ORIGINAL ARTICLE

Change of pathology request forms can reduce unwanted requests and tests

J Bailey, A Jennings, L Parapia

Background: Developments in clinical and laboratory medical practice have resulted in a large increase in laboratory workload, with considerable financial implications. It has been shown that the design of laboratory request cards can influence patterns of test ordering and possibly reduce inappropriate requests.

Aims/Methods: To redesign pathology request cards with a view to reducing inappropriate test requesting.

Results: A redesign of the request cards used by general practitioners in the Bradford area led to a significant reduction in the ordering of specific investigations.

Conclusions: The redesigning of pathology request cards can have a beneficial effect on test requesting.

METHODS

Until the end of 1998, a request form that listed 16 different biochemical and immunological tests was in regular use (table 1). This form, which was used by both hospital and community doctors, had been developed to enable fast data inputting and test ordering in the laboratory using barcodes printed on the form next to tick boxes. The barcodes could be scanned with magic wands attached to the laboratory computers. The request forms used in the community served by Bradford Trust were redesigned and tests more appropriate for hospital use were removed. We set out to study the effect that changes to the design of our laboratory request cards had on patterns of test ordering within the local general practices.

The pathology service at Bradford Teaching Hospitals NHS Trust, in partnership with Leeds Teaching Hospitals NHS Trust, serves a population of approximately 500 000 in the Bradford area. The services support both hospital and community doctors. We reviewed the effect that changes to the design of our laboratory request cards had on patterns of test requesting within the local general practices.

RESULTS

The incidence rate ratio was calculated for each test studied (table 3). With the new form the request rate for calcium fell to an average of 38% of the original request rate when the old form was in use (fig 1). Serum LDH showed an even more dramatic fall to 21% of the original request rate (fig 2). The

Table 1 Tests listed until January 1999

<table>
<thead>
<tr>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea and electrolytes</td>
</tr>
<tr>
<td>Serum glucose</td>
</tr>
<tr>
<td>Blood glucose</td>
</tr>
<tr>
<td>HbA1c (glycated haemoglobin)</td>
</tr>
<tr>
<td>Renal</td>
</tr>
<tr>
<td>Hepatic</td>
</tr>
<tr>
<td>Cardiac</td>
</tr>
<tr>
<td>Cholesterol</td>
</tr>
<tr>
<td>Thyroid screen</td>
</tr>
<tr>
<td>Hypothyroid on treatment</td>
</tr>
<tr>
<td>Hypertension on treatment</td>
</tr>
<tr>
<td>Lipids</td>
</tr>
<tr>
<td>Chemotherapy</td>
</tr>
<tr>
<td>Rheumatoid factor</td>
</tr>
<tr>
<td>C reactive protein</td>
</tr>
<tr>
<td>Autoantibody screen</td>
</tr>
</tbody>
</table>

Abbreviations: CRP, C reactive protein; LDH, lactate dehydrogenase; NHS, National Health Service
reductions in request rate for rheumatoid factor and CRP were smaller but nevertheless highly significant at 73% and 70% of the original request rates, respectively. Table 3 shows the incidence rate ratio data. The rheumatoid factor requests showed a month on month growth rate of approximately 7% after they were removed from the form (fig 3). This is in keeping with our current overall increase in workload. CRP showed a significant decrease in the number of requests, although there has been a pronounced increase in the number of requests in the follow up period (fig 4). This may reflect the increasing use of CRP instead of the erythrocyte sedimentation rate.

**DISCUSSION**

Research, particularly in the Netherlands, suggests that request cards with multiple check boxes increase laboratory requests and discourage the rational ordering of investigations. Our study also supports the idea that multiple tick boxes can encourage excessive and probably inappropriate requesting, simply by offering a list of easily accessible tests that may not have been foremost in the clinician's mind. The continued increase in rheumatoid factor requests at the expected rate in our study suggests that their removal from the request cards did not have a deleterious effect on appropriate usage. These tests have specific indications and tend not to be treated as “profiles”.

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Our work also illustrates the importance of using clear labelling and explanations of the individual test components of a composite request. For example, ticking the “chemotherapy” profile on the original form actually ordered a serum urate, LDH, calcium, and urea and electrolytes. When this was removed, LDH testing underwent a large reduction. This probably reflects the highly ambiguous nature of profiles, which were originally included for perceived ease of use by clinicians and the laboratory.

In the cost conscious NHS, it is important that investigations are ordered in a rational and appropriate manner. Any change in the design of request cards should always be made with this in mind. Fortunately, the data available on influencing patterns of requesting are scanty. Zaat et al showed an 18.5% reduction in blood test requesting using a redesigned form. The benefit from this was lost as soon as

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**Table 2** Tests listed from January 1999

<table>
<thead>
<tr>
<th>Test</th>
<th>IRR</th>
<th>95% CI</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea and electrolytes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood glucose</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cholesterol</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lipids (cholesterol and triglycerides)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver function tests</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7Menopause</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Thyroid screen</td>
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<td></td>
<td></td>
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<tr>
<td>Thyroid on treatment</td>
<td></td>
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</tbody>
</table>

**Table 3** Incidence rate ratio (IRR) data

<table>
<thead>
<tr>
<th>Test</th>
<th>IRR</th>
<th>95% CI</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>0.38</td>
<td>0.37 to 0.39</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LDH</td>
<td>0.21</td>
<td>0.16 to 0.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RF</td>
<td>0.73</td>
<td>0.68 to 0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CRP</td>
<td>0.70</td>
<td>0.66 to 0.74</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

CI, confidence interval; CRP, C reactive protein; LDH, lactate dehydrogenase; RF, rheumatoid factor.
practitioners were allowed to revert to their original request form. Others have shown that education strategies can improve the rationality of test ordering in the short term, but without long-term feedback the effect is short lived.5 Smellie et al. showed how the development of coronary prevention patient categories could be used to encourage the rational and appropriate use of the laboratory investigation of lipid profiles.3 The effect of such strategies might produce a more durable change in clinical behaviour.

At a time when the NHS is becoming ever more cost conscious and competitive, there is a need to develop effective strategies for promoting rational and cost effective test requesting. Our study illustrates the significant effect that a change in request card design can have on the rate of test ordering.

ACKNOWLEDGEMENTS
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REFERENCES
1 Bird C. Shedding the shackles. Medical Laboratory Worker May 2003:13–17.

Take home messages
- We found that redesigning pathology request cards, in particular reducing the number of preprinted tests with check boxes, led to a reduction in inappropriate test requesting
- Requests for serum calcium, lactate dehydrogenase, rheumatoid factor, and C reactive protein all showed large reductions
- The continued increase in rheumatoid factor requests at the expected rate in our study suggests that their removal from the request cards did not have a deleterious effect on appropriate usage

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