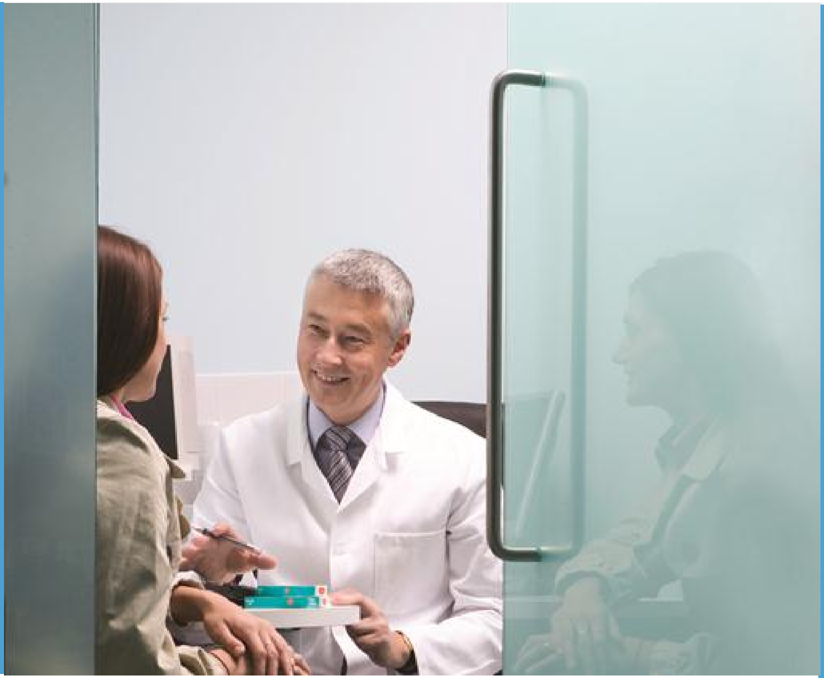
Predicting and Preventing Readmissions:

Opportunities & Challenges



Geraint Lewis MD MPH FRCP FFPH

Senior Director

Clinical Outcomes and Analytics

May 31, 2012

Overview

Introduction	• Why is Walgreens interested in readmissions?
Challenge 1	• Who is **at risk**?
Challenge 2	• Who is **amenable** to preventive care?
Challenge 3	• Which **interventions** can prevent readmissions?
Challenge 4	• What about **Roemer's law?**

Why is Walgreens Interested in Readmissions?

Perception

America’s #1 pharmacy retailer,
Trusted for over 100 years.

Reality

Walgreens is

- Nearly 8,000 community pharmacies
- More than 8,500 total points of care
- Within 5 miles of 70% of the U.S. population
  - #1 in worksite health centers
  - #1 in health system pharmacies
  - #1 in flu immunizations
  - #1 in health testing services
- **6 million consumer visits daily**

Why the Interest in This Topic?

Problem

- Ageing population
- Rising prevalence of chronic disease
- Cost pressures

Opportunity

- ~ 5% of patients account for 50% of emergency bed days
- Unplanned admissions are:
  - Expensive
  - Undesirable
  - Potentially avoidable

Four Major Challenges

- Where Walgreens may be able to add value

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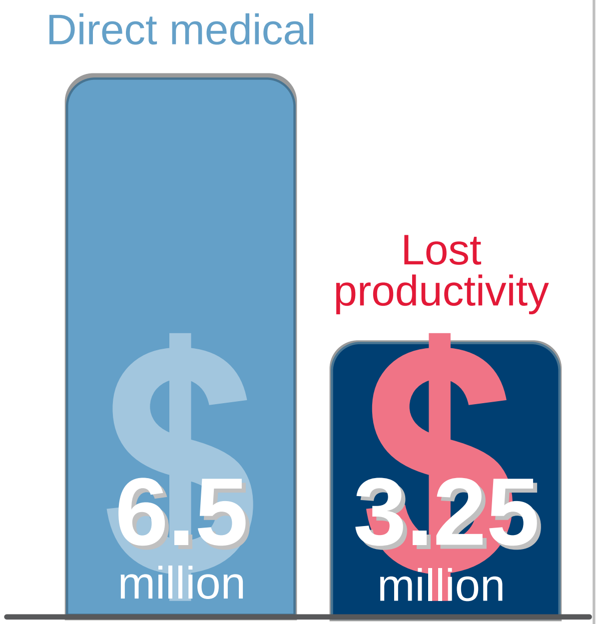
Cost of Poor Adherence

The annual cost of poor medication adherence in the US [1]:

$290 billion

Readmissions costs of poor adherence: $100 billion [2]



Annual cost of poor adherence per 10,000 lives

[1]Thinking Outside the Pillbox: A System-wide Approach to Improving Patient Medication Adherence for Chronic Disease. NEHI Research Brief, Aug. 2009

[2]Osterberg L, Blaschke T. Adherence to medication. N Engl J Med. 2005;353(5):487-497

Far Beyond the Corner Drugstore

We have close relationships and interactions with every major stakeholder in healthcare

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Challenge 1: Who is at Risk?

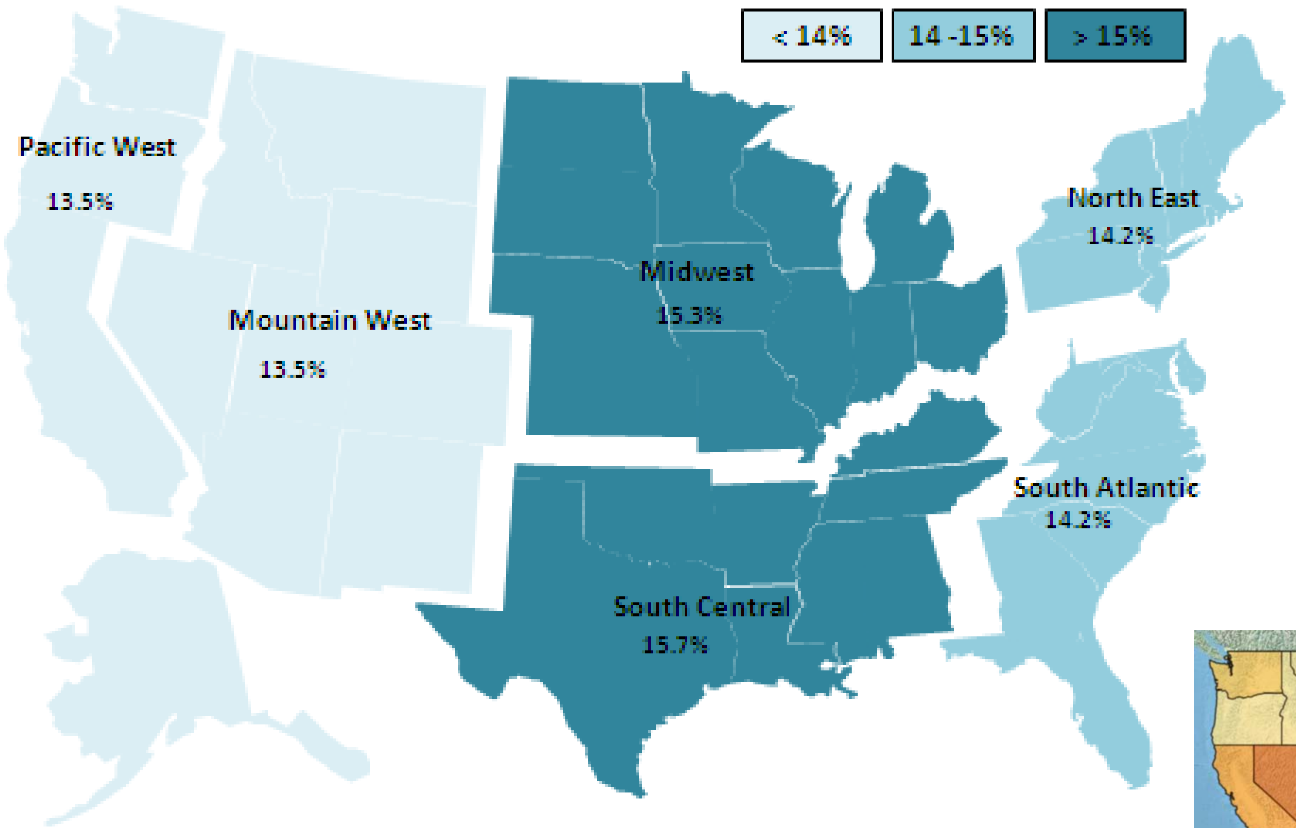
Medicare Readmission Rates

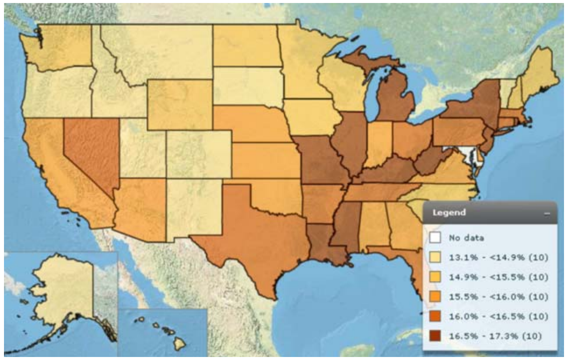
	% Population	Mean Age	% Male	% MH	PMPM
0 admissions	83.4	70	46	21	$315
0 readmissions	14.1	72	43	54	$2,636
1 readmission	1.8	72	45	65	$4,948
2+ readmissions	0.7	68	47	75	$8,078

Note. Data from 5% Medicare sample in 2010. %MH = proportion with mental health diagnosis

Readmission Rates: Regional Distribution

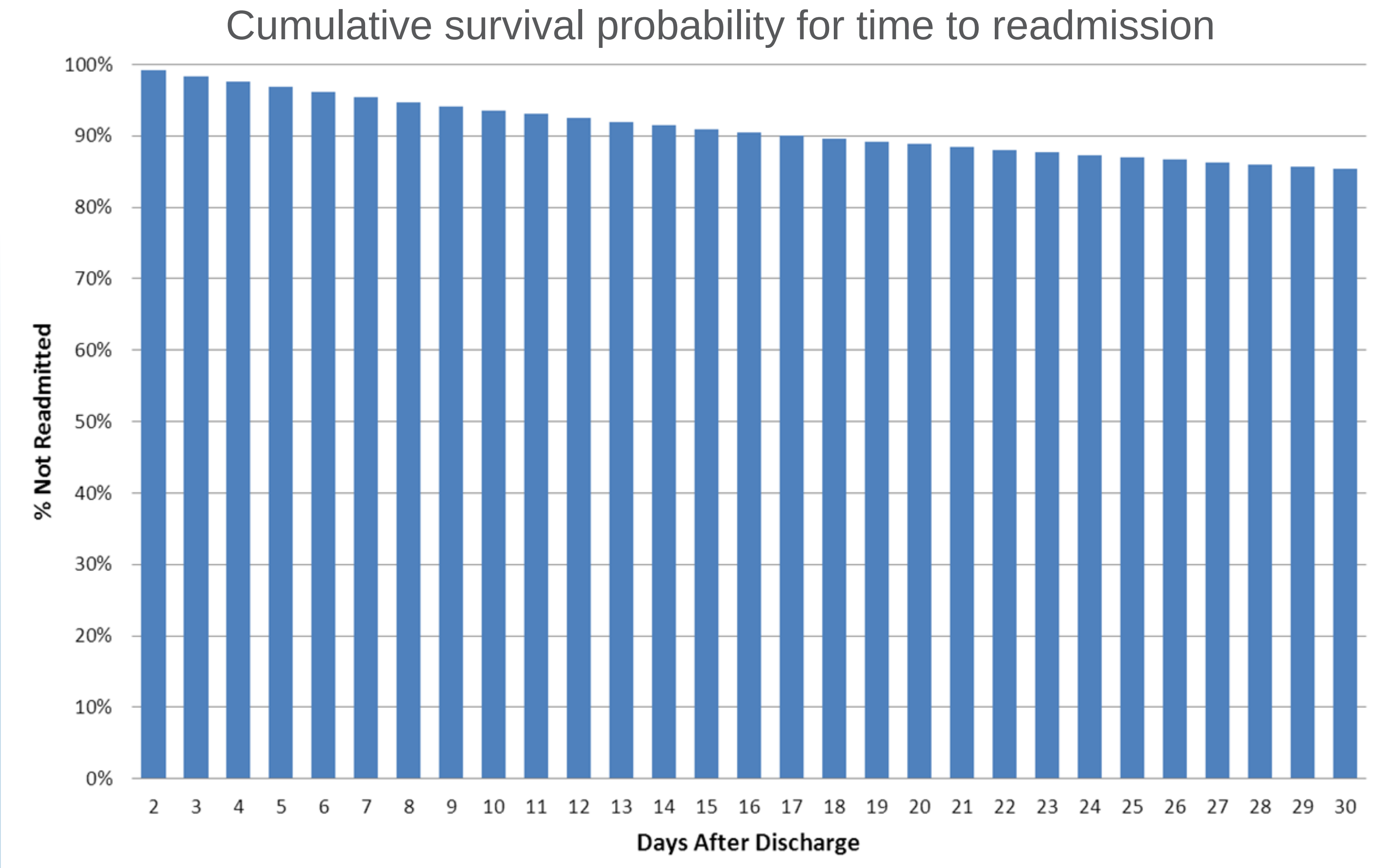
% of Medicare beneficiaries with at least one 30-day readmission in 2010, by region





Note: Data from 5% Medicare sample in 2010. Inlayed state map from 2009 Dartmouth Atlas data.

Readmission Decay Curve



Note: Data from 5% Medicare sample in 2010.

Case study: UK Evercare Pilots

- A 2002 BMJ study* showed that Kaiser Permanente in California seemed to provide higher quality healthcare than the NHS at a lower cost
- Kaiser identifies high risk people in their population and offer them preventive care in the community aimed at avoiding hospital admissions

UK Evercare Pilots

- **Comprehensive geriatric assessment**, structured assessment tools, and a physical examination
- **Individualized care plan** agreed with the patient, PCP and other staff
- Patients were then **monitored** and supported in the community by a specialist nurse

*Feachem RG, Sekhri NK, White KL. Getting more for their dollar: a comparison of the NHS with California's Kaiser Permanente BMJ 2002;324:135-143

Retrospective Analysis of UK Evercare Pilots

No reduction seen in:

- emergency admissions
- emergency bed days
- mortality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Elderly health scheme criticised

A government-backed health scheme aimed at keeping frail and elderly people out of hospital failed to cut emergency admissions, a study has found.

The scheme aims to look after the elderly in the community, if possible

The Evercare scheme began in pilot areas in England in 2003, and was the basis for the community matrons scheme.

But the British Medical Journal study said it failed to cut admissions, length of stays and death rates.

However, the government said "much had changed" since the Manchester University research was carried out.

The Evercare programme was based on a successful scheme in the US, where it cut hospital admissions by up to half.

"Much has moved on, and continues to do so, since the pilots"
Health minister Rosie Winterton

It used specially-trained nurses to identify and monitor "at risk" older people, with the aim that they would receive treatment before a visit to hospital was necessary, a process

BBC ACTION NETWORK
Elderly care
What the issues are and how to get involved

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- Move to push NHS into community 30 Jan 06 | Health
- Mixed reaction to NHS care plans 30 Jan 06 | Health
- 'Community matrons' planned 08 Jun 04 | Health

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Gravelle H, Dusheiko M, Sheaff R, Sargent P, Boaden R, Pickard S, Parker S, Roland M. Impact of case management (Evercare) on frail elderly patients: controlled before and after analysis of quantitative outcome data. BMJ. 2007;334(7583):31

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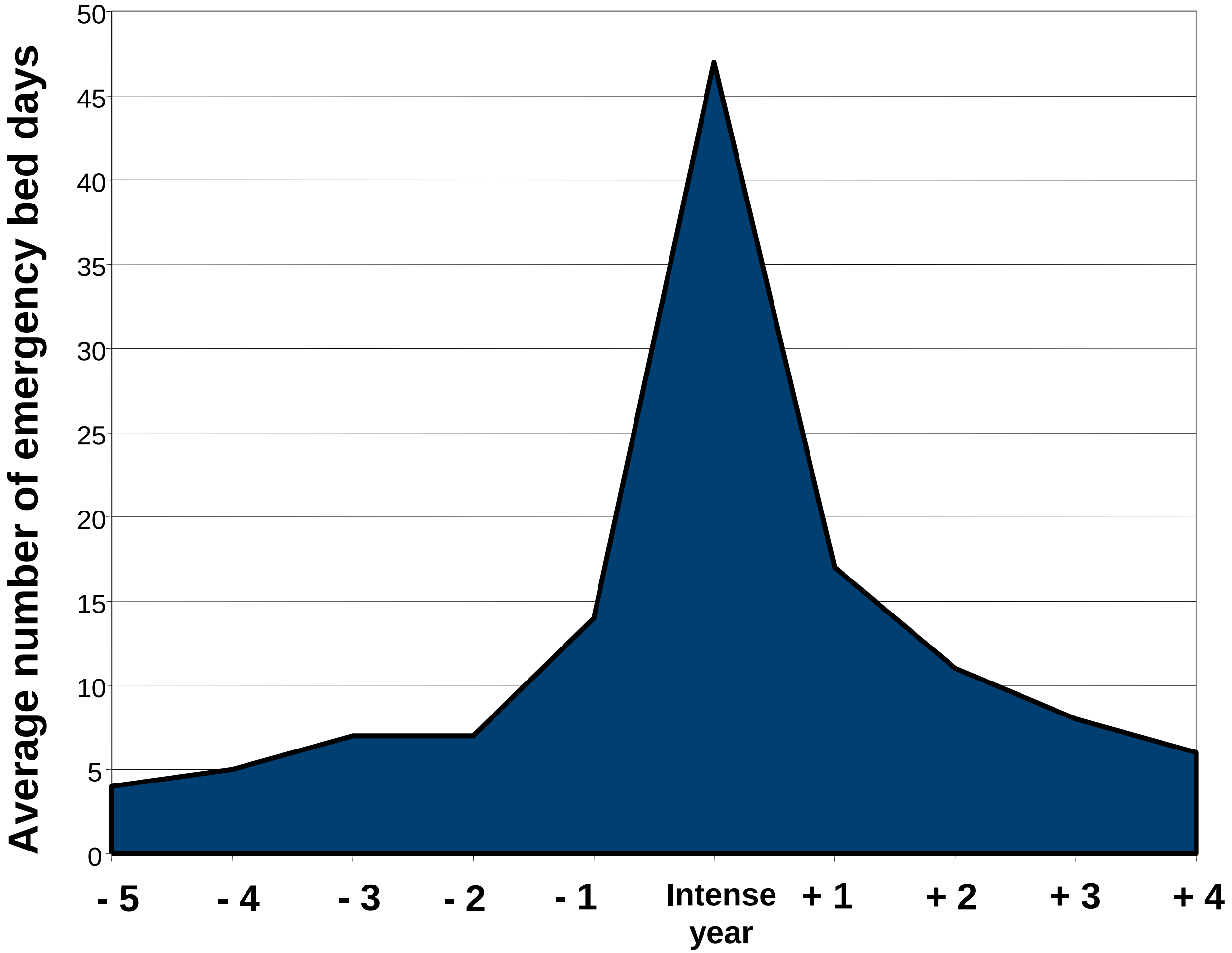
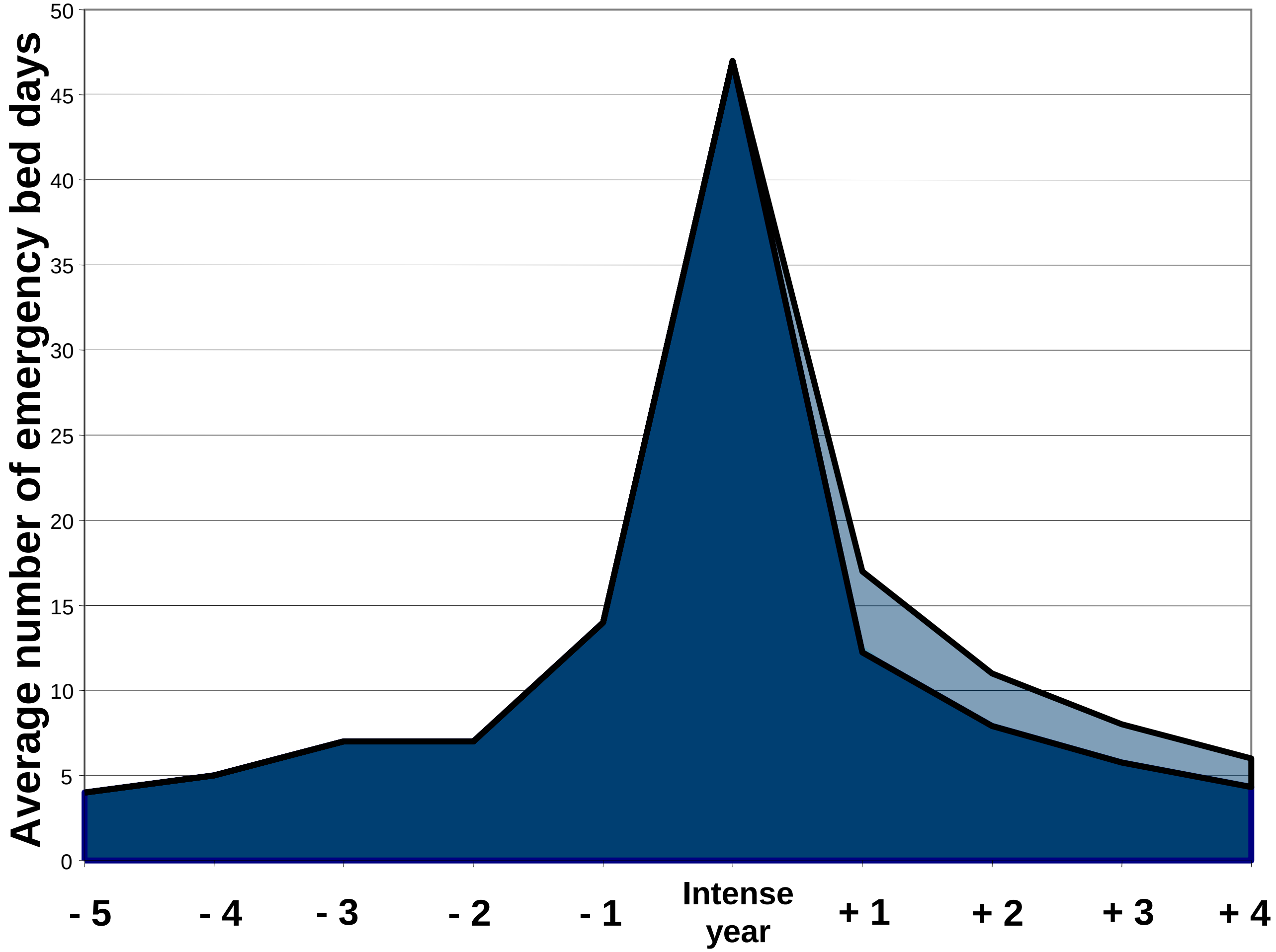
Importance of Accurate Case Finding



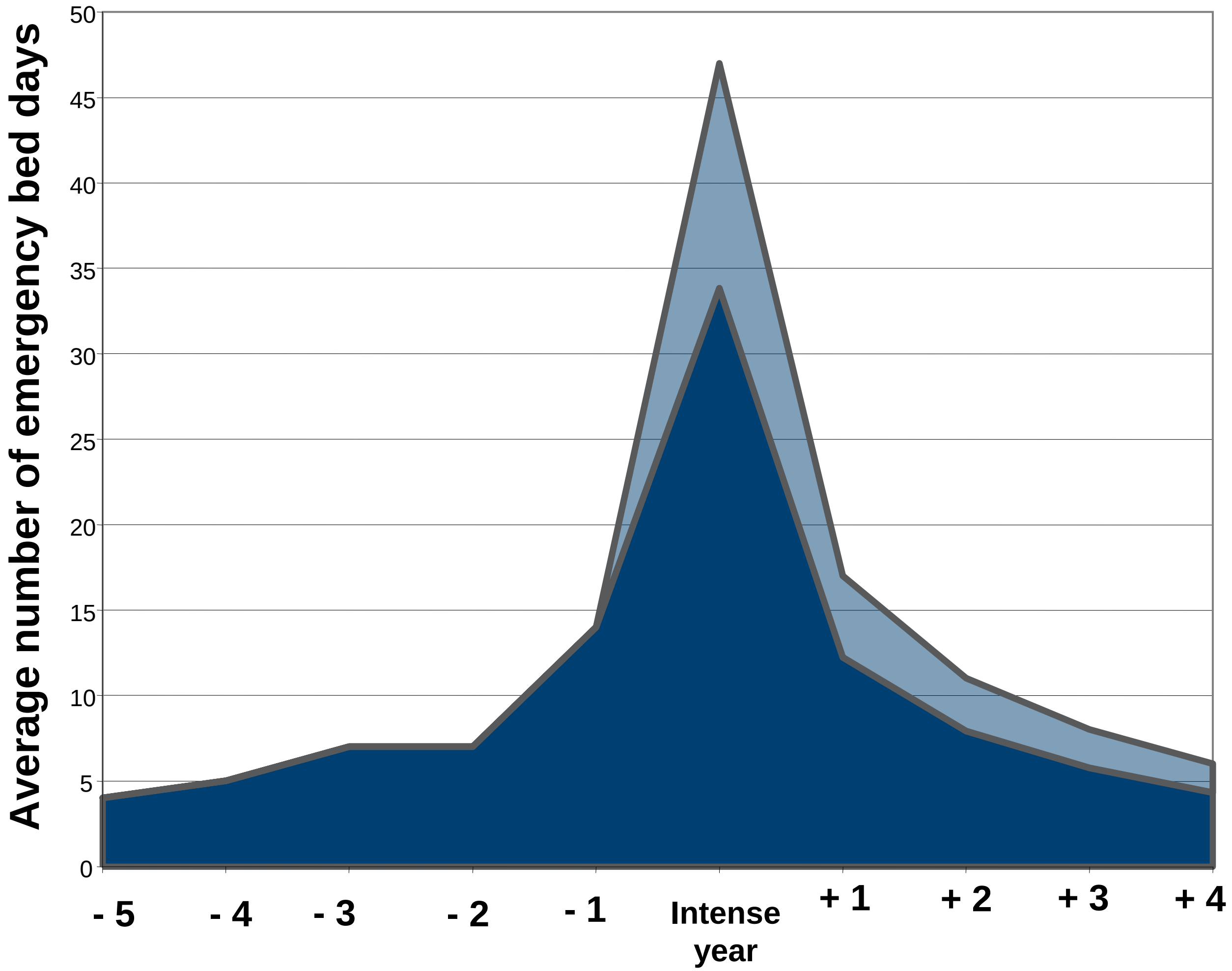
Halliday R. Department of Health analysis of Hospital Episode Statistics for England

Importance of Accurate Case Finding



Halliday R. Department of Health analysis of Hospital Episode Statistics for England

Importance of Accurate Case Finding



Halliday R. Department of Health analysis of Hospital Episode Statistics for England

Preventive Care Can Only Work if Offered to Individuals Who are Truly at Risk

Inaccurate Approaches:

- Threshold models (e.g. all patients aged >65 with 2+ admissions)
- Clinician referrals

Curry N, Billings J, Darin B, Dixon J, Williams M, Wennberg D. Predictive risk project literature review. London: King's Fund, 2005

Referrals by Clinicians

Assessed the predictions made by

- Physicians
- Case managers
- Nurses

"...none of the AUC values were statistically different from chance"

Inability of Providers to Predict Unplanned Readmissions

Nazima Allaudeen, MD[1,2], Jeffrey L. Schnipper, MD, MPH[3], E. John Orav, PhD[4], Robert M. Wachter, MD[2], and Arpana R. Vidyarthi, MD[2]

[1]Department of Medicine, VA-Palo Alto Healthcare System, Palo Alto, CA, USA; [2]Division of Hospital Medicine, Department of Medicine, University of California, San Francisco, CA, USA; [3]BWH Academic Hospitalist Service and Division of General Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA; [4]Department of Biostatistics, Harvard School of Public Health, Boston, MA, USA.

Allaudeen N, Schnipper JL, Orav EJ, Wachter RM, Vidyarthi AR. Inability of providers to predict unplanned readmissions. J Gen Intern Med. 2011;26(7):771-6

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LACE Model

Length of stay
Acuity
Comorbidity
ER visits in the last six months

C statistic = 0.684

1-point increase in the LACE score increases the odds of unplanned readmission by 18% (odds ratio 1.18, 95% CI 1.14–1.21)

van Walraven C, Dhalla IA, Bell C, Etchells E, Stiell IG, Zarnke K, Austin PC, Forster AJ. Derivation and validation of an index to predict early death or unplanned readmission after discharge from hospital to the community. CMAJ. 2010 Apr 6;182(6):551-7

Trade-off Between Sensitivity and PPV

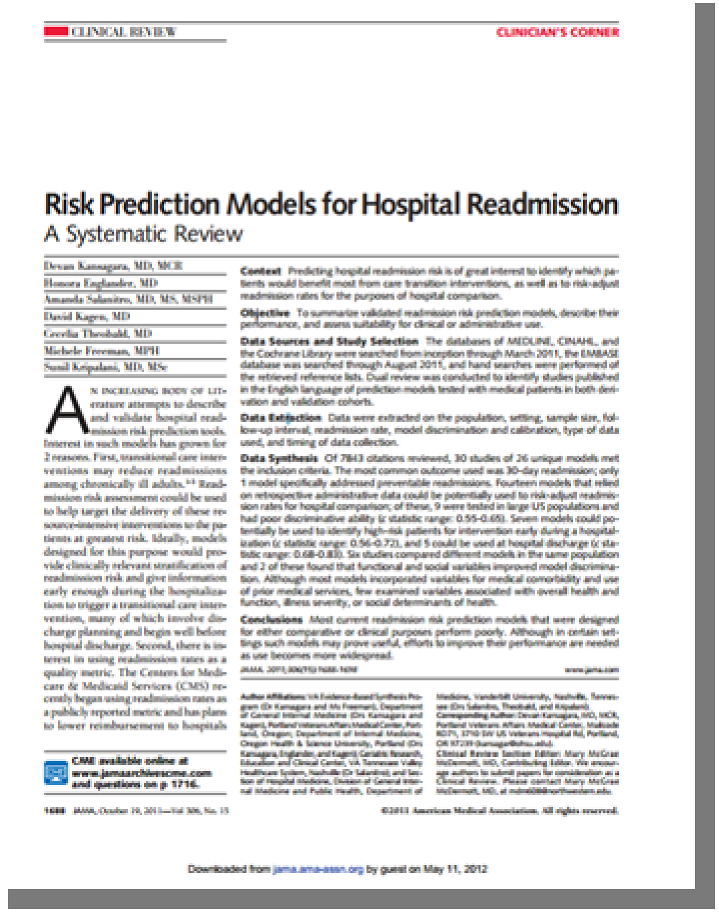
Cut-off score	Positive predictive value	Sensitivity
50	0.65	0.54
70	0.77	0.18
80	0.84	0.08

Area under the ROC curve (“c-statistic”) = 0.685

Billings et al. Case finding for patients at risk of readmission to hospital: development of algorithm to identify high risk patients. BMJ 2006;333:327

Current Predictive Models are Suboptimal

“Most current readmission risk prediction models perform poorly…Efforts to improve their performance are needed.”



Implications

- A single, nationwide model is unfeasible
- Additional data points may improve predictive accuracy – possibly including pharmacy data

Kansagara D, Englander H, Salanitro A, Kagen D, Theobald C, Freeman M, Kripalani S. Risk prediction models for hospital readmission: a systematic review. JAMA. 2011 Oct 19;306(15):1688-98.

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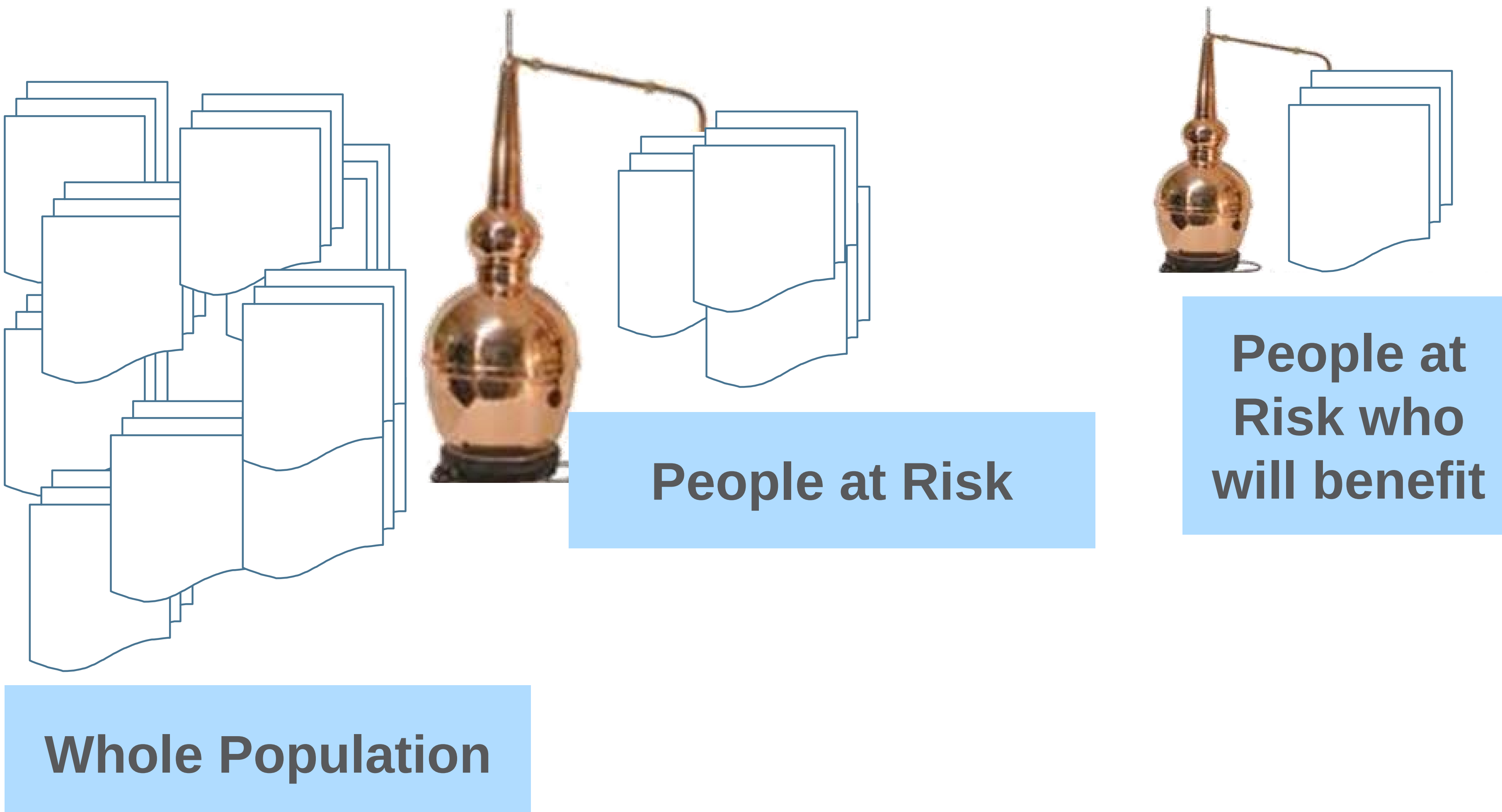
Challenge 2: Who is Amenable to Preventive Care?

Predictive Risk Model

Impactability Model



Approaches to Impactability Modelling

Approach to Impactability Modelling	Efficiency	Equity
Prioritise patients with ACS conditions	✓	✓
Prioritize patients with high “gap scores”	✓	✓
Exclude “difficult” patients	✓	✗

Lewis GH. Impactibility Models: Identifying the Subgroup of High Risk Patients Most Amenable to Hospital Avoidance Programs. Milbank Quarterly 2010;88(2).

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Impactability: Top 5 Diagnoses

Cohort	Top 5 Commonest Diagnoses by Cohort
0 readmissions	1. Pneumonia 2. Osteoarthritis 3. Septicemia 4. Obstructive chronic bronchitis 5. Urinary tract infection
1 readmission	1. Pneumonia 2. Obstructive chronic bronchitis 3. Septicemia 4. Urinary tract infection 5. Acute kidney failure
2+ readmissions	1. Obstructive chronic bronchitis 2. Pneumonia 3. Congestive heart failure 4. Septicemia 5. Urinary tract infection

Data from 5% Medicare sample in 2010.

Impactibility: Quality of Care

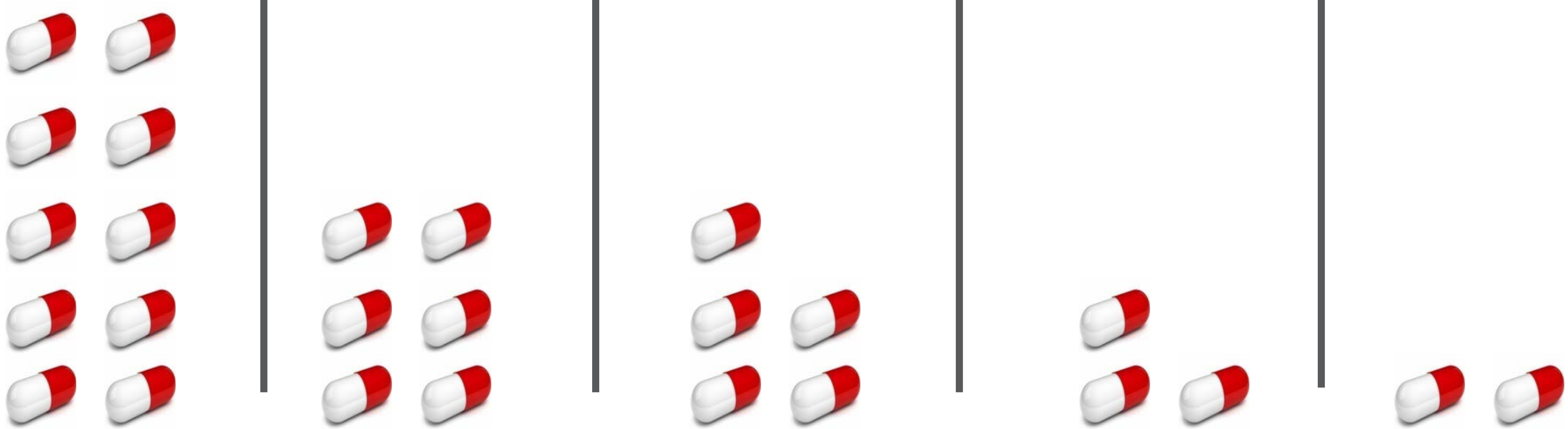
% of people, by number of admissions/readmissions, who had recommended annual tests performed according to HEDIS guidelines, by disease category, in the previous year

Condition:	CAD	HF	DM	DM	DM	COPD
Annual Test:	**LDL**	**LDL**	**HbA1C**	**Eye**	**Albumin**	**Spirometry**
0 admissions	77%	66%	76%	47%	33%	24%
0 readmissions	63%	55%	64%	65%	42%	23%
1 readmission	57%	52%	58%	61%	39%	23%
2+ readmissions	51%	47%	52%	59%	34%	25%

Data from 5% Medicare sample in 2010. Annual tests relate to HEDIS measures.

Medication Fill Rate as a Potential Additional Predictor Variable

100%	50% - 70%	48% - 60%	25% - 30%	15% - 20%
Prescriptions	Brought to Pharmacy	Picked up	Are Taken Properly	Are Refilled



Source: IMS

33 to 69 percent of readmissions attributed to poor medication adherence*

*Osterberg L, Blaschke T. Adherence to Medication. New England Journal of Medicine. 2005;353(5):487-497.

Challenge 3: Interventions to Prevent Readmissions

Meta-Analysis

Classification:

Pre-discharge
Bridging
Post-discharge

"No single intervention implemented alone was regularly associated with reduced risk for 30-day re-hospitalization"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Review

IMPROVING PATIENT CARE

Interventions to Reduce 30-Day Rehospitalization: A Systematic Review

Luke O. Hansen, MD, MHS; Robert S. Young, MD, MS; Keiki Hinami, MD, MS; Alicia Leung, MD; and Mark V. Williams, MD

Author Affiliations

Abstract

Background: About 1 in 5 Medicare fee-for-service patients discharged from the hospital is rehospitalized within 30 days. Beginning in 2013, hospitals with high risk-standardized readmission rates will be subject to a Medicare reimbursement penalty.

Purpose: To describe interventions evaluated in studies aimed at reducing rehospitalization within 30 days of discharge.

Data Sources: MEDLINE, EMBASE, Web of Science, and the Cochrane Library were searched for reports published between January 1975 and January 2011.

Hansen LO, Young RS, Hinami K, Leung A, Williams MV. Interventions to reduce 30-day rehospitalization: a systematic review. Ann Intern Med. 2011;155(8):520-8.

Toronto Virtual Ward

- Offered to patients with a **high LACE score**
- Care at home using the **systems and staffing of a hospital ward** for 30 days post-discharge
- **Bridge** from hospital to home
- Randomized Controlled Trial underway

Lewis GH. Toronto Virtual Wards: useful lessons for NHS hospitals? http://www.nuffieldtrust.org.uk/blog/toronto-virtual-ward-useful-lessons-nhs-hospitals

Walgreens Interventions to Prevent Readmission

Hospital Treatment

1. Patient identified, enrolled in program
2. Generate medication history
3. Fill, alignment and reconciliation of discharge medications
4. Bedside delivery of medication and patient consultation

Post-discharge Care

5. Education follow up initiated 48-72 hours after discharge
6. Clinical therapy review approximately 10 days post discharge
7. Community integration at day 25 post discharge

8. **Joint outcomes reporting with health system and IT partner**

Challenge 4: Roemer's Law

Roemer's Law

Positive correlation between

- number of short-term general hospital **beds available** per 1,000 population; and
- number of hospital **bed-days used** per 1,000 population

Roemer's Law: A hospital bed built is a hospital bed filled

Shain M, Roemer MI. Hospital costs relate to the supply of beds. Modern Hospital 1959 ;92(4):71-3

Contact Information

Dr. Geraint Lewis
Senior Director,
Clinical Outcomes & Analytics
geraint.lewis@walgreens.com

1415 Lake Cook Rd. / 4S / MS #L444
Deerfield, IL 60015