Unplanned Admissions among People with HIV in Regional NSW are Predicted by Multimorbidity but not by HIV specific markers

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Aboriginal artwork produced by Gumbaynggir artist Brentyn Lugnan.

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Multimorbidity

- The presence of 2 or more chronic health conditions
- In addition to HIV in HIV literature[1,2]

- Predictions are that multimorbidity among PWH may increase dramatically in coming years[3]

- Differs from comorbidity in recognising equal importance and multidirectional impacts of conditions

[1]Guaraldi G et al. Clin Infect Dis. 2011;53:1120-6; [2]Salter ML et al. Clin Infect Dis. 2011;53:1256-64; [3]Smit M et al. Lancet Infect Dis. 2015;15:810-8.

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Measuring Multimorbidity

- Cumulative Illness Rating Scale (CIRS)
  - Predicts mortality in other cohorts
  - Associated with age and prior AIDS[1]
- Veterans Aging Cohort Score (VACS)
  - Predicts mortality and hospitalisations in PWH
- Medications (Polypharmacy)
  - Predicts mortality and hospitalisation in other cohorts

[3]Edmiston N et al. Sex Health. 2015;12:425-32

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56 yo male, CIRS

System and Score	Condition	Management	Score
Cardiac			
Vascular	Hypertension	Beta blocker	2
Haematological			
Respiratory	Smoker <20 pktyrs	Counselling	1
ENT/eye			
Upper GI	GORD	PPI daily	2
Lower GI			
Hepatic/pancreatic	HCV with late cirrhosis	Failed treatment	3
Renal			
Genitourinary			
Musculoskeletal/skin	Osteoporosis	Vitamin D	1
Neurological			
Endocrine/metabolic	Hypogonadism	Testosterone	2
Psychiatric	Depression/Alcoholism	Meds/Counselling/not well mx	3

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Hospital Admissions

- PWH more likely to be hospitalised than age/sex matched peers[1]
- Hospitalisation associated with age and past AIDS[2]
  - social isolation
  - missed visits to HIV specialist
  - adverse drug reactions
- Reasons - CVD or malignancy

- Impacts – cost/fragmentation of care/risks
- Unplanned admissions via ED - more impact/potentially preventable

[1]Moore CL et al. HIV Med. 2016;17:327-39; [2]Falster K et al. AIDS. 2010;24:1329-39

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Research Questions

- What factors predict unplanned hospital admissions among PWH accessing a regional HIV service?
- Our hypothesis was that multimorbidity as measured by baseline CIRS score predicts unplanned admission
- Are there markers of care coordination that are associated with unplanned admission?

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Study Method

- Prospective cohort study
- Population
  - PWH who attended a regional sexual health clinic in 2012 and had subsequent visits or admissions
- Submitted to Northern NSW HREC
  - Quality Assurance activity, 16 Dec 2015
- Baseline variables collected in 2012
- Followed to first visit in 2016 or last visit if not seen prior to 30 June 2016

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Baseline variables

- Age and gender
- Duration of HIV and Past AIDS
- CD4 current and nadir, VL current
- Antiretroviral regimen
- Missed visits in preceding 12 months
- Specific Chronic Health Conditions
- CIRS scores- total, no of systems, no >3
- VACS and number of medications

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Outcomes

- Primary outcome was time to first unplanned admission
  - Date, reason
- Planned admissions
  - Date, reason
- Deaths
  - Date, reason

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Care Coordination Markers

- Collected at follow-up time point
  - Number of prescribers
- From 2012 to follow-up
  - Number of letters to GP
  - Gaps in viral load measurements > 6/12
  - Viral load measurements >500 copies/mL

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Statistical Analysis

- Univariate ($p<0.1$) and multivariate cox regression analysis for predictors of time to first unplanned admission
- Backward stepwise method
- Added specific conditions to the final model

- Chi-squared statistic to compare care coordination variables for unplanned admission vs no unplanned admission
- STATA version 14

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Table 1. Baseline Variables

	n=181	Univariate p value
Age yrs, median (IQR)	51.9 (46.2-57.7)	0.803
Gender, Male n(%)	167 (92.3)	0.971
Duration HIV yrs, median (IQR)	17.5 (0.6- 29.5)	0.800
Current ARV* regimen		
2 NRTIs[1] + NNRTI[2] n(%)	58 (32.0)	
2 NRTIs[1] + PI[3] n(%)	46 (25.4)	0.410
2 NRTIs[1] + II[4] n(%)	10 (5.5)	0.574
Other n(%)	57 (31.5)	0.186
Nil n(%)	10 (5.5)	0.559
AIDS, Ever n(%)	47 (26.0)	0.364
Missed visits, 1 or more	34 (18.8)	0.120
Viral load, less than 50 copies/mL	161 (89.0)	0.270
Nadir CD4 cell count , less than 200 cell/µL n(%)	95 (52.5)	0.740
Current CD4 cell count		
<350 cells/µL n(%)	30 (16.6)	
350- 499 cells/µL n(%)	30 (16.6)	0.631
500- 699 cells/µL n(%)	57 (31.5)	0.360
700 cells/µL or greater n(%)	64 (35.4)	0.252

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Baseline Multimorbidity

			Range
No. of medications	Median 5	IQR 3-8	0-24
Mean CIRS score	9.08	SD 4.69	1-27
Mean no systems	5.31	SD 2.16	1-13
Mean no systems>3	0.72	SD 1.02	0-6
Mean VACS	18.33	SD 13.87	0-84

10 + meds	28 (15.5%)
2 + chronic conditions	99 (54.5%)

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Outcomes

Person years to first unplanned admission	739 person years
1 or more unplanned admissions[1]	39 persons
Range of unplanned admissions per person	1-10
1 or more planned admissions	73 persons
Range of planned admissions per person	1-5
Deaths[2]	9 persons

[1]Reasons for unplanned admissions, CVD 9/39, Malignancy 4/39, Other
[2]All deaths preceded by an unplanned admission

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Predictors of Unplanned Admission

	Univariate HR (95% CI)	Univariate p value	Multivariate HR (95% CI)	Multivariate p value
No of medications	1.078 (1.006-1.156)	0.034		
CIRS score	1.165 (1.099-1.235)	<0.001	1.165 (1.099-1.235)	<0.001
CIRS systems affected	1.317 (1.142-1.518)	<0.001		
CIRS systems rated 3 or more	1.782 (1.426- 2.228)	<0.001		
VACS score	1.033 (1.012-1.055)	0.002		

Adding specific conditions did not improve the prediction of total CIRS score

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Care Coordination Associations with Unplanned Admission

	Overall n=180	No UA* n=142	UA* n= 38	p value (χ^2)
	N (%)	N%	N%	
1 or more letters to GP	131 (72.78)	101 (71.13)	30 (78.95)	0.336
2 or more prescribers	79 (43.65)	54 (38.03)	25 (65.79)	0.004
> 6 months between VL	98 (54.44)	73(51.41)	25(65.79)	0.114
VL > 500 copies/mL	31 (17.22)	22 (15.49)	9 (23.68)	0.235

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Limitations

- Study size
- Potential missed outcomes
- Care coordination not prospective

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Conclusions

- CIRS score predicts unplanned admissions
- No HIV markers or specific conditions predict unplanned admission

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Recommendations

- HIV specialist teams obtain a CIRS score for PWH at entry to care and update this annually
- Specialist HIV prescribers consider a multimorbidity approach to care[1] for PWH with two or more prescribers or following first unplanned admissions

[1]Multimorbidity: Clinical Assessment and Management. National Institute for Health and Care Excellence 2016; London UK, Sept 2016: www.nice.org.uk/guidance/ng56. Accessed 24 Feb 2017.

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Multimorbidity Posters

23. Changes in Multimorbidity Levels among a Prospective Cohort of People with HIV

25. Higher Baseline Multimorbidity is Associated with Shared Care for HIV in Regional NSW

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