

Age and Medical Conditions

Gender-Stratified Analysis

HPP 10K Dataset

Ages 40-70

Female: 12,313 | Male: 11,152

Blue = Male | Red = Female

EXECUTIVE SUMMARY: GENDER-STRATIFIED ANALYSIS
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This report examines whether the relationship between age and medical conditions differs between males and females.

SAMPLE SIZE

- Female: 12,313 subjects (52%)
- Male: 11,152 subjects (48%)
- Age range: 40-70 years

SIGNIFICANT ASSOCIATIONS ($p < 0.05$, $n \geq 50$)

MALES:

- 26 significant conditions
- 15 increase with age
- 11 decrease with age

FEMALES:

- 32 significant conditions
- 18 increase with age
- 14 decrease with age

KEY FINDINGS

1. CARDIOVASCULAR CONDITIONS

Generally increase with age in BOTH genders, but may have different slopes (effect sizes).

2. SEX-SPECIFIC CONDITIONS

- Breast Cancer, PCOS, Endometriosis: Female only
- Erectile Dysfunction: Male only
- Gout: More common in males

3. MENTAL HEALTH

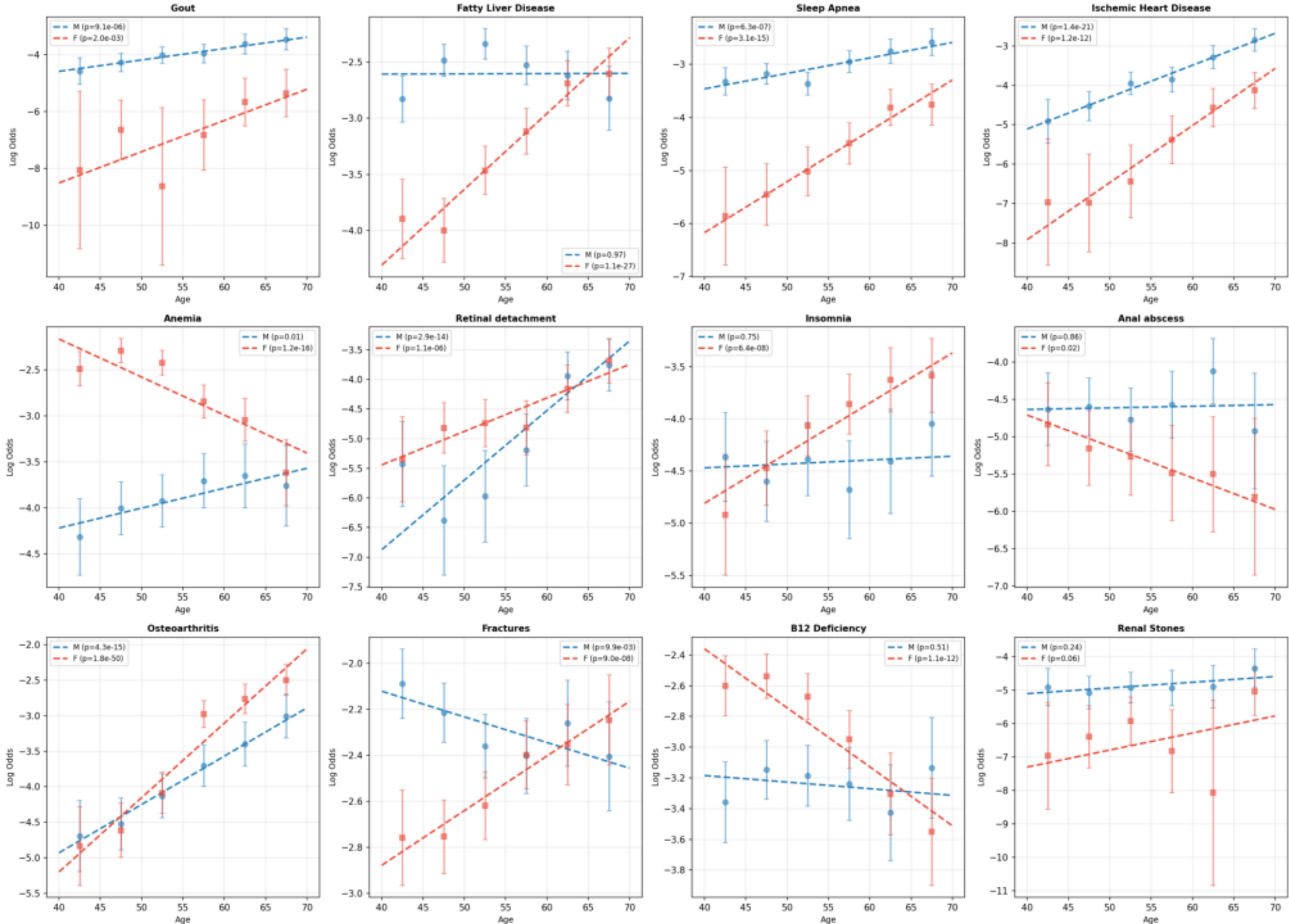
Depression, Anxiety: May show different age patterns by gender

4. AUTOIMMUNE CONDITIONS

Often more prevalent in females with different age trajectories

Conditions with Largest Gender Differences

Conditions with Largest Gender Differences in Age Effect
(Blue=Male, Red=Female, dashed=fitted line)



Top 15 Conditions Increasing with Age - MALES

Condition	N (Male)	OR/Decade	P-value
Retinal detachment	76	3.23	2.86e-14
Ischemic Heart Disease	231	2.25	1.36e-21
Hypertension	1451	2.24	2.53e-105
Diabetes	137	2.12	4.45e-12
Glaucoma	77	2.05	6.22e-07
Osteoarthritis	216	1.97	4.34e-15
Hyperlipidemia	2751	1.79	1.39e-89
Hearing loss	457	1.72	2.02e-19
Prediabetes	903	1.71	2.42e-34
Gout	197	1.49	9.12e-06
Gallstone Disease	256	1.44	4.11e-06
Peptic Ulcer Disease	223	1.35	4.55e-04
Sleep Apnea	490	1.34	6.29e-07
Urinary Tract Stones	510	1.31	2.54e-06
Anemia	217	1.24	0.0130

Top 15 Conditions Increasing with Age - FEMALES

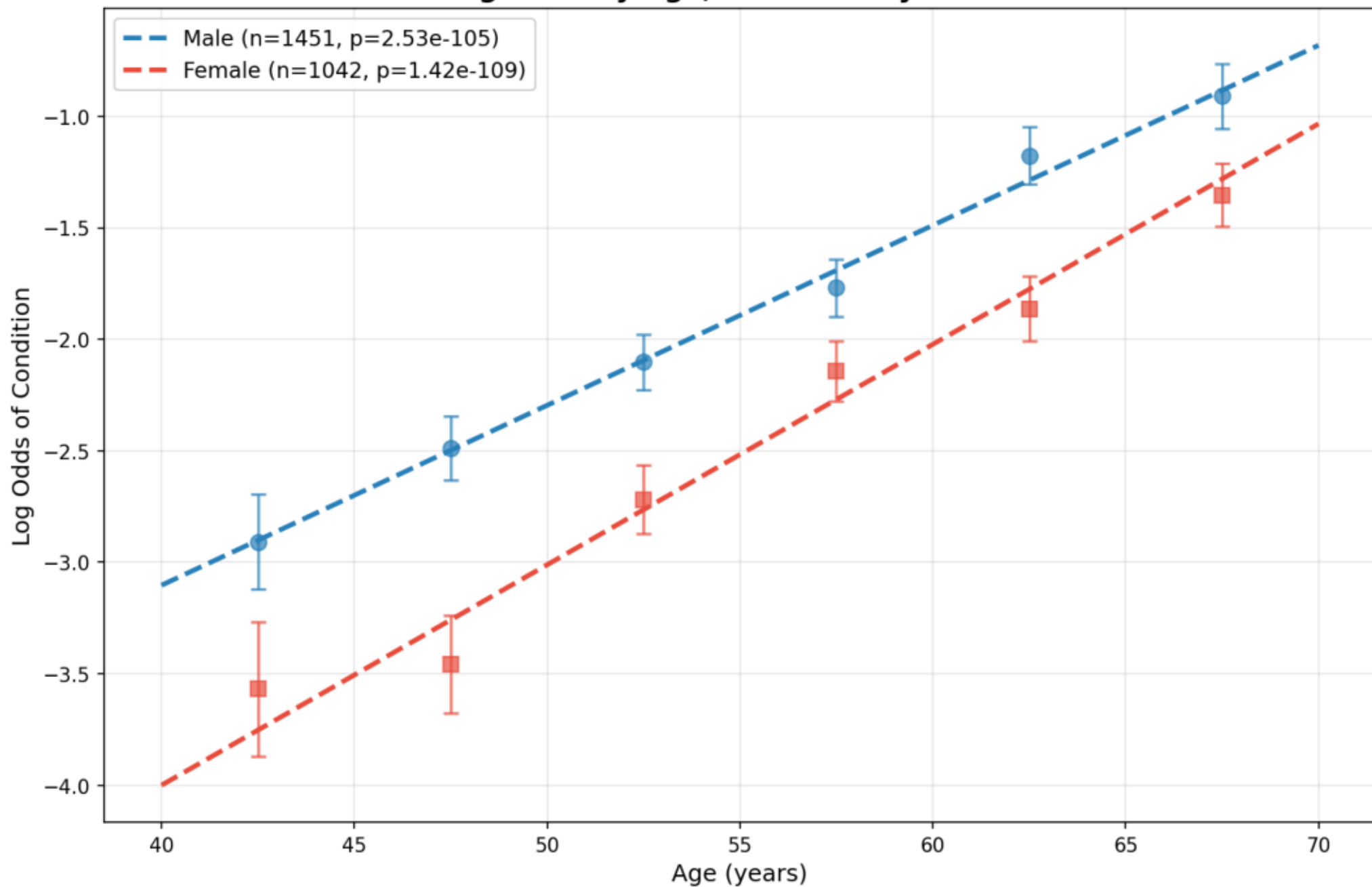
Condition	N (Female)	OR/Decade	P-value
Ischemic Heart Disease	54	4.25	1.23e-12
Glaucoma	84	2.87	1.71e-12
Osteoarthritis	395	2.85	1.83e-50
Hypertension	1042	2.69	1.42e-109
Sleep Apnea	123	2.61	3.10e-15
Hyperlipidemia	2261	2.15	5.07e-131
Fatty Liver Disease	456	1.97	1.14e-27
Prediabetes	1049	1.82	9.84e-46
Retinal detachment	124	1.76	1.10e-06
Hearing loss	365	1.72	1.57e-15
Diabetes	110	1.65	4.76e-05
Insomnia	211	1.62	6.44e-08
Peptic Ulcer Disease	205	1.5	7.43e-06
Hypercholesterolaemia	50	1.33	0.1185
Fractures	902	1.27	9.03e-08

Conditions with Largest Gender Differences in Age Effect

Condition	N Male	OR/10y Male	N Female	OR/10y Female
Gout	197	1.49	15	3.0
Fatty Liver Disease	813	1.0	456	1.97
Sleep Apnea	490	1.34	123	2.61
Ischemic Heart Disease	231	2.25	54	4.25
Anemia	217	1.24	830	0.66
Retinal detachment	76	3.23	124	1.76
Insomnia	125	1.04	211	1.62
Anal abscess	109	1.02	59	0.66
Osteoarthritis	216	1.97	395	2.85
Fractures	1034	0.89	902	1.27
B12 Deficiency	417	0.96	693	0.68
Renal Stones	79	1.19	22	1.66
Glaucoma	77	2.05	84	2.87
Fibromyalgia	34	0.91	211	1.18
Diabetes	137	2.12	110	1.65

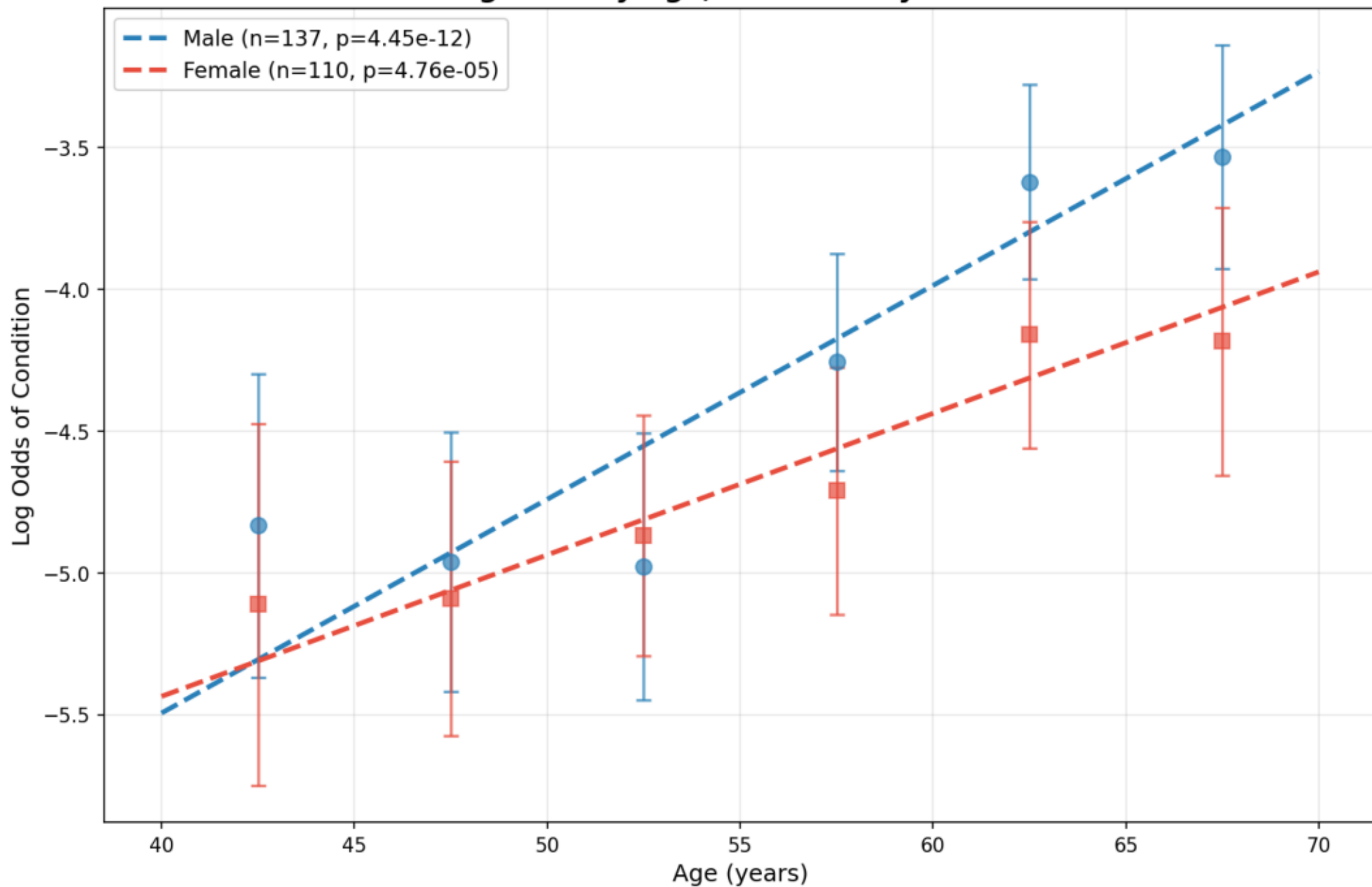
Hypertension

Log Odds by Age, Stratified by Gender

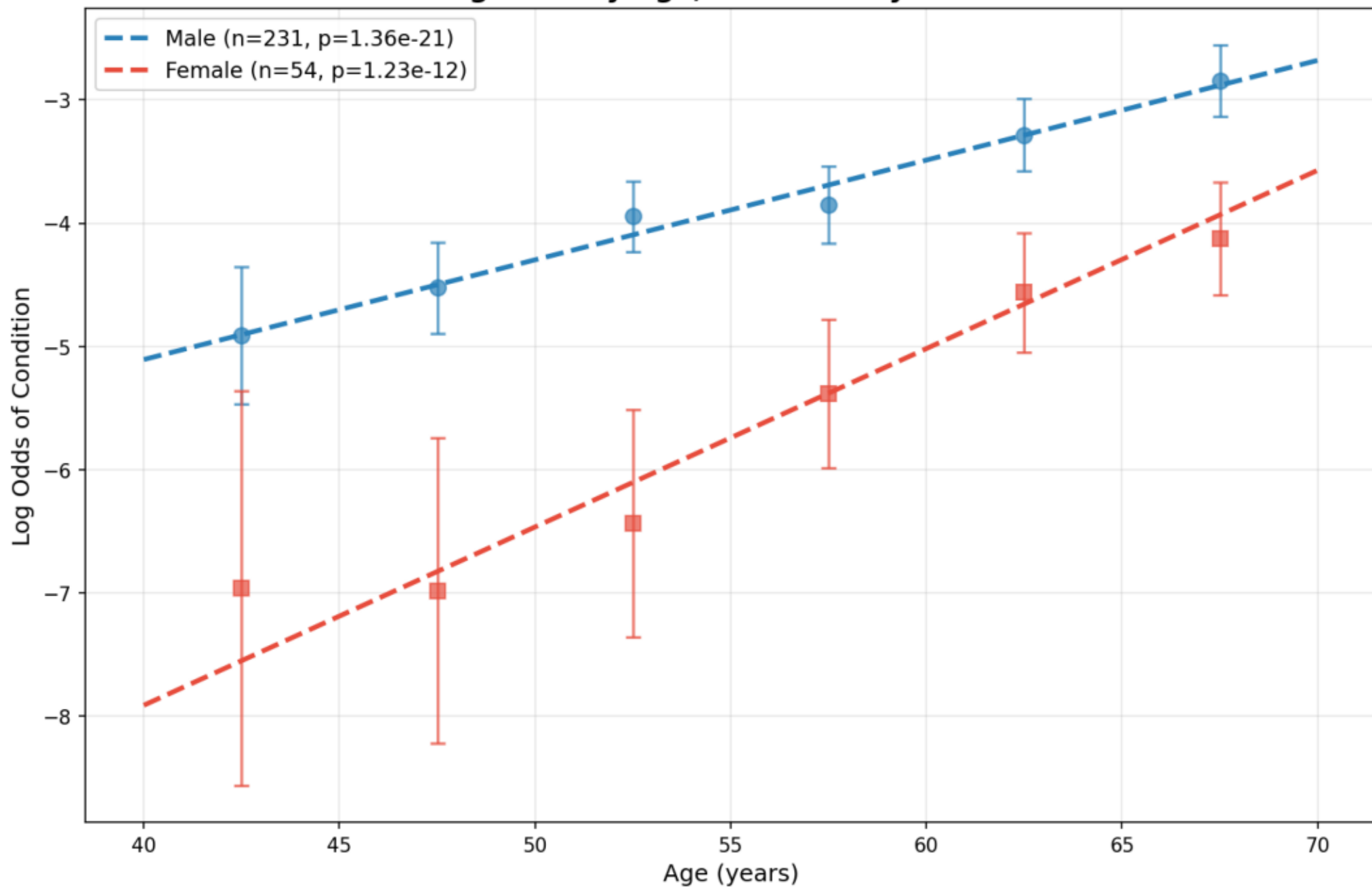


Diabetes

Log Odds by Age, Stratified by Gender

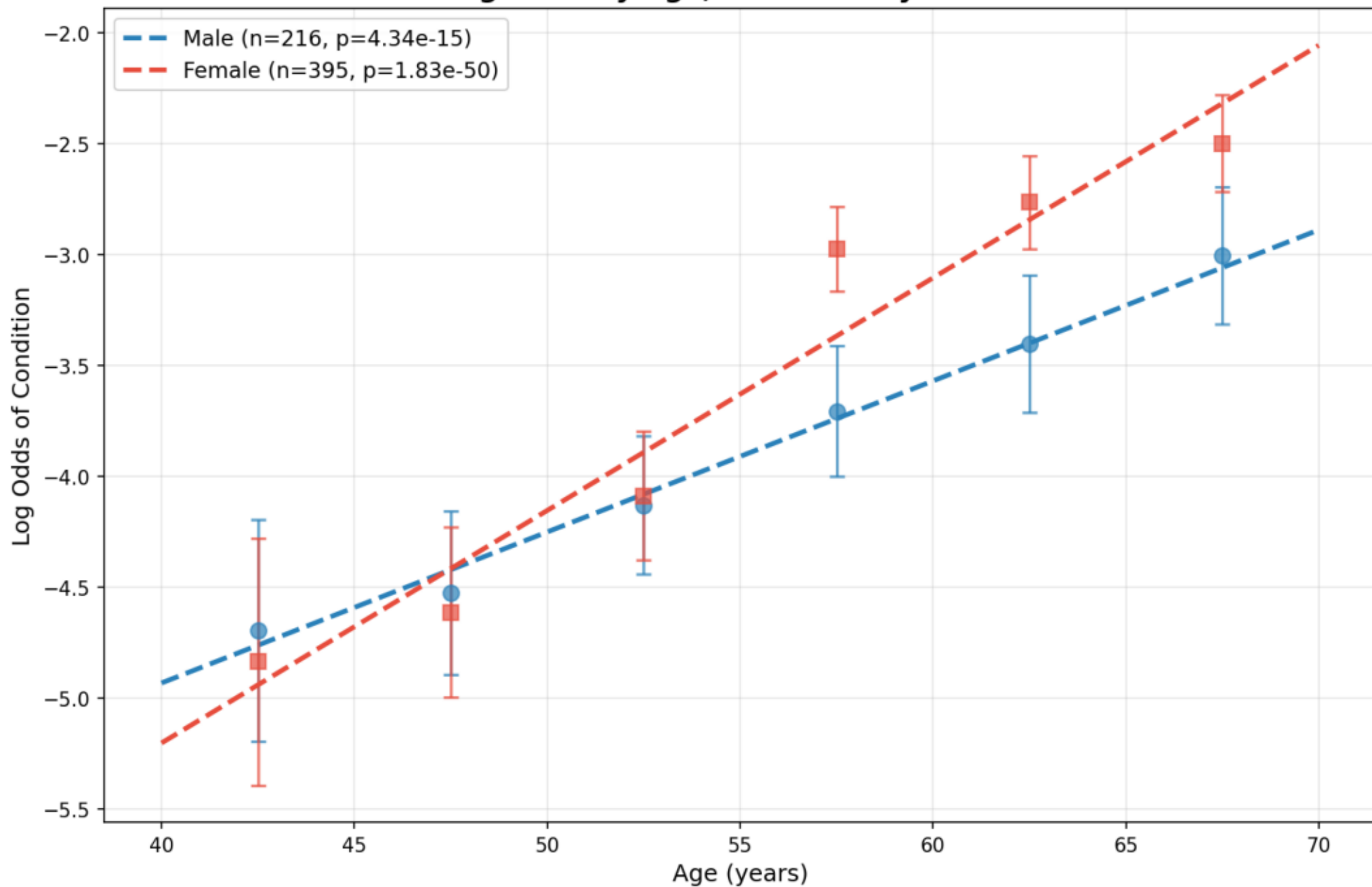


Ischemic Heart Disease Log Odds by Age, Stratified by Gender



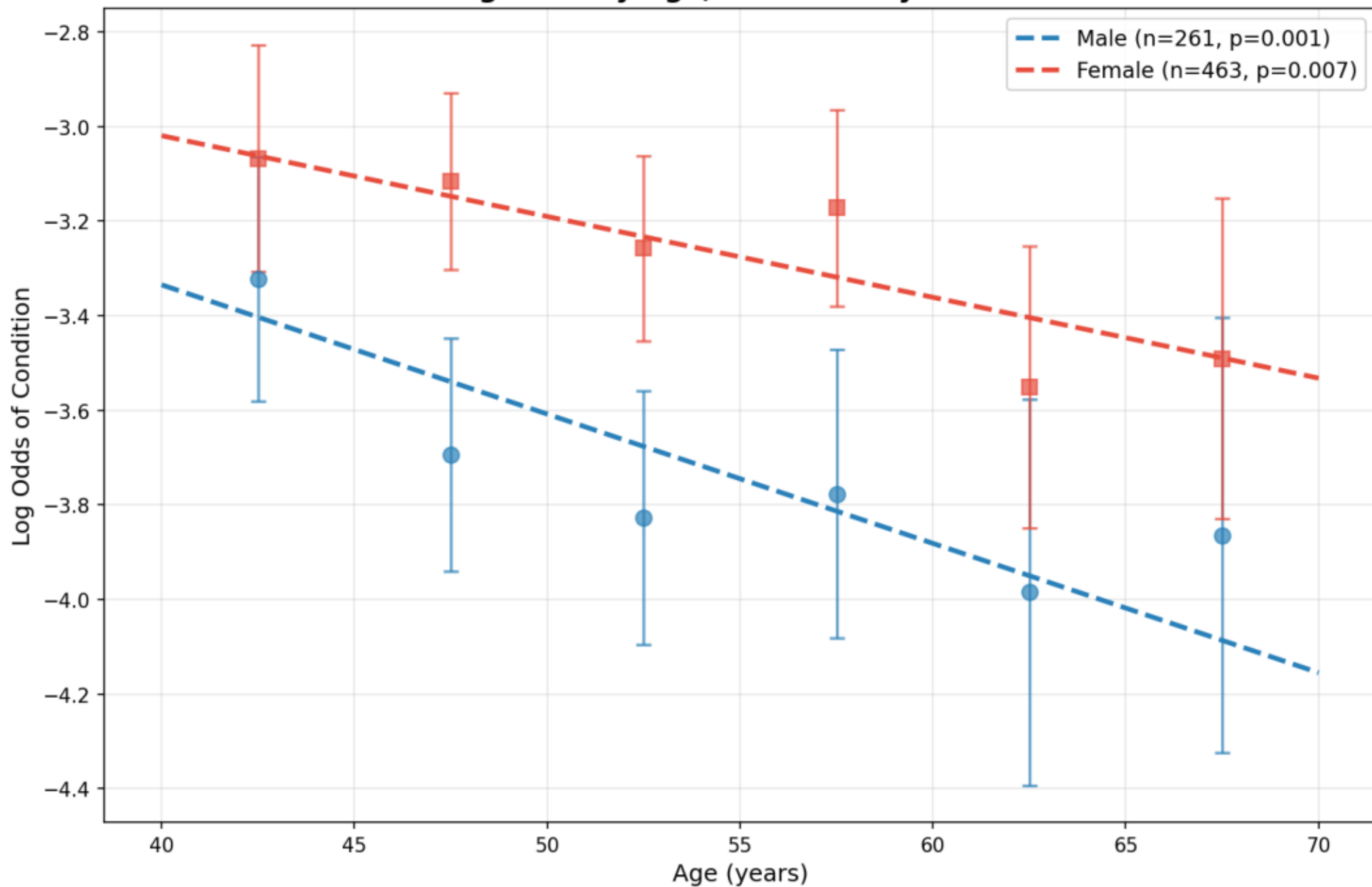
Osteoarthritis

Log Odds by Age, Stratified by Gender



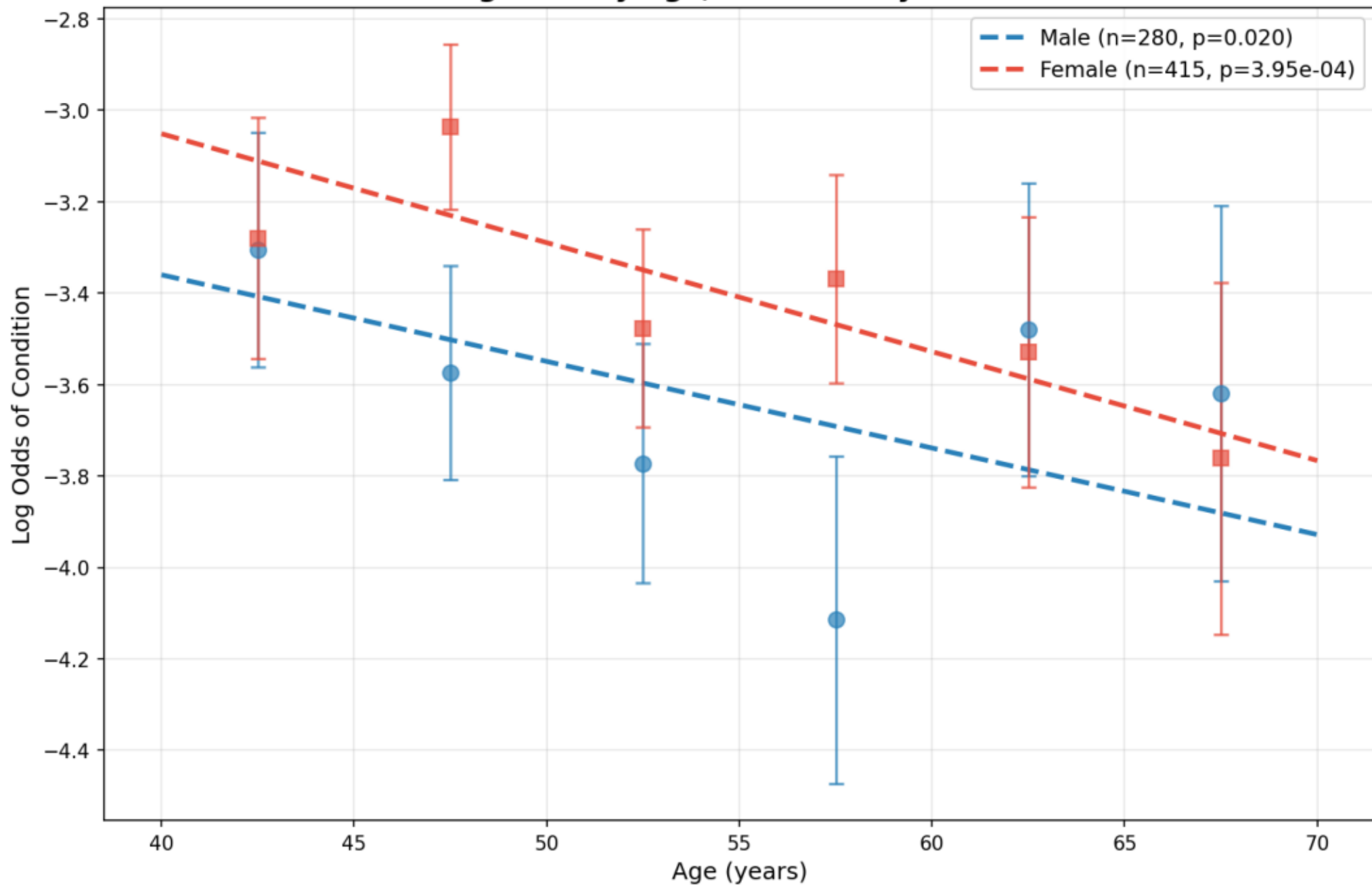
Depression

Log Odds by Age, Stratified by Gender



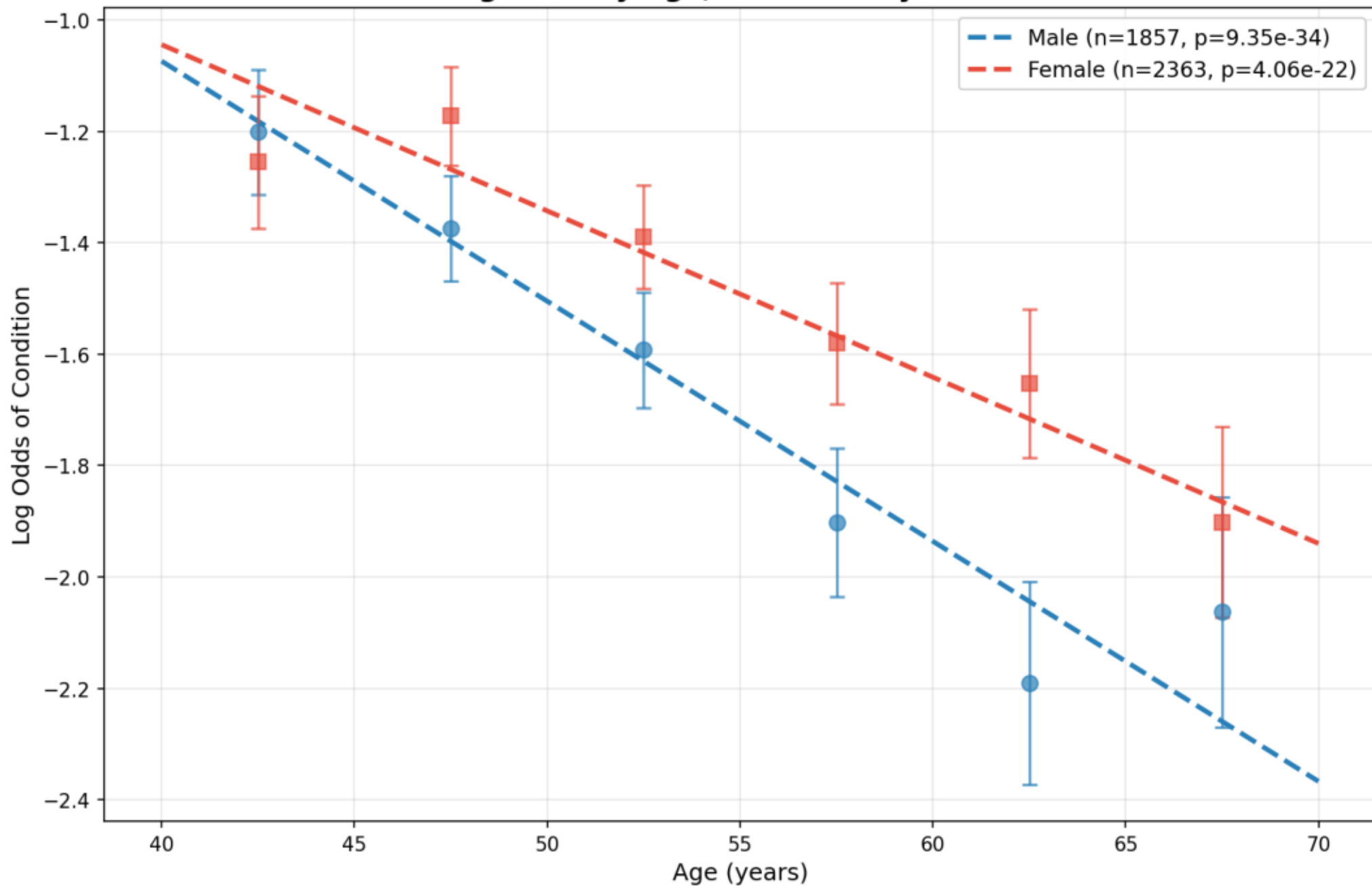
Anxiety

Log Odds by Age, Stratified by Gender



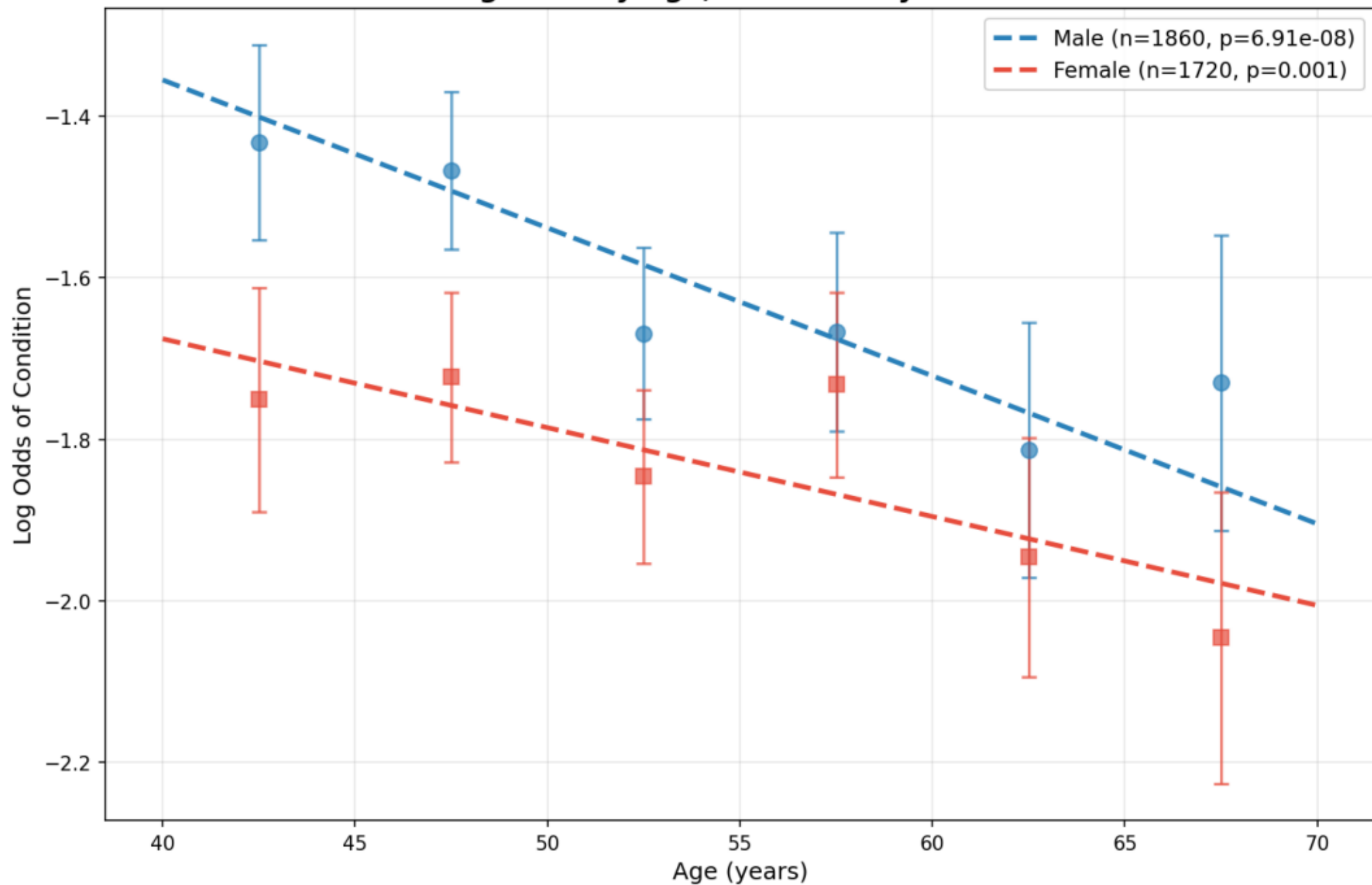
Allergy

Log Odds by Age, Stratified by Gender



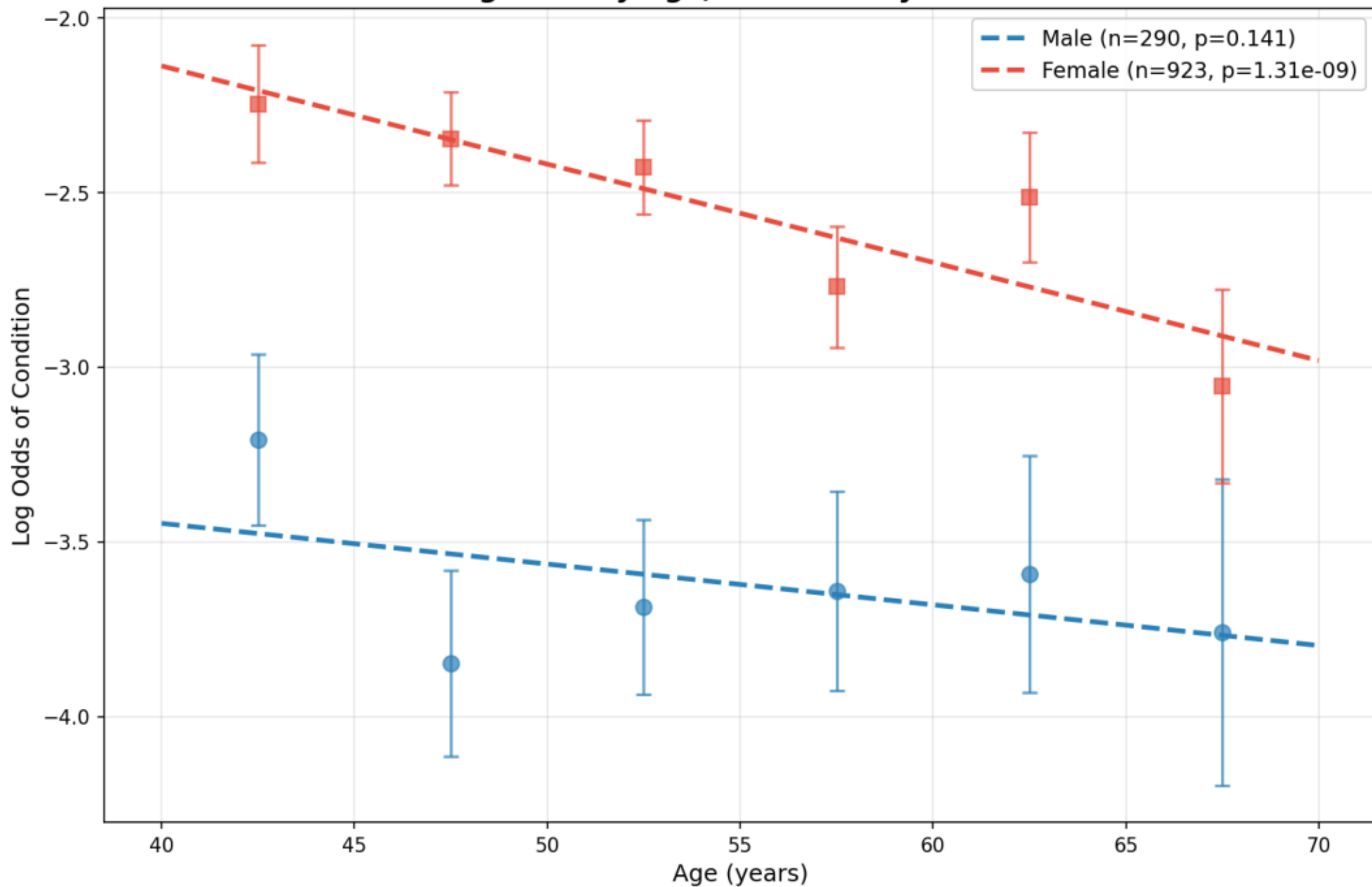
ADHD

Log Odds by Age, Stratified by Gender



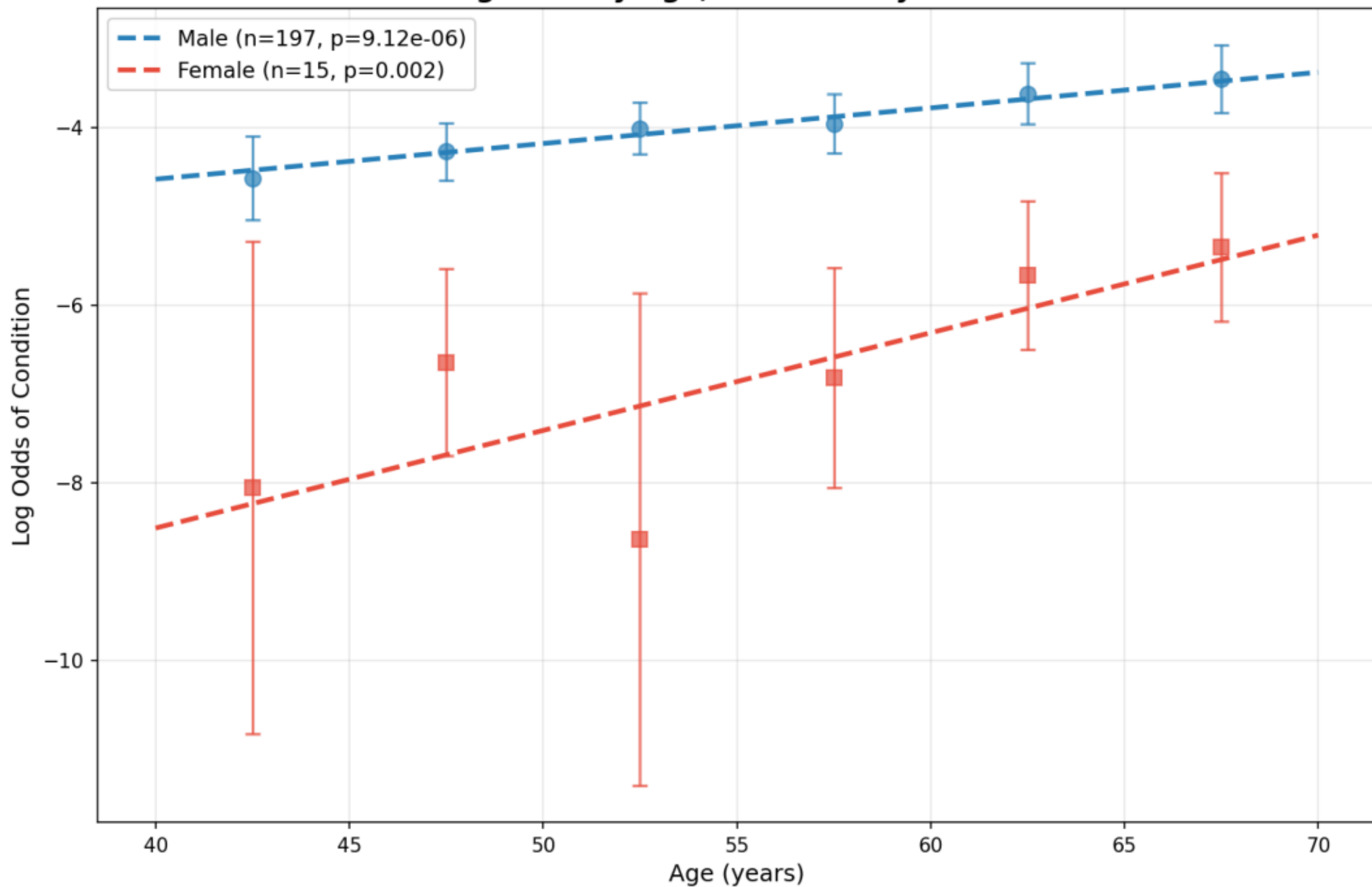
Migraine

Log Odds by Age, Stratified by Gender



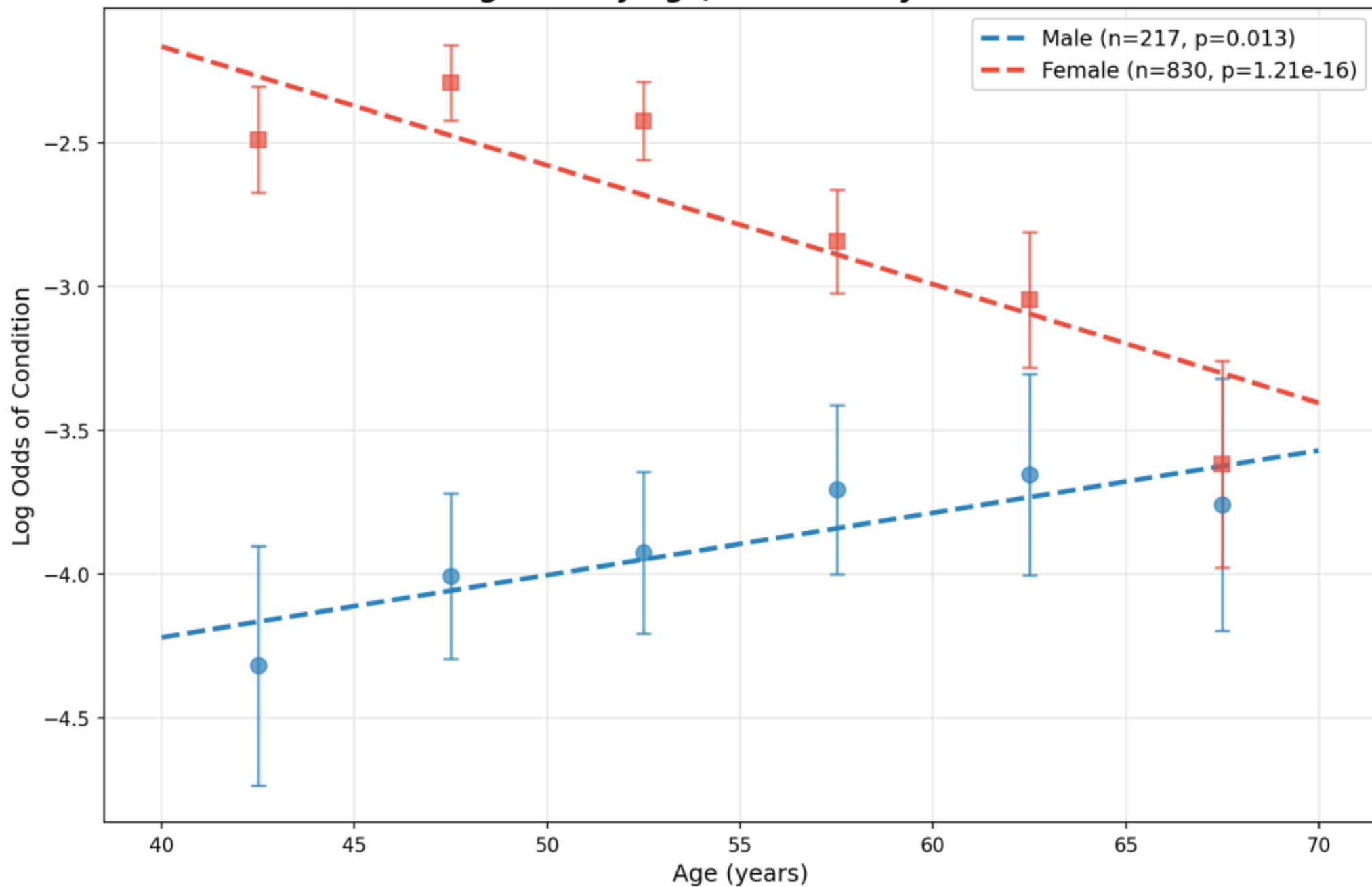
Gout

Log Odds by Age, Stratified by Gender



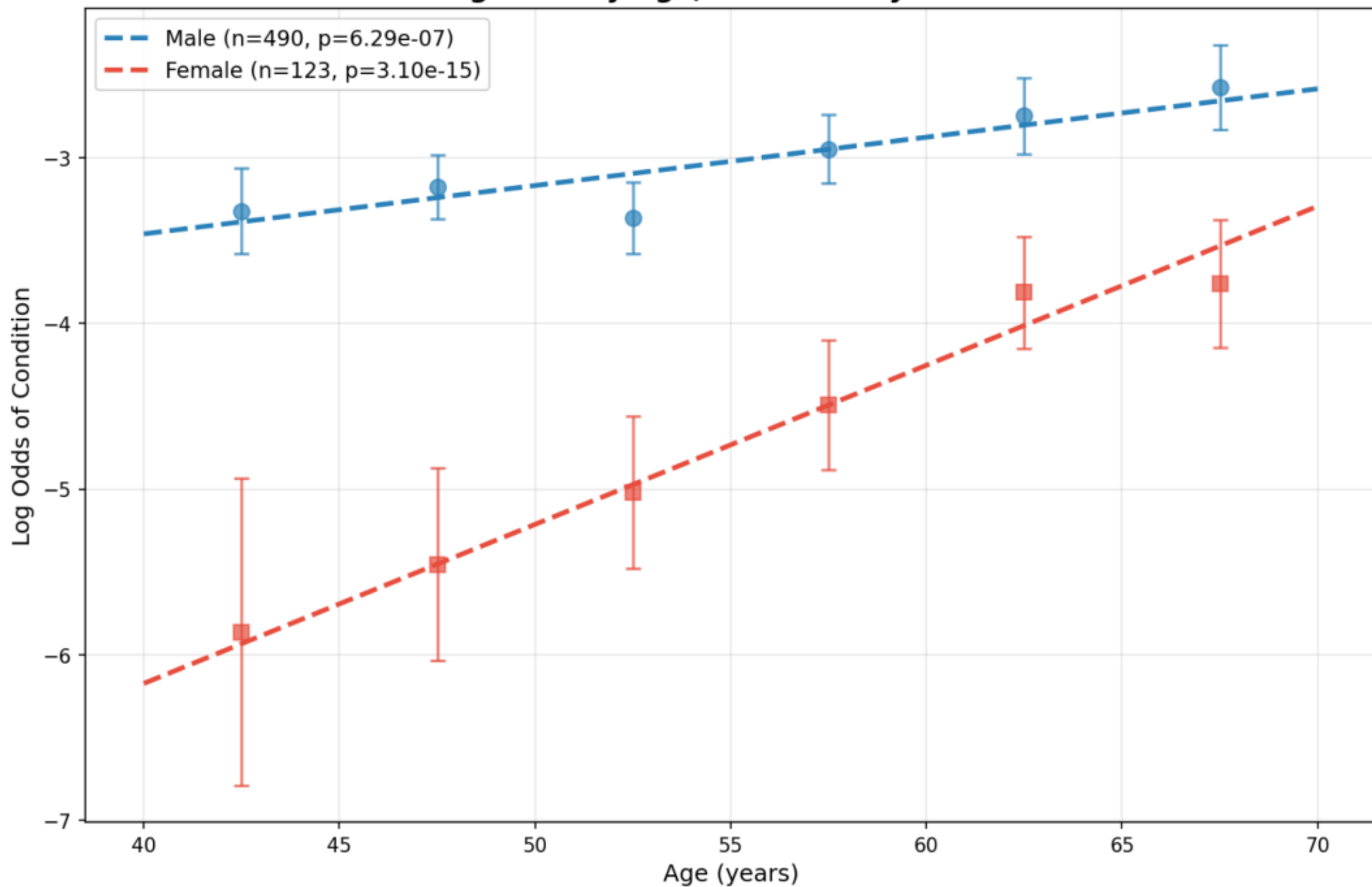
Anemia

Log Odds by Age, Stratified by Gender



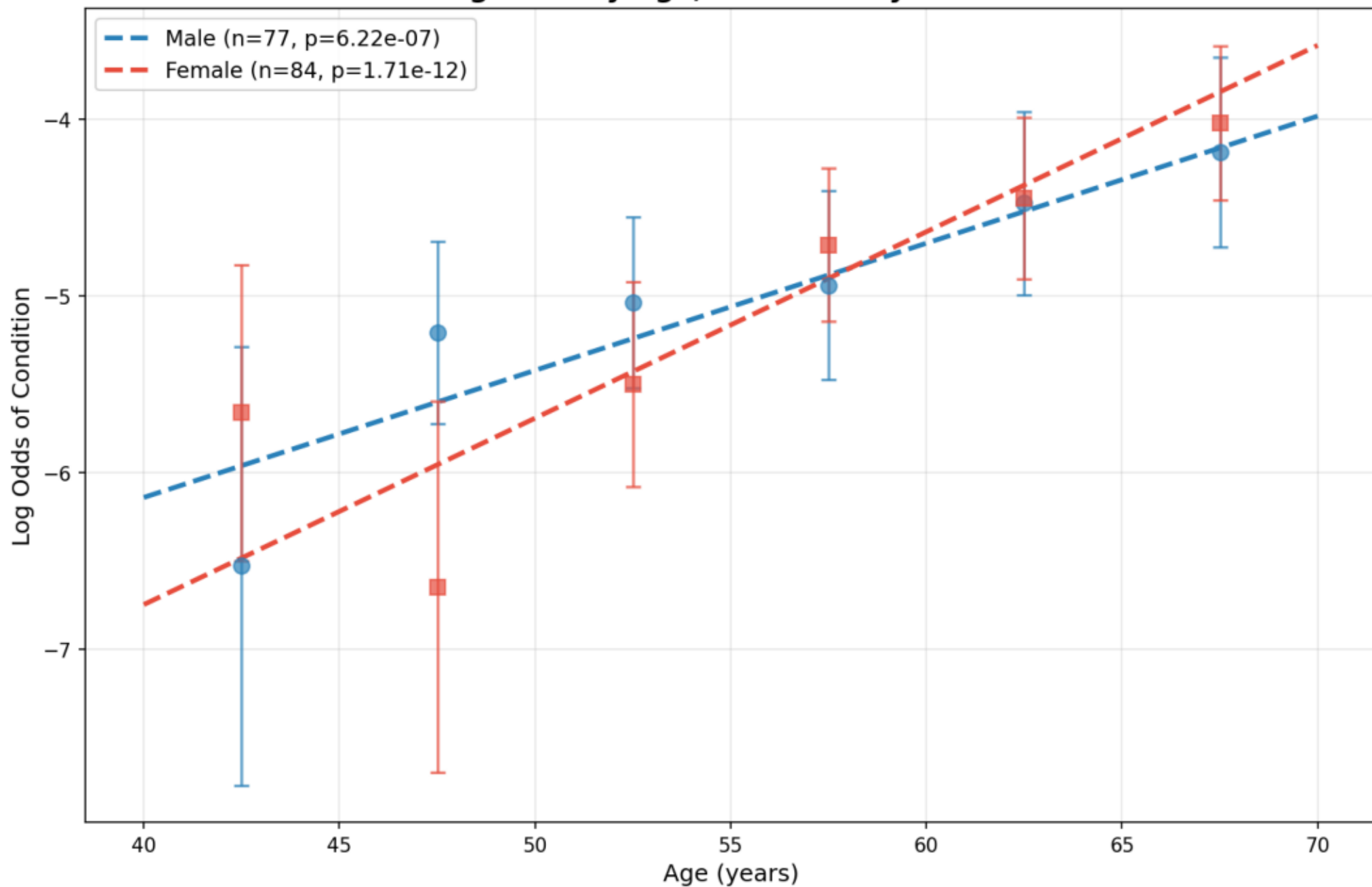
Sleep Apnea

Log Odds by Age, Stratified by Gender



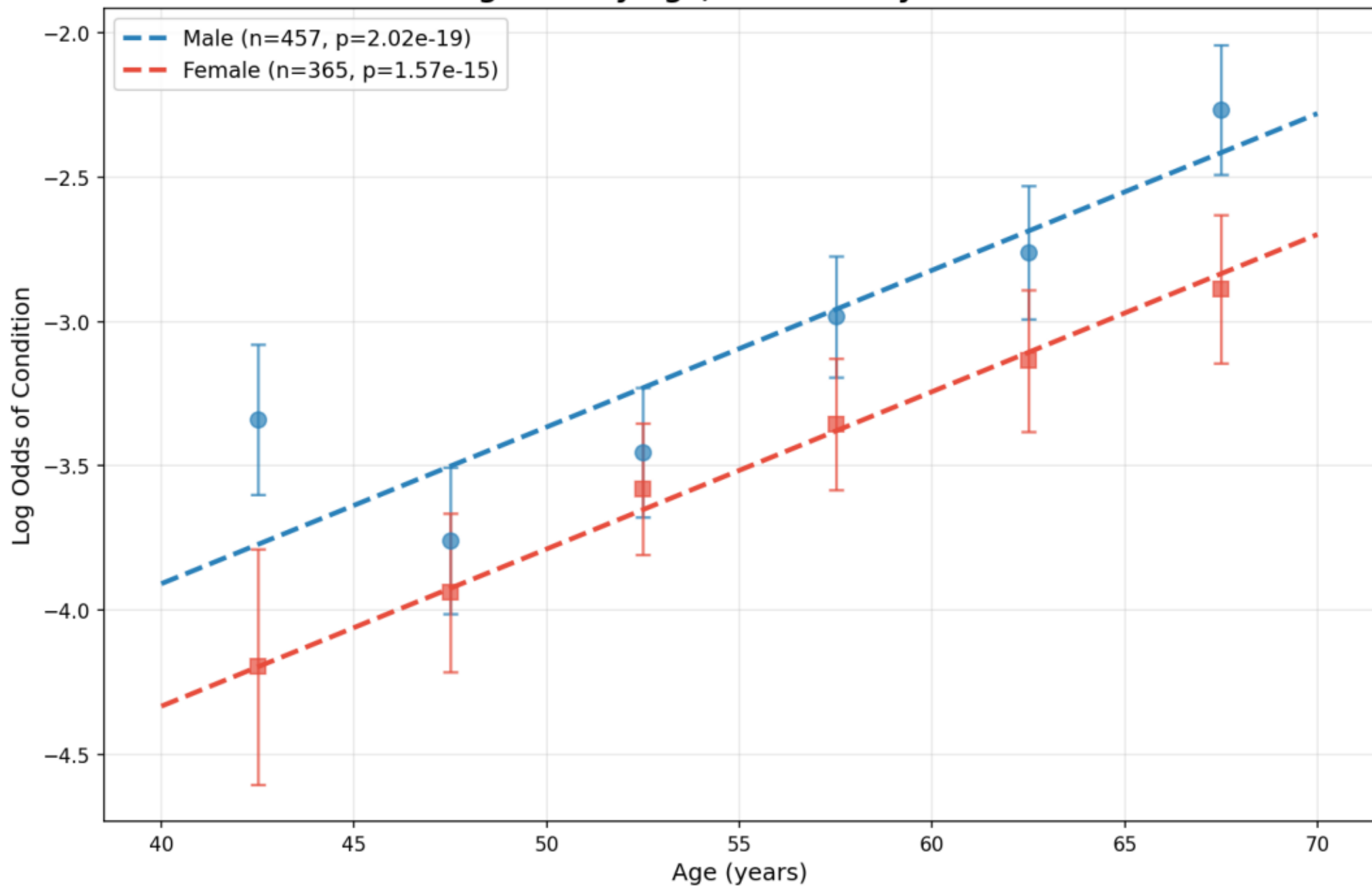
Glaucoma

Log Odds by Age, Stratified by Gender



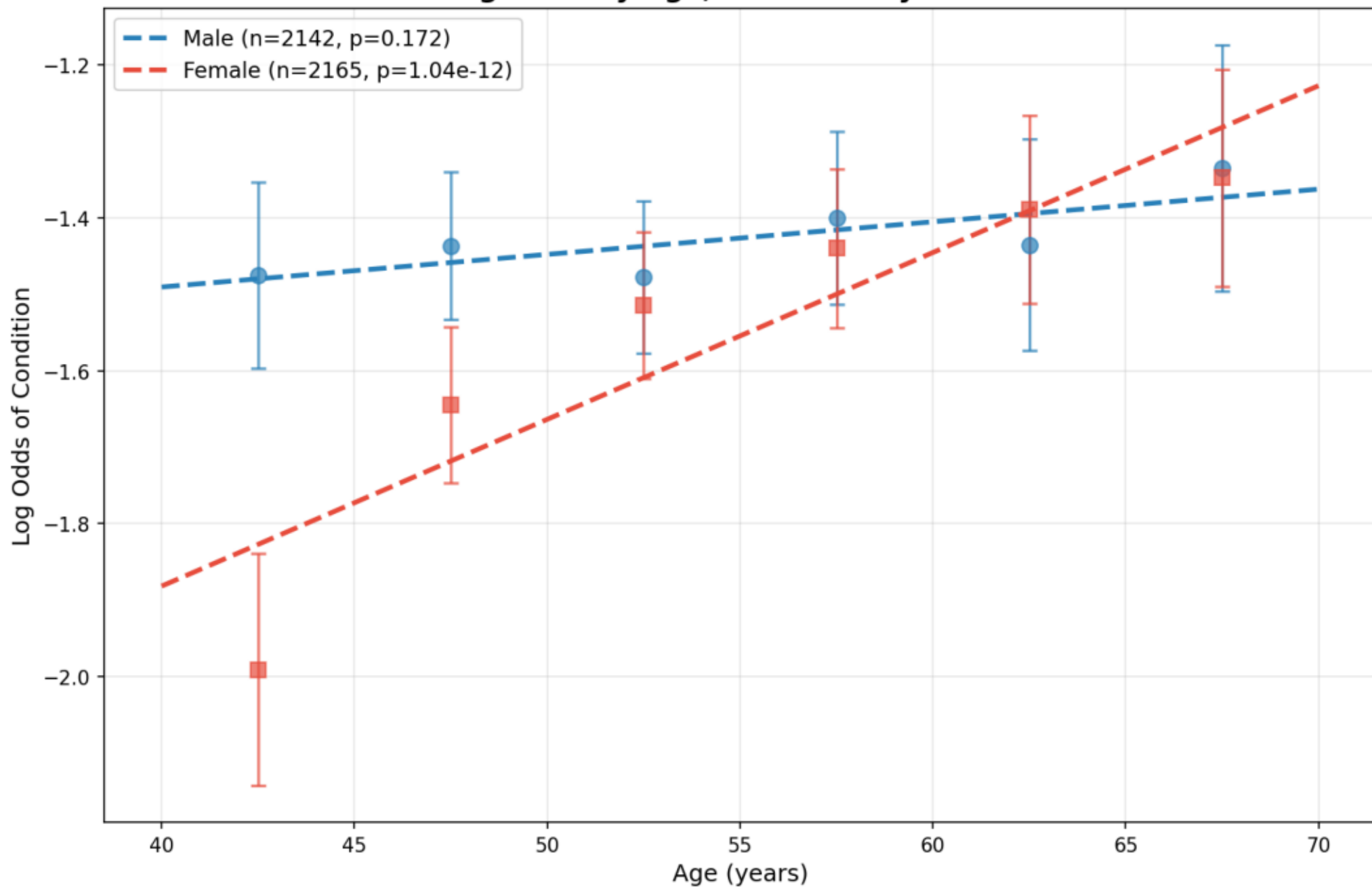
Hearing loss

Log Odds by Age, Stratified by Gender



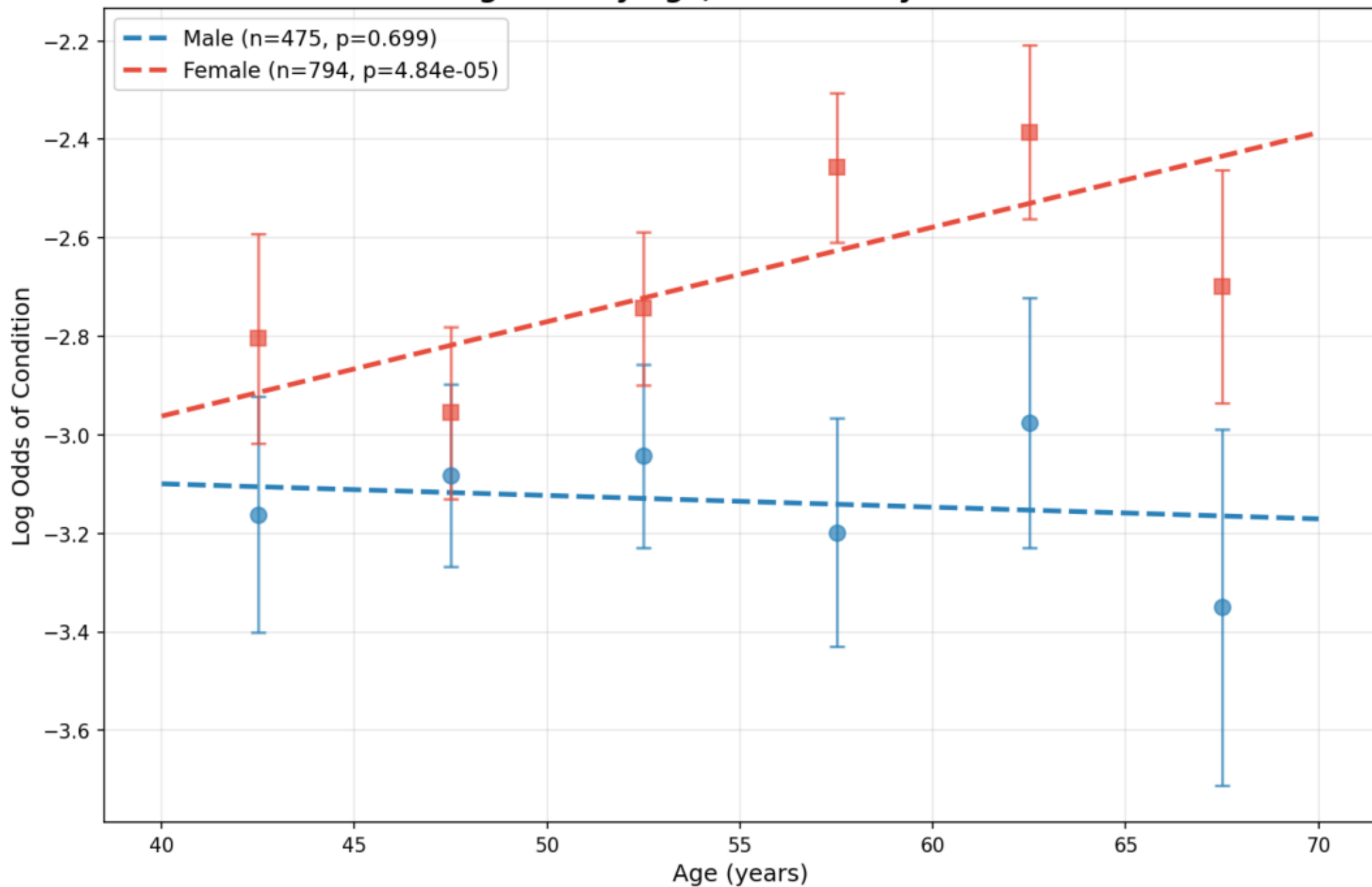
Back Pain

Log Odds by Age, Stratified by Gender



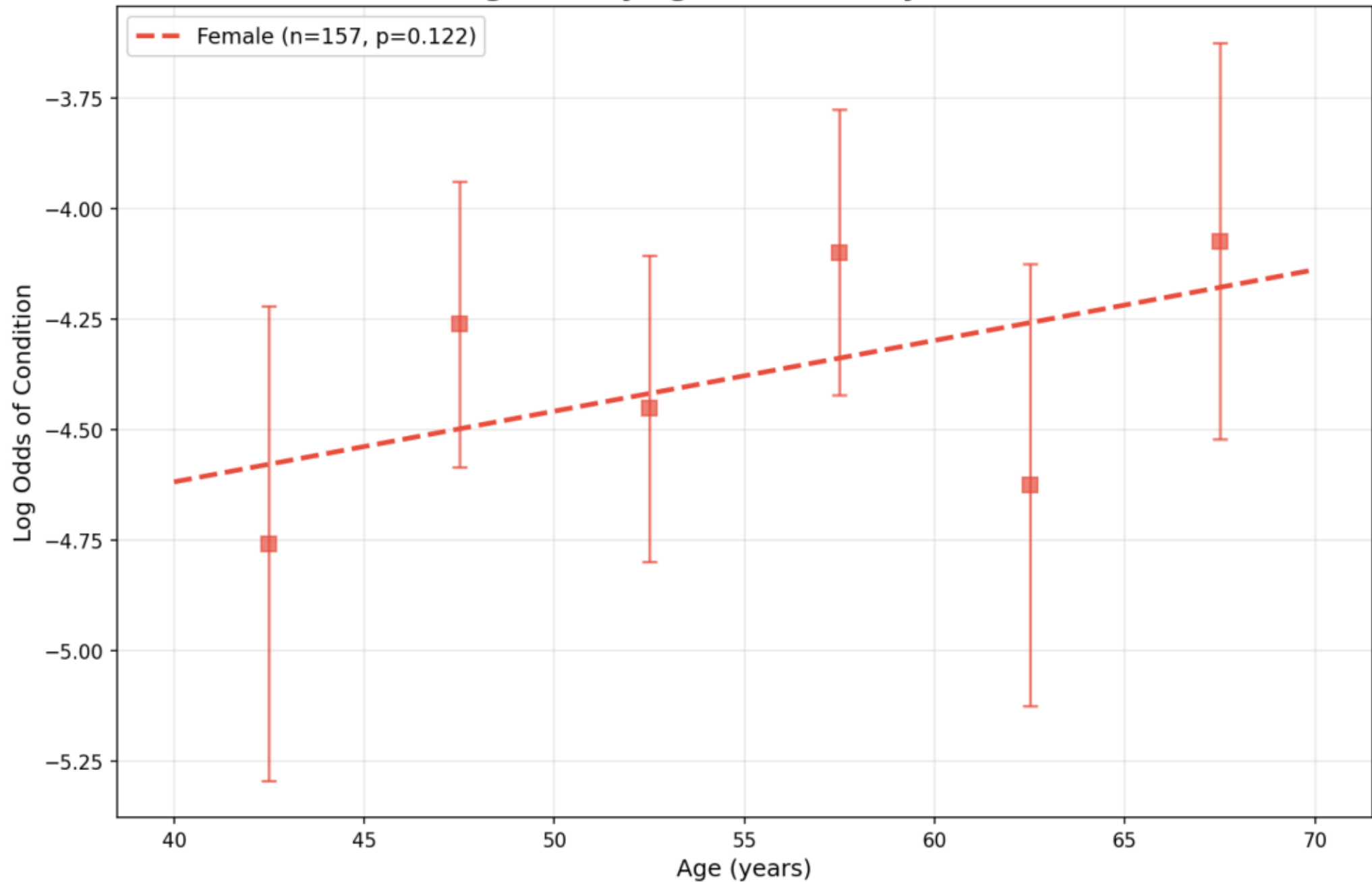
Obesity

Log Odds by Age, Stratified by Gender



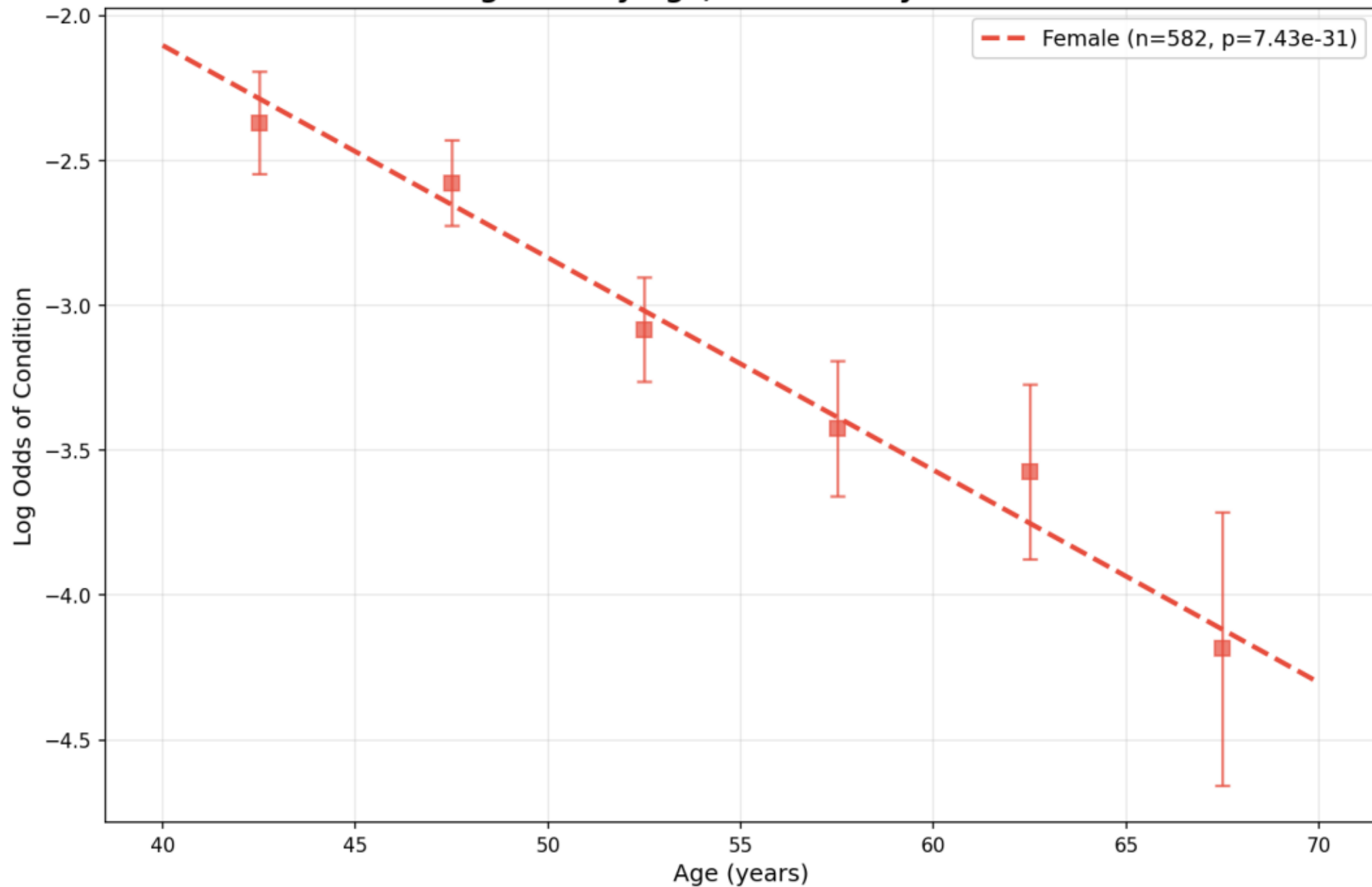
Breast Cancer (Sex-Specific)

Breast Cancer Log Odds by Age, Stratified by Gender



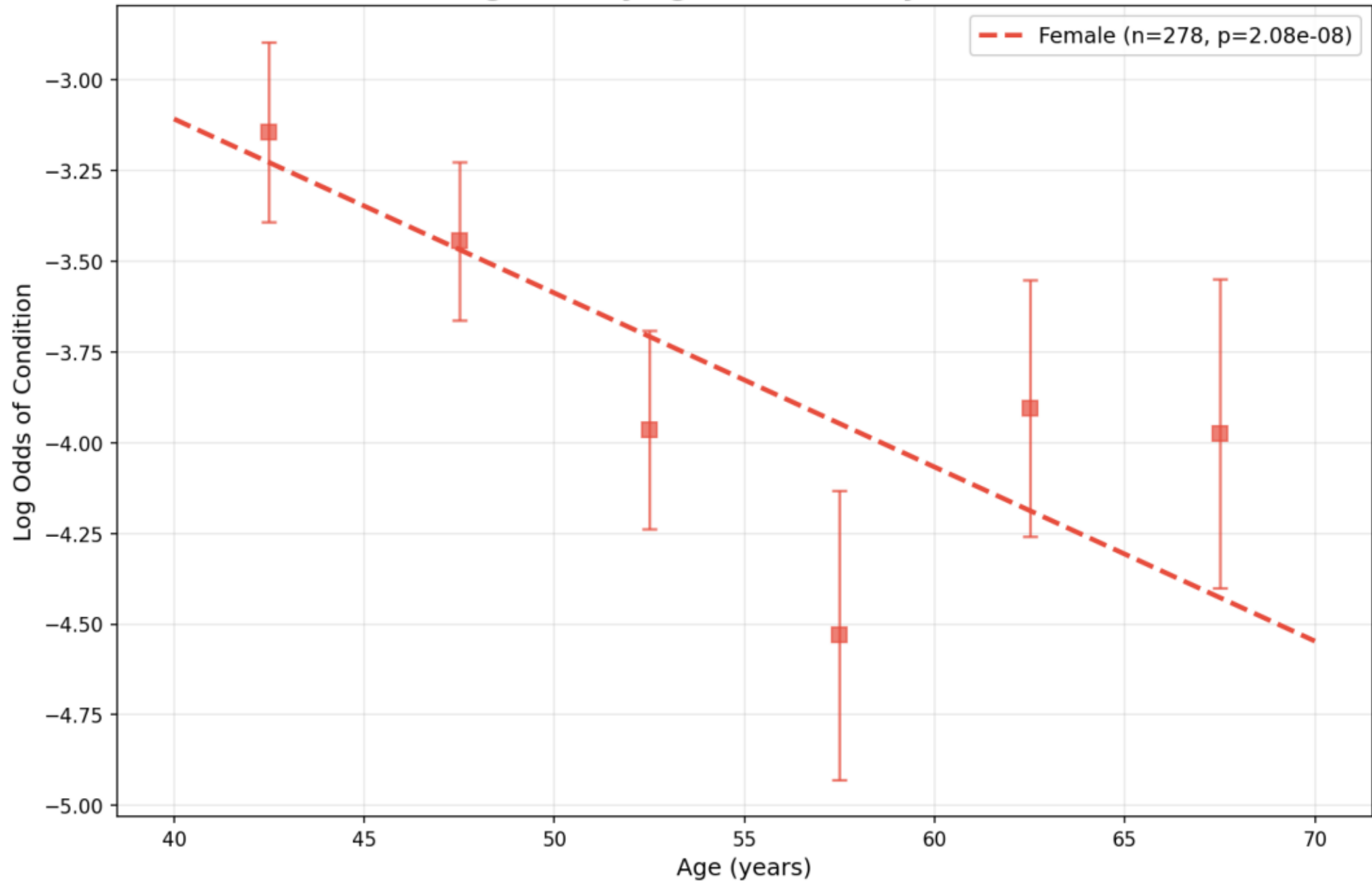
Polycystic Ovary Disease (Sex-Specific)

Polycystic Ovary Disease Log Odds by Age, Stratified by Gender



Endometriosis and Adenomyosis (Sex-Specific)

Endometriosis and Adenomyosis Log Odds by Age, Stratified by Gender



METHODOLOGY

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STATISTICAL MODEL

- Separate logistic regressions for each gender
- $\log(p/(1-p)) = \beta_0 + \beta_1 \times \text{Age}$
- Performed independently for males and females

PLOT INTERPRETATION

- Blue circles/line = Male data and fit
- Red squares/line = Female data and fit
- Dashed lines = Fitted regression
- Legend shows sample size (n) and p-value

ODDS RATIO INTERPRETATION

- OR/Decade = $\exp(\text{coefficient} \times 10)$
- OR = 2.0 means 2x more likely per decade
- OR = 0.5 means 2x less likely per decade

INCLUSION CRITERIA

- Age: 40-70 years
- Minimum 50 cases per gender for analysis
- Total $n \geq 100$ for condition

LIMITATIONS

1. Some conditions are sex-specific (PCOS, breast cancer)
2. Prevalence differences may affect power
3. Hormonal factors not directly measured
4. Cross-sectional design limitations apply

SAMPLE SIZES

- Total: 23,473 subjects
- Female: 12,313 (52%)
- Male: 11,152 (48%)

KEY FINDINGS BY CONDITION CATEGORY

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CARDIOVASCULAR

Both genders show increased risk with age for:

- Hypertension, Ischemic Heart Disease, Heart Valve Disease

Males may have steeper increase for some conditions.

METABOLIC

- Diabetes, Hyperlipidemia: Increase with age in both
- Obesity: Different patterns by gender
- Fatty Liver: More common in males

MENTAL HEALTH

- Depression: Decreases with age in both genders
- Anxiety: Similar pattern, may differ in magnitude
- ADHD: Cohort effect visible in both genders

MUSCULOSKELETAL

- Osteoarthritis: Increases with age, similar in both
- Gout: Much more common in males, steeper increase

AUTOIMMUNE/INFLAMMATORY

- Allergy: Decreases with age in both
- Psoriasis: Different patterns by gender possible
- Hashimoto's: More common in females

SENSORY

- Hearing loss: Increases in both, may differ in rate
- Glaucoma: Similar pattern in both genders

NOTES ON INTERPRETATION

- Gender differences may reflect:
 - Biological differences (hormones, genetics)
 - Healthcare-seeking behavior
 - Diagnostic patterns
 - Survival differences
- Some apparent differences may not be statistically significant
- Always check sample sizes and p-values