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Hotel Novotel, Amsterdam City
3-4 May 2018

How do clinicians decide to give fluid resuscitation?
Edward Lloyd, Biomedical science student
Background

- NHS spends over £156 million on IV fluids annually
- Fluid assessment is a key competency
- NICE CG174 – Lack of evidence fluid assessment process
- 1 in 5 patients suffer complications
Qualitative Research: Aims

1. Determine how fluid assessments are currently being performed within the clinical setting.
2. Identify how this assessment is being used in the decision-making process of prescribing IV fluids.
Methods

• Single site study in the West Midlands
• Semi-structured interview process
• Stratified sampling: foundation year, core trainee, specialist trainee, and consultant
• The interviews were performed by a non-clinician with no experience performing IV fluid assessments
• Thematic analysis was used as the method to analyse the collected data
Results

• 3 main influences on the decision to prescribe IV fluids
• Of note, the fluid assessment was not used
Results

"Initially if you’re looking at their observations, that would be the one that you want to act on the most…"

"...if they’re depleted to the extent that they’re tachycardic, hypotensive, then you should resuscitate them"
Results

“If the patient is acutely unwell, which happens, then they’re almost guaranteed to need fluid resuscitation.”

“Sick”
Results

“I’m extremely pro fluids”

“I still go with the pro policies that we have at the moment”
Limitations

- First time interviewing and using these qualitative methods
- Single-site study
- Interview data provides an interpretation of what others are saying, not what is happening
Conclusion

• Three influences on the decision-making process
  • Observations
  • Pro-fluid culture
  • “Sick”
• Fluid assessment may be ritualistic
References


Thank you
Any questions?
Measuring ‘True hospital avoidance’ in Ambulatory care
Measuring ‘True hospital avoidance’ in Ambulatory care

By

Channa Vasanth Nadarajah, Acute Medical Consultant
Basingstoke and North Hampshire Hospital, UK
AIMS

• Basingstoke town
• Basingstoke Hospital
• Journey of ACU at Basingstoke
• Impact of ACU
• Future plans
• Summary
Basingstoke town

• Originally a market town in Hampshire county

• Now considered a ‘modern town’
  • due with rapid development in 1960s
  • in conjunction with London council to manage ‘London overspill’

• In perspective: -
  • 55 minutes direct train journey to central London
  • 50 minutes car journey to Oxford and Southampton
Basingstoke Hospital

• Part of Hampshire Hospital Foundation Trust:
  - Royal Hampshire (Winchester Hospital)
  - Basingstoke
  - Andover

• District Hospital with 450 beds

• Medical admission at Basingstoke:
  - Ran by General Physicians - admit all patient for inpatient investigation and treatment
  - 2005 - 13.2 (over 24 hours)
  - 2015 - 24.7 (87% increase)
Journey of ACU at Basingstoke

- ACU started at Basingstoke December 2015
  - No money or increase of resource
  - Redeployment of existing AAU staff
  - ‘Broom cupboard’ - office in AAU, no dedicated space
- Impact: -
  - Saw average 3-5 patients per day
  - Reduce medical admission
  - Reduce AAU bed stay
  - Improve zero length of stay
  - Improve patient satisfaction
ACU 2015
Journey of ACU at Basingstoke

• Upgraded unit: -
  • ‘storage cupboard’-dedicated space (September 2016)
  • 2 chairs and 1 trolley
  • Dedicated Admin, nursing and junior doctor
  • Increase consultant body
  • Extended opening times for ACU 09:00-18:00 (Monday-Fridays)
ACU 2016
Data and Results

• Quality improvement project

• Measure impact of ACU

• Data collected: -
  
  • 1st of January – 31st of December 2017
  
  • Monday- Fridays all medical admission
  
  • All ACU patients

• Analysed ACU data for: -
  
  • Same day admission
  
  • 30 day re-admission
  
  • 30 day mortality
<table>
<thead>
<tr>
<th>Months</th>
<th>Total Patients seen in ACU</th>
<th>Total Patients seen on Medical Take</th>
<th>Total Medical Patients</th>
<th>% of Patients Discharge from ACU</th>
<th>Number &amp; % of ACU Patients Admitted (Same Day)</th>
<th>Number &amp; % of Patients Admitted within 30 days from ACU</th>
<th>Percentage of True Hospital Avoidance from ACU</th>
<th>Percent of so Day MORDITY In ACU</th>
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<tbody>
<tr>
<td>January</td>
<td>187</td>
<td>586</td>
<td>773</td>
<td>86.5%</td>
<td>5</td>
<td>11.396</td>
<td>4</td>
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<tr>
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<td>157</td>
<td>518</td>
<td>675</td>
<td>88.4%</td>
<td>1</td>
<td>9.296</td>
<td>4</td>
<td>2.596</td>
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<td>263</td>
<td>587</td>
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<td>17</td>
<td>9.896</td>
<td>8</td>
<td>3.096</td>
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<td>184</td>
<td>435</td>
<td>619</td>
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<td>1</td>
<td>10.796</td>
<td>1</td>
<td>0.596</td>
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<tr>
<td>May</td>
<td>218</td>
<td>522</td>
<td>740</td>
<td>85.2%</td>
<td>17</td>
<td>2.696</td>
<td>5</td>
<td>2.936</td>
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<td>539</td>
<td>768</td>
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<td>5</td>
<td>10.396</td>
<td>3</td>
<td>1.396</td>
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<td>267</td>
<td>541</td>
<td>808</td>
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<td>4</td>
<td>8.696</td>
<td>2</td>
<td>0.796</td>
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<td>248</td>
<td>530</td>
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<td>91.9%</td>
<td>1</td>
<td>7.096</td>
<td>3</td>
<td>1.96</td>
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<tr>
<td>September</td>
<td>282</td>
<td>544</td>
<td>826</td>
<td>91.6%</td>
<td>9</td>
<td>5.396</td>
<td>9</td>
<td>3.296</td>
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<tr>
<td>October</td>
<td>256</td>
<td>558</td>
<td>814</td>
<td>90.0%</td>
<td>14</td>
<td>8.096</td>
<td>5</td>
<td>2.096</td>
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<tr>
<td>November</td>
<td>239</td>
<td>565</td>
<td>804</td>
<td>91.4%</td>
<td>9</td>
<td>6.196</td>
<td>6</td>
<td>2.596</td>
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<tr>
<td>December</td>
<td>250</td>
<td>711</td>
<td>961</td>
<td>91.9%</td>
<td>0</td>
<td>6.296</td>
<td>5</td>
<td>2.096</td>
</tr>
<tr>
<td>Average</td>
<td>232</td>
<td>553</td>
<td>785</td>
<td>89.3%</td>
<td>3</td>
<td>8.8%</td>
<td>5</td>
<td>1.9%</td>
</tr>
</tbody>
</table>
Data and Results

• Average per month: -
  
  • Patient seen in ACU- 232
  
  • Same day admission- 8.8% (n=13)
  
  • 30 day re-admission- 1.9% (n=5)

• Discharge from ACU: - **89.3%**
Data and Results

Total number of ACU patients – (same day admission + 30 day re-admission) = True hospital avoidance

Total of ACU patient + Total number of medical patients

\[
\frac{232 - (13+5)}{232+553} = 27.3\%
\]
Data and Results

• 30 day Mortality: -

• **0.2%** per month

• Over 12 months: -
  
  • 3-palliative patients under investigation for VTE
  
  • 1 end stage Heart failure under hospice care
  
  • Above 4 patient passed away at home/hospice

  • 1 young female presented with leg pain → Necrotising fasciitis
  
  • 1 female with AAA rupture (sent is as ?PE)
  
  • 1 Male with large PE burden
Future

• New unit: -
  • 7 clinical space, 1 private room for procedures

• Aims: -
  • 30-35% true hospital avoidance
  • Recruit in total 7 Acute Medical Consultants
  • Extended hours 08:00-20:00
  • Weekend service
ACU 2018
Summary

• On Average per month: -

• ACU discharge **89.3%**

• True Hospital Avoidance **27.3%**

• 30 day mortality **0.2%**
Thank you
Administer Timely Fluid in AKI: The "Magnetic" Intervention

Dr Nainal Shah, Consultant
Dr Mahjabin Islam, Specialist Registrar
Dr Desislava Kondova, Specialist Registrar
Department of Acute Medicine, University Hospitals of Leicester, UK
Introduction:

• Acute kidney injury is seen in 13–18% of all people admitted to hospital.
• In the UK up to 100,000 deaths each year in hospital are associated with acute kidney injury.
• Up to 30% could be prevented with the right care and treatment
• Annual inpatient care cost for AKI in England : £1.02 billion, (just over 1% of the NHS budget)

Reference: Acute kidney injury: NICE guideline (March 2013)
AKI: Worldwide Statistics

• The incidence rate of AKI: 21.6% in adults primarily in hospital settings
• AKI-associated mortality rates for Adults 23.9%

Ref: Acute Kidney Injury Advisory Group of the American Society of Nephrology
Rationale for the Project

- To identify scale of the problem in fluid management of patients with AKI
- To determine the reasons for delay of fluid administration in patients with AKI
- Staff concerns about AKI and IV fluids
- Sketch out the possible solution of the problem
Methodology

• Prospective study
• Audited group of patients with AKI in 2 different medical specialty wards (Acute medicine and Geriatrics)
• Inclusion criteria – patients with AKI (all stages)
• Implemented 4 PDSA (Plan, Do, Study, Act) interventions
• Data were collected from EPMA, Ilab, patients notes
• Analysis – Excel formulas
• We conducted staff survey on the common reasons for fluid administration delay and proposed solutions
Primary Audit

Number of patients: 25
Questionnaire based
Baseline results Patients characteristics

• 25 case notes audited

Characteristics of patients

<table>
<thead>
<tr>
<th>AKI stage</th>
<th>CKD stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>16%</td>
</tr>
<tr>
<td>Stage 2</td>
<td>4%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>4%</td>
</tr>
<tr>
<td>CKD Stage 4</td>
<td>12%</td>
</tr>
<tr>
<td>Total number CKD</td>
<td>19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AKI stage</th>
<th>CKD stage</th>
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</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>5%</td>
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<tr>
<td>Stage 2</td>
<td>5%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>15%</td>
</tr>
<tr>
<td>CKD Stage 4</td>
<td>4%</td>
</tr>
<tr>
<td>Total number CKD</td>
<td>5%</td>
</tr>
</tbody>
</table>

CCF - 3
Baseline results

### Reasons for delay

- **No explanation**: 6 (21%)
  - 3 (10%)
- **Poor handover from AMU**: 4 (14%)
  - 3 (10%)
- **No iv access**: 4 (14%)
  - 3 (10%)
- **Fluids inadequately prescribed**: 4 (14%)
  - 3 (10%)
- **Nurses were not informed**: 6 (21%)
  - 3 (10%)
- **Other treatment in progress**: 6 (21%)
  - 3 (10%)

### Scale of Delay

- **>6 H**: 16 (42%)
  - 4 (11%)
- **4-6 H**: 5 (13%)
  - 4 (11%)
- **2-4 H**: 3 (7%)
  - 4 (11%)
- **Up to 2 H**: 6 (16%)
  - 3 (7%)
- **Up to 1 H**: 1 (6%)
  - 4 (10%)
- **Up to 30 min**: 4 (10%)
  - 4 (10%)

- **26 % ds initiated by 1 H flui**
Result from primary survey

• All (100%) of the patients had delay of fluid administration

• More than half had delay of 6 hours and more

• Patients did not receive all intended amount of fluids prescribed for 24 hours (average 1 litre less given)
Survey Results and Common Themes

Staff surveyed: Staff working in 2 Medical Wards
(27 responses)

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>10</td>
</tr>
<tr>
<td>Nurse</td>
<td>15</td>
</tr>
<tr>
<td>HCA</td>
<td>2</td>
</tr>
</tbody>
</table>
Questionnaire Answers

- Fluid duration not specified on prescription: 29%
- Incorrect/Delayed Handover: 74%
- No venous access: 59%
- No nurse available to administer the fluids: 22%
- Concern about fluid overload: 18%
Other common concerns

Poor communication

More training for nurses and doctors on fluid management

Nurses should be aware of diagnosis

Not enough fluids prescribed

Nerve Centre Delay

Fluids not in stock

Canula in suboptimal position

All nurses to be trained in iv cannulation

Canula in suboptimal position
PDSA Cycles

PDSA – 1: Nerve Centre
PDSA – 2: Education with Poster
PDSA – 3: Drip Magnet
PDSA – 4: Drop Magnet
PDSA CYCLE :1 – The Nervecentre audited 20 patients

** AKI Stage 3 **
Please ensure IV fluids at 100ml/hr for today and monitor fluid status 4-6hourly
PDSA CYCLE: 1 – The Nervecentre

Objective:
To Improve handover for better Fluid Management

Correct Handover with Nervecentre

Studied 20 Patients afterwards and compared with baseline data
PDSA 1 Nerve Centre Update about AKI patients - Audited 20 cases

AKI
- Stage 1: 2
- Stage 2: 1
- Stage 3: 4
- Stage 4: 3

CKD
- Stage 1: 16
- Stage 2: 2
- Stage 3: 1
- Stage 4: 3

CCF - 1
- <75: 35%
- >75: 65%
#### PDSA 1-Nerve Centre update

**Scale of Delay after intervention comparison**

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Nerve Centre update</th>
<th>Baseline results</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;6 H</td>
<td>23%</td>
<td>42%</td>
</tr>
<tr>
<td>4-6 H</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>2-4 H</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Up to 2 H</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Up to 1 H</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>min</td>
<td>10%</td>
<td></td>
</tr>
</tbody>
</table>

**Reasons of delay NC update intervention**

<table>
<thead>
<tr>
<th>Reason</th>
<th>Reasons for Delay NC</th>
<th>Reasons for delay baseline results</th>
</tr>
</thead>
<tbody>
<tr>
<td>No explanation</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Poor handover from AMU</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>No iv access</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Fluids inadequately prescribed</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Nurses were not informed</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Other treatment in progress</td>
<td>21%</td>
<td></td>
</tr>
</tbody>
</table>

20% Fluids initiated by 1 H
PDSA 1 Results:

• No Improvement with Nerve Centre update

• Yet to yield the desired results ie. Improving fluid administration times and reducing delay.
PDSA 2: Education with The Posters
Audited 20 cases

**Doctors Prescribing Fluids For Patients with AKI**

1. Inform the nurse looking after the patient that fluids are prescribed
2. Specify the rate of the fluid
3. Ensure enough fluid is prescribed
4. Check your patient has a venous access

**Nurses Administering Fluids For Patients with AKI**

1. Please administer the fluids as soon as possible
2. Ensure fluid is given in prescribed time and rate
3. Speak to the doctor as soon as possible if your patient has no venous access
PDSA CYCLE : 2 – Education with The POSTER

- Improving fluid management by proper prescription and administration strategy
- Studied 20 Patients afterwards and compared with Nervecentre data
### PDSA 2 Using Posters

**Patient’s characteristics - 20 cases**

<table>
<thead>
<tr>
<th></th>
<th>&lt;75</th>
<th>&gt;75</th>
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</thead>
<tbody>
<tr>
<td><strong>AKI</strong></td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><strong>Stage 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stage 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stage 3</strong></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Stage 4 CKD</strong></td>
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<td><strong>Total</strong></td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td><strong>Percentage</strong></td>
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<td>53%</td>
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<table>
<thead>
<tr>
<th></th>
<th>&lt;75</th>
<th>&gt;75</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CKD</strong></td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Stage 1</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Stage 2</strong></td>
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</tr>
<tr>
<td><strong>Stage 3</strong></td>
<td>20%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Stage 4 CKD</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Percentage</strong></td>
<td>20%</td>
<td>20%</td>
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</tbody>
</table>

#### Age distribution

- **CCF 1**
  - <75 years: 30%
  - >75 years: 70%
Results after using posters

Scale of Delay after intervention comparison

<table>
<thead>
<tr>
<th>Time</th>
<th>Delay</th>
<th>Nerve Centre update Posters</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;6 H</td>
<td>8%</td>
<td>23%</td>
</tr>
<tr>
<td>4-6 H</td>
<td>13%</td>
<td>21%</td>
</tr>
<tr>
<td>2-4 H</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Up to 2 H</td>
<td>12%</td>
<td>1%</td>
</tr>
<tr>
<td>Up to 1 H</td>
<td>9%</td>
<td>15%</td>
</tr>
<tr>
<td>Up to 30 min</td>
<td>11%</td>
<td>23%</td>
</tr>
</tbody>
</table>

38% of fluids administered in 1 H

Reasons of delay Poster intervention

- Concern about fluid overload: 5%
- Inadequate staff: 4%
- No explanation: 30%
- Poor handover from AMU: 9%
- No iv access: 9%
- Fluids inadequately prescribed: 9%
- Nurses were not informed: 9%
- Other treatment in progress: 14%
- Reasons for Delay NC: 42%
- Reasons for delay Posters: 20%
PDSA 2 Results:

• Evidence of improvement of fluid administration time with introduction of posters
• 50% of patients had fluids delivered in less than 2 hours
• All patients received the intended amount of fluid prescribed
PDSA 3 The Drip Magnet

Give fluids
Save
Kidneys
PDSA CYCLE: 3 – The DRIP MAGNET

Devise an Easy handover tool

Studied 20 Patients afterwards and compared with Poster data
DRIP Magnet: Results

**Age Distribution**
- 50% < 75
- 50% > 75

**AKI Stages**
- Stage 1: 65%
- Stage 2: 25%
- Stage 3: 10%

**CKD Stages**
- Stage 1: 45%
- Stage 2: 11%
- Stage 3: 22%
- Stage 4: 22%
Results Comparison with Drip Magnet

Scale of Delay after intervention with Drip Magnet comparison

- 39% fluids delivered in 1 H
- 55% in 2 H
PDSA 3 Results:

- Evidence of improvement of fluid administration time with introduction of Magnets
  - Almost 30% had only 30 min delay
  - 38% < 1 hour
  - more than 50% fluids delivered in 2 hours
- Only 4 patients (13%) had fluids delivered in more than 6 hours whereas about 16 patients (42%) had delay more than 6 hours in primary result.
- All patients received the intended amount of fluid prescribed after implementation of magnet
PDSA 4 : The Drop Magnet
PDSA CYCLE: 4 – The DROP MAGNET

Finishing off cycles and carrying out with best outcome

Put the Magnet in the board like the drip magnet and collect data.

Studied 20 Patients afterwards and compared with Drip magnet data

Put the Magnet in the board like the drip magnet and collect data.
Results after using Drop Magnet

Scale of Delay after intervention with Drop Magnet comparison

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Drip Magnet</th>
<th>Poster</th>
<th>Nerve Centre</th>
<th>Drop Magnet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 30 min</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Up to 1 H</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Up to 2 H</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2-4 H</td>
<td>7</td>
<td>6</td>
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<td>7</td>
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<tr>
<td>4-6 H</td>
<td>6</td>
<td>3</td>
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<td>4</td>
</tr>
<tr>
<td>&gt;6 H</td>
<td>8</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

29% fluids delivered in 1 H
64% delivered in 2 H
Comparison of percentage of fluids given in 2 hours after prescription

- Baseline: 33%
- Nerve Centre: 38%
- Posters: 50%
- Drip magnet: 55%
- Drop magnet: 64%
Project Outcome:

• Identified large scale problem leading to delay in fluid management of AKI patients

• Common problems listed were:
  
  ✓ lack of appropriate handover
  ✓ Unclear prescription
  ✓ Delay in venous access
  ✓ Lack of knowledge about patients and their needs
Recommendations:

• Communication between nursing staffs and medical team is essential – Nervecentre and Board Magnets can certainly facilitate.

• Board magnets for Trust wide Implementation

• Regular small group teaching on AKI fluid Management
References:

1. Acute kidney injury: NICE guideline (March 2013)
2. NCEPOD adding insult to injury 2009;
3. Acute Kidney Injury Advisory Group of the American Society of Nephrology
4. RCP Tool Kit: Acute Kidney Injury
QUESTIONS?
Screening instruments for identification of vulnerable older adults at the emergency department

Carmen van Dam
Introduction

• Increased flow of vulnerable older patients at the ED \(^1,^2,^3\)

• At risk of adverse outcomes: functional decline, increased length of stay, institutionalization, mortality

• Early detection → remedial measures/interventions → better patient outcomes \(^4,^5\)
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<thead>
<tr>
<th>MPHF</th>
<th>SOF</th>
<th>G8</th>
<th>IFQ</th>
<th>SPQ</th>
<th>FIBLSA</th>
<th>ISAR-HP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPPB</td>
<td>ZED2</td>
<td>EFS</td>
<td>MFS</td>
<td>FI40</td>
<td>VES13</td>
<td>InterRAI</td>
</tr>
<tr>
<td>PHF</td>
<td>ZED 3</td>
<td>CGAST</td>
<td>HSF</td>
<td>CGA</td>
<td>HRCA</td>
<td>APOP</td>
</tr>
<tr>
<td>FSS</td>
<td>ZED1</td>
<td>TFI</td>
<td>BFI</td>
<td>FI70</td>
<td>QHRH</td>
<td>......</td>
</tr>
<tr>
<td>BDE</td>
<td>PFI</td>
<td>GFI</td>
<td>SI</td>
<td>NLTCS</td>
<td>SHCFS</td>
<td>......</td>
</tr>
<tr>
<td>FiND</td>
<td>CSBA</td>
<td>SDFI</td>
<td>FSS</td>
<td>EFIP</td>
<td>VMS</td>
<td>......</td>
</tr>
</tbody>
</table>
Aim

• Level of agreement of four simple and frequently used screening instruments

  • Veiligheidmanagementsysteem (VMS) 9
  • Identification of Senior At Risk-Hospitalized Patients (ISAR-HP) 10
  • Resident Assessment Instrument (InterRAI ED screener) 11
  • Acutely Presenting Older Patient (APOP) 12
Methods

- Prospective cohort study VU University Medical Center
- August - December, 2017

- Population: patients ≥ 70 years presenting at ED

- Inclusion: informed consent
- Exclusion: high urgency, language barrier or incapacitated

- Measurement: 4 screening instruments: vulnerable vs. non-vulnerable
- Outcome: level of agreement between screening instruments
Results – prevalence vulnerability

• N=256

• APOP 19%
• InterRAI ED Screener 22%
• VMS 38%
• ISAR-HP 45%
Table 2. Level of agreement

<table>
<thead>
<tr>
<th></th>
<th>VMS</th>
<th>ISAR-HP</th>
<th>InterRAI</th>
<th>APOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMS</td>
<td></td>
<td>72%</td>
<td>75%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K=0.43*</td>
<td>K=0.41*</td>
<td>K= 0.44*</td>
</tr>
<tr>
<td>ISAR-HP</td>
<td>72%</td>
<td></td>
<td>73%</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>K= 0.43*</td>
<td></td>
<td>K=0.42*</td>
<td>K= 0.36*</td>
</tr>
<tr>
<td>InterRAI</td>
<td>75%</td>
<td>73%</td>
<td></td>
<td>86%</td>
</tr>
<tr>
<td>ED Screener</td>
<td>K=0.41*</td>
<td>K= 0.42*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>APOP</td>
<td>77%</td>
<td>70%</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K=0.44*</td>
<td>K= 0.36*</td>
<td>K=0.55*</td>
<td></td>
</tr>
</tbody>
</table>

Numeric percentages of agreement, level of agreement as calculated using Cohen's Kappa (K). *p=<0.001
Results – positive instruments
Conclusion

• Depending on screening instrument 19% or 45% of patients vulnerable → Large dissimilarities working processes, resources, costs

• **Level of agreement** between four current used screening instruments at Dutch EDs is only fair to moderate.

• Screening instruments should not be interchangeably used
Discussion

• Which screening instrument is best?
  → Follow up data, including clinical opinion
References


Thank you!

Nadia Moss
Sophie Schaper
Marijke Trappenburg
Marike Ter Wee - Zaal
Majon Muller
Prabath Nanayakkara
Mike Peters
Kira Scheerman
• Reservedia’s
Introduction (1)

- Increased flow vulnerable older patients at the ED $^{1,2,3}$

  - Early detection $\rightarrow$ remedial measures $\rightarrow$ better patient outcomes $^{4,5}$
Introduction (2)

• However: no gold standard to determine vulnerability
• Current guidelines recommend screening instruments

• > 40 screening instruments existing...
MPHF, SPPB, PHF, FSS, BDE FiND, SOF, ZED2, ZED 3, ZED1, PFI, CSBA, G8, EFS, CGAST, TFI, GFI, SDFI, IFQ, MFS, HSF, BFI, SI, FSS, SPQ, FI40, CGA, FI70, NLTCS EFIP, FIBLSA, VES13, HRCA, QHRH, SHCFS, VMS, ISAR-HP, InterRAI, APOP
Flowchart inclusion

Eligible patients  
N = 506

Excluded: N = 250
- No informed consent: n = 168
- Including those not approachable (n=47)
- Limited length of stay at ED: n = 36
- Labelled as high urgency: n = 35
- Unknown reason: n = 11

Included patients  
N = 256
### Table 1. Baseline characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n=256)</th>
<th>Not-admitted (n=146 (57))</th>
<th>Admitted (n=110 (43))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years, median (IQR)</td>
<td>76 (71-81)</td>
<td>76 (71-81)</td>
<td>76 (71-81)</td>
</tr>
<tr>
<td>Male</td>
<td>128 (50)</td>
<td>70 (48)</td>
<td>58 (53)</td>
</tr>
<tr>
<td>Moderate - high education level</td>
<td>206 (81)</td>
<td>121 (83)</td>
<td>85 (77)</td>
</tr>
<tr>
<td>Polypharmacy</td>
<td>142 (56)</td>
<td>74 (52)</td>
<td>68 (62)</td>
</tr>
<tr>
<td>Living situation independent</td>
<td>171 (67)</td>
<td>107 (73)</td>
<td>64 (59)</td>
</tr>
<tr>
<td>Katz ADL independent</td>
<td>172 (67)</td>
<td>111 (76)</td>
<td>61 (56)</td>
</tr>
<tr>
<td>Last month presentation ED</td>
<td>33 (13)</td>
<td>20 (14)</td>
<td>13 (12)</td>
</tr>
<tr>
<td>Last month admission hospital</td>
<td>30 (12)</td>
<td>15 (10)</td>
<td>15 (14)</td>
</tr>
<tr>
<td>Fall in the past 6 months</td>
<td>102 (40)</td>
<td>51 (35)</td>
<td>51 (46)</td>
</tr>
</tbody>
</table>

Results are described as n (%) unless otherwise specified.
Table 3. High-risk labelled patients versus admission

<table>
<thead>
<tr>
<th>n = 256</th>
<th>Admitted immediately after ED presentation</th>
<th>Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>n = 146 (57)</td>
<td>n = 110 (43)</td>
</tr>
<tr>
<td>ISAR-HP at risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>88 (60)</td>
<td>53 (48)</td>
</tr>
<tr>
<td>Yes</td>
<td>58 (40)</td>
<td>57 (52)</td>
</tr>
<tr>
<td>VMS at risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>95 (65)</td>
<td>65 (59)</td>
</tr>
<tr>
<td>Yes</td>
<td>51 (35)</td>
<td>45 (41)</td>
</tr>
<tr>
<td>InterRAI ED screener at risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>128 (88)</td>
<td>73 (66)</td>
</tr>
<tr>
<td>Yes</td>
<td>18 (12)</td>
<td>37 (34)</td>
</tr>
<tr>
<td>APOP at risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>133 (91)</td>
<td>75 (68)</td>
</tr>
<tr>
<td>Yes</td>
<td>13 (9)</td>
<td>35 (32)</td>
</tr>
</tbody>
</table>

Vulnerability versus admission after presentation at the emergency department. Results are described as n (%). Chi-Square is used to compare groups.
**Supplementary Figure 1. Overview of screening instruments**

<table>
<thead>
<tr>
<th>Screening instrument</th>
<th>Domain</th>
<th>Score</th>
<th>Recommended cut-off point patients at risk</th>
</tr>
</thead>
</table>
| ISAR-HP 11           | IADL - assistance  
Use of walking device  
Assistance for travelling  
Education after age 14 | No: 0 0 0 1  
Yes: 1 2 0 1 0 | Total score ≥ 2 = at risk for functional decline* |
| VMS 12               | Delirium (sum of 3 items)  
Falls in the past 6 months  
Katz ADL index (sum of 6 items)  
Nutritional status (sum of SNAQ score)  
(3 items, maximum score 5) | No: 0 0 0 1  
Yes: 1 1 2 2 | Aged 70-80 ≥ 3 = at risk for adverse outcome  
Aged ≥ 80 years ≥ 1 = at risk for adverse outcome** |
| InterRAI ED screener 13 | Self-reliance index  
Self-rated Health  
Dyspnoea  
Unstable condition  
Family overwhelmed  
Self-rated Mood  
Support in Personal Hygiene  
ADL | Algorithm | Score 1-2 = unlikely to require further assessment or follow-up  
Score 3-4 = further assessment or follow-up based when indicated  
Score 5-6 = further assessment or follow-up recommended |

* Functional decline defined as decline ≥ 1 on the Katz ADL index at 3 months of follow-up
** Adverse outcome defined as: decline ADL function and/or high health-care demand or death after 12 months of follow-up. Functional decline defined as decline ≥ 1 on the Katz ADL index at 3 months of follow-up.
| InterRAI ED screener | Algorithm | Score 1-2 = unlikely to require further assessment or follow-up  
Score 3-4 = further assessment or follow-up based when indicated  
Score 5-6 = further assessment or follow-up recommended |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reliance index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-rated Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyspnoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unstable condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family overwhelmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-rated Mood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support in Personal Hygiene ADL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Algorithm | Percentage ≥ 50 (%) chance to functional decline within 3 months ***  
Percentage ≥ 25 (%) chance to die within 3 months ***  

**Functional decline or mortality at 90-day follow-up.**
Supplementary table 1. Absolute number of agreement

<table>
<thead>
<tr>
<th></th>
<th>VMS</th>
<th>ISAR-HP</th>
<th>InterRAI ED Screener</th>
<th>APOP</th>
<th>Total (n=256)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>VMS</td>
<td>Yes</td>
<td></td>
<td>70 (27)</td>
<td>26 (10)</td>
<td>43 (17)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>45 (18)</td>
<td>115 (45)</td>
<td>12 (5)</td>
</tr>
<tr>
<td>ISAR-HP</td>
<td>Yes</td>
<td></td>
<td>70 (27)</td>
<td>45 (18)</td>
<td>50 (20)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>26 (10)</td>
<td>115 (45)</td>
<td>65 (25)</td>
</tr>
<tr>
<td>InterRAI ED Screener</td>
<td>Yes</td>
<td></td>
<td>43 (17)</td>
<td>12 (5)</td>
<td>50 (20)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>53 (21)</td>
<td>148 (58)</td>
<td>65 (25)</td>
</tr>
<tr>
<td>APOP</td>
<td>Yes</td>
<td></td>
<td>42 (16)</td>
<td>6 (2)</td>
<td>43 (17)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td></td>
<td>54 (21)</td>
<td>154 (60)</td>
<td>72 (28)</td>
</tr>
</tbody>
</table>

Absolute number of agreement on both negative and positive test outcomes: n (%)
### ISAR-HP

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Before hospital admission, did you need assistance for IADL (e.g., assistance in housekeeping, preparing meals, shopping, etc.) on a regular basis?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. Do you use a walking device (e.g., a cane, rollator, walking frame, crutches, etc.)?</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3. Do you need assistance for travelling?</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. Did you continue education after age 14?</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total score (circled figures)**

Total score 0 or 1 = not at risk  
Total score $\geq 2$ = patient is at risk for functional decline
<table>
<thead>
<tr>
<th>VMS</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADL</strong></td>
<td>score(^1) ≥ 2?</td>
<td>□</td>
<td>doorverwijzen fysio-</td>
<td>/of ergotherapeut</td>
</tr>
<tr>
<td><strong>voeding</strong></td>
<td>SNAQ(^2) ≥ 2 of MUST(^2) ≥ 1?</td>
<td>□</td>
<td>voedingsassistent of</td>
<td>diëtist inschakelen</td>
</tr>
<tr>
<td><strong>vallen</strong></td>
<td>patiënt gevallen afgelopen half jaar?</td>
<td>□</td>
<td>risicofactoren</td>
<td>inventariseren</td>
</tr>
<tr>
<td><strong>delfier</strong></td>
<td>score(^3) ≥ 1?</td>
<td>□</td>
<td>3 x daags DOSS</td>
<td>afnemen</td>
</tr>
</tbody>
</table>

aantal risicofactoren

patiënt jonger dan 80 jaar? Vraag bij 3 of 4 risicofactoren  ➔ **RODE VLAG**

patiënt 80 jaar of ouder? Vraag bij 1 of meer risicofactoren  ➔ **RODE VLAG**
Welkom bij de APOP app. Start een test door te kiezen waar de patient zich bevindt.

Waar bevindt de patient zich?

Demographics
- Age (p r 5 y ars increas)
- F•male
- Living in residential care or nursing hom
- High education
- Severity of disease indicators
- Arrival by ambulance
- Triag c:t gory
  - Standard (Green)
  - Urgent (Yellow)
  - Very urgent (Orange)
- Fall-related ED visit
- Indication for vital measurements
- Indication for blood test(s)
- Geriatric measurements
- Number of different medications
- Use of walking device
- Needs help bathing/showering
- Needs help dressing
- Hospital admission in past 6 months
- Needed help prior to ED visit
- History of dementia
- Disoriented in time
Clinical intuition predicts adverse outcomes in older medical emergency patients

N Zelis, PhD student
Zuyderland Medical Centre, the Netherlands
Clinical intuition: what is that?

• Healthcare professionals have a gut feeling whether ‘something might be wrong’ with their patients.

• This feeling is already present within the first seconds or minutes of contact.

• Patients (or their caregivers) might also have this gut feeling.
Background and objective

• Older patients (≥65 years) experience high rates of adverse outcomes after an emergency department (ED) visit. ¹,²

• Reliable tools to predict adverse outcomes in older ED patients are lacking.

• To determine the discriminatory value of clinical intuition of nurses, physicians and patients for: 30-day mortality

---


Methods

• Prospective, multi-centre observational cohort study.
• Medical ED patients (≥65 years of age)

• Patients:
  - severity of illness score
  - severity of concern score
  - self-rated health score

• Nurses and physicians:
  - severity of illness score
  - severity of concern score
  - SQ: “Would you be surprised if this patient died within the next 30 days?”

• Scores filled in during first stage of the ED visit

Results: Patient Characteristics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>All patients N=602</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>79 (7.5)</td>
</tr>
<tr>
<td>Male (n, %)</td>
<td>311 (51.7)</td>
</tr>
<tr>
<td>Community-dwelling</td>
<td>522 (86.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of Experience (median, IQR)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>3 [1-15]</td>
</tr>
<tr>
<td>Physician</td>
<td>2 [1-3]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day all-cause mortality</td>
<td>66 (11.0)</td>
</tr>
</tbody>
</table>
a) Severity of illness score

- Score 1: not at all
- Score 2: mildly
- Score 3: moderately
- Score 4: very
- Score 5: extremely

b) Severity of concern score

- Score 1: not at all
- Score 2: mildly
- Score 3: moderately
- Score 4: very
- Score 5: extremely

c) 30-day surprise question

- Score 1: yes
- Score 2: probably yes
- Score 3: don't know
- Score 4: probably no
- Score 5: no

d) Self-rated health

- Score 1: very good
- Score 2: good
- Score 3: fair
- Score 4: poor
- Score 5: very poor
Discriminatory values of intuition scores for mortality are sufficient (patients) to good (professionals)

<table>
<thead>
<tr>
<th></th>
<th>Without cut-off</th>
<th>With cut-off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AUC (95% CI)</td>
<td>Cut-off</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity of illness score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient</td>
<td>0.69 (0.62 – 0.76)</td>
<td>4</td>
</tr>
<tr>
<td>Nurse</td>
<td>0.71 (0.64 – 0.78)</td>
<td>4</td>
</tr>
<tr>
<td>Physician</td>
<td>0.72 (0.65 – 0.79)</td>
<td>4</td>
</tr>
<tr>
<td>Severity of concern score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient</td>
<td>0.64 (0.56 – 0.71)</td>
<td>4</td>
</tr>
<tr>
<td>Nurse</td>
<td>0.75 (0.68 – 0.81)†</td>
<td>3</td>
</tr>
<tr>
<td>Physician</td>
<td>0.75 (0.68 – 0.81)†</td>
<td>4</td>
</tr>
<tr>
<td>30-day SQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>0.73 (0.66 – 0.80)</td>
<td>4</td>
</tr>
<tr>
<td>Physician</td>
<td>0.74 (0.68 – 0.81)</td>
<td>4</td>
</tr>
<tr>
<td>Self-rated health score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient</td>
<td>0.67 (0.58 – 0.75)</td>
<td>4</td>
</tr>
</tbody>
</table>

AUC = area under the curve
†significantly higher AUC with a p-value <0.05 (de Long test)
Diagnostic accuracy improves, when in agreement

<table>
<thead>
<tr>
<th>Combination of scores</th>
<th>n</th>
<th>LR</th>
<th>Observed Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Severity of illness score agreement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient + Nurse + Physician +</td>
<td>47</td>
<td>6.0</td>
<td>42.6</td>
</tr>
<tr>
<td>Patient - Nurse - Physician -</td>
<td>214</td>
<td>0.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Nurse + Physician +</td>
<td>58</td>
<td>5.1</td>
<td>39.7</td>
</tr>
<tr>
<td>Nurse - Physician -</td>
<td>399</td>
<td>0.5</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Severity of concern score agreement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient + Nurse + Physician +</td>
<td>68</td>
<td>5.9</td>
<td>42.6</td>
</tr>
<tr>
<td>Patient - Nurse - Physician -</td>
<td>156</td>
<td>0.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Nurse + Physician +</td>
<td>94</td>
<td>4.4</td>
<td>36.2</td>
</tr>
<tr>
<td>Nurse - Physician -</td>
<td>256</td>
<td>0.3</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Surprise question agreement</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse + Physician +</td>
<td>34</td>
<td>10.7</td>
<td>52.9</td>
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<td>Nurse - Physician -</td>
<td>319</td>
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<td>4.1</td>
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<td>Nurse score 1 Physician score 1</td>
<td>188</td>
<td>0.1</td>
<td>1.6</td>
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</table>
Conclusions and future perspectives

• First clinical intuition is a useful tool to predict adverse outcomes in older medical emergency patients.

• Teamwork is important: diagnostic accuracy improves when in agreement.

• Future research:
  - validation of these scores and test their reproducibility
  - assessment of the discriminatory value when applied in a later stage of the ED visit or admission.
Any Questions?
The Effect of Statins and Antiplatelet Drugs on D-dimer Levels
A Systematic Review and Meta-Analysis
Introduction

D-dimer is a product of fibrin degradation and can be used to rule out venous thrombo-embolism (cut off 0.5-1.0 µg/ml)

---

**Figure 1: YEARS algorithm**
CTPA=computed tomography pulmonary angiography.
**Introduction**

D-dimer is a product of fibrin degradation and can be used to rule out venous thrombo-embolism (cut off 0.5-1.0 µg/ml)

Do **Antiplatelet Drugs & Statins** (which also have antithrombotic properties) influence D-dimer levels?
Results – Statins

Articles: 307 screened → 22 articles included

Participants: 18052

Affected by:
- Cardiovascular disease
- Dyslipidemia
- HIV
- Others, including 1 study on healthy volunteers

- 7 Controlled Trials
- 11 Cohort Studies
- 4 Cross-sectional Studies
Results – Statins

Meta Analysis

<table>
<thead>
<tr>
<th>Study name</th>
<th>Std diff in means</th>
<th>Std diff in means and 95% CI</th>
<th>Statistics for each study</th>
<th>Std diff in means</th>
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<tbody>
<tr>
<td>Adams et al. 2013</td>
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<td>Balmann et al. 2006</td>
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<td>Calza et al. 2017</td>
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<td>Chang et al. 2002</td>
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<td>Costeijn et al. 2017</td>
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<td>Eckardt et al. 2014</td>
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<td>Hölschermann et al. 2000</td>
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<td>Sejbel et al. 2002a</td>
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<td>Tankin et al. 2015</td>
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<td>Trillo et al. 2003</td>
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<td>van de Ree et al. 2003a</td>
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<td>Wada et al. 1992</td>
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<td>Weiss et al. 2016</td>
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<tr>
<td></td>
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</table>

Variances, Lower/Upper limits, Z-values, p-values.
Results – Antiplatelet Drugs

Articles: 1000 screened → 17 articles included

Participants: 1117

Affected by:

• Cardiovascular disease
• Atrial fibrillation
• Others, including 2 studies on healthy volunteers
# Results – Antiplatelet Drugs

<table>
<thead>
<tr>
<th>Study name</th>
<th>Std diff in means</th>
<th>Std error</th>
<th>Statistics for each study</th>
<th>Std diff in means and 95% CI</th>
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<tbody>
<tr>
<td>Hashing</td>
<td>-0.2665</td>
<td>0.3888</td>
<td>Variance: 0.1512, Lower limit: -1.0286, Upper limit: 0.4956, Z-Value: -0.6853, p-Value: 0.4931</td>
<td>![Graph showing the difference in means and 95% CI for Hashing study]</td>
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<td>SB</td>
<td>-0.3001</td>
<td>0.2195</td>
<td>Variance: 0.0482, Lower limit: -0.7304, Upper limit: 0.1301, Z-Value: -1.3674, p-Value: 0.1715</td>
<td>![Graph showing the difference in means and 95% CI for SB study]</td>
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<tr>
<td>KM, Kim HV</td>
<td>-0.1747</td>
<td>0.2069</td>
<td>Variance: 0.0428, Lower limit: -0.5802, Upper limit: 0.2307, Z-Value: -0.8448, p-Value: 0.3982</td>
<td>![Graph showing the difference in means and 95% CI for KM, Kim HV study]</td>
</tr>
<tr>
<td>Rien</td>
<td>0.1046</td>
<td>0.2024</td>
<td>Variance: 0.0410, Lower limit: -0.2921, Upper limit: 0.5014, Z-Value: 0.5169, p-Value: 0.6052</td>
<td>![Graph showing the difference in means and 95% CI for Rien study]</td>
</tr>
<tr>
<td>Tpopoulos</td>
<td>0.2647</td>
<td>0.3575</td>
<td>Variance: 0.1278, Lower limit: -0.4360, Upper limit: 0.9654, Z-Value: 0.7403, p-Value: 0.4591</td>
<td>![Graph showing the difference in means and 95% CI for Tpopoulos study]</td>
</tr>
<tr>
<td>Ath (Eu...)</td>
<td>1.0500</td>
<td>0.1761</td>
<td>Variance: 0.0310, Lower limit: 0.7048, Upper limit: 1.3952, Z-Value: 5.9615, p-Value: 0.0000</td>
<td>![Graph showing the difference in means and 95% CI for Ath (Eu...) study]</td>
</tr>
<tr>
<td>Eye</td>
<td>0.0292</td>
<td>0.2043</td>
<td>Variance: 0.0417, Lower limit: -0.3713, Upper limit: 0.4296, Z-Value: 0.1429, p-Value: 0.8864</td>
<td>![Graph showing the difference in means and 95% CI for Eye study]</td>
</tr>
<tr>
<td>Hich</td>
<td>-1.6875</td>
<td>0.6721</td>
<td>Variance: 0.4517, Lower limit: -3.0047, Upper limit: -0.3702, Z-Value: -2.5108, p-Value: 0.0120</td>
<td>![Graph showing the difference in means and 95% CI for Hich study]</td>
</tr>
<tr>
<td>Ringer</td>
<td>0.0535</td>
<td>0.2103</td>
<td>Variance: 0.0442, Lower limit: -0.3587, Upper limit: 0.4658, Z-Value: 0.2545, p-Value: 0.7991</td>
<td>![Graph showing the difference in means and 95% CI for Ringer study]</td>
</tr>
<tr>
<td>Gi, a</td>
<td>-0.1408</td>
<td>0.1916</td>
<td>Variance: 0.0367, Lower limit: -0.5163, Upper limit: 0.2347, Z-Value: -0.7348, p-Value: 0.4625</td>
<td>![Graph showing the difference in means and 95% CI for Gi, a study]</td>
</tr>
<tr>
<td>Gi, b</td>
<td>-0.3663</td>
<td>0.2345</td>
<td>Variance: 0.0550, Lower limit: -0.8260, Upper limit: 0.0934, Z-Value: -1.5617, p-Value: 0.1183</td>
<td>![Graph showing the difference in means and 95% CI for Gi, b study]</td>
</tr>
<tr>
<td>Dgi</td>
<td>-0.0299</td>
<td>0.1583</td>
<td>Variance: 0.0250, Lower limit: -0.3400, Upper limit: 0.2803, Z-Value: -0.1886, p-Value: 0.8504</td>
<td>![Graph showing the difference in means and 95% CI for Dgi study]</td>
</tr>
</tbody>
</table>
Conclusion

• There is an association between statin use and reduction of D-dimer, independent of treatment duration and type of statin. This may influence the performance of diagnostic algorithms on suspected DVT

• Antiplatelet drugs do not reduce D-dimer levels
Age-Adjusted D-Dimer
Ready for prime time?
Dr Robert Johnston
Background

➢ DVT and PE (VTEs) are common in clinical practice
➢ Manageable through ambulatory care (MAC)
➢ Inappropriate investigation is a source of lost patient time, safety and financial cost
Investigating VTE

➢ Current investigations require a Wells score to determine pre-test probability then a D-dimer

➢ If LIKELY then request scan

➢ If UNLIKELY, then request D-dimer

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active cancer (treatment ongoing, within 6 months, or palliative)</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis or recent plaster immobilisation of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden for more than 3 days or major surgery within 12 weeks requiring general or regional anaesthesia</td>
<td>1</td>
</tr>
<tr>
<td>Localised tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Entire leg swollen</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling 3 cm larger than asymptomatic side</td>
<td>1</td>
</tr>
<tr>
<td>Pitting oedema confined to the symptomatic leg</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicose)</td>
<td>1</td>
</tr>
<tr>
<td>Previously documented DVT</td>
<td>1</td>
</tr>
<tr>
<td>An alternative diagnosis is at least as likely as DVT</td>
<td>-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical probability simplified score</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT “likely”</td>
<td>2 points or more</td>
</tr>
<tr>
<td>DVT “unlikely”</td>
<td>1 point or less</td>
</tr>
</tbody>
</table>
D-Dimer

➢ High sensitivity: 97%
➢ Low specificity: 3%
➢ Increases with age\(^1\)
   ○ 60-80 years 854 ng/ml
   ○ >80 years 1397 ng/ml
➢ Leads to over-investigation with ultrasound or CTPA

![Average D-Dimer by age](adapted from [1])
Age-Adjusted D-Dimer 1

- Investigated in recent years for safety related to patient care and cost-saving potential
- Calculated by patient age/100 which gives new threshold value as shown in table below

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Standard cut off value (mg/L FEU)</th>
<th>Calculated A2D2 (mg/L FEU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>70</td>
<td>0.5</td>
<td>0.7</td>
</tr>
<tr>
<td>80</td>
<td>0.5</td>
<td>0.8</td>
</tr>
</tbody>
</table>
Aims

➢ To assess if patients referred to MAC for assessment of possible VTE were investigated appropriately using an age-adjusted D-dimer (A2D2) over a 2 month period in 2016

➢ Compare the results with the previous audit of 2015 and see if the introduction of the A2D2 has had an impact on:
  o Cost
  o Number of scans
  o Patient safety
Method

➢ Review computer records of D-dimers taken in MAC and A&E in January and April 2016

➢ Patient episode then reviewed for:
  o Why was D-dimer taken and was it an ambulatory care patient?
  o Was a scan performed? If so what was result?

➢ Calculate if a scan should have been avoided if using A2D2
Results 1

➢ Number of patients over 50 years attending MAC for possible VTE:
  o 269 patients:
    • 145 had negative scan for VTE
    • 49 had positive scan for VTE
    • 75 not scanned
Results 2

Outcome for patients investigated for VTE on MAC:

- 54% Aged >50 and negative USS
- 28% Aged >50 and positive USS
- 18% Aged >50 but no scanned performed
Results 3

➢ After reviewing the notes with age adjustment; of 269 patients:

➢ 136 (51%) patients required a scan due to positive D-dimer (after age adjusting) (unavoidable scan)

➢ 75 (28%) patients were reviewed in MAC but not scanned (therefore presumed to have a negative Wells and negative D-dimer)
  o 14 of these patients had a negative A2D2 in MAC
  o 20 patients were seen in A&E and not referred to MAC due a negative A2D2; therefore these patients were not further investigated for VTE
Results 4

➢ After reviewing the notes with age adjustment; of 269 patients:
   o 30 (11%) patients had a scan when A2D2 would have removed the indication for it (potentially avoidable scans by age adjustment):
     • 3 (10%) were positive for VTE
     • 27 (90%) were negative for VTE
Results 5

Potential outcomes for scans performed on MAC after adjusting D-dimer for age:

- 51% Necessary scans
- 28% Potentially avoidable scans using A2D2
- 10% Potentially avoidable scans as DD negative
- 11% Scan not performed
Discussion 1

➢ How many scans were avoided?

○ In total 34 scans were avoided:
  • 14 scans were avoided in MAC over the two month audit period
  • 20 patients avoided a scan and a referral to medicine over the two month audit period
Discussion 2

Patients who would potentially have had VTE ‘missed’:

- 3 patients had a negative A2D2 but a positive USS:
  - Patient 1: 88 year old, DD 0.73, Wells 3, history colon cancer, positive calf vein DVT
  - Patient 2: 75 year old, DD 0.72, Wells 4, recent fem-pop bypass with 2/52 swelling, positive calf vein DVT (unable to see flow)
  - Patient 3: 78 year old, DD 0.52, Wells 3, on Rx for NHL,
Conclusion 1

Actual savings

- The data shows that 14 patients seen in MAC did not have a scan due to using the A2D2, all of whom would have had a scan in 2015:
  - Resulting in a saving of £799 (€907) in the cost of scans (potentially £4,794 (€5,441) per annum)

- 20 patients had a negative A2D2 in A&E and did not have onward referral to MAC:
  - Saving £1,185 (€1,345) in the cost of scans (estimated £7,110 (€8,070) per annum)
  - Saving £6,500 (€7,378) by avoiding referral to MAC (estimated £39,000 (€44,266) per annum)
Conclusion 2

➢ Taking into account the scans and MAC referrals avoided, this equates to a saving of:
  • £8,484 (€9,629) over the audit period
  • £50,904 (€57,775) per annum
Conclusion 3

➢ A2D2 can save patient time, limit radiation exposure and lower costs for the trust

➢ Three patients, out of the 64 who had a negative A2D2, were found to have a positive USS for DVT resulting in a false negative rate of 4%

➢ The three patients who could have had a missed DVT all had a positive Wells score. This reinforces that D-dimer should be used in conjunction with a Wells score
Limitations

➢ Of the 20 A&E patients not referred to MAC (due to a negative A2D2) it is likely that a proportion of these patients would have either no indication or only a small indication for a D-dimer to have been taken. It is likely that most were taken in triage prior to seeing a medic and a differential diagnosis being made.
References


Thank you
SAMsterDAM2
LIFE IN THE DAM
Connecting Protecting Liberating
Hotel Novotel, Amsterdam City
3-4 May 2018

Adherence to Geriatric Emergency Department guidelines in routine care

Laura Blomaard, PhD candidate
Department of Internal medicine – Gerontology & Geriatrics
Leiden University Medical Center
Acutely Presenting Older Patient

screening

High risk

interventions
Acutely Presenting Older Patient Program

- Screening
  - Not high-risk: Usual care
  - High-risk: ED interventions

  - Hospitalization
    - Geriatric consultation team: Targeted interventions
  - Discharge
    - General practitioner: Targeted interventions
Methods

Implementation study with before-after design
Prospective observational cohort

Inclusion: all ED patients ≥ 70 years

Observations of routine ED care: 8AM-11PM

Patient satisfaction questionnaires
### ACEP Geriatric Emergency Department guidelines

<table>
<thead>
<tr>
<th>Quality improvement</th>
<th>➢ APOP program</th>
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<tr>
<td>Screening for high risk features</td>
<td>➢ Screening for high risk features</td>
</tr>
<tr>
<td>Education</td>
<td>➢ Education on GEM</td>
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</table>

<table>
<thead>
<tr>
<th>Equipment and supplies</th>
<th>➢ Proxy: use of bed, food/drinks</th>
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<tbody>
<tr>
<td>Guidelines for the use of urinary catheters</td>
<td>➢ Proxy: use of urinary catheters</td>
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<tr>
<td>Delirium and dementia</td>
<td>➢ Proxy: family involvement</td>
</tr>
<tr>
<td>Follow-up and transition of care</td>
<td></td>
</tr>
</tbody>
</table>
Results

599 observations on the ED:

- Patients nursed on bed 35.5% (n=201)
- Patients receiving food/drinks 7.1% (n=40)
- Patients receiving urinary catheter 6.4% (n=38)
- Patients in presence of family 88.7% (n=495)
- Number of involved staff (median) 8 (IQR: 5-10)
- Number of door movements (median) 41 (IQR: 24-64)

223 questionnaires of discharged patients:

- Received written discharge instructions 14% (n=29)
Conclusions

- Baseline adherence to Geriatric Emergency Department guidelines is low
- The observed use of urinary catheters and involvement of family seems good
- Room for improvement of hospital bed use, presence of food/drinks, stressful environmental factors and written discharge instructions

➢ First step to improve guideline adherence
➢ Starting point for implementation of system improvement programs
Acutely Presenting Older Patient Program

70% of patients screened are not high-risk and receive usual care.

Patients identified as high-risk proceed to ED interventions:

- Hospitalization:
  - Geriatric consultation team
    - Targeted interventions
  - General practitioner
    - Targeted interventions
- Discharge
Acknowledgements

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Bas de Groot
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Isabel Lewensztain
Jaap Fogteloo
Wouter Dannenberg
Marjan van der Elst
Gijs Willemsen

**Public health & primary care**
Jacobijn Gussekloo

More information
Website:  www.apop.eu
Screen:  screenerapop.eu
: Twitter:  @APOPLeiden

Contact
Email:  L.C.Blomaard@lumc.nl
Twitter:  @BlomaardLC