The GRACE-Med study

General Practice and Residential Aged Care Facility Concordance of medications study

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HIC Melbourne July 2016
GRACE-Med study overview

RESEARCH QUESTION AND AIMS

• EVIDENCE GAP on the mismatch between medication records at Residential Aged Care Facilities (RACFs) and the GPs’ practice software

• What is the magnitude of medication discrepancies between GPs’ practice clinical information system and residents’ medication charts at the RACF?

• What is the risk to patient safety for RACF residents associated with these differences?
GRACE-Med study background

MEDICATION MANAGEMENT IN THE GENERAL PRACTICE

GP CLINICAL INFORMATION SYSTEMS

2013-14 BEACH data:

- 96.3% of GPs were producing prescriptions electronically (ePrescribing or printing scripts)
- More than two-thirds (69.9%) reported they used electronic medical records exclusively (ie paperless)
- Only 2.4% of GPs did not use a computer at all for clinical purposes
RACF USE OF CLINICAL INFORMATION SYSTEMS

- Range of programs, with different versions in use at RACFs
- Variable use of medication management modules eg hybrid of handwritten changes faxed to pharmacy, then electronic charts generated, which RACF can view but not alter at the facility
GRACE-Med study background

DATA OVERVIEW – PROCESS WHEN A MEDICATION FOR A RESIDENT IS CHANGED AT THE FACILITY…

MEDICINE
NEW or CHANGE
Written by hand on RACF chart
No electronic decision support available
Limited use of laptop or cloud by GPs

PRESCRIPTION
Written by hand and left at facility
or

Prescription generated electronically at practice
BUT electronic decision support uses medicines list at the practice
not RACF chart

Pharmacist dispenses medicine and generates revised medication chart, sends to RACF

Altered medication chart at the RACF faxed to pharmacy
GRACE-Med study background

DATA OVERVIEW – PROCESS WHEN A MEDICATION FOR A RESIDENT IS CHANGED AT THE FACILITY...

**Prescription**
- Written by hand and left at facility
- Prescription generated electronically at practice
- BUT electronic decision support uses medicines list at the practice
  - not RACF chart

**Medicine**
- NEW or CHANGE
  - Written by hand on RACF chart
  - No electronic decision support available
  - Limited use of laptop or cloud by GPs

Pharmacist dispenses medicine and generates revised medication chart, sends to RACF

Altered medication chart at the RACF faxed to pharmacy
RACF systems designed to support RACF needs in patient care, NOT DESIGNED TO SUPPORT GP WORKFLOW

- No prescribing medicine functions allergy alerts, interactions
- No ability to generate electronic scripts in RACF CIS
- No interoperability between systems at GP practice and RACF
- No SMD functions at RACF – can’t send securely point to point such as notes, discharge summaries, referrals
- No education for GPs in using RACF CIS
- No SHS reaching My Health Record from RACF CIS, GPs are sending from their practice systems using the data held there
GRACE-Med study methods

METHODS OVERVIEW

- Approx. 1100 GPs in the PHN region invited to participate
- GP participants identified their RACF residents
- 10 residents per GP selected randomly, stratified by RACF
- **Medication data extracted**
  - GP’s practice CIS
  - RACF chart on the same day
- Discrepancies analysed
- GP feedback was sought on
  - Nature of discrepancies
  - Plans for further action
- RACGP audit activity
## GRACE-Med study methods

**METHODS – MEDICATION DATA ENTRY**

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Strength</th>
<th>Dosage</th>
<th>Route</th>
<th>Reason</th>
<th>Last script</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOPURINOL Tablet (Allopurinol)</td>
<td>100mg</td>
<td>1 mane</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>AMOXICILLIN/CLA VULANIC ACID Tablet (Amoxicillin (as trihydrate)/Clavulanic acid (as the potassium salt))</td>
<td>875mg/125mg</td>
<td>1 b.d.</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>ASPIRIN EC Tablet (Aspirin)</td>
<td>100mg</td>
<td>1 mane</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>COLOXYL WITH SENNA Tablet (Docusate sodium/Sennosides)</td>
<td>50mg/11.27mg</td>
<td>2 b.d. p.r.n.</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>ELEUPHRAT Cream (Betamethasone dipropionate)</td>
<td>0.05%</td>
<td>Apply daily</td>
<td>Topical</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>FERROGRAD C Tablet (Ferrous sulfate/Ascorbic acid)</td>
<td>325mg/500mg</td>
<td>1 mane</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>MACROVIC Sachet</td>
<td>13.125g/350.7mg/46.6mg/178.5mg</td>
<td>1 b.d.</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>MONODUR SR Tablet (Isosorbide mononitrate)</td>
<td>120mg</td>
<td>1 mane</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
<tr>
<td>PANTOPRAZOLE EC Tablet (Pantoprazole (as sodium)</td>
<td>40mg</td>
<td>1 b.d.</td>
<td>Oral</td>
<td></td>
<td>14/01/2016</td>
</tr>
</tbody>
</table>
GRACE-Med study methods

METHODS – MEDICATION DATA ENTRY

- Data entry into MD software and Access database using AusDI/MIMS/ATC/AMT coding
<table>
<thead>
<tr>
<th>MEDICINE NAME</th>
<th>STRENGTH</th>
<th>DOSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLOXYL WITH SENNA Tablet (Docusate sodium/Sennosides)</td>
<td>50mg/11.27mg (calculated as sennoside B 8mg)</td>
<td>2 no. p.r.n.</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>50mcg</td>
<td>1 mane</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>100mcg</td>
<td>1 mane</td>
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<td>1 mane</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>50mcg</td>
<td>1 daily</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>50mcg</td>
<td>1 daily</td>
</tr>
<tr>
<td>PHOSPHATE SANDOZ Eff' Tablet (Phosphorus (as sodium phosphate monobasic))</td>
<td>500mg</td>
<td>1 t.i.d.</td>
</tr>
<tr>
<td>SYMBICORT TURBUHALER 200/6 Turbuhaler (Budesonide/Eformoterol fumarate dihydrate)</td>
<td>200mcg-6mcg/actuation</td>
<td>2 b.d. Rinse mouth after use.</td>
</tr>
<tr>
<td>SPIRACTIN Tablet (Spironolactone)</td>
<td>25mg</td>
<td>1 mane</td>
</tr>
<tr>
<td>SYMBICORT RAPIHALER Inhaler (Budesonide/Eformoterol fumarate dihydrate)</td>
<td>200mcg-6mcg/actuation</td>
<td>1 b.d.</td>
</tr>
<tr>
<td>VALPAM Tablet (Diazepam)</td>
<td>2mg</td>
<td>0.5 b.d.</td>
</tr>
<tr>
<td>ZYPREXA Tablet (Olanzapine)</td>
<td>2.5mg</td>
<td>1 no.</td>
</tr>
</tbody>
</table>

**ALLERGIES:** Elastoplast

**YOUR PRACTICE RECORD**

<table>
<thead>
<tr>
<th>MEDICINE NAME</th>
<th>STRENGTH</th>
<th>DOSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVAPRO Tablet (Irbesartan)</td>
<td>300mg</td>
<td>1 daily</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>100mcg</td>
<td>1 daily</td>
</tr>
<tr>
<td>EUTROXSIG Tablet (Thyroxine sodium)</td>
<td>50mcg</td>
<td>1 daily</td>
</tr>
<tr>
<td>MIRTAZON Tablet (Mirtazapine)</td>
<td>30mg</td>
<td>2 no. m.d.u.</td>
</tr>
<tr>
<td>PHOSPHATE SANDOZ Eff' Tablet (Phosphorus (as sodium phosphate monobasic))</td>
<td>500mg</td>
<td>1 t.i.d.</td>
</tr>
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**ALLERGIES:** NKA
All medication orders at RACF and GP were categorised as:

1. **Omissions** - appeared on the RACF medication chart but was not present on the GP’s practice record

2. **Additions** – appeared on the GP’s practice record but was not present on the RACF medication chart

3. **Dose differences** - the same medicine appeared in both locations but had a different total daily dose

4. **Matches** - the same medicine appeared in both locations with the same total daily dose
High Risk Discrepancies flagged

Eg Warfarin, aspirin, opioids, diuretics, antibiotics, beta-blockers, methotrexate, insulin, NSAIDS, anti-epileptics...

- Expert review group (GP, pharmacists - literature)

- Higher potential for harm for older people, adverse events
GRACE-Med results

GP PARTICIPANT CHARACTERISTICS

- 31 GPs – 52% male; 48% female
- 21 general practices – 90% eHealth ready

- Average length of time treating nursing home patients – 25 years
Most GPs prescribed electronically when they returned to the practice, or left a hand-written script at RACF
GRACE-Med results

RESIDENT CHARACTERISTICS

203 residents from 53 RACFs

RACFs by level of care:
- 55% Mixed
- 32% High
- 13% Low

Residents by level of care:
- 62% Mixed
- 29% High
- 9% Low
GRACE-Med results

CLINICAL INFORMATION SYSTEMS AT THE RACF

Range of programs, with different versions in use at RACFs (eg MyHR capability)

RACF systems in use don’t support a GP altering medication at the RACF with electronic decision support
5091 medication orders

- 385 different medicines
- At RACF, ranged from 1 to 38 (average 12.9)
- At GP, ranged from 1 to 33 (average 12.2)
GRACE-Med results

ALL MEDICATION ORDER DISCREPANCIES AND MATCHES

Altogether there were **5091 medication orders**

**55% DISCREPANCIES**
**45% MATCHES**

- **N = 2307** All matches
- **N = 1535** All dose differences
- **N = 690** RACF and GP
- **N = 559** GP Additions
- **N = 559** RACF Omissions
GRACE-Med results

AVERAGE % OF DISCREPANCIES PER RESIDENT

- Matches RACF: 38.7%
- Dose Differences RACF: 23.1%
- Omissions at RACF: 21.7%
- Additions at Practice: 16.5%
GRACE-Med results

PERFECT MATCHES AND ABSOLUTE MISMATCHES

- 6 (3%) of 203 residents were perfectly matched between their RACF medication chart and their GP’s practice record

- 14 (7%) had no matched medication orders between the RACF chart and GP practice record
140 (69.0%) residents experienced some form of high risk discrepancy

78 unique medications (classified by ATC code Level 5) were categorised as high risk

Of the total set of 2784 discrepancies, 611 (21.2%) were noted to involve high risk medications
35.5% of residents had an allergy mismatch
GRACE-Med results

MEDICATION CONCORDANCE SCORE

No. of matched medication orders on the RACF chart

\[ \times 100 \]

All medication orders on RACF chart + Additions on the GP record
This score represented how ‘well matched’ a resident was, and ranged from 0 (no match) to 100 (perfect match).

Average of 38.7 (SD 25.2) and median of 35.7 (IQR 35.36).
GRACE-Med results

LIST OF FACTORS THAT WE STUDIED

- We grouped the residents into four quartiles according to their medication concordance scores.
- We looked at the following factors to see if there was any association with:
  - Total number of medication orders at the RACF
  - Proportion of High Risk discrepancies per resident
  - Age of residents
  - Gender of RACF resident
  - Difference in allergies recorded by GP and RACF
  - Number of beds at the resident’s RACF
  - Level of care provided at the RACF
  - Number of FTE GPs at the resident’s GP practice
  - Number of half day sessions worked by GPs
  - Type of software used by resident’s GP practices
Having a GP working in a larger practice group (7 or more FTE doctors) raised the odds of having a medication concordance score lower than the median (OR 2.3, 95% CI 1.1-4.7)

This means residents with GPs in a practice of 7 or more were more likely to be poorly matched.
Having a greater proportion of high risk discrepancies raised the odds of having a medication concordance score lower than the median (OR 3.3, 95% CI 1.8-6.1)

This means residents with a greater % of high risk discrepancies were more likely to be poorly matched
GRACE-Med results
CHARACTERISTICS ASSOCIATED WITH POORER MEDICATION CONCORDANCE SCORES

- Residing in a high care facility lowered the odds of having a medication concordance score lower than the median (OR 0.4, 95% CI 0.2-0.9)
- This means you were less likely to be poorly matched if you lived in a high care facility
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GP REASONS FOR DISCREPANCIES

- 72% of discrepancies were unintentional
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GP PLANNED FOLLOW UP ACTIONS – ALL DISCREPANCIES

![Bar chart showing planned actions with highest count for Update practice record]

- Update practice record
- Update RACF record
- No action
- Other
- No response

Number of responses
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GP REASONS FOR DISCREPANCIES

- Practice records not updated after a change – time pressures, memory
- OTC medications not included in practice records as pharmacy didn’t require a script
- Practice software used solely for generating scripts, not considered a source of truth
- RACF charts treated as source of truth
- Convenience of having non-regular ‘favourites’ in the practice list
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GP FEEDBACK – RACF DIGITAL HEALTH NEEDS

GP feedback indicated a need for:

- Remote access to RACF records from the practice
- Integrated, interoperable software between their practice and the RACF
- Improved support using eHealth tools (such as secure messaging, and education about using My Health Record)
GRACE-Med Study - summary

KEY FINDINGS: BASELINE STUDY TO DEFINE THE ISSUE

- Current software (GP and RACF CIS) does not support GP workflow within RACFs for medication management
- There are significant medication record differences for the vast majority of people between RACF and GP systems
- These include a significant proportion of high risk medicines
- The incorrect medication data is sitting in the system that is being used to share primary care data with My Health Record, generate referrals, and generate new prescriptions using inaccurate allergy information and inaccurate interaction checking decision support

RACF residents are at risk of patient harm

Our ability to electronically communicate RACF resident’s medicine information accurately is greatly impaired
GRACE-Med study

QUESTIONS?

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Macquarie University