Inappropriate hospital admission in the emergency department: an intensity of care model for multi-dimensional patient evaluation.

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Background

ED Overcrowding

**INPUT**
- Epidemiology
- Inappropriate non-urgent access
- Frequent users

**TROUGHPUT**
- Diagnostic evaluation
- Specialists' consultations
- Boarding – access block

**OUTPUT**
- Bed blockers

Elderly Patients in ED

- multiple health issues requiring greater urgency and global assistance evaluation;
- Often admitted to hospital and/or return to EDs, waiting extended time for care and often reporting low satisfaction rates;
- The interplay of multiple comorbidities and functional decline of elderly patients result in the complex state of frailty.

mod. from Asplin BR. Ann Emerg Med 2003
Aim: to design a new framework

ED approach to elderly patients’ needs:
- Multidimensional evaluation tools
- Hospital admission only after correct risk assessment
Methods

Tri-Co
(triage of corridor)

NEWS
New Early Warning Score
NICE, 2007

IDA
Assistance dependency index
+ ICA
Assistance Load index
S. Argena - M. Civita, 2018

Clinical assessment + Geriatric assessment

= multidimensional evaluation of elderly patients in ED
Multidimensional evaluation in ED: intensity of care model

<table>
<thead>
<tr>
<th>Clinical &amp; Assistance assessment</th>
<th>IDA+ICA 27-30</th>
<th>IDA+ICA 15-26</th>
<th>IDA+ICA 10-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEWS 0-4</td>
<td>Tri-Co 1</td>
<td>Tri-Co 2</td>
<td>Tri-Co 4</td>
</tr>
<tr>
<td></td>
<td>Low intensity (Discharge)</td>
<td>Low-medium intensity (Geriatric hospital, Rehabilitation)</td>
<td>High intensity (hospital)</td>
</tr>
<tr>
<td>NEWS 5-6</td>
<td>Tri-Co 3</td>
<td>Tri-Co 3</td>
<td>Tri-Co 4</td>
</tr>
<tr>
<td></td>
<td>Medium intensity (Subacute care unit)</td>
<td>Medium intensity (Subacute care unit)</td>
<td>High intensity (hospital)</td>
</tr>
<tr>
<td>NEWS ≥7 (or 1 parameter = 3)</td>
<td>Tri-Co 4</td>
<td>Tri-Co 4</td>
<td>Tri-Co 4</td>
</tr>
<tr>
<td></td>
<td>High intensity (hospital)</td>
<td>High intensity (hospital)</td>
<td>High intensity (hospital)</td>
</tr>
</tbody>
</table>
Study setting

Study design:

- retrospective, observational
- 1,377 patients (1 Jan 2016 - 28 Feb 2017);
- admitted to Internal Medicine Ward – ASST Mantua “Carlo Poma” hospital;
- > 14 years old.

Aim of the study:

- To evaluate inappropriate hospital admission rate
- To apply a standardized “risk stratification”
Results:
patient classifications

Tot: 1,377 pts
Chi-square sign: $p<0.001$
Hospital admission appropriateness *age classes*

<table>
<thead>
<tr>
<th>Age Class</th>
<th>Tri-Co 1</th>
<th>Tri-Co 2</th>
<th>Tri-Co 3</th>
<th>Tri-Co 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 65 y</td>
<td>84</td>
<td>8</td>
<td>4</td>
<td>58</td>
</tr>
<tr>
<td>65-79 y</td>
<td>180</td>
<td>32</td>
<td>20</td>
<td>177</td>
</tr>
<tr>
<td>&gt; 80 y</td>
<td>258</td>
<td>99</td>
<td>34</td>
<td>423</td>
</tr>
</tbody>
</table>

Tot: 1,377 pts
Chi-square sign: *p* < 0.001
Hospital admission appropriateness

*linear regression*
ED: modality of presentation

inappropriate admitted patients

<table>
<thead>
<tr>
<th>Age Group</th>
<th>ambulance</th>
<th>walk-in</th>
<th>Tot.</th>
<th>Chi-square sign: $p=0.461$</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65y</td>
<td>48</td>
<td>32</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>65-79y</td>
<td>97</td>
<td>76</td>
<td>173</td>
<td></td>
</tr>
<tr>
<td>&gt;80y</td>
<td>137</td>
<td>124</td>
<td>261</td>
<td></td>
</tr>
</tbody>
</table>

Tot: 522 pts (Tri-Co1)
Discharge modality: 

Tri-Co classification

Chi-square sign: $p=0.044$

Tot: 1,377 pts
Hospital stay: *Tri-Co classification*

- Tri-Co 1: 12.57
- Tri-Co 2: 12.84
- Tri-Co 3: 10.86
- Tri-Co 4: 13.13

Mean: 12.35

Tot: 1,377 pts
Chi-square sign: $p < 0.01$
1. High level of organizational inappropriateness (Tri-Co):
   – Standardization of a new ED patient evaluation model
   – Differentiation of hospital / intermediate care unit admission;
2. Worst appropriateness in <65 years patients (Tri-Co1>4);
3. High rate (83%) >65 years patients Tri-Co1;
4. Length of hospital stay better explains “bed-blockers” phenomenon and ED overcrowding.