The Case for Medical Care in the Home

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Home-Based Healthcare in the 21st Century
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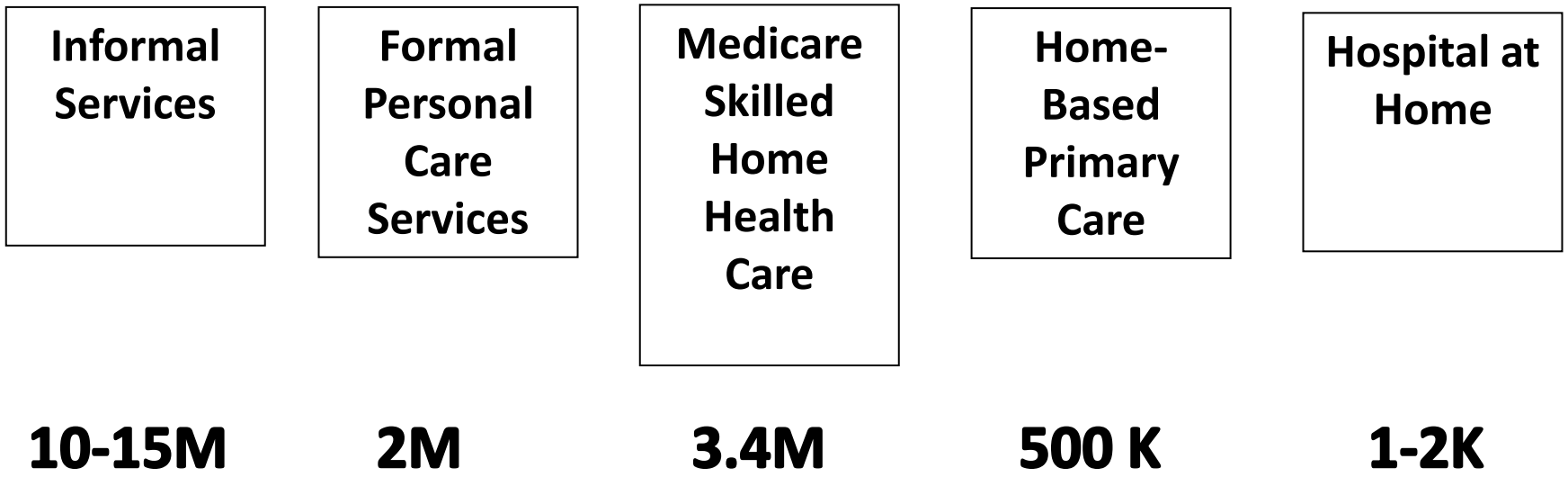
Let’s Think About

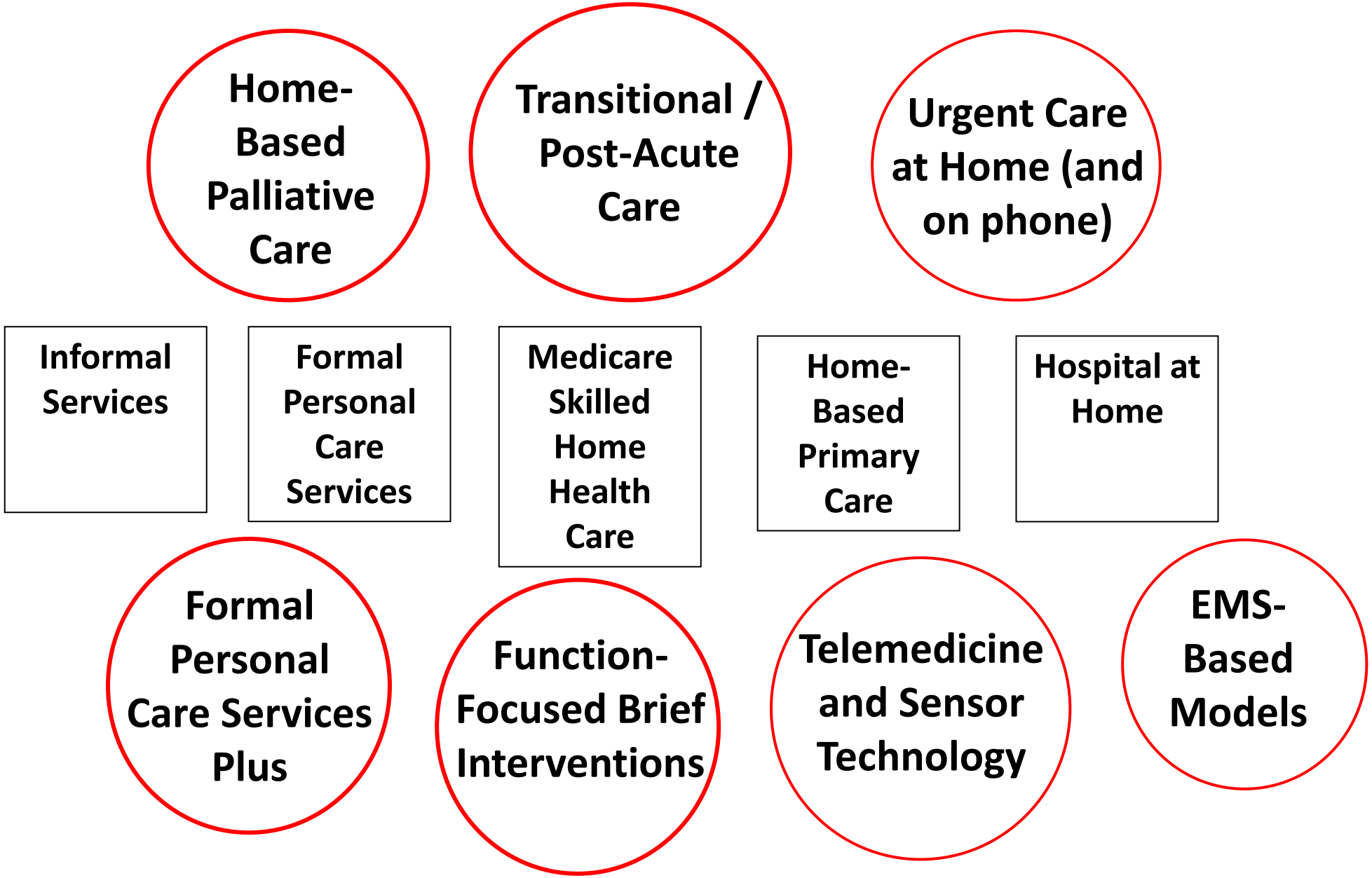
- Spectrum of home-based care and disruptions in the field
- Who’s at home
- Some models of home-based care

The Spectrum of Home-Based Care



Leff B, in IOM (Institute of Medicine) and NRC (National Research Council). 2015. The future of home health care: Workshop summary. Washington, DC: The National Academies Press, p5.

The Field is Expanding and Being Disrupted



What do we know about people who are at home or homebound?

Original Investigation

Epidemiology of the Homebound Population in the United States

Katherine A. Ornstein, PhD, MPH; Bruce Leff, MD; Kenneth E. Covinsky, MD; Christine S. Ritchie, MD, MSPH; Alex D. Federman, MD, MPH; Laken Roberts, MPH; Amy S. Kelley, MD, MSHS; Albert L. Siu, MD, MSPH; Sarah L. Szanton, PhD

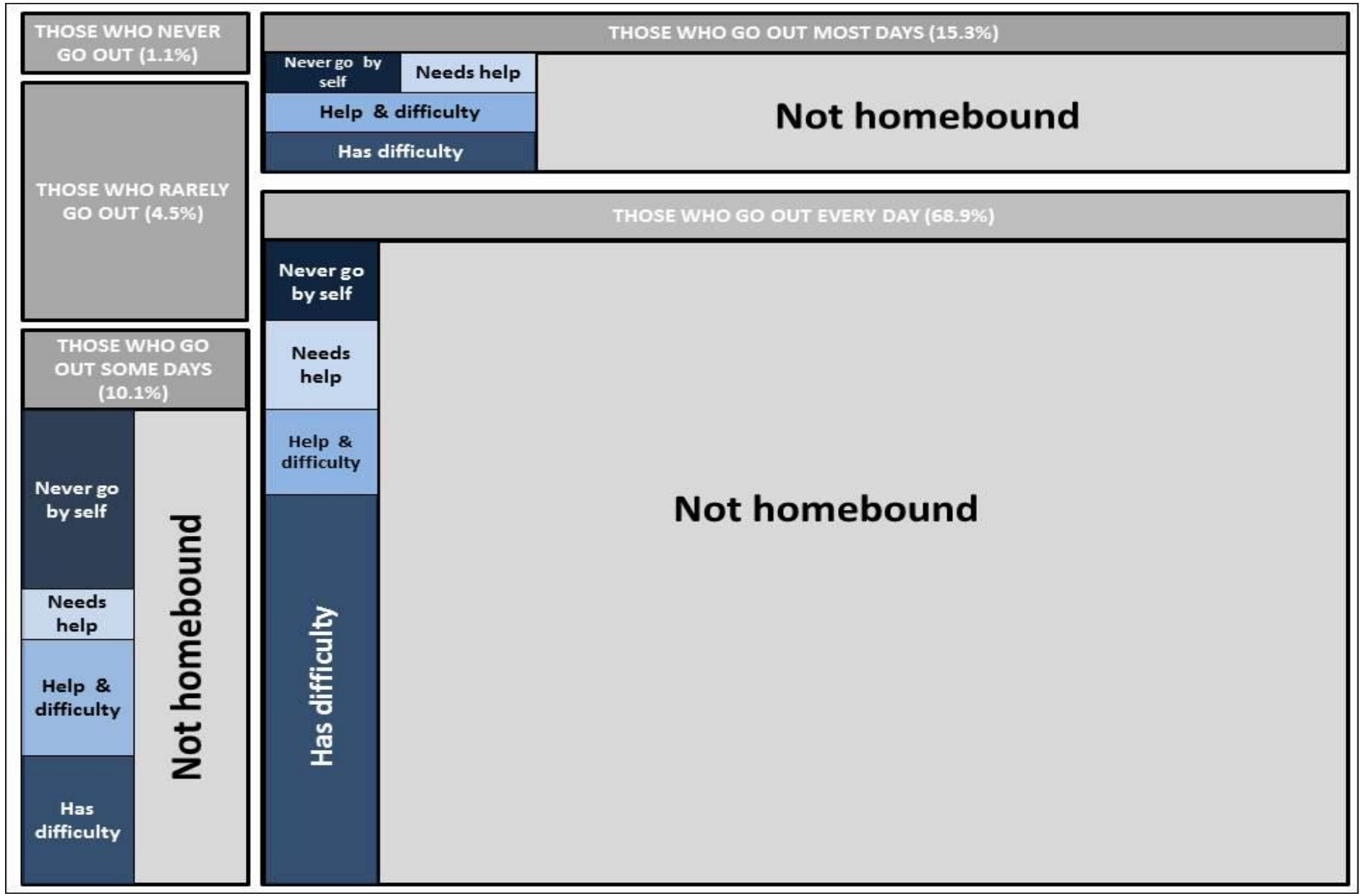
- National Health and Aging Trends Study (NHATS)
- Population-based study
- Random sample ≥ 65 Medicare enrollment rolls
- In-person interviews + physical and cognitive performance assessments
- Our N = 7603 non-NH subjects
- NHATS had no predefined measure of homebound – capacity and ability approach

JAMA Intern Med. 2015;175(8):1426

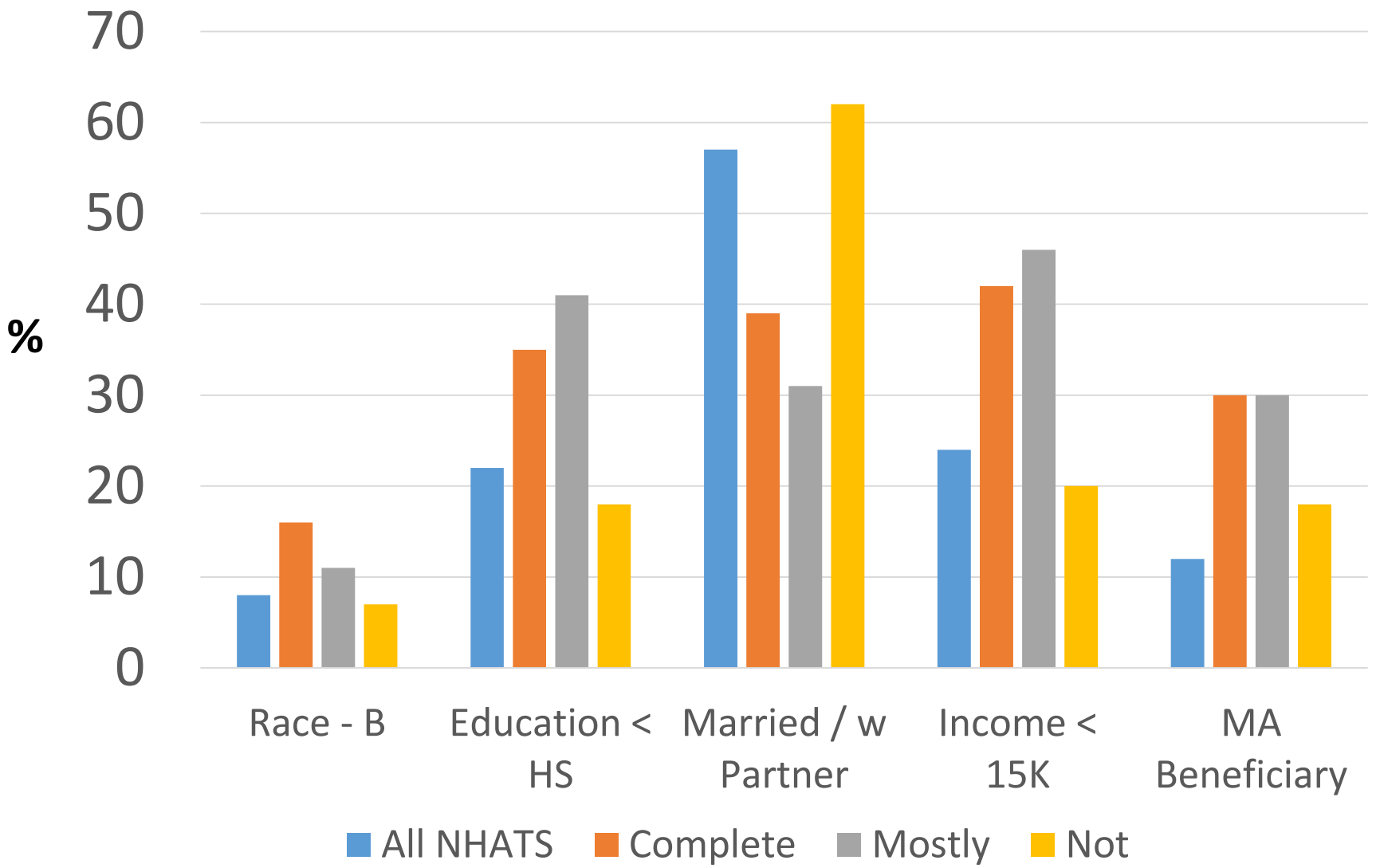
Homebound Status in U.S. in NHATS

Level	Definition	%	#
Completely Homebound	Never went out in last month	1.1%	395,422
Mostly Homebound	Rarely (weekly or less) in last month	4.5%	1.5M
Semi homebound			
Never by self	Out at least sometimes (twice per week) but never by self	3.3%	1.5M
Needs help or has difficulty	Out at least sometimes (twice per week) but needs help or has difficulty	11.8%	4.1M
Not Homebound	Out >= twice weekly without help or difficulty	79%	28M

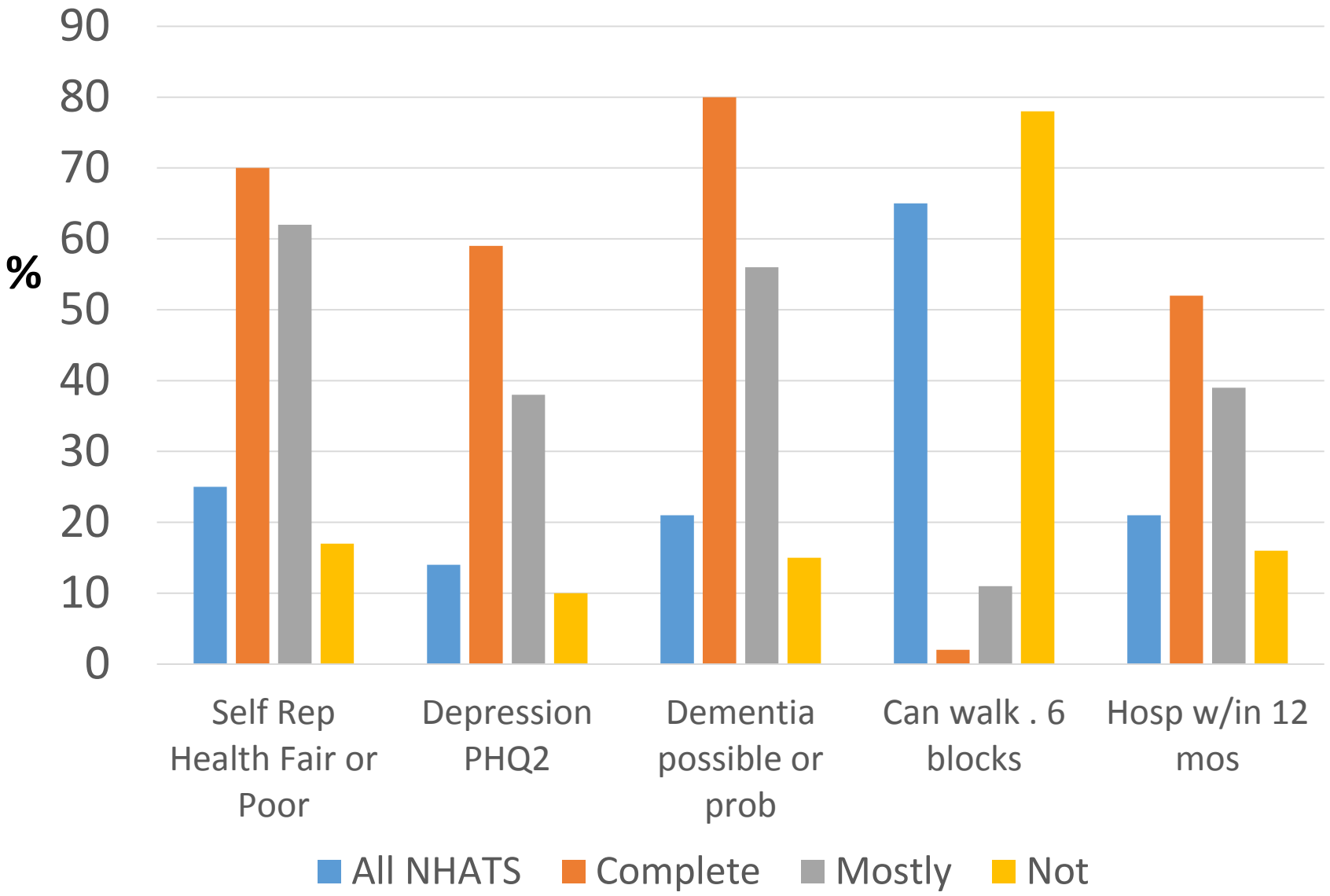
Frequency/Ability to Leave the Home Among Community-dwelling Medicare Benefes Age ≥ 65



Demographics by Homebound Status



Health and Function by Homebound Status



The Homebound are Not Like You and Me

- Greater burden of chronic illness
- Worse health status
- Greater functional impairment
- Limited social capital
- These folks need home-based health care approaches – few get what they need
  - Completely homebound – 11% regular physician visit is a home visit
  - Mostly homebound 5%
- *Invisible*

Some Models of Home-Based Care: Existing and Newer

Current Skilled Home Health and Personal Care

- Medicare Skilled Home Health
  - Intermittent skilled home health care
    - Homebound + skilled need
    - 60-day episodes
    - 12,000+ agencies
    - Large workforce
    - Unloved by many, including MedPAC
- Personal Care Services
    - Home health aides
    - Financial criteria – Medicaid
    - Otherwise, self-pay and difficult to access

- Discontinuous, skilled, intermittent
- Weak medical model
- Slow response to urgent problems
- Inconsistent, variable ADL support
- Payment in silos, not aligned

Adapted, courtesy of Peter Boling

Newer Models of Home-Based Medical Care

- Home-based primary care
  - VA HBPC
  - Non-VA HBPC
  - Independence at Home
- Home-based palliative care
- Transitional care
- Consultative – GRACE
- CAPABLE
- Hospital at Home

Home-Based Primary Care

- Continuous, comprehensive, longitudinal medical care in a patient's residence-extraordinary means to prevent crises
- Interdisciplinary - coordinate ALL medical AND social
- Geriatrics and palliative care skill sets
- Careful selection of specialists
- Portable diagnostics
- Support and empowerment of caregivers / family
- 24/7 ready access to care
- Not in the body part business!

MODELS OF GERIATRIC CARE, QUALITY IMPROVEMENT, AND PROGRAM DISSEMINATION

Better Access, Quality, and Cost for Clinically Complex Veterans with Home-Based Primary Care

Thomas Edes, MD, MS,[a] Bruce Kinosian, MD,[b,c,d,e] Nancy H. Vuckovic, PhD,[f] Linda Olivia Nichols, PhD,[g,h] Margaret Mary Becker, LCSW,[i] and Monir Hossain, MS[j]

- Cost projections using HCC model
- N=9425 newly enrolled HBPC patients
- Projected annual costs compared with actual costs
- During HBPC Medicare costs 10.8% lower than projected
- VA + MC costs were 11.7% lower than projected
- Combined hospitalizations were 25.5% lower than during period without HBPC
- High satisfaction

JAGS 62:1954, 2014

Systematic Review of Outcomes from Home-Based Primary Care Programs for Homebound Older Adults

Outcome	# Studies	Result
ED Visits	4	15%
Hospitalizations	9	30%
Hospital BDOC	4	37-50%
LTC Admits	3	10-20%
LTC BDOC	1	88%
Costs	4	24%
Satisfaction/	5	Better
CG QOL	5	Better

- 8 / 9 substantial effect $\geq$ 1 outcome
- 6 with three core components:
  - Inter-professional care teams
  - Regular inter-professional care meetings
  - After hours support

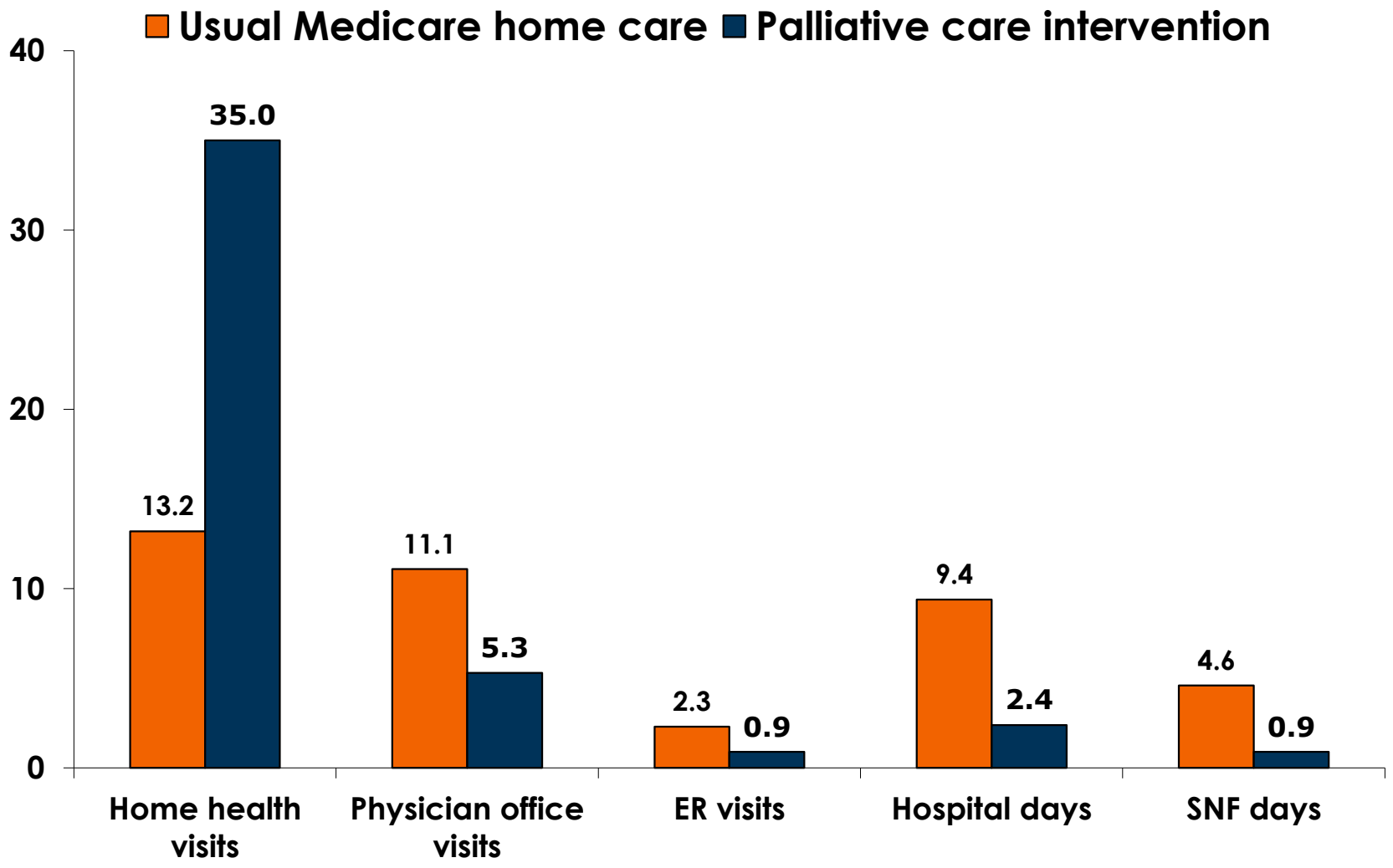
JAGS 62:2243,2014

Independence at Home: CMMI ACA 3024

- Sick patients
  - Hospital stay, post-acute care use, 2+ ADL, 2+ chronic conditions
  - Home-based (primary) care model
  - 5% min savings; gain share with CMS
  - Quality measures – mostly utilization
  - 18 Sites – varied organizations, 10,000 participants
  - Year 1: ***$3070 average savings per beneficiary***; $25M total savings
  - Risk adjustment key in estimating savings

https://innovation.cms.gov/initiatives/independence-at-home/

Home-Based Palliative Care



- KP CO, HI
- RCT, Homebound, Terminally ill
- N=298
- Px $\leq$ 1 yr, $\geq$ 1 hosp or ED visit in last year
- Better satisfaction
- More likely to die at home

JAGS 55:993, 2007

Transitional Care – 3 Flavors

- Intense – Naylor
  - RCT, NP intensive bridge, 4 weeks, multiple home visits
  - 6-week readmissions 10% v 25% (62% RR)
  - Hospital costs reduced - ~$3100 ↓ 3 months, 50% savings *JAMA 1999;281:613*
- Less Intense – Coleman
  - RCT, Coach model, written care plan, pt empowerment, light clinical touch
  - 30-day readmission 8.3% v 11.9% (30% RR)
  - Hospital costs ↓ $488 in 6 months *Arch Int Med 2006;166:1822*
- Community-Based Care Transition Program (CCTP), ACA 3026
  - Community-based organization partners with acute care hospitals
  - CMMI pays direct cost of transition service
  - 102 partnerships
  - Initial evaluation: early implementation and scaling challenges, "limited evidence of early effectiveness of the program" *https://innovation.cms.gov/Files/reports/CCTP-AnnualRpt1.pdf*

Adapted, courtesy of Peter Boling

Consultative: GRACE

- RCT, Patients have PCP
- NP structured quarterly in-home assessments, 3 year study
- Lower intensity model, no primary care, no urgent care, need experienced team
- Care processes better
- Hospitalizations lower in high risk group in year 2 – 44% decrease

JAMA. 2007;298:2623

CAPABLE

- Targets community-dwelling functionally impaired low income older adults
- Time-limited: 16-week RN, OT, handyman
- Focus of intervention patient-directed – REALLY
- CMMI HCIA I, NIH RCT
- Results: 75% improved ADLs. Mean improvement total sample:3.9→2.1 ADL limitations. Significant improvement in depressive symptoms.
- Total cost: home repair+OT+RN visits <$3,000

Annals of Internal Medicine | Improving Patient Care

Hospital at Home: Feasibility and Outcomes of a Program To Provide Hospital-Level Care at Home for Acutely Ill Older Patients

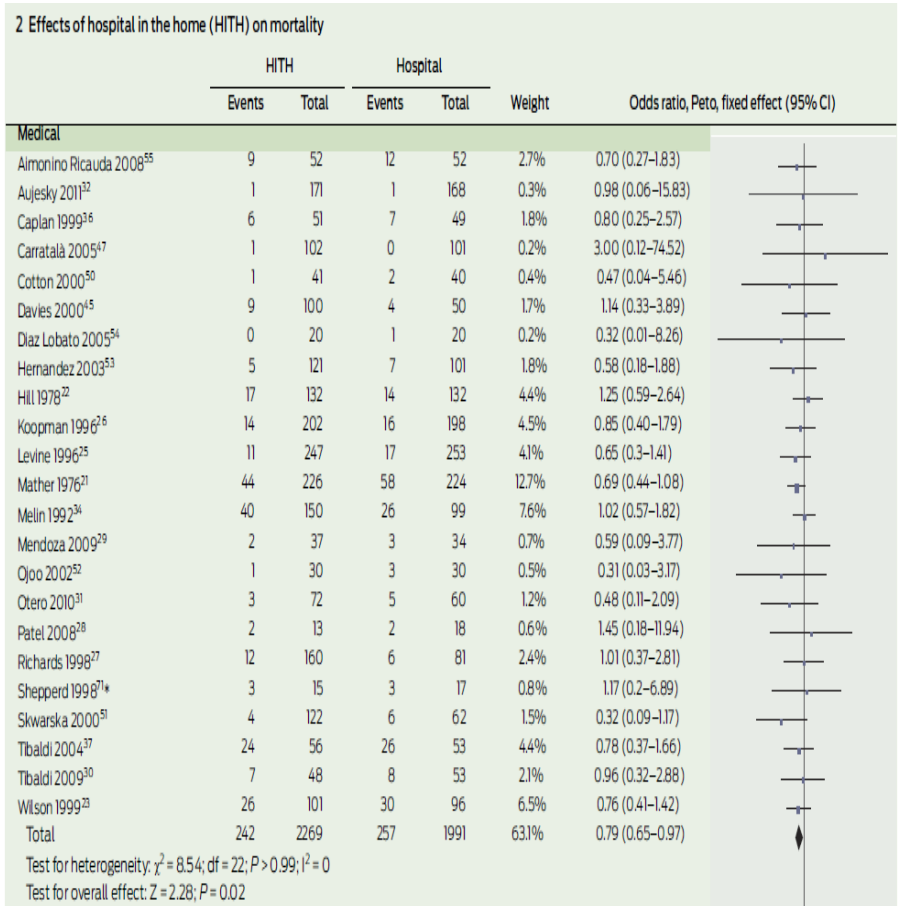
Bruce Leff, MD; Lynda Burton, ScD; Scott L. Mader, MD; Bruce Naughton, MD; Jeffrey Burl, MD; Sharon K. Inouye, MD, MPH; William B. Greenough III, MD; Susan Guido, RN; Christopher Langston, PhD; Kevin D. Frick, PhD; Donald Steinwachs, PhD; and John R. Burton, MD

- High-quality care
- Fewer complications
- Higher satisfaction
- Lower costs of care
- Less CG stress
- Better function
- High provider satisfaction

- CMMI HCIA II Demonstration
- Evaluation funded by the John A. Hartford Foundation

Ann Intern Med. 143:798-808, 2005. J Am Geriatr Soc. 54:1355-1363, 2006. J Am Geriatr Soc. 2008;56(1):117-23. Am J Manag Care. 15:49-56, 2009. J Am Geriatr Soc. 2009;57(2):273-8. Medical Care, 47(9):979-85, 2009. Health Affairs 2012;31:1237. hospitalathome.org

Hospital at Home Meta-Analysis

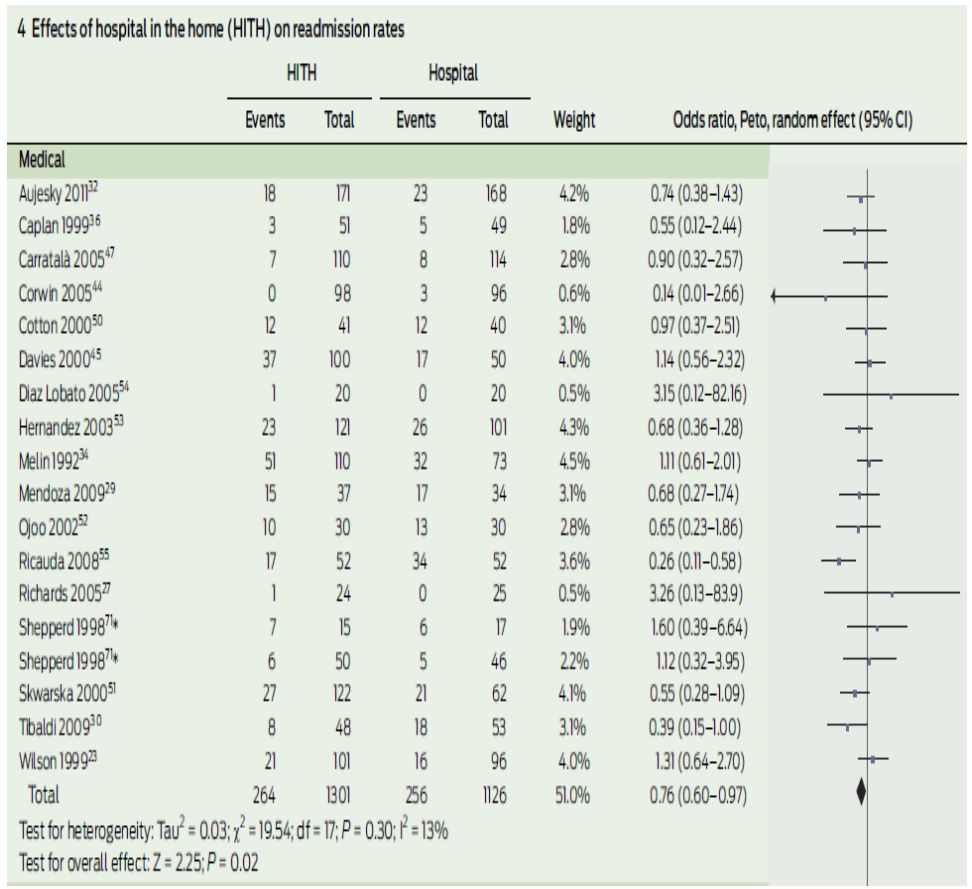


2 Effects of hospital in the home (HITH) on mortality

	HITH		Hospital			
	Events	Total	Events	Total	Weight	Odds ratio, Peto, fixed effect (95% CI)
Medical						
Almonino Ricauda 2008[55]	9	52	12	52	2.7%	0.70 (0.27–1.83)
Aujesky 2011[32]	1	171	1	168	0.3%	0.98 (0.06–15.83)
Caplan 1999[36]	6	51	7	49	1.8%	0.80 (0.25–2.57)
Carratalà 2005[47]	1	102	0	101	0.2%	3.00 (0.12–74.52)
Cotton 2000[50]	1	41	2	40	0.4%	0.47 (0.04–5.46)
Davies 2000[45]	9	100	4	50	1.7%	1.14 (0.33–3.89)
Diaz Lobato 2005[54]	0	20	1	20	0.2%	0.32 (0.01–8.26)
Hernandez 2003[53]	5	121	7	101	1.8%	0.58 (0.18–1.88)
Hill 1978[22]	17	132	14	132	4.4%	1.25 (0.59–2.64)
Koopman 1996[26]	14	202	16	198	4.5%	0.85 (0.40–1.79)
Levine 1996[25]	11	247	17	253	4.1%	0.65 (0.3–1.41)
Mather 1976[21]	44	226	58	224	12.7%	0.69 (0.44–1.08)
Melin 1992[34]	40	150	26	99	7.6%	1.02 (0.57–1.82)
Mendoza 2009[29]	2	37	3	34	0.7%	0.59 (0.09–3.77)
Ojoo 2002[52]	1	30	3	30	0.5%	0.31 (0.03–3.17)
Otero 2010[31]	3	72	5	60	1.2%	0.48 (0.11–2.09)
Patel 2008[28]	2	13	2	18	0.6%	1.45 (0.18–11.94)
Richards 1998[27]	12	160	6	81	2.4%	1.01 (0.37–2.81)
Shepperd 1998[71]*	3	15	3	17	0.8%	1.17 (0.2–6.89)
Skwarska 2000[51]	4	122	6	62	1.5%	0.32 (0.09–1.17)
Tibaldi 2004[37]	24	56	26	53	4.4%	0.78 (0.37–1.66)
Tibaldi 2009[30]	7	48	8	53	2.1%	0.96 (0.32–2.88)
Wilson 1999[23]	26	101	30	96	6.5%	0.76 (0.41–1.42)
Total	242	2269	257	1991	63.1%	0.79 (0.65–0.97)

Test for heterogeneity: $\chi^2 = 8.54$; df = 22; $P > 0.99$; $I^2 = 0$

Test for overall effect: $Z = 2.28$; $P = 0.02$



4 Effects of hospital in the home (HITH) on readmission rates

	HITH		Hospital			
	Events	Total	Events	Total	Weight	Odds ratio, Peto, random effect (95% CI)
Medical						
Aujesky 2011[32]	18	171	23	168	4.2%	0.74 (0.38–1.43)
Caplan 1999[36]	3	51	5	49	1.8%	0.55 (0.12–2.44)
Carratalà 2005[47]	7	110	8	114	2.8%	0.90 (0.32–2.57)
Corwin 2005[44]	0	98	3	96	0.6%	0.14 (0.01–2.66)
Cotton 2000[50]	12	41	12	40	3.1%	0.97 (0.37–2.51)
Davies 2000[45]	37	100	17	50	4.0%	1.14 (0.56–2.32)
Diaz Lobato 2005[54]	1	20	0	20	0.5%	3.15 (0.12–82.16)
Hernandez 2003[53]	23	121	26	101	4.3%	0.68 (0.36–1.28)
Melin 1992[34]	51	110	32	73	4.5%	1.11 (0.61–2.01)
Mendoza 2009[29]	15	37	17	34	3.1%	0.68 (0.27–1.74)
Ojoo 2002[52]	10	30	13	30	2.8%	0.65 (0.23–1.86)
Ricauda 2008[55]	17	52	34	52	3.6%	0.26 (0.11–0.58)
Richards 2005[27]	1	24	0	25	0.5%	3.26 (0.13–83.9)
Shepperd 1998[71]*	7	15	6	17	1.9%	1.60 (0.39–6.64)
Shepperd 1998[71]*	6	50	5	46	2.2%	1.12 (0.32–3.95)
Skwarska 2000[51]	27	122	21	62	4.1%	0.55 (0.28–1.09)
Tibaldi 2009[30]	8	48	18	53	3.1%	0.39 (0.15–1.00)
Wilson 1999[23]	21	101	16	96	4.0%	1.31 (0.64–2.70)
Total	264	1301	256	1126	51.0%	0.76 (0.60–0.97)

Test for heterogeneity: $Tau^2 = 0.03$; $\chi^2 = 19.54$; df = 17; $P = 0.30$; $I^2 = 13\%$

Test for overall effect: $Z = 2.25$; $P = 0.02$

21% Reduction in Mortality: *NNT=50*

24% Reduction in readmission

Med J Austral 2012;197:512-9

Technology in the Home and Telemedicine

- Active v passive
  - Physiologic monitoring
  - Monitoring of function and detection of emergencies
  - Safety
  - Security
  - Social interactions
  - Cognitive and sensory activity
  - Disease management

- VA – 2 M visits
- KP – in 2016 KP N. CA more televisits (phone, email, tele) than in-person
- Mayo – By 2020 plans to serve 200M, most remotely
- Evidence base
  - 2012 review – 141 RCTs telehealth for chronic conditions (only 10 video with doc) *J Telemed Telecare 2012;18:211*
  - *Not really sure what works, what doesn't*

Issues to Consider with All These Models

- Matching target population to the appropriate model / intervention to achieve **the** result intended
  - Population: medical, functional, social, high-cost
  - Intervention: intensity, type, how long, continuous / short-lived, workforce, scalability, who funds, who gets savings?
  - Outcome: what do you REALLY want to achieve