Background

- Spirometry is recommended in guidelines for diagnosis and management of COPD and Asthma.
- Uptake of spirometry has been low in Australia, even though ownership of spirometers is high.
- Quality of spirometry performed is generally poor.
- Barriers to performing spirometry in general practice –
  - cost of new equipment and low level of reimbursement
  - lack of time for adequate training
  - GPs lacking confidence in their ability to interpret
  - greater emphasis on clinical information

Need for Spirometry

“When presented with interpreted spirometry results, GPs usually make the appropriate diagnostic and treatment decisions. However, the problem remains: who is going to do all of these spirometry tests, when and where?”

Enright P. Thorax 2008; 63:387-8

Current Evidence –

- Eaton et al (NZ) - Spirometry in primary care practice: the importance of quality assurance and the impact of spirometry workshops – Chest 1999
- Witt et al (US) for US Agency for Healthcare Research and Quality – Use of spirometry for case finding, diagnosis and management of COPD – 2005
- Postje Schermmer et al (Netherlands) – General practitioners’ needs for ongoing support for the interpretation of spirometry tests – Eur Respir J 2007
- Yawn, Enright et al (US) 2007 – Spirometry can be done in family physicians’ offices and alters clinical decisions in management of asthma and COPD – Chest 2007
- Walens et al (Aust) – a mixed methods study to compare models of spirometry delivery in primary care for patients at risk of COPD – Thera 2009
Aim of the Study

To critically examine the impact of the measurement of airflow obstruction, using spirometry*, on the management of asthma in adults and children

* i.e. consistent and informed use of standardised spirometry measurement by properly trained primary care health professionals

Hypotheses

- That, compared to asthma patients managed with usual care in general practice, patients managed with regular spirometry will show better health outcomes - both for adults (aged 18+) and children (aged 7-17)
- That there will be an improvement in process-of-care measures for both children and adults
- That the training in and use of spirometry will be acceptable to and valued by the patients, GPs and staff in general practice
- That the performance of quality spirometry can be cost-effective for practices

Study Design & Sample Size

- cluster randomised controlled trial
- randomisation at the practice level
- target of 50 practices in SA and Tas – actual number 40, with 23 urban and 17 rural
- target of 1000 patients - actual number 560
- 397 adults (240 intervention; 157 control) and 163 children (112 intervention; 51 control)

Selected Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>Adults (n=397)</th>
<th>Children (n=163)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (mean; std dev)</td>
<td>56.7 (15.5)</td>
<td>12.0 (2.7)</td>
</tr>
<tr>
<td>Gender (% female)</td>
<td>47.9%</td>
<td>41.1%</td>
</tr>
<tr>
<td>Country of birth (% Australian born)</td>
<td>82.6%</td>
<td>97.8%</td>
</tr>
<tr>
<td>Smoking status (% never smoked)</td>
<td>53.9%</td>
<td>96.8%</td>
</tr>
<tr>
<td>Rating of asthma severity (% mod/sev)</td>
<td>31.8%</td>
<td>32.5%</td>
</tr>
<tr>
<td>Rating of asthma control (% good/v.good)</td>
<td>72.9%</td>
<td>76.7%</td>
</tr>
<tr>
<td>Most common co-morbidities</td>
<td>Hypertension &amp; Osteoarthritis</td>
<td>RTIs &amp; Eczema</td>
</tr>
</tbody>
</table>

The Intervention

- GPs and practice nurses in the intervention practices were offered comprehensive training in the performance and interpretation of spirometry, as well as follow-up support
- 2 intervention groups - 13 practices offered 2 hrs training and 13 practices offered 6 hrs training
- Training undertaken by 84 GPs and 33 practice nurses from 22 of the 26 intervention practices
- Incentives of QA/CME points (for GPs who did 6 hrs training), and nominal payment for each patient recruited to the study

Data Collection & Analysis

- Patient data collected at baseline, 6 mths and 12 mths
- Research nurses performed spirometry
- Patient questionnaires on demographics, past history and current asthma symptoms
- Patient questionnaires on quality of life (Juniper’s AQLQ)
- Case note audit
- Questionnaires for GPs and practice nurses
- All analyses adjusted for clustering, covariates (asthma severity) and multiple comparisons
Results – Health Outcomes – Adults, 12 months

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n=194)</th>
<th>Control (n=129)</th>
<th>Adjusted Mean Diff (p values) or Rate Ratio (conf intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Life (max 7)</td>
<td>5.38</td>
<td>5.59</td>
<td>MD = -0.225 (p = 0.152)</td>
</tr>
<tr>
<td>Days off work</td>
<td>19.7%</td>
<td>14.0%</td>
<td>RR = 1.52 (0.91, 2.54)</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>43.5%</td>
<td>41.1%</td>
<td>RR = 1.19 (0.85, 1.61)</td>
</tr>
<tr>
<td>Weekly asthma on waking</td>
<td>25.4%</td>
<td>20.9%</td>
<td>RR = 1.21 (0.79, 1.85)</td>
</tr>
<tr>
<td>Weekly nocturnal asthma</td>
<td>20.3%</td>
<td>21.7%</td>
<td>RR = 0.96 (0.63, 1.51)</td>
</tr>
<tr>
<td>Post-broncho FEV1/FVC</td>
<td>0.71</td>
<td>0.72</td>
<td>MD = 0.006 (p = 1.000)</td>
</tr>
</tbody>
</table>

Results – Health Outcomes – Children, 12 months

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n=79)</th>
<th>Control (n=41)</th>
<th>Adjusted Mean Diff (p values) or Rate Ratio (conf intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Life (max 7)</td>
<td>6.06</td>
<td>6.24</td>
<td>MD = -0.312 (p = 0.570)</td>
</tr>
<tr>
<td>Days off school</td>
<td>22.8%</td>
<td>12.2%</td>
<td>RR = 1.64 (0.63, 4.31)</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>21.5%</td>
<td>22.0%</td>
<td>RR = 0.84 (0.40, 1.74)</td>
</tr>
<tr>
<td>Weekly asthma on waking</td>
<td>26.5%</td>
<td>14.6%</td>
<td>RR = 1.88 (0.50, 2.86)</td>
</tr>
<tr>
<td>Weekly nocturnal asthma</td>
<td>16.5%</td>
<td>12.2%</td>
<td>RR = 0.76 (0.21, 2.75)</td>
</tr>
</tbody>
</table>

Changes in QOL over time

Results – Process of Care – Adults, 12 Months

<table>
<thead>
<tr>
<th>Performance of spirometry at least 6 monthly</th>
<th>Intervention (n=112)</th>
<th>Control (n=61)</th>
<th>Adjusted Rate Ratio (conf intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.4%</td>
<td>4.9%</td>
<td>1.32 (0.23, 5.98)</td>
</tr>
</tbody>
</table>

Results – Process of Care – Children, 12 Months

<table>
<thead>
<tr>
<th>Performance of spirometry at least 6 monthly</th>
<th>Intervention (adult n = 194, child n = 79)</th>
<th>Control (adult n = 129, child n = 41)</th>
<th>Adjusted Mean Difference (p values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADULT acceptability: 0.81</td>
<td>0.81</td>
<td>-0.01 (p = 1.00)</td>
</tr>
<tr>
<td></td>
<td>ADULT usefulness: 0.76</td>
<td>0.74</td>
<td>0.014 (p = 1.00)</td>
</tr>
<tr>
<td></td>
<td>CHILD acceptability: 0.87</td>
<td>0.89</td>
<td>-0.009 (p = 1.00)</td>
</tr>
<tr>
<td></td>
<td>CHILD usefulness: 0.83</td>
<td>0.79</td>
<td>0.042 (p = 1.00)</td>
</tr>
</tbody>
</table>
investigate better ways of targeting patients most likely to benefit from spirometry.

- Look at developing other simpler methods of measuring lung function.

### Results - Comments from 86 GPs & nurses

- Majority found training useful, comprehensive and long enough.
- Need for follow-up in 3-6 months was suggested.
- 50% felt they had increased their use of spirometry.
- Practice nurse usually performs spirometry, then patient sees GP immediately (88% of responses).
- GP usually does the interpretation (85% of responses).

- Many barriers still remain to using it regularly in the practices:
  - slow, space, workflow
  - no reimbursement
  - lack of confidence
  - quality control, on-going training
  - patient reluctance

### Limitations of Study

- For children, it was not sufficiently powered to provide evidence of a difference – barriers to child recruitment are a major concern, with implications for paediatric asthma management.
- As all practices received notification of abnormal spirometry results from the researchers, this may have impacted on their decision to do spirometry themselves.
- 2 different trainers were used in TAS and SA.
- Majority of control practices (10/14) were from TAS – many involved in previous studies related to spirometry, so “usual care” may have been biased.
- Study focused on use of spirometry for management of asthma – does not relate the advice to use it for diagnosis.

### Conclusions

- No clear evidence whether length of training makes a difference.
- Negative outcome of the study is important to report.

### Implications for Policy and Practice

- Research benefits of managing according to symptoms vs managing to spirometry.
- Investigate better ways of targeting patients most likely to benefit from spirometry – e.g. poorly controlled, non-adherent.
- Consider alternative methods for funding practice nurses trained in spirometry – e.g. interprofessional chronic disease team numbers.
- Explore alternative approaches to service delivery – e.g. specialist GPs in a region, primary care spirometry labs.
- Look at developing other simpler methods of measuring lung function – e.g. measures of airflow resistance.

### Policy and Practice

“have strengthened capacity and increased policy-relevant knowledge, but primary health care researchers and policymakers need to work much more closely together if evidence is to contribute to decision making.”

Mays N. MJA 2008; 8: s44-s45.
Links between Research, Policy and Practice

1. Primary Care Research Capacity Building
2. Grant Success
3. Completed Policy-related Study
4. Policy Changes
5. Robust Evidence-based Primary Care

Thank you
Questions