

A photograph of a university campus. In the foreground, there are several trees with green and yellowing leaves, suggesting autumn. A paved path leads through a grassy area. In the background, a large brick building with a prominent tower is visible under a clear blue sky.

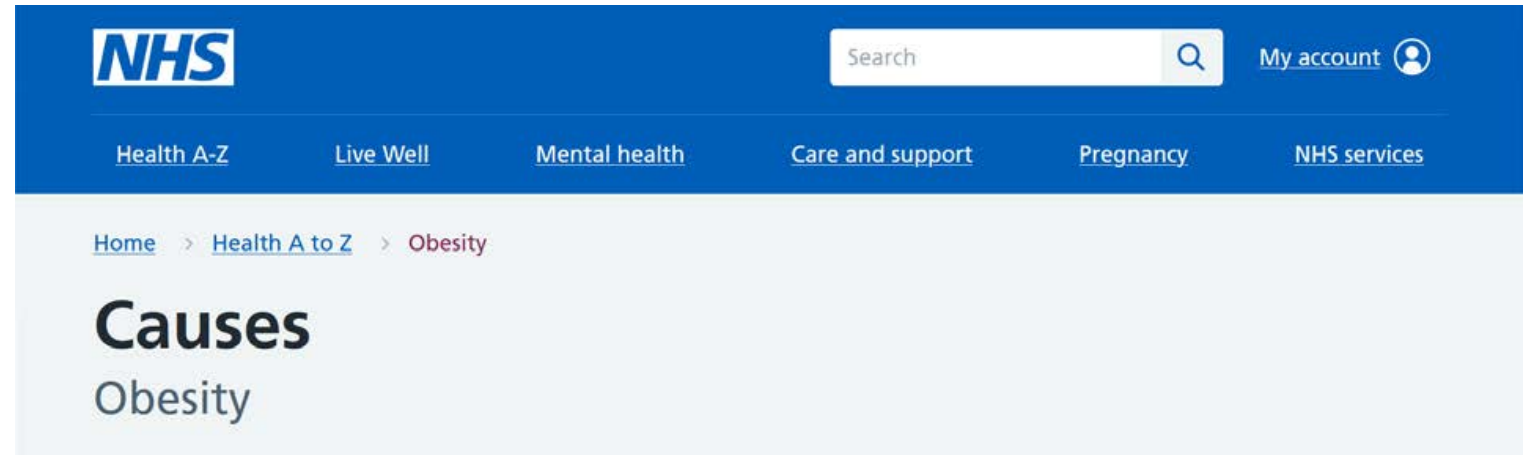
Addressing obesity at a population level: integrating solutions for causes and contributors

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Key Point 1: Define “Obesities”

A collection of diseases with multiple causes, contributors, and clinical expressions

Common view of obesity



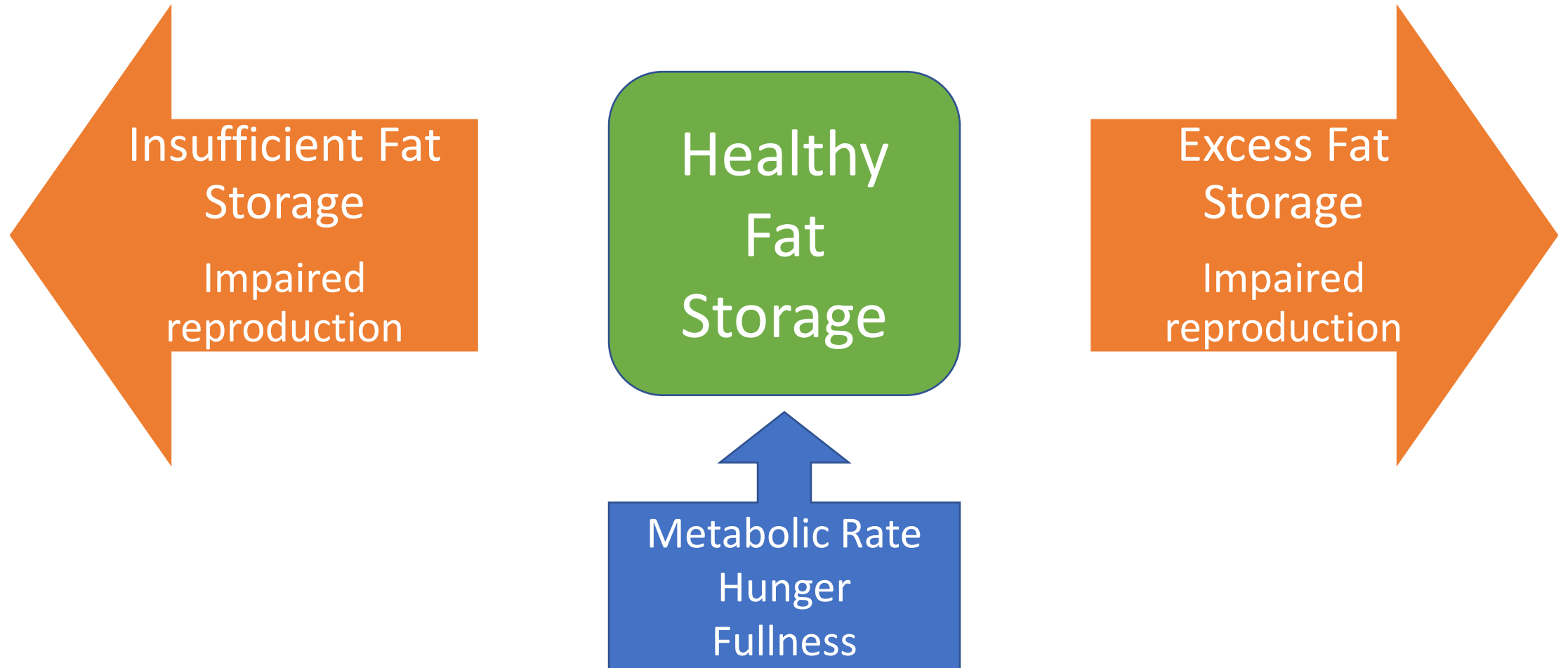
The screenshot shows the NHS website interface. At the top is the NHS logo, a search bar, and a 'My account' link. Below this is a navigation menu with links for 'Health A-Z', 'Live Well', 'Mental health', 'Care and support', 'Pregnancy', and 'NHS services'. The breadcrumb trail reads 'Home > Health A to Z > Obesity'. The main heading is 'Causes' with a sub-heading 'Obesity'.

“Obesity is generally caused by eating too much and moving too little.”

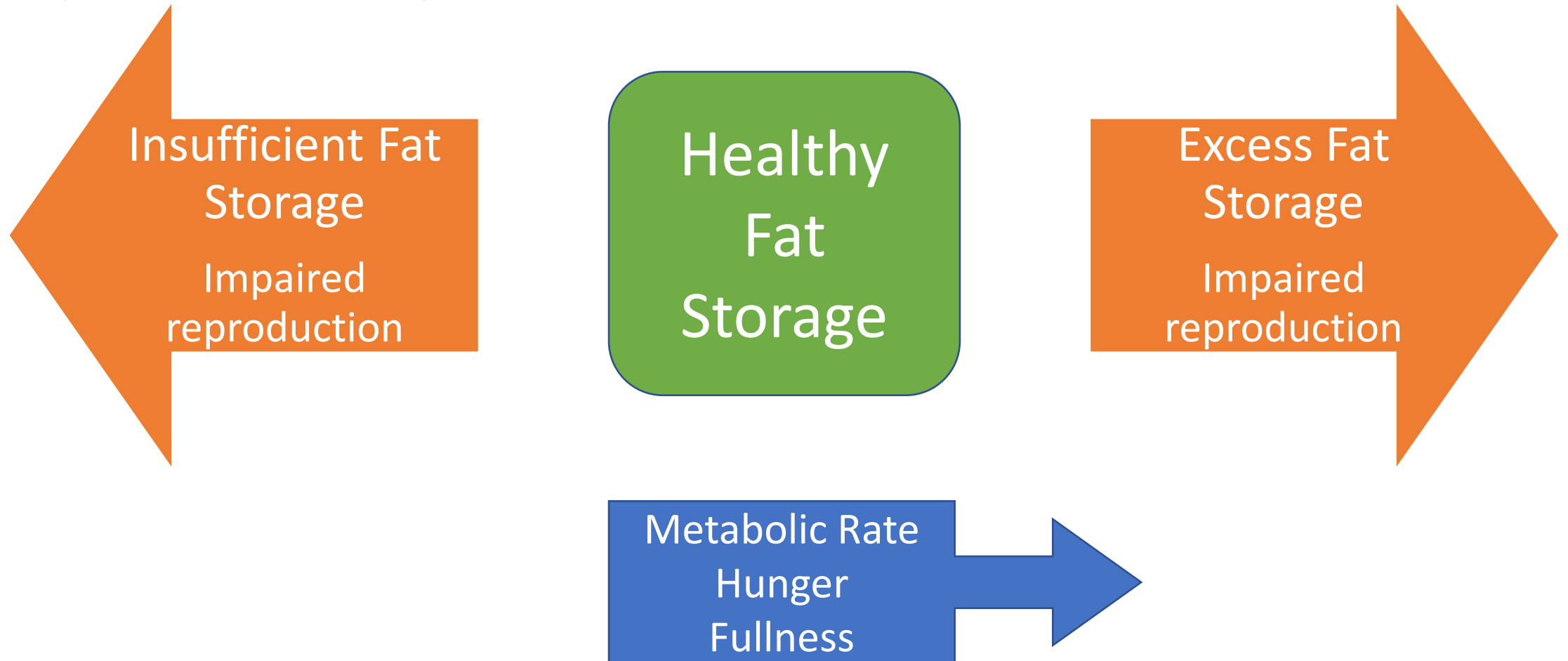
“(obesity develops...) as a result of poor diet and lifestyle choices.”

- Swelling (edema), is not caused by drinking excessive water, but due to impairment in water balance regulation
- Obesity is due to impairment in energy balance regulation

In a healthy state, body fat is maintained within a range



In people with obesity, this homeostatic system is impaired or overwhelmed.



Alternate
view of
obesity

Obesity is caused by an inability
of the body to maintain fat within
a healthy range

Causes	Contributors
Intrinsic	Extrinsic
Can induce obesity without contributors	Can lead to obesity in presence of causes
Non-preventable, treatable	Preventable, modifiable, treatable

Causes



Obesity

- Genes: e.g. Leptin, MC4R
- Hormones: e.g. thyroid, hunger, satiety
- Brown fat
- Fat oxidation
- Infections
- Environmental chemicals

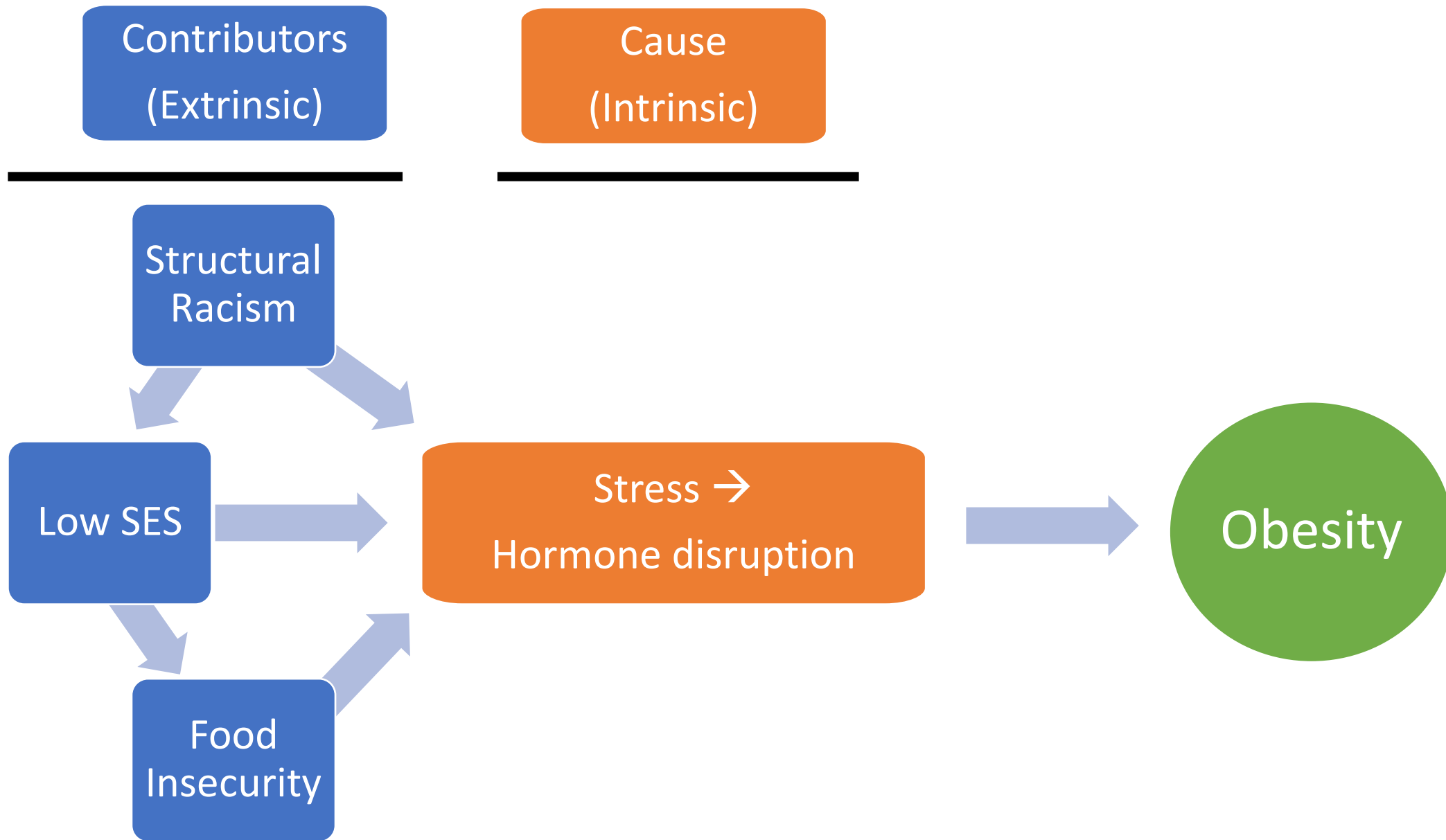
Contributors

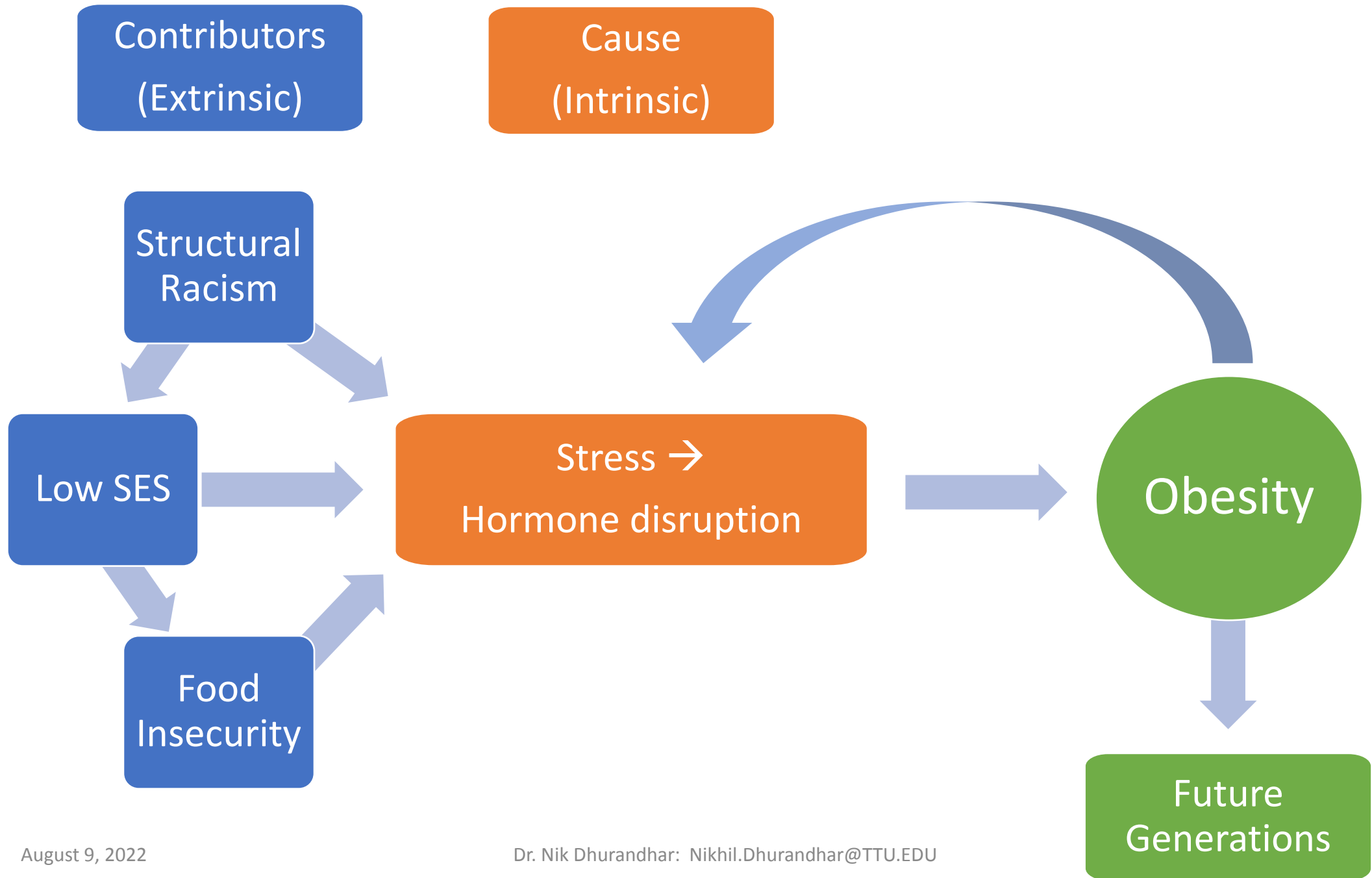
- Energy dense food
- Large portions
- Ultra processed food
- Sleep duration & quality
- Physical activity
- Psychological health
- Tobacco cessation
- Food insecurity

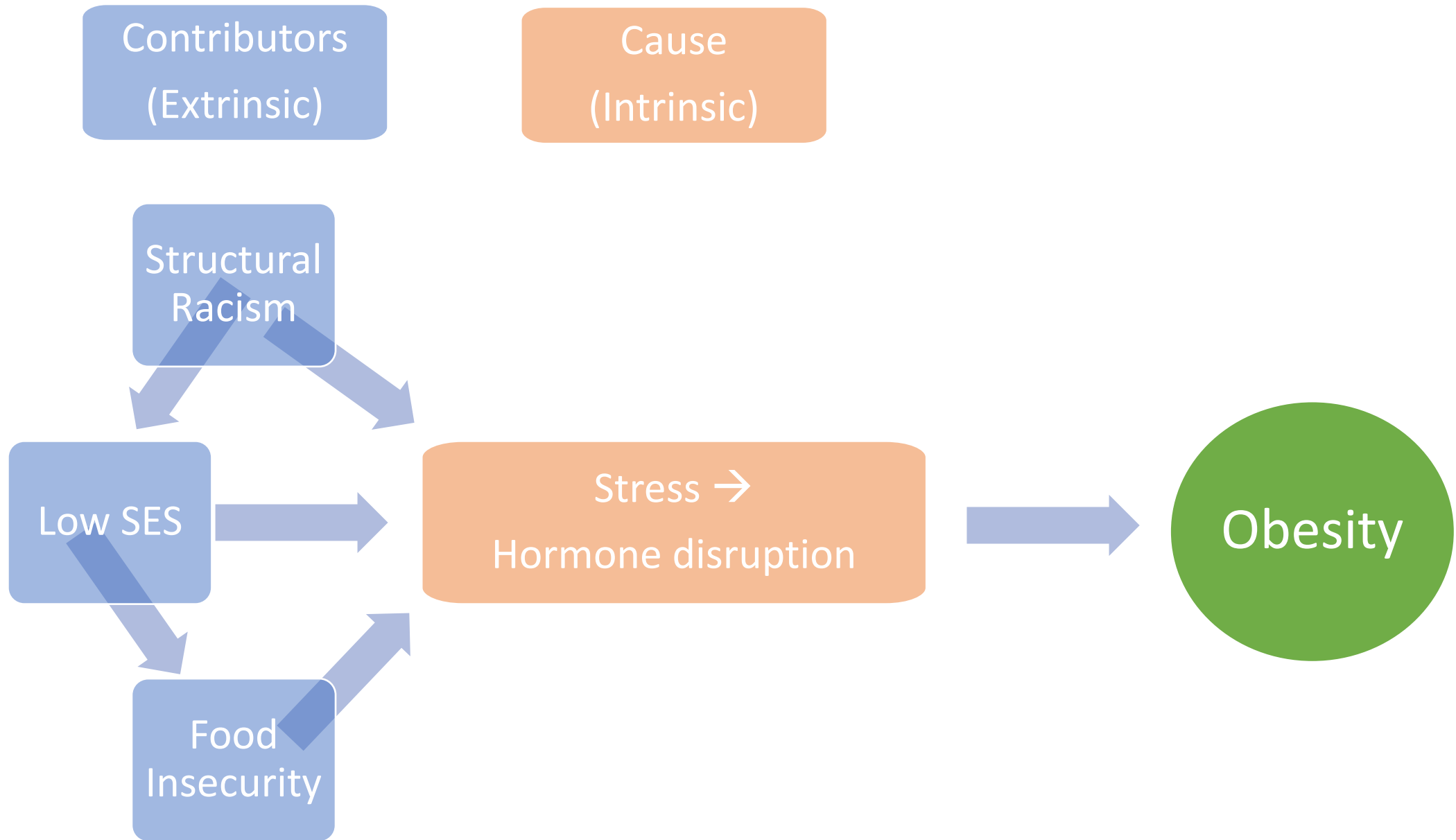
Causes

- Genes: e.g. Leptin, MC4R
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- Brown fat
- Fat oxidation
- Infections
- Environmental chemicals

Obesity







185 million adults with overweight or obesity in the US

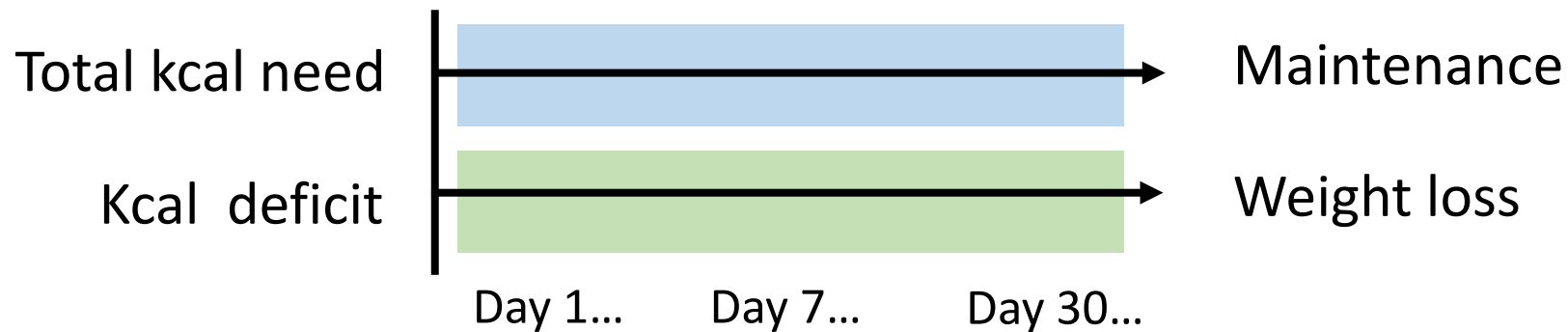
Obesity in an individual is not spontaneously reversible without a substantial and sustained negative energy balance.

Treatment of individuals affected with obesity is imperative.



Key Point 2:

Obesity treatment requires substantial, chronic negative energy balance



General
weight loss
suggestions do
not produce
meaningful
weight loss

Placebo groups of weight loss drug trials

- Counseling for diet and physical activity.
- Eat less, move more, eat smaller portions, less fat, etc.

→ 1 – 2% weight loss after 1 year treatment.










Start simple with MyPlate Plan

The benefits of healthy eating add up over time, bite by bite. Small changes matter. Start Simple with MyPlate.

A healthy eating routine is important at every stage of life and can have positive effects that add up over time. It's important to eat a variety of fruits, vegetables, grains, protein foods, and dairy or fortified soy alternatives. When deciding what to eat or drink, choose options that are full of nutrients. Make every bite count.

Food Group Amounts for 2,200 Calories a Day for Ages 14+ Years

				
<p>2 cups</p>	<p>3 cups</p>	<p>7 ounces</p>	<p>6 ounces</p>	<p>3 cups</p>
<p>Focus on whole fruits</p> <p>Focus on whole fruits that are fresh, frozen, canned, or dried.</p>	<p>Vary your veggies</p> <p>Choose a variety of colorful fresh, frozen, and canned vegetables—make sure to include dark green, red, and orange choices.</p>	<p>Make half your grains whole grains</p> <p>Find whole-grain foods by reading the Nutrition Facts label and ingredients list.</p>	<p>Vary your protein routine</p> <p>Mix up your protein foods to include seafood; beans, peas, and lentils; unsalted nuts and seeds; soy products; eggs; and lean meats and poultry.</p>	<p>Move to low-fat or fat-free dairy milk or yogurt (or lactose-free dairy or fortified soy versions)</p> <p>Look for ways to include dairy or fortified soy alternatives at meals and snacks throughout the day.</p>
<p> Limit</p> <p>Choose foods and beverages with less added sugars, saturated fat, and sodium.</p> <p>Limit:</p> <ul style="list-style-type: none"> • Added sugars to <55 grams a day. • Saturated fat to <24 grams a day. • Sodium to <2,300 milligrams a day. 		<p> Activity</p> <p>Be active your way:</p> <p>Children 6 to 17 years old should move 60 minutes every day. Adults should be physically active at least 2½ hours per week.</p>		

Calories in 6 oz equivalent

Fish:	200
Chicken:	240
Meat:	450
Egg:	420
Beans:	360
Nuts:	700



6-ounce equivalents

1 ounce of protein foods counts as

- 1 ounce seafood, lean meats, or poultry; or
- 1 egg; or
- 1 Tbsp peanut butter; or
- $\frac{1}{4}$ cup cooked beans, peas, or lentils; or
- $\frac{1}{2}$ ounce unsalted nuts or seeds.

500 Calorie difference
across 'equivalents'

Unstructured
weight loss
instructions
are less likely
to succeed

- Unfamiliarity with calorie requirement and daily variation
- Unfamiliarity with calorie value of food or physical activity
- Body resists weight loss (↓ RMR & satiety
↑ hunger)
- Negative energy balance is difficult to achieve or sustain

Individualized & structured treatment is needed
for people with obesity

Role of public health efforts in addressing obesity

Efforts are underway to improve population health

- Increasing fruit and vegetable consumption
- Increasing physical activity
- Reducing added sugar
- Reducing SSB consumption

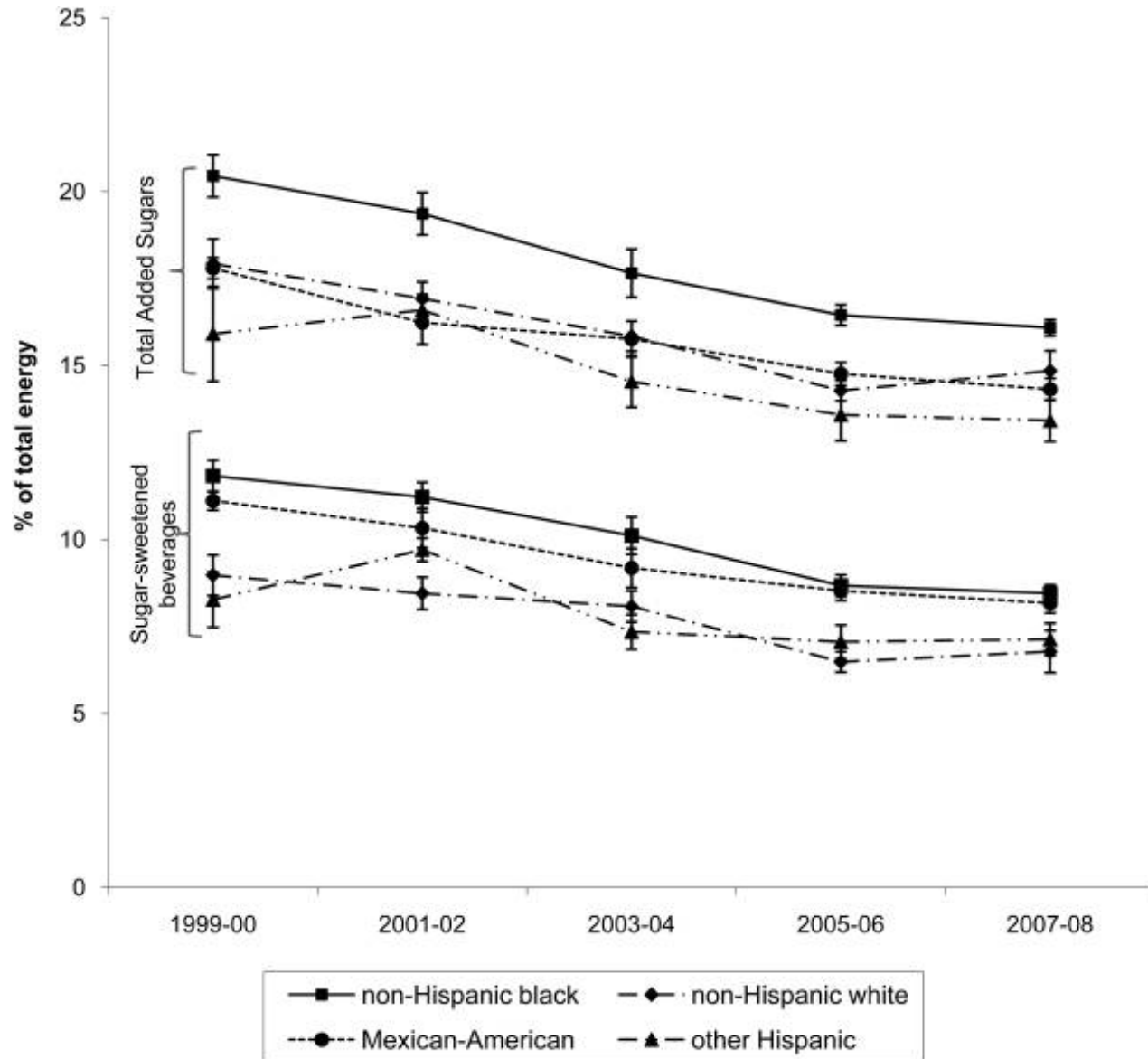
Percentage of U.S. adults aged ≥ 18 years who consumed fruit two or more times per day and vegetables three or more times per day, --- Behavioral Risk Factor Surveillance System, 2000--2009*

	Fruit two or more times per day						Vegetables three or more times per day					
State	2000	2002	2003	2005	2007	2009	2000	2002	2003	2005	2007	2009
Overall	34.4	33.5	32.2	32.8	32.9	32.5	26.7	26.3	26.2	27.1	27.4	26.3

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5935a1.htm>

Trends in Meeting the 2008 Physical Activity (PA) Guidelines in Adults (%)

2008	2010	2012	2014	2016	2018
No PA					
36	32	29	30	27	25
Moderate intensity, > 150 min / wk					
43	47	50	50	52	54
Moderate intensity, > 300 min / wk					
28	32	34	34	36	37

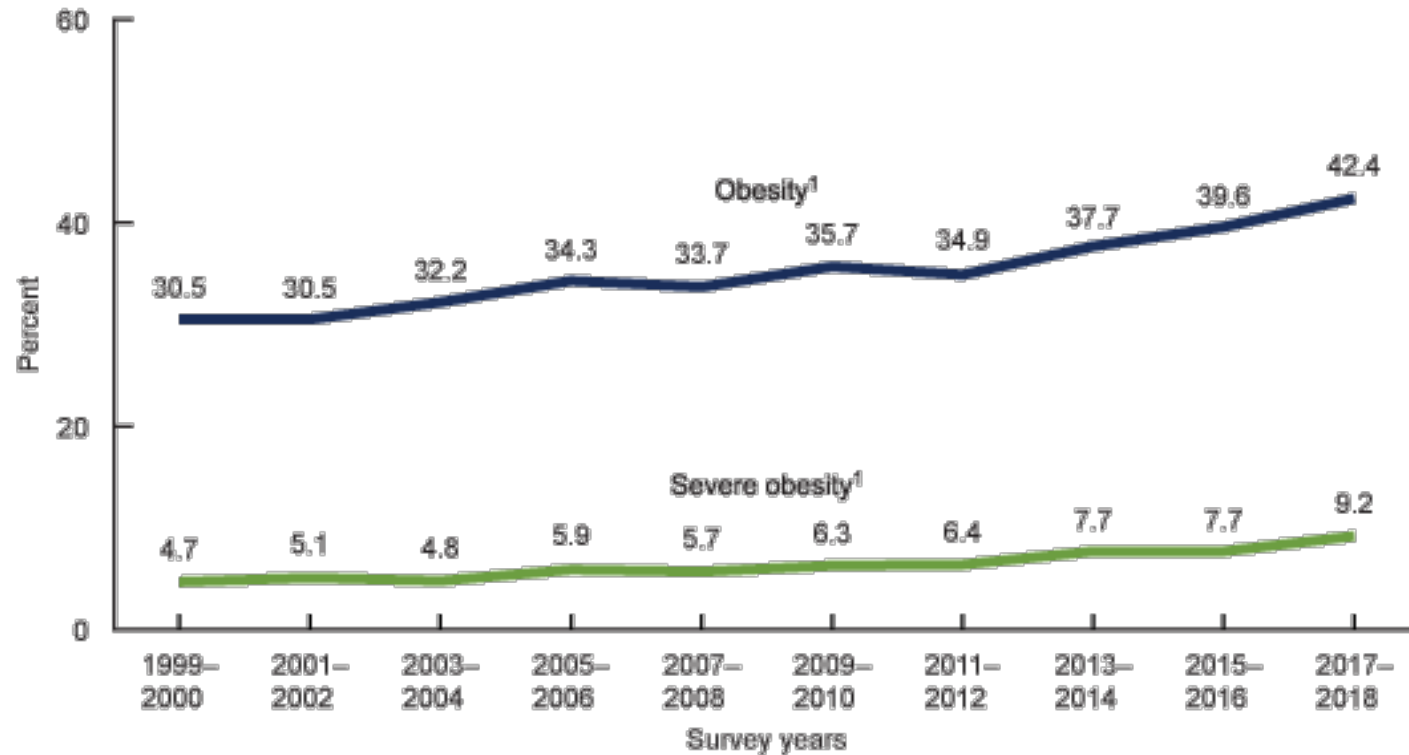


Added sugar

Sugar-sweetened beverages

[Am J Clin Nutr.](#) 2011 Sep; 94(3): 726–734.

Trends in age-adjusted obesity and severe obesity prevalence among adults aged 20 and over: United States, 1999–2000 through 2017–2018



CDC / NCHS Data Brief No. 360, February 2020

Improving health ≠ Addressing obesity




What works / does not work? Why ?

REVIEW

Open Access

Associations between the built environment and obesity: an umbrella review



Thao Minh Lam^{1,3,4*} , Ilonca Vaartjes^{1,3,5}, Diederick E. Grobbee^{1,6}, Derek Karssenber^{2,3}
and Jeroen Lakerveld^{1,3,4}

.....most studies have not been able to confirm the assumed influence of built environments on weight....



Emphasis on a single food item = Digging a hole in water

Key Point 3:

Addressing obesity meaningfully requires

- 1) Treating existing obesity: Individualized, effective, wide scale
- 2) Prevention: Minimizing additional expression of obesity

Integrating solutions for causes and contributors

Strategic partnership for addressing obesity at individual and community level, using complementary approaches.

Addressing Physiology

Facilitating obesity management for individuals

- Identify and address operating cause(s) in individuals

e,g, Poor sleep: Address sleep apnea

System-wide changes

- Minimize maintaining contributors

e.g. Poor sleep: Address conditions leading to disturbed sleep

Supporting Reduced Energy Intake

Enabling reduction in energy intake for individuals

- Personalized diet for negative energy balance

e.g. Development of effective tools and strategies, diets, drugs and surgery, devices

System-wide changes

- Promoting conducive environment

e.g. Awareness, screening, access to care, availability and access to lower energy density food options, taste and cost considerations

Promoting Energy Expenditure

Promoting increase in energy expenditure for individuals	System-wide changes
<ul style="list-style-type: none">Physical activity (PA) promotion	<ul style="list-style-type: none">Resources to encourage PA
e.g. personalized PA prescription, approved drugs / devices	e.g. Policies, resources, awareness, easy access to facilities,

Facilitating Widespread Treatment

Making obesity management widely available for individuals

- Inclusion of PCPs in addition to obesity specialists

e.g. inclusion of physicians, NP, PA, RD

August 9, 2022

System-wide changes

- Obesity management training in med school
- Greater and better tools to manage obesity
- Insurance coverage
- Access to care

e.g. Policies, resources, awareness, easy access to facilities, reducing barriers

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Minimizing Obesity Expression

Minimizing or preventing weight gain or regain in individuals	System-wide changes
<ul style="list-style-type: none">• Identify additional risk factors for obesity development.• Identify at-risk individuals.	<ul style="list-style-type: none">• Resources to minimize risk factors for obesity expression
e.g. screening for gene defects, hypothyroidism,	e.g. reducing structural racism, food insecurity, economic stability,

SUMMARY

- Obesities have causes (intrinsic) and contributors (extrinsic)
- Effective obesity treatment of an individual requires structured and personalized treatment
- Effectively addressing obesity on a national level will need integrating:
 - a) Treatment: Effective and wide scale obesity treatment of individuals, and supporting system-wide changes
 - b) Prevention: Minimizing excess weight gain or regain in at-risk individuals, and by minimizing system-wide risk factors for obesity expression

A scenic view of a large blue lake in Salzburg, Austria, with mountains in the background and houses in the foreground. The text "Thank you !" is overlaid in the center.

Thank you !

August 9, 2012

Salzburg, Austria. 2012

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