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**Emergency Department Utilization Among Formerly Homeless
Adults with Mental Disorders After 1-year of Housing First: A
Randomized Controlled Trial**

Publication submitted and under review at JAMA



Outline

- ◆ Background
- ◆ Literature Review
- ◆ Methods
- ◆ Results
- ◆ Discussion
- ◆ Strengths & Limitations
- ◆ Conclusions



Background

- ◆ Homelessness is associated with a wide range of negative health consequences
- ◆ Leading to increased acute health care use
- ◆ Housing First (HF) is as an effective means of facilitating reduced acute health service use
- ◆ An absence of studies employing rigorous experimental designs examining the effect of HF on emergency department (ED) use in Canada



Literature Review ^{1/3}

◆ Homelessness and ED Use

◆ Predictive Factors

- ◆ Comorbid health conditions
- ◆ Mental disorders
- ◆ Substance misuse
- ◆ Poor health status
- ◆ Unstable housing



Literature Review 2/3

- ◆ Why homeless individuals present differently...
 - ◆ Injuries
 - ◆ Psychiatric or substance related complaints
 - ◆ Ambulance arrival
 - ◆ Increased time in the ED
 - ◆ Frequent users



Literature Review 3/3

- ◆ Housing First (HF)
 - ◆ Housing is a basic human right
 - ◆ Success in the US for homeless individuals
 - ◆ HF has shown to reduce costs and acute health service use



Study Objectives & Methods



Primary Hypothesis

Primary hypothesis: ED utilization will be lower among homeless individuals randomized to HF, regardless of housing type, compared to treatment as usual (TAU).



Methods ^{1/4}

◆ Study Design

- ◆ Vancouver At Home Study (VAH)
 - ◆ Comprised of 2 Randomized Controlled Trials
- ◆ Linked administrative ED data
 - ◆ n=297
 - ◆ St. Paul's Hospital, Vancouver General Hospital, Richmond Hospital, Mount St. Joseph's Hospital, UBC Hospital, and Lions Gate Hospital
 - ◆ 1 year pre and up to 2 years post randomization



Methods ^{2/4}

Recruitment/Data Collection

- ◆ October 2009 – June 2011
- ◆ Community agencies
- ◆ Baseline questionnaire
- ◆ Personal Health Numbers (PHN) linked
- ◆ ED data spanning April 2007 to October 2012

Study Population

- ◆ Legal status (19+)
- ◆ Absolutely homeless or precariously housed
- ◆ Presence of mental disorder



Methods ^{3/4}

Independent Variables

Primary Independent Variable – Study Arm

- ◆ HF in Congregate setting (CONG)
- ◆ HF in Scattered Site apartments (SS)
- ◆ Treatment as usual (TAU) - reference

- ◆ Socio-demographics
- ◆ Physical Health status
- ◆ Mental and Substance Disorder
- ◆ Access to Healthcare

Dependent Variable

- ◆ Number of ED visits in the post randomization period



Methods ^{4/4}

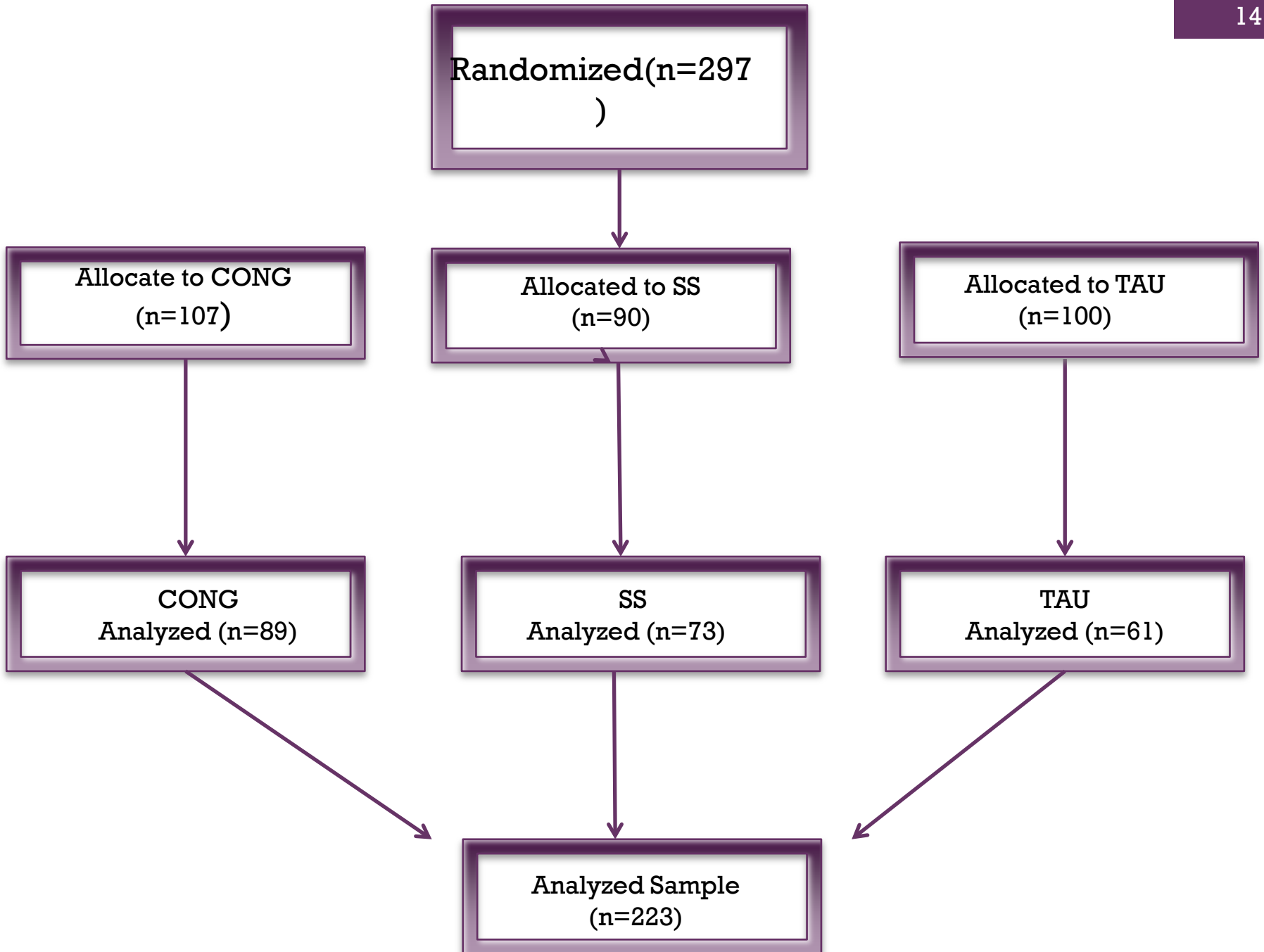
Statistical Analysis

- ◆ Parametric and Non-parametric tests
- ◆ Negative Binomial Regression Analysis
 - ◆ Count nature of data
 - ◆ Over-dispersion
 - ◆ Better fit
 - ◆ Incidence Rate Ratio and 95% Confidence Intervals



+

Results





Socio-demographics at baseline

Variable	Eligible Sample (n=223) n (%)
Study Arms	
CONG	89 (40)
SS	73 (33)
TAU	61 (27)
Male Gender	163 (74)
Age at Randomization (years) Mean (SD)	39.4 (10.9)
Lifetime Duration of Homelessness (months) Mean (SD)	57.9 (63.9)
Mental Disorder (severe cluster)	201 (90)
Substance Dependence (past month)	141 (63)
Chronic Medical Condition (3 or more)	141 (63)
Needed healthcare, but did not receive it	92 (43)



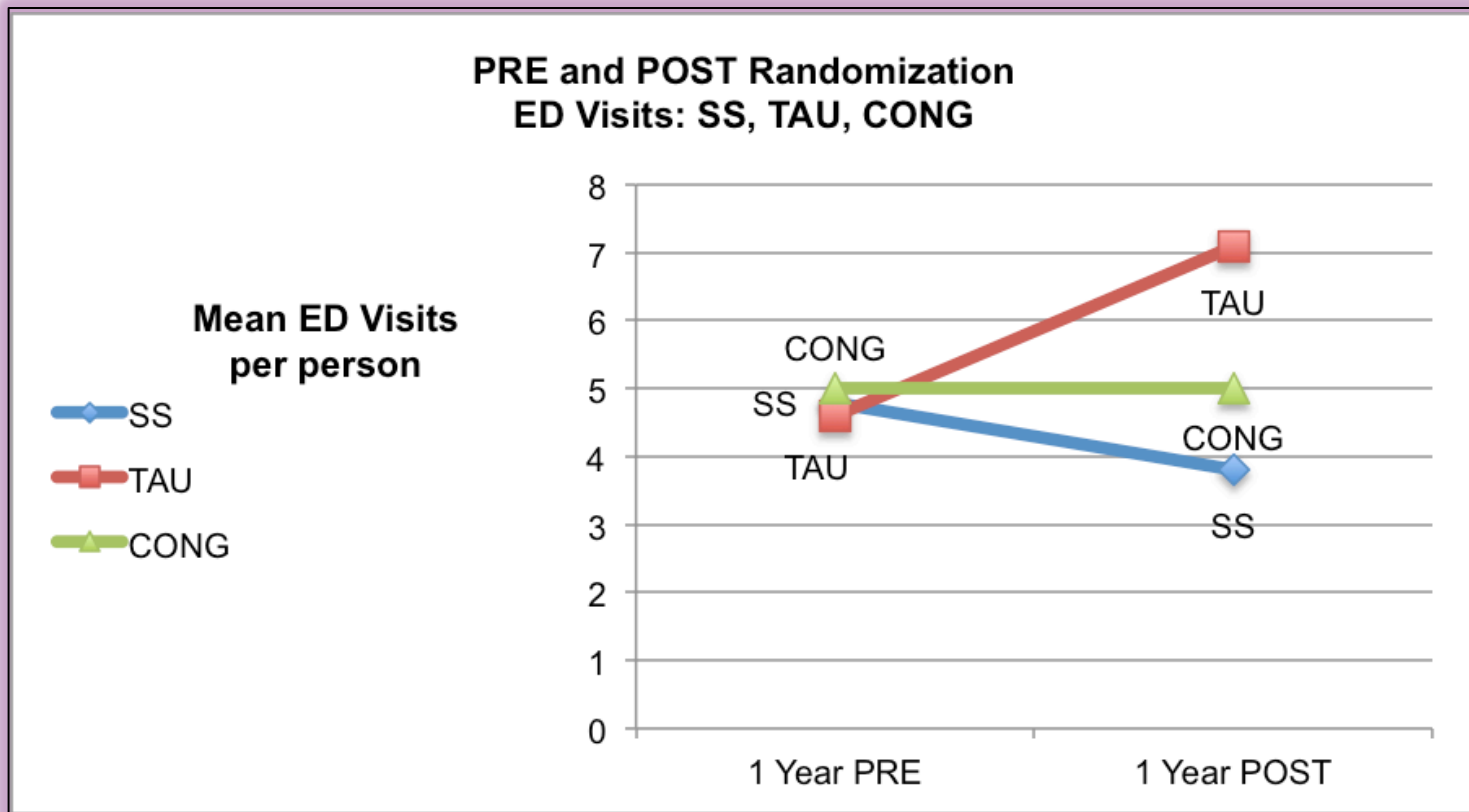
ED Related Characteristics

Variable	Mean (SD)
ED visits before randomization per year	4.8 (8.4)
ED visits after randomization per year ¹	4.7 (8.9)
Total number of ED visits before randomization (past year)	1079
Total Number of ED visits after randomization (1 st year)	1166

¹ yearly estimation derived using the number of ED visits in the post-period divided by the post-period



Change in ED visits



+ Negative Binomial Regression Analysis

Variable	Unadjusted IRR	p-value	Adjusted IRR	p-value
Study Arms				
CONG	0.91 (0.58, 1.43)	0.688	0.76 (0.49, 1.17)	0.212
SS	0.63 (0.39, 1.02)	0.058	0.55 (0.35, 0.86)	0.008
TAU	Reference			
ED Visits before randomization (past year)	1.09 (1.06, 1.12)	<0.001	1.07 (1.04, 1.10)	<0.001

- Bold indicates significant at p-value <0.05
- Adjusted for: gender, ethnicity, prior ED use, chronic medical conditions (3+), place to go when you are sick, needed healthcare but didn't receive it.



+ Discussion, Future Research
& Conclusions



Discussion ^{1/3}

- ◆ SS format with Assertive Community Treatment (ACT), promotes lower ED use post randomization
 - ◆ Stable living environment
 - ◆ Improved quality of life
 - ◆ Improved access to health services
 - ◆ Primary care
 - ◆ Intensity of ACT services
- ◆ Geographic proximity to ED



Discussion ^{2/3}

- ◆ Increase in TAU 1-year post randomization
 - ◆ Lack of stable housing
 - ◆ Age and illness severity
 - ◆ Change in access to services
 - ◆ Identify type(s) of visits



Strengths & Limitations

◆ Strengths:

- ◆ Longitudinal analysis of ED and HF
- ◆ Canadian context

◆ Limitations:

- ◆ Proximity to ED
- ◆ Restricted to PHN's



Conclusions

- ◆ HF produces significantly lower ED use
- ◆ Reductions have direct implications for the costs associated with healthcare use
- ◆ Study sheds light on HF in Canadian context



Thank You

Acknowledgments

Somers Research Group

Vancouver At Home Study participants

Mental Health Commission of Canada

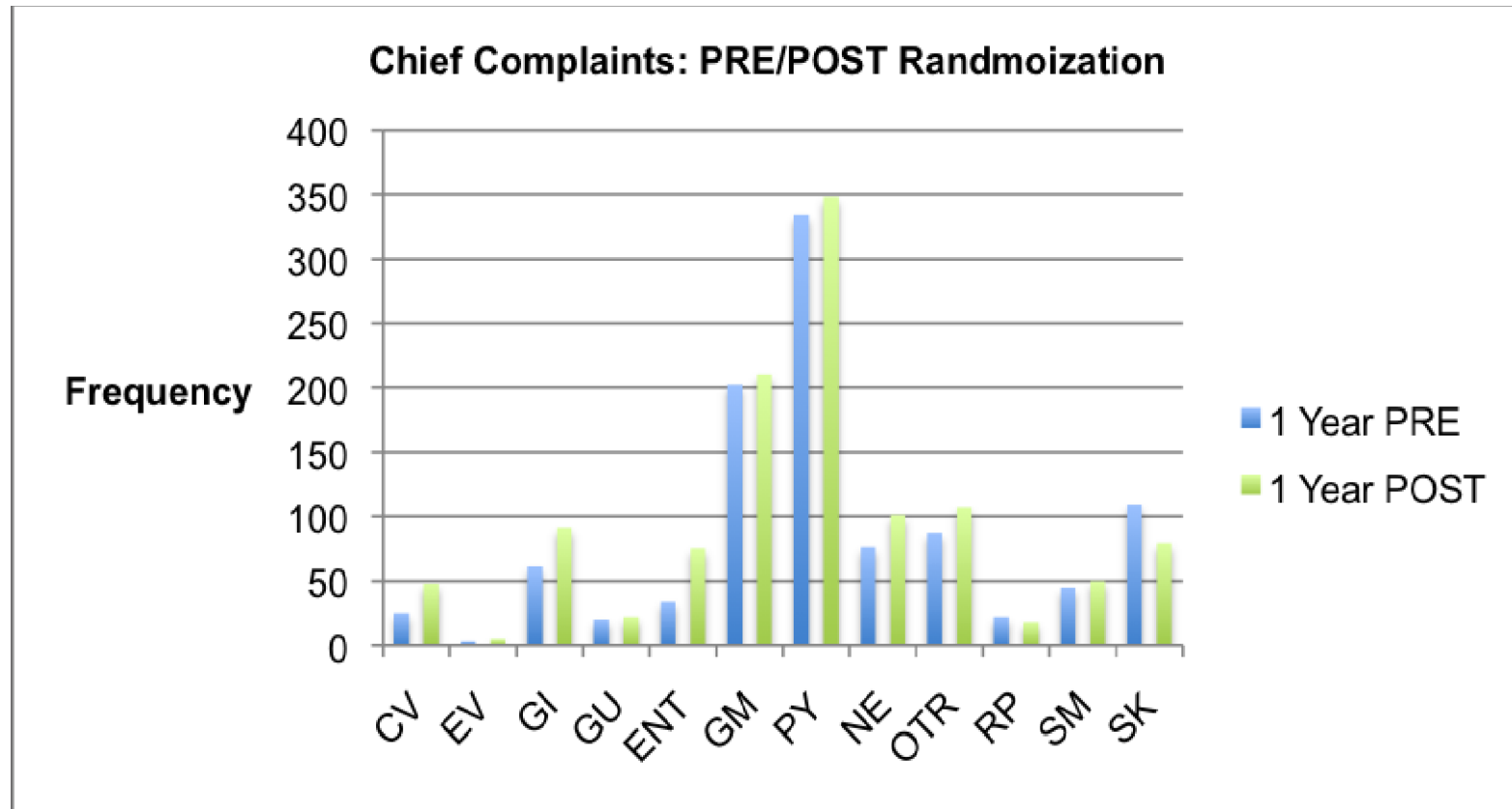
Vancouver Coastal Health Research Institute



+ Just in case slides



Chief Complaints





Frequent Users

- Frequent Users
 - Accounted for nearly 40% of sample pre and post
 - Often include homeless individuals
 - Loosely defined as greater than 4 visits
 - Have defining characteristics above 20 visits per person per year



Change in ED visits

Variable	CONG (89) n (%)	SS (72) n (%)	TAU (61) n (%)	P value
Age at enrolment (in years) Mean (SD)	40.1 (11.2)	39.6 (10.3)	38.2 (10.9)	0.562
Lifetime duration of homelessness (in months) Mean (SD)	57.8 (65.4)	63.8 (71.7)	52.3 (52.0)	0.592
Age of first homelessness Mean (SD)	29.4 (12.9)	27.8 (11.6)	26.9 (12.2)	0.462
Number of ER visits before randomization (last year) Mean (SD)	5.0 (8.5)	4.8 (8.0)	4.6 (8.8)	0.951
Number of ER visits after randomization (first year) Mean (SD)	5.0 (7.6)	3.9 (5.1)	7.2 (16.1)	0.179
ER visit Reduction (post-pre) per year Mean (SD)	-0.01 (7.4)	0.90 (6.9)	-2.54 (16.2)	0.151



NBR – over dispersion

Distribution	Mean	Variance	Assumption
Binomial	Np	$Np(1-p)$	Variance < mean Success and failure
Poisson	Lamda	Lambda	Variance=mean Counting rare success
Neg Binomial	M	$>M$	Over dispersion Counting to the next success