Challenges of evaluating integrated care

The implications of new research for managing and avoiding emergency admissions. Welcome Trust Dec 1\textsuperscript{st} 2014

Martin Bardsley
Director of Research
Nuffield Trust
The Nuffield Trust

- Promote independent analysis and informed debate on healthcare policy across the UK
- Charitable organization founded in 1940
- Formerly a grant-giving organization
- Since 2008 we have been conducting in-house research and policy analysis
- Significant interest in uses of data linkage and predictive risk techniques
Nuffield work includes studies of....

Telehealth and Telecare – Whole System Demonstrator in 3 areas

National Integrated Care Pilots

Partnerships for Older People*

Birmingham Own Health

Virtual Wards in 4 sites*

Marie Curie Nursing Service*

NW London Integrated Care Pilot

British Red Cross .. Care in the Home

Background
Trends in emergency admissions

Source: A&E Annual activity statistics, NHS and independent sector organisations in England
By ambulatory care sensitive conditions…

[Graph showing trends in directly standardised rates per 100,000 for various conditions from 2001/02 to 2012/13. The conditions include UTI/pyelonephritis, pneumonia (primary diagnosis), gastroenteritis, asthma, congestive heart failure, and angina.]
Why the current interest in integrated care?

- Rising levels of chronic disease
- Ageing population
- Increasing levels of hospital admissions and readmissions, especially among the elderly and vulnerable, and children
- Economic hard times, and unsustainable health and social care economies
- And too often we still do not get it right in terms of care co-ordination, care planning, communication with families
- Interest in prevent solutions that reduce the need for hospital admissions
Integration

Table 1: Trends in integration initiatives

1980s
- coordinated working
- shared planning
- coordinated care
- care programmes
- case/care management

1990s
- inter-agency working
- intermediate care
- shared protocols
- managed care
- disease management

2000s
- inter-professional working
- whole systems working
- integrated delivery networks
- patient-centred care
- shared decision-making
- integrated care pathways

“Integration pioneers leading the way for health and care reform”

Care Minister announces details of fourteen areas leading the way in delivering better joined up care....

Results from these approaches in the pioneer areas include:

• 2,000 fewer patient admissions over a two and a half year period, achieved through teams of nurses, social workers, occupational therapists and physiotherapists working together to prevent crises

• Reducing waiting times from eight weeks to 48 hours at physiotherapy services by making professionals work closer together

• Setting up a crisis house where people who suffer mental health problems can get intensive support
One model ..Virtual Wards

Analysis of virtual wards: a multidisciplinary form of case management that integrates social and health care

Geriart H. Lewis,1 Theo Georgiou, Adam Steventon, Rhama Vaithianathan, Xavier Chitnis, John Billings, Ian Blunt, Lorraine Wright, Adam Roberts, and Martin Bardsley2

Nuffield Trust
University of Auckland
New York University

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Rationale for the virtual ward

Need to respond to growing needs of people with chronic health problems

Emergency admissions have been rising for some time – undesirable for patients and costly in terms of acute hospital care. No one explanation for rise in emergency admissions – part patients factors, part health systems

Aim to develop approaches that are preventive before crises emerge. Needed to identify patients at risk of future admissions

Needed a linked process for managing high risk patients in community settings
Virtual Wards = Predictive Model + Hospital-at-Home
Identifying future users of health care

Current intensive users, tend to be less intensive users in future years
(regression to the mean)

Predictive models attempt to predict intense users here
Virtual Ward A
Community Matron
Nursing complement
Health Visitor
Ward Clerk
Pharmacist
Social Worker
Physiotherapist
Occupational Therapist
Mental Health Link
Voluntary Sector Link

Virtual Ward B
Community Matron
Nursing complement
Health Visitor
Ward Clerk
Pharmacist
Social Worker
Physiotherapist
Occupational Therapist
Mental Health Link
Voluntary Sector Link

Specialist Staff
- Specialist nurses
- Asthma
- Continence
- Heart Failure
- Palliative care team
- Alcohol service
- Dietician
Lewis* described the following model of care known as 'virtual wards':

- Each virtual ward is linked to a specific group of GP practices serving a pop of c.30,000.
- A patient is offered "admission" to a virtual ward if a risk prediction tool identifies him or her as being at high risk of a future emergency hospital admission.
- Each virtual ward has a capacity for 100 patients, i.e. 100 "virtual beds" per virtual ward. These are subdivided into five "daily" beds, 35 "weekly" beds and 60 "monthly" beds, reflecting the frequency with which different patients are reviewed on a ward round.
- Virtual ward staff discuss patients on office-based "ward rounds", participating either in person or by telephone.
- The virtual ward staff share a common medical record.
- Systems to alert local hospitals, emergency departments and out-of-hours providers that a patient is on a virtual ward.

Evaluation Methods VW

Three pilots sites with different models of VW

**Retrospective** analysis of existing projects

Track cohort of specific patients to look at service use over time

Exploit existing data through secure data linkage

Compare change to matched control group (matched on multiple variable using propensity and prognostic score)

Costing service activity and interventions
Prevalence of health diagnoses categories in intervention and control groups
So what did we find...
Virtual Ward patients

The virtual ward patients in one site had

- a mean combined model score of 0.63 compared with score of 0.06 for the rest of the population
- a higher rate of emergency hospital admissions (2.64 per patient compared with 0.06)
- more general practice surgery visits (42.99 visits compared with 5.55)
- more contact with community nurses (68.6 per cent of virtual ward patients had been in contact with community nurses in the year before receiving the intervention compared with 1.0 per cent for the rest of the population)
- more chronic health problems 2.48 vs 0.07 conditions for the rest of the population
- more social care services eg 19.3 per cent of virtual ward patients had received home care at some point in the previous twelve months, compared with 0.5 per cent for the rest of the population.
Lengths of stay on the Virtual Wards
Changes in hospital activity

<table>
<thead>
<tr>
<th>Category</th>
<th>Estimate</th>
<th>Lower CL</th>
<th>Upper CL</th>
<th>P Value</th>
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<tbody>
<tr>
<td>Non-elective</td>
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<td>-0.090</td>
<td>0.176</td>
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<tr>
<td>Elective</td>
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<td>Elective bed days</td>
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<td>-1.505</td>
<td>0.112</td>
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<tr>
<td>Non-elective bed days</td>
<td>-1.159</td>
<td>-3.071</td>
<td>0.754</td>
<td>0.235</td>
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</table>
Impact on care use

Sample dominated by one site

Difficulties in matching to patients with complex health problems (had to use national hospital based models)

No evidence of reductions in emergency admissions at 6mnths

Indications of possible reductions in OP and elective care
Reality of implementation

In largest site the model ‘changed’

• from multidisciplinary case management to standard service delivered by a community matron supported by an administrative assistant

• Predictive model not used consistently throughout

• organisational commitment and investment in preventive care for high risk patients but local GPs seemed less visible

• Long lengths of stay linked with incentives to have 500 patients on VW

Large differences between sites in costs of VW itself

Two sites still in early stages- and have subsequently developed
General observations on VW

There were different 'forms' of virtual ward in this study and we suspect an even wider number of variants in other settings.

Our analyses have shown how patients being cared for on virtual wards included some people with serious complex illnesses that have important health service implications.

Virtual wards are part of a generic approach to long term care which may be justified in other terms, for example as ways to improve the quality of communication between community health staff, the continuity of care, patient experience or safety. No simple solutions we can take off the shelf

Though the evidence was not conclusive, the differential levels of service use in high risk patients suggested that these would provide more fertile ground for interventions aimed at reducing hospital use.
But negative results also found........
The Partnership for Older People Projects (POPPs)

- £60m investment by DH with aim to:
  - *shift resources and culture away from institutional and hospital-based crisis care*

- 146 interventions piloted in 29 sites.

We looked at a subset including

- Support workers for community matrons
- Intermediate care service with generic workers
- Integrated health and social care teams
- Out-of-hours and daytime response service

- 4 different short term assessment and signposting services
Impact of eight different interventions on hospital use

- Support workers for community matrons (A)
- Intermediate care service (B)
- Integrated health and social care team (C)
- Rapid response services (D)
- Short-term signposting service (E)
- Short-term signposting service (F)
- Short-term signposting service (G)
- Short-term signposting service (H)
And 11 integrated care pilots (all pilots combined n=11,296)

- Elective admissions & outpatient attendances reduced more quickly for intervention patients than matched controls.
- However, emergency admissions appeared to have increased more quickly.

<table>
<thead>
<tr>
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<th>Difference in difference analysis (individual patient level)</th>
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</thead>
<tbody>
<tr>
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<td>Absolute difference (per head)</td>
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<tr>
<td>Emergency admissions</td>
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<tr>
<td>A&amp;E attendance</td>
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<tr>
<td>Elective admissions</td>
<td>-0.04</td>
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<tr>
<td>Outpatient attendance</td>
<td>-0.20</td>
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* Difference also detected at practice level
Impact of Marie Curie Nursing Service on place of death & hospital use at the end of life

- 29,538 people who received MCNS care from January 2009 to November 2011
- Matching techniques used to select 29,538 individually matched controls from those who died in England from January 2009 – November 2011
- Matched on demographic, clinical and prior hospital use variables
- People started receiving MCNS care on average 8 days before death


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Selected observations......

1. Recognise that planning and implementing large scale service changes take time

2. Pay attention to the process of implementation as well as outcome. Look for intermediate and proxy outcomes for early change

3. If you want to demonstrate statistically significant change, size and time matter
Recruitment and power

The chart illustrates the number of patients consenting to interventions and the chance of detecting a change at the end of each month. The data indicates:

- Total ICP membership: A steady increase from August 2011 to August 2012, with a significant rise in membership from January to April 2012.
- Evaluation cohort: A smaller, consistent increase in membership throughout the period.
- Follow up period: The chance of detecting a change at the end of each month.

Key observations:
- From August 2011 to December 2011, there is no detection of change for either the total membership or the evaluation cohort.
- From January 2012 onwards, there is a notable increase in the chance of detecting a change, particularly for the total membership.
- The chart shows a 25% reduction in the 3-month follow-up period and a 10% reduction in the 6-month follow-up period.

Data not yet available for the evaluation cohort and follow-up period.

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More selected observations

4. Define the service intervention clearly – and be clear when the model is changed

5. Success or failure will depend on targeting the right people not just volumes.

6. Hospital use and costs are not the only impact measures

7. Carefully consider the best models for evaluation and timescales – prospective/retrospective; formative/summative; quant./qualitative
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