Development of a web-based decision support system for insulin self-titration

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Contact frequency and the improvement in HbA1c

![Graph showing the relationship between contact frequency and improvement in HbA1c. The graph illustrates that increased contact frequency leads to a decrease in fasting blood glucose, with a target range indicated. The graph includes data from Swinnen and DeVries, Diabetologia 2009; 52:2324-2327.](MIE 2011, A.C.R. Simon)
Internet to provide insulin dosing advice

- Provide insulin advice
- Recognise unsafe situations
- Overrule the system
Methods

- Literature review
- Patient interviews
- Expert panel

Existing CDSS for patients with diabetes
Existing titration rules
Decision rules to prevent/handle hypoglycemic events
Barriers of insulin intensification

MIE 2011, A.C.R. Simon
Results

- System specifications
  - Treat-to-target titration algorithm

<table>
<thead>
<tr>
<th>Lowest fasting plasma glucose of the preceding three to six days</th>
<th>Insulin dose adjustment for people &lt; 70 yrs</th>
<th>Insulin dose adjustment for people &gt; 70 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 mmol/l</td>
<td>-0.02 IU/kg (min -2 IU)</td>
<td>-0.02 IU/kg (min -2 IU)</td>
</tr>
<tr>
<td>4.0 – 5.5 mmol/l</td>
<td>Stable dose</td>
<td>Stable dose</td>
</tr>
<tr>
<td>5.6 – 9.9 mmol/l</td>
<td>+0.02 IU/kg (min +2 IU)</td>
<td>+0.02 IU/kg (min +2 IU)</td>
</tr>
<tr>
<td>&gt; 10 mmol/l</td>
<td>+0.04 IU/kg (min +4 IU)</td>
<td>+0.04 IU/kg (min +4 IU)</td>
</tr>
</tbody>
</table>

* min = minimum
Results

- System specifications
  - Treat-to-target titration algorithm
  - Tailor target range
Results

- Status: OK
- Status: warning
  - Redirect to PANDIT
  - Adjust target range + redirect to PANDIT
  - Provide own insulin advice
<table>
<thead>
<tr>
<th>Date</th>
<th>Fasting blood glucose</th>
<th>Insulin advice</th>
<th>Insulin used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>woensdag 10-08-2011</td>
<td>8,3</td>
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<td>dinsdag 09-08-2011</td>
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<td>11,7</td>
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</tr>
</tbody>
</table>

Have you recently, since your last visit to the PANDIT system, experienced symptoms of hypoglycemia?  
☐ Yes  ☐ No

Save entry
Discussion

• Strength of the study:
  – Both patient and care professionals are involved in clarifying the system requirements

• Limitation of the study:
  – Dietary and lifestyle aspects of diabetes were not considered

• Future work:
  – Pilot study: safety, usability
  – RCT: medical efficacy
Thank you