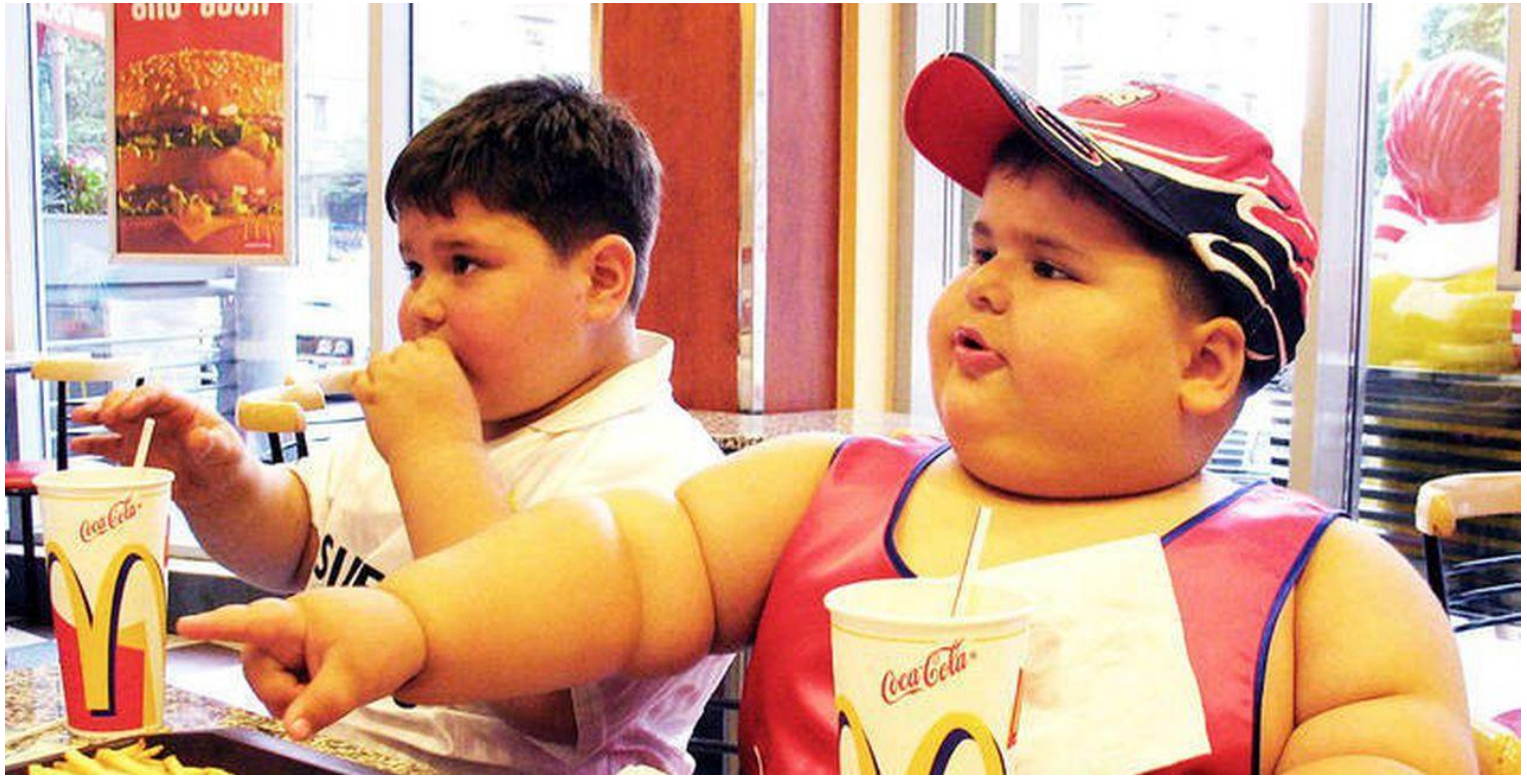
Childhood Obesity :

How to approach this insidious epidemic through osteopathic and lifestyle medicine



Presented by:

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MOA

October 2025

HELLO

My name is

CHRISTINA LUCAS-VOUGIOUKLAKIS
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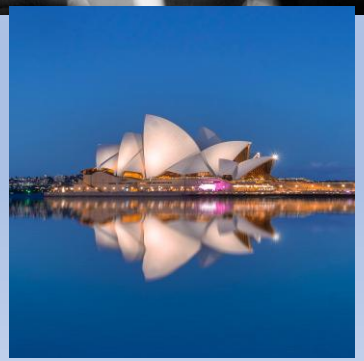


LECOM
LAKE ERIE COLLEGE OF OSTEOPATHIC MEDICINE

DISCLAIMER and DISCLOSURES

I have no personal or professional disclosures (Other than my daughter Nina loves donuts after church!)

OBJECTIVES TODAY:

Definition of childhood obesity

Sobering statistics on childhood obesity

Symptoms and sequelae of childhood obesity

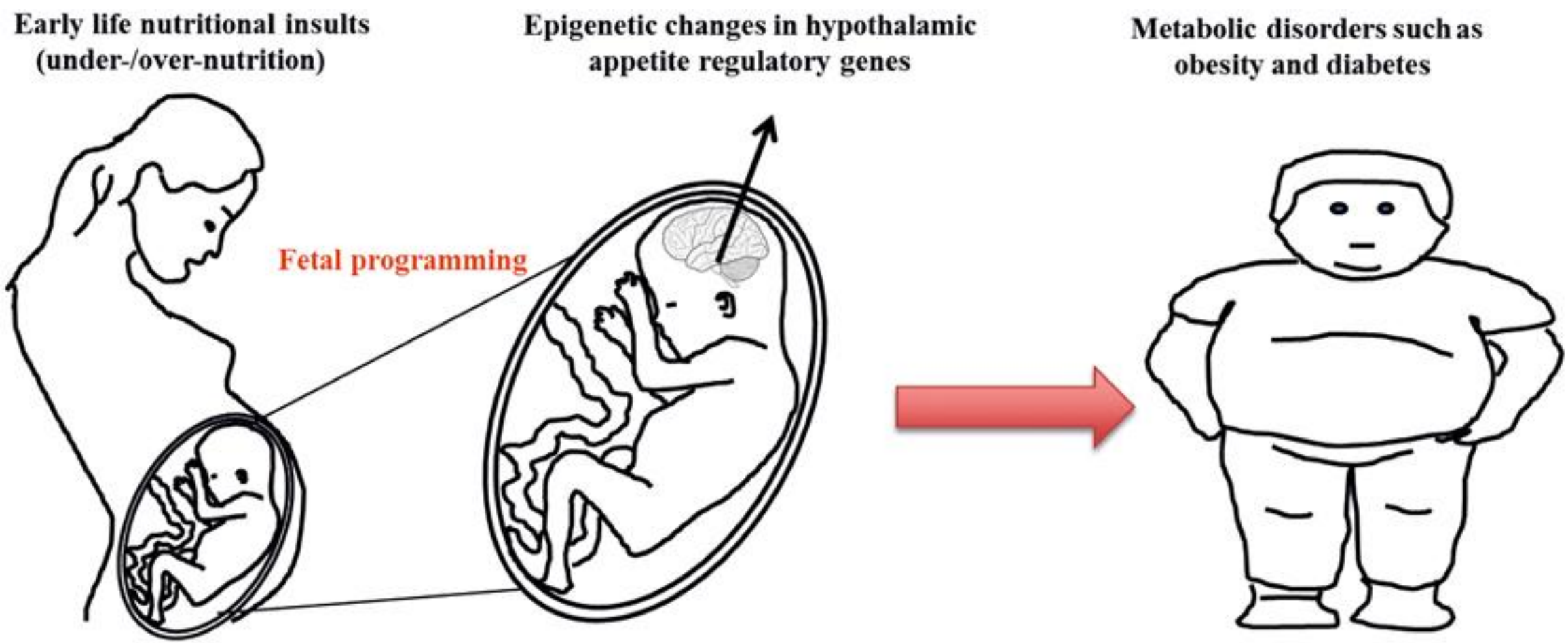
How does mental health, food, sleep, exercise, meditation, social connections and stress reduction influence their health?

How can Lifestyle and Osteopathic medicine help optimize health and wellbeing in our children and beyond?

To understand wellness, we have to understand the underlying cause of disease

Hippocrates was the first to regard disease as a natural, rather than a supernatural phenomenon. He encouraged looking at the empiric/root cause and studying how illness arises through observation and critical deductive reasoning – rather than “supernatural” causes – epilepsy caused by the gods being angry - as some priests believed

It starts in the Womb



EATING SAFELY DURING PREGNANCY

ENJOY:

VEGETABLES

Carrots
Cooked greens
Pumpkin
Spinach
Sweet potatoes
Red sweet peppers

Benefits: Vitamin A & Potassium

FRUITS

Apricots
Bananas
Cantaloupe
Grapefruit
Honeydew
Mangoes
Oranges
Prunes
Tomatoes

Benefits: Potassium

DAIRY

Skim or 1% milk
Soymilk
Fat-free or low-fat yogurt

Benefits: Calcium, Potassium, Vitamin A & Vitamin D

GRAINS

Ready-to-eat cereal
Cooked cereal

Benefits: Iron & Folic Acid

PROTEINS

Beans and peas
Lean beef
Lamb and pork
Nuts and seeds
Poultry
Salmon, trout, herring, sardines and pollock

Benefits: Amino Acid

AVOID:

Foods to eat during Pregnancy:

- Vegetables: carrots, sweet potatoes, pumpkin, spinach, cooked greens, tomatoes and red sweet peppers (for vitamin A and potassium)
- Fruits: cantaloupe, honeydew, mangoes, prunes, bananas, apricots, oranges, and red or pink grapefruit (for potassium)
- Dairy: fat-free or low-fat yogurt, skim or 1% milk, soy milk (for calcium, potassium, vitamins A and D)
- Grains: ready-to-eat cereals/cooked cereals (for iron and folic acid)
- Proteins: beans and peas; nuts and seeds; lean beef, lamb and pork; salmon, trout, herring, sardines and pollock
- Optimal weight in pregnancy decreases risks of complications and sequelae during labor and delivery and decreases risk of obesity and sequelae in children. Average weight women should gain 25-35 pounds, overweight women 15-25, underweight women up to 40 pounds www.marchofdimes.org
- www.hopkinsmedicine,com Nutrition During Pregnancy | Johns Hopkins Medicine

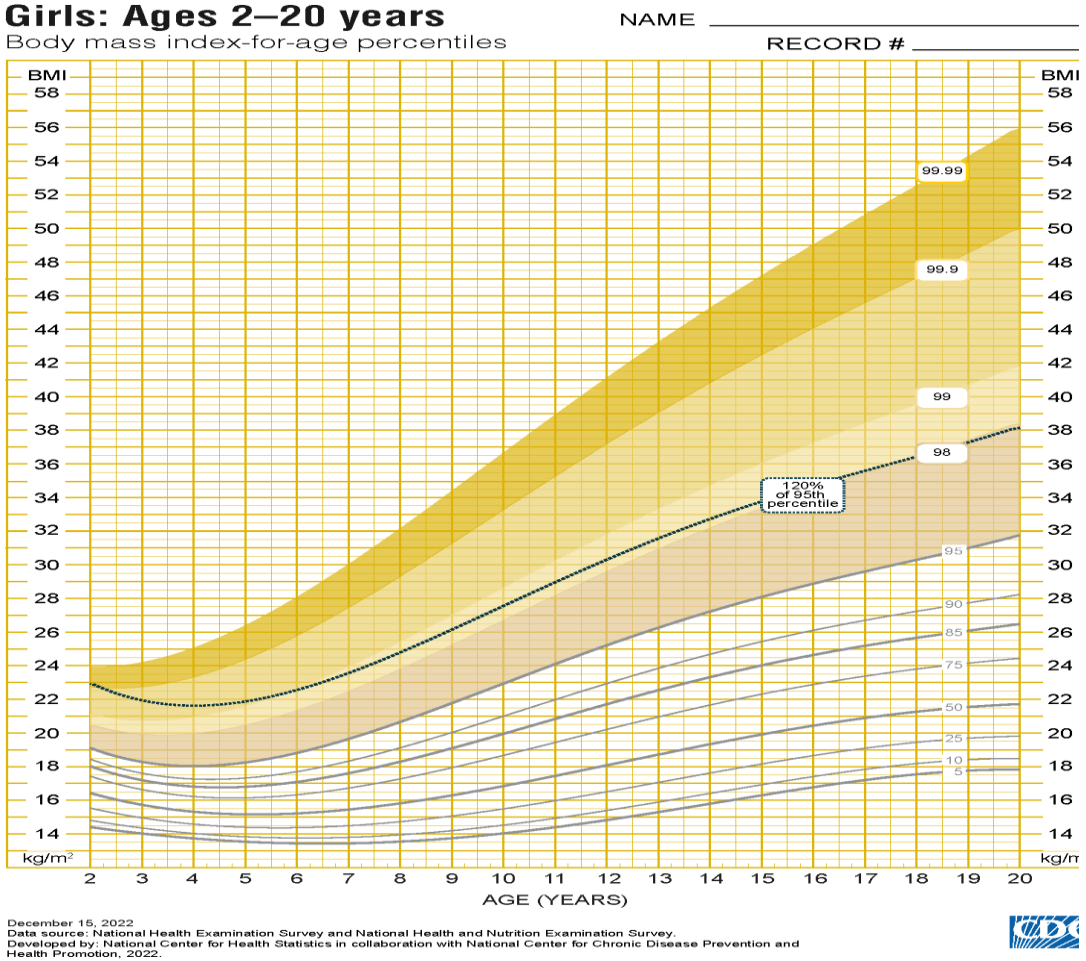
The baby is here! Now what?

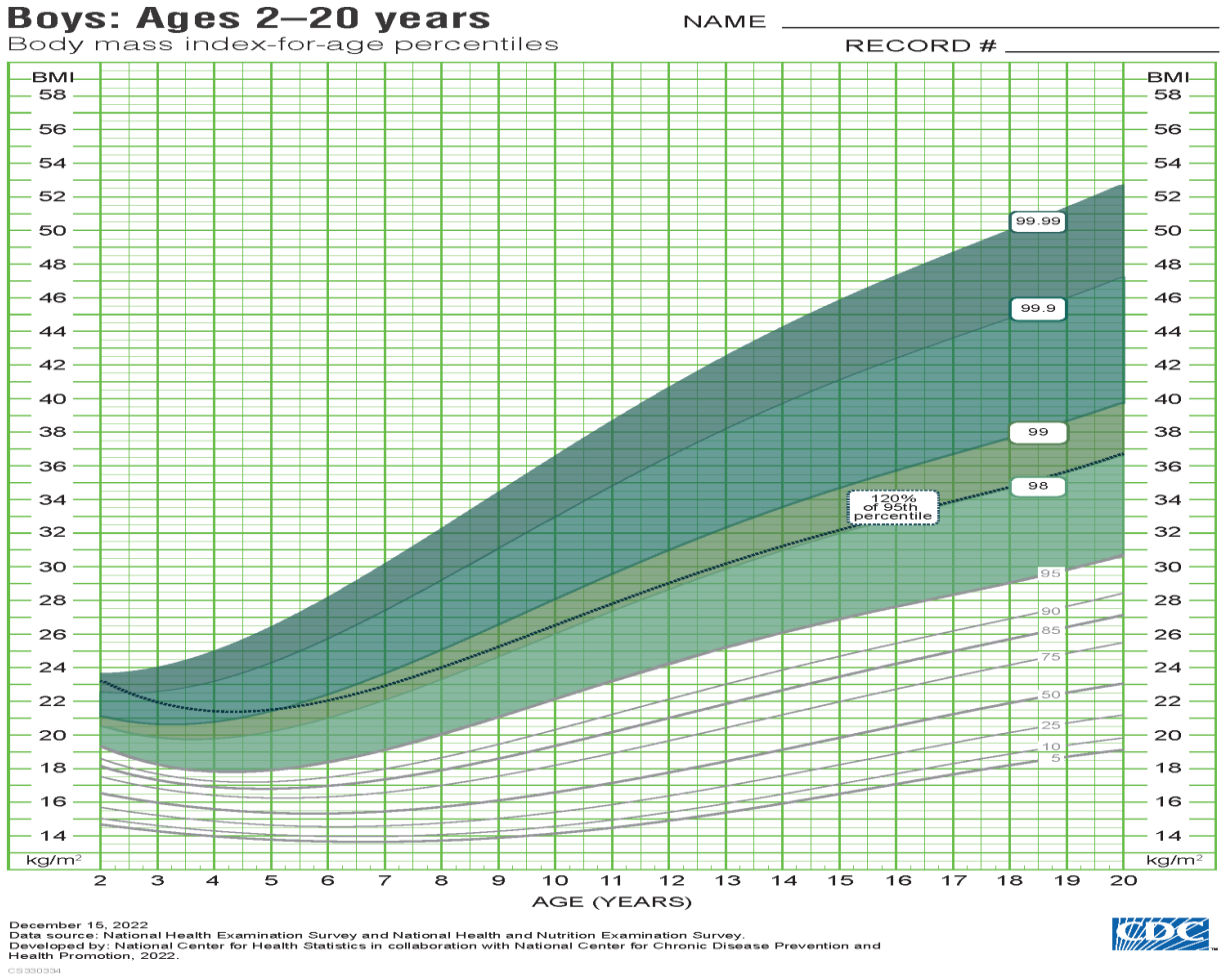
Factors contributing to obesity:

- Breast v bottle
- Feeding habits
- Jar food v homemade baby food
- Sleep habits
- Stress in the home (Happy mom/happy baby)
- Stroller/time outdoors
- Siblings/stimulation/social

Let's Grow! How big is TOO big?

- The definition of childhood obesity is generally noted as a BMI > 95% - seen at well child visits – healthcare providers evaluate the child's height and weight based on age-related graphs (growth chart)





They Grow Up So Fast! - The history of the growth chart

- **Definition of the Body Mass Index (BMI) growth chart** - consists of a series of percentile curves that illustrate the distribution of selected body measurements (weight and height) in U.S. children and in adults

- **First use**: 1977. The 1977 growth charts were developed by the National Center for Health Statistics (NCHS) as a clinical tool for health professionals to determine if the growth of a child is adequate. The 1977 charts were also adopted by the World Health Organization for international use.

- **BMI-for-age charts** - created for use in place of the 1977 weight-for-stature charts. BMI (wt/ht2) is calculated from weight and height measurements and is used to judge whether an individual's weight is appropriate for their height.

- **Revisions recommended –** When the 1977 NCHS growth charts were first developed, NCHS recommended that they be revised periodically as necessary. With more recent and comprehensive national data now available, along with improved statistical procedures, the 1977 growth charts were revised and updated to make them a more valuable clinical tool for health professionals.

- **The 2000 CDC growth charts** - represent the revised version of the 1977 NCHS growth charts. Most of the data used to construct these charts come from the National Health and Nutrition Examination Survey (NHANES), which has periodically collected height and weight and other health information on the American population since the early 1960's.
- **Intent – For measurement and monitoring -** Growth charts are **not** intended to be used as a sole diagnostic instrument. Instead, growth charts are tools that contribute to forming an overall clinical impression for the child being measured. The revised growth charts provide an improved tool for evaluating the growth of children in clinical and research settings.
- **Most recent revision -** December 2022 - the CDC revised the growth chart to include BMI up to 60

- Growth Charts - Background (cdc.gov)

Sobering Statistics on Childhood Obesity Worldwide

- 39 million children under the age of 5 were overweight or obese (2020)
- 20% of children and adolescents are overweight in the US (WHO)
- Globally, 1/3 of the population is overweight or obese, and almost 400 million (and rising) of those are children (WHO)
- **Highest Rate US:** West Virginia 40.6% , Mississippi 25% Louisiana 23.1% Alabama 22.8% Arkansas 22.7%
- **Lowest Rate US** Montana 10.2% Colorado 10.8% Wyominh 11.5% Utah 12.0%
- The Pacific Island states of Nauru and Palau (>30%), Tonga and Samoa, the US and Micronesia are > 20%
- Cyprus, Greece, Malta, Spain, and Italy are experiencing the *fastest* rate of increased overweight and obese children in Europe
- The countries with some of the LOWEST rate of childhood obesity are – Finland, Denmark, Norway, Latvia
- According to a 2025 WorldAtlas study Vietnam has the lowest rate of obesity overall at 2.1%
- **It is not uncommon to find under-nutrition and obesity existing side by side within the same country, the same community or even within the same household in these settings.**

us states highest rate childhood obesity – Search www.stateofchildhoodobesity.org

#	Country	Income group	% obesity
1	Niue		38.62
2	Cook Islands		37.46
3	Nauru	High income	33.36
4	Tonga	Upper-middle income	32.58
5	Tokelau		32.31
6	Tuvalu	Upper-middle income	29.87
7	American Samoa	High income	29.08
8	Palau	High income	27.94
9	Chile	High income	27.38
10	Bahamas	High income	27.31
11	French Polynesia	High income	26.46
12	Qatar	High income	26.30
13	Antigua and Barbuda	High income	24.67
14	Samoa	Upper-middle income	23.79
15	Barbados	High income	23.15

Some statistics of the top 15 countries with the highest percentage of childhood obesity and comparison to income group

RANKING (% OBESITY BY COUNTRY) | WORLD OBESITY FEDERATION GLOBAL OBESITY OBSERVATORY

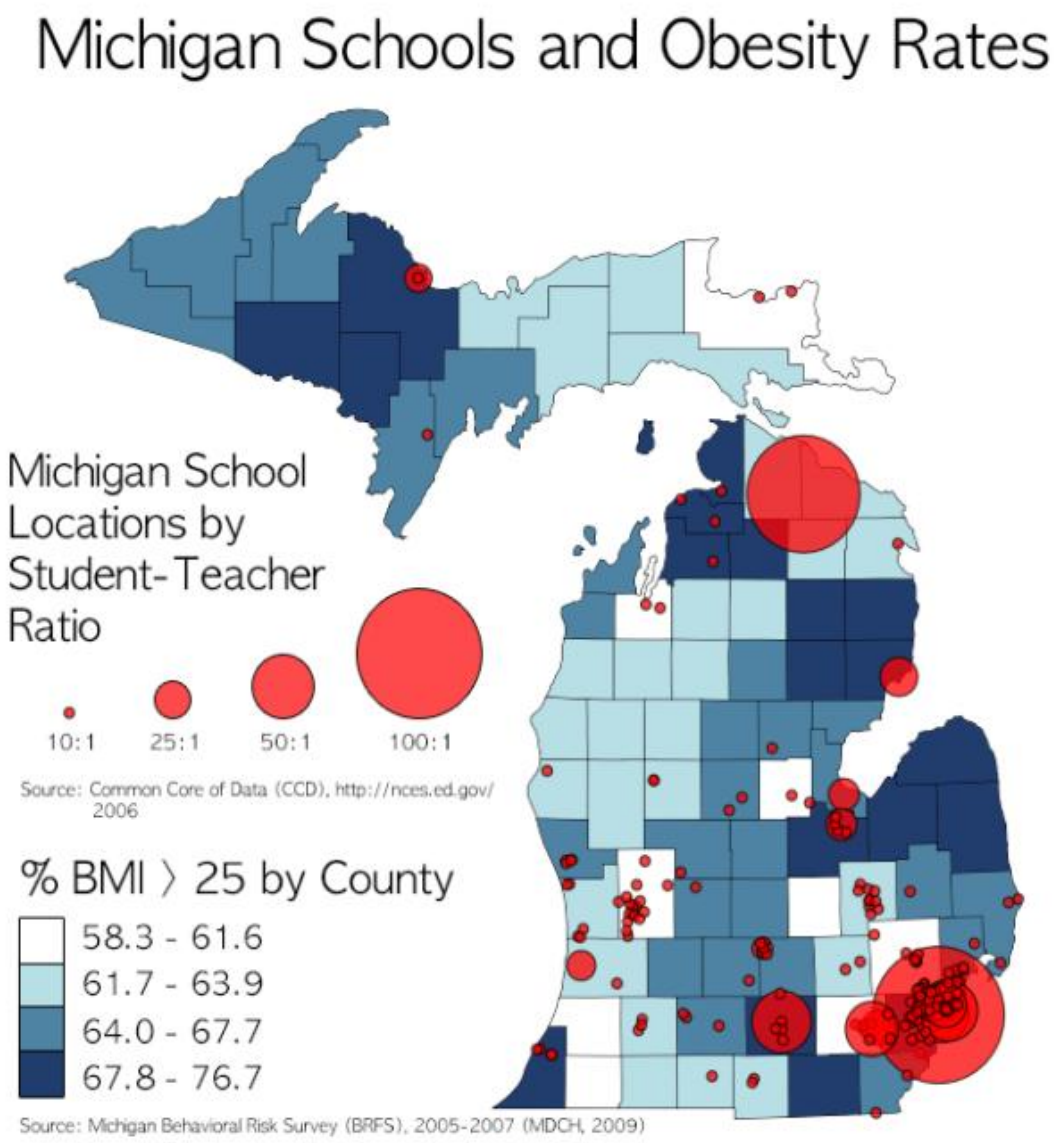
Sobering Statistics on Childhood Obesity in the US

- **Childhood obesity is a significant health issue affecting approximately 1 in 5 children in the U.S., leading to various health risks and requiring comprehensive prevention strategies.**
- **Prevalence and Demographics**
- About **19.7%** of U.S. children and adolescents aged 2 to 19 years are classified as obese, which translates to approximately **14.7 million** youths.
- The prevalence varies by age group: **12.7%** among children aged 2-5, **20.7%** among those aged 6-11, and **22.2%** among adolescents aged 12-19.
- Health care for obesity is expensive for patients and the health care system. In 2019 dollars, the estimated annual medical cost of obesity among U.S. children was $1.3 billion.
- Medical costs for children with obesity were $116 higher per person per year than for children with healthy weight. Medical costs for children with severe obesity were $310 higher per person per year than for children with healthy weight.
- **Affected Groups**: Obesity rates are notably higher among certain demographics, including **Hispanic children (26.2%)** and **non-Hispanic Black children (24.8%)**. Additionally, children from lower-income families are at a greater risk.

- Childhood Obesity Facts | Obesity | CDC
- Childhood obesity - Symptoms and causes - Mayo Clinic

How are we doing in Michigan?

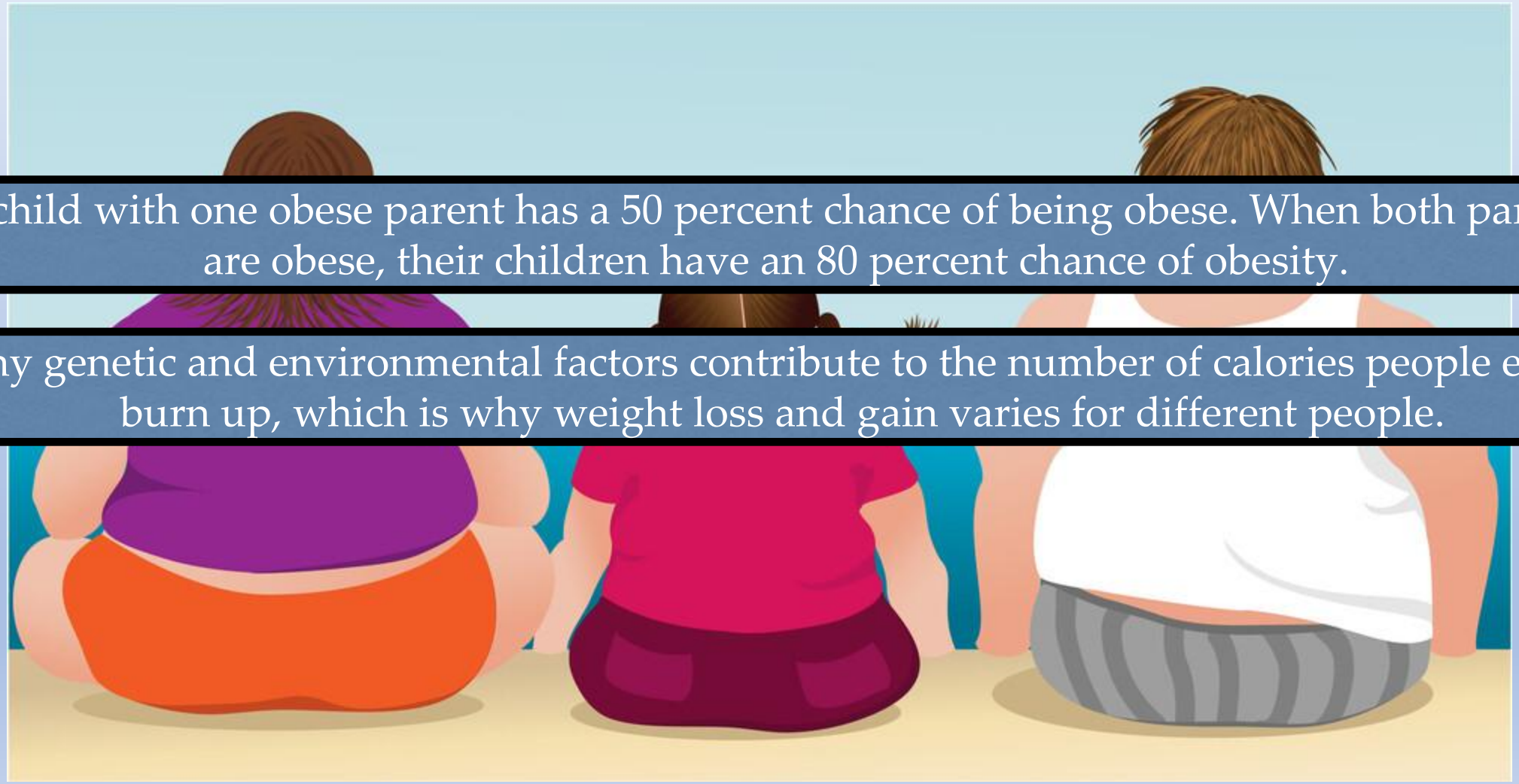
- **Michigan**
- In Michigan, 19.1% of youth ages 10 to 17 have obesity, giving Michigan a ranking of 38 among the 50 states and D.C. This page includes Michigan data in four areas: the latest data on obesity, diabetes, and hypertension; how federal nutrition policies impact Michigan; health behaviors and outcomes among high school students; and policies enacted by Michigan to support health and prevent obesity.
- State Data - State of Childhood Obesity



Factors contributing to weight gain in kids

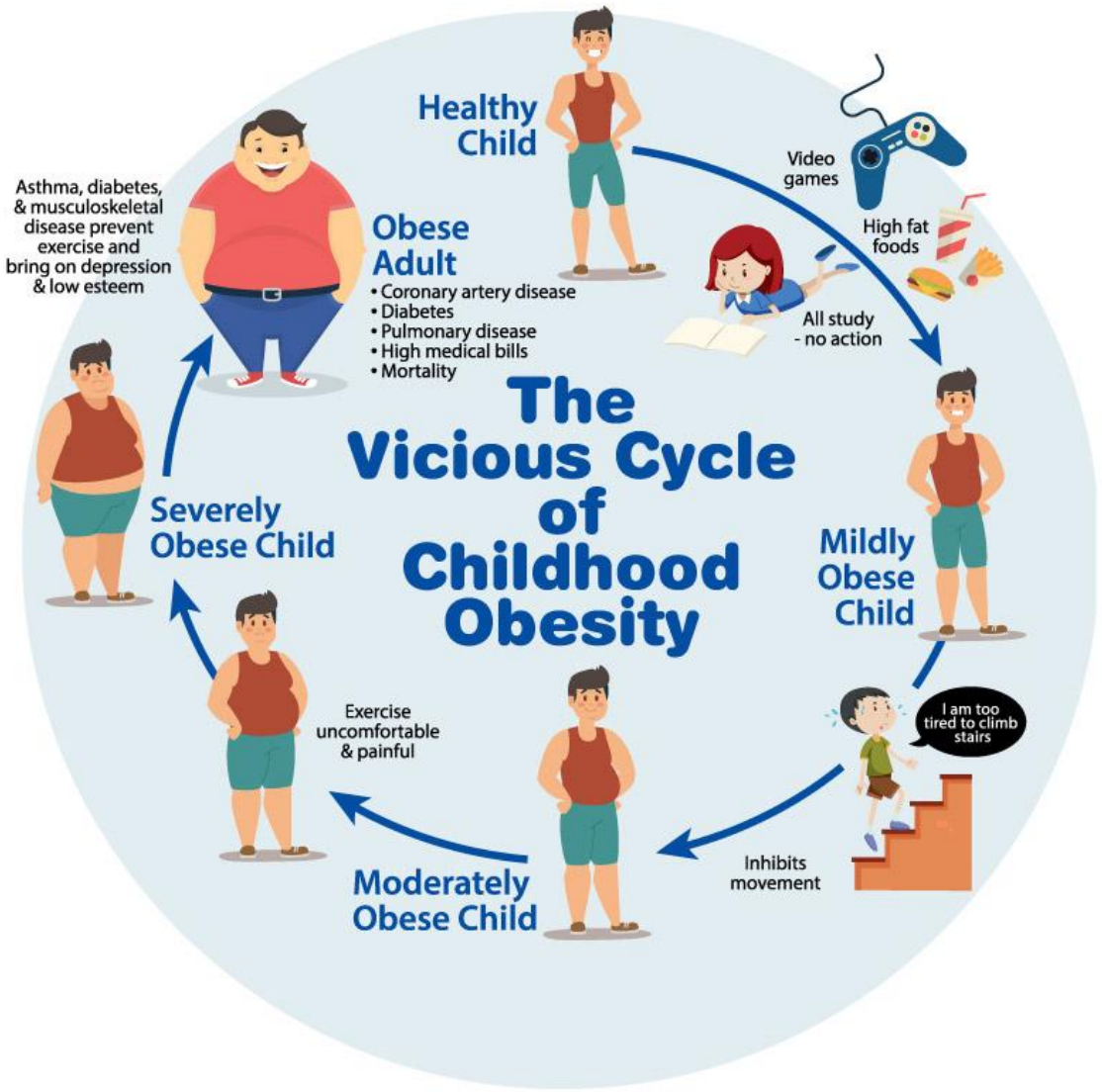
- Poor sleep
- Lack of movement/exercise (Covid – gaming)
- Poor nutrition (the “unhappy” meal)
- Stress
- Genetics and epigenetics
- Metabolic disorders
- Depression/anxiety
- Socioeconomic : Education on nutrition/access to healthy food/cost

Childhood Obesity and Genetics



A child with one obese parent has a 50 percent chance of being obese. When both parents are obese, their children have an 80 percent chance of obesity.

Many genetic and environmental factors contribute to the number of calories people eat and burn up, which is why weight loss and gain varies for different people.



Disease Sequelae related to Childhood obesity

- Chronic fatigue
- Diabetes
- Cardiovascular disease
- Depression
- Sleep Apnea
- Arthritis
- Acne/Hormone imbalance
- Decreased longevity
- Depression and anxiety

Eating Behaviors & Development

- Weight: A Sensitive Topic
- We come in all shapes and sizes
- What, when, and how much to eat is learned through direct experiences with food & observation of others.
- Survival, attachment, comfort, sensation, control influence are associated with food
- Evolving Habits (automatic) & Choices (conscious decisions) shape our eating
- Play is key to movement and motor skills development

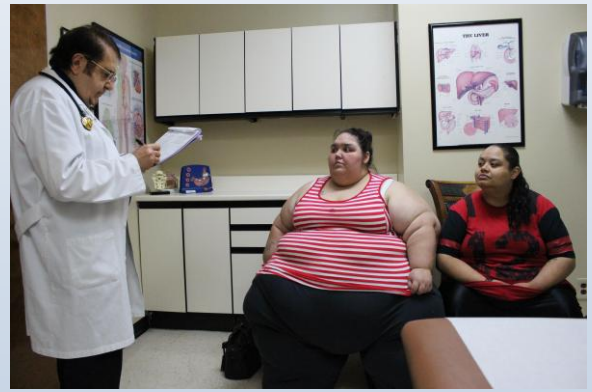
Eating Behaviors & neuro-psychological and GI effects

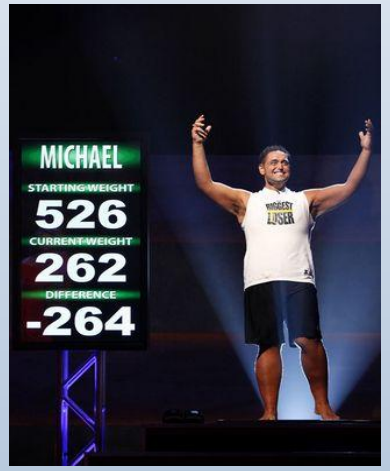
- Depression Anxiety Isolation affect serotonin levels
- Malnutrition – unhealthy gut microbiome
- Addiction -Sugar v cocaine "The Bliss Point" Howard Moskowitz 1970s Mathematician
- Social Stigma / Bullying
- Low Self Worth / Negative Body Image
- Lifelong battle with weight
- Chemical imbalances
- Brain Development
- Fecal transplant studies in Mice at NIH to improve obesity with a healthy diet

Adverse effects of Obesity on Mental Health

- Food is to tied to emotions and emotions are tied to food → dependence
- Turning to food for comfort when faced with social stigma, poor self & body image, poor relationship with self and others lead to increased stress → unresolved anger and frustration
- Social isolation, risks of depression, suicide, aggravation and psychosis

Obesity and TV/Social Media





So, What's the solution Doc?

How do we encourage our kids to find balance, self regulate, and optimize their chances for good health and a positive well-being?

Lifestyle Medicine!

- Definition : The application of Medical, behavioral, motivation and environmental principles to manage lifestyle-related health problems.

Self Care and self management are important elements of Lifestyle Medicine

Hippocrates - "let food be Thy medicine, and medicine be Thy food"

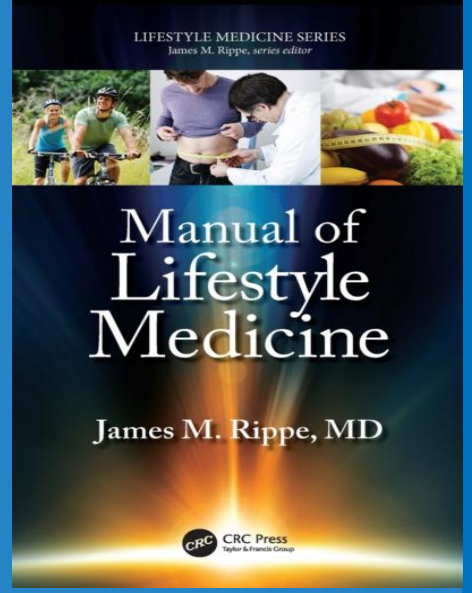
Thomas Edison " the doctor of the future will give no medicine but will interest his patients in the care of the human frame, in diet, and in the cause and prevention of disease"

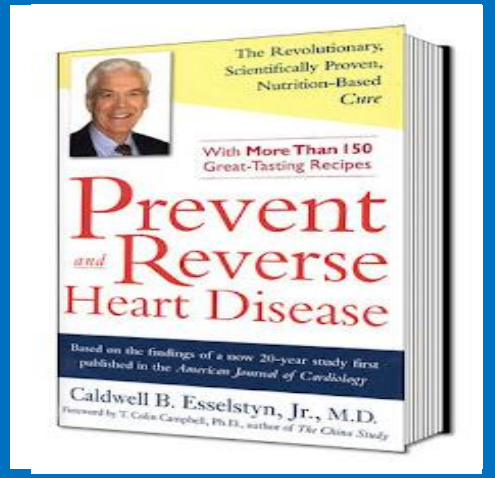
Dean Ornish - preventative medicine research center (1980's) the lifestyle heart trial showed regression of cardiac stenosis at 1 year through a low-fat vegetarian diet, stress management exercise, smoking cessation, and small group positive psychology and connectedness –

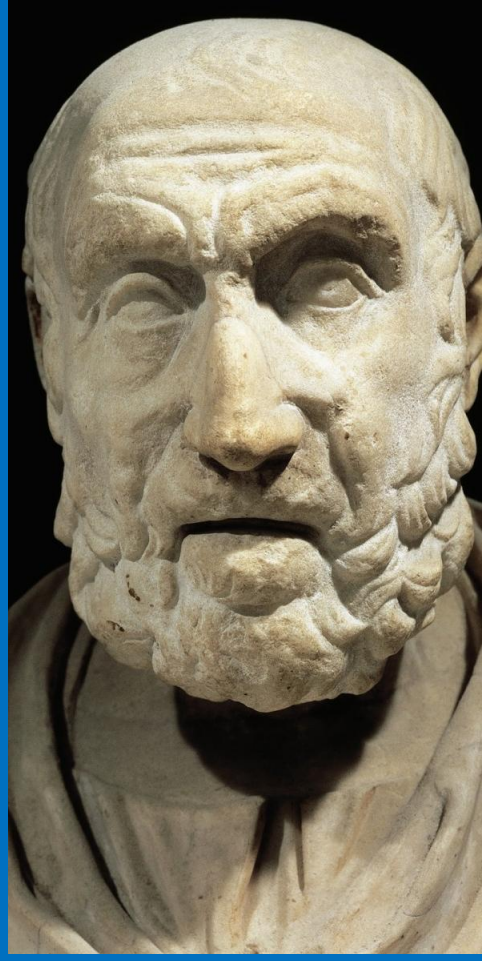
Caldwell Esselstyn – Cleveland clinic 1990's – developed a 20-year longitudinal study about arresting and reversing heart disease in critically ill patients

James Rippe – wrote the first comprehensive medical text focused on Lifestyle medicine (1990s)

ACLM – American college of lifestyle medicine – founded in 2004 by Dr John Kelly/Loma Linda University







LIFESTYLE MEDICINE

6 WAYS TO TAKE CONTROL OF YOUR HEALTH

Lifestyle medicine is an evidence-based approach to treating and reversing disease by replacing unhealthy behaviors with positive ones.

www.lifestylemedicine.org

1 NUTRITION
Food is Medicine. Choose predominantly whole, plant-based foods that are rich in fiber and nutrient dense. Vegetables, fruit, beans, lentils, whole grains, nuts and seeds.

2 EXERCISE
Regular and consistent physical activity that can be maintained on a daily basis throughout life - walking, gardening, push ups and lunges - is an essential piece of the optimal health equation.

3 STRESS
Stress can lead to improved health and productivity - or it can lead to anxiety, depression, obesity, immune dysfunction and more. Helping patients recognize negative stress responses, identify coping mechanisms and reduction techniques leads to improved wellbeing.

4 SUBSTANCE ABUSE
The well-documented dangers of any addictive substance use can increase risk for many cancers and heart disease. Positive behaviors that improve health include cessation of tobacco use and limiting the intake of alcohol.

5 SLEEP
Lack of, or poor quality sleep can lead to a strained immune system. Identify dietary, environmental, and coping behaviors to improve sleep health.

6 RELATIONSHIPS
Social connectedness is essential to emotional resiliency. Studies show that isolation is associated with increased mortality. Considering a patients home and community environment improves overall health.

AMERICAN COLLEGE OF Lifestyle Medicine

6 pillars of lifestyle medicine

EXERCISE

- PHYSICAL INACTIVITY IS THE FOURTH LEADING RISK FACTOR FOR GLOBAL MORTALITY. LONGEVITY IS DIRECTED CORRELATED TO PHYSICAL ACTIVITY
- *PHYSICAL ACTIVITY* – ANY MOVEMENT OF THE BODY DONE THROUGH SKELETAL MUSCLE CONTRACTION THAT CAUSES THE ENERGY EXPENDITURE TO BE BEYOND ITS BASELINE
- *EXERCISE* – PURPOSEFUL PHYSICAL ACTIVITY THAT IS ORGANIZED, PLANNED AND REOCCURRING AND THAT IS DONE WITH THE INTENT OF IMPROVING OR MAINTAINING ONE OR MORE COMPONENTS OF ONE'S HEALTH
- *FITNESS* – ***THE ABILITY TO PERFORM ONE'S ACTIVITIES OF DAILY LIFE, RESPOND TO EMERGENCIES AND ENJOY LEISURE TIME ACTIVITIES WITH SUFFICIENT ENERGY AND VITALITY AND WITHOUT EXCESS FATIGUE***
- 220-AGE = MAXIMAL HEART RATE / FAT BURNING ZONE IS 80% OF THIS

EXAMPLE: AGE 50 FEMALE MAX HEART RATE IS 170. 80% OF THIS IS 140-150S FOR IDEAL FAT BURNING ZONE

2018 PHYSICAL ACTIVITY GUIDELINES – AEROBIC EXERCISE, STRETCH TRAINING AND RESISTANCE, FLEXIBILITY EXERCISE, BALANCE/NEUROMOTOR EXERCISE

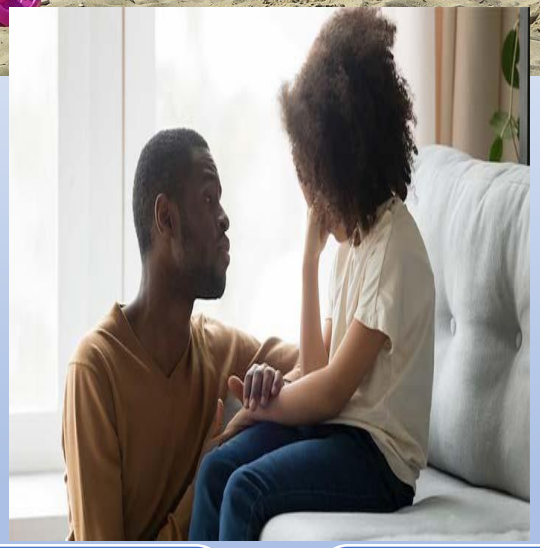
NUTRITION

- DIET'S DON'T WORK – LIFELONG CHANGES DO!
- HOW DO WE DEFINE "GOOD FOR YOU?"
- PROCESSED FOODS/HIGH SUGAR/RED DYE #40
- 3500KCAL = 1 POUND OF FAT
- READING A LABEL – SHOULD BE TAUGHT IN SCHOOLS
- FRENCH ETIQUETTE CLASSES ON EATING LUNCH AT SCHOOL
- WESTERN DIET AKA "SAD DIET"

Sleep

- - Sleep and school performance are positively linked
- - Sleep and mood are positively linked
- - sleep routines are critical for physical and mental recovery
- - Kids age 1-2 years need 11-14 hours, kids 3-5 years 10-13 hours, age 6-12 need 9-12 hours, and age 13-18 need 8-10 hours
- - optimal bedtime surroundings (no electronics/blue light before bed)
- - meditation, soft music, a snuggle can assuage anxiety before bed

STRESS REDUCTION – favorite quotes



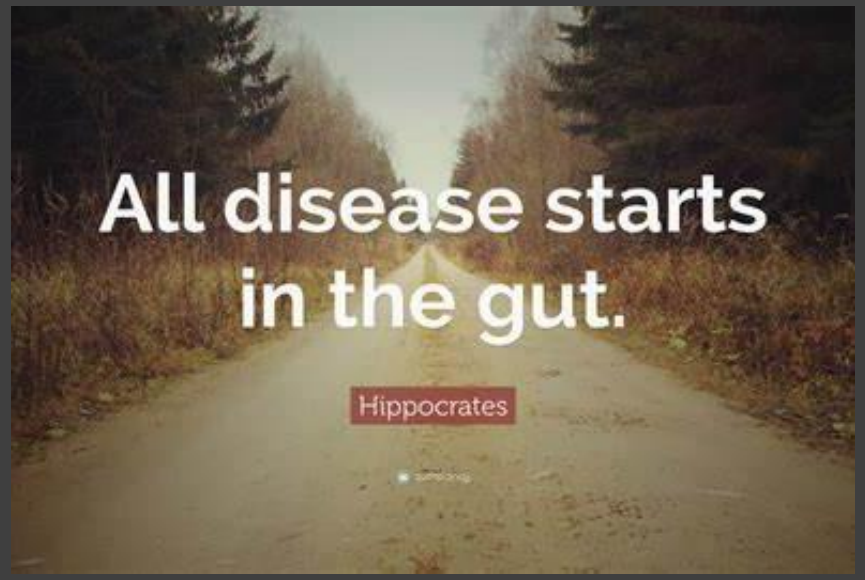
Listen to learn, and learn to listen

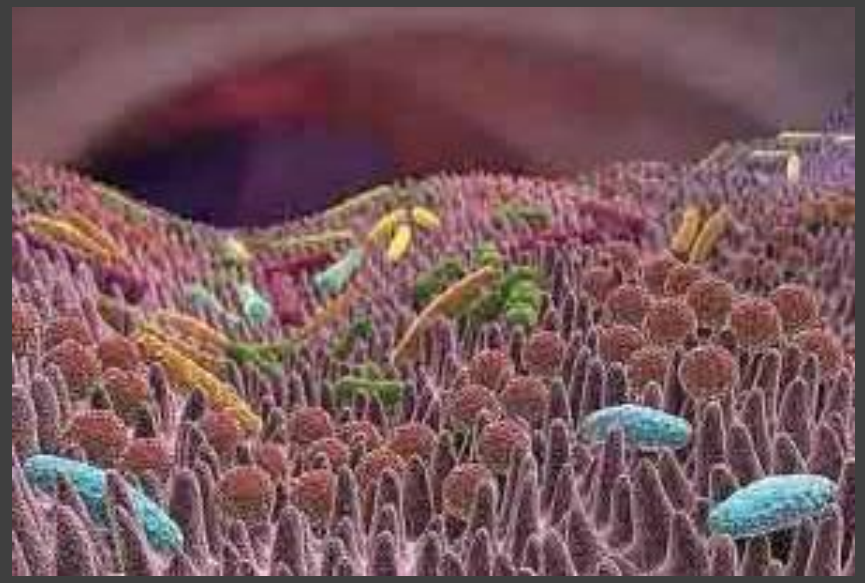
Play is a child's work, and toys are their equipment

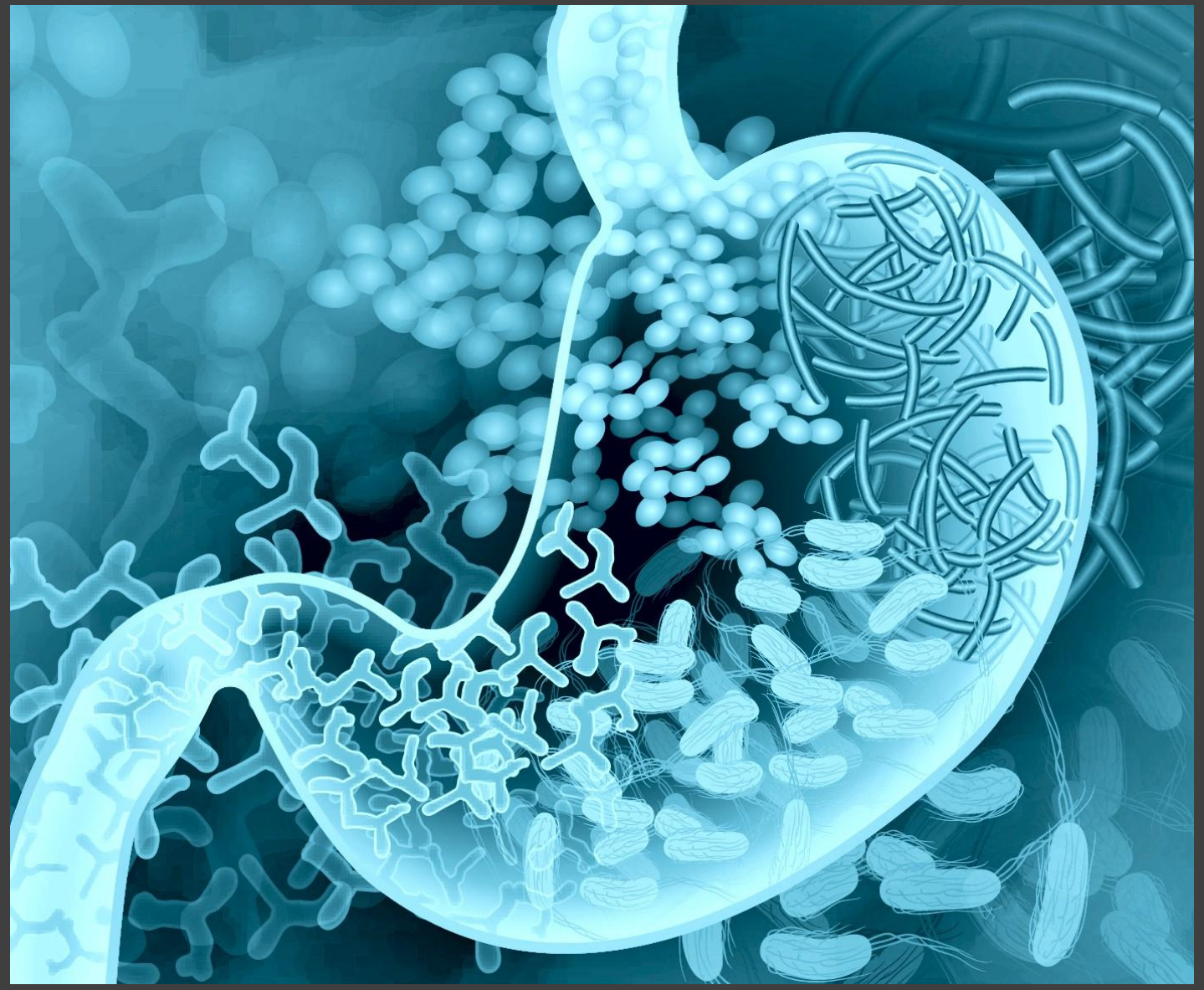
teach don't criticize

SOCIAL CONNECTION & TIME OUTSIDE

Forest Bathing – a Japanese practice is a process of relaxation called *Shinrin Yoku*. This method focuses on being still and quiet outside amongst trees, observing what is happening in nature, and practicing deep breathing. According to Nat Geo Kids, this practice in children helps them become more self aware and help with self soothing


All disease starts
in the gut.
Hippocrates

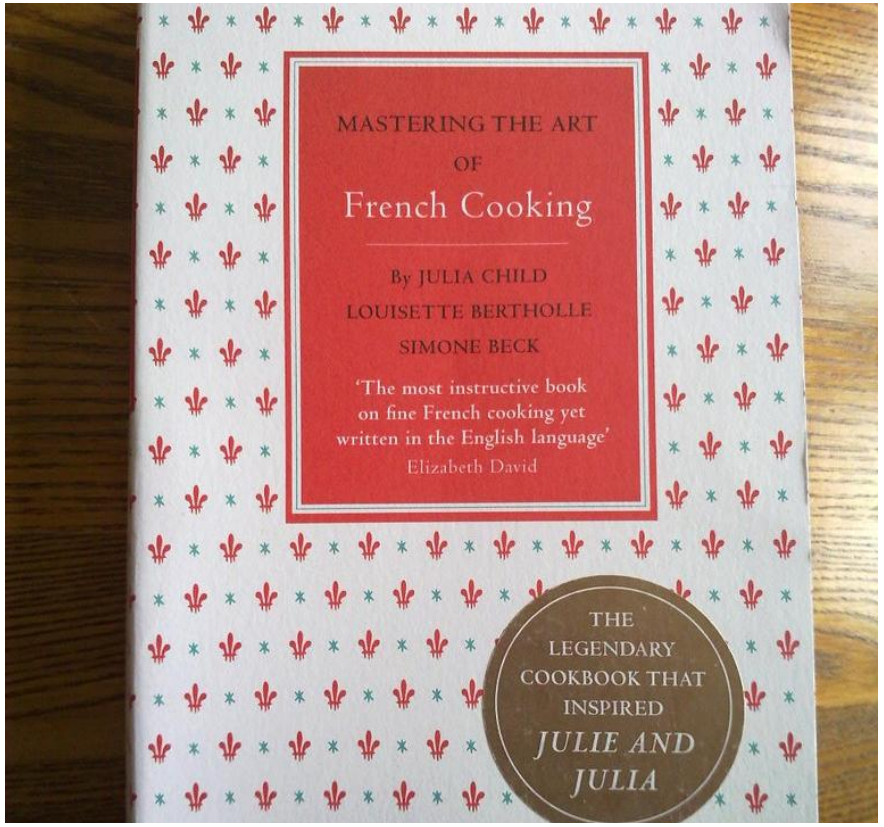




LET FOOD BE THY MEDICINE
LET MEDICINE BE THY FOOD

HIPPOCRATES

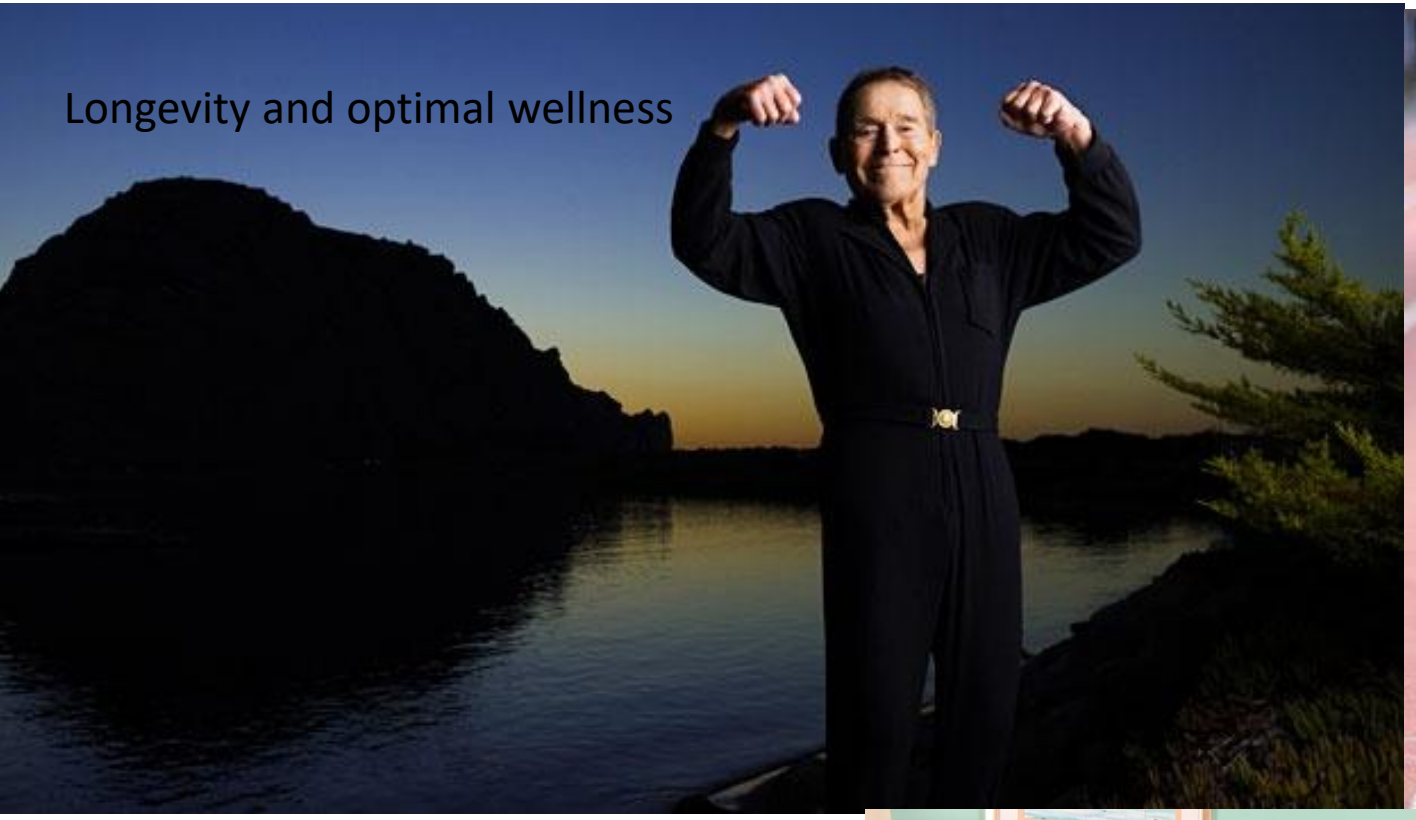
ANYONE CAN COOK!



Master the Art of ***Healthy*** Cooking

- **"Give a man a fish, he eats for a day, teach a man to fish, he eats for life" Chinese Philosopher Lao Tzu – founder of Taoism**
- **Kids who get involved in cooking their food are more invested in wanting to eat the food**
- **Try one new fruit or vegetable at the grocery store and learn about it, where does it come from? How to prepare it? What does it do in our bodies?**
- **Look into culinary medicine programs and opportunities to get kids/adults involved in the cooking process**

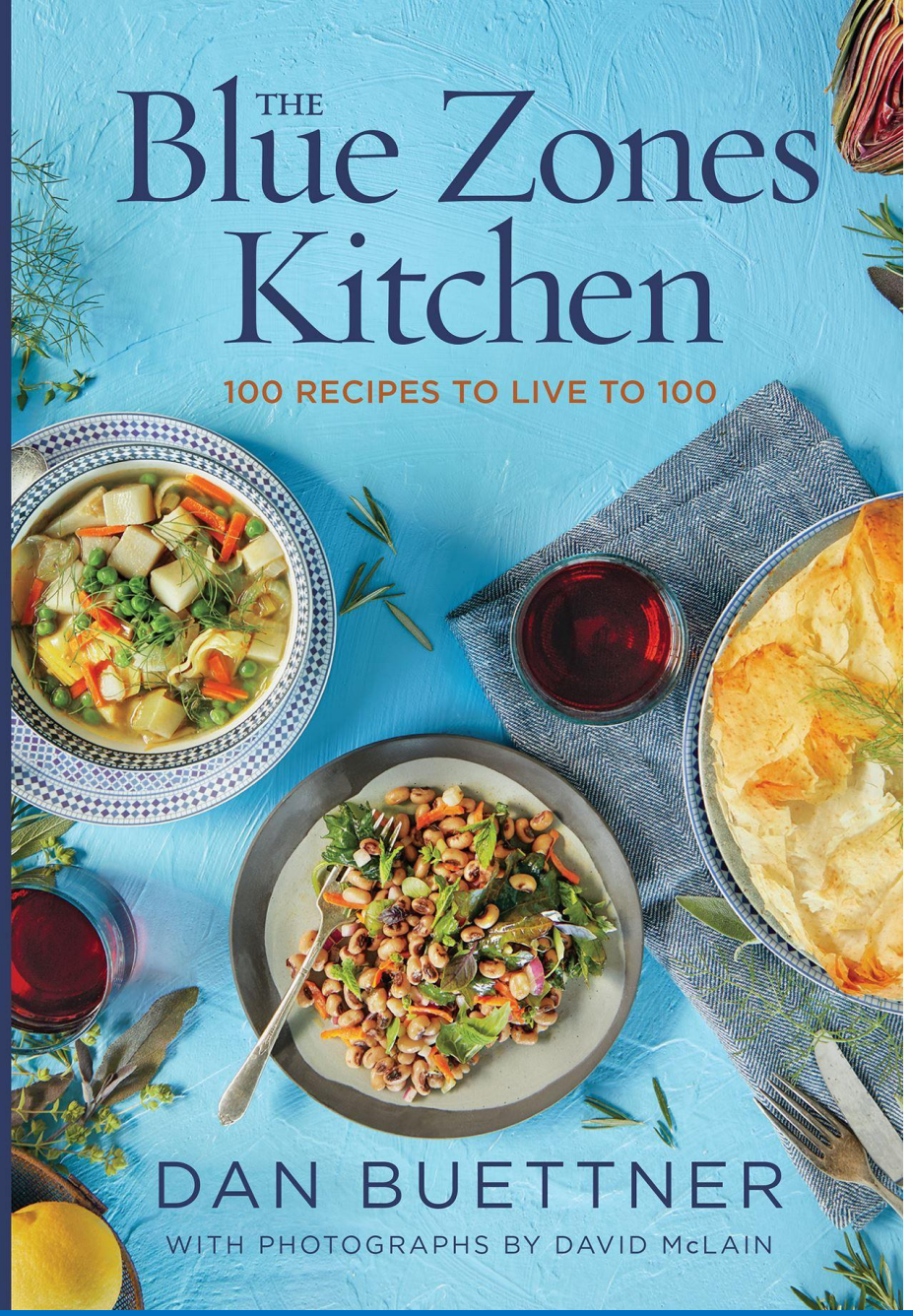
Longevity and optimal wellness



Why is this the exception and not the rule? What do they do differently?

The Blue Zones

These areas have some of the lowest rates of obesity and other chronic diseases.



How To Implement Wellness as a Lifestyle Model to optimize longevity

- Reduce Stress Daily and move naturally – take long walks by the sea, in the mountains

Eat real food! A whole food, plant-based meal (Lots of Veggies!) There is no one specific diet that all Blue Zoners share, but there are a few general principles they have in common.

- Build a Community. ...
- Create a Healthy Environment. ...
- Have a purpose!

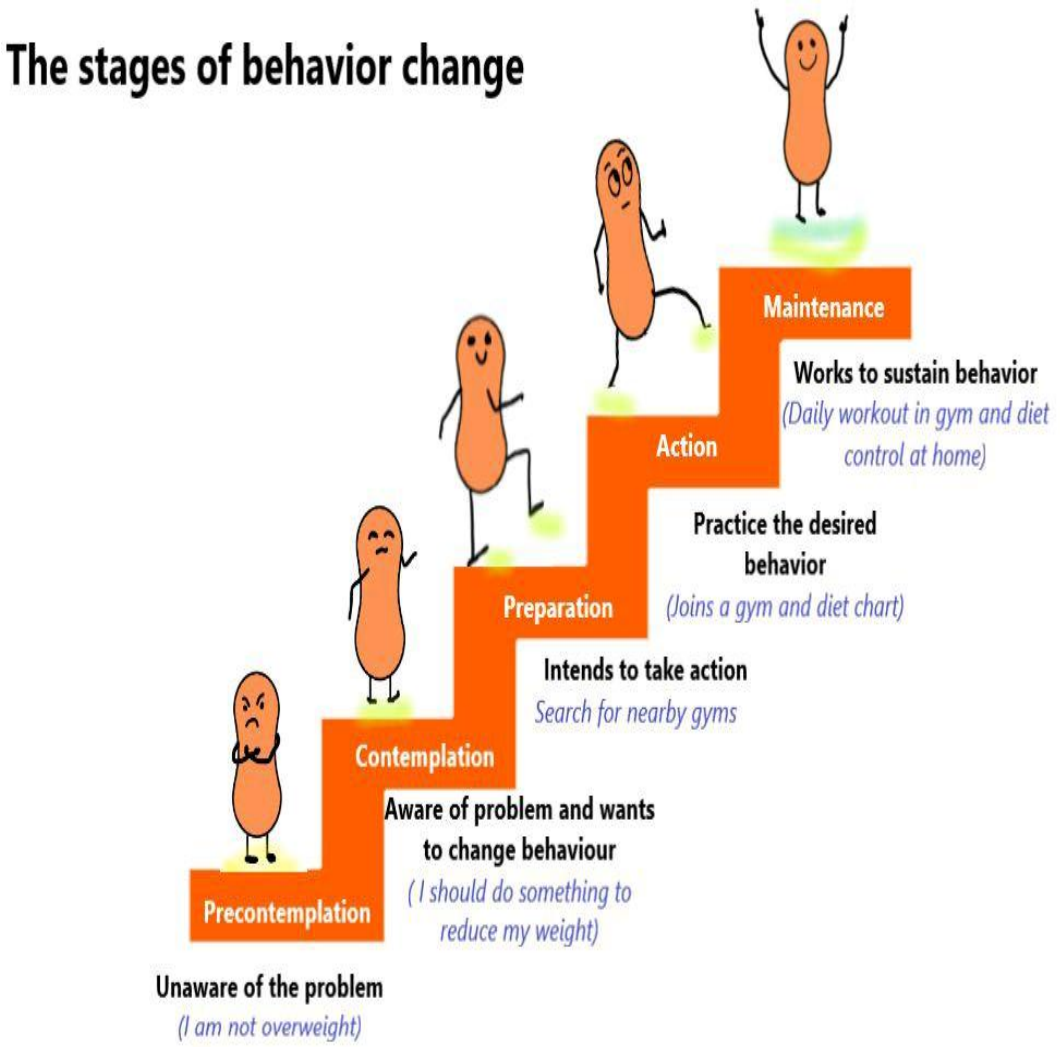
Eat until you are 80% full

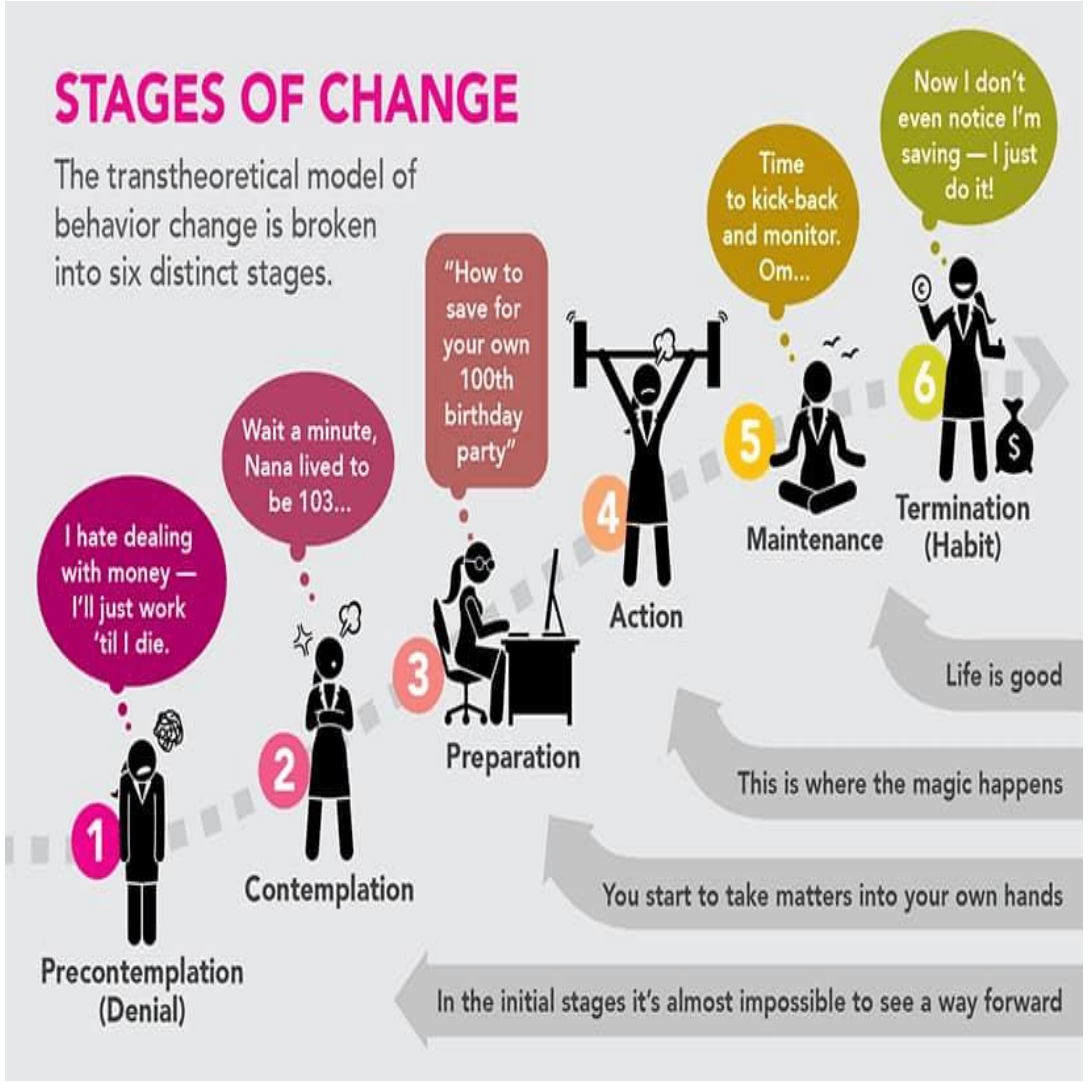
Παν Μέτρον Άριστα! (everything in moderation)

- Don’t drink, Don’t smoke
- Stay close with family
- Maintain a fulfilling social life
- Participate in wellness programs offered through your work

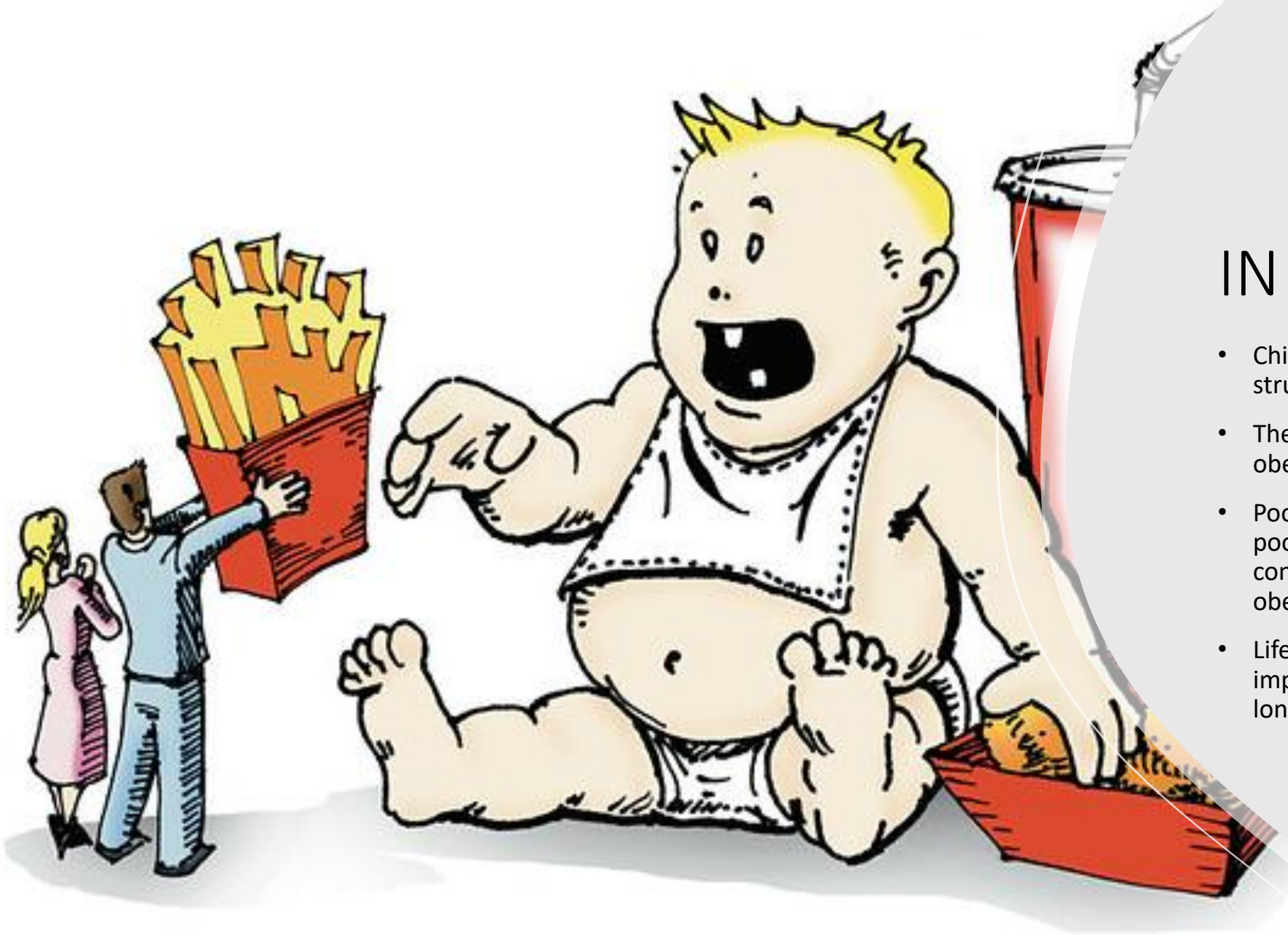
What WE can DO

- Walk and Talk with your kids
- Avoid Shame: Whose problem is it
- Be A Positive Role Model
- Focus on Health Not Weight
- Change the environment: Healthy Foods, Stress Reduction
- Seek Professional Health
- Balance Patient Acceptance with Supportive Encouragement
- Engage in cooking classes together and discover how cooking together, eating together, can build a healthy lifestyle and a healthy community!


The stages of behavior change
Maintenance
Works to sustain behavior
(Daily workout in gym and diet control at home)
Action
Practice the desired behavior
(Joins a gym and diet chart)
Preparation
Intends to take action
Search for nearby gyms
Contemplation
Aware of problem and wants to change behaviour
(I should do something to reduce my weight)
Precontemplation
Unaware of the problem
(I am not overweight)

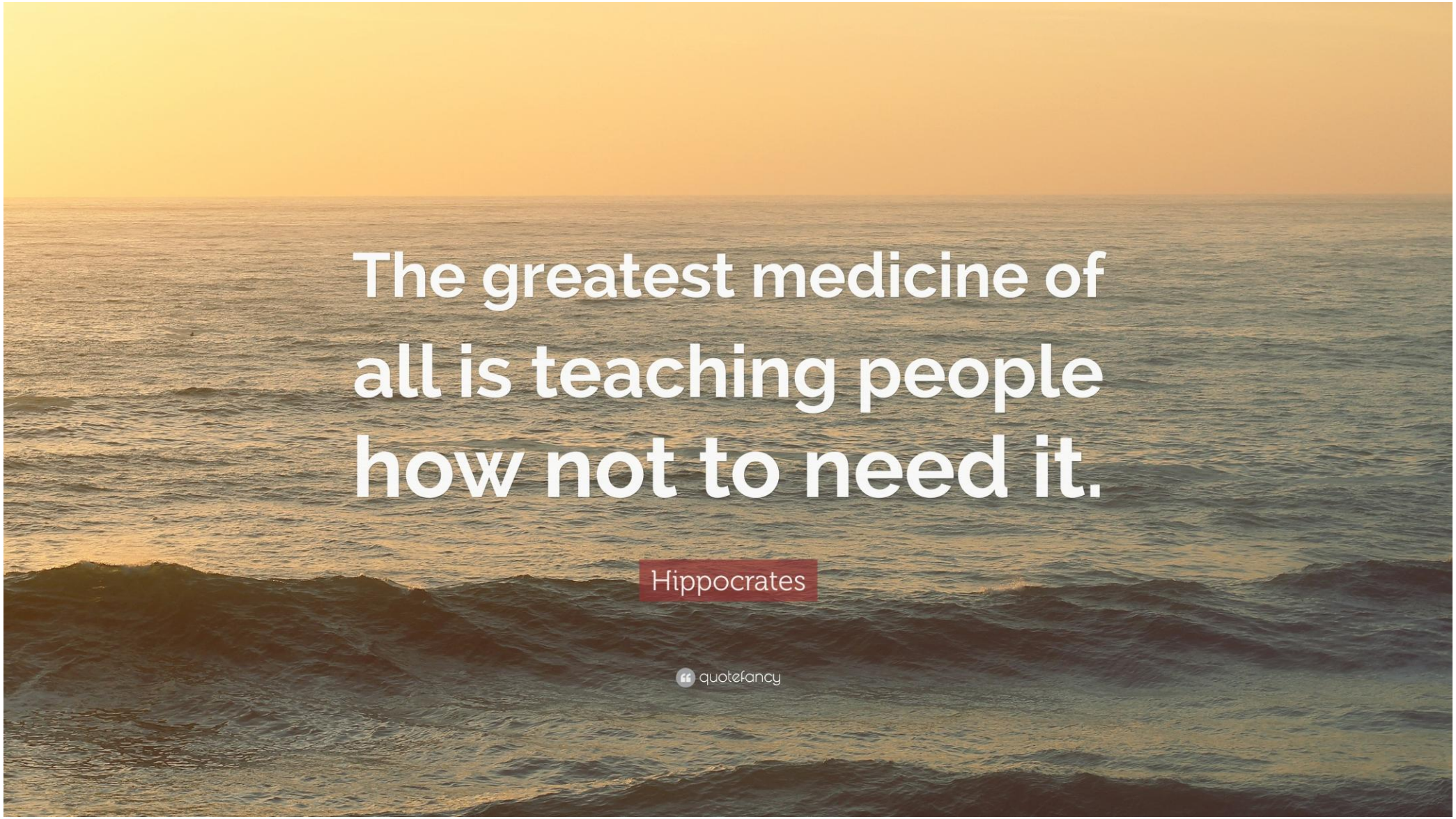

STAGES OF CHANGE
The transtheoretical model of behavior change is broken into six distinct stages.
I hate dealing with money — I'll just work 'til I die.
Wait a minute, Nana lived to be 103...
"How to save for your own 100th birthday party"
Time to kick-back and monitor. Om...
Now I don't even notice I'm saving — I just do it!
1
Precontemplation (Denial)
2
Contemplation
3
Preparation
4
Action
5
Maintenance
6
Termination (Habit)
Life is good
This is where the magic happens
You start to take matters into your own hands
In the initial stages it's almost impossible to see a way forward

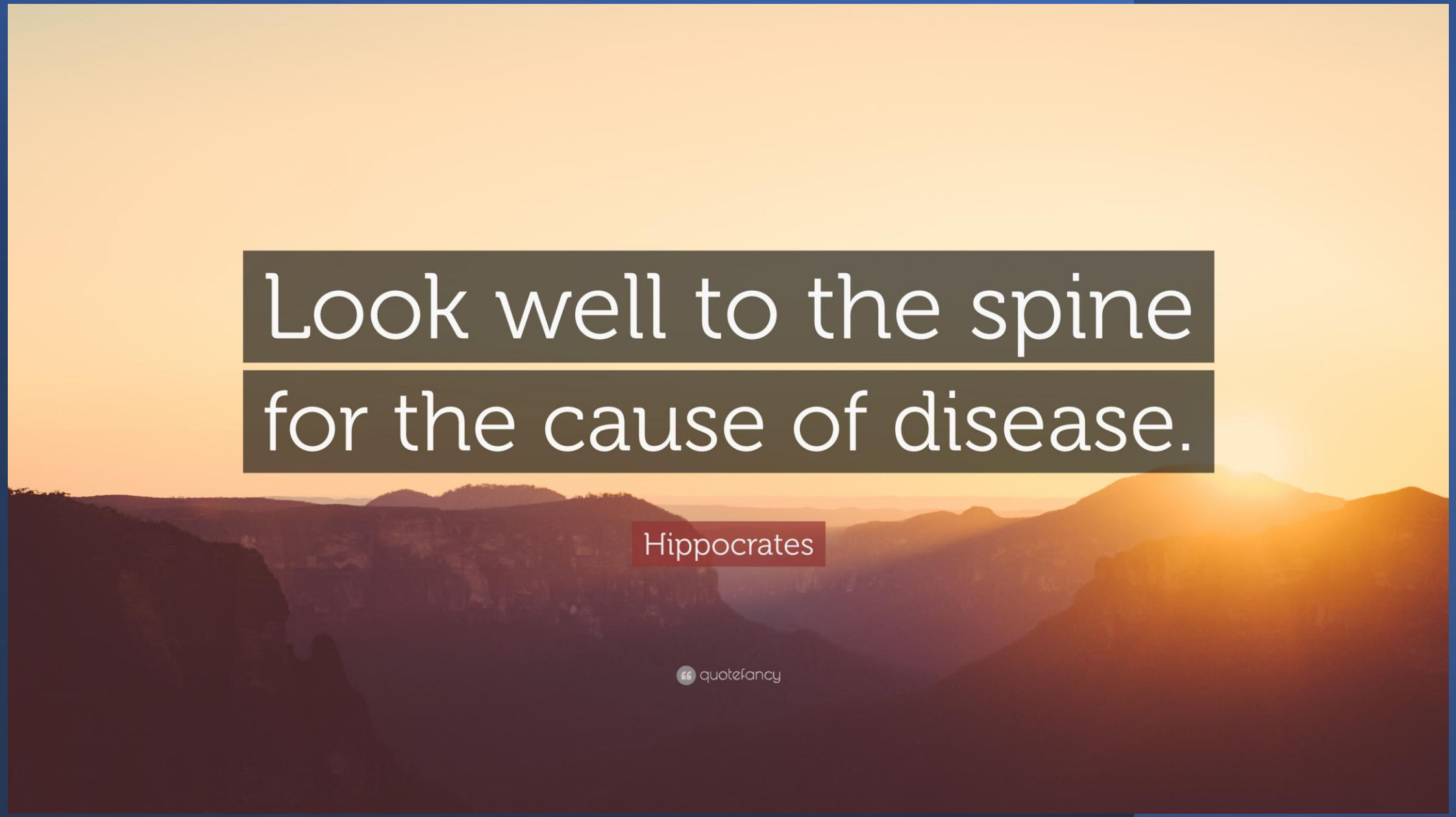

8-STEP HABIT CHANGING CYCLE
7. put a date on the calendar to check progress
8. repeat every 21 days
6. tell a friend or colleague of your decision
1. think through your daily activities
5. choose one item from the list and commit to eliminating it
2. write down repeated behaviors (be specific)
4. prioritize the list - not sure ask someone for help
3. identify low or little value activities
Leddin, 2019
leddingroup.com/blog

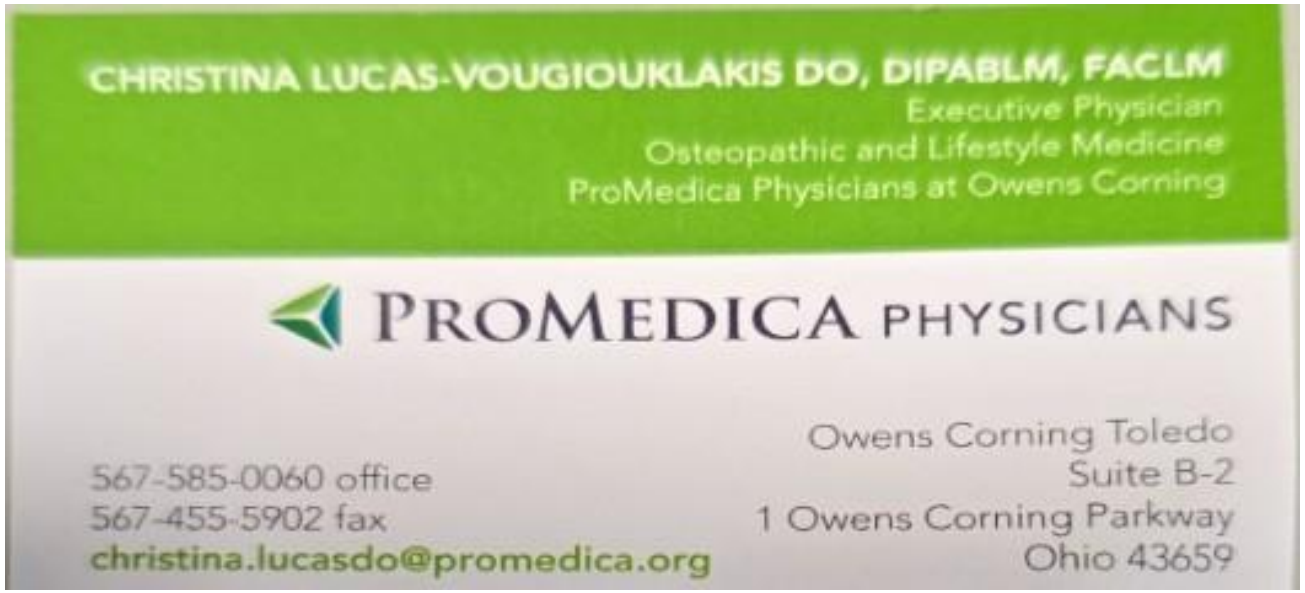


IN SUMMARY

- Childhood obesity is a global healthcare struggle
- The US is the second highest in childhood obesity in the world (China is #1, India is #3)
- Poor sleep, inadequate movement/exercise, poor diet, stress, and poor relationships all contribute to risk of childhood and adult obesity.
- Lifestyle changes - can help optimize improvement in obesity and improve longevity in life and longevity in health


The greatest medicine of
all is teaching people
how not to need it.
Hippocrates
quotefancy


Look well to the spine
for the cause of disease.
Hippocrates
quotefancy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Resources and references

https://www.hopkinsmedicine.org

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- Childhood obesity - Symptoms and causes - Mayo Clinic

us states highest rate childhood obesity – Search www.stateofchildhoodobesity.org

Ranking (% obesity by country) | World Obesity Federation Global Obesity Observatory

State Data - State of Childhood Obesity


Multumesc
Thank you
Gracias
Merci
Asan
Gracias
Dank u
謝謝
Terima kasih
Obrigado
Спасибо
Grazie
謝謝
Terima kasih
Grazie