Clinicians’ and laboratory medicine specialists’ views on laboratory demand management: a survey in nine European countries

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Abstract

Background: Laboratory tests are an essential aspect of current medical practice and their use has grown exponentially. Several studies however have demonstrated inappropriate use of laboratory testing. This inappropriateness can lead to delayed or wrong diagnosis, negatively impacting patient safety and an increase in health care expenditure. The aim of the present small-scale survey was to obtain information on the current status of demand management in European laboratories, as well as the opinions of laboratory and clinical professionals in this regard.

Methods: Two surveys were developed, one for laboratory specialists and one for clinicians, covering information on current use, knowledge and opinions on the possible impact of different demand management strategies on patient outcome and health care costs. Additionally, we asked for the current state and willingness on collaboration of laboratory specialists and clinicians.

Results: One hundred and fifty responses, 72 laboratory specialists and 78 clinicians, from nine countries were received. Developing local ordering protocols/profiles in collaboration with clinicians was the most used strategy (80.3% of laboratories). Of clinicians, 85.6% considered measures to ensure appropriate use of tests necessary and 100% were interested in advice/information about their indication. Of the laboratory specialists 97.2% were either already participating or willing to participate in multidisciplinary groups on the appropriateness of test demand as were 60.3% of clinicians, and 85.9% of clinicians were interested in attending activities about laboratory test demand management.

Conclusions: The results of our survey show that tools to improve the appropriate use of laboratory tests are already regularly used today. Laboratory medicine specialists as well as clinicians are willing to undertake additional shared activities aimed at improving patient-centered laboratory diagnostic workup.

Keywords: laboratory medicine; patient safety; preanalytical phase; test demand management.

Introduction

Diagnostic tests are an essential aspect of current medical practice and their use has grown exponentially over the past decades. The increase is due to both an increase in the number of routine laboratory test requests and the expansion of the repertoire of available tests including
analyses that require complex interpretation [1]. There is, however, a growing body of evidence that the use of laboratory testing has increased inappropriately in the past decades and that laboratory tests are too often considered a commodity. Several studies have demonstrated the inappropriate use of laboratory resources, which is often attributed to overutilization of laboratory resources, but also to their underutilization [2–4]. According to these investigations, the volume of inappropriate test ordering ranges between 5% and 95%, depending on the criteria used to define inappropriateness [3, 5–7]. On the other hand, failure to order required tests is far more frequent than maybe assumed, yet much harder to quantify. Investigations retrospectively evaluating physician reported errors or malpractice claims found that 44–55% of these cases were attributable to laboratory underuse [8, 9]. Both laboratory test underutilization and overutilization can lead to diagnostic errors and have a negative impact on patient safety, resulting in increased health care expenditure [10].

We recently reviewed the inappropriate use of laboratory resources concerning costs, reasons for inadequate demand, identification approaches, possibilities of improvement and the conditions required to succeed with these strategies [11]. In this review, the collaboration between clinicians and laboratory medicine specialists was identified as one of the key requirements for developing and successfully implementing demand management strategies.

As most published studies on laboratory demand management are approached from laboratory medicine specialists’ perspective and not from clinicians’ perspective [12–17], we sought the opinions and needs of both laboratory specialists and clinicians on this topic, along with learning more about if and how European laboratories are currently using demand management strategies as a mechanism to further define and understand the situation.

Therefore, the aim of the present small-scale survey was to obtain information on the current demand management situation in European laboratories, as well as the possible opinions of laboratory and clinical professionals in this regard.

Materials and methods

Two surveys were developed by the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) Working Group on Pre-analytical Phase (WG-PRE), the former for laboratory specialists and the latter for clinicians (doctors/physicians), covering information on general demographics, current use and opinions on possible impact of different demand management strategies on patient outcome and health care costs. Additionally, we asked for knowledge on laboratory costs as well as both the current state and willingness in collaboration between laboratory specialists and clinicians and for their opinion on the usefulness of demand management strategies. Finally, we asked for opinions on what influence laboratory medicine specialists, clinicians and/or hospital management should have on such strategies, and whether or not participants were interested in attending respective meetings or e-learning courses. All questions and respective answering options are summarized in Supplementary Table I.

Ethical approval was not required for this study. To perform the survey, an electronic survey tool was used (LimeSurvey; LimeSurvey GmbH, Hamburg, Germany). Questions were shown to or hidden from participants depending on their answers to previous questions.

Selected WG-PRE members, engaged in the topic of demand management, were asked to transmit the survey directly to laboratory specialists and clinicians, both in and outside hospitals, within their respective country.

Evaluation of results was performed using Microsoft EXCEL 2010 (Microsoft Corp, Redmond, WA, USA).

Results

A total of 150 responses from nine different countries (Austria, Belgium, Denmark, Ireland, Portugal, Russia, Serbia, the UK and Spain) were received from 72 laboratory specialists and 78 clinicians. One response from a laboratory professional was excluded because he/she stated that he/she was not involved in sample analysis. Demographic data of participants are shown in Tables 1 and 2.

Responses from laboratory specialists

Developing local ordering protocols/profiles in collaboration with clinicians was the most used strategy (80.3% of participants). According to surveyed laboratory medicine specialists, this was also the second most useful strategy to ensure appropriate use of laboratory tests (94.4%), just behind providing published guidelines/diagnostic algorithms to clinicians. In terms of reducing health care costs this strategy was considered effective by 84.5% of participating laboratory medicine specialists, whilst implementation of re-testing intervals was thought to be a more efficient practice (97.2%) to reduce health care cost. Table 3 shows all strategies including their implementation status and the opinions on their usefulness, according to laboratory specialists.

When queried on the knowledge of costs of laboratory tests, 36.6% of responders declared being aware of
reagent cost for all tests performed in their facility, whilst 62% of responders stated knowing the cost for most of the tests. A high percentage (91.5%) of responding laboratory specialists considered this information as important/relevant.

Regarding the collaboration with clinicians, 35.2% of responders claimed to have meetings, clinical sessions or other contacts, where the use of laboratory tests can be discussed by an interdisciplinary team on a regular basis, 19.7% declared to be engaged in such practice twice a year, 14.1% once a year, 8.5% once a month and 22.5% have never had this type of connection with clinicians. Only 32.4% of respondents participated in multidisciplinary groups with clinicians on the appropriateness of the demand for laboratory tests and another 32.4% stated that they were not participating, but they would be willing to do so. Of those who declared that such groups do not exist at their facility (22.5%), all (i.e. 100%) would be willing to participate if these meetings were available.

Information about laboratory services (preanalytical instructions, new tests, test indications, etc.) is provided via a laboratory website, as a printed manual with instructions, during regular meetings with clinicians, by e-mail and/or using other ways of communication [e.g. newsletters, hospital information system (HIS), hospital intranet, etc.] in 49%, 39.4%, 25.4%, 39.4% and 23.9% of cases, respectively. Only one participant declared that this information was not supplied to users in any form.

Advice or information on indications for laboratory test ordering was regarded as being useful for any test, useful only for new tests or useless by 83.1%, 12.7% and 4.2% of participating laboratory specialists, respectively. When asked which areas such information was considered most useful for, the answers were: preanalytics (77.5%), autoimmunity (62.0%), genetics/molecular (60.6%), biochemistry (53.5%), hemostasis/coagulation (52.1%), infectious diseases serology (50.7%), tumor markers (50.7%), allergy (45.1%), microbiology (45.1%), therapeutic drug management (TDM)/toxicology (42.3%), protein diagnostics (35.2%), hematology (33.8%) and blood gas (25.4%).

Of the laboratory specialists surveyed, 94.4% were interested in attending meetings or e-learning programs on laboratory test demand management, while 91.5%
were interested in participating in a benchmark program regarding laboratory test demand.

**Responses from clinicians**

Overall, 50.0%, 20.5%, 10.3%, 11.5% and 7.7% of participating clinicians declared to communicate with laboratory specialists on a regular basis, once a month, once a year, twice a year or never, respectively. Of those who communicated with the laboratory, 53.8% did this face to face, 34.6% did so by telephone and 41.0% by e-mail or other written forms of communication. Only 19.2% of respondents declared participating in multidisciplinary groups with laboratory specialists on appropriateness of the demand for laboratory tests at a local level. Another 35.9% do not currently participate but would like to be engaged and 6.4% of responders stated that these groups did not exist in their health care settings. Of these most (i.e. up 80%) would be willing to participate if they existed.

The most frequent means used to obtain information on laboratory services was the laboratory website (70.5%), followed by laboratory ordering system electronic or sheets (44.9%), written guidelines (44.9%), directly in person (26.9%), by other colleagues (25.6%) or e-mail (2.6%). Only one physician declared that he/she was not receiving any type of information on laboratory services.

Only 10.2% of the surveyed clinicians declared receiving advice/information about indications of the available tests, while 30.8% claimed that this information was unavailable and 59% replied that they were unaware of this option. All participating clinicians (100%) would be interested in such advice, 26.9% of whom would be interested only for new tests and the remaining 73.1% for all tests. The areas in which this additional information was considered most useful were infectious diseases/serology (65.4%), followed by microbiology (53.8%), autoimmunity (51.3%), biochemistry (47.4%), hematology (44.9%), genetics/molecular diagnosis (43.6%), TDM/toxicology (42.3%), tumor markers (33.3%), hemostasis/coagulation (32.1%), allergy (32.1%), preanalytics (29.5%), protein diagnostics (24.4%), and blood gas analysis (15.4%). A total percentage of 78.2% of clinicians would welcome assistance by laboratory specialists in modifying their test ordering behavior according to clinical and analytical information.

Measures to ensure appropriate use of laboratory tests (test demand management and test rationalization) were considered necessary by 85.9% of the surveyed clinicians. Only 1.3% stated that none of these strategies were actually needed, whilst 12.8% did not have an opinion. The clinicians’ opinions about effectiveness of demand management strategies are shown in Table 4. Overall, 75.6% of clinicians believed that improving appropriateness in laboratory testing would contribute to improving patient safety, while 5.1% disagreed and 19.2% were not interested in this issue.

When asked about knowledge regarding laboratory costs, 51% of the clinicians declared knowing the exact cost of all the tests they could order from the laboratory, whilst 65.4% of them stated knowing the expenditure of most of such tests. A total of 29.5% stated that they were unaware of prices, whilst 88.5% considered this information important/relevant to themselves.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Used in their lab</th>
<th>Effectiveness to improve patient outcome</th>
<th>Effectiveness to reduce health care costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes, %</td>
<td>Yes, %</td>
<td>Don't know, %</td>
</tr>
<tr>
<td>Provide published guidelines/diagnostic algorithms to clinicians</td>
<td>69.0</td>
<td>95.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Develop own ordering protocols/profiles in collaboration with clinicians</td>
<td>80.3</td>
<td>94.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Manage the demand using electronic order entry tools with/without an expert system</td>
<td>69.0</td>
<td>84.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Delete selected tests from standard laboratory ordering forms</td>
<td>37.5</td>
<td>49.3</td>
<td>18.3</td>
</tr>
<tr>
<td>Define re-testing intervals (minimum period between two identical tests)</td>
<td>54.9</td>
<td>81.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Give clinicians personal feedback about the number and cost of laboratory tests requested</td>
<td>56.3</td>
<td>66.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Review appropriateness of selected test requests by a specialist in laboratory medicine</td>
<td>62.0</td>
<td>91.2</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Finally, both groups were asked what influence laboratory specialists, clinicians and health care management should have on decisions to introduce or abandon tests in the local test menu. According to laboratory specialists, the average score (in a scale between 0 and 5) was 4.2 for laboratory specialists, 3.7 for clinicians and 2.5 for health care managers, respectively. In the clinicians’ opinions the average score was 3.2, 3.6 and 2.4, respectively.

Discussion

The results of this study reflect the current context of demand management strategies in European laboratories and opinions about these policies of both laboratory medicine specialists and clinicians. Developing local ordering protocols/profiles in collaboration with clinicians was a strategy used by a large proportion of laboratories and well valued by laboratory specialists in terms of patient safety and cost. The positive perception was also manifested in the responses from the clinicians. Given the additional fact that this strategy has proven very effective in multiple studies and because it needs minimal effort for implementation and maintenance, it must be considered as a valuable strategy [18–20]. However, attention has to be paid to ensure that these ordering profiles are not misused when offered as “routine” panels aiming to cover most organs and illnesses, as this may lead to substantial overuse of laboratory resources [5].

Provision of published guidelines/diagnostic algorithms given to clinicians was found to be another favored strategy, by both clinicians and laboratory medicine specialists. Nevertheless, only 69% of laboratories stated that this option was used locally. Given the discrepancy between the perceived utility of feedback on the number and cost of laboratory tests requests according to clinicians (84.6%) and their use by laboratories (56.3%), laboratories should be encouraged to implement this demand management strategy. Using electronic order entry tools, with or without an expert system to manage inappropriate use of laboratory tests was considered effective by many authors [15, 21–26], as well as by many laboratory specialists participating in our survey. This strategy was actually used by 69% of surveyed laboratories, but was only deemed useful by 56.4% of the participating clinicians. Close collaboration with clinicians is therefore required when implementing this strategy to explain the advantages to the stakeholders.

Re-testing intervals, although recognized as an effective strategy for the appropriate use of laboratory tests by 74.4% of clinicians and 81.7% of laboratory specialists, was only used by 54.9% of laboratories. Although several examples have been published that show the efficacy of re-testing intervals, the reason for the limited use of this approach may be the larger amount of resources necessary for defining and implementing this strategy in an automated manner [5, 23, 27, 28].

The fact that only 37.5% of laboratories indicated using elimination from standard laboratory ordering forms as a strategy may be due to misunderstanding of the question, as respondents might have thought that the question concerned the entire request form and not a single patient request. A comparison between opinions of laboratory specialists and clinicians about the usefulness of main demand management strategies is shown in Figure 1.

The main focus of implementing demand management strategies is often their financial impact, aimed at cutting down costs. This approach, however, often leads to unsuccessful projects, as compliance or adherence strongly relies on clinicians’ awareness and belief that these strategies may really be effective for improving patient care. Therefore, patient safety and medical benefit must always be the core of the process. As most health care systems are still struggling with a lack of public funding,
we included some pertinent questions in our survey. It is also important to consider, there can be a conflict between demand management (usually trying to reduce inappropriate testing) and income generation (which may incentivize doing the opposite) within some healthcare systems. Nearly all laboratory specialists declared to have a good knowledge on reagent costs and considered this information very useful. A possible bias may be that a significant number of responders had responsibilities within laboratory management. Over 70% of responding clinicians also declared that they were aware of the price of most or all of the laboratory tests they could order. This is an interesting finding, potentially explained by test ordering programs providing this information upon test request. Moreover, nearly 90% of clinicians mentioned that cost information would be important, possibly prompted by a need to optimize resources utilization or is driven by local incentives or budget savings. Notably, organizations such as Medicare and Medicaid deny reimbursement of laboratory tests when an appropriate diagnosis does not accompany the request [4].

Close collaboration and cooperation between laboratory medicine specialists and clinicians is an essential prerequisite for successful implementation of demand management strategies [29]. In our survey, half of the responding clinicians stated having regular interactions with the local laboratory. However, only 35% of laboratory specialists declared organizing meetings or clinical sessions on a regular basis, where use of laboratory tests could be discussed. Although nearly all clinicians claimed to be offered general information on laboratory services, only 10.3% stated that advice/information on indication of tests was provided. Notably, neither information or education can be successfully maintained when regular reminders are not provided [29, 30]. Overall, participation in multidisciplinary groups with clinicians on the appropriateness of laboratory testing was rare, despite a relevant interest indicated by both groups (Figure 2). However, our findings regarding the viewpoints of clinicians might be biased due to the fact that participating

**Figure 1:** Usefulness of demand management strategies according to laboratory specialists’ and clinicians’ opinions.

**Figure 2:** Participation in multidisciplinary groups on appropriateness of laboratory testing.
clinicians were contacted directly by a laboratory specialist and are hence probably more likely to interact with the laboratory on a regular basis. A significant number of laboratory participants claimed to use different strategies for demand management, whilst the adoption of combined strategies was found to be the best practice in many studies [26, 31].

In terms of advice/information, information on pre-analytical aspects was considered very important by laboratory specialists, but this evidence was not actually mirrored by clinicians’ replies. This aspect may reflect a lack of knowledge on the impact of preanalytical errors on laboratory results and patient safety. Therefore, laboratory specialists and scientific societies should be more engaged in disseminating this important knowledge.

A major interest was found in both groups for attending meetings or participating in other activities on demand management. The EFLM, as well as other national laboratory societies of laboratory medicine, regularly organize scientific meetings, mostly targeting laboratory medicine specialists. Based on our findings, it would be reasonable to consider organizing joint meetings with clinicians to improve the diagnostic workup of patients and develop consensus recommendations about any part of the total testing process. In this perspective, many national societies referring to the EFLM are currently engaged in promoting multidisciplinary working groups.

Perhaps unsurprisingly, laboratory medicine specialists considered that their role in the choice of test portfolio ought to predominate, while their role was not so important in the opinion of clinicians. Although the expertise of laboratory medicine professionals on the clinical significance of laboratory tests may often be higher than that of many clinicians [32], the laboratory must always collaborate with clinicians and nursing staff, becoming an essential part of every health care setting as a clinical advisor [33]. An opinion shared by both clinicians and laboratory specialists was that health care managers should play a limited role in defining the laboratory test portfolio (Figure 3).

In conclusion, the results of our survey show that tools to improve the appropriate use of laboratory diagnostics are already regularly used today, and that laboratory medicine specialists as well as clinicians are willing to undertake additional actions aimed at improving patient-centered laboratory diagnostic workup. To reach this goal, all professions would need to strengthen their liaisons. Laboratory specialists in particular need to reinforce proactive interactions with clinicians, developing a culture of “diagnostic stewardship”, as was recently proposed in the “Manifesto for the future of laboratory medicine professionals” by Mario Plebani and colleagues [34].

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References


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