

# IMPACT AND DETERMINANTS OF COMORBIDITY CLUSTERS IN PEOPLE LIVING WITH HIV

D. De Francesco<sup>1</sup>, S.O. Verboeket<sup>2</sup>, J. Underwood<sup>3</sup>, F.W. Wit<sup>2</sup>, E. Bagkeris<sup>1</sup>, P.W.G. Mallon<sup>4</sup>,  
A. Winston<sup>3</sup>, P. Reiss<sup>2</sup> and C.A. Sabin<sup>1</sup> for the POPPY study group

<sup>1</sup>UCL, UK <sup>2</sup>Amsterdam University Medical Centers (location AMC), University of Amsterdam, The Netherlands  
<sup>3</sup>Imperial College London, UK <sup>4</sup>UCD, Ireland



Pharmacokinetic and clinical observations in people over 50

**Background and aims**  
With an ageing cohort, the co-occurrence of multiple acute or chronic conditions is increasingly common among people living with HIV (PLWH). These comorbidities appear to occur in clusters<sup>1</sup>, however little is known about the potentially different determinants and impact on quality of life of specific clusters seen in PLWH.

**Aims**

- To explore associations of data-driven clusters of comorbidities occurring in PLWH with sociodemographic, lifestyle and HIV-related risk factors.
- To assess associations of clusters with self-reported physical and mental health.

**Methods**

**Participants**  
A total of **1073 PLWH** from the UK and Ireland were enrolled into the POPPY study:

- 699 (65.1%) PLWH aged ≥50 years
- 374 (34.9%) PLWH aged from 18 to 50 years

**Comorbidities**  
We evaluated the presence/absence of **65 individual comorbidities** related to various organ systems.

Diagnosis was based on information on medical conditions, medications and healthcare utilisation provided by the study participants via structured interview with trained staff.

**Comorbidity clusters**  
Principal component analysis (PCA) with tetrachoric correlations for dichotomous variables was used to identify data-driven clusters of co-occurring comorbidities<sup>1</sup>. Coefficients of the PCA were used to derive a 'severity score' for each cluster and for each participant, proportional to the number of comorbidities present from the cluster within the participant (higher scores → greater number of comorbidities).

**Self-reported physical and mental health**  
Physical and mental health summary scores were obtained from the SF-36 questionnaire (range 0-100, higher scores → better physical/mental health).

**Statistical analysis**

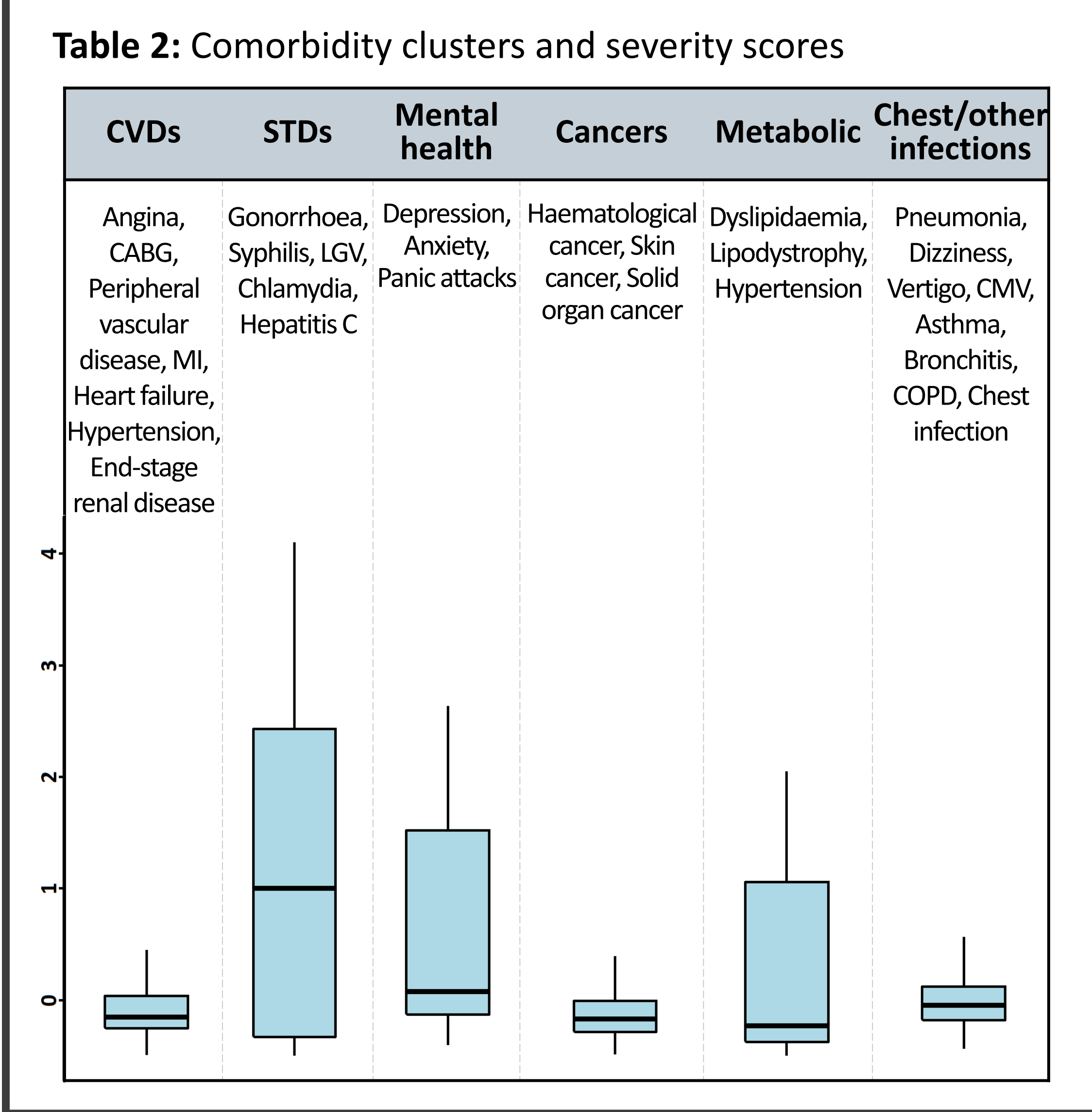
- Each cluster severity score was considered as a dependent variable in a multivariable median regression model to identify potential risk factors
- Multivariable linear regression was used to investigate the associations between severity scores (independently of each other) and patient-reported quality of life.

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**Results**

**Table 1: Participant characteristics**

		median (IQR) or n (%)
Gender	Male	914 (85.2%)
	Female	159 (14.8%)
Age [years]		52 (47, 59)
Ethnicity	Black-African	171 (15.9%)
	White	902 (84.1%)
Sexuality	MSM/Homosexual	816 (76.0%)
	Heterosexual	257 (24.0%)
BMI [kg/m <sup>2</sup> ]		25.5 (23.2, 28.2)
Smoking	Current smoker	267 (24.9%)
	Ex-smoker	365 (34.0%)
Current recreational drug use		307 (28.6%)
Current/past injection drug use		112 (10.5%)
Time since of HIV diagnosis [years]		13.2 (7.8, 20.5)
Nadir CD4 <sup>+</sup> T-cell count [cells/mm <sup>3</sup> ]		202 (101, 304)
Prior AIDS		311 (29.0%)
HIV RNA <50 copies/ml		965 (89.9%)



**Conclusion**  
Comorbidity clusters in PLWH appear to have different demographic-, lifestyle- and HIV-related risk factors, and demonstrate significant associations with quality of life, that are also different from cluster to cluster.

These findings may help prioritising interventions for those at risk for poorer health outcomes and focus research to understand common pathophysiological pathways contributing to comorbidities in treated PLWH

**Determinants of comorbidity clusters**

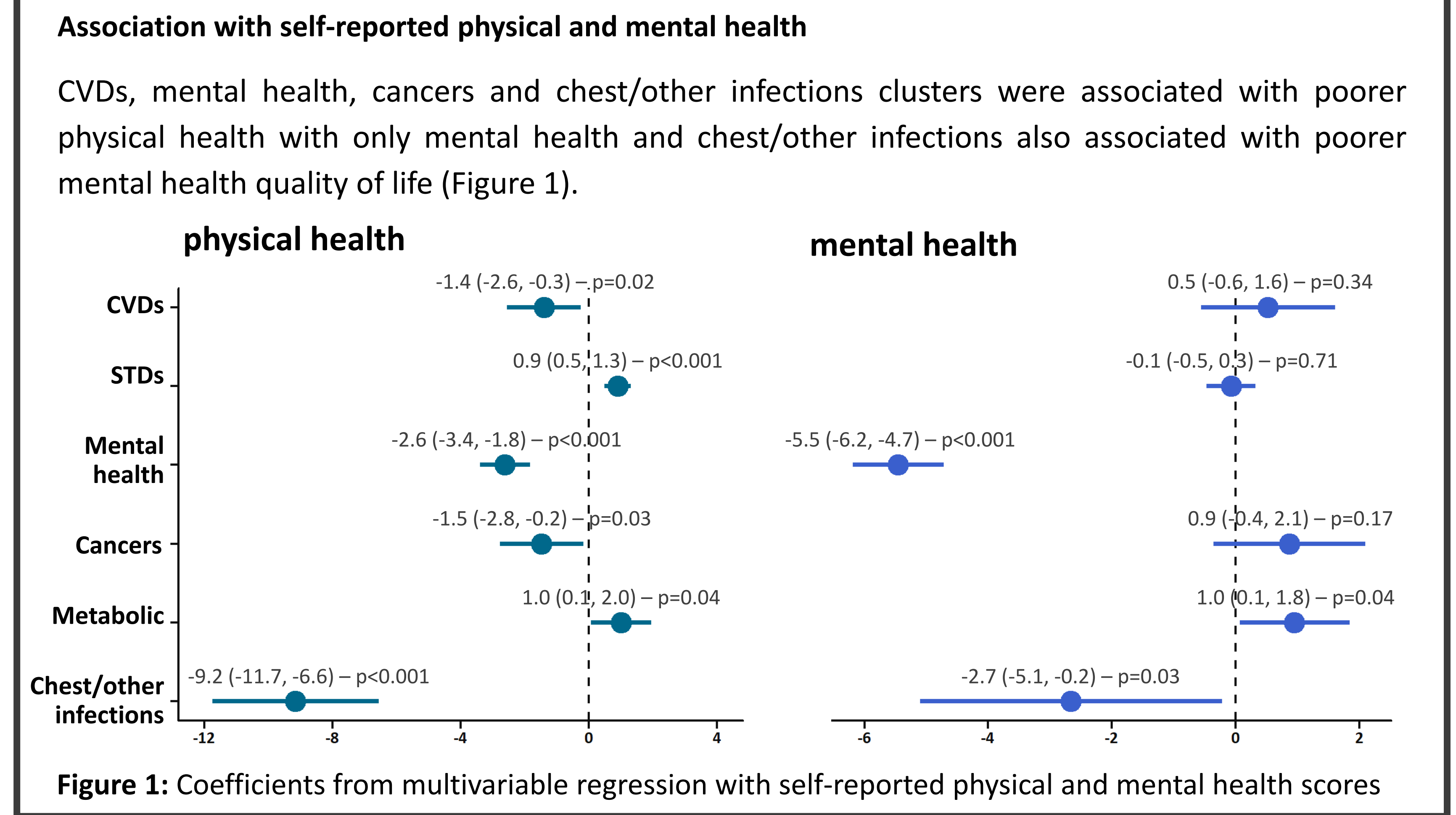
Older age was associated with higher scores in the CVDs, cancers, metabolic and chest/other infections clusters (all p's<0.001, Table 3). Higher BMI was associated with higher scores in the CVDs (p=0.009), cancers (p=0.03) and metabolic clusters (p=0.006).

Prior AIDS and longer time since HIV infection were associated with several clusters' severity scores, independently of age.

**Table 3: Associations between cluster severity scores and risk factors**

Risk factor	CVDs	STDs	Mental health	Cancers	Metabolic	Chest/other infections
Age	↑	-	-	↑	↑	↑
Gender (female vs male)	-	-	↑	-	-	-
Ethnicity (white vs black-African)	-	-	-	-	-	-
Sexuality (MSM vs heterosexual)	-	↑	-	↑	-	-
Body mass index	↑	-	-	↑	↑	-
Current smoking	-	-	-	-	-	-
Past smoking	-	-	-	-	-	-
Current recreational drug use	-	-	-	-	-	-
Current/past injection drug use	-	↑	↑	-	-	-
Time since of HIV diagnosis	↑	-	↑	-	↑	↑
Nadir CD4 <sup>+</sup> T-cell count	-	-	-	-	-	-
Prior AIDS	↑	-	↑	↑	-	↑

Legend:  
- no association (p≥0.05)  
↑ positive association (p<0.05)



**Correspondence:**  
Davide De Francesco, MSc  
@: d.defrancesco@ucl.ac.uk

**Reference:**  
<sup>1</sup> De Francesco, Davide, et al. "Patterns of co-occurring comorbidities in people living with HIV." *OFID*. Vol. 5 (11), 2018.