

Online supplementary Table S5b

QUESTION

Can PEF variability testing help diagnose asthma in adults with episodic/chronic suggestive symptoms?	
POPULATION:	Population of adults (>18 yrs old) with diagnostic uncertainty of asthma
INDEX TEST:	PEFR
GOLD STANDARD	1. Bronchodilation > 12% AND > 200 ml improvement 2. Airway hyperresponsiveness: PC20 < 16 mg/ml (or 8 mg/ml) of Methacholine (or Histamine) or PD mannitol < 625 mg or fall in FEV ₁ > 10% after exercise

ASSESSMENT

Test accuracy		
How accurate is the test?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Very inaccurate <input type="radio"/> Inaccurate <input type="radio"/> Accurate <input type="radio"/> Very accurate <input checked="" type="radio"/> Varies <input type="radio"/> Don't know	Low sensitivity ranging from 0.05, 0.1, 0.12, 0.45, 0.93 (in retrospective secondary care) High specificity: 0.93-1.00 Accuracy and reliability of home recording unclear.	Completion rates around 50% in Goldstein study
Desirable Effects		
How substantial are the desirable anticipated effects?		
JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Trivial <input type="radio"/> Small <input type="radio"/> Moderate <input checked="" type="radio"/> Large <input type="radio"/> Varies	High PPV, but low NPV. So if positive as a first test, then highly desirable	

○ Don't know		
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Undesirable Effects

How substantial are the undesirable anticipated effects?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Large ○ Moderate ○ Small X Trivial ○ Varies ○ Don't know 	<p>No direct undesirable effects.</p> <p>Discuss a bit about the impact of FALSE NEGATIVES (perhaps not very relevance if PEFR is part of a diagnostic algorithm and interpreted together with other tests with better sensitivity)</p> <p>Discuss a bit about the impact of FALSE POSITIVES (may lead to over-treatment)</p>	

Certainty of the evidence of test accuracy

What is the overall certainty of the evidence of test accuracy?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Very low X Low ○ Moderate ○ High ○ No included studies 	<p>Low Quality of Evidence</p>	

Certainty of the evidence of management's effects

What is the overall certainty of the evidence of effects of the management that is guided by the test results?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Very low ○ Low ○ Moderate X High ○ No included studies 	<p>If positive – higher certainty of asthma</p> <p>If negative – does not rule out asthma</p>	

	This question is related to the certainty about asthma treatment (i.e which is the overall certainty of asthma treatments?)	
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Certainty of the evidence of test result/management

How certain is the link between test results and management decisions?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Very low <input type="radio"/> Low <input type="radio"/> Moderate <input checked="" type="radio"/> High <input type="radio"/> No included studies	If positive – then management of asthma can be started in primary care. No further testing required.	

Balance of effects

Does the balance between desirable and undesirable effects favor the intervention or the comparison?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<input type="radio"/> Favors the comparison <input checked="" type="radio"/> Probably favors the comparison <input type="radio"/> Does not favor either the intervention or the comparison <input type="radio"/> Probably favors the intervention <input type="radio"/> Favors the intervention <input type="radio"/> Varies <input type="radio"/> Don't know	<p>There are no harms of PEFR, so if PEFR is performed and the test is positive, then this is highly desirable.</p> <p>Is not consistent with the draft recommendation AGAINST the intervention. If the overall balance favors the intervention, some of the following criteria should go really against the intervention</p>	

Resources required

How large are the resource requirements (costs)?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
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<ul style="list-style-type: none"> ○ Large costs ○ Moderate costs ○ Negligible costs and savings X Moderate savings ○ Large savings ○ Varies ○ Don't know 	<p>No research evidence identified.</p> <p>Some considerations here are related to feasibility these care additional considerations. PEFR is cheap, can be performed in all resource setting, whereas BdR/Bronchial Challenge is not easily universally available, and is more costly to perform.</p> <p>BdR alone feasible in primary care – quicker diagnosis, but requires spirometry, salbutamol, nurse to perform, interpretation training.</p> <p>Bronchial challenge not feasible in primary care.</p>	<p>In those with airflow obstruction or reduction in FEV₁ – likelihood of diagnosing reversibility is greater.</p>
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Equity

What would be the impact on health equity?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ Reduced ○ Probably reduced ○ Probably no impact ○ Probably increased ○ Increased ○ Varies X Don't know 	<p>None Identified</p>	<p>PEFR requires self-monitoring / recording at home, compared to other tests it may generate inequities in low literacy population.</p> <p>However, there are other available tests not requiring self-monitoring / recording at home so there is probably no final impact if recommended</p>

Acceptability

Is the intervention acceptable to key stakeholders?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
<ul style="list-style-type: none"> ○ No ○ Probably no X Probably yes ○ Yes ○ Varies ○ Don't know 	<p>PEFR may become unrewarding, time consuming or anxiety provoking?</p> <p>Some patients may prefer to undergo BdR over 15 mins than to do PEFR at home for 2 weeks and then come back for re-assessment. Risk of not performing correctly or not completing.</p>	<p>Clinicians and people involved in decision-making are also key stakeholders that may have something to say with regards to acceptability</p>

Feasibility

Is the intervention feasible to implement?

JUDGEMENT	RESEARCH EVIDENCE	ADDITIONAL CONSIDERATIONS
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<input type="radio"/> No <input type="radio"/> Probably no <input type="radio"/> Probably yes <input checked="" type="radio"/> Yes <input type="radio"/> Varies <input type="radio"/> Don't know	More feasible than Bronchial Challenge in primary care. No difference to BdR.	
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BdR: Bronchodilator reversibility; PEFr: Peak expiratory flow rate; NPV: Negative predictive value; PPV: Positive predictive value.

TYPE OF RECOMMENDATION

Strong recommendation against the intervention	Conditional recommendation against the intervention	Conditional recommendation for either the intervention or the comparison	Conditional recommendation for the intervention	Strong recommendation for the intervention
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CONCLUSIONS

Recommendation

The TF suggests not recording PEF variability as the primary test to make an asthma diagnosis (conditional recommendation against, low quality of evidence)

PEF may be considered if no other lung function test is available including spirometry and bronchial challenge

PEF should be monitored over a two--week period and a variation of >20% considered as supportive of asthma diagnosis

PEF variability <20% does not rule out asthma

PEF may be especially useful to support a diagnosis of occupational asthma

Justification

Results from studies on PEF variability demonstrate a highly variable sensitivity, with lower sensitivities in studies where the prevalence of asthma was low. Completion of accurate peak flow diaries was poor, with results as low as 50% in one study²⁶, challenging the reliability, accuracy and feasibility of home PEF recording. In the absence of spirometry defined obstruction and significant BDR, PEF can be monitored over a two-week period particularly if access to bronchial challenge is limited. In the context of a patient with symptoms suggestive of asthma, a positive PEF variability of >20%, that is reliably performed, has a high positive predictive value. Thus, PEF monitoring may be of higher value to diagnose asthma in patients with highly variable day-to-day symptoms, where variable airflow obstruction might be easily detected, or in patients with suspected occupational asthma. We caution that lack of PEF variability does not rule out asthma and further objective testing should be performed.