Improving Safety for People with multi-morbidity in Primary Care

Professor Bruce Guthrie
University of Dundee, Scotland
Improving safety for people with multimorbidity in primary care

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Professor of Primary Care Medicine
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Outline

• Challenge of multimorbidity
• How might health services respond?
• Safety improvement in primary care
• Prescribing as an exemplar
  – Polypharmacy
  – High risk prescribing (narrow)
  – Antimicrobials (narrow)
  – Polypharmacy (broad)
• Wider implications
The challenge of multimorbidity

Barnett K et al. Lancet 2012:380;37-43
Adapting clinical guidelines to take account of multimorbidity

Percentage of patients with this condition who also have this condition

Coronary heart disease
- CVD
- Hypertension
  - Heart failure
  - Stroke
  - Atrial fibrillation
  - Diabetes
  - COPD
  - Painful condition
  - Depression
  - Dementia
  - No other condition

When does multimorbidity matter?

- Hard to specify precisely...
- NICE multimorbidity guideline
  - Complexity of conditions
  - Complexity of care
  - Interaction between conditions and between treatments
- Life expectancy and frailty are also important (not just age)
- Always a judgement...

https://www.nice.org.uk/guidance/ng56
How should health services respond?

- Develop guidance on “an approach to care that accounts for multimorbidity”
- Patient values & priorities central
- What is the goal of treatment?
- What are we trying to achieve?
- Who is responsible? Should it be me who is responsible?

Farmer et al. BMJ 2016;354:i4843
How should health services respond?

1. Ensure health system retains strong generalism
2. Focus on holistic management and care co-ordination for people with very high need
3. Focus on specific problems that are common and important to people with multimorbidity
4. Focus on high-volume processes predominately used by people with multimorbidity
How should health services respond?

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Approaches to improvement

• ‘Traditional’ methods
  – Education
  – Guidelines
  – Tools to support improvement
  – Multidisciplinary teams
  – Incentives
• Evaluated in trials and interrupted time series analysis
• Most common method used in health services

• Breakthrough Collaboratives
  – Model for Improvement
  – Care bundles
  – PDSA cycles/small cycles of change
  – Local solutions
  – Shared learning/spread
• Evaluated by self-measurement
• Commonly used method in large-scale improvement programs
Approaches to improvement in primary care

• Repeatedly sample from flow
• High-volume examples in primary care
  – Access
  – Repeat prescribing
  – Results handling
  – Letters handling
  – Medicines reconciliation
• However, many processes in primary care are low volume, and much relies on judgement

• Scottish Patient Safety Programme in Primary Care warfarin bundle
  – Measure 1: Warfarin dose is prescribed according to local guidance
  – Measure 2: Is the target INR & duration of treatment clearly documented?
  – Measure 3: Has patient been taking the advised dose since last blood test?
  – Measure 4: INR measured within 7 days of planned repeat INR?
  – Measure 5: Patient has received education in the last 6 months
Approaches to improvement in primary care

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Polypharmacy

• The price of success
  – More effective treatments
  – Better survival from acute events

• Not wrong in itself but frequently problematic
  – Over-prescribing
  – Under-prescribing

• Medical training and work focuses almost entirely on starting treatments
Does it matter?

- People on warfarin prescribed NSAIDs, anti-platelets, high-risk antibiotics, oral azole antifungals
  - 16.0% in 1995
  - 10.7% in 2010
  - Safer...

- People on warfarin prescribed NSAIDs, anti-platelets, high-risk antibiotics, oral azole antifungals
  - 258/1611 in 1995
  - 538/5006 in 2010
  - Safer but more people are at risk...
  - Requires more vigilance about adverse events, more thought about individual benefit/risk
High risk prescribing (narrow)

- Prescribing is a high benefit, high risk, high cost activity
- 6.5% of hospital admissions are related to ADEs
- Mostly due to ‘appropriate’ drugs that guidelines tell us to prescribe more of
- Not a never event, but needs regular review
  - The correct level is NOT zero

<table>
<thead>
<tr>
<th>No. of chronic drugs</th>
<th>% getting a high risk prescription</th>
<th>Adjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 drugs</td>
<td>4.3</td>
<td>1</td>
</tr>
<tr>
<td>1-2 drugs</td>
<td>11.0</td>
<td>2.7</td>
</tr>
<tr>
<td>3-4 drugs</td>
<td>12.7</td>
<td>3.2</td>
</tr>
<tr>
<td>5-6 drugs</td>
<td>14.5</td>
<td>3.8</td>
</tr>
<tr>
<td>7-8 drugs</td>
<td>18.3</td>
<td>5.0</td>
</tr>
<tr>
<td>9-10 drugs</td>
<td>21.5</td>
<td>6.1</td>
</tr>
<tr>
<td>11+ drugs</td>
<td>26.6</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Guthrie B et al. BMJ 2011;342:d3514
PINCER trial

- Cluster randomised trial in 72 English practices
- Control arm get one round of feedback + written education
- Intervention arm get 12 weeks of pharmacist support to review patients & make recommendations, and to implement system changes for future improvement

<table>
<thead>
<tr>
<th>Primary outcome</th>
<th>6 months odds ratio</th>
<th>12 months odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSAID in peptic ulcer</td>
<td>0.58</td>
<td>0.91</td>
</tr>
<tr>
<td>Asthma + beta-blocker</td>
<td>0.73</td>
<td>0.78</td>
</tr>
<tr>
<td>Aged 75+ on ACEI without U&amp;E in last 15 months</td>
<td>0.51</td>
<td>0.63</td>
</tr>
</tbody>
</table>

DQIP trial

• Cluster-randomised, stepped-wedge trial in 33 practices
• Targets nine measures of high-risk NSAID and antiplatelet prescribing
• Intervention components
  – Educational outreach visit
  – Informatics to identify patients, support review and track progress
  – Financial incentives to review (£15/€20 per completed review)

DQIP trial

- Reduced high risk prescribing
  - All prescribing OR 0.63
  - Ongoing prescribing OR 0.60
  - New prescribing OR 0.77
- Sustained effect in the year after financial incentives cease
- Reduced emergency admission with
  - Gastrointestinal bleeding OR 0.66
  - Heart failure OR 0.73
  - (but not acute kidney injury OR 0.84)
- Complex but highly effective

EFIPPS trial

- Cluster randomised trial in 262 general practices
- Targeted six measures, three arms
  - Usual care (written education + support for searching)
  - Feedback (quarterly for a year)
  - Feedback + written behaviour change intervention
- All sent by the NHS
- Comparator is the 25th centile
  - 75% are worse than comparator

Guthrie B et al. BMJ 2016;354:i4079
EFIPPS trial

• Both intervention arms effective
  – Feedback alone OR 0.88
  – Feedback plus OR 0.86

• Time series analysis in each arm
  – Usual care: no effect of written education & support for searching
  – Feedback alone: change in trend
  – Feedback plus: step change and change in trend

• Cheaper and easier to scale

Guthrie B et al. BMJ 2016;354:i4079
NHS translation?

- DQIP like intervention using three EFIPPS measures in all practices in NHS Forth Valley
- Part of ‘Whole System Working’
  - Financial incentive to engage
  - Educational workshop
  - Single round of feedback
  - Support for searching
- Year 1 targets three NSAID and antiplatelet measures
- Larger effects than the trials...

MacBride-Stewart et al. BJGP in press 2016
NHS translation? YES!

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NHS translation?

- Year 2 targets antipsychotic prescribing in over-75s
NHS translation?

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- Same intervention but absolutely nothing happens...

MacBride-Stewart et al. BJGP in press 2016
NHS translation? **NO!**

- Year 2 targets antipsychotic prescribing in over-75s
- Same intervention but absolutely nothing happens...
- Same pattern seen in EFIPPS
  - No magic bullets
  - Different ‘types’ of prescribing may need different interventions

MacBride-Stewart et al. BJGP in press 2016
Antimicrobial prescribing

- >50 stewardship trials in primary care
  - Small effects, most things work
- Scotland targeted 4Cs in 2009
  - Co-amoxiclav, cephalosporins, fluorquinolones, clindamycin
  - High-risk of C difficile
- Intervention varied by Health Board
- Evaluated using time series analysis

Antimicrobial prescribing

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• Intervention varied by Health Board
• Evaluated using time series analysis
• Current trial of feedback in 380 practices targeting total use

Antimicrobial resistance?

• Very large reductions in 4C use
• Does resistance change?
• Very few studies of this, but not straightforward
  – Urine culture easy but sampling bias
• Resistance in Gram negative community acquired bacteraemia
• Reduced resistance by three years to fluoroquinolones (39%) and cephalosporins (44%)
• Co-amoxiclav resistance no change
Polypharmacy (broad)

- Many inconclusive trials of pharmacist-led medication review
  - Inconsistent effect on prescribing
  - Little data on clinical outcomes
- Polypharmacy guidance
  - Largely consensus based
  - Comprehensive but very long
- Developing informatics tools to support polypharmacy review
  - Embed in broader interventions/context
  - Two health boards, time series analysis

[Links]
http://www.sign.ac.uk/pdf/polypharmacy_guidance.pdf
http://www.polypharmacy.scot.nhs.uk/
Follow the Scottish Polypharmacy Guidance process:


1. Identify the goals of drug therapy – what are we trying to achieve in this person?
2. Identify essential drug therapy
3. Does the patient take unnecessary drug therapy?
4. Are therapeutic objectives being achieved?
5. Does the patient have adverse drug reactions, or is at risk of adverse drug reactions (ADRs)?
6. Is there a significantly cheaper alternative?
7. Is the patient willing and able to take drug therapy as intended?

What are the goals of drug therapy?
What does the patient or their carer or their welfare proxy want (for example, to prioritise management of symptoms, minimisation of drugs and potential side effects, avoidance of particular long-term outcomes such as stroke)?

What is the individual context (short life expectancy or frailty)?

What are the objectives of drug therapy (shorter-term management of current symptoms and conditions or longer-term prevention or both)?
Specific prescribing quality and safety indicators triggered by the patient

### High Risk Treatment

<table>
<thead>
<tr>
<th>Indicator</th>
<th>What is the risk?</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient aged 65 years or older without dementia is prescribed one or more drugs with strong anticholinergic properties</td>
<td>Confusion, cognitive decline, falls and fractures</td>
<td>Stop anticholinergic drugs wherever possible (see under ‘anticholinergics’ in the current medication summary to see which drugs the patient is taking and have anticholinergic properties)</td>
</tr>
<tr>
<td>Patient aged 75 years or older and without dementia is prescribed one or more drugs with significant sedating effects</td>
<td>Drowsiness, falls and fractures</td>
<td>Stop sedative drugs wherever possible (see under ‘sedation’ in the current medication summary to see which drugs the patient is taking and are significantly sedative)</td>
</tr>
<tr>
<td>Verapamil, opioid or oral iron prescribed to a patient with constipation</td>
<td>Constipation</td>
<td>Limit or stop prescribed opioid or iron if you can. Consider replacing any prescribed verapamil with a beta blocker, diltiazem or digoxin (if a heart rate limiting effect is desired) or an alternative antihypertensive (if not). If stopping the offending drug is not possible, or symptoms persist, prescribe a laxative. For opioid induced constipation, do not use bulk-forming laxatives. Use an osmotic laxative (or disaccharide which also softens stools) and a stimulant laxative. Check for alternative causes of constipation (e.g. dehydration, diet etc).</td>
</tr>
</tbody>
</table>

### Potential Overtreatment

<table>
<thead>
<tr>
<th>Indicator</th>
<th>What is the risk?</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient is prescribed long term treatment with a PPI at full therapeutic dose</td>
<td>PPI toxicity (e.g. C. diff infection, osteoporosis, renal impairment)</td>
<td>Unless there is a reason to be on high dose, then reduce dose to: omeprazole 10mg (if on higher doses of omeprazole or esomeprazole), lansoprazole 15mg, pantoprazole 20mg, rabeprazole 10mg</td>
</tr>
</tbody>
</table>

### Monitoring

<table>
<thead>
<tr>
<th>Indicator</th>
<th>What is the risk?</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>INR not measured in the last twelve weeks in patient prescribed warfarin</td>
<td>Over and under anticoagulation</td>
<td>INR should be checked at least 12 weekly.</td>
</tr>
</tbody>
</table>

Potential Undertreatment - No identified risks
# Current Medications

<table>
<thead>
<tr>
<th>Active Repeat Prescriptions</th>
<th>Last Issued</th>
<th>Anticholin</th>
<th>Sedation</th>
<th>Bleeding</th>
<th>Low BP</th>
<th>Renal Failure</th>
<th>Constipation</th>
<th>Linked Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loperamide 2mg tablets, ONE TO BE TAKEN AS REQUIRED FOR DIARRHOEA MAX DOSE IS 16MG IN 24 GOURS</td>
<td>22/02/18</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Fracture of neck of femur</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyoscine butylbromide 10mg tablets, 1 Tab morning and night</td>
<td>06/05/18</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Fracture of neck of femur</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dihydrocodeine 30mg tablets, ONE TO BE TAKEN FOUR TIMES A DAY AS REQUIRED FOR PAIN</td>
<td>20/04/18</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Fracture of neck of femur</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warfarin 3mg tablets, TO BE TAKEN AS DIRECTED</td>
<td>21/03/18</td>
<td>X</td>
<td></td>
<td></td>
<td>Anticoagulant therapy</td>
<td></td>
<td></td>
<td></td>
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<td>21/03/18</td>
<td></td>
<td></td>
<td></td>
<td>Anticoagulant therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warfarin 1mg tablets, TO BE TAKEN AS DIRECTED</td>
<td>17/03/18</td>
<td>X</td>
<td></td>
<td></td>
<td>Anticoagulant therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fampir 2.5mg capsules, ONE TO BE TAKEN EACH MORNING</td>
<td>06/05/18</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simvastatin 2.5mg tablets, ONE TAB DAILY</td>
<td>05/05/18</td>
<td>X</td>
<td>X</td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peptan liquid aniseed (Teva UK Ltd), 15-20MLS AFTER MEALS AND AT BEDTIME</td>
<td>20/04/18</td>
<td></td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gator 0.3mg/ml / 5mg/ml eye drops (Alerean Ltd), ONE DROP EACH EYE AT NIGHT</td>
<td>17/05/18</td>
<td></td>
<td></td>
<td></td>
<td>Glaucoma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laxido Orange oral powder sachets sugar free (Galen Ltd), ONE SACHET A DAY, DISSOLVE IN AT LEAST HALF A GLASS OF WATER</td>
<td>16/01/16</td>
<td></td>
<td></td>
<td></td>
<td>Fracture of neck of femur</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroxocobalamin 1mg/1ml solution for injection ampoules, As directed</td>
<td>14/12/15</td>
<td></td>
<td></td>
<td></td>
<td>Pernicious anaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adol-03 chewable tablets tutti frutti (ProStrakan Ltd), 1 Tab morning and night</td>
<td>09/05/10</td>
<td></td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atenolol 20mg tablets, 1 Tab weekly</td>
<td>08/05/10</td>
<td></td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esomeprazole 20mg gastro-resistant capsules, 1 Cap morning and night WEEKLY</td>
<td>06/05/16</td>
<td></td>
<td></td>
<td></td>
<td>?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levohydroxine sodium 100mgmonogram tablets, ONE TO BE TAKEN EACH DAY</td>
<td>06/05/16</td>
<td></td>
<td></td>
<td></td>
<td>?</td>
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<td></td>
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<th>Renal Failure</th>
<th>Constipation</th>
<th>Linked Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laxido Orange oral powder sachets sugar free (Galen Ltd), TAKE 4 SACHETS</td>
<td>03/05/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Hydrocortisone 1% / Clothinazol 1% cream, APPLY THINLY ONCE A DAY AS DIRECTED</td>
<td>20/04/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Hydrocortisone 1% ointment, APPLY THINLY ONCE A DAY AS DIRECTED</td>
<td>06/03/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>?</td>
</tr>
</tbody>
</table>
Improving safety for people with multimorbidity

• Multimorbidity is much of healthcare
  – Too big and ill-defined to ‘fix’

• Identify important but digestible chunks
  – Mine is prescribing - what’s yours?

• Pick a plausible method
  – No magic bullet, horses for courses
  – Data, data, data
  – “If you can’t measure it, you can’t manage it”
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• Get on with it...
Improving safety for people with multimorbidity

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  – “It is wrong to suppose that if you can’t measure it, you can’t manage it – a costly myth”
• Get on with it…
How should health services respond?

1. Focus on holistic management and care co-ordination
   – Taking responsibility, not disease focused
   – Evidence for “comprehensive geriatric assessment” in inpatients

2. Focus on specific common and important problems
   – Prescribing safety, polypharmacy

3. Focus on high-volume processes predominately used by people with multimorbidity
   – Hospital care bundles (lines, ventilators, hand-washing etc)
   – Medicines reconciliation, access, document handling, repeat prescribing
Always a team game

Among others:
DQIP: Tobias Dreischulte, Aileen Grant, Adrian Hapca, Peter Donnan, Colin McCowan, Dennis Petrie
EFIPPS: Marion Bennie, Chris Robertson, Kim Kavanagh, Karen Barnett, Iain Bishop, Dennis Petrie, Lewis Ritchie, Shaun Treweek
Forth Valley: Sean MacBride-Stewart, Neil Houston, Iain Watt, Charis Marwick, Andrea Patton
Antimicrobials: Andrea Patton, Charis Marwick, Peter Davey
Polypharmacy: Tobias Dreischulte, Lyall Cameron, Graeme Longair, Jason Tang, Suzanne Grant, Neil Mellon, Grant McHattie
Thank you!

Any questions?