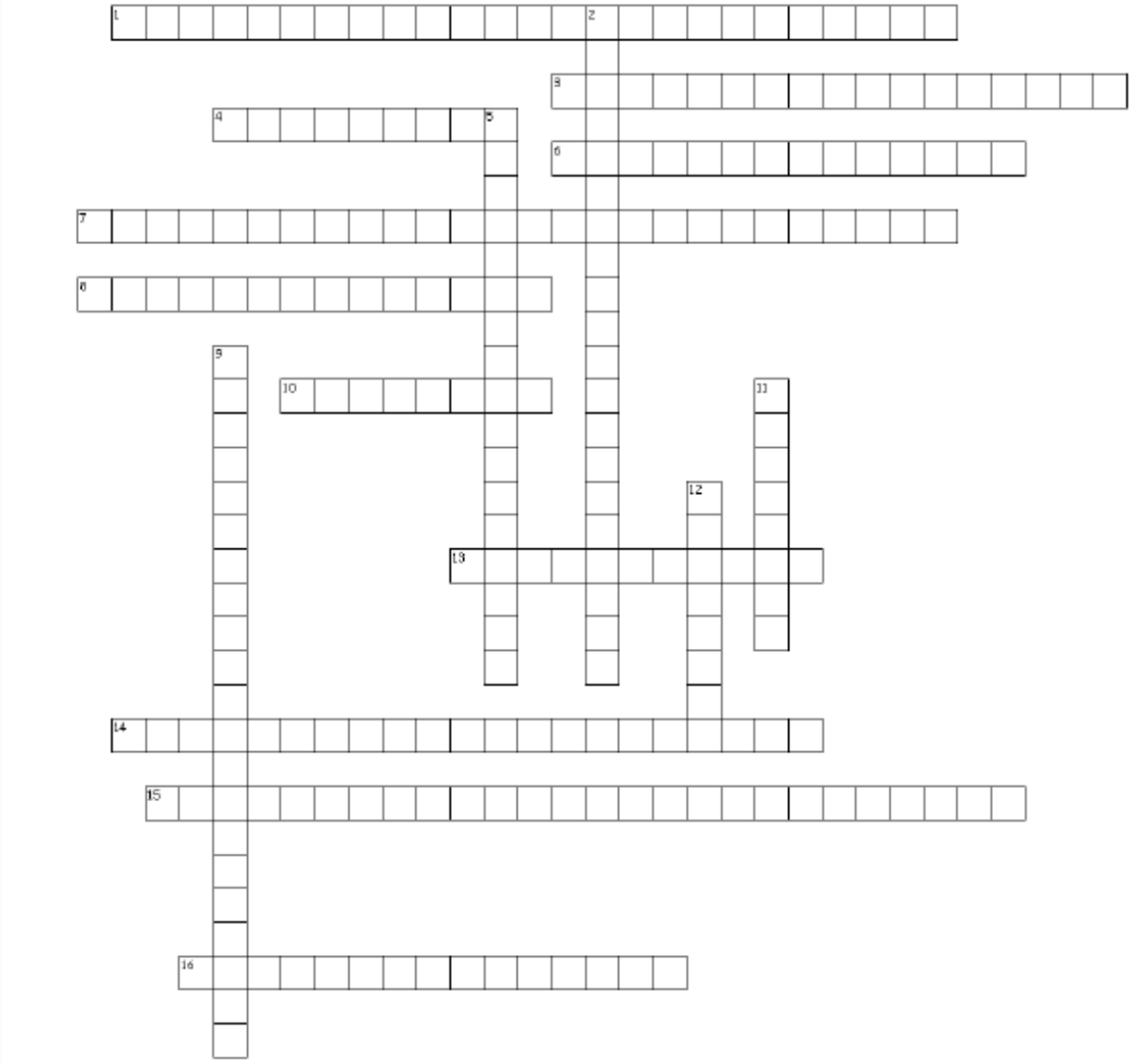
Along with excessive sugar consumption, metabolic syndrome is an epidemic that silently attacks the health of Americans and must be acknowledged as a major public health concern in order to stimulate political action for its treatment and prevention.

Because obesity and other risk factors are so common in today's society, the lack of public concern for MetS produces medical inertia, or the unwillingness of medical and healthcare institutions to act on the problem.

At the public health level, not only does MetS linked to excessive sugar pose health concerns for the individual, but also it poses financial concerns regarding healthcare costs for treating MetS.

To address the MetS epidemic, it is imperative to fund research for prevention and treatment of MetS, prioritize nutritional programs that reduce sugar consumption and educate the public about MetS, implement dietary interventions such as the Medical Nutrition and Equity Act 2019, and enact policies for medical establishments to accommodate the growing healthcare needs of this epidemic (McGovern, 2019). Ultimately, these policy changes will improve the socioeconomic burdens and health of the 75 million people and counting who are suffering from MetS.

Crossword



Across

1. Genes promoting insulin resistance increased in frequency over the course of human evolution because their energy-maximizing properties conferred competitive advantage in nutrient-deficient environments

3. "The ever-intensifying social process by which medicine and the medical paradigm become gradually more relevant to laypeople's daily lives" (Armstrong-Hough, 2018, p. 9).

4. Valuation of lifestyle choices promoting longevity and preventing chronic disease

6. A critical stage of development extending from gestation to several weeks postpartum.

7. Preemptive epigenetic modifications of one's biology to maximize survival in a future environment

8. Problematization of a biological condition; it can be measured by "the degree to which previously non medical issues and problems are reframed as within the purview of modern medicine" (Armstrong-Hough, 2018, p. 21)

10. Incompatibility of predictive adaptation and environment

13. Disease prevention

14. Describes societal belonging, protection, and obligation on the basis of biological condition

15. In utero homeostatic alterations evolved to optimize the use of reduced nutrient supply in adverse environments

16. Framing of a condition as a disease criterion

Down

2. 20th-century shift in disease mortality causation from infectious to chronic

5. A cluster of genetic abnormalities affiliated with 2-fold risk of cardiovascular disease or and a 5-fold risk of diabetes

9. The leading cause of death of Americans

11. Homeostatic norm of metabolism

12. Inability to effectively use insulin


Thank
you for
reading!

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