



Mass General Brigham

# How can we impact delirium with advanced home-based care?

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# Disclosures

Biofourmis: royalties

Feminai: scientific advisor

The MetroHealth System: fees



# Objectives

1

Describe the ADRD  
pre-enrolled home  
hospital care model.

2

Describe the rehab  
at home care model.

3

Discuss incident  
reduction in  
delirium for home  
hospital patients.

Choose your least favorite and type it in the chat!





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# Skipping the hospital:

Acute hospital care at home for people living with dementia



NIDUS Briefing

# Why Home Hospital for PLWD?

- Need



# The need

1

**Hospitalization is a common occurrence for many PLWD.**

- PLWD are hospitalized at twice the rate as older adults without ADRD

2

**The harm of hospitalization is magnified for PLWD.**

- 5 times the odds of an adverse event

3

**Few home hospital efforts specifically care for PLWD.**

- Perceived risk
- Lack of clear goals of care

Fox A. J Appl Gerontol. 2021.  
Rudolph JL. J Am Geriatr Soc. 2010  
Fick DM. J Am Geriatr Soc. 2002  
Han QYC. J Am Med Dir Assoc. 2022

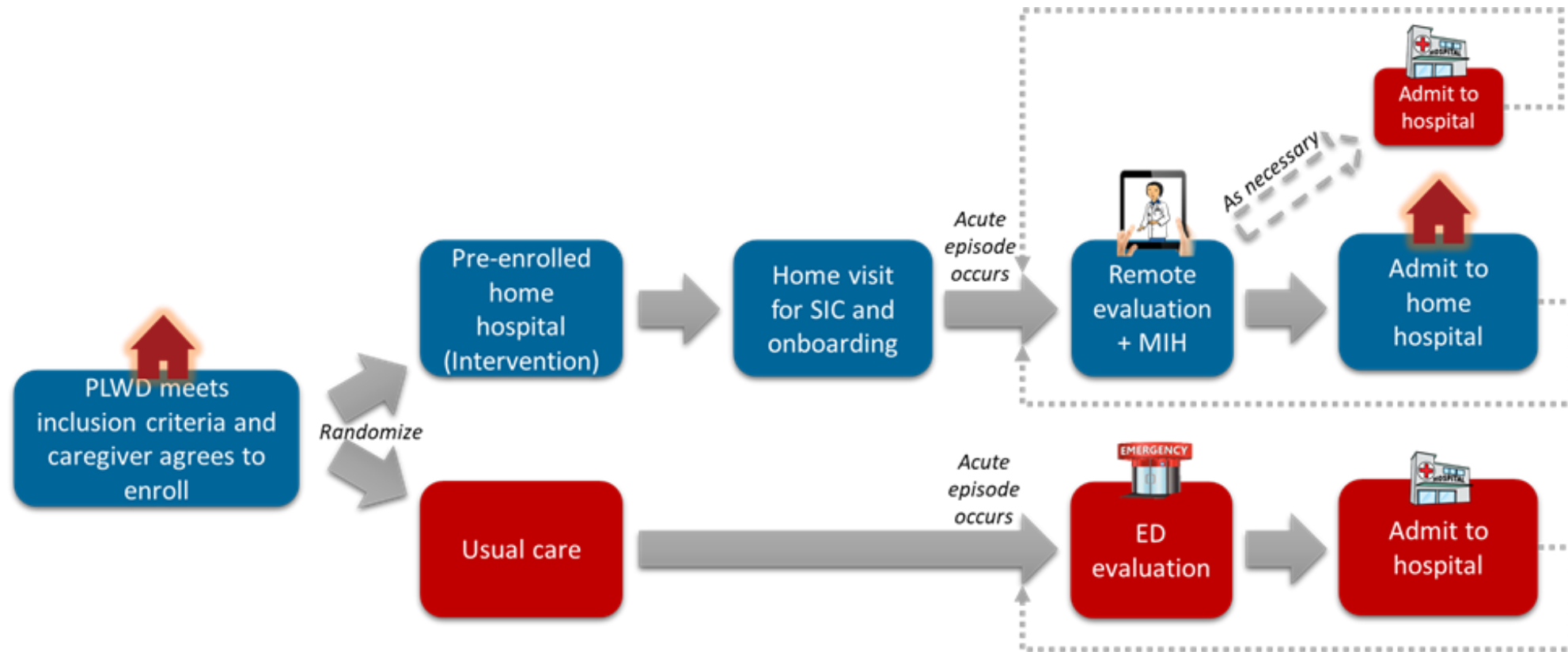


# What is pre-enrollment for Home Hospital?

- Study design
- Model
- Preliminary inclusion/exclusion criteria
- Preliminary outcomes



# Study Design





# Operating Characteristics

- 1.5-year enrollment
  - October 1, 2025 – March 31, 2027
- ~200 patients total
  - ~100 patients to intervention
  - ~3 enrollments weekly



# Preliminary Inclusion/Exclusion

- Diagnosis of moderate or severe dementia
- Resides in a private or assisted living residence with or nearby (<15min travel time) to a family caregiver
- Resides within the MGB home hospital catchment area
- Has had at least 1 hospitalization in the last 12 months

- Undomiciled
- No heat (in winter) or A/C (in summer)
- DV, police custody
- Resides in a SNF
- On ventilator
- Requires IV controlled substances
- Family caregiver unable to maintain communication with team
- Additional secondary conditions



# Primary Outcome

Outcome	Measure
Time at home	Days at home after an acute care episode



# Secondary Outcomes

Outcome	Measure
30-day post-acute events	30-day unplanned readmission or mortality
Delirium	UB-2 + 3D-CAM
Health related quality of life	DEMQOL, DEMQOL-Proxy
Physical activity	Time supine & sedentary during acute episode

Abbreviations: DEMQOL, dementia quality of life survey; UB-2, ultrabrief-2; CAM 3D, 3-minute diagnostic interview for CAM-defined delirium





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# **SAFE AT HOME:**

## Patient Safety During Home Hospital

May, 2025

## Definition of Adverse Event (AE)

Unintended physical injuries resulting from or contributed to by healthcare management (including the absence of medical treatment) that require additional monitoring, treatments, or hospitalizations, or that result in death.

- AEs may occur with *appropriate care* or as a result of *medical error*.
- AEs encompass both *non-preventable* and *preventable* events



# Methods Setting & Design

3 home hospital programs in Boston

Feb 2020 – Aug 2023

EHR retrospective review

Irrespective of arm, entire episode analyzed



# Methods Exclusions

Sociodemographics <sup>a</sup>	Clinical <sup>a</sup>
Undomiciled	Hemodialysis
Resides in skilled nursing facility	Acute myocardial infarction
Domestic violence screen positive	Acute stroke
Resides beyond catchment	Acute substance use disorder
	Acute psychiatric exacerbation
	Code status
	IV opioids
	SBP>200, HR>150, RR>35, or T>103.9

<sup>a</sup>: Does not yet include characteristics excluded by manual chart review





# Methods Propensity Score

Sociodemographics	Chronic Clinical	Acute Clinical
Sex	Elixhauser comorbidity	Calendar quarter
Age	Smoking status	eCART score at admission
Race	BMI	Emergency severity index
Ethnicity	# hospitalizations prior 6mo	Site <sup>a</sup>
Partner status	# ED visits prior 6mo	Day clinically eligible <sup>a</sup>
Education	Code status	
Employment		
Preferred language		
Payor status		
Area deprivation index	Unpublished preliminary data	<sup>a</sup> : Exact match

# Methods Diagnosis-Specific Criteria

Pneumonia	Heart Failure
CURB65>3 <sup>a</sup>	Get with the guidelines-HF >10% mortality risk <sup>a</sup>
SMRTCO>2 <sup>a</sup>	ADHERE high or intermediate risk 1
New bilevel non-invasive ventilation	Loop diuretic dose within 24 hours of admission <sup>a</sup>
O <sub>2</sub> saturation < 90% despite 5L O <sub>2</sub>	Left ventricular assist device

<sup>a</sup>: Exact match



# Methods Automated AEs and Triggers

AEs	Triggers
Inpatient mortality	Code or rapid response
Mortality within 72hrs of discharge	Home to BAM transfer
Hospital-acquired pressure injury	ED visit within 48hrs of discharge
CLABSI	Diphenhydramine administration
CAUTI	PTT>100
Hospital-acquired AKI	
Hospital-acquired delirium	
Severe hypoglycemia	Unpublished preliminary data
Hospital-acquired C Dif	
Hospital-acquired MRSA	<i>Several still to come!</i>



# Results Sociodemographics

Characteristic, %	Home (n=1875) <sup>a</sup>	BAM (n=5729) <sup>a</sup>
Age, mean	71	70
Female	56	54
White race	62	65
Partnered	42	40
English language preference	81	83
Private insurance	38	39
<High school	18	16
Retired	59	57
Area deprivation index, most deprived	10	10

Home and BAM  
were well-matched  
for  
sociodemographic  
characteristics.

<sup>a</sup>: All SMDs <0.2

Unpublished preliminary data

# Results *Chronic* Clinical Characteristics

Characteristic, %	Home (n=1875) <sup>a</sup>	BAM (n=5729) <sup>a</sup>
Elixhauser, mean	10	10
BMI	30	29
Prior smoker	40	40
0 hospitalizations last 6 months	37	56
0 ED visits last 6 months	50	54
Full code	63	62

Home and BAM were well-matched for chronic clinical characteristics.

<sup>a</sup>: All SMDs <0.2



# Results *Acute* Clinical Characteristics

Characteristic, %	Home (n=1875)	BAM (n=5729)
1 <sup>st</sup> calendar quarter <sup>a</sup>	24	25
eCART score <sup>a</sup>	11	11
<b>Emergency severity index</b>		
1-immediate	1	1
2-emergent	17	16
3-urgent	19	11
4-less urgent	1	0
5-least urgent	63	73

Home and BAM were well-matched for acute clinical characteristics, except BAM was less emergent.

<sup>a</sup>: SMD <0.2



# Results Diagnoses

Diagnosis, %	Home (n=1875) <sup>a</sup>	BAM (n=5729) <sup>a</sup>
Heart failure	29	25
Pneumonia	16	18
Complicated UTI/Pyelonephritis	19	21
Skin/Soft Tissue Infection	18	18
Other Infection	9	9
COPD	8	7
IBD	1	1

Home and BAM had similar frequencies for diagnoses.

<sup>a</sup>: All SMDs <0.2

*More diagnoses to come...*



# Results Pneumonia Characteristics

Characteristic, %	Home <sup>a</sup>	BAM <sup>a</sup>
CURB65=0	22	23
SMRTO=0	83	83

<sup>a</sup>: All SMDs <0.2

Home and BAM were well-matched for specific pneumonia criteria.





# Results Adverse Events

Unpublished preliminary data

Events per 100 patients				
Event	Home	BAM	IRR	p-value
Inpatient mortality	0.11	1.69	0.06	<0.001
Mortality within 72 hours of discharge	0.27	0.35	0.76	0.59
Hospital-acquired pressure injury	0.53	2.41	0.22	<0.001
CLABSI	0	0	--	--
CAUTI	0.16	0.59	0.27	0.03
Hospital-acquired AKI	1.6	3.77	0.42	<0.001
Hospital-acquired delirium	2.29	57.36	0.04	<0.001
Severe hypoglycemia	1.97	6.13	0.32	<0.001
Hospital-acquired C. Dif infection	0.8	0.8	0.57	0.38
Hospital-acquired MRSA infection	1	1	0.25	<0.001

Home was associated with fewer AEs than BAM for nearly all AEs.

# Results Triggers

*Events per 100 patients*

Event	Home	BAM	IRR	p-value
Code or rapid response	<b>0.05</b>	<b>3.28</b>	<b>0.02</b>	<b>&lt;0.001</b>
Home Hospital to BAM transfer	4.43	NA	--	--
ED visit within 48 hours of discharge	2.13	3.02	0.71	0.04
Diphenhydramine administration	2.45	8.99	0.27	0.04
PTT>100	<b>0.59</b>	<b>6.58</b>	<b>0.09</b>	<b>&lt;0.001</b>

Home was associated with fewer triggers than BAM for nearly all triggers.

Unpublished preliminary data



# Results Total Harm

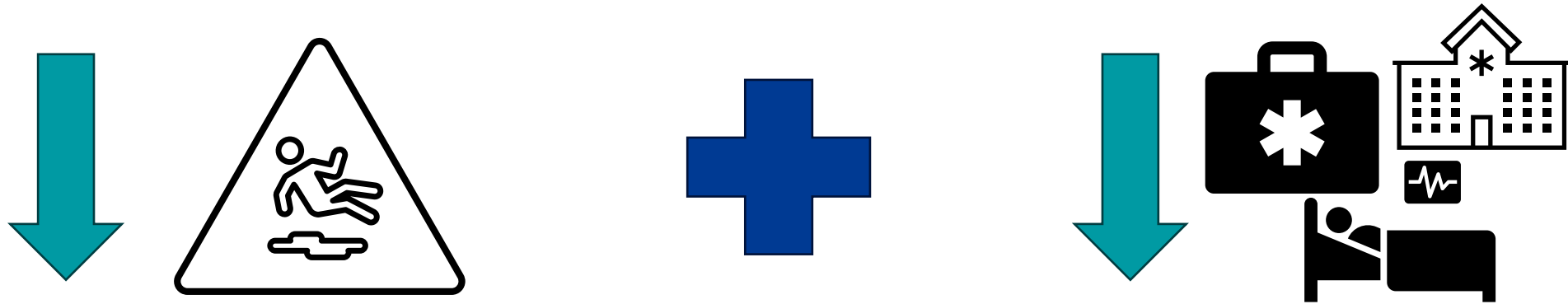
<i>Events per 100 patients</i>				
Event	Home	BAM	IRR	p-value
Total number of AEs, mean	17	100	0.18	<0.001
Total number of AEs w/o delirium, mean	15	40	0.38	<0.001
Any safety event, %	13	41	0.32	<0.001
Any safety event w/o delirium, %	13	29	0.42	<0.001

Home was associated with fewer safety events per patient than BAM.

Unpublished preliminary data



# Discussion



- Rigorous matching
- Real-world data

# Limitations

Still to come

- Manual chart review for exclusions in unstructured data
- Adjudication for AEs

Missed AEs not in the EHR

Generalizability: 3 sites

Association, not causation



# Urgent call

To home  
hospitalize our  
patients

To identify evidence-  
based interventions to  
curtail harm at home –  
*few exist*



# New Journal

JAHM THE JOURNAL OF ADVANCED  
HOME MEDICINE



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