

# Building a 500 bed hospital that isn't there

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Hospital in the Home Unit

Royal Melbourne Hospital





# What is Hospital in the Home?

HIH is the management of patients in their own homes where such patients would require traditional inpatient admission

Acute bed **substitution** that requires staff, skills, knowledge and technology currently maintained only in acute hospitals

# Policy

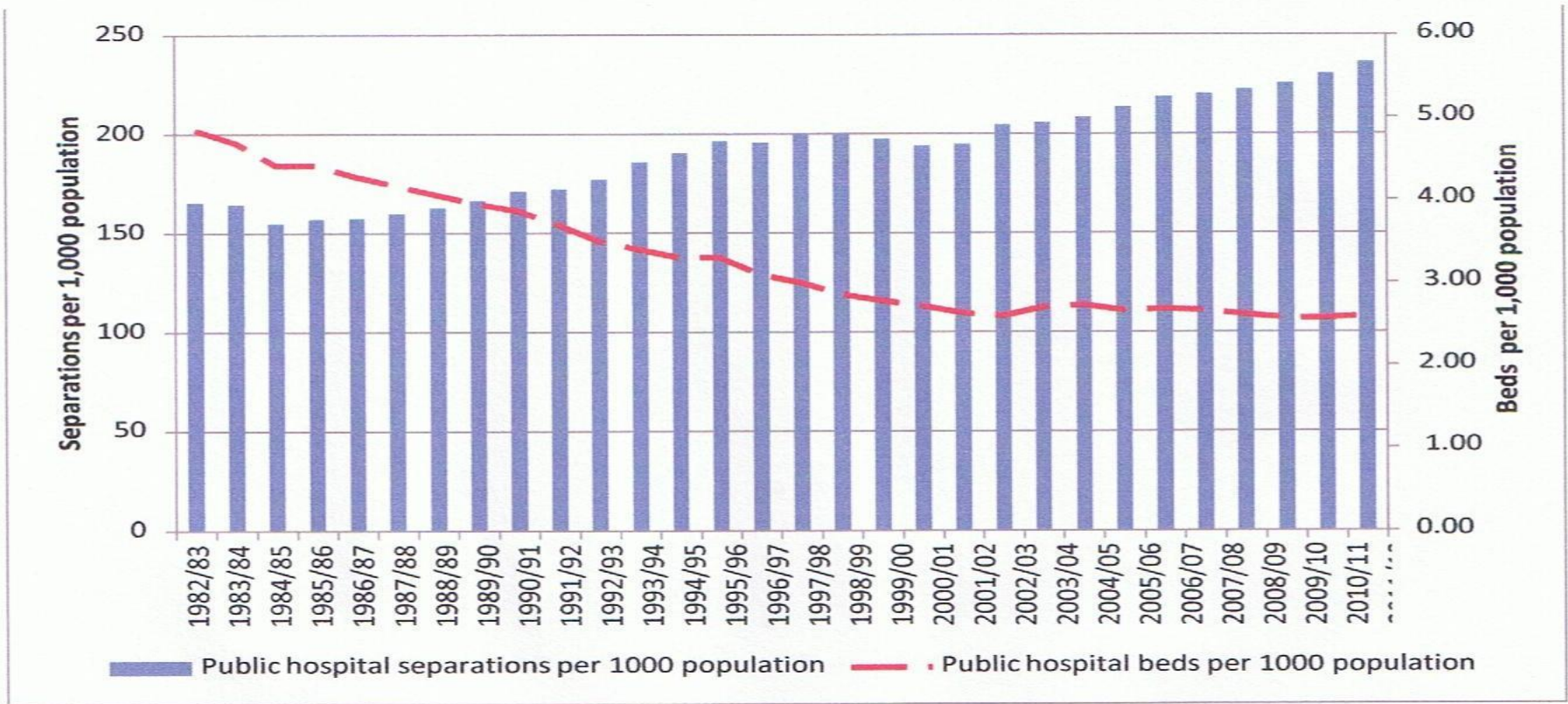
No net growth in public beds

Health 9.5% of GDP

Rising cost of built capital/land

System capacity vs. bed capacity





# People



- Pharmaceutical



- PICC



- Pump design



- Portable diagnostics







# Patients

Ageing: increase in RACF population

Shift from lethal to chronic illness: greater exposure to hospitals

No major advances in hospital comfort

Hospitals further distant from homes and communities

Impersonal, commercial, and occasionally dangerous

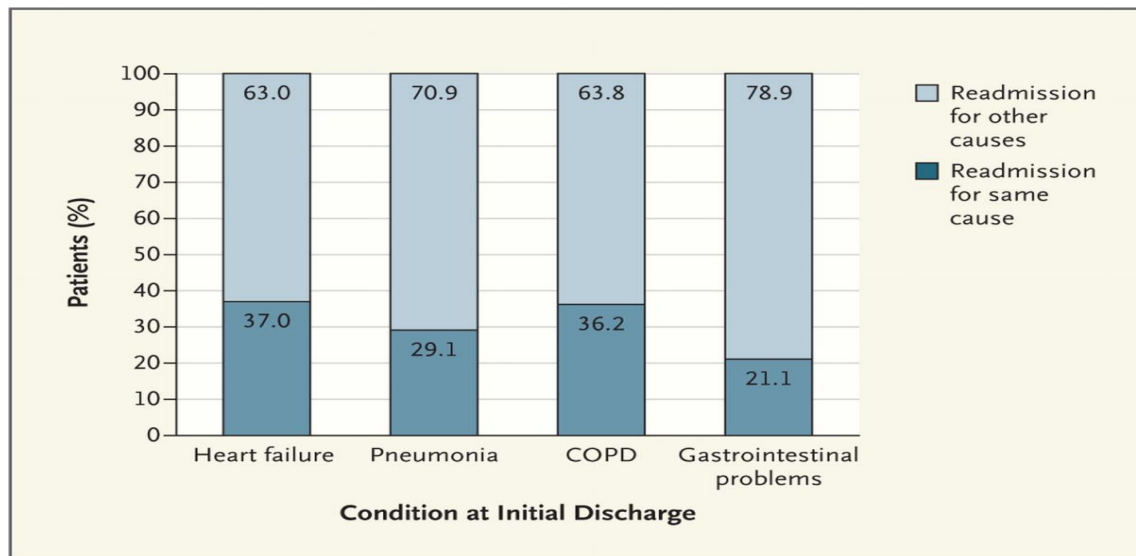


## Perspective

### Post-Hospital Syndrome — An Acquired, Transient Condition of Generalized Risk

Harlan M. Krumholz, M.D.

N Engl J Med 2013; 368:100-102 January 10, 2013 DOI: 10.1056/NEJMp1212324









# MJA

## The Medical Journal of Australia

15 February 1999  
Volume 170, number 4



Established 1914

Journal of the Australian Medical Association

### Pneumococcus, penicillin and pneumonia

pp 147, 152, 165

### Evidence-based HIH

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PRINT POST APPROVED PP255003/00505

## Proof

Cochrane review of Hospital in the Home:  
Shepperd, Doll, Angus et al CMAJ 2009; 180 (2)

- 10 studies included in review
- 'Admission avoidance' ?= substitutive
- Italy; UK; Australia; NZ
- None from USA

## Cochrane meta analysis summary

- Included 10 RCTs (n=1333), 7 of which were eligible for the IPD. 5 out of these 7 trials contributed to the IPD meta-analysis (n=850/975; 87%).
- Non significant reduction in mortality at three months for the admission avoidance HAH group (adjusted HR 0.77, 95% CI 0.54 to 1.09; p=0.15),
- A non significant increase in admissions was observed for patients allocated to HAH (adjusted HR 1.49, 95% CI 0.96 to 2.33; p=0.08).
- Few differences were reported for functional ability, quality of life or cognitive ability.
- Patients reported increased satisfaction with HAH.
- Two trials conducted a full economic analysis, when the costs of informal care were excluded admission avoidance hospital at home was less expensive than admission to an acute hospital ward.

Origin	Condition	Medical Input
Davies (UK)	COAD	None
Kalra (UK)	CVA	None
Caplan (AU)	Mixed Ger	? Hosp or GP
Corwin (NZ)	Cellulitis	Own GP/Co-op
Harris (NZ)	Mixed Ger	Hospital Registrar
Nicholson (AU)	COAD	None
Ricauda (IT)	CVA	Hospital
Richards (NZ)	Pneumonia	Own GP/Co-op
Tibaldi (IT)	Mixed Ger	Hospital
Wilson (UK)	Mixed Ger	Usual GP

Variation of definition & models

RCT is limiting:

- Small studies

- Initiation studies

- Mixture of conditions/treatments:

- Main outcome of interest is safety if treatment is identical



## Medical models in HIH

1. No medical care
2. Outpatient (OPAT) model
3. Infusion centre (OPAT) model
4. Usual community care
5. Clinical unit model



## Clinical Review

## Outpatient parenteral antimicrobial therapy

BMJ 2013 ; 346 doi: <http://dx.doi.org/10.1136/bmj.f1585> (Published 26 March 2013)

Cite this as: *BMJ* 2013;346:f1585

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**Summary points**

- Outpatient parenteral antimicrobial therapy (OPAT) allows patients requiring intravenous antibiotics to be treated outside hospital
- OPAT is suitable for many infections, especially cellulitis, bone and joint infections, and infective endocarditis
- Antibiotics can be administered in an outpatient unit, at home by a nurse, or at home by the patient or a carer
- Patients should be assessed by a doctor and specialist nurse to determine medical and social suitability
- Evidence suggests that OPAT is safe as long as it is administered through a formal service structure to minimise risk



## Non-medical HITH or OPAT

- Low acuity, low substitutive
- Emphasis on efficiency
- Reinforces the in/out patient gap
- Out of sight out of mind
- Low threshold for return to hospital, low threshold for admission, extension of LOS
- Patient burden and anxiety. Patients will accept if only way of leaving hospital

# Delivery of traditional hospital services to patients at home

Michael Montalto and David Dunt

The high cost of traditional inpatient care, advances in the delivery of depot antibiotics and narcotics, and the demands of patients for realistic alternatives to frequent hospitalisation have led to programs for the provision of acute hospital care in the home. We review the progress of overseas hospital-in-the-home programs and the issues that such service delivery has raised for clinicians and administrators. The potential application in Australia is examined and priorities for preparative research are suggested. It seems inevitable that for a select number of conditions in a select group of patients, home hospital services will become a reality in this country.

(Med J Aust 1993; 159: 263-265)

**T**here was a time when nearly all health care took place in the home, often provided solely by the patient's family. It was the need to provide care for those with no family that spawned the notion of a congregation of the infirm and sick.<sup>1</sup> Anyone who could afford to avoid a hospital did so. This is far from our late 20th Century Western idea of hospitals, some of which are appointed in a manner to which even the wealthiest of patients are accustomed.<sup>2</sup> Hospitals remain the focus for health service delivery and this dominance seems unlikely to change.

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David Dunt, MB BS, PhD, Associate Professor.  
No reprints will be available. Correspondence: Dr M Montalto.

← Hospital In The Home

Renal Clinic  
Dept. of Neph



## The 500-bed hospital that isn't there: the Victorian Department of Health review of the Hospital in the Home program

Michael Montalto

### · ABSTRACT

- The Victorian Department of Health reviewed its Hospital in the Home (HIH) program in 2009, for the first time in a decade. Annual reimbursements to all Victorian hospitals for HIH care had reached \$110 million.
- Nearly all Victorian hospitals have an HIH program. Collectively, these units recorded 32 462 inpatient admissions in 2008–09, representing 2.5% of all inpatient admissions, 5.3% of multiday admissions and 5% of all bed-days in Victoria. If HIH were a single entity, it would be a 500-bed hospital.
- Treatment of many patients with acute community- and hospital-acquired infections or venous thromboembolism has moved into HIH. There is still capacity for growth in clinical conditions that can be appropriately managed at home.
- The review found evidence of gaming by hospitals through deliberate blurring of boundaries between acute HIH care and postacute care.
- The Victorian HIH program is a remarkable success that has significantly expanded the overall capacity of the hospital system, with lower capital resources. It suggests HIH with access to equivalent hospital remuneration is necessary for a successful HIH policy.
- Hospitals should invest in HIH medical leadership and supervision to expand their HIH services, including teaching.
- HIH is a challenge to the traditional vision of a hospital. Greater community awareness of HIH could assist in its continued growth.

MJA 2010; 193: 598–601

# History of Victorian HITH policy

Prior to 1994 - no HITH activity (despite indirect incentives)

1994 - Victorian Government initiates inclusion of HITH in acute hospital reimbursement + uncapped

- ▶ HITH is a hospital centred inpatient program in Victoria
- ▶ HITH earns equivalent acute reimbursement

Evaluated in 1999: positive

No preferred model specified

Few inputs specified

Little state input thereafter

Estimated 75% of all HIH activity in Australia occurs in Vic

Growth to \$110 mill pa reimbursements – over 20 years,  
AUD 2 billion ; £1 billion

## 2009 Victorian HIH review

- 2007-08: Concern aroused
- 2008: DOH circular 'reminding' hospital of admission criteria
- 2009: DOH audits
- 2009: Review undertaken by DLA Philips Fox
- 2010: Evaluation released. Guidelines.



## Activity

All metro and regional hospitals have a HIH

- 32,462 inpatient episodes in 08-09
- 2.5% of all episodes
- **5.3% of all multiday admissions**
  
- Approx 500 bed hospital



# 1. Activity

	Same day	Over-night	Multi-day	Total	Av total LOS	Av HIH LOS
2004/05	6304	8399	23397	38100	8.4	6.1
2005/06	7294	9133	22240	38667	7.3	4.9
2006/07	8627	10503	21749	40879	7.1	4.7
2007/08	9177	7830	21448	38455	7.7	5.0
2008/09	9010	2477	20975	32462	9.0	5.8



- 20% decrease in activity from peak in 06-07
- 75% decrease in overnight admissions
- ▶ Suggests previous gaming



## 2. Clinical scope

### Commonest DRGs by beddays

1. Cellulitis	8. Bone and joint infection
2. Venous thrombosis	9. Non major arrhythmia
3. Other	10. Knee joint replacement
4. Diabetic foot procedures	11. Cystic fibrosis
5. Sleep apnoea	12. Other aftercare
6. Pulmonary embolism	13. Osteomyelitis
7. Post-operative infection	14. Colonoscopy



- 25% of all patients admitted with SSTI in Victoria treated in HIH
- 58% of DVT in Victoria treated in HIH
- Increasing to 60% and 90% would add 2700 episodes and 11,000 bed days (=38 new beds)
- ▶ Ad hoc expansion WIES preferentially offered to HIH to support further growth

**Table 1 – Health care professionals employed directly by HAH programs (full-time equivalent (FTE)) in Victoria (2011)**

Qualification	Metro	Regional	Sub-regional	Rural	All
<b>Number of programs</b>	15	6	10	4	35
<b>Manager</b>	15.3	6.5	5.8	0.75	28.4
<b>Nurses</b>	193.15	26.3	30.8	0.3	250.55
<b>Medical Specialist</b>	9.2	5.5	2.2		16.9
<b>GP</b>	2.3	2.2	0.2		4.7
<b>Administrative assistant</b>	16	4	1.3	0.4	21.7
<b>Physiotherapist</b>	1.6				1.6
<b>Pharmacist</b>	4.75	0.4	0.4	0.7	6.3

Source: Department of health (2012) <sup>23</sup>

# Pros and Cons

Pros	Cons
Dramatic <b>measurable</b> growth	Activity not always substitution
Low capital cost for hospital	Little reinvestment of benefits
Flexibility	Lowest denominator
Hospitals (gatekeeper) engaged	No medical clinical culture/structure
Financially competitive	Gaming
Access to (non &hospital) technology	Specific HITH technology slow
Hospital badge	Governance gaps
Patient benefits	Threats to patient safety



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# Hospital in the Home: risk management lessons — inquest into the death of Andrew Gilmore

*Ruane Brell AVANT MUTUAL GROUP*

*“The coroner stated that the HITH did not have the same level of attendant care and observation as being an inpatient, which should therefore be the basis for having earlier and lower thresholds for escalation.”*

*“The Coroner noted ....there was obvious confusion within the household about the appropriate point of contact if any concerns arose. The Coroner stated that confusion seemed to exist within the hospital itself as to who was responsible for the ongoing supervision of the patient.”*

## RMH Model of HITH

- Since 2004 HITH at RMH is a medical clinical Unit with a traditional structure and bed card
- All HITH patients are transferred to HITH unit
- Consultants, registrars and resident
- Referral, assessment, transfer, care and discharge
- Home based care: medical and nursing visits
- 7 day inc 24 hour cover
- Nursing staff and pharmacy services
- Direct admissions and ED, Inreach and APU
- Severity/Complexity/ Complete episodes

## RMH Hospital in the Home 2013-14

- 937 admissions 2013-14
- 8353 beddays = 23 occupied beds
- Mean LOS = 8.6 days
  
- 28.3% from ED or SSU
- 27.5% direct from Inreach/OP/GP
- 3.7% RAPU
- 26.5% medical wards
  
- 44 unplanned returns to hospital (4.7%)
- 8 deaths (0.9%)



FY 2013-2014	FY WIES	FY Separations	FY Av LOS
Medicine and Community Care	10,510	6,492	7.5
HOSPITAL IN THE HOME ( <i>% total</i> )	1738 (16.5%)	790 (12.2%)	12.6
MU1	1544	927	7.8
MU2	1684	1022	6.6
MU3	1719	923	7.8
MU4	1790	993	7.8
RAU	409	643	1.3
RESPMED	1225	1074	4.5
ORTHOMED	377	108	9.7

# HITH Inpatient Handover 3 October 2014

1. MSSE infected sternum post CAGS: IV VANC
2. PE left UL (ED): ENOX/WARF
3. Enterococcal sepsis (NH, direct): IV AMOX/IV FLUID
4. Exacerbation CCF (NH, ED): IV FRUSE
5. Compartment syndrome post-embolus: VAC
6. Vertebral discitis: IV FLUCLOX
7. Influenza/bpneumonia/CCF (NH, Direct): IV CTX/IV FRUSE/PO  
OSTELMAV
8. Pre-op anticoagulation: ENOX
9. Infected ACL/septic joint: IV FLUCLOX
10. AML pre-BMT: IV FLUDAR
11. L heel OM: VAC/IV TAZ

- |   |                  |
|---|------------------|
| 12. Cellulitis right leg (ED):          | IV CFZ           |
| 13. Cellulitis/infected ulcer (ED, NH): | IV CFZ           |
| 14. Right mastectomy:                   | DT/PO AB         |
| 15. AP wound breakdown:                 | VAC              |
| 16. Nocardia lung infection/NHL:        | IV CTX/IV AZITH  |
| 17. AP wound infection:                 | IV VANC/IDC/VAC  |
| 18. Leg cellulitis w abscess:           | IV CFZ           |
| 19. R THJ infection:                    | IV DAPTO/FLUCLOX |
| 20. Peri-operative AC:                  | ENOX/WARF        |

21.	Pseudomonas urosepsis (NH, Direct):	IV CEFTAZ
22.	Peri-op anticoagulation:	ENOX/WARF
23.	MSSA sepsis:	IV VANC
24.	Epidural abscess:	IV FLUCLOX
25.	Peri-op anticoagulation:	ENOX/WARF
26.	MSSA sepsis post BMT (AML):	IV CFZ
27.	Perioperative anticoagulation:	ENOX/WARF
28.	Influenza/bronchopneumonia (NH,Direct):	IV CTX/IV FLUID/STEROID
29.	Appendiceal abscess:	DT
30.	PPH :	DT







# DVT RIGHT LEG WORKSHEET

Patient Name: \_\_\_\_\_  
 Number: Symbion Imaging  
 Sonographer: BIGMORE Mr Garry  
 Date: 03/08/07 867480-1  
 DOB: 02/09/1949  
 History: Symbion Imaging

Acute  Chronic

Ultrasound Assessment of deep and superficial venous system using compression and augmentation as required. Exam extended to points of pain for possible explanation, eg Baker's Cyst

Overall Exam Impression NAD

Comments / Findings:  
(Comments on all non-NAD Findings)

2 sets of med gastro veins  
 Contain thrombus one 9cm dist KC  
 The other 12cm dist KC - these  
 sets join & extend to pop.  
 2cm length of partial thrombosis  
 pop.

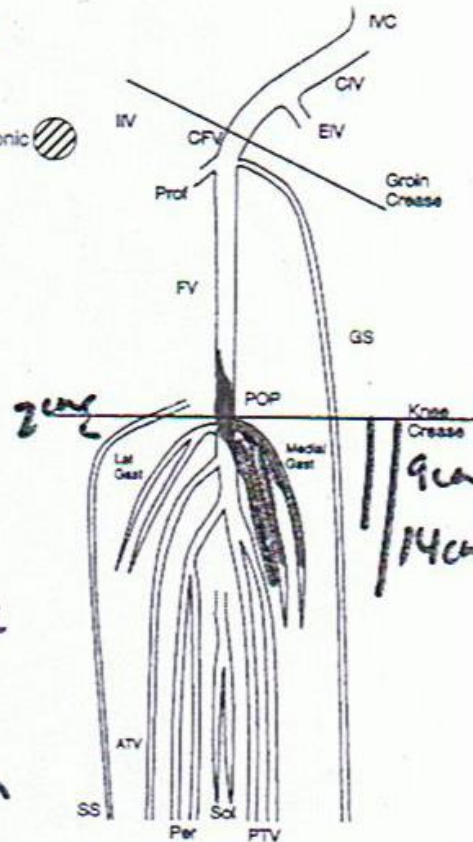


Diagram / Further Notes on Reverse Side: Yes  No







# Impact of HITH by specialty

## 1. Infectious Disease: viral, bacterial, fungal

Community acquired: SSTI, pneumonia, urosepsis

Hospital acquired

Immunocompromised

Post-operative surgical

Prosthesis related

MDR

Serious: end organ

Chronic recurrent: CF, bronchiectasis

Renal impairment: PD peritonitis; infections in HD pts

## 2. Haematology Clinical

DVT

PE

Peri-operative anticoagulation

## 3. Cardiology

Intravenous inotropes

Intravenous diuretics

AF

Endocardiac infections



## 4. Haematology/Oncology

Pre-SCT conditioning with IV fludarabine

Intravenous antiviral: post-BMT CMV for IV gancyclovir

MDS related palliative blood transfusion

Post-auto SCT monitoring

Febrile neutropenia: low risk

Intravenous antifungal for invasive/disseminated disease

Intravenous fluid – supportive

auto - SCT

## 5. Diabetic Foot Management/ Post Surgery/Complex Wound Care

Diabetic foot

VAC

Post operative drains

Burns

## 6. Respiratory

Pneumonia

Bronchiectasis/Inf COPD/CF

Empyema/Abscess

7. Immunology: ulcerative colitis, MS

IV corticosteroid

8. Palliative Care

IV fluids/antibiotics/blood product

9. Geriatrics

combination with all of above

delirium as complication

swallowing/renal impairment/CCF/dehydration



## Quality indicators: Returns to Hospital

Fever (9)	Vomiting (1)
Deterioration (8)	Acute Kidney Injury (1)
Bleeding (5)	Pulmonary embolism (1)
Wound breakdown (3)	Unable to cope (1)
Worsening pain (2)	Urinary retention (1)
Breathlessness (2)	Collapse (1)
Chest pain (2)	Others (7)



# Nursing Home Acquired Pneumonia

Growth in number and proportion of population living in RACF

Higher rates of ED presentation, admission, mortality, morbidity than age adjusted community dwellers

Significant co-morbidities and high severity scores

But, most recover to discharge and usual function

NHAP commonest reason for non-trauma hospital presentation from RACF

LOS means 7-18 days, mortality 10-40%

2008-: 31,760 admissions to acute care from RACF for pneumonia = 222,320 bed days or 609 occupied beds\*.

\*Australian Institute of Health and Welfare 2013. Movement between hospital and residential aged care 2008–09. Data linkage series no. 16. CSI 16. Canberra: AIHW: pg 107)



# The treatment of Nursing Home Acquired Pneumonia using a medically intensive Hospital in the Home model: a case control study

Montalto M, Chu MY, Ratnam I, Spelman T, Thursky K

## Aim

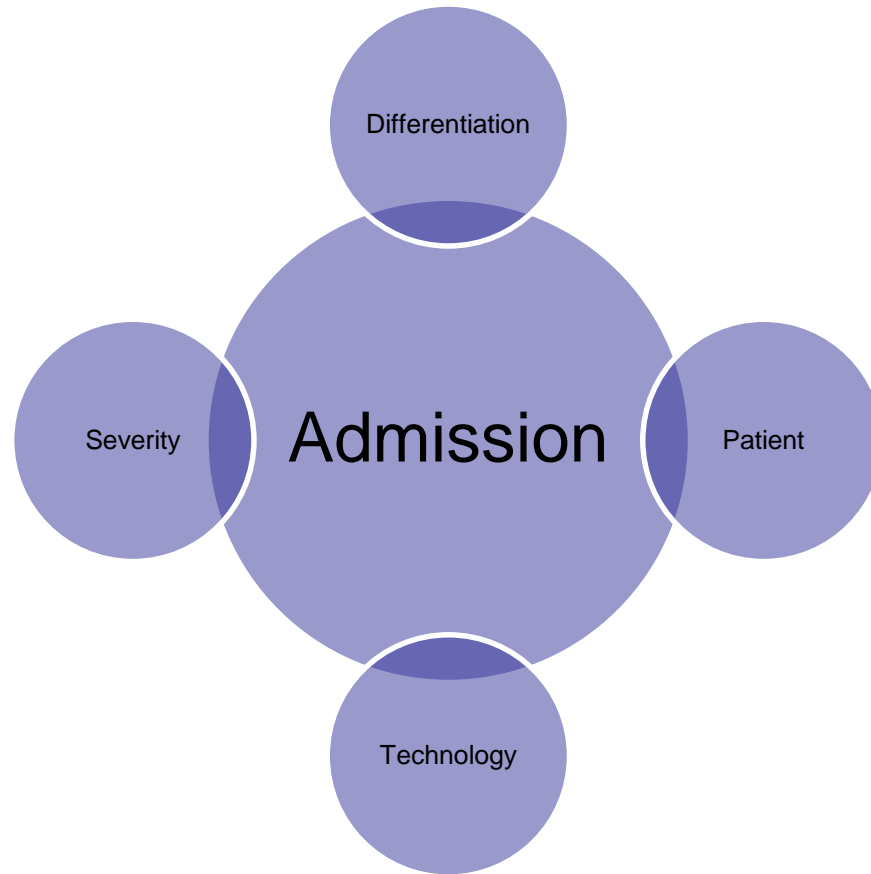
To compare the outcome of patients with NHAP treated wholly in Hospital in the Home with traditional ward based care

\*unpublished

Primary outcome - LOS

Secondary outcomes

1. Mortality : episode and 30 day
2. Readmissions: 30 day
2. Complications
3. Treatment failure in HITH – unplanned return to hospital



	<b>Inpatient</b>	<b>Outpatient</b>	<b>Hospital in the Home</b>
Intensity/severity	High	Low	Medium
Technology	High	Low	Medium
Hospital Responsibility	Full	Partial	Full
Self care	No	Yes	Medium
Differentiation	No	Usually	Usually
All hours	Yes	No	Yes
On site	Yes	Yes	No

# THE FUTURE









The platform for a multitude of as yet unknown technologies to  
integrate into acute care

# The System

Life Monitor has **TGA Approval**  
of all devices that require it



# HIH in the UK?

[www.hscic.gov.uk](http://www.hscic.gov.uk)

Health and Social Care Information Centre  
Hospital Episode Statistics for England  
Admitted patient care statistics 2013-14

Condition	Admissions
Phlebitis and thrombophlebitis	21,771
PE	24,725
Other venous embolism	1,428
Cellulitis	69,229
Cutaneous abscess	33,688
Impetigo	1,012
Acute lymphadenitis	2,438
Other infectious SST	5,239

Condition	Admissions
Pneumonia (strep, h.infl, other, other)	188,937
Endocarditis (acute&subacute, unspec)	2,613
Acute bronchitis	3054
Unspec LRTI	93,009
Bronchiectasis	12,324
Lung abscess, pyothorax	3,322
Cystitis	22,069
Orchitis, epididymitis	9191



Total = 494,049 admissions

- Excludes (seemingly): wound infections; infected prostheses; osteomyelitis; unspecified sepsis; etc

Suggests approximately 600,000 admissions in conditions potentially amenable to HIH