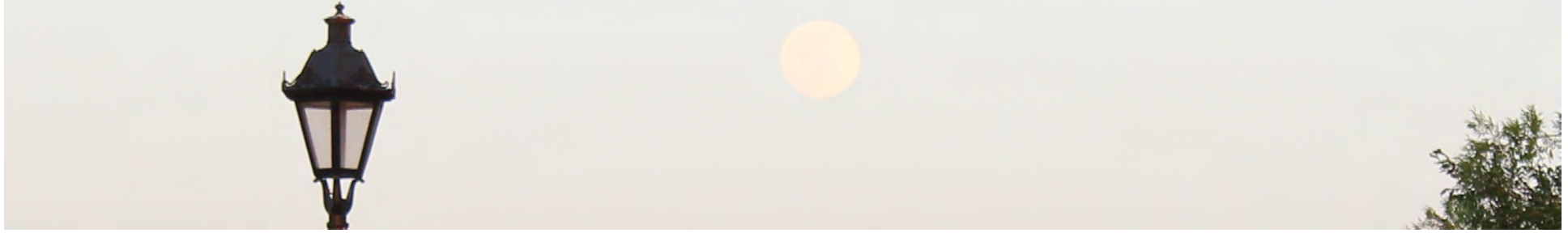

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Obesity and Arthritis

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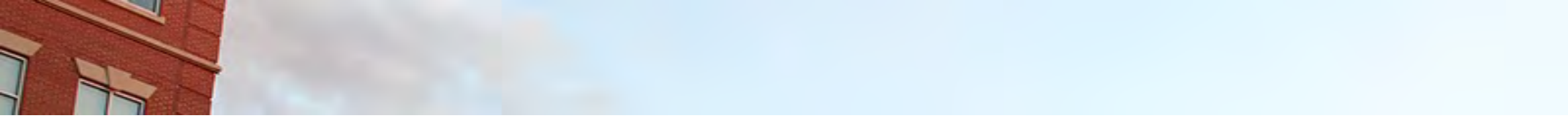


- A general Overview of Arthritis and Obesity.
- Examine the relationship between obesity and the risk of developing Arthritis.
- Influencing factors

Arthritis

- Disabling degeneration of the joints due to inflammation, often leading to pain.
- Most common cause of disability among adults residing in the United limiting everyday activities for 24 million Americans.
- Affects all ages, gender, and races, but it is especially high in adults aged 45 to 64 at 30.7%.

Arthritis

Pathophysiology

Arthritis

Risk Factors: Gene & Environment

- Age
- Gender
- Race
- diet
- Physical activities
- Smoking
- Alcohol consumption

Arthritis

- **Medical Costs**

In 2013, the national arthritis-attributable medical costs were $140 billion.

That's $2,117 in extra medical costs per adult with arthritis.

Ambulatory care medical care costs accounted for nearly half of arthritis-attributable medical costs.

- **Earnings Losses**

Total national arthritis-attributable lost wages were $164 billion in 2013.

That's $4,040 less pay for an adult with arthritis compared with an adult without arthritis.

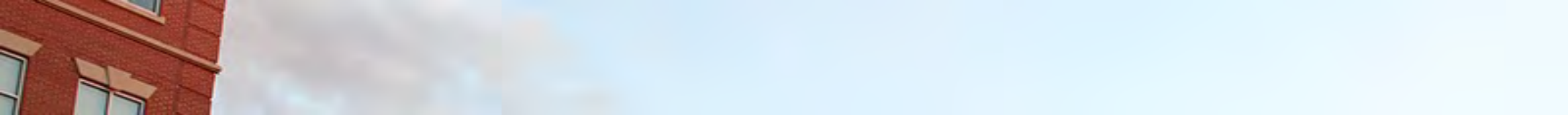
- **Job losses**

Highest among people whose jobs are physically demanding

Arthritis

Types

- Rheumatoid Arthritis
- Osteoarthritis
- Psoriatic Arthritis
- Gout



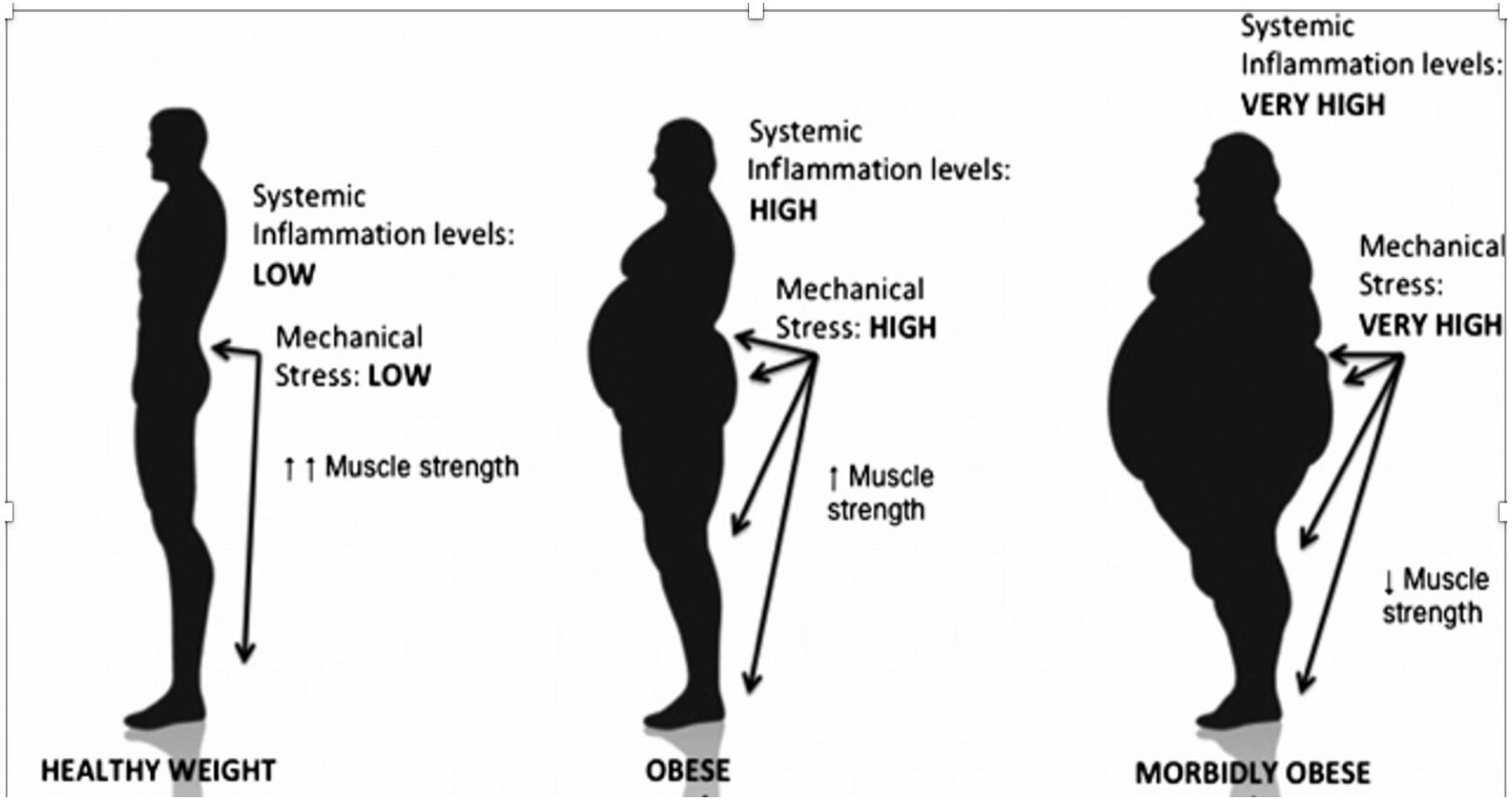
Could obesity be a contributing cause?

Obesity

A known risk factor for many disease including musculoskeletal disorders.

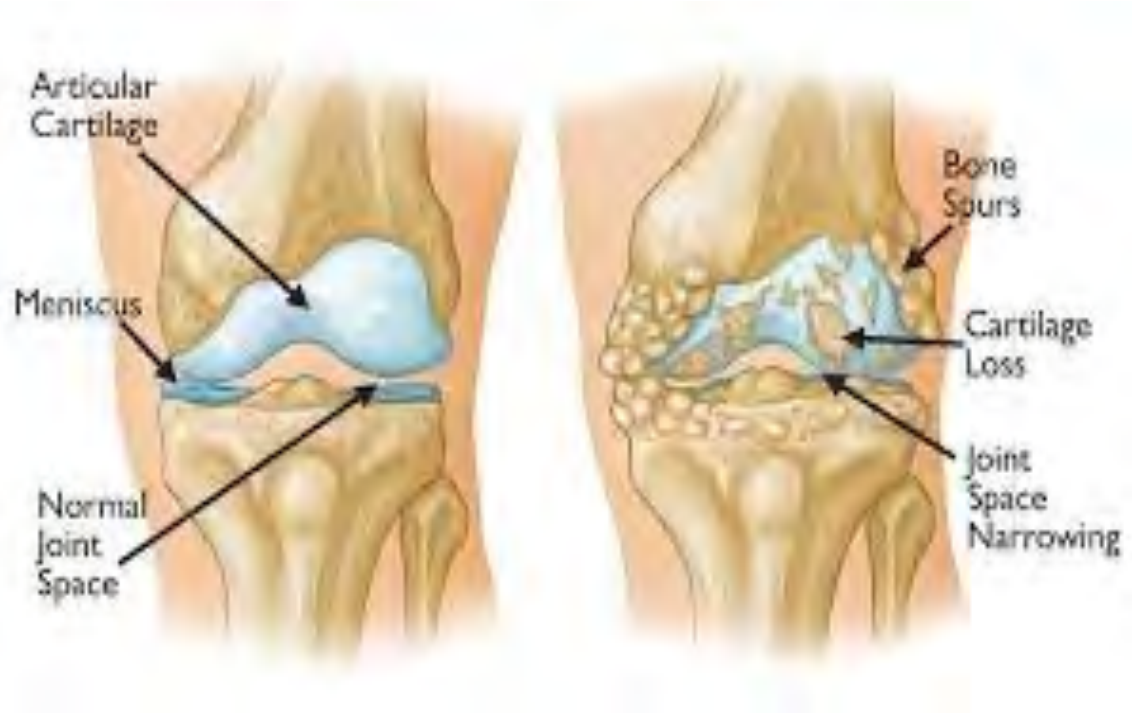
Obesity

- Mechanical
- Pro-inflammatory



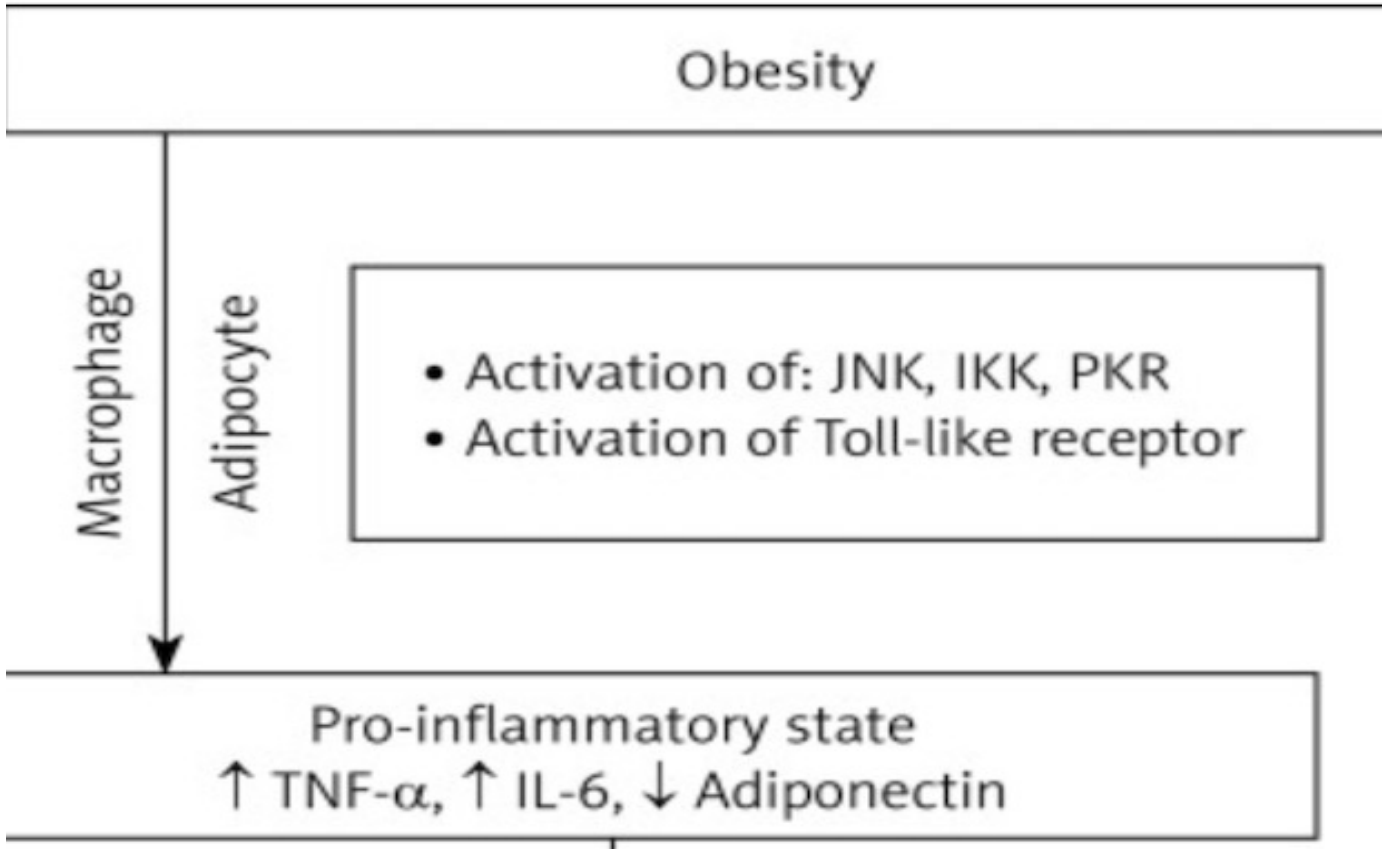
Obesity

Mechanical: Increased wear-and-tear.

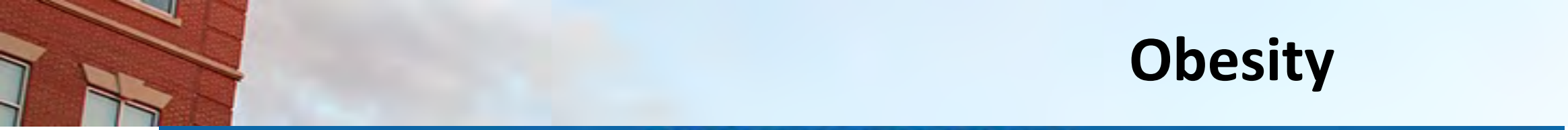


Obesity

Systemic Inflammation



Obesity



WEIGHT IN POUNDS (lbs)

HEIGHT IN FEET

	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330
4'5"	30	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75	78	80	83
4'6"	29	31	34	36	39	41	43	46	48	51	53	56	58	60	63	65	68	70	72	75	77	80
4'7"	28	30	33	35	37	40	42	44	47	49	51	54	56	58	61	63	65	68	70	72	75	77
4'8"	27	29	31	34	36	38	40	43	45	47	49	52	54	56	58	61	63	65	67	70	72	74
4'9"	26	28	30	33	35	37	39	41	43	46	48	50	52	54	56	59	61	63	65	67	69	72
4'10"	25	27	29	31	34	36	38	40	42	44	46	48	50	52	54	57	59	61	63	65	67	69
4'11"	24	26	28	30	32	33	36	38	40	43	45	47	49	51	53	55	57	59	61	63	65	67
5'0"	23	25	27	29	31	32	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
5'1"	23	25	26	28	30	32	34	36	38	40	42	44	45	47	49	51	53	55	57	59	61	62
5'2"	22	24	25	27	29	31	33	35	37	38	40	42	44	46	48	49	51	53	55	57	59	60
5'3"	21	23	25	27	28	30	32	34	36	37	39	41	43	44	46	48	50	51	53	55	57	59
5'4"	21	22	24	26	28	29	31	33	34	36	38	40	41	43	45	46	48	50	52	53	55	57
5'5"	20	22	23	25	27	28	30	32	33	35	37	38	40	42	43	45	47	48	50	52	53	55
5'6"	19	21	23	24	26	27	29	31	32	34	36	37	39	40	42	44	45	47	48	50	52	53
5'7"	19	20	22	24	25	27	28	30	31	33	35	36	38	39	41	42	44	46	47	49	50	52
5'8"	18	20	21	23	24	26	27	29	30	32	34	35	37	38	40	41	43	44	46	47	49	50
5'9"	18	19	21	22	24	25	27	28	30	31	33	34	36	37	38	40	41	43	44	46	47	49
5'10"	17	19	20	22	23	24	26	27	29	30	32	33	35	36	37	39	40	42	43	45	46	47
5'11"	17	18	20	21	22	24	25	27	28	29	31	32	34	35	36	38	39	41	42	43	45	45
6'0"	16	18	19	20	22	23	24	26	27	29	30	31	33	34	35	37	38	39	41	43	43	45
6'1"	16	17	19	20	21	22	24	25	26	28	29	30	32	33	34	36	37	38	40	41	42	44
6'2"	15	17	18	19	21	22	23	24	26	27	28	30	31	32	33	35	36	37	39	40	41	42
6'3"	15	16	18	19	20	21	23	24	25	26	28	29	30	31	33	34	35	36	38	39	40	41
6'4"	15	16	17	18	20	21	22	23	24	26	27	28	29	30	32	33	34	35	37	38	39	40
6'5"	14	15	17	18	19	20	21	23	24	25	26	27	29	30	31	32	33	34	36	37	38	39
6'6"	14	15	16	17	19	20	21	22	23	24	25	27	28	29	30	31	32	34	35	36	37	38
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6'8"	13	14	15	17	18	19	20	21	22	23	24	25	26	28	29	30	31	32	33	34	35	36
6'9"	13	14	15	16	17	18	19	20	21	23	24	25	26	27	28	29	30	31	32	33	34	35
6'10"	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	34	35

Severly Underweight: < 17.5

Underweight: 17.5 - 18.4

Optimal: 18.5 - 25

Overweight: 25.1 - 30

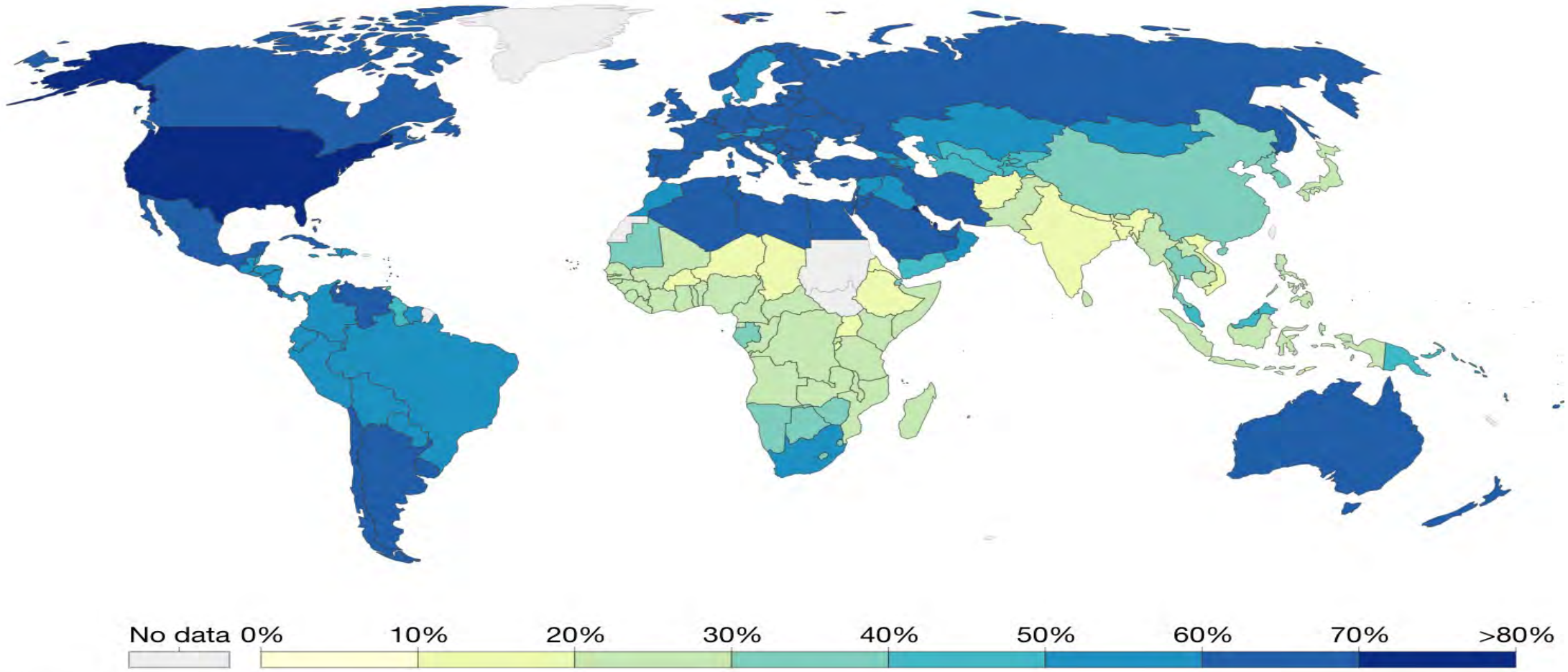
Obese: 30.1 - 40

Severely Obese: > 40.1

Obesity as a Global Problem

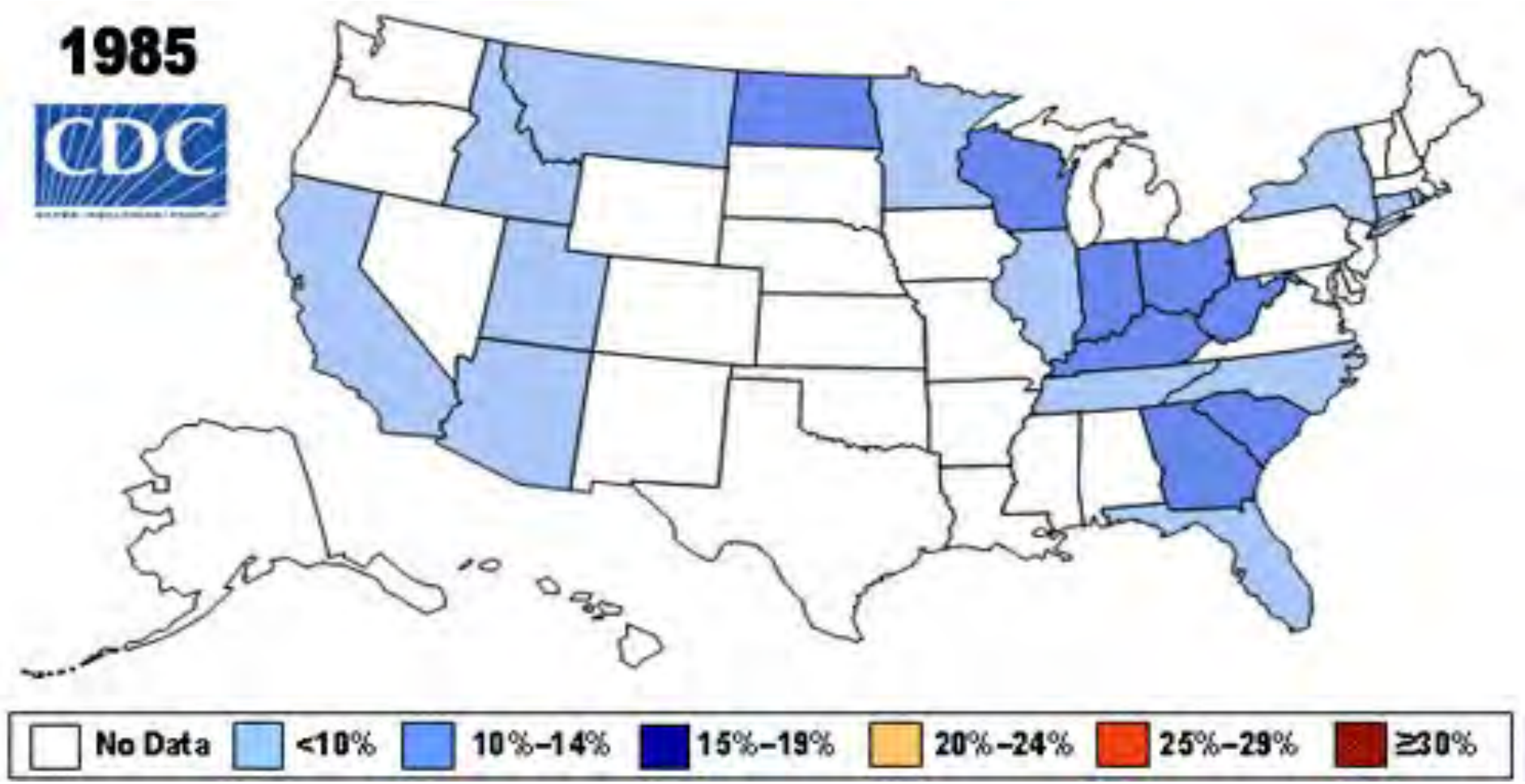
Share of adults that are overweight or obese, 2016

Being overweight is defined as having a body-mass index (BMI) greater than or equal to 25. Obesity is defined by a BMI greater than or equal to 30. BMI is a person's weight in kilograms divided by his or her height in metres squared.



Source: WHO, Global Health Observatory

As an American Problem

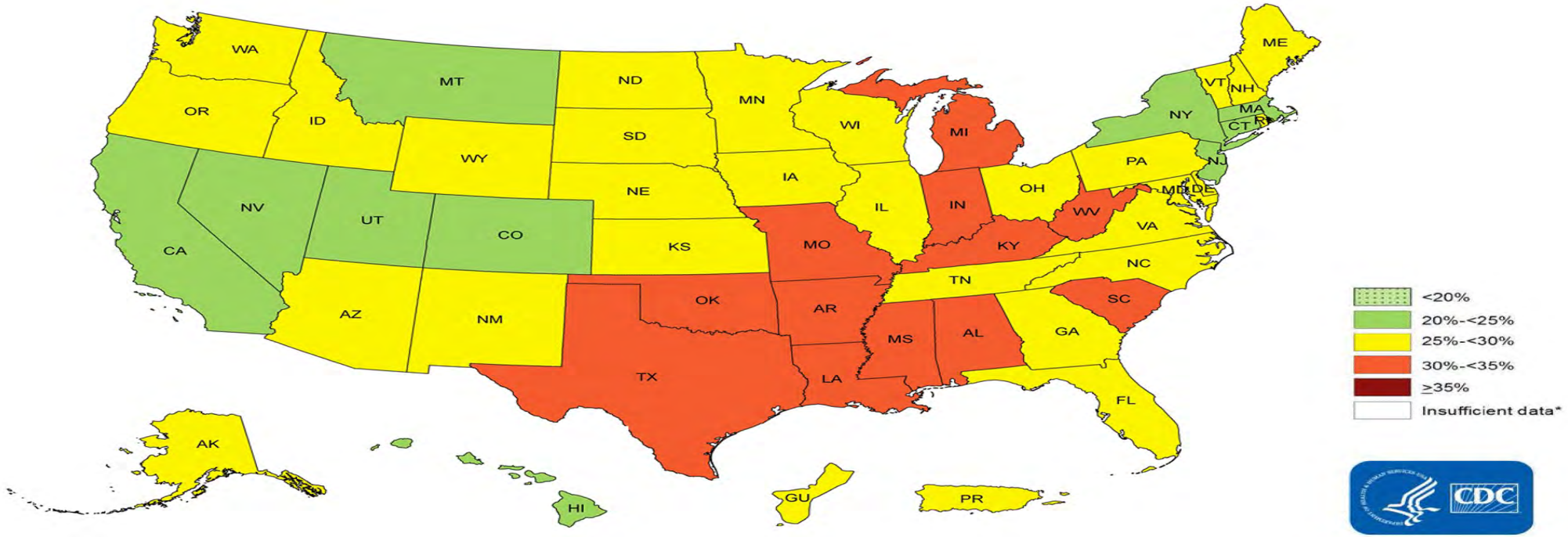


An American Problem

Prevalence† of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS

†Prevalence estimates reflect BRFSS methodological changes started in 2011.
These estimates should not be compared to prevalence estimates before 2011.

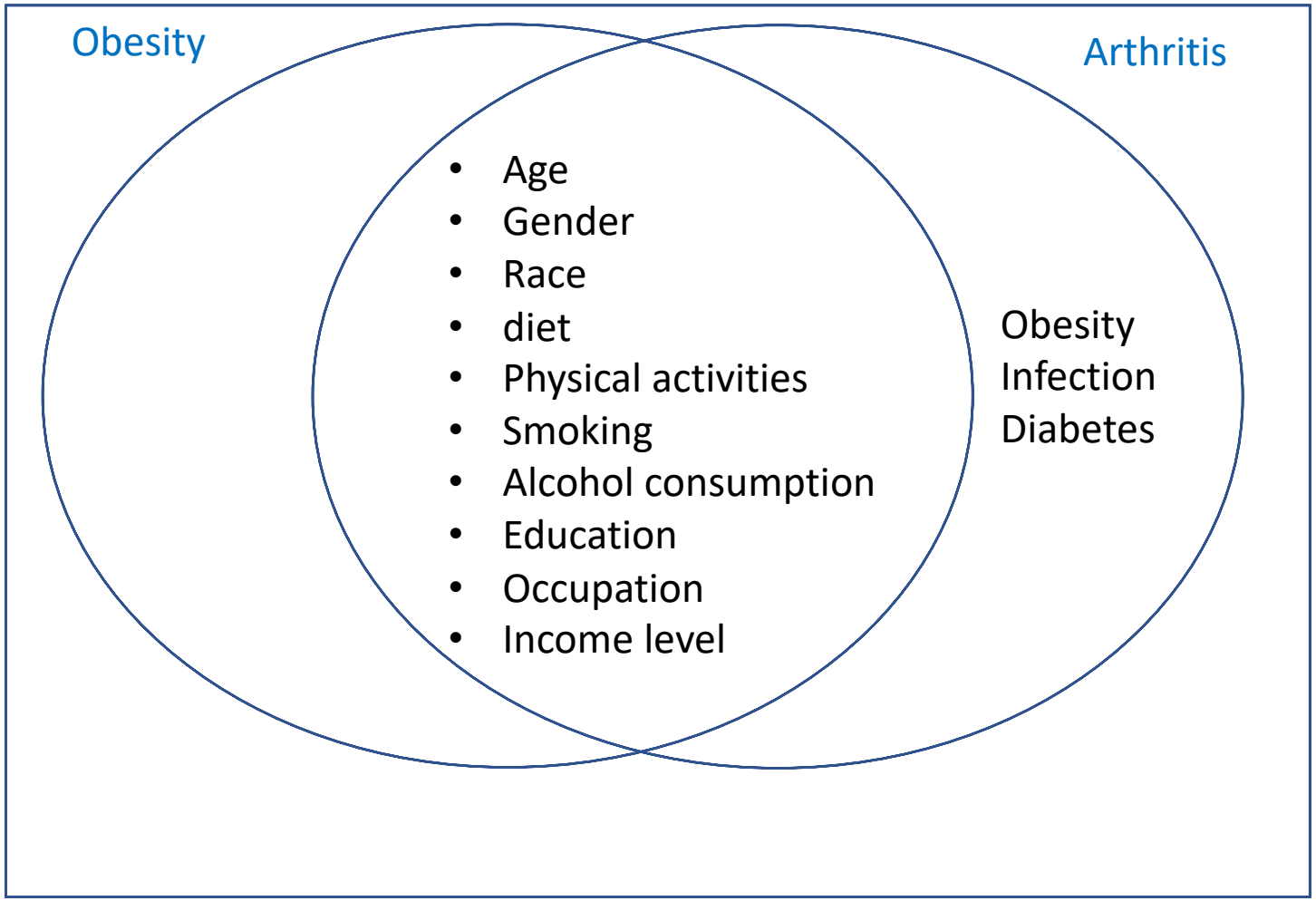
2011 2012 2013 2014 2015 2016 2017 2018 2019

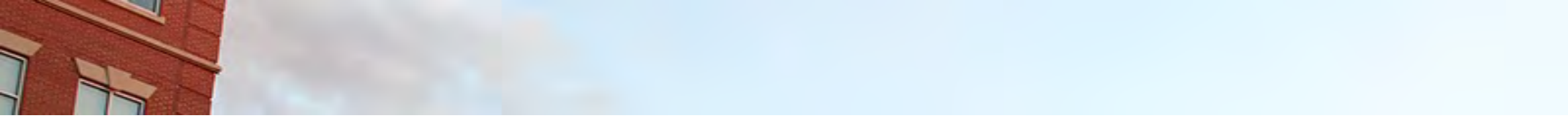


*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥30%.

Overlap in Risk factors?

Gene & Environment





The Study

National Health and Nutrition Examination Survey (NHANES)

- A nationally representative sample of non-institutionalized persons each year.

  (2012 – 2018).
- Combine assessment of risks and lifestyle factors and physical examination with laboratory tests (include medical, dental, physical, and physiological)

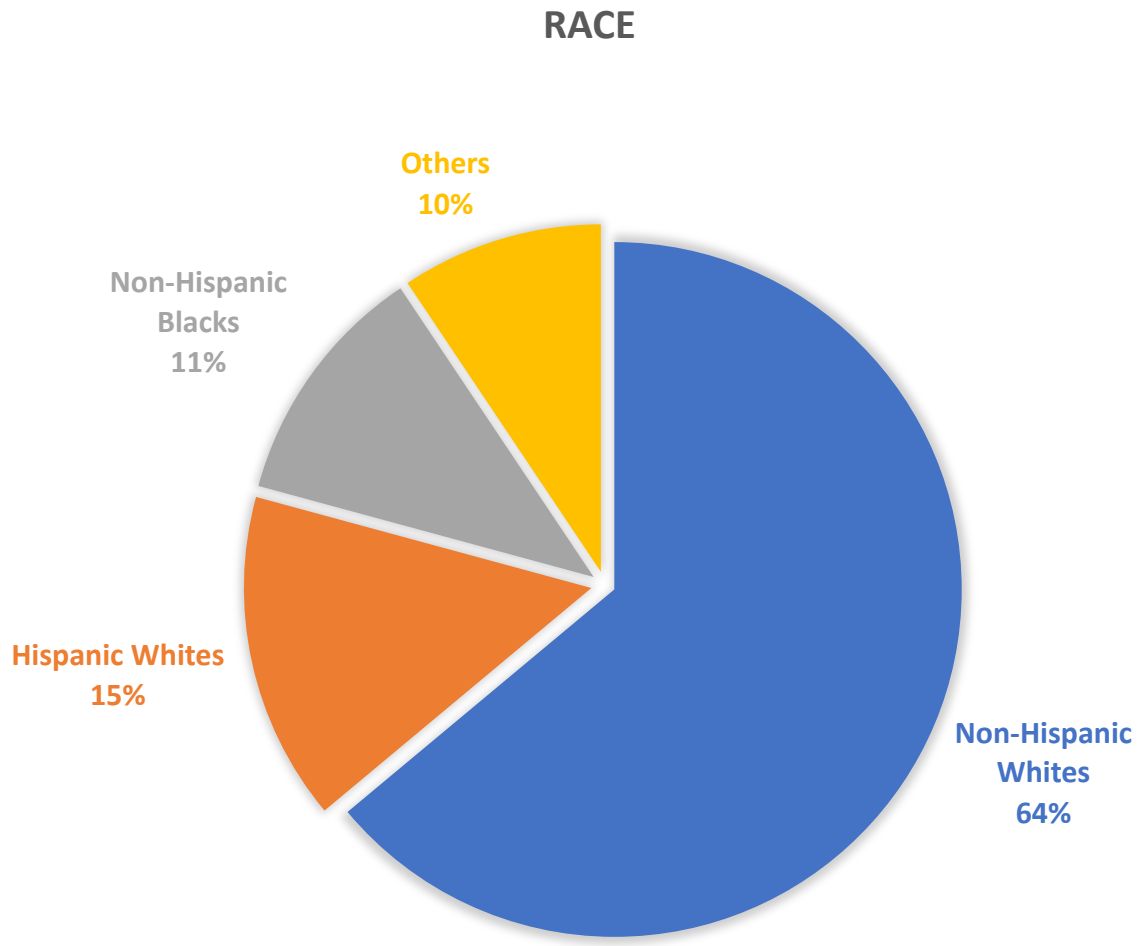
Study

Goals

- Investigate the relationship between obesity in Americans 30 years and above.
- Influencing (risk factors).
- Investigate inflammatory vs wear-and-tear effects of obesity on arthritis.

Study

Demographics
(N=17,016)



- ≥ 30 years of age = 79.7 %
- Women = 51.8%
- At or above the poverty level = 85%
- Lacked college education = 69%

Results

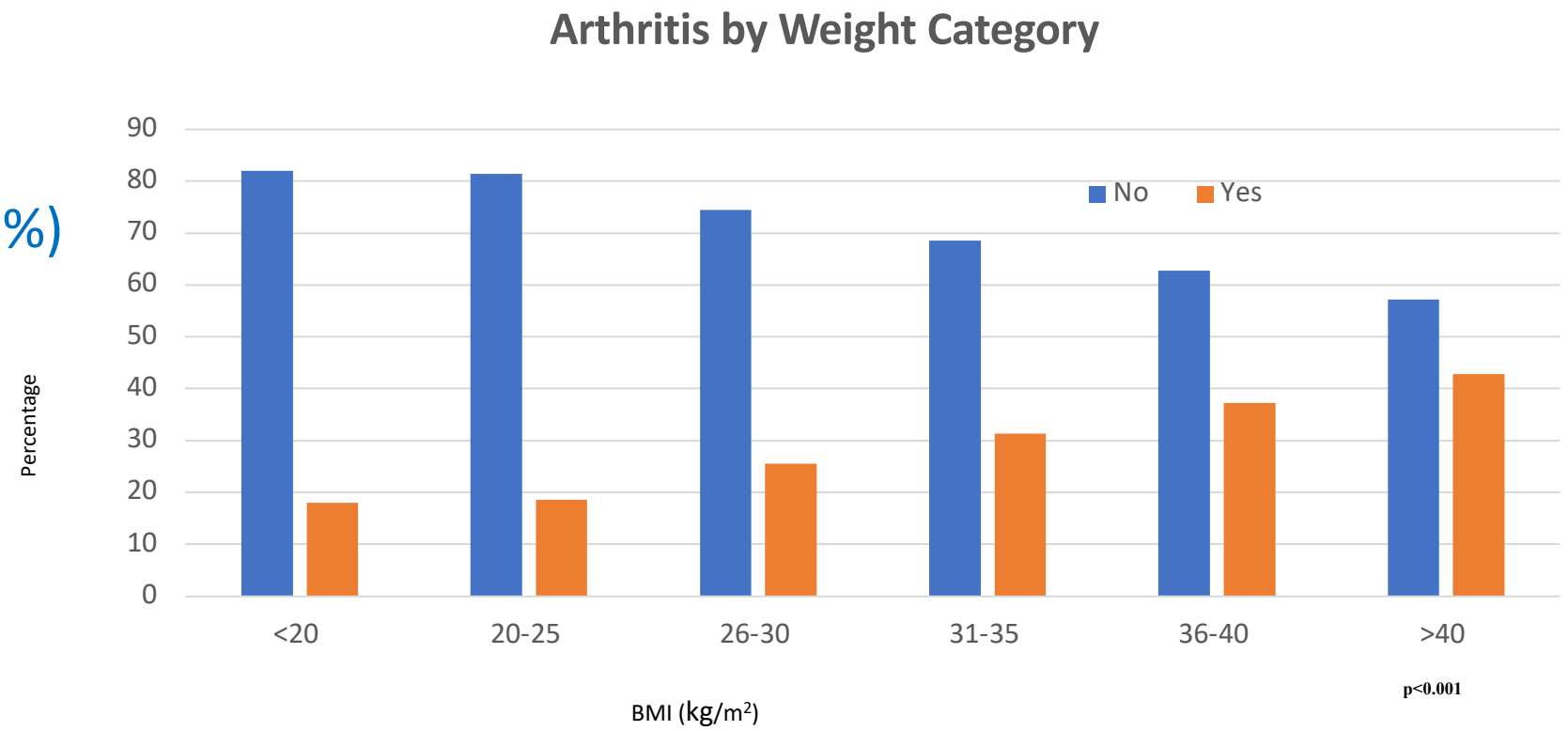
Relationship

Obesity → **Arthritis**

N=17,016

Prevalence:

- Obesity was 40.0% (42.4%)
- Arthritis 27.5% (22.7%)



Results

Variable	Unadjusted		Adjusted	
	OR (95%CI)	p-value	OR (95%CI)	p-value
Obesity				
Normal (<30kg/m²)	Ref		Ref	
Obese (> 30kg/m²)	1.88(1.70-2.08)	0.00	1.55(1.35-1.80)	0.00
Age				
< 30 years	Ref		Ref	
>= 30 years	12.01(9.71-14.87)	0.00	10.81(6.36-18.37)	0.00
Gender				
Male	Ref		Ref	
Female	1.61(1.49-1.74)	0.00	1.94(1.66-2.28)	0.00
Race				
Non-Hispanic Whites	Ref		Ref	
All Hispanics	0.42(0.37-0.48)	0.00	0.43(0.35-0.52)	0.00
Non-Hispanic Blacks	0.70(0.62-0.79)	0.00	0.65(0.50-0.85)	0.00
Other Races	0.55(0.46-0.65)	0.00	0.80(0.62-1.04)	0.10
Educational Level				
College Degree or higher	Ref		Ref	
Less than College Degree	1.32(1.15-1.52)	0.00	1.23(0.94-1.60)	0.12*
Poverty income ratio				
At or above	Ref		Ref	
Below (Poor)	0.99(0.84-1.16)	0.89*	1.36(1.09-1.70)	0.01
Smoking Status				
Non-Smoker	Ref		Ref	
Current Smoker	0.69(0.61-0.79)	0.00	0.72(0.60-0.88)	0.00
Engages in moderate work activity				
Yes	Ref		Ref	
No	1.07(0.96-1.20)	0.24*	1.24(1.05-1.46)	0.01
Alcohol Consumption				
Normal drinker	Ref		Ref	
Often Drinker	1.43(0.89-2.29)	0.14*	0.78(0.37-1.69)	0.53*
Diet				
Healthy Diet	Ref		Ref	
Fairly Healthy Diet	0.98(0.86-1.12)	0.76*	1.06(0.87-1.29)	0.57*
Poor Diet	1.20(0.97-1.49)	0.09*	1.09(0.70-1.72)	0.69*

Results

Influencing factors

More likely

- Obese individuals = 55%
- ≥30 years = 10 times likely
- Female = 94%
- Poor = 36%
- Alcoholics (> 14 drinks/week)= 24%
- Lack of Physical activity = 24%

Less Likely

- Race
  All Hispanics = 57%
  Non- Hispanic Blacks =35%
  Others = 20 %
- Smokers* = 28 %

Results

Inflammation

Inflammatory markers:

- C-reactive protein (CRP)
- Erythrocyte sedimentation rate (ESR)

No significant difference between obese with arthritis and obese without arthritis.

Inference

- The results suggest, at least in part, that obesity-induced inflammation might not be the major driver for the development of arthritis.
- Prevalence due to the impact of greater weight exerted on the cartilage and underlying bone in weight-bearing joints of obese individuals.

Summary

- Obesity
- Gender
- Age
- Physical Activities

Summary

Maintaining healthy weight

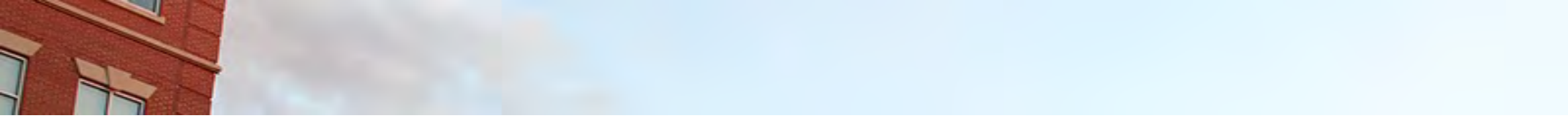
- Energy balance

  (2,000 calories per day), but Don’t just count calories.

- Physical activity

  Adults:150 minutes of physical activity each week (30 minutes a day, five days a week), including aerobic activity and muscle strengthening activity.

  ≥65: at least 150 minutes a week of moderate intensity activity such as brisk walking, at least two days a week.



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