Spirometry training for GPs and practice nurses: is it feasible and beneficial to asthma patients?

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Spirometry and Asthma Management in Children and Adults in General Practice

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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 re-imbursement
  - lack of time for adequate training
  - GPs lacking confidence in their ability to interpret
  - greater emphasis on clinical information

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- Current Evidence –
  - Eaton et al (NZ) - Spirometry in primary care practice: the importance of quality assurance and the impact of spirometry workshops – *Chest 1999*
  - Wilt et al (US) for US Agency for Healthcare Research and Quality – Use of spirometry for case finding, diagnosis and management of COPD - *2005*
  - Poels, Schermer et al (Netherlands) – General practitioners' needs for ongoing support for the interpretation of spirometry tests – *Eur J Gen Prac 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*
  - Walters et al (Aust) – a mixed methods study to compare models of spirometry delivery in primary care for patients at risk of COPD – *Thorax 2008*

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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

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Why is Valid Spirometry important?

- Poorly performed spirometry leads to misinterpretation of the results
- Key measurements –
  - FORCED VITAL CAPACITY (FVC)
    Maximal volume of air exhaled with maximal forced effort from a position of maximal inspiration, expressed in litres (BTPS)
  - FORCED EXPIRATORY VOLUME (FEV_t)
    The volume of air exhaled in the specified time during the performance of the FVC, e.g. FEV_1 is the volume of air exhaled during the first second of the FVC, expressed in litres (BTPS)
- Spirometry testing requires maximal subject participation and an astute operator who can coach the patient to achieve this

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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 practices
- 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

	Adults (n=397)	Children (n=163)
Age in years (mean; std dev)	56.7 (15.5)	12.0 (2.7)
Gender (% female)	67.5%	41.7%
Country of birth (% Australian born)	82.6%	97.6%
Smoking status (% never smoked)	53.9%	98.8%
Rating of asthma severity (% mod/sev)	31.8%	32.5%
Rating of asthma control (% good/v.good)	72.9%	76.7%
Most common co-morbidities	Hypertension & Osteoarthritis	RTIs & Eczema

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

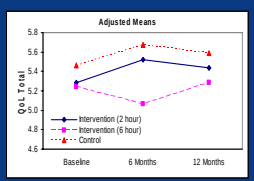
Results – Health Outcomes – Adults, 12 months

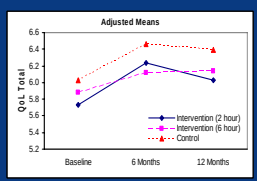
	Intervention (n=194)	Control (n=129)	Adjusted Mean Diff (p values) or Rate Ratio (conf intervals)
Quality of Life (max 7)	5.38	5.59	MD = -0.225 (p = 0.152)
Days off work	19.7%	14.0%	RR = 1.52 (0.91, 2.54)
Exacerbations	43.5%	41.1%	RR = 1.09 (0.85, 1.41)
Weekly asthma on waking	25.4%	20.9%	RR = 1.21 (0.79, 1.85)
Weekly nocturnal asthma	20.3%	21.7%	RR = 0.98 (0.63, 1.51)
Post-broncho FEV1/FVC	0.71	0.72	MD = -0.005 (p = 1.000)

Results – Health Outcomes – Children, 12 months

	Intervention (n=79)	Control (n=41)	Adjusted Mean Diff (p values) or Rate Ratio (conf intervals)
Quality of Life (max 7)	6.06	6.24	MD = -0.312 (p = 0.570)
Days off school	22.8%	12.2%	RR = 1.64 (0.63, 4.31)
Exacerbations	21.5%	22.0%	RR = 0.84 (0.40, 1.74)
Weekly asthma on waking	16.5%	14.6%	RR = 1.19 (0.50, 2.86)
Weekly nocturnal asthma	16.5%	12.2%	RR = 0.76 (0.21, 2.75)
Post-broncho FEV1/FVC	0.84	0.85	MD = -0.013 (p = 1.000)

Changes in QOL over time





ADULTS

CHILDREN

Results – Process of Care – Adults, 12 Months

	Intervention (n=240)	Control (n=157)	Adjusted Rate Ratio (conf intervals)
Performance of spirometry at least 6 mthly	7.7%	8.5%	0.93 (0.43, 1.99)
Planned asthma GP visits as percentage of total asthma visits	7.1%	2.8%	N/A (nos. too small)
Written asthma action plan prepared or reviewed	N/A (nos. too small)	N/A (nos. too small)	N/A

Results – Process of Care – Children, 12 Months

	Intervention (n=112)	Control (n=51)	Adjusted Rate Ratio (conf intervals)
Performance of spirometry at least 6 mthly	7.4%	4.9%	1.23 (0.25, 5.98)
Planned asthma GP visits as percentage of total asthma visits	13.8%	22.0%	0.64 (0.25, 1.60)
Written asthma action plan prepared or reviewed	2.4%	5.0%	0.52 (0.09, 3.08)

Results – Acceptability by patients, 12 Months

	Intervention (adult n = 194, child n = 79)	Control (adult n = 129, child n = 41)	Adjusted Mean Difference (p values)
ADULT acceptability	0.81	0.81	-0.010 (p = 1.00)
ADULT usefulness	0.76	0.74	0.014 (p = 1.00)
CHILD acceptability	0.87	0.89	-0.009 (p = 1.00)
CHILD usefulness	0.83	0.79	0.042 (p = 1.00)

Results – Comments from 86 GPs & nurses

- Majority found training useful, comprehensive and long enough
- Need for follow-up in 3-6 months time was suggested
- 50% felt they had increased their use of spirometry
- Practice nurse usually performs spirometry, then patient sees GP immediately (66% of responses)
- GP usually does the interpretation (85% of responses)

Results – Comments from 86 GPs & nurses

- Many barriers still remain to using it regularly in the practices
  - time, space, workflow
  - re-imbursement
  - lack of confidence
  - quality control, on-going training
  - patient reluctance

Limitations of Study

- for the 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 refute the advice to use it for diagnosis

Conclusions

- No evidence generally that training of GPs and nurses in spirometry makes a difference to patient health outcomes
- No clear evidence whether length of training makes a difference:
  - Assessment of quality of spirometry printouts suggests 6 hr training leads to better performance than 2 hrs (5/8 practices scored 12 or more out of 15 compared to 4/12). Interpretation accuracy was not assessed
  - No statistically significant differences in individual outcomes
  - No apparent differences in level of GP changes in management
- Negative outcome of the study is important to report

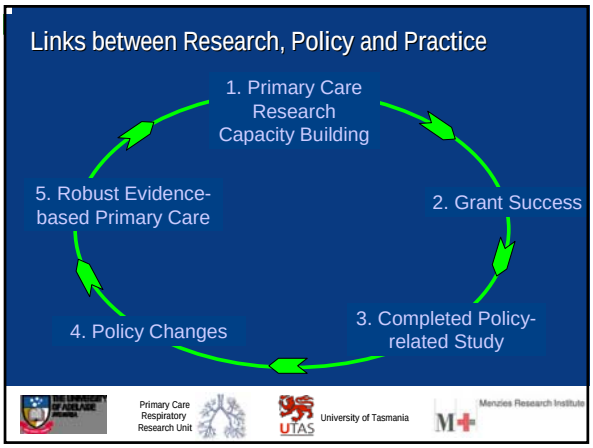
Implications for Policy and Practice

- research benefits of managing according to symptoms vs managing to spirometry
- investigate better ways of targetting 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. integrated respiratory chronic disease item 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 airways 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
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Thank you
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