IMPACT OF MULTIMORBIDITY INCLUDING MENTAL HEALTH CONDITIONS ON DISABILITY

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Purpose
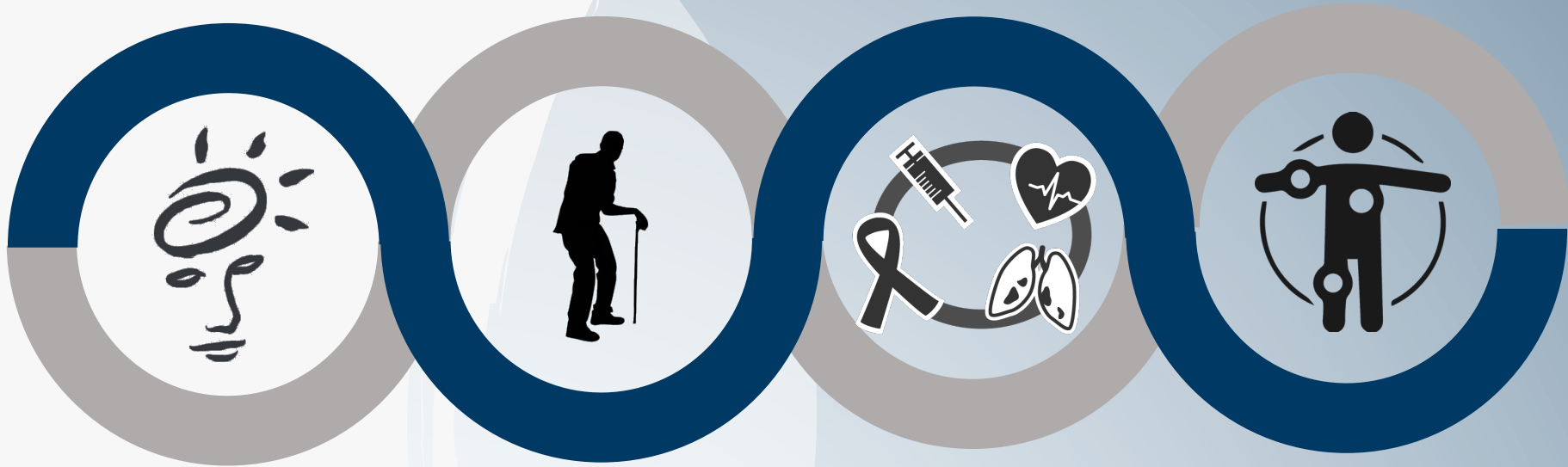
*This study aims to improve our understanding of the **differential impact** on disability of **mental health** conditions that co-exist with other physical chronic conditions.*

Background - Multimorbidity

o This is a **multimorbidity** study with a focus on mental health
o What is multimorbidity?
  o multimorbidity is defined as having 2 or more **chronic** conditions
  o broadly consists of chronic conditions that are **physical** (e.g., COPD, cancer, CHF, arthritis, diabetes) or **mental** (e.g., depression, anxiety, bipolar disorder, schizophrenia)

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Background – Multimorbidity

o **Multimorbidity** is a global health burden linked to greater **disability**, mortality, complex clinical management, self-management challenges, healthcare service use/cost.

o **Mental health** disorders are linked with higher disability compared to physical health conditions (Moen et al., 2018; Garin et al., 2014)

o **Physical** health multimorbidity is linked to higher rates of **mental** disorders (Stubbs et al., 2017; Bobo et al., 2016)

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Background – Synergistic Impact (Mental Health)

o **Mental health** conditions within the context of multimorbidity may have a **synergistic impact** on **disability**:

   o Disease clusters involving depression associated with higher disability compared to those involving only physical conditions (Quinones et al., 2018)

   o Only one of the 14 most prevalent disease clusters included a mental health condition (depressive symptoms, ranked 11th), yet showed highest disability (Quinones et al., 2016)

   o **Co-occurrence** of mental health conditions with specific physical conditions (**arthritis, COPD, diabetes**) linked to higher **disability** (Quinones et al., 2019; Rivera-Almaraz et al., 2018; Yokota et al. 2016)

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Background – Multimorbidity Research Challenges

- Studies of multimorbidity, disability and mental health need to control for other influential socio-demographic factors, e.g.,:
  - multimorbidity and disability increase with age
  - multimorbidity and disability higher in women, lower SES groups, minority populations
  - mental health conditions higher in women
- Lists used to estimate multimorbidity vary widely and mental health conditions often not included (Diederichs et al., 2011)
- Disease clusters difficult to *fully* study in relation to other variables (e.g., limited to dyads, most prevalent clusters)

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Study Objectives

Examine

Identify

Investigate
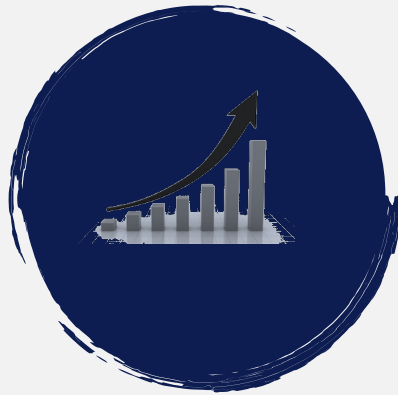
1. Determine the rate of **physical disability** and **mental disorders**, and which physical conditions frequently cluster with mental health conditions.

2. Examine the association between **disability and multimorbidity,** with the analyses structured to **isolate the role that mental health** plays in shaping disability.

3. Investigate how **age, sex** and other socio-demographic factors modify the association between disability and multimorbidity (with and without mental health conditions).

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Main Hypotheses

Multimorbidity combinations that include mental health conditions are associated with higher levels of disability compared to combinations that include only physical conditions, for a given level of multimorbidity.

Mental health conditions will cluster with highly symptomatic conditions (e.g., painful conditions such as arthritis, stressful conditions such as COPD, highly uncomfortable conditions such as stomach/bowel disorders), which may explain the link with disability.

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Methods – Data Source

Baseline data collected from the Canadian Longitudinal Study on Aging

Community-dwelling, Canadians aged 45-85

In-person or computer-assisted telephone interviews

$$N = 51,338$$

Methods – Main Measures

1 **Outcome (Disability):** Dichotomous (any self-reported limitation versus no limitation). Participants were considered to have disability if they indicated difficulty with any of 14 Basic or Instrumental Activities of Daily Living (ADL/IADL) items from the Older Americans Resources and Services (OARS) Multidimensional functional assessment.

2 **Multimorbidity:** Number of chronic conditions (6+ months) were self-reported; participants were asked, "has a doctor ever told you that you have ____?".

3 **Mental Health Conditions**: Mood or anxiety self-reported as described in 2 above. Due to potential under-reporting of mental health conditions, we also repeated our analyses including those reporting depressive symptoms (CESD score 10+).

Methods – Chronic Conditions (Multimorbidity)

Chronic Condition	Total N=51277	
	Number	%
High Blood Pressure	19203	37.56%
Eye Condition	15608	30.87%
Arthritis	14825	29.25%
Mood or Anxiety Disorder	10070	19.67%
Diabetes, borderline diabetes	8863	17.31%
Respiratory Condition	8379	16.40%
Cancer	7902	15.42%
Thyroid Condition	7185	14.16%
Heart Condition	7009	13.73%
Migraine headaches	6773	13.23%
Bowel Disorder	5412	10.58%
Osteoporosis	4698	9.21%
Urinary incontinence	4388	8.57%
Intestinal or stomach ulcers	3912	7.65%
Peripheral vascular disease, poor circulation	3165	6.19%
Stroke or TIA	2367	4.64%
Kidney disease, kidney failure	1460	2.85%
Neurological Condition	1121	2.19%

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Methods - Analyses

- **Phase 1**:
  - Compared **disability prevalence** for people with and without mental health conditions:
    - Compared people at same multimorbidity level (number of chronic conditions): those who have at least one mental health condition versus those who do not have a mental health condition
    - Stratified analysis by age, sex
  - Logistic Regression to obtain **odds of disability** for people with and without mental health conditions:
    - Unadjusted and adjusted analyses
- **Phase 2**:
  - Mental Health: **Depressive Symptoms (CESD)** + depression
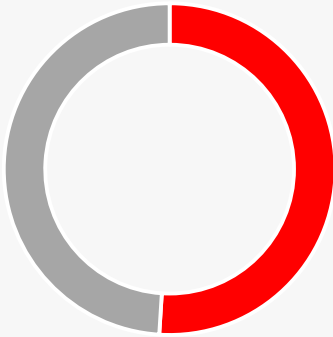 - Disability: **IADL & ADL** examined separately
- **Phase 3**:
  - Exploratory factor analysis to determine **multimorbidity clusters** and which physical conditions clustered with mental health conditions
  - Explored links between **social participation** and mental health conditions

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Phase 1 Results

Results - Demographic Characteristics

51% Female

20% Mood or
Anxiety Disorder

Multimorbidity: Mean Number of Chronic Conditions
- 2.23 overall
- 2.09 in those without Mood/Anxiety
- 2.82 in those with Mood/Anxiety disorder

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Demographic Characteristics

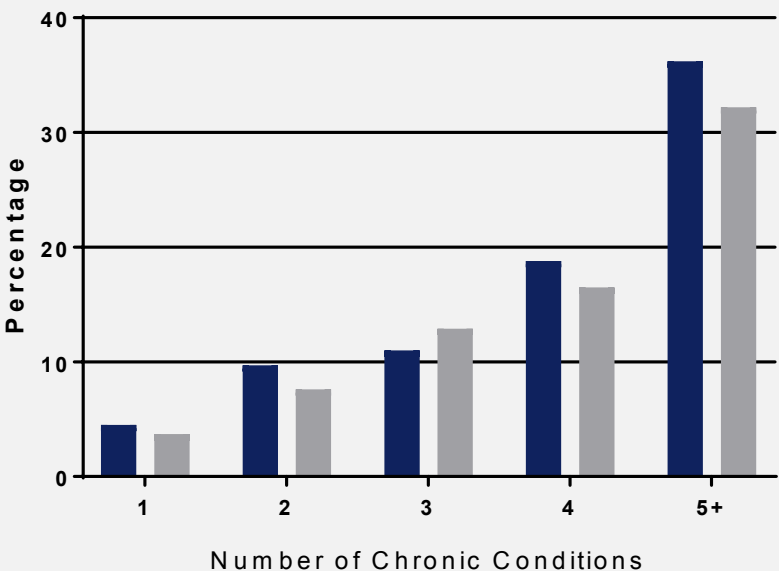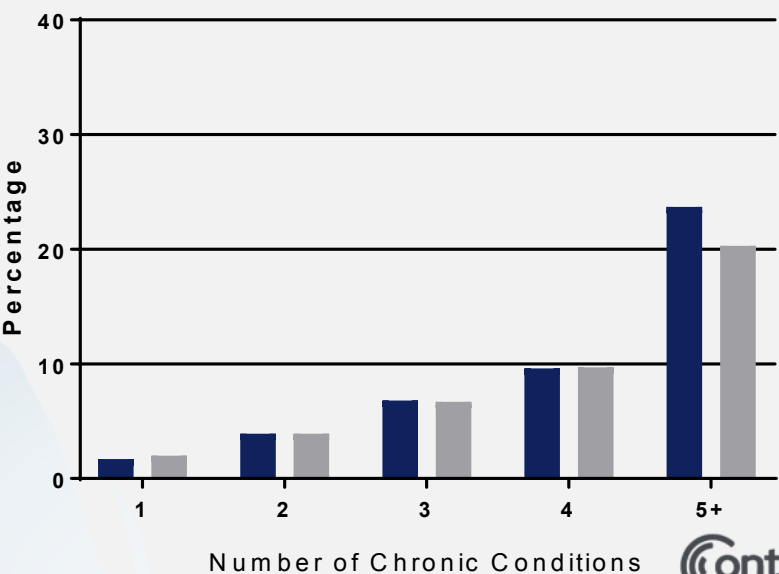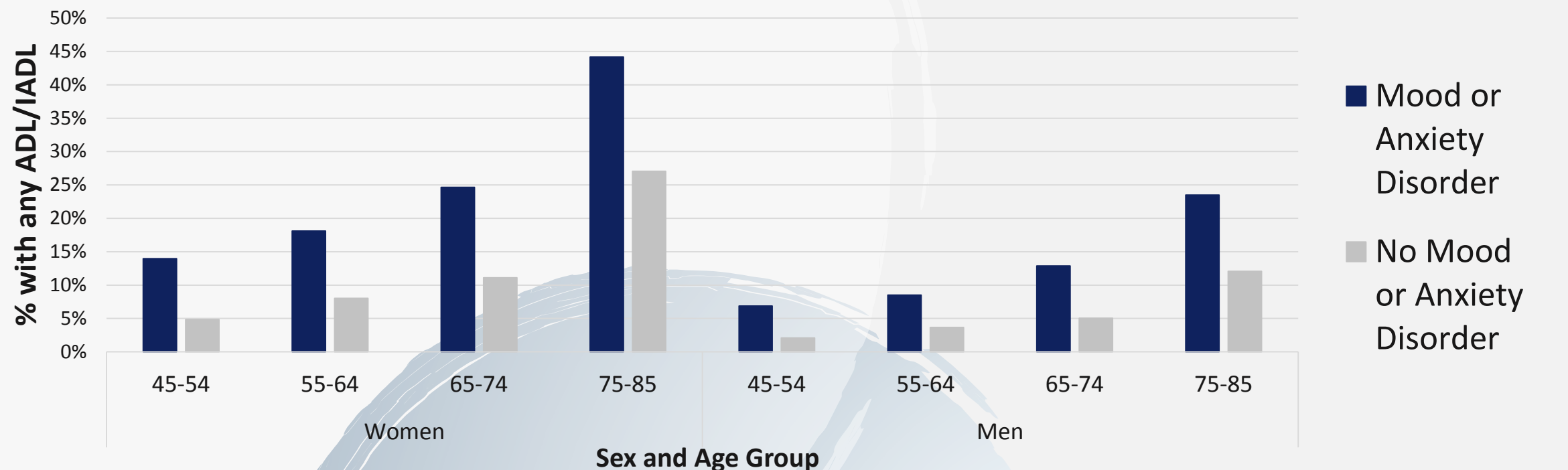|	All Participants N=51,338		Participants with a Mood or Anxiety Disorder N=10,070		Participants without a Mood or Anxiety Disorder N=41,113	
	N	%	N	%	N	%
Sex						
Men	25183	49.1	3731	37.1	21370	52.0
Women	26155	51.0	6339	62.9	19743	48.0
Age						
45-54	13427	26.2	2961	29.4	10430	25.4
55-64	16420	32.0	3749	37.2	12625	30.7
65-74	11996	23.4	2213	22.0	9747	23.7
75-85	9495	18.5	1147	11.4	8311	20.2
5 Most Common Physical Chronic Conditions						
Arthritis	14825	29.3	3514	34.9	6423	15.6
Eye condition	15608	30.9	3026	30.0	6875	16.7
High blood pressure	19203	37.6	4033	40.0	6012	14.6
Diabetes	8863	17.3	2137	21.2	7918	19.3
Respiratory condition,	8379	16.4	2376	23.6	7645	18.6
Number of Chronic Conditions						
0	7564	14.8	0	0.0	7564	18.4
1	10532	20.6	1103	11.0	9429	22.9
2	10339	20.2	1826	18.1	8513	20.7
3	8248	16.1	1922	19.1	6326	15.4
4	5875	11.5	1660	16.5	4215	10.3
5+	8625	16.9	3559	35.3	5066	12.3
Social Participation Prevented by Health Status	3877	7.6	1424	14.1	2438	5.9
Limitation in Basic or Instrumental Activities of Daily Living (ADL/IADL)	5186	10.1	1732	17.2	3425	8.3

Results – Disability Prevalence

There is well-established evidence that **disability and multimorbidity increase with age.** Our results are consistent with this finding.

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Disability Prevalence by Age and Sex

Figure 4: Disability Prevalence by Mood or Anxiety Disorder, Sex, and Age

Legend:
- Mood or Anxiety Disorder
- No Mood or Anxiety Disorder

Y-axis: % with any ADL/IADL (0% to 50%)

X-axis: Sex and Age Group

Women: 45-54, 55-64, 65-74, 75-85
Men: 45-54, 55-64, 65-74, 75-85

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Multimorbidity and Age

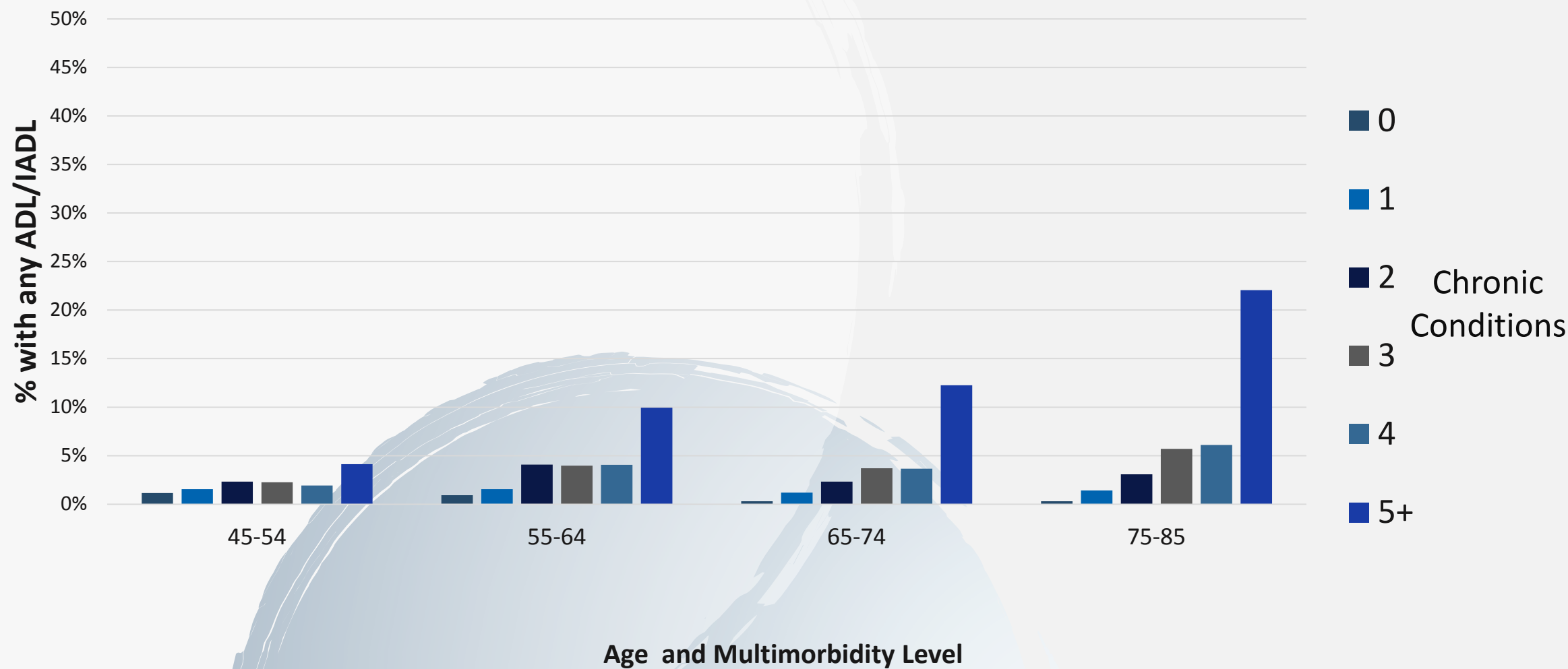**Figure 6:** Number of Chronic Conditions by Mood or Anxiety Disorder and Age
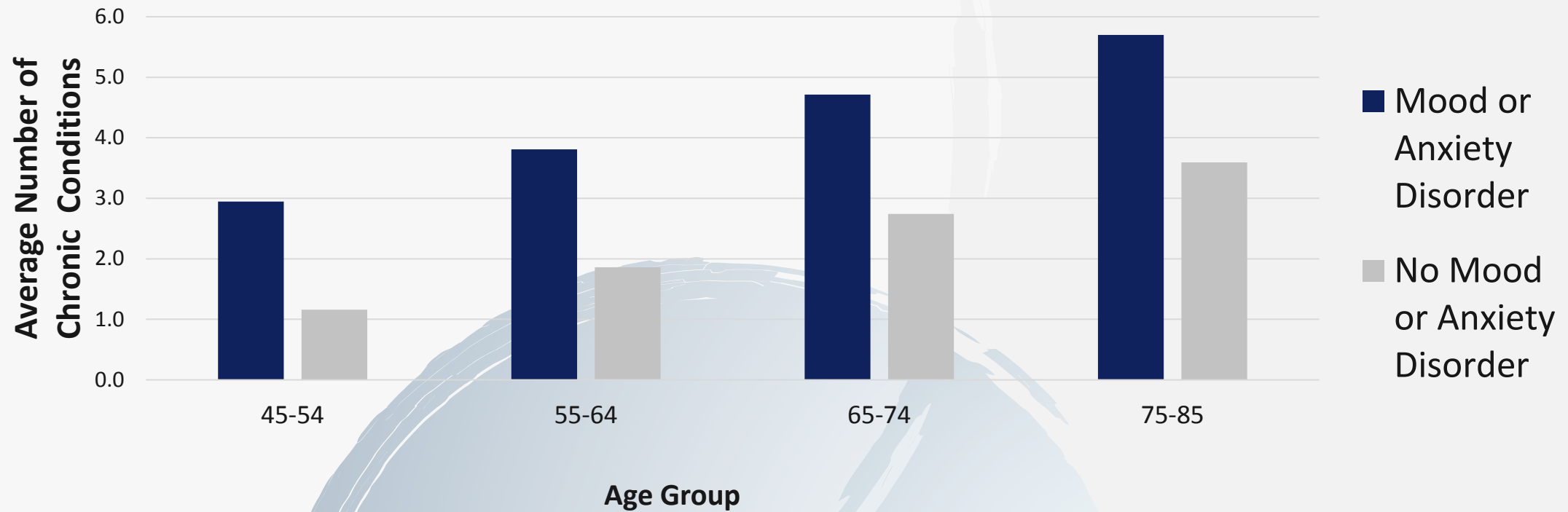
Results – Disability Prevalence

Results so far suggest that **age and multimorbidity** are especially important to control for to better understand how each relates to disability.
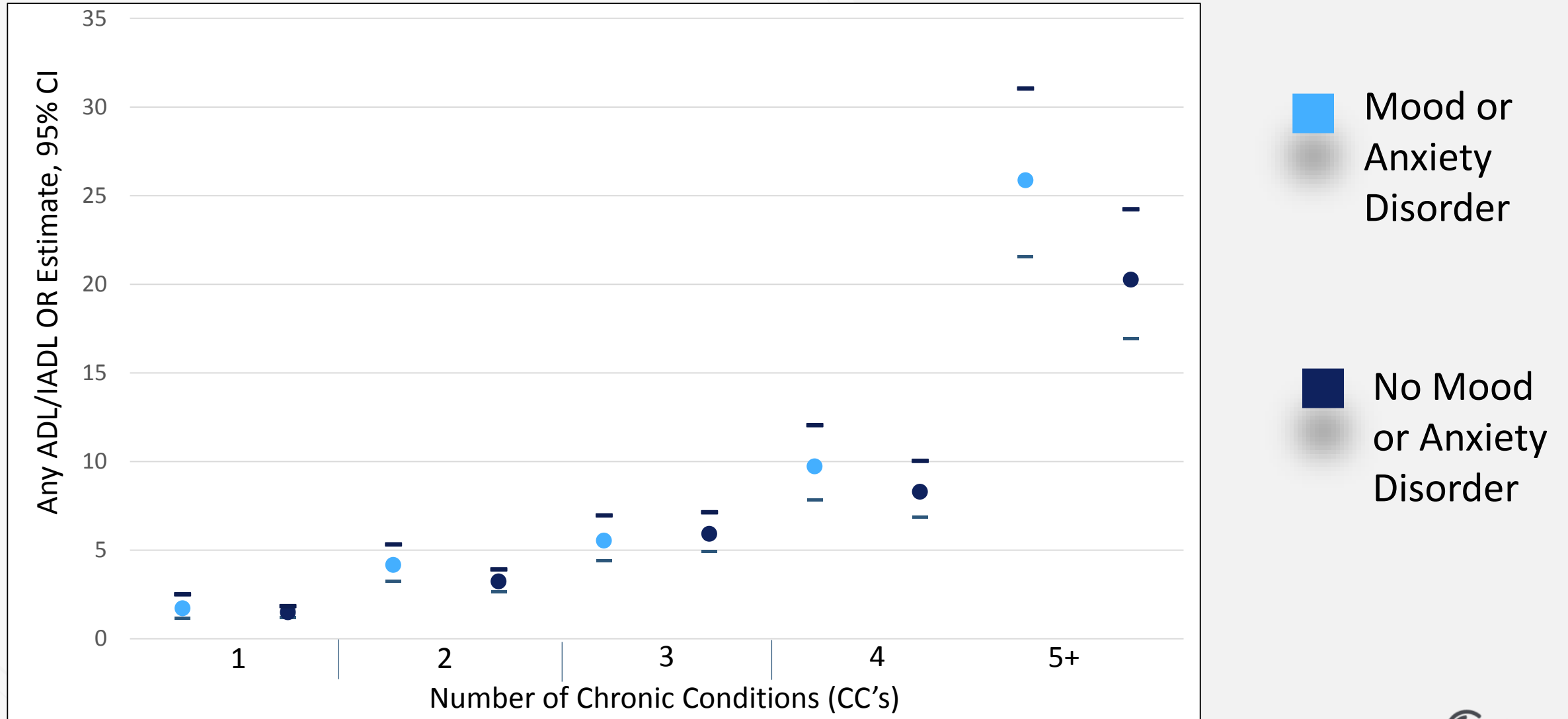
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Disability Prevalence

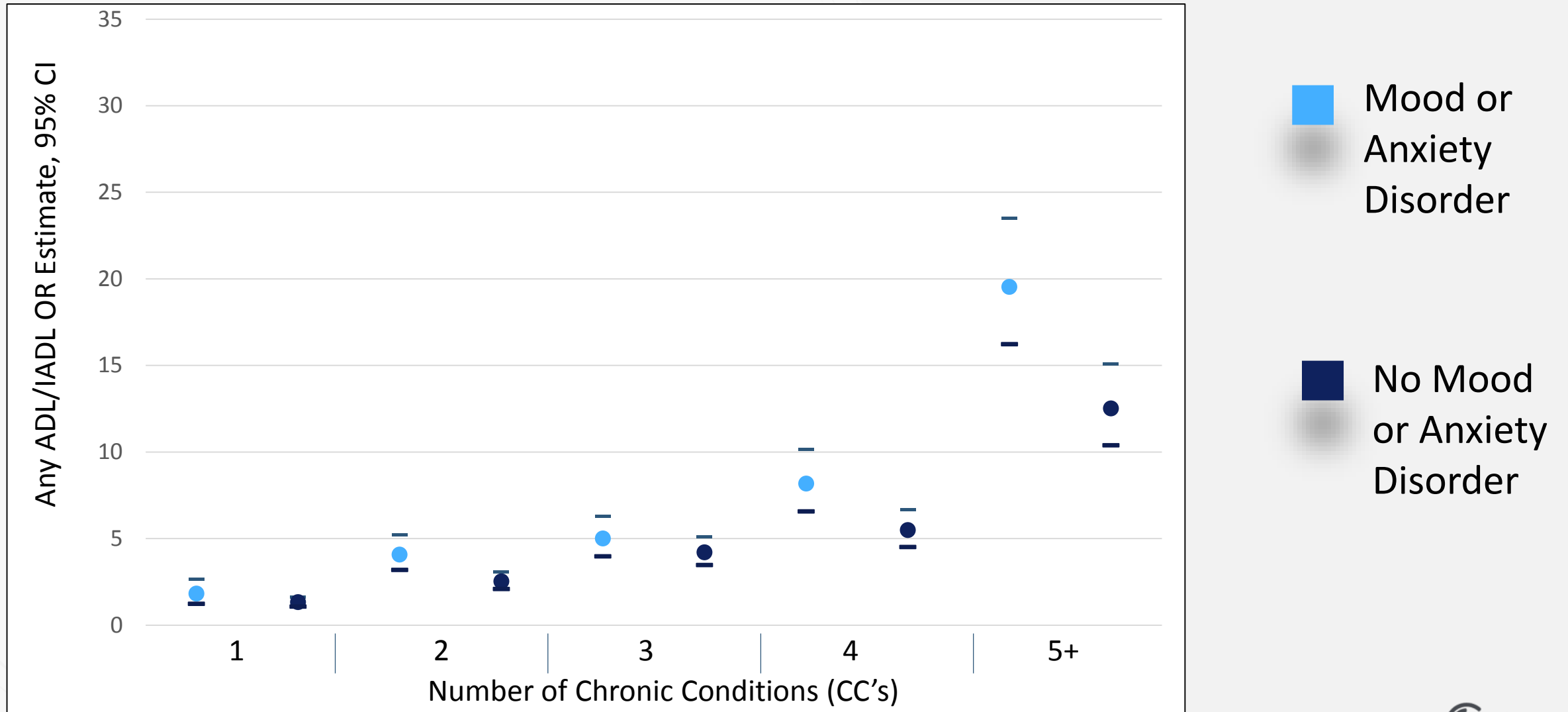**Figure 5:** Disability Prevalence by Number of Chronic Conditions and Age

Disability with and without Mental Health

Figure 6: Odds Ratio Disability (ADL, IADL) stratified by CC and Mood/Anxiety **Unadjusted**

Disability with and without Mental Health

Figure 7: Odds of Disability (ADL, IADL) stratified by CC and Mood/Anxiety **Adjusted for Age**

Legend:
- Mood or Anxiety Disorder
- No Mood or Anxiety Disorder

Y-axis: Any ADL/IADL OR Estimate, 95% CI

X-axis: Number of Chronic Conditions (CC's)

Results – Disability Prevalence

We looked at many stratified analyses for evidence of differences in disability prevalence, stratifiers included:

- Sex
- Age
- Income
- Education
- Living alone
- Social support

Age, sex and education showed the strongest relationships with disability, so all logistic regressions were adjusted for these.

Comparison of Disability with and without Mental Health

Figure 8: Odds of Disability (ADL, IADL) stratified by CC and Mood/Anxiety **Adjusted for Age, Sex and Education**
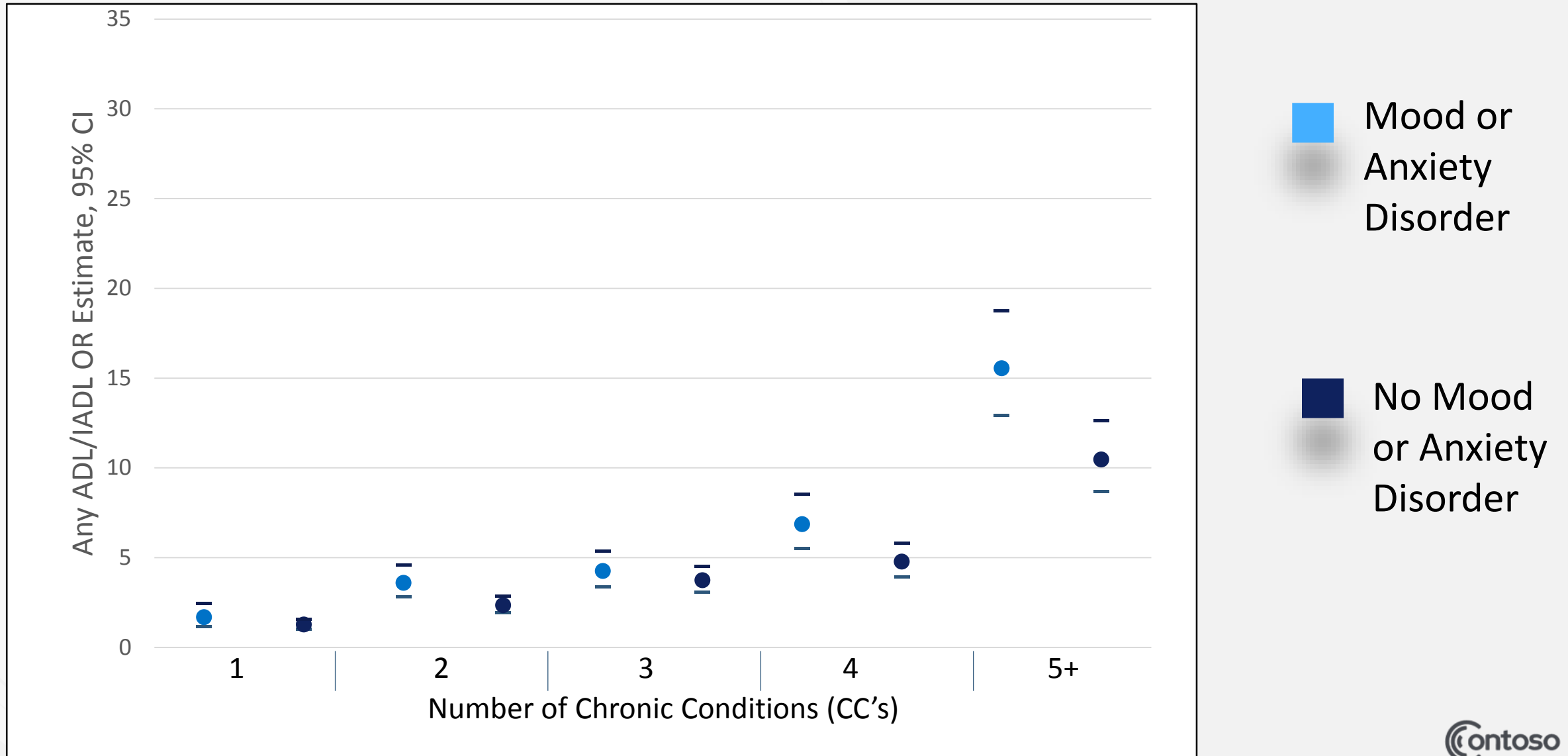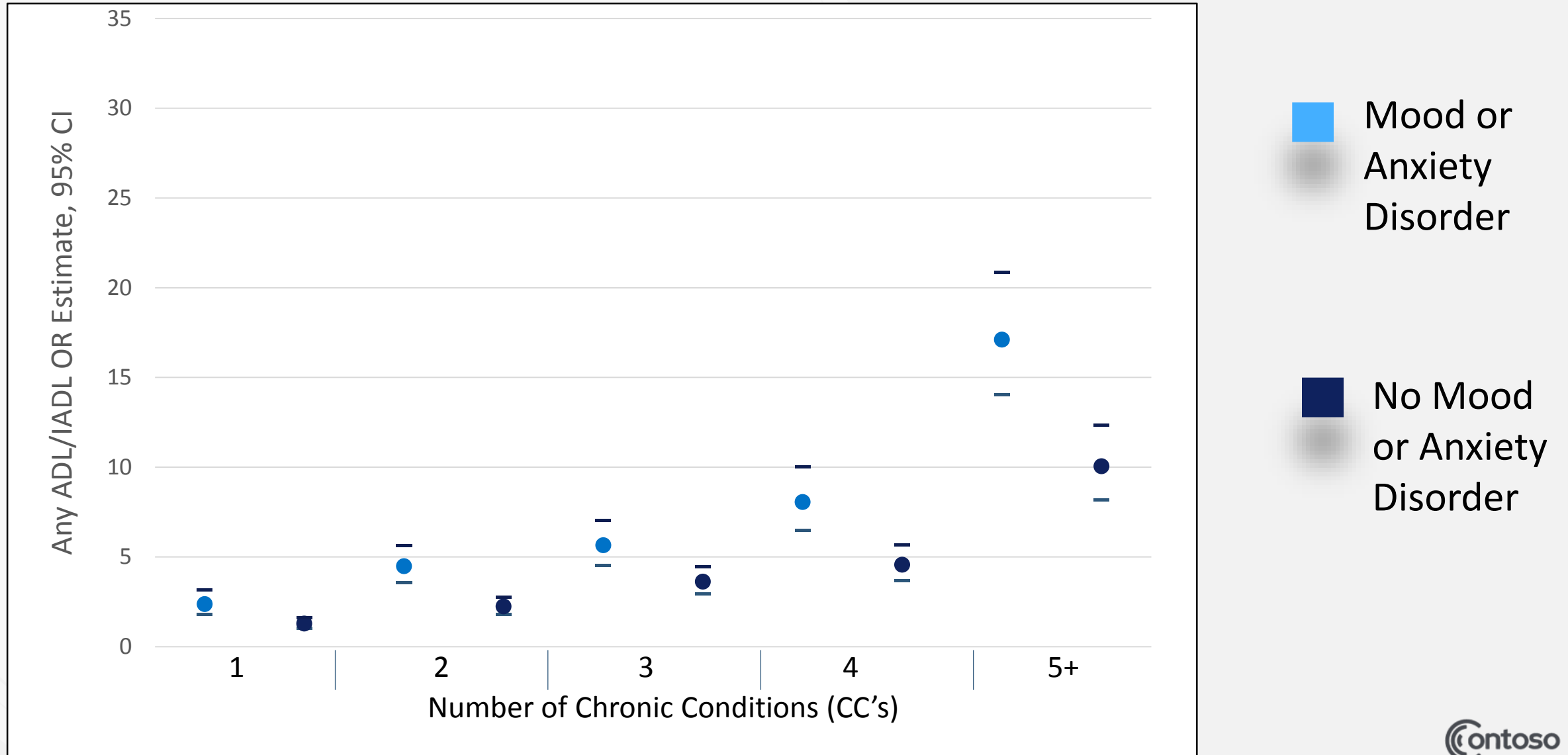
Phase 2 Results

Composite Outcome: CESD + Self-Reported Mood/Anxiety

Comparison of Disability with and without Mental Health

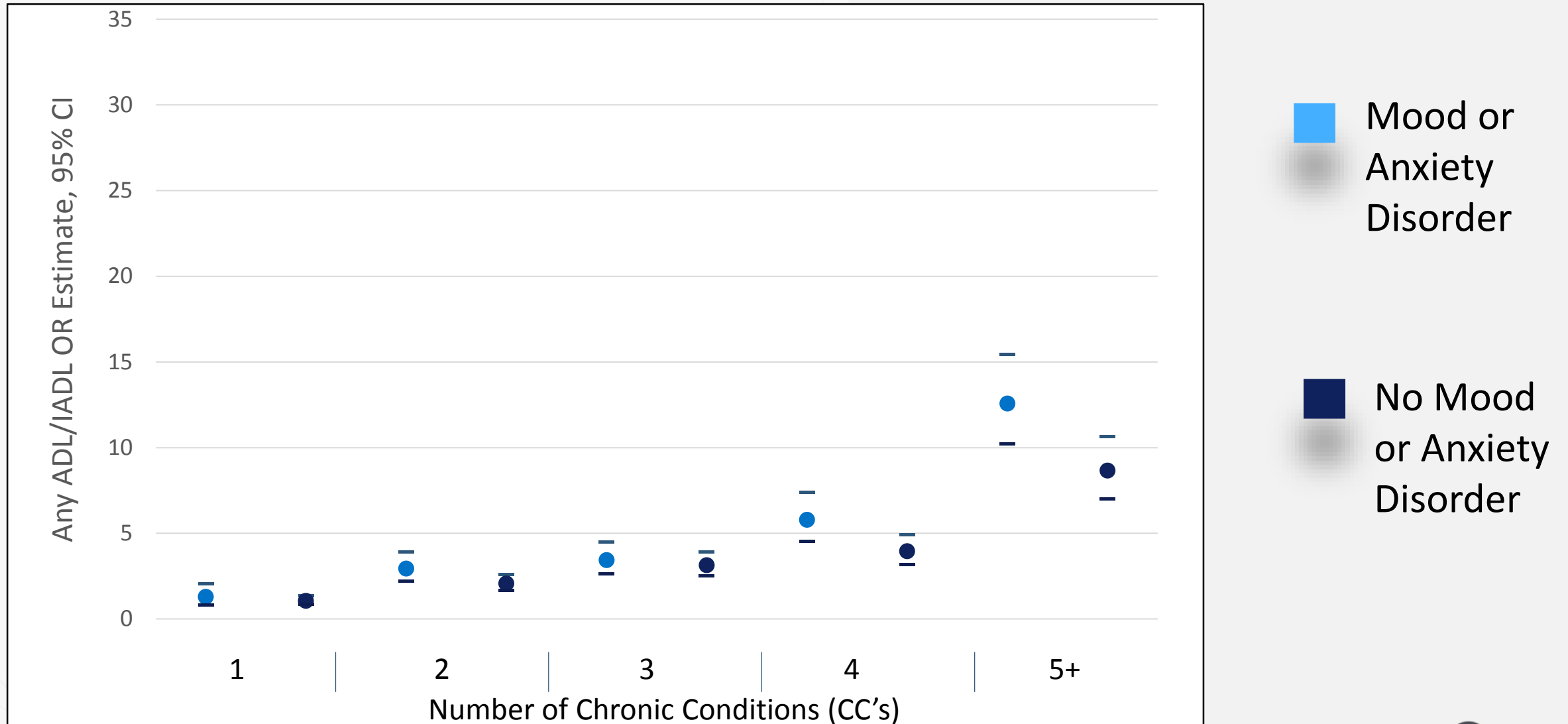**Figure 9**: Odds of Disability (ADL, IADL) stratified by CC and Mood/Anxiety/CESD Adjusted for **Age, Sex and Education**

Y-axis: Any ADL/IADL OR Estimate, 95% CI

X-axis: Number of Chronic Conditions (CC's) — 1, 2, 3, 4, 5+

Legend:
- Mood or Anxiety Disorder
- No Mood or Anxiety Disorder

Disability: ADL and IADL Examined Separately

Comparison of Disability with and without Mental Health

Figure 10: Odds of ADL (Only) stratified by CC and Mood/Anxiety Adjusted for Age, Sex and Education
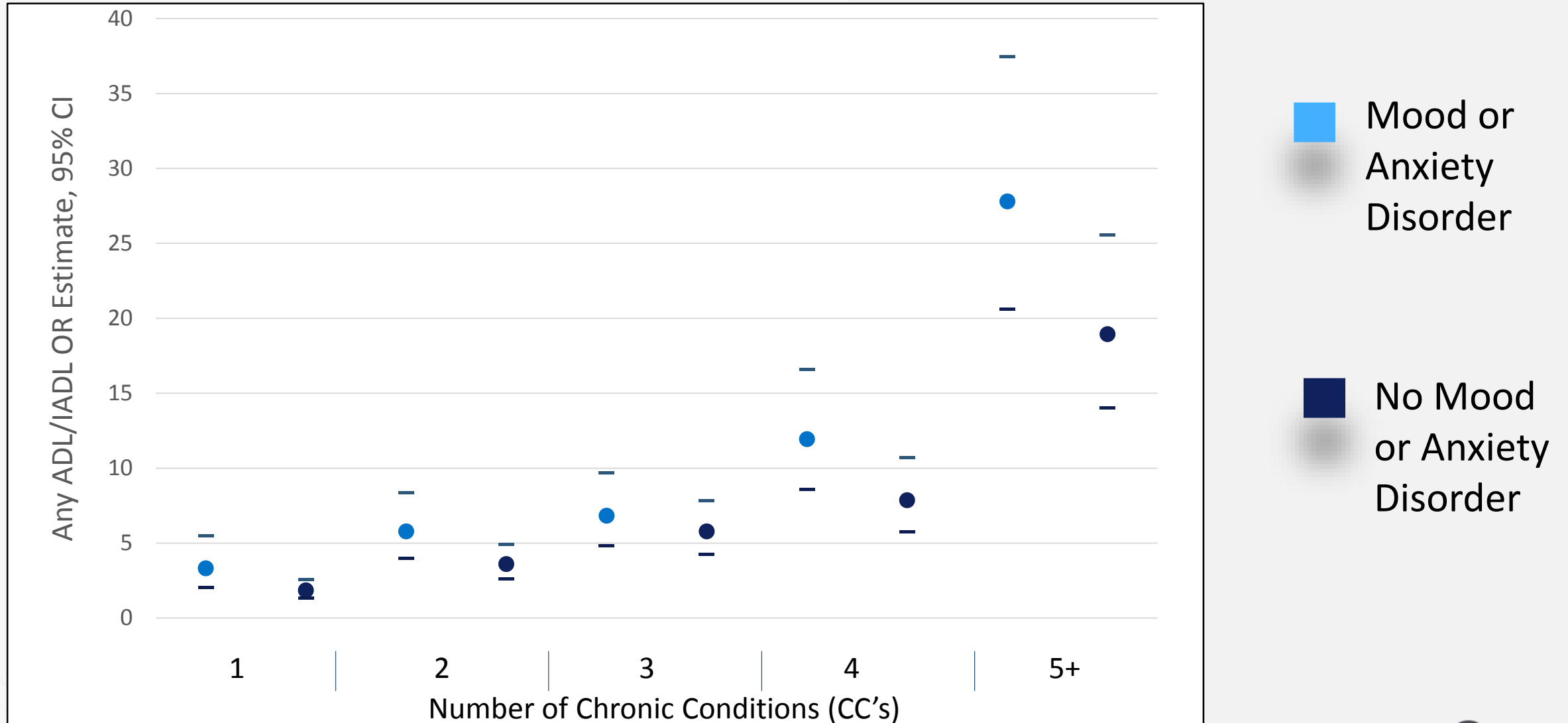
Comparison of Disability with and without Mental Health

Figure 11: Odds of IADL (Only) stratified by CC and Mood/Anxiety Adjusted for **Age, Sex and Education**
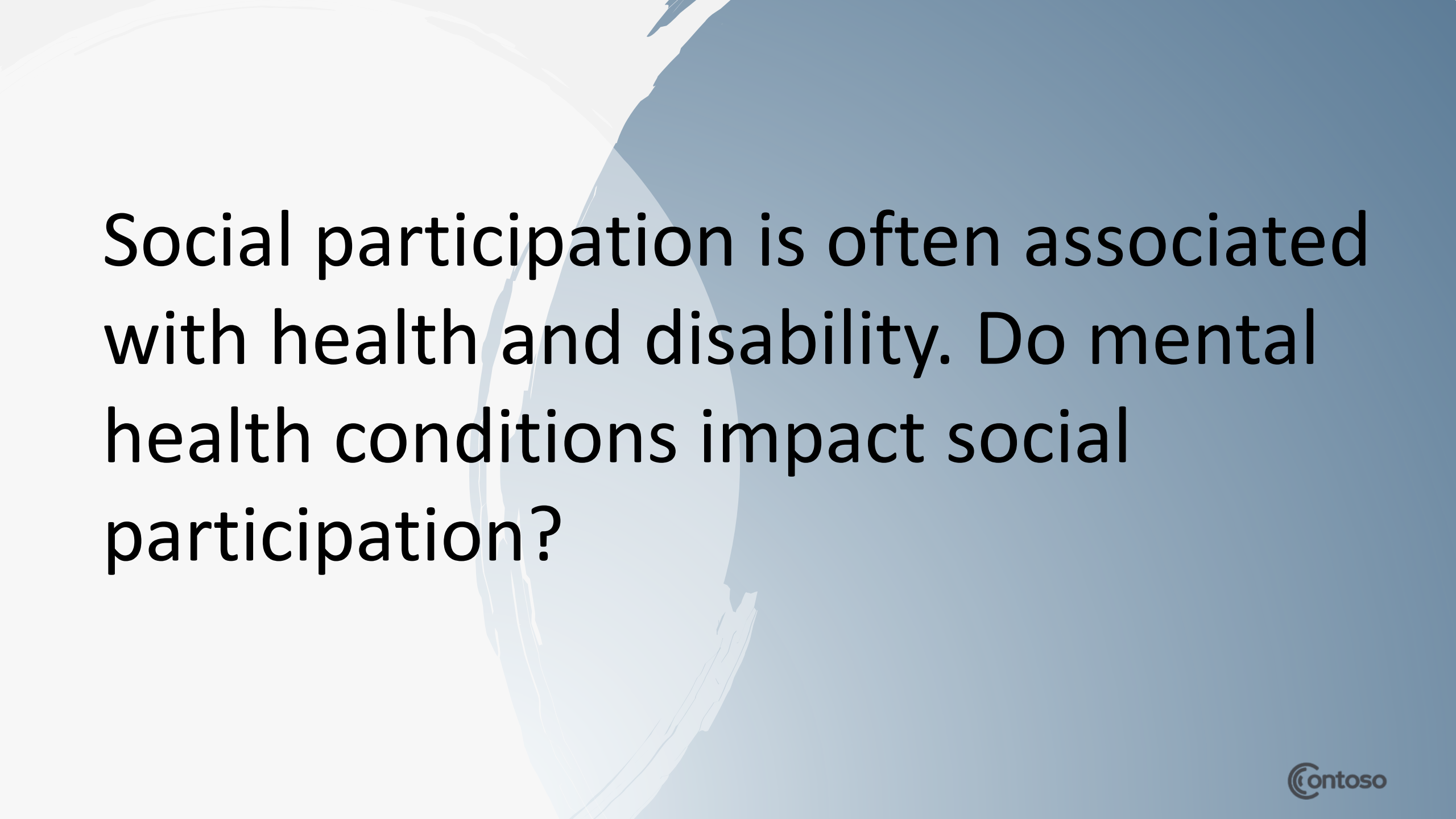
Phase 3 Results

What multimorbidity clusters exist, and what physical conditions (if any) do mental health conditions cluster with?

Chronic Conditions Clusters

Table 2: Rotated Factor Analysis

	Cardio-metabolic	Highly-Symptomatic (incl. Mood)	Miscellaneous	Neurologic
High Blood Pressure	0.74	0.04	0.08	-0.08
Diabetes	0.70	0.16	-0.11	-0.15
Heart disease, CHF, angina, or MI	0.67	-0.02	0.07	0.25
Stroke, CVA, mini-stroke, or TIA	0.53	0.01	0.10	0.50
Kidney disease or kidney failure	0.49	0.19	0.19	0.05
Peripheral vascular disease	0.46	0.13	0.24	0.28
Mood or anxiety disorder	0.02	0.68	-0.06	0.13
Bowel disorder	0.05	0.60	0.24	0.15
Migraine headaches	-0.09	0.59	0.09	0.15
Intestinal or stomach ulcers	0.22	0.55	0.08	-0.06
Respiratory condition	0.15	0.48	0.12	-0.05
Osteoporosis	-0.07	0.05	0.76	0.23
Arthritis	0.21	0.24	0.58	-0.06
Eye condition	0.44	-0.11	0.57	0.11
Hypothyroidism or hyperthyroidism	0.04	0.18	0.52	-0.08
Neurological condition	-0.01	0.12	-0.06	0.81
Urinary incontinence	0.15	0.34	0.29	0.43

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Social participation is often associated with health and disability. Do mental health conditions impact social participation?

Social Participation

Figure 5: Social Participation Restriction by Mood or Anxiety Disorder, Sex, and Age
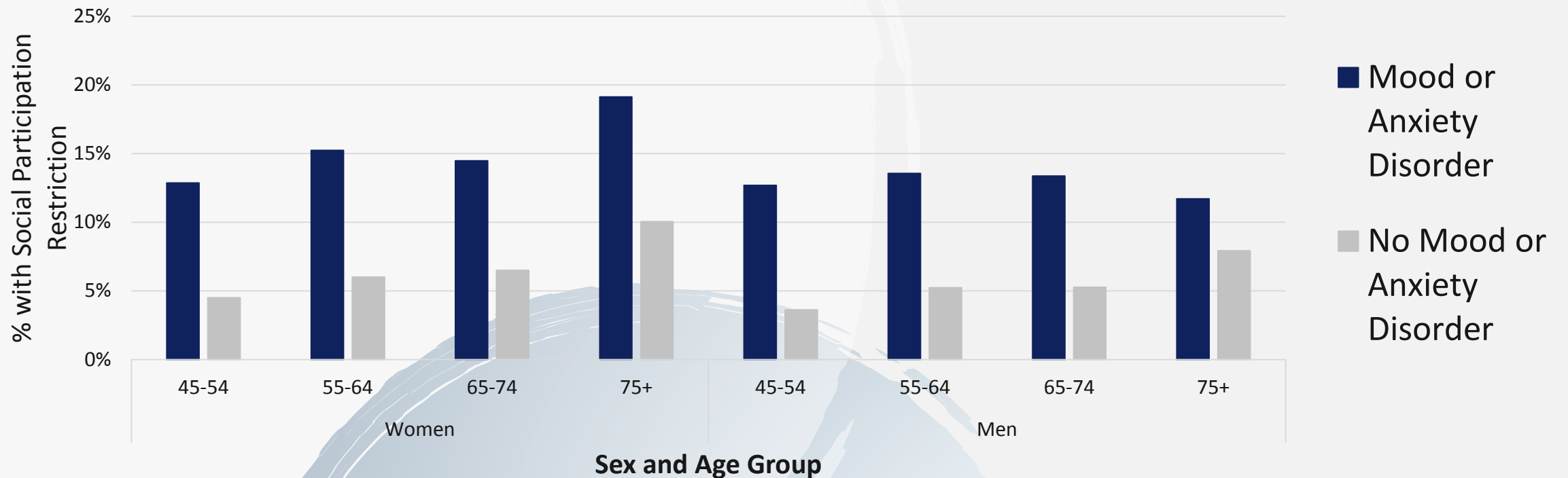
Discussion

o **Mood or anxiety disorders** are more prevalent in the younger age groups and in women.

o **Mood or anxiety disorders** cluster with other highly-symptomatic physical conditions (e.g., respiratory conditions, migraine headaches, bowel and intestinal conditions).

o **Disability** is higher in women than men, at all levels of multimorbidity.

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Discussion

o The **prevalence of disability** increases with the level of multimorbidity.

o At a given level of multimorbidity, the **prevalence of disability** is higher for those with **mental health disorders** compared to those without, in adjusted models.

o For men and women in all age groups, those with **mental health disorders** were more likely to report **social participation restrictions** due to health compared to those without.

Discussion

o some multimorbidity studies have reported a more significant impact of mental health disorders on disability compared to our results

    o this can reflect the populations studied and chronic conditions captured

    o there are also methodological differences, some of which exaggerate the impact of mental health – e.g.,

        o adding a mental health disorder to an existing set of physical conditions & comparing to the set of physical conditions alone…this involves different levels of multimorbidity (number of conditions) which will contribute to differences in the outcome

Discussion – Our Original Analysis

Bar chart showing % with any ADL/IADL by Number of Chronic Conditions

Number of Chronic Conditions	Mood or Anxiety Disorder	No Mood or Anxiety Disorder
0	~4.5%	~2%
1	~7.5%	~3.5%
2	~11.5%	~6.5%
3+	~28%	~17.5%

Legend:
- Mood or Anxiety Disorder
- No Mood or Anxiety Disorder
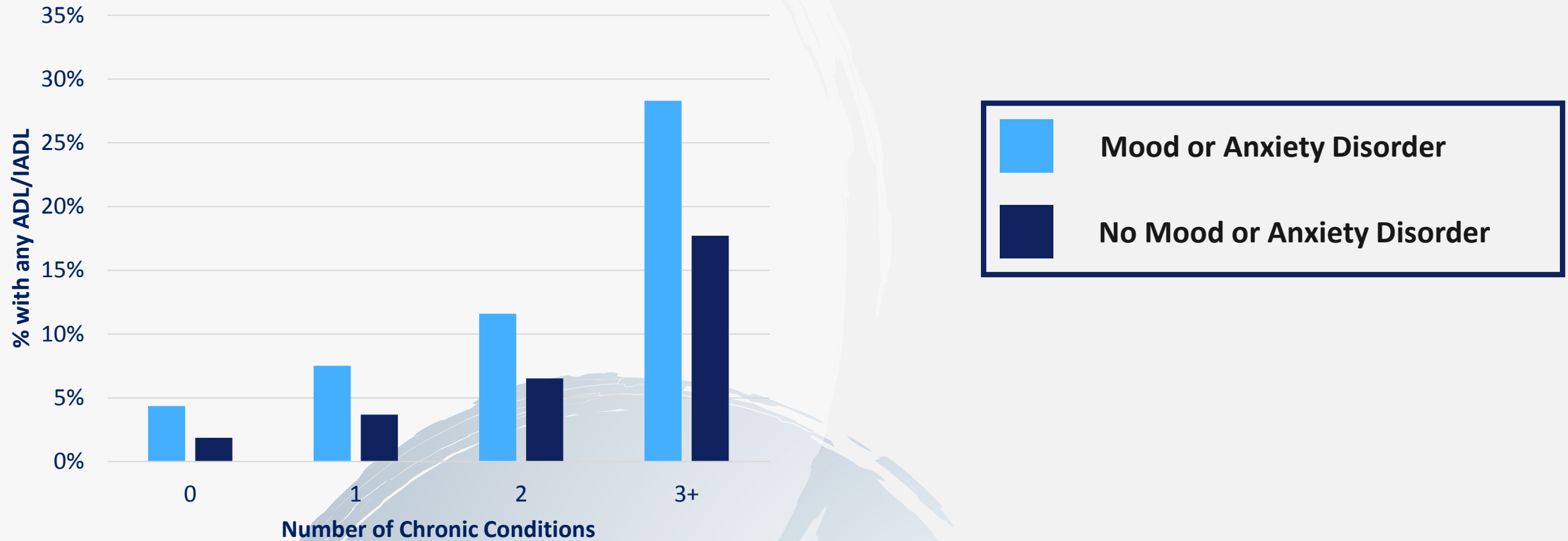
Limitations

o relatively few CLSA participants reporting an ADL/IADL limitation (age 45+, relatively "healthy" population of community-dwelling adults)

o cross-sectional study using baseline CLSA (not longitudinal)

o small cell sizes thereby limiting stratified analyses and regressions

Limitations

o multimorbidity measured using a count of chronic conditions obscures the importance of individual chronic conditions and interactions of particular combinations of physical and mental health conditions, e.g.,

o the impact on disability is likely to be greater for a person with anxiety and COPD compared to a person with anxiety and hypertension, even though both people have 2 chronic conditions

Conclusions

Results suggest that the presence of mental health disorders increases the level of disability and decreases social activity at all levels of multimorbidity, with potentially stronger effects seen in women compared to men.

References

Bobo, WV., Yawn, BP, St. Sauver, JL et al. (2016). Prevalence of Combined Somatic and Mental Helath Multimorbidity: Patterns by Age, Sex, and Race/Ethnicity. *J Gerontol A Biol Sci Med Sci*. 71, No. 11, 1483-1491.

Diederichs, C., Berger, K.,. Bartels, D.B. (2011). The Measurement of Multiple Chronic Diseases – A Systematic Review on Existing Multimorbidity Indices. *J Gerontol A Biol Sci Med Sci*. 66A, No. 301-311.

Garin, N., Olaya, B., Moneta, MV et a. (2014). Impact of Multimorbidity on Disability and Qulaity of Life in the Spanish Older Population. PLOS One. Volume 9, No. 11, e111498.

Quinones, AR, Markwardt, S., Botoseneanu, A. (2016). Multimorbidity Combinations and Disability in Older Adults. *J Gerontol A Biol Sci Med Sci*. 71, No. 6, 823-830.

Quinones, AR, Markwardt, S., Botoseneanu, A. (2019). Diabetes-Multimorbidity Combinations and Disability Among Middle-aged and Older Adults. *J Gen Intern Med*. Doi: 10.1007/s11606-019-04896-2.

References

Quinones, AR, Markwardt, S., Thielke, S. et al. (2018). Prospective Disability in Different Combinations of Somatic and Mental Multimorbidity. *J Gerontol A Biol Sci Med Sci*. 73, No. 2, 204-210.

Rivera-Almaraz, A., Manrique-Espinoza, B., Avila-Funes, JA. et al. (2018). Disability, quality of life, and all-cause mortality in older Mexican adults: association with multimorbidity and frailty. BMC Geriatrics. 18:236.

Stubbs, B., Vancampfort, D., Veronese, N. et al (2017). Depression and physical health multimorbidity: primary data and country-wide meta-analysis of population data from 190,593 people across 43 low- and middle-income countries. *Psychological Medicine*. 47, 2107-2117.

Yokota, RT, Van der Heyden, J., Nusselder, WJ et al. (2016). Impact of Chronic Conditions and Multimorbidity on the Disability Burden in the Older Population in Belgium. *J Gerontol A Biol Sci Med Sci*. 00, No. 00, 1-7.

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