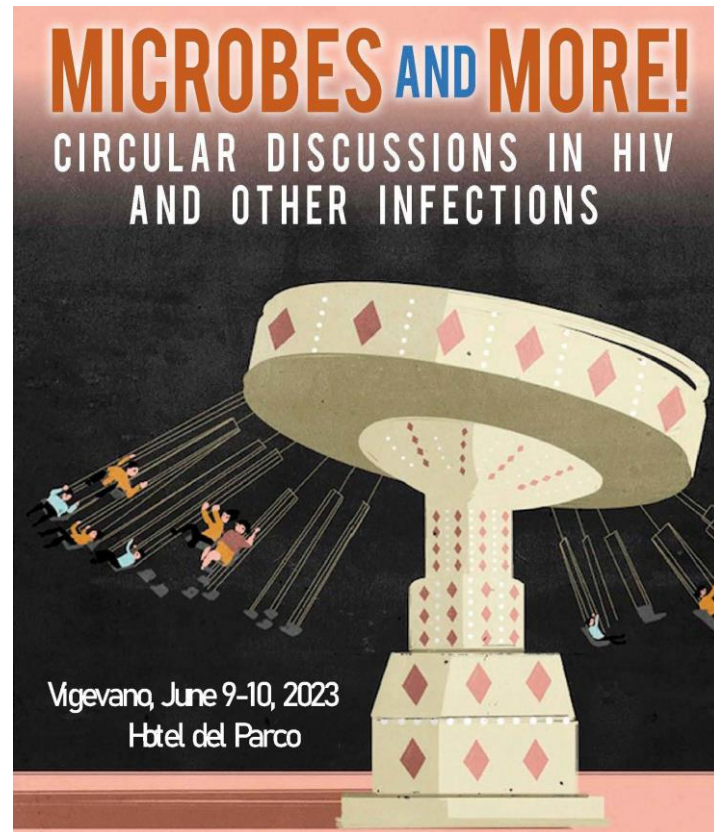


SESSION IV - ICONA STUDIES AT SPID

Patient-reported outcomes (PROs)

Alessandro Tavelli



Health and well-being as basis of HR-QoL

CONSTITUTION OF THE WORLD HEALTH ORGANIZATION¹

Constitution of the WHO 1948

THE STATES Parties to this Constitution declare, in conformity with the Charter of the United Nations, that the following principles are basic to the happiness, harmonious relations and security of all peoples:

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

- WHO provided the grounds for the introduction of the **health-related quality of life (HR-QoL)** concept into medicine.
- **QoL** reflects the **subjective perception of health**, and is one of the core concepts within Patient Reported Outcomes (PROs).

Paradigm shift

Bullinger M, Quitmann J. Dialogues Clin Neurosci. 2014

- Development of the HR-QoL field in medicine was spurred on, by the increasing prevalence of **chronic health conditions** requiring life-long treatment and care (incl. HIV).
- Paradigm shift occurred in evaluating the outcomes of medical care:
Focus from clinical indicators of disease to the patients' perception of health condition

HR-QoL is a multidimensional construct, that reflects the impact of health or medical conditions/treatments on an individual's perception of physical, emotional and social well-being

QoL is a unidimensional construct that evaluates general well-being or life satisfaction

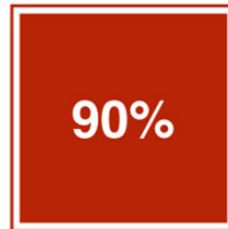
HR-QoL and HIV

- ART has changed HIV to a chronic condition but **PLWH** continue to have substantially **lower HRQoL than the general population** (even virological controlled and immunologically stable PLWH)
- Evidence suggests that in addition to the underlying infection, **social** circumstances, **relationship issues**, **comorbidities** and **stigma** may impact on HRQoL in PLWH
- **Improving quality of life is central to the care and support of PLWH.**
- Evaluations of new treatments and interventions to improve healthcare require standards clinical endpoints (CD4 count, viral load, clinical progression, management of comorbidities) as well as measurement of HR-QoL

Cooper V et al. 2017

The ‘fourth 90’

Lazarus JV BMC Med 2016



Diagnosed



On treatment



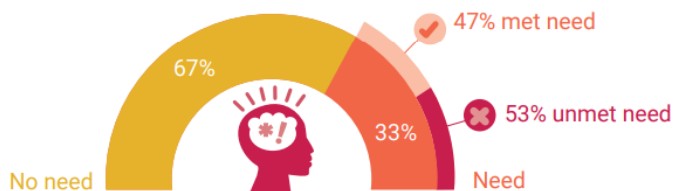
Virally suppressed



Good health-related
quality-of-life

Mental Health for PLWH

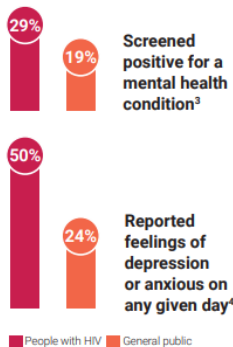
MENTAL HEALTH SUPPORT



Help managing stress

People living with HIV are around twice as likely to have mental health problems compared to the general public, depending on how it is measured.

The most common mental health conditions reported were depression (diagnosed in a third) and anxiety (diagnosed in a quarter). There was also significant experience of rarer conditions such as sleep disorders (15%), post-traumatic stress disorder (5%), psychosis/schizophrenia (2.4%) and bipolar disorder (1.7%). Significantly, the presence of mental health difficulties was the same across all ages, genders and ethnicities.

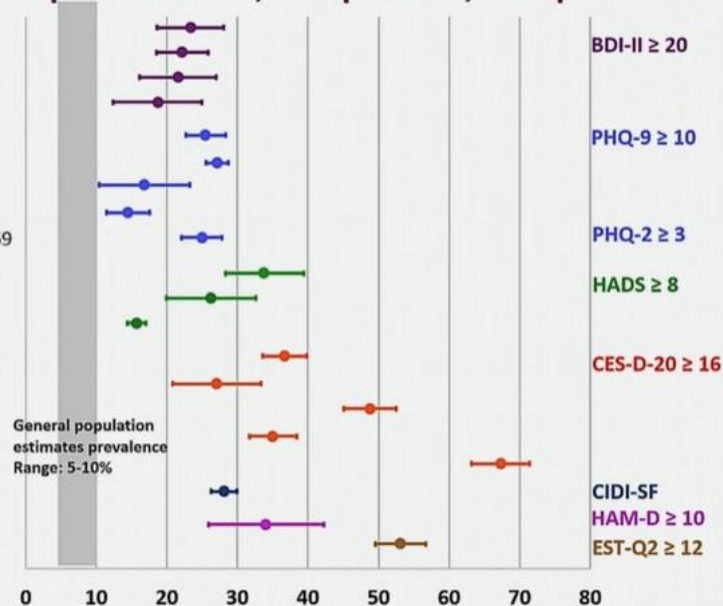


About 1 in 3 (31%) needed a psychologist or counsellor in the past year, but for 38% this need went unmet

Depression - symptom questionnaire, HIV-positive, Europe

Denmark 2008 N=304
Denmark 2013 N=501
Belgium 2012 N=218
France 2007-8 N=150
UK & IRE (POPPY) Age ≥ 50, 2013-14 N=975
England (ASTRA) 2011-12 N=3258
England Women, 2014 N=140
Netherlands (AGEHIV) 2010-12 N=541
England (PRIME) Women Age 45-60 2015 N=869
UK & IRE 2014 N=278
Germany ('50/2010') Age ≥ 50, 2008-9 N=183
W Europe (CRANIUM) 2010-11 N=2863
UK & IRE (POPPY) Age ≥ 50, 2013-14 N=952
Netherlands On ART, 2008-9 N=201
Italy (DHIVA) <2015 N=690
Spain On ART, 2008 N=799
Russia 2008-9 N=492
France (VESPA2) 2011 (past year) N=2392
Portugal 2008 N=130
Estonia 2013 N=729

Prevalence (%)
and 95% CI



F. Lampe – HIV Glasgow 2018

Patient Reported Outcomes (PROs)

A PRO is a measurement of any aspect of a patient's health status that comes directly from the patient without the interpretation by physicians or anyone else¹

- Measurement implies a tool with known characteristics in terms of validity³
- Validity is not a yes/no attribute but implies the availability of a comprehensive set of information and data

Validity
Reliability
Responsiveness
Interpretability

- Conceptual framework
- Item generation
- Scaling, scoring
- Item reduction
- Reproducibility
- Content validity
- Construct validity
- Discriminant validity
- Convergent validity
- Responsiveness
- Cultural adaptation

Patient as unique and direct source of

Reports

Presence of symptom

Evaluations

Intensity or interference

Without any interpretation

QoL, Quality of Life, HR-QoL, Health-related Quality of Life

1. Apolone G, *Health Qual Life Outcomes*. 2003;1:3; 2. Pollard B, et al. *Health Qual Life Outcomes*. 2007;5:14; 3. Medical News Today 2017. Available at: <https://www.medicalnewstoday.com/articles/150999.php> (Last accessed June 2019).

Electronic data collection of PROs

(Kall, Lancet HIV, 2019)

- It is increasingly popular, particularly in **large-scale** application of PROs.
- It **decreases human resource burden**, **minimises errors**, and enables **sophisticated** survey administration
- It can be captured using several **devices** (PCs, tablets or smartphones) using apps or online webtools
- It could be adapted for **serial use** (eg, using electronic reminders for FU surveys or electronic diaries).
- It could include user-friendly reports that score multidimensional tools and **interpret results in real-time**
- It can **aggregate** data at clinic level or **disaggregate** data for individual patient–clinician use
- **Data linkage** into registries can present this data alongside laboratory results and other health-care data as well as observational DB for research.

Decision-making chart for selection of patient-reported outcomes in HIV per population and setting

Considerations	
Population-level prevalence or surveillance	Ability to compare with general population surveys, use of probability sampling to ensure representativeness, and extra resources, long-term investment, or incentives that might be required due to population size and frequency of collection
Cohort research (including nested interventions)	Causal pathway to clinical outcomes and other measures and focused research question
Clinical use (patient level)	Measurement of symptoms and side-effects, short-forms that can be easily collected and scored, and developmental age for child respondents
Clinical trial research	Cost-effectiveness studies to derive utility (QALY, DALY) and measures responsive over a relatively short period of time, given the limited duration of HIV clinical trials
Multicountry monitoring	Brief, multidimensional tools that can be easily collected in routine monitoring and cross-cultural validation and adaptation
Considerations include sampling, length, mode, format, generic versus HIV-specific outcome measures. QALY=quality-adjusted life-year. DALY=disability-adjusted life-year.	

Popular topics in HIV research and patient-reported outcomes to measure

	Outcomes
Healthy ageing	Lifestyle (eg, physical activity, alcohol and tobacco use); nutrition; loneliness and resilience
Patient empowerment	Self-efficacy; self-management behaviours; perceived knowledge or information seeking; patient activation; resilience, and tolerance of uncertainty
Experience with HIV and ART	Self-reported symptoms; beliefs about treatment; adherence; fatigue, and sleep disorders
Sexual and reproductive health	Sexual dysfunction (lack of desire, sexual arousal disorders or orgasm disorders, sexual pain) and satisfaction with sex life
Use of psychoactive substances	Alcohol consumption; tobacco smoking, and use of cannabis and other psychoactive drugs
ART=antiretroviral therapy.	

Patient reported outcome assessment must be inclusive and equitable

Patient-reported outcomes are increasingly collected in clinical trials and in routine clinical practice, but strategies must be taken to include underserved groups to avoid increasing health disparities.

Melanie J. Calvert, Samantha Cruz Rivera, Ameeta Retzer, Sarah E. Hughes, Lisa Campbell, Barbara Molony-Oates, Olalekan Lee Aiyegbusi, Angela M. Stover, Roger Wilson, Christel McMullan, Nicola E. Anderson, Grace M. Turner, Elin Haf Davies, Rav Verdi, Galina Velikova, Paul Kamudoni, Syed Muslim, Adrian Gheorghe, Daniel O'Connor, Xiaoxuan Liu, Albert W. Wu and Alastair K. Denniston



Box 1 | Key terms

Digital inclusion. Many people face barriers to using digital services, including a lack of digital skills or lack of access to infrastructure. Digital inclusion seeks to design services so that they meet all user needs²¹.

Diversity, equity and inclusion. Respecting and valuing all forms of difference in individuals, acknowledging and allowing for case-specific resource allocation for different individuals to reach the same outcomes, while positively striving to meet the needs of different people and taking deliberate action to create environments where everyone feels respected and able to reach their potential^{12,22}.

Health data poverty. Health data are often not representative of the diversity within a population, and so some groups do not benefit from healthcare innovations⁷.

Interactive voice response. This allows participants to complete an automated questionnaire via a telephone keypad or by speech recognition.

Patient-reported outcomes.

A measurement of a patient's health provided directly by the patient, rather than interpreted by a clinician²³.

Underserved groups. The definition of underserved is context specific and depends on the target population, question being asked, and intervention being tested. Underserved groups may reflect demographic, socioeconomic and health status factors. Examples include, but are not limited to, age, race, ethnicity, sexual orientation, gender identity, socioeconomic or educational disadvantage, individuals with disabilities, rare disease or language or literacy barriers, pregnant women, and those living in remote areas or areas where local service provision is weak or failing²⁴.

User-centered design. Design processes that are iteratively conducted with end users¹².

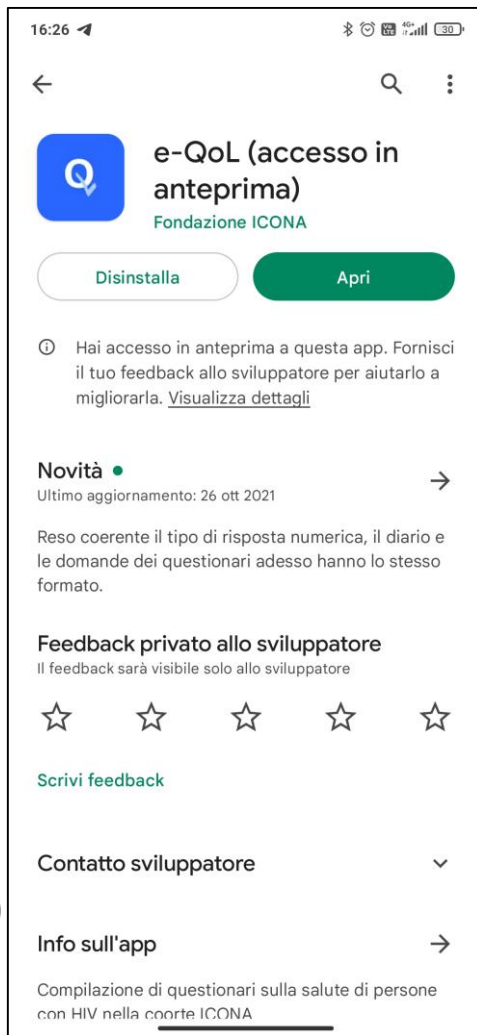
Value-based healthcare. "The equitable, sustainable and transparent use of the available resources to achieve better outcomes and experiences for every person"²⁵.

Collected PROs in Icona e-QoL app

Mobile app launched only for Icona PLWH in October 2021
PROs collected every 12 months, EQ-5D-3L every 6 months

1. **EQ-5D-5L**, measure of current health status (EuroQoL Group)
2. **PHQ-9**, Depression screening
3. **GAD-7**, Generalized Anxiety screening
4. **Adherence questionnaire**, ARV Treatment adherence
5. **AUDIT-C**, measure of alcohol misuse
6. **HIVDQoL** (HIV Dependent Quality of Life), measure QoL and impact of HIV
7. **HIVSRQ** (HIV Symptoms Rating Questionnaire) measure presence and grading of symptoms
8. **HIVTSQ** (HIV Treatment Satisfaction Questionnaire), measure treatment satisfaction of ARV therapy (HIVTSQs; HIVTSQc)
9. **W-BQ16** (Well-Being Questionnaire), measure of the psycho-physical well-being

Download Android and iOS Stores



from Android 7.0



From iOS 11



Login credentials

745 objects displayed [Search](#)

Codice interno	Username
A13-BLPO323SP	518431
A13-BUAI324SP	518433
A13-VRPO325SP	518534
A13-PDSN326SP	518569
A13-NCEO327SP	518617
A13-BIWL328SP	518623
A13-GEAE329SP	519404
A13-MGOO330SP	521121
A13-SSGA331SP	522006
A13-MNFA333SP	525566
A13-ADKM334SP	525820
A13-SDMU335SP	526405
A13-AFMH336SP	527300
A13-PNCA337SP	528475
A13-TODM700SP	5285571

745 objects

Presidente: Antonella d'Arminio Monforte

CDA: M. Andreoni, A. Antinori, A. Castagna, F. Castelli, R. Cauda, A. d'Arminio Monforte, G. Di Perri, M. Galli, R. Iardino, G. Ippolito, A. Lazzarin, G. Marchetti, G. Rezza, P. Viale, F. Von Schlosser.

Segreteria Amministrativa: E-MAIL: amm.icona@gmail.com;
PEC: fondazioneicon@legalmail.it



Fondazione Icona ITALIAN COHORT NAIVE ANTIRETROVIRALS Conceived by Professor Mauro Moroni



Username: provatav

Password: provatav

Create

Open

Edit

Delete

Scarica credenziali PRO





Accesso

Accedi con credenziali



Accedi con codice QR



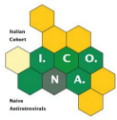
Login

Presidente: Antonella d'Arminio Monforte

CDA: M. Andreoni, A. Antinori, A. Castagna, F. Castelli, R. Cauda, A. d'Arminio Monforte, G. Di Perri, M. Galli, R. Iardino, G. Ippolito, A. Lazzarin, G. Marchetti, G. Rezza, P. Viale, F. Von Schlosser.

Segreteria Amministrativa: E-MAIL: amm.icona@gmail.com;
PEC: fondazioneiconas@legalmail.it

Fondazione Icona ITALIAN COHORT NAIVE ANTIRETROVIRALS *Conceived by Professor Mauro Moroni*



Username: provatav
Password: provatav



Accesso



Username



Password



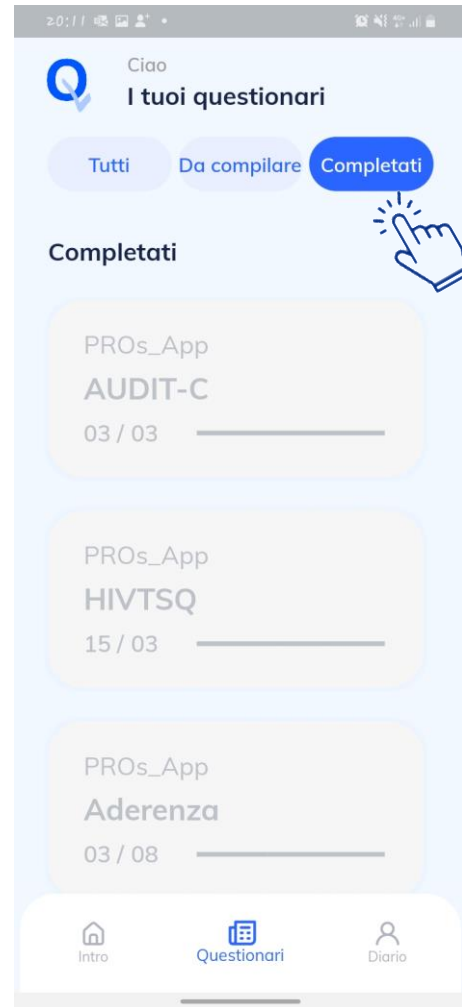
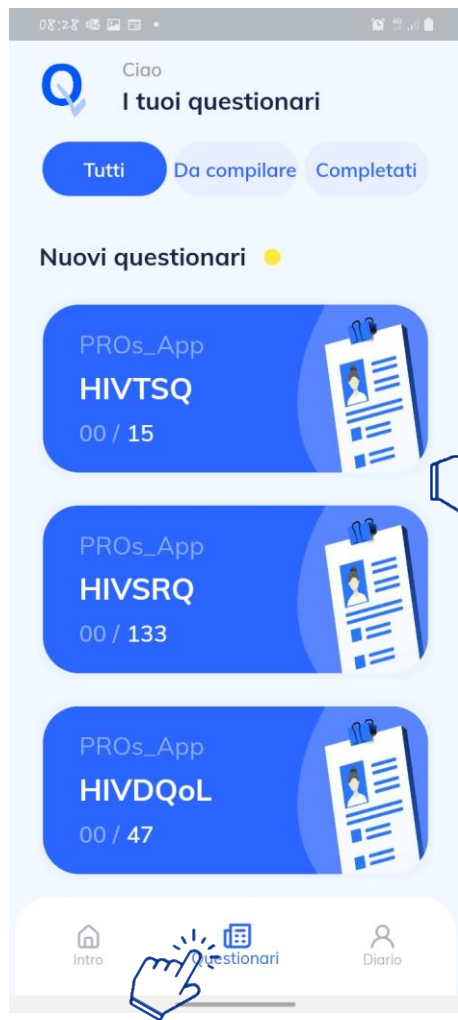
Resta connesso

[Password dimenticata?](#)

Intro section: Why using the app, QoL, PROs



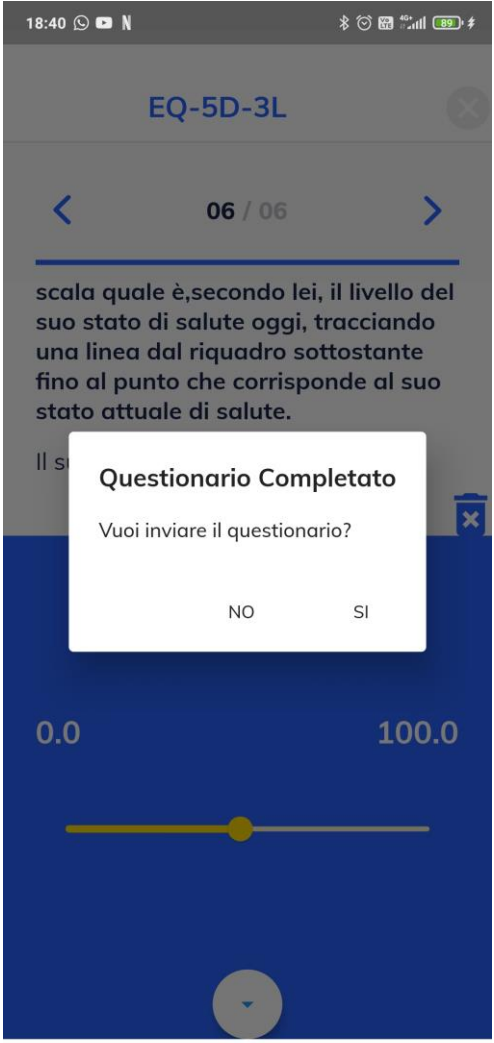
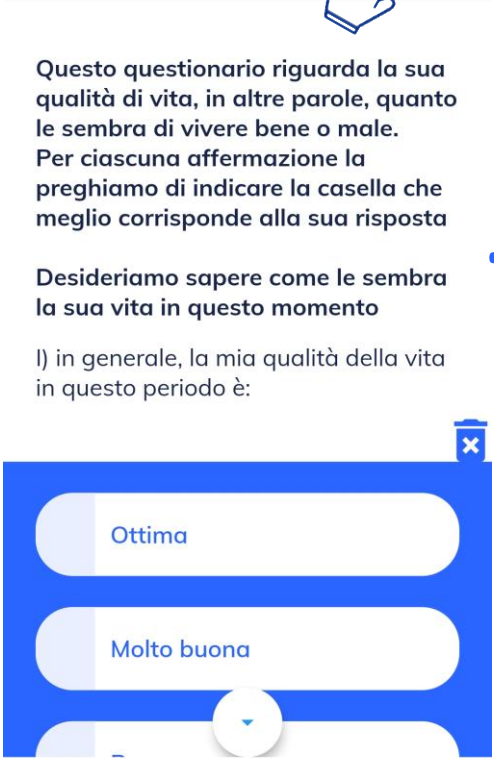
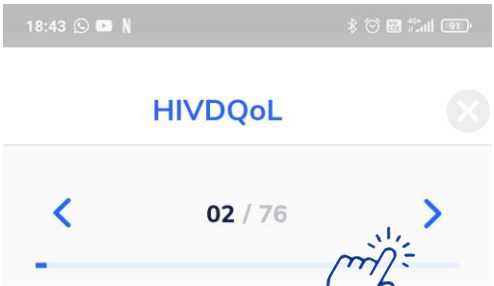
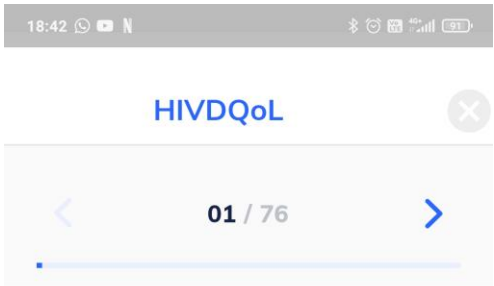
PROs section



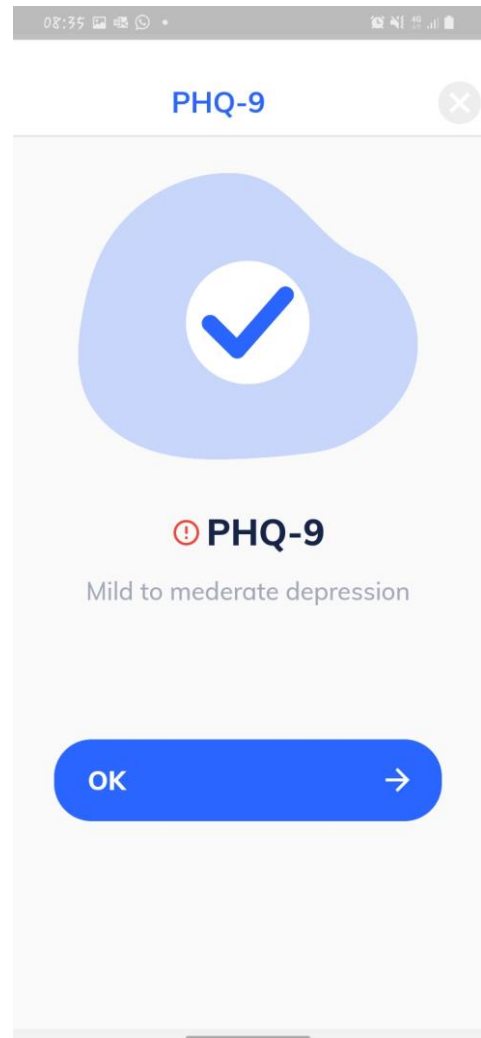
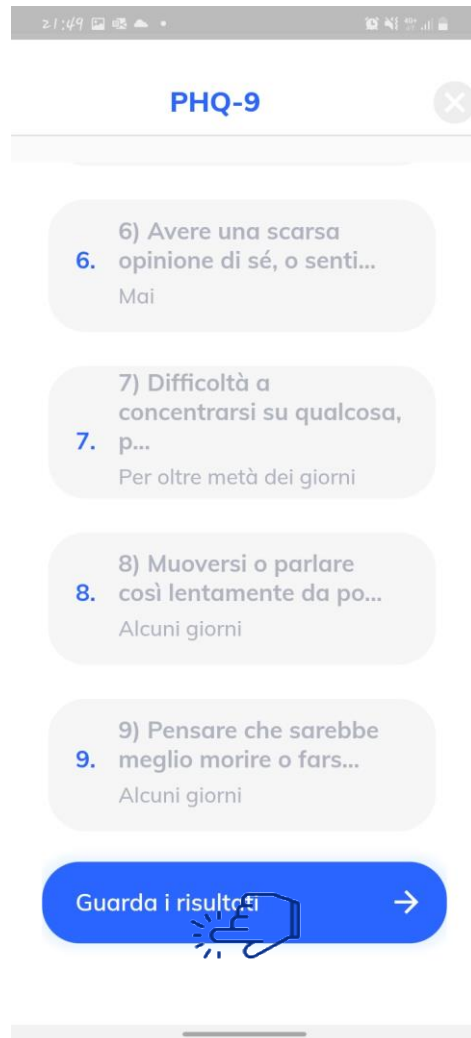
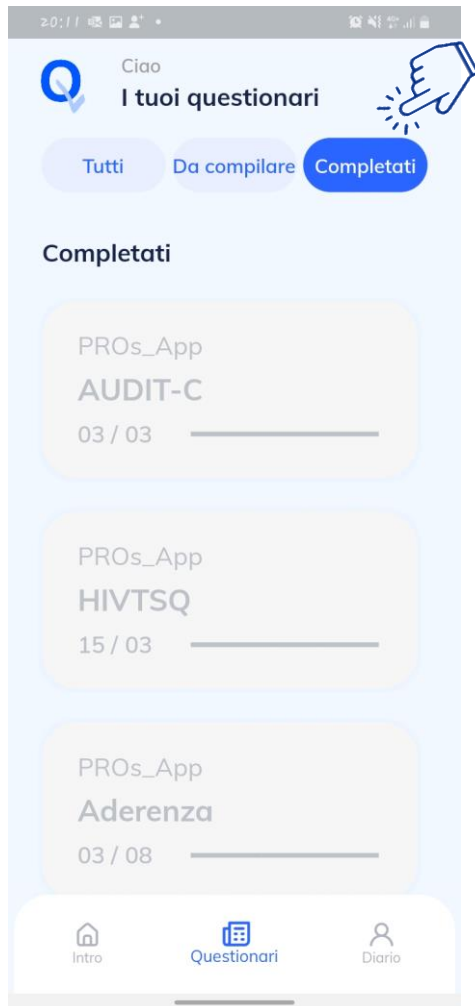
Description and start



Responses



Revision of responses And Outcomes



New e-QoL App (Mid-June)

- New design
- New functionalities
- New sections(BMI, Alimenti e Calorie)



Methods

- Demographical and clinical comparison between Icona PLWH who responded at least 1questionnaire using the mobile app and those not using the app in the same centers and in same period (after inclusion of the first users for each center)
- **Description of baseline PROM** of first 1.5 year of implementation of mobile app the Icona
- Stratification for sex and age strata
- In order to explore the interrelationship among these PRO measures a correlation matrix was constructed: Spearman's rank correlation coefficient was used to assess relationship strength and direction of effect.

Collected PROs using e-QoL app (29may2023 update)

935 questionnaire for 133 Icona PLWH (56 questionnaire still in the temporary area)

94 questionnaire for ART naive (10.0%), 11 PLWH (8.3%)

105 questionnaire with >1 assesment (for 14 PLWH)

PROs	N. questionnaires collected	N. 1 st session	>1 questionnaire per user	Questionnaires ART-Naive
Adherence	94	81	13	11
AUDIT-C	94	84	10	10
EQ-5D-3L	133	120	13	11
GAD-7	92	82	10	10
HIVDQoL	124	110	14	10
HIVSRQ	100	88	12	12
HIVTSQ	97	86	11	10
PHQ-9	97	86	11	10
W-BQ16	104	93	11	10

Clinical Center	tot questionnaires	tot num PLWH
A06	62	12
A12	13	3
A13	265	31
A14	18	2
A15	9	1
A19	9	1
B00	229	28
B07	1	1
C02	9	1
D00	19	3
E08	301	50
	935	133

Incomplete and missing questionnaire/responses

1st Session (baseline data):

70/133 (52.6%) did not complete all the 9 questionnaire for first session

Questionnaires completes	n PLWH	percent
<5 questionnaires/session	45	33.8%
5 questionnaires/session	3	2.3%
6 questionnaires/session	2	1.5%
7 questionnaires/session	8	6.0%
8 questionnaires/session	12	9.0%
9 questionnaires/session (all)	62	46.6%

Questionnaires	Collected 1 st session	Percent collected/total 1 st session	% risposte
Adherence	81	60.9%	97.3%
AUDIT-C	84	63.2%	100.0%
EQ-5D-3L	120	90.2%	98.1%
GAD-7	82	61.7%	100.0%
HIVDQoL	110	82.7%	90.1%
HIVSRQ	88	66.2%	92.3%
HIVTSQ	86	64.7%	94.9%
PHQ-9	86	64.7%	100.0%
W-BQ16	93	69.9%	99.9%

ICONA users included

Icona PLWH to whom the app has been offered (4.4%) and completed at least 1 questionnaire are:

- Younger
- ART-experienced but with shorter history of HIV
- MSM
- With higher education

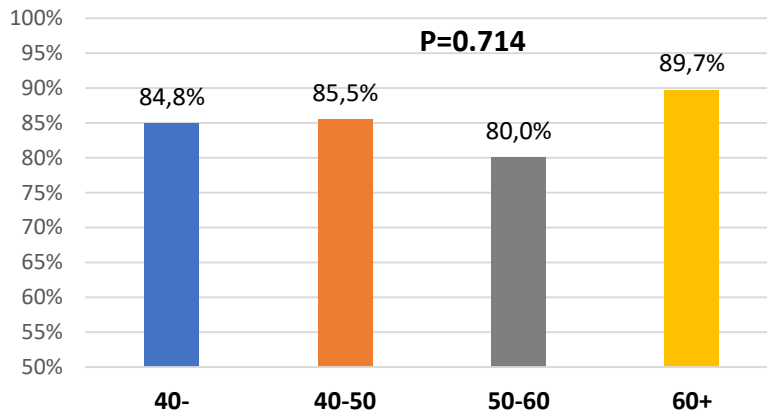
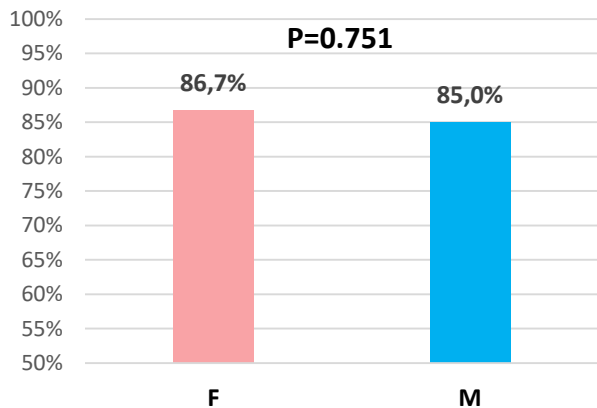
	No questionnaire N=2709 (95.6%)		At least 1 questionnaire completed N=126 (4.4%)		p
Sex, Female	452	16.7	14	11.1	0.099
Age, median (IQR)	48	39-56	45	36-53	
<40	700	26	39	30.95	0.036
40-49	782	29	46	36.51	
50-59	768	28.35	23	18.25	
60+	459	16.94	18	14.29	
Years from HIV diagnosis	7.6	3.1-12.4	4.3	1.9-11.0	0.004
ART-naïve	250	9.2	4	3.2	0.02
Years from ART-start	6.9	3.8-10.7	4.4	2.0-9.6	<0.001
Ethnicity, Caucasiam	2,348	86.67	116	92.06	0.080
Italian	2199	81.2	107	84.9	0.291
Mode of Transmission					<0.001
Hetero	853	31.49	22	17.46	
IDU	180	6.64	5	3.97	
MSM	1,468	54.19	93	73.81	
Other/Unknown	208	7.68	6	4.76	
Nadir CD4	290	151-432	305	197-447	0.426
AIDS	388	14.3	16	12.7	0.61
CD4 cell count, cells/mm ³	703	505-946	656	519-918	0.384
CD4<200 cells/mm ³	142	5.3	4	3.2	0.299
HIVRNA<50 copies/ml	2321	87.8	110	87.3	0.872
HIVRNA<50 cps/ml among ART-exp	2309	93.9	110	90.2	0.097
Education, University	478	24.4	41	40.6	<0.001
Job status, Not Occupied	256	9.4	8	6.3	0.242
HBsAg pos	125	5.2	4	3.3	0.364
HCVAb pos	288	11.3	8	6.7	0.117
2DR-INSTI based regimen	522	19.3	35	27.8	0.019

EQ-5D-3L

	N responses	PRO Score	
EQ-5D-3L, VAS, median (IQR)	106	85.0%	(75-90.8)
5 Domains (% some/extreme problems)			
Pain/discomfort	108	32	29.6%
Self Care	109	2	1.8%
Mobility	110	10	9.1%
Anxiety/Depression	109	47	43.2%
Usual Activities	108	11	10.2%

Generic measure of **health status**:

- 5 domains likert scale 3 levels (1-3)
- Today health status VAS scale (0-100%)

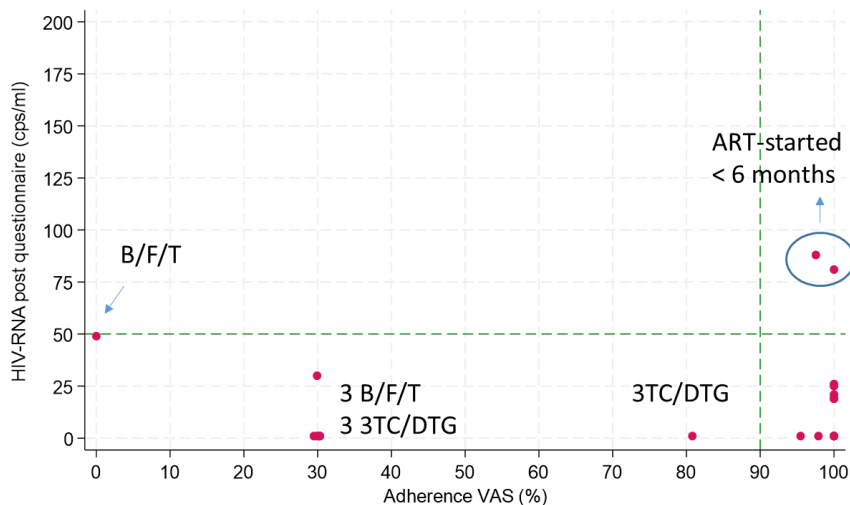


Adherence questionnaire

Adherence last month VAS, median (IQR) : 100% (32.7-100%)

	n	Adherence response median	IQR	P=0.362
F	7	100%	100-100	
M	68	100%	32-100	

Age strata	adherence median	IQR	P=0.162
40-	100%	30.5-100	
40-50	100%	37.2-100	
50-60	100%	100-100	
60+	66.4%	30.1-100	



HIVDQoL (HIV-dependent QoL)

Measure of QoL,

- 4 overview items including:
 - Generic QoL [+3 (excellent) to -3 (extremely bad)]
 - HIV-dependent QoL (*'If I did not have HIV, my quality of life would be'*) [-3 (very much better) to +1 (worse)]

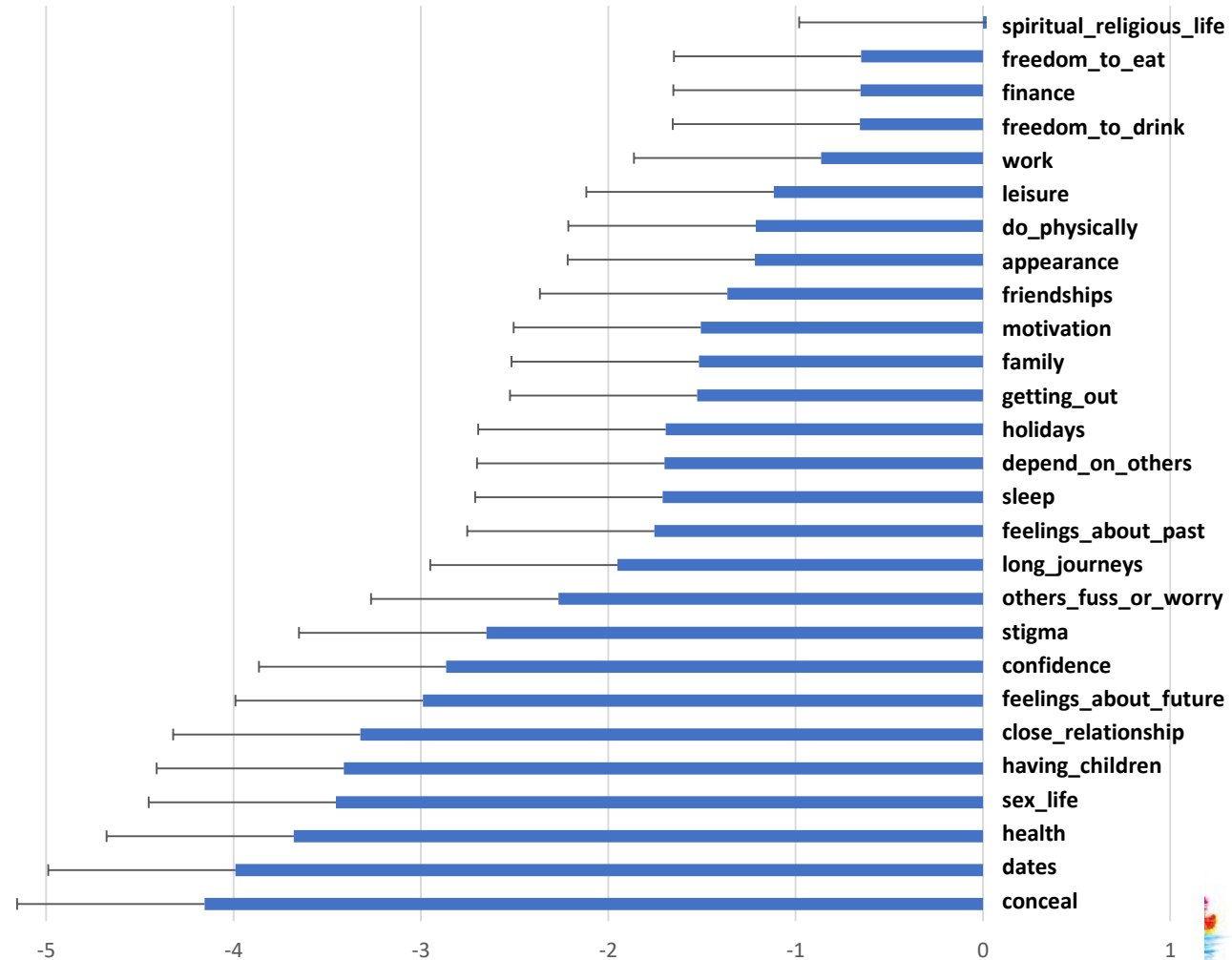
	N. Resp	HIVDQoL score	
HIVDQOL, general QoL, median (IQR)	104	2	1-2
Very Good (+2) or Optimal (+3), n(%)		58	55.70%
HIVDQoL HIV dependent, median (IQR)	104	-1	-2;0
HIVDQoL HIV Average Weighted Impact, median (IQR)	103	-1.43	-2.48; -0.67

- 26 domain specific items measuring the impact of HIV on each and the importance for QoL.
- Weighted impact (WI) scores are calculated (*impact x importance*) per domain.
- Average weighted impact score (AWI) can also be calculated from 24 items [-9 (greatest negative impact) to +3 (greatest positive impact)]

	F	M	p
HIVDQOL, general QoL,	1 (1-1)	2 (1-2)	0.003
HIVDQoL, HIV dependent QoL	-2 (-3;-1)	-1 (-2;0)	0.117
HIVDQoL, AWI	-2.5 (-4.8;-15)	-1.3 (-2.38;-0.67)	0.094

	40-	40-50	50-60	60+	p
HIVDQOL, general QoL,	2 (1-3)	1 (1-2)	2 (1-3)	1 (1-2)	0.381
HIVDQoL HIV dependent	-1 (-2;0)	-1 (-2;0)	-1 (-2;0)	-1 (-1;-1)	0.808
HIVDQoL AWI	-1.28 (-2.18; -0.55)	-1.37 (-2.67; -0.74)	-1.58 (-2.44;-0.52)	-1.41 (-2.47; -1.05)	0.839

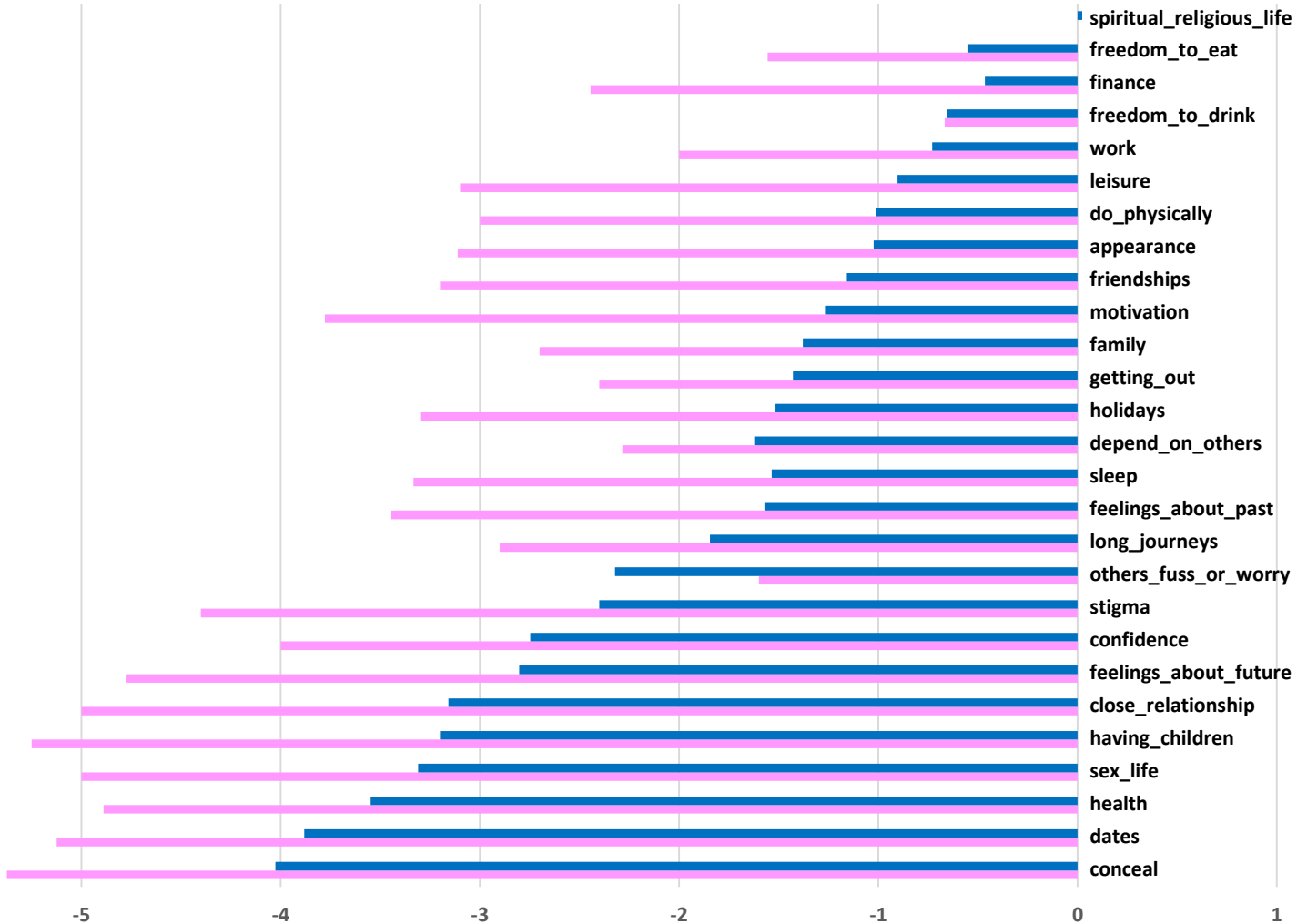
HIVDQoL



HIV weighted Impact

HIVDQoL

■ M
■ F



HIV weighted
Impact

HIVTSQ-s (HIV Treatment Satisfaction questionnaire)

- 12 items investigating aspects of **treatment satisfaction** including side effects and convenience [0 (very dissatisfied) / +6 (very satisfied)].
- Items 1–11 are summed to produce a Treatment Satisfaction score [range: 0 to 66]
- the higher the score, the greater the satisfaction with treatment

	N. responses	HIVTSQ-sScore	
HIVTSQs, Treatment Satisfaction score, median (IQR)	64	63	(58-66)
Standardize HIVTS score, percent, median (IQR)		95.40%	(87.9-98.1%)

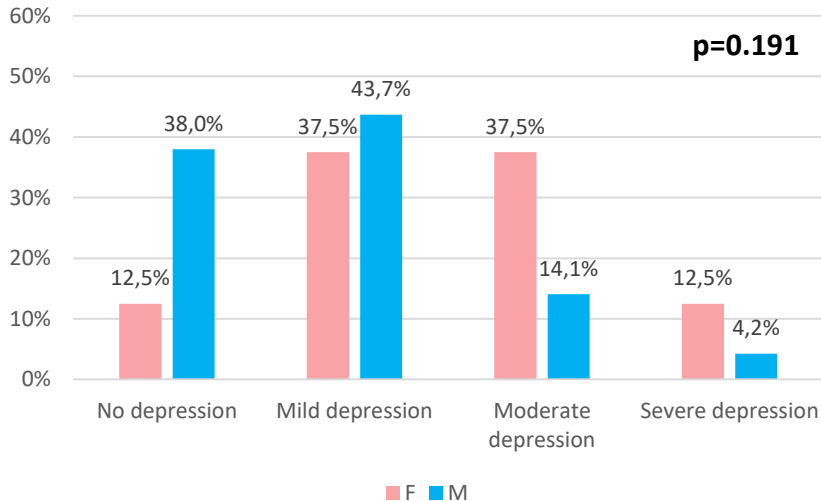
	n PLWH	HIVTSQs score (percent)	P=0.216
F	7	90.90% (74.2-95.4)	
M	68	95.40% (87.9-98.5)	

	n PLWH	HIVTSQs score (percent)	P=0.164
40-	19	100% (83.3-100)	
40-50	30	100% (87.9-97.0)	
50-60	9	100% (89.4-100)	
60+	6	66.40% (97.0-100)	

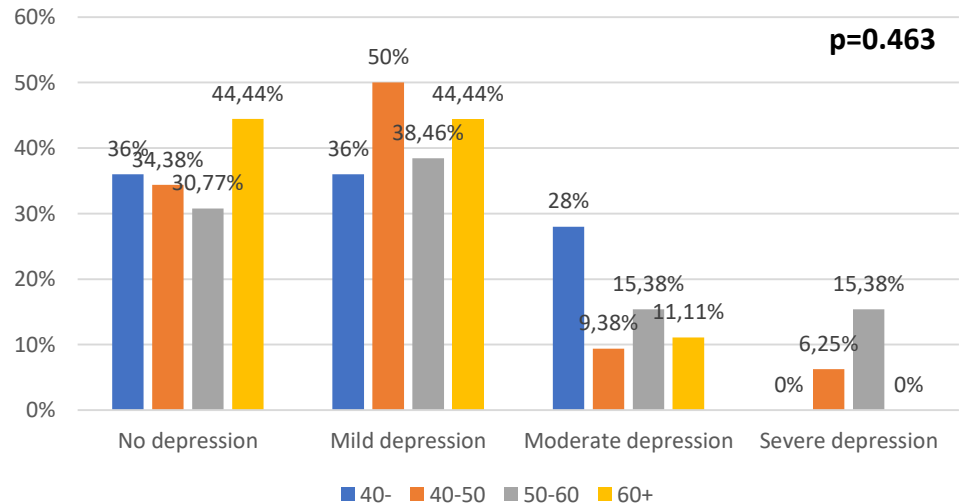
PHQ-9 (Patient Health Questionnaire-9)

	N responses	PHQ-9 score	
PHQ-9 score, median (IQR)	79	6	(3-9)
No Depression, n(%)		28	(35.4%)
Mild Depression, n(%)		34	(43.0%)
Moderate Depression, n(%)		3	(16.5%)
Severe Depression, n(%)		4	(5.0%)

21.5%



- 9-items tool to assess the degree of **depression**
 - 4 levels responses [0-3]. Total score 0-27 pts
- Score interpretation
- ≥ 10 pts: 88% specificity and sensibility detecting major depressive disorder



GAD-7 (General Anxiety Disorder-7)

	N. responses	GAD-7 score
GAD7 score, median (IQR)	75	6 (3-7)
Minimal Anxiety <5, n(%)	31	(41.3%)
Mild Anxiety 5-9, n(%)	33	(44.0%)
Moderate Anxiety 10-14, n(%)	6	(8.0%)
Severe Anxiety >14, n(%)	5	(6.7%)

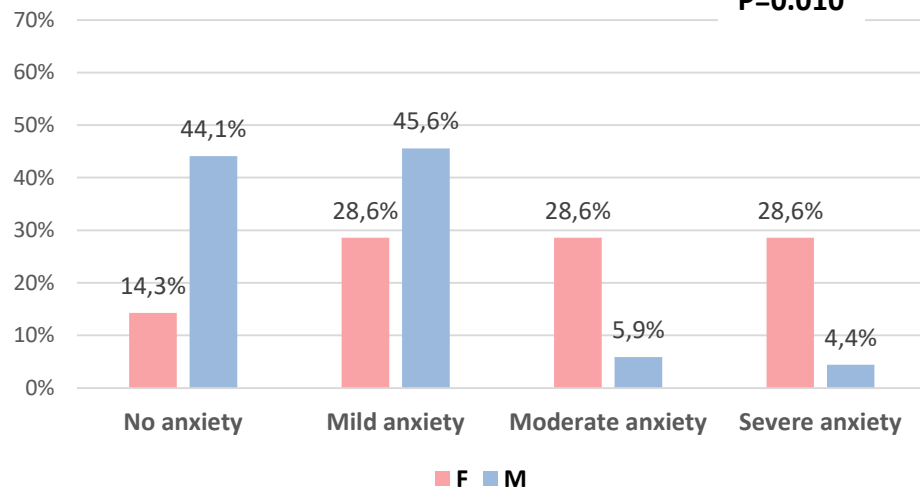
14.7%

- 7-items tool to assess the general **anxiety** disorder
- 4 levels responses [0-3]. Total score 0-21 pts

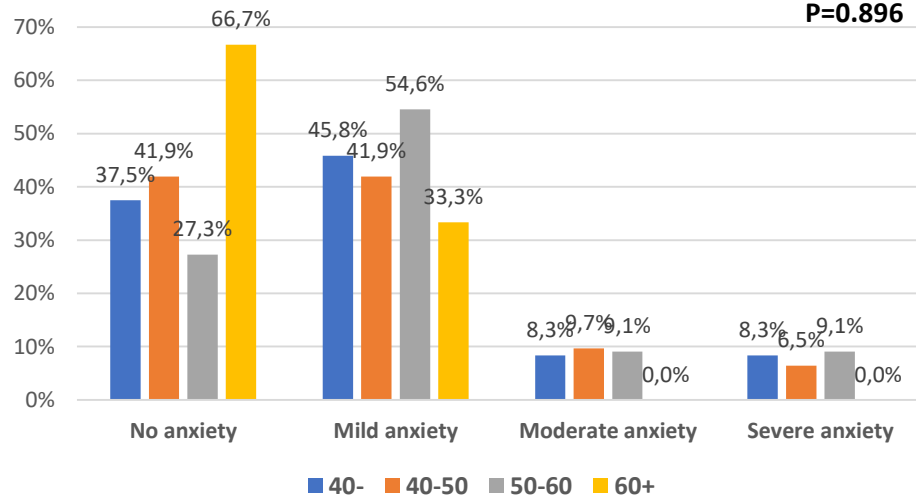
Score interpretation

>=10 pts: 89% sensitivity 82% and sensibility detecting GAD

P=0.010



P=0.896

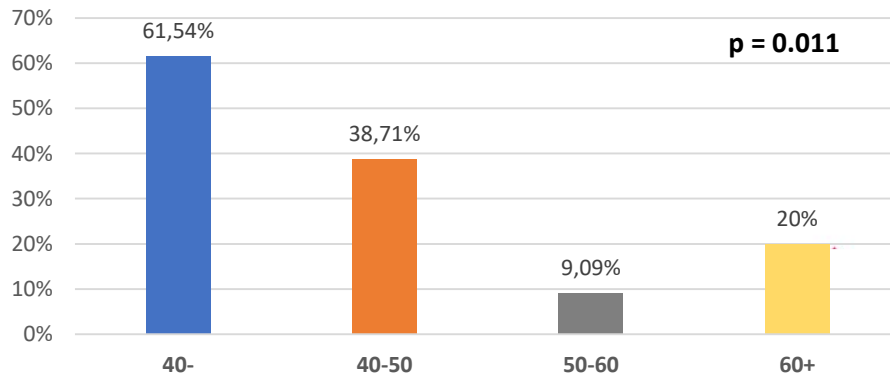
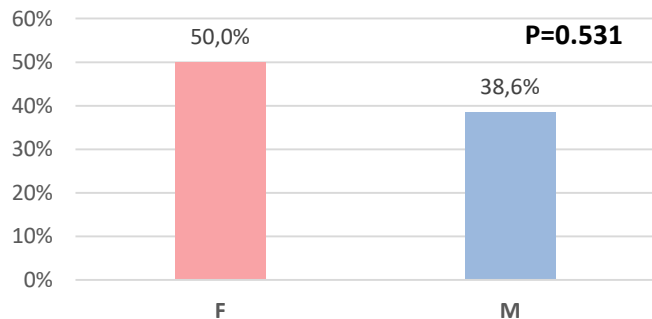


AUDIT-C (Alcohol Use Disorder Identification Test)

	N. Responses	AUDIT-C Score	
AUDIT-C score, median (IQR)	78	3	(2-4)
Hazardous Drinking, n(%)		31	(39.7%)

		Alcohol use last available Icona visit		Agreement: 53.7% Cohen's Kappa: 0.023 (Slight agreement)
		No	Yes	
Alcohol Use AUDIT-C				
No		4	4	
Yes		21	25	

- Quantifies **alcohol misuse**
 - 3 questions on consumption habits (frequency, amount, binge drinking)
 - 5 levels scale (0-4). Total score 0-12
- Score interpretation (higher score greater severity):
- Males: ≥ 4 suggest alcohol misuse.
 - Females: ≥ 3 suggest alcohol misuse.



W-BQ16 (Well-Being Questionnaire)

	N. Responses	W-BQ16 score			range
WB-Q16, General Well-Being, median (IQR)	85	31	(25-36)	0-48	
Energy	86	7	(5-9)	0-12	
Negative well-being	86	3	(1-5)	0-12	
Positive well-being	85	7	(6-9)	0-12	
Stress	86	5	(3-7)	0-12	

- Generic measure of **well-being**
 - 16-items, 4-level scale (0-3).
 - 4 subscales (4-items) + general WB score calculated by combining subscales
- Score interpretation
- Higher general WB score and positive WB, Energy subscales = greater WB
 - Higher stress and negative WB subscales = lower WB

W-BQ16	F	M	p
General	21 (18-34)	31 (27-36)	0.067
Energy	6 (4-7)	7 (6-9)	0.094
Positive WB	6 (6-8)	8 (6-9)	0.430
Negative WB	6 (2-7)	3 (1-4)	0.027
Stress	7 (4-10)	4 (3-6)	0.086

W-BQ16	40-	40-50	50-60	60+	p
General	31 (27-34)	31 (25-35)	31 (20-38)	32 (28-36)	0.84
Energy	7 (5-9)	7 (6-8)	7 (5-10)	7 (6-10)	0.967
Positive WB	7 (6-9)	8 (6-9)	6 (4-8)	7 (6-10)	0.51
Negative WB	3 (2-5)	3 (1-6)	3 (1-4)	2 (1-4)	0.557
Stress	5 (3-6)	5 (4-7)	5 (3-8)	5 (3-6)	0.807

HIVSRQ

(HIV Symptom Rating Questionnaire)

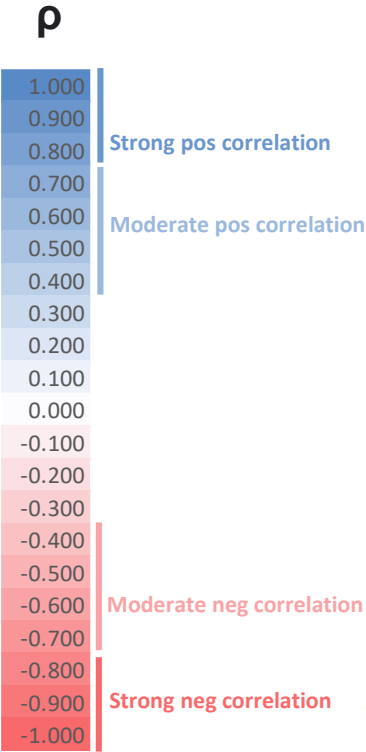
- 64-item measure the degree to which PLWH are **bothered by symptoms**
- Scores range 1 (not at all) / 4 (a lot)
- 6 subscales
- Symptoms Overview scale (38-items)

	HIVSRQ			
	N. Resp	Score, median	(IQR)	range
HIVSRQ Overview	71	37	(13-57)	0-152
HIVSRQ emotion/mood	73	8	(2-12)	0-16
HIVSRQ skin problem	72	0	(0-4)	0-12
HIVSRQ sex life	72	3	(0-6)	0-12
HIVSRQ neuromuscular	73	4	(2-8)	0-36
HIVSRQ minor ill	77	2	(0-4)	0-12
HIVSRQ gastrointestinal	78	3	(0-6)	0-36

Bothering rate

	N	Mean	SD		N	Mean	SD
Sleep_problems	72	2.10	1.65	Cough	80	0.74	1.24
Depressed	73	1.97	1.55	Eye_problems	76	0.71	1.25
Emotional	73	1.95	1.49	Dizzy	72	0.69	1.36
Tired	78	1.92	1.51	Trouble_breathing	80	0.69	1.34
Anxious	73	1.74	1.63	Nasal_problems	77	0.66	1.17
Irritable	73	1.56	1.55	Lipodystrophy	72	0.64	1.29
Injection	18	1.44	1.72	Skin_rash	72	0.56	1.23
Bloated	78	1.44	1.60	Nausea	78	0.54	1.19
Avoid_sex	72	1.38	1.55	Chest_Pain	79	0.52	1.15
Back_pain	74	1.35	1.48	Uncoordinated	72	0.51	1.20
Excessively_sleepy	72	1.19	1.54	Lack_of_sensation_fingers/toes	73	0.51	1.17
Generally_unwell	78	1.17	1.53	Hair_loss	77	0.51	1.24
Lack_interest_sex	72	1.14	1.49	Bleeding_gums	78	0.50	1.04
Abnormal_dreams	72	1.14	1.46	Constipation	78	0.47	1.09
Muscle_weakness	76	1.08	1.49	Bad_taste	72	0.47	1.16
Headaches	77	1.04	1.40	Thirsty	79	0.43	0.93
Indigestion	78	1.03	1.42	Swollen_glands	72	0.42	1.07
Numbness_hands/feet	73	0.99	1.39	Bruised_skin	72	0.42	1.14
Muscle_pain	76	0.97	1.36	Poor_appetite	72	0.40	1.06
Diff_becoming_sexually_aroused	72	0.97	1.61	Abdominal_pain	78	0.38	1.06
Flatulence	78	0.94	1.40	Difficulty_Swallowing	78	0.33	1.03
Joint_pain	74	0.93	1.44	Discoloured_urine	72	0.29	0.90
Difficulty_thinking	72	0.93	1.49	Diarrhoea	78	0.23	0.84
Feverish	78	0.91	1.30	Mouth_ulcers	77	0.22	0.82
Minor_Illness	77	0.91	1.43	Weight_loss	72	0.21	0.67
Dry_skin	72	0.90	1.27	Period_problems	46	0.13	0.62
Dry_mouth	78	0.88	1.35	Hyperactive	72	0.10	0.45
Night_sweats	72	0.88	1.36	Hallucinations	73	0.08	0.52
Vomited	78	0.87	1.39	Broken_bone	75	0.07	0.41
Itching	72	0.86	1.45	Jaundice	76	0.07	0.41
Problems_sex_function	50	0.80	1.56	Blood_in_urine	72	0.06	0.47
Palpitations	81	0.77	1.28	Passed_out	72	0.00	0.00

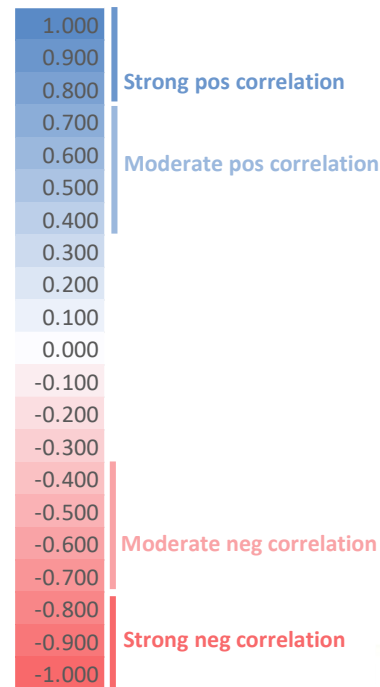
EQ-5D-3L VAS	1												
HIVDQoL QoL	0.406*	1											
HIVDQoL QoL-HIV	0.290*	0.258*	1										
HIVDQoL AWI	0.426*	0.337*	0.706*	1									
WBQ16 General	0.538*	0.618*	0.473*	0.615*	1								
WBQ16 Energy	0.399*	0.586*	0.452*	0.504*	0.845*	1							
WBQ16 Neg WB	-0.458*	-0.531*	-0.392*	-0.500*	-0.826*	-0.625*	1						
WBQ16 Pos WB	0.511*	0.585*	0.351*	0.480*	0.817*	0.674*	-0.591*	1					
WBQ16 Stress	-0.458*	-0.416*	-0.419*	-0.537*	-0.780*	-0.543*	0.566*	-0.469*	1				
PHQ9 score	-0.444*	-0.600*	-0.294*	-0.446*	-0.760*	-0.740*	0.674*	-0.620*	0.524*	1			
GAD7 score	-0.340*	-0.571*	-0.374*	-0.311*	-0.739*	-0.660*	0.654*	-0.538*	0.645*	0.777*	1		
HIVTSQs score	0.398*	0.326*	0.255*	0.225	0.405*	0.384*	-0.349*	0.323*	-0.355*	-0.3863*	-0.357*	1	
HIVSRQ overview	-0.379*	-0.580*	-0.262*	-0.431*	-0.596*	-0.555*	0.591*	-0.389*	0.367*	0.719*	0.576*	-0.341*	1
	EQ-5D-3L VAS	HIVDQoL QoL	HIVDQoL QoL-HIV	HIVDQoL AWI	WBQ16 General	WBQ16 Energy	WBQ16 Neg WB	WBQ16 Pos WB	WBQ16 Stress	PHQ9 score	GAD7 score	HIVTSQs score	HIVSRQ overview



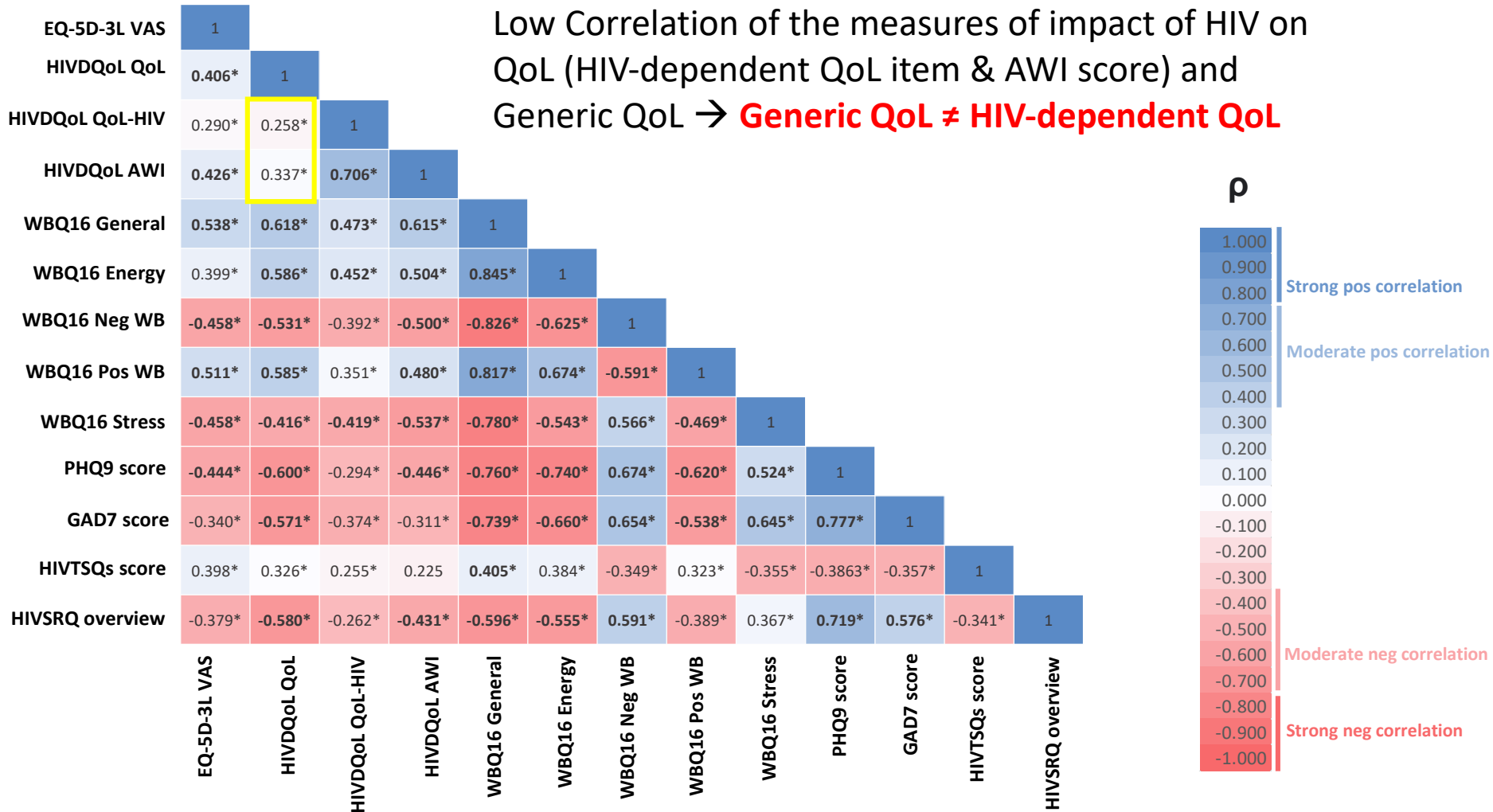
General well-being (and related positive subscales), health status, QoL are all significantly related

EQ-5D-3L VAS	1												
HIVDQoL QoL	0.406*	1											
HIVDQoL QoL-HIV	0.290*	0.258*	1										
HIVDQoL AWI	0.426*	0.337*	0.706*	1									
WBQ16 General	0.538*	0.618*	0.473*	0.615*	1								
WBQ16 Energy	0.399*	0.586*	0.452*	0.504*	0.845*	1							
WBQ16 Neg WB	-0.458*	-0.531*	-0.392*	-0.500*	-0.826*	-0.625*	1						
WBQ16 Pos WB	0.511*	0.585*	0.351*	0.480*	0.817*	0.674*	-0.591*	1					
WBQ16 Stress	-0.458*	-0.416*	-0.419*	-0.537*	-0.780*	-0.543*	0.566*	-0.469*	1				
PHQ9 score	-0.444*	-0.600*	-0.294*	-0.446*	-0.760*	-0.740*	0.674*	-0.620*	0.524*	1			
GAD7 score	-0.340*	-0.571*	-0.374*	-0.311*	-0.739*	-0.660*	0.654*	-0.538*	0.645*	0.777*	1		
HIVTSQs score	0.398*	0.326*	0.255*	0.225	0.405*	0.384*	-0.349*	0.323*	-0.355*	-0.3863*	-0.357*	1	
HIVSRQ overview	-0.379*	-0.580*	-0.262*	-0.431*	-0.596*	-0.555*	0.591*	-0.389*	0.367*	0.719*	0.576*	-0.341*	1
	EQ-5D-3L VAS	HIVDQoL QoL	HIVDQoL QoL-HIV	HIVDQoL AWI	WBQ16 General	WBQ16 Energy	WBQ16 Neg WB	WBQ16 Pos WB	WBQ16 Stress	PHQ9 score	GAD7 score	HIVTSQs score	HIVSRQ overview

ρ

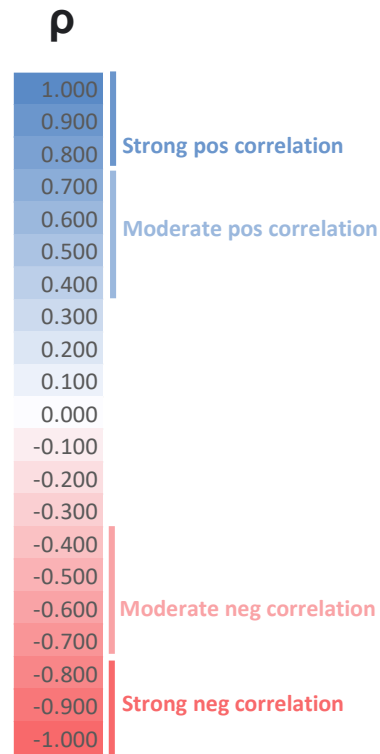


Low Correlation of the measures of impact of HIV on QoL (HIV-dependent QoL item & AWI score) and Generic QoL → **Generic QoL ≠ HIV-dependent QoL**



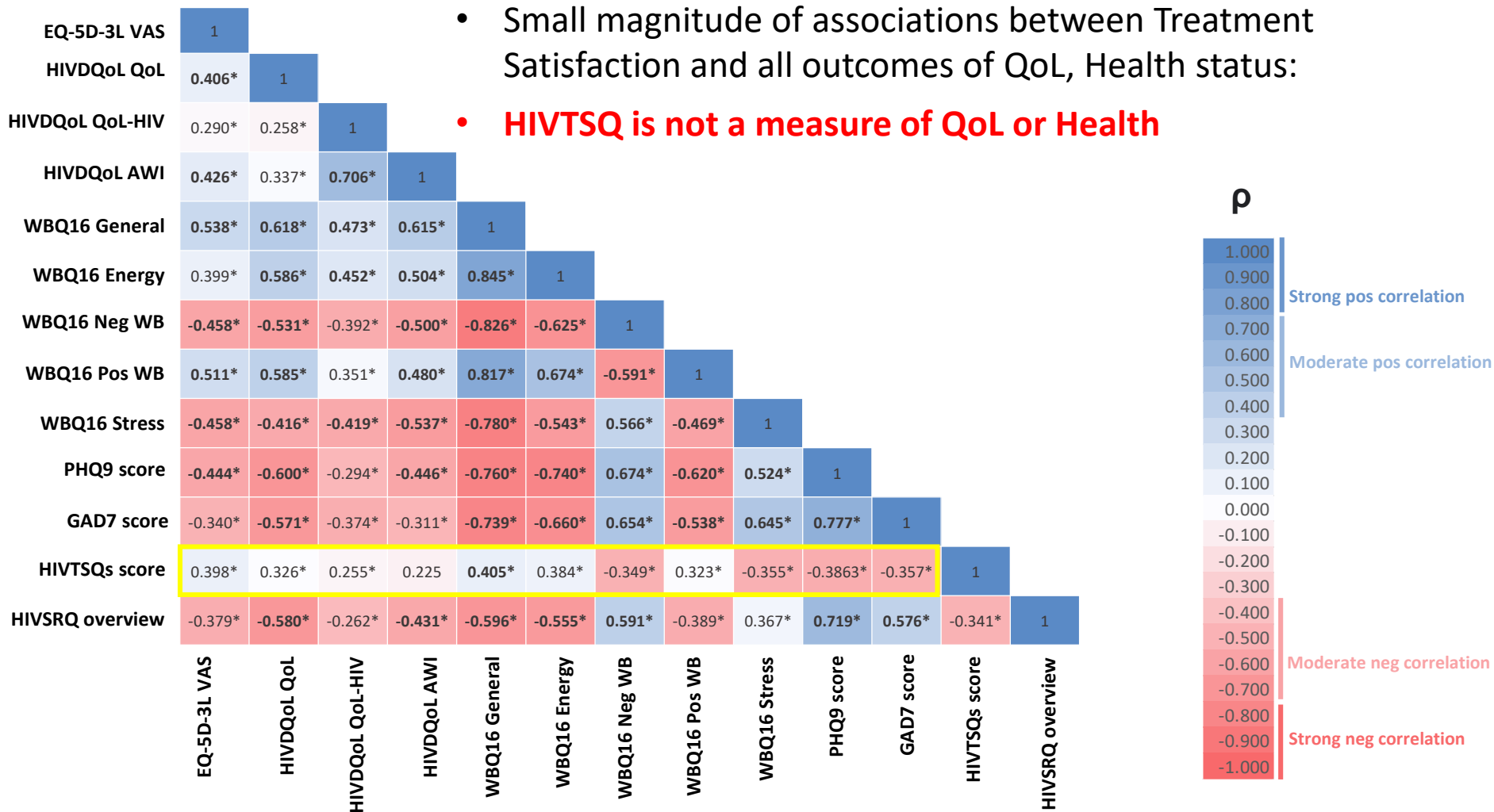
EQ-5D-3L VAS	1												
HIVDQoL QoL	0.406*	1											
HIVDQoL QoL-HIV	0.290*	0.258*	1										
HIVDQoL AWI	0.426*	0.337*	0.706*	1									
WBQ16 General	0.538*	0.618*	0.473*	0.615*	1								
WBQ16 Energy	0.399*	0.586*	0.452*	0.504*	0.845*	1							
WBQ16 Neg WB	-0.458*	-0.531*	-0.392*	-0.500*	-0.826*	-0.625*	1						
WBQ16 Pos WB	0.511*	0.585*	0.351*	0.480*	0.817*	0.674*	-0.591*	1					
WBQ16 Stress	-0.458*	-0.416*	-0.419*	-0.537*	-0.780*	-0.543*	0.566*	-0.469*	1				
PHQ9 score	-0.444*	-0.600*	-0.294*	-0.446*	-0.760*	-0.740*	0.674*	-0.620*	0.524*	1			
GAD7 score	-0.340*	-0.571*	-0.374*	-0.311*	-0.739*	-0.660*	0.654*	-0.538*	0.645*	0.777*	1		
HIVTSQs score	0.398*	0.326*	0.255*	0.225	0.405*	0.384*	-0.349*	0.323*	-0.355*	-0.3863*	-0.357*	1	
HIVSRQ overview	-0.379*	-0.580*	-0.262*	-0.431*	-0.596*	-0.555*	0.591*	-0.389*	0.367*	0.719*	0.576*	-0.341*	1
	EQ-5D-3L VAS	HIVDQoL QoL	HIVDQoL QoL-HIV	HIVDQoL AWI	WBQ16 General	WBQ16 Energy	WBQ16 Neg WB	WBQ16 Pos WB	WBQ16 Stress	PHQ9 score	GAD7 score	HIVTSQs score	HIVSRQ overview

- Strong negative correlation between GAD and Depression measures and well-being, QoL, health status
- Positive correlation with negative WB and symptoms rating
- **Mental Health is an important aspect of PLWH treatment and care**



- Small magnitude of associations between Treatment Satisfaction and all outcomes of QoL, Health status:

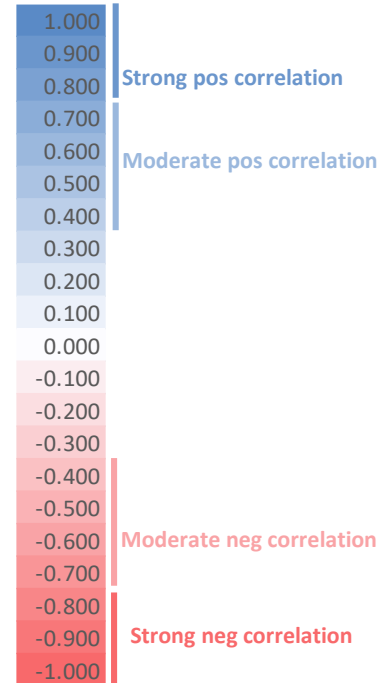
- **HIVTSQ is not a measure of QoL or Health**



EQ-5D-3L VAS	1													
HIVDQoL QoL	0.406*	1												
HIVDQoL QoL-HIV	0.290*	0.258*	1											
HIVDQoL AWI	0.426*	0.337*	0.706*	1										
WBQ16 General	0.538*	0.618*	0.473*	0.615*	1									
WBQ16 Energy	0.399*	0.586*	0.452*	0.504*	0.845*	1								
WBQ16 Neg WB	-0.458*	-0.531*	-0.392*	-0.500*	-0.826*	-0.625*	1							
WBQ16 Pos WB	0.511*	0.585*	0.351*	0.480*	0.817*	0.674*	-0.591*	1						
WBQ16 Stress	-0.458*	-0.416*	-0.419*	-0.537*	-0.780*	-0.543*	0.566*	-0.469*	1					
PHQ9 score	-0.444*	-0.600*	-0.294*	-0.446*	-0.760*	-0.740*	0.674*	-0.620*	0.524*	1				
GAD7 score	-0.340*	-0.571*	-0.374*	-0.311*	-0.739*	-0.660*	0.654*	-0.538*	0.645*	0.777*	1			
HIVTSQs score	0.398*	0.326*	0.255*	0.225	0.405*	0.384*	-0.349*	0.323*	-0.355*	-0.3863*	-0.357*	1		
HIVSRQ overview	-0.379*	-0.580*	-0.262*	-0.431*	-0.596*	-0.555*	0.591*	-0.389*	0.367*	0.719*	0.576*	-0.341*	1	
CD4 count pre	0.0218	0.138	0.132	0.154	0.061	0.095	0.027	0.059	-0.061	-0.079	-0.026	-0.029	-0.224	1
EQ-5D-3L VAS														
HIVDQoL QoL														
HIVDQoL QoL-HIV														
HIVDQoL AWI														
WBQ16 General														
WBQ16 Energy														
WBQ16 Neg WB														
WBQ16 Pos WB														
WBQ16 Stress														
PHQ9 score														
GAD7 score														
HIVTSQs score														
HIVSRQ overview														
CD4 count pre														

In this selected group no correlation between CD4 count and health, QoL and WB measures

ρ



Limitations

- Poor participations by Icona centers
- Selection bias on PLWH asked to download/that actually downloaded «e-QoL» app
 - digital exclusion
 - underserved group
- Incomplete sessions → Low «patients engagement»
- Small sample size and too selected to draw any conclusion for associations between clinical/demographic characteristics and PROMs
- Only for italian-language speakers

Conclusions

- ePROs can be an **important tool** for management of PLWH, and their implementation in observational research setting could identify **specific profile** of PLWH
- The first 1.5 years of the electronic collection of PROs in ICONA cohort document important **burden of mental health disorders** despite high level of general QoL and health status.
- Measures of **well being, health, QoL, symptoms are all significantly related, but** each represents distinct construct that need to be collected and investigated.
- These data can help to inform **interventions** that ensure maintenance of good physical and emotional health for PLWH (e.g. need to integrate mental healthcare into HIV primary care)
- Needs more specific efforts for adequate implementation in the Icona setting also for key-populations → shared path with clinical centers and members of community