A pharmacist-led IT intervention to reduce PIP: the PINCER trial

Dr Sarah Rodgers
Senior Research Fellow, University of Nottingham
A cluster randomised trial comparing the effectiveness of a pharmacist-led IT-based intervention with simple feedback in reducing rates of clinically important errors in medicines management in general practices.
Main research question

Is a pharmacist-led IT-based complex intervention using educational outreach and practical support more effective than simple feedback in reducing rates of clinically important errors in medicines management in general practice?
Overview

• The study involved at-risk patients in 72 general practices who were being prescribed drugs that are commonly and consistently associated with medication errors.

• These included the prescription of NSAIDs and beta blockers, and the monitoring of ACE inhibitors or loop diuretics, methotrexate, lithium, warfarin, and amiodarone.
Cluster randomised trial

72 General Practices consented into the study

Simple feedback
Computer-generated feedback on patients at potential risk from hazardous prescribing (n=36)

Pharmacist-led intervention
Simple feedback plus educational outreach and dedicated support to correct and prevent potentially hazardous prescribing (n=36)
PINCER findings

- At 6-months follow-up patients in the PINCER group were
  - 42% less likely to have been prescribed a nonselective NSAID if they had a history of peptic ulcer without gastroprotection
  - 27% less likely to be given a beta blocker if they had asthma
  - Almost 50% less likely to be prescribed an ACE inhibitor or loop diuretic without appropriate monitoring
  - The intervention also improved composite prescribing and monitoring outcomes

- Using GP computer systems to identify patients at risk, combined with a pharmacist intervention, can substantially reduce medication errors

- There was evidence that the intervention was cost-effective

- The intervention could be rolled out across NHS at low cost to reduce prescribing errors
What next after PINCER?

• We are involved in a substantial body of research that is having an influence on policy and practice

• We now have a great opportunity to develop things further through current opportunities

• PINCER was “proof of principle”

• In terms of taking the PINCER work forward, we now want to focus on:
  - Rollout of the PINCER prescribing safety indicators
  - Which prescribing safety indicators are the most important/most cost-effective
  - Whether the PINCER approach reduces morbidity
Rollout of PINCER indicators

Stage 1: Update PINCER indicators and make them available to general practices in England

- We have worked with Primary Care Information Services (PRIMIS) to update the MIQUEST computer queries used in the PINCER trial and have made them available to general practices in England through the PRIMIS Query Library

- We have developed web-based general practice/CCG views of aggregated anonymised patient level data using CHART online
### PINCER QUERY SET

**PEPTIC ULCER, NSAID AND PPI**

<table>
<thead>
<tr>
<th>PATIENTS AT RISK</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FURTHER DETAILS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Patients aged 18 or over with a Peptic Ulcer Reed code that is dated over 8 months ago. (All these patients can be seen on the list)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Prescribed NSAID in the last 6 months</strong></td>
<td>339</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2.06%</td>
</tr>
<tr>
<td><strong>Not prescribed NSAID in the last 6 months</strong></td>
<td>332</td>
</tr>
<tr>
<td>equals</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>Of which</strong></td>
<td>97.94%</td>
</tr>
<tr>
<td><strong>Prescription of PPI dated within the last 6 months</strong></td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2.06%</td>
</tr>
<tr>
<td><strong>No prescription of PPI dated within the last 6 months</strong></td>
<td>256</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1.17%</td>
</tr>
</tbody>
</table>

These patients can be identified by using preset filter 1 on the datasheet.

| Patients with Peptic Ulcer AND who have no prescription of PPI in the last 6 months. | 256 |
| Of which have a prescription for NSAID in the last 6 months. | 3 |
| Percentage | 1.17% |
General practice/CCG view

PINCER Results - all practices in NHS South Weatherfield CCG
(Currently registered patients only)

Peptic ulcer, NSAID and PPI

Patients at risk (percent)

- At risk
- CCG average

Click on a bar to see results for all PINCER queries for one practice

PINCER Results - all Queries
(Currently registered patients only)

My GP Surgery
NHS South Surgery Weatherfield CCG

View as table

Patients at risk (percent)

- At risk
- CCG average

Click on a bar to see results for all practices in NHS South Weatherfield CCG
### PINCER Results - all queries

(Currently registered patients only)

**GP Surgery 1**  
NHS South Weatherfield CCG

<table>
<thead>
<tr>
<th>PINCER Query</th>
<th>Patients at risk</th>
<th>Percent at risk</th>
<th>Trend</th>
<th>CCG Average</th>
<th>Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peptic ulcer, NSAID and no PPI</td>
<td>3</td>
<td>3.8</td>
<td>↓</td>
<td>5.4</td>
<td>1</td>
</tr>
<tr>
<td>Asthma (all) and β-blockers</td>
<td>47</td>
<td>2.9</td>
<td>↓</td>
<td>3.1</td>
<td>1</td>
</tr>
<tr>
<td>Asthma (unresolved) and β-blockers</td>
<td>47</td>
<td>2.9</td>
<td>↓</td>
<td>3.1</td>
<td>1</td>
</tr>
<tr>
<td>ACEI, loop diuretics and no monitoring</td>
<td>8</td>
<td>2.2</td>
<td>↓</td>
<td>13.2</td>
<td>1</td>
</tr>
<tr>
<td>Thrombosis and CHC</td>
<td>1</td>
<td>0.4</td>
<td>-</td>
<td>0.3</td>
<td>3</td>
</tr>
<tr>
<td>Methotrexate and no FBC</td>
<td>0</td>
<td>0.0</td>
<td>-</td>
<td>11.5</td>
<td>1</td>
</tr>
<tr>
<td>Methotrexate and no LFTs</td>
<td>2</td>
<td>6.5</td>
<td>↓</td>
<td>17.6</td>
<td>1</td>
</tr>
<tr>
<td>Warfarin and no INR</td>
<td>1</td>
<td>0.8</td>
<td>-</td>
<td>29.1</td>
<td>1</td>
</tr>
<tr>
<td>Lithium and no level recording</td>
<td>5</td>
<td>29.4</td>
<td>↑</td>
<td>34.0</td>
<td>1</td>
</tr>
<tr>
<td>Amiodarone and no TFTs, no thyroxine</td>
<td>2</td>
<td>40.0</td>
<td>↓</td>
<td>48.8</td>
<td>2</td>
</tr>
<tr>
<td>Amiodarone and no TFTs, with thyroxine</td>
<td>2</td>
<td>40.0</td>
<td>↓</td>
<td>39.0</td>
<td>2</td>
</tr>
</tbody>
</table>
Rollout of PINCER indicators

Stage 2: Develop further query libraries

- We are working with PRIMIS to develop further query libraries based on 56 RAND approved prescribing safety indicators developed for the RCGP

- We have conducted an E-Delphi exercise to identify potential harm and likelihood of hazardous prescribing for the 56 indicators

- We have identified 15 of the most important indicators (in terms of severity and frequency) from this exercise (PINCER+)
Rollout of PINCER indicators

Stage 3: Pilot the prescribing safety indicator query libraries

- We are about to start piloting the acceptability, technical feasibility, reliability, and validity of the prescribing safety indicators in one Clinical Commissioning Group (CCG)

- We plan to explore the prevalence of “at-risk” patients for the 15 most important RCGP indicators using an analysis of the QResearch database

- We are collaborating with the University of Manchester to apply the prescribing safety indicators in the Salford integrated (primary & secondary care) healthcare dataset and Clinical Practice Research Datalink (CPRD)

- We are working with PRIMIS to facilitate a PINCER rollout in N. Ireland
Rollout of PINCER indicators

Stage 4: Economic modelling

- We have just received further funding from the NIHR School for Primary Care Research to model the cost effectiveness of different prescribing safety indicators to identify those indicators that are likely to be the most cost-effective
PINCER resources

- eLearning materials developed as a result of the PINCER study: [http://www.pulse-learning.co.uk/commissioning-modules/commissioning/how-we-reduced-prescribing-errors-with-pharmacists-support](http://www.pulse-learning.co.uk/commissioning-modules/commissioning/how-we-reduced-prescribing-errors-with-pharmacists-support)


- Rodgers S. Five steps to reducing prescribing errors using PINCER. Pulse Today 12 February 2013 [http://www.pulsetoday.co.uk/your-practice/practice-topics/it/-five-steps-to-reducing-prescribing-errors-using-pincer/20001835.article](http://www.pulsetoday.co.uk/your-practice/practice-topics/it/-five-steps-to-reducing-prescribing-errors-using-pincer/20001835.article)

Further work

- PINCER indicators embedded into the ECLIPSE Live software
- Draws uploads from GP systems overnight
- Stores anonymised data on eclipse
- Allows medicines management to get live prescribing data
- Allows feedback on hazardous prescribing
- Has the ability to link primary and secondary care data
- We have just been successful in obtaining funding to carry out an evaluation of ECLIPSE software in 1 CCG
Programme of work for next 6-12 months

- QRESEARCH/CPRD studies to explore error prevalence
- Apply for NIHR programme grant or funding for a large trial to test whether PINCER reduces morbidity
- Evaluation of ECLIPSE Live
- Work with PRIMIS to develop new Rx Query Libraries
- Investigating 1st and 2nd care data linkage to investigate morbidity
- Economic models to identify most cost effective Rx indicators
- Pilot PINCER+ Rx Query Library in one CCG
Thank you for listening

For further information please visit our website:
http://www.nottingham.ac.uk/research/groups/medicinesafetyeffectivehealthcare/index.aspx

Or contact:

Dr Sarah Rodgers
Sarah.rodgers@nottingham.ac.uk

Professor Tony Avery
tony.avery@nottingham.ac.uk