Facilitating access to laboratory guidelines by modeling their contents and designing a computerized user interface

Mobin YASINI, Catherine DUCLOS, Jean-Baptiste LAMY, Alain VENOT

Medical and Bio informatics Laboratory (LIM&BIO) – UFR SMBH – Université Paris 13 – 93017 Bobigny, France


Presented by: Mobin YASINI, MD, MSc
Oslo, 29/08/2011
Ninomobin@yahoo.fr
Problem positioning

• Laboratory tests are not always prescribed properly (Up to 67%)
  
  

• Evidence-based laboratory guidelines for improving test ordering, specimen collection and handling procedures were formulated by expert panels of the public hospital system of Paris (AP-HP)

• Theses textual recommendations were not well formulated and were not frequently consulted by physicians or by the nurses
Various strategies for changing the test-ordering behavior of medical practitioners, have been proposed in the literature including:

Education programs


Redesigning the request form


Feedback on the number or rational basis of tests prescribed


Informing requesters about the costs of the tests requested


The use of Computerized Decision Support Systems (CDSS)

Goal

- Modeling the information contained in the guidelines
- Develop and evaluate a human-machine interface to have a new presentation of the information of these laboratory guidelines

Materials

- 22 laboratory guidelines formulated by expert panels of the AP-HP related to
  - Microbiology
  - Immunoglobulin analysis
  - Autoimmune diseases
  - HLA and associated diseases
Electrophorèse des protéines sériques

Avant de faire les examens de biologie

LIQUE (Coeliac disease)

date de révision : 30 septembre 2008

La condition de la maladie cœliaque, Pr Michel MARRE, endocrinologue.

ICHEL, médecine interne. Pr Luc MOUTHON.

livre MEYER. réumatologie.

le travail de l'immunologiste à l'ADNAKIAN, Chantal ANDRE, Eric

ERT, Marie-Agnes DRAGON-DUREY. Ande

Pascale NICAISE, Céline TOLY-NDOUR.

Règles de prescription

Prescription médicale

Type de patients concernés ou contexte clinique du
Suscpective de bactériémie primaire ou secondaire

Examen à recommander car apporte un diagnostic
Hémoculture : L'élément clef est le volume
nombre de Pneumocystis
- volume de sang de 15 ml par ponction
- dans des flacons adaptés à ce petit

Règles de prescription / Indications

- Examen d'orientation
- Indication très large
- Examen préalable à toute autre exploration des protéines sériques chez l'adulte

Rendu du résultat

La feuille de rendu de résultat doit comporter :
- le tracé densitométrique ;
- les chiffres (en % des fractions et en g/l). Chaque fois que possible, une fraction monoclonale devra être quantifiée ;

...
Methods

• The guidelines were randomly assigned into two groups

• All the different headings present in the study group were listed

• The contents of the sections were categorized into recommendations

• The various elements of information within the recommendations were identified

• UML modeling

• Interface design

• Evaluation
It is necessary that the physician indicates if there is a suspicion of anaerobic infection.

In cases of suspicion of anaerobic bacteremia (gastro-intestinal infections, gynecologic, ENT, inhalation pneumonia,...) the blood volume is divided into 5 ml in the aerobic flask and 10 ml in the anaerobic flask.
Evaluation

21 physicians and 14 nurses

- Reading the original documents
- Interface manipulation
- Score the interface on a questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to the initial presentation, the order of presentation of information seems better/worse (0 for the worst and 100 for the best)</td>
<td>74</td>
<td>19</td>
</tr>
<tr>
<td>Compared to the initial presentation, the headings seem more/less comprehensible (0 for the least understandable and 100 for the most understandable)</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>The clickable menu in the left margin seems hard/easy to use (0 for difficult to use and 100 for very simple)</td>
<td>77</td>
<td>15</td>
</tr>
<tr>
<td>Do you find the possibility of selecting “Specific clinical contexts” useful? (0 for not at all useful and 100 for very useful)</td>
<td>96</td>
<td>6</td>
</tr>
<tr>
<td>Overall, access to the information is/is not better (0 for has no improvement and 100 for considerable improvement)</td>
<td>74</td>
<td>15</td>
</tr>
</tbody>
</table>

Overall Result: The physicians and nurses think that the interface improves the consultation of guidelines
Discussion

• The consultation of guidelines → rational and appropriate requests for testing

• The integration into a web-based interface → provide a contextual menu

• Preliminary evaluation → Quantitative evaluation

• Perspectives
  
  • Implementation of new applications
    • Alert systems
    • Applications based on decision trees or graphical approaches
  
  • Formulation of the future laboratory guidelines

• Design of a knowledge base
Thank you for your attention
References