STEMI Recognition and Intervention: Implementation, Process and the Future

John M Tallon MD MSc FRCPC
VP Medical Programs, Emergency and Health Services Commission
BCAS: British Columbia Ambulance Service

- BCAS responds to the needs of more than 4.4 million British Columbians and attends calls for service across six health authorities covering 944,700 square kilometres.
- BCAS employs nearly 3,700 paramedic and dispatch staff who respond from 184 ambulance stations and three dispatch centres.
- Budget: $300 million
BCAS: British Columbia Ambulance Service

• 2011: BCAS paramedics responded to more than 486,000 events through its fleet of 540 vehicles, including 478 ambulances and 62 support vehicles.

• BCAS also has a fleet of 10 dedicated ambulance aircraft staffed with critical care paramedics who transported more than 7,700 patients throughout the province.

• There are approximately 6,500 FRs in BC
STEMI Pre-Hospital Triage:

Panel

Onset of symptoms of STEMI → 9-1-1 EMS Dispatch → EMS on-scene:
- Encourage 12-lead ECGs
- Consider prehospital fibrinolytic if capable and EMS-to-needle within 30 min

Panel B

Fibrinolysis → Noninv. Risk Stratification

Not PCI capable → PCI capable

Receiving Hospital → Primary PCI

PCI or CABG → Late Hosp Care & Secondary Prev

American Heart Association

*Golden Hour = First 60 minutes

Total Ischemic time: Within 120 min*
STEMI Criterion:

Software interpretation of probable STEMI

Or

ACP interpretation of ≥ 1 mm ST elevation in two anatomically contiguous leads*

(*completion of STEMI Workshop required)
12-Lead Transmission Outcome: GVRD Only

<table>
<thead>
<tr>
<th>Period</th>
<th># of Transmissions</th>
<th>STEMI's</th>
<th>Not a STEMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec '08 to Feb '09</td>
<td>45</td>
<td>33</td>
<td>12</td>
</tr>
<tr>
<td>Mar to May</td>
<td>72</td>
<td>56</td>
<td>16</td>
</tr>
<tr>
<td>Jun to Aug</td>
<td>56</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>Sept to Nov</td>
<td>67</td>
<td>48</td>
<td>19</td>
</tr>
<tr>
<td>Dec to Feb'10</td>
<td>56</td>
<td>35</td>
<td>21</td>
</tr>
</tbody>
</table>

Transmissions = 296  STEMI = 214 (72%)  Not a STEMI = 82 (28%)
ACP Over-Reads (Recognize STEMI's)

ECG Over Read | Confirmed STEMI
Transmissions = 73/296  STEMI = 19 (26%)
12-Lead Transmission Outcome

Dec '08 to Feb '09: 45 transmissions, 33 STEMI's, 12 Not a STEMI
Mar to May: 72 transmissions, 56 STEMI's, 16 Not a STEMI
Jun to Aug: 56 transmissions, 42 STEMI's, 14 Not a STEMI
Sept to Nov: 67 transmissions, 48 STEMI's, 19 Not a STEMI
Dec to Feb'10: 56 transmissions, 35 STEMI's, 21 Not a STEMI

Transmissions = 296
STEMI = 214 (72%)
Not a STEMI = 82 (28%)

ACP Over-Reads Recognize STEMI's

Dec '08 to Feb: 14 ECG Over Read, 3 Confirmed STEMI
Mar to May: 17 ECG Over Read, 6 Confirmed STEMI
Jun to Aug: 13 ECG Over Read, 5 Confirmed STEMI
Sept to Nov: 13 ECG Over Read, 3 Confirmed STEMI
Dec to Feb'10: 16 ECG Over Read, 2 Confirmed STEMI

ECG Over Read Transmissions = 73
STEMI = 19 (26%)
ACP STEMI Recognition Accuracy

Dec '08 to Feb: 45 Transmissions, 33 STEMI's, 73 STEMI Accuracy - %
Mar to May: 56 Transmissions, 56 STEMI's, 78 STEMI Accuracy - %
Jun to Aug: 56 Transmissions, 42 STEMI's, 75 STEMI Accuracy - %
Sept to Nov: 67 Transmissions, 48 STEMI's, 72 STEMI Accuracy - %
Dec to Feb'10: 56 Transmissions, 35 STEMI's, 72 STEMI Accuracy - %
Performance Time Measures: 10 Months

- **EMS to Balloon**
  - Median = 93

- **ED to Balloon**
  - Median = 60
  - Median = 48

- **On Scene Duration**
  - Median = 34
  - Median = 21

- **First ECG**
  - Median = 8

- **Delivery to Hospital**
  - Median = 8

- **Contact to Hospital**
  - Median = 48

- **Median**
  - 60
  - 34
  - 21
  - 8

- **Time Periods**
  - Dec'08 to Feb'09
  - Mar to May
  - Jun to Aug
  - Sept to Nov
  - Dec to Feb'10
  - Mar to May
  - Jun to Aug

- **Data Set Size**
  - N=301
Vancouver Island: Pre-Hospital System Performance

Excluding Cardiac Arrests & Clinical Decision to Delay
(Median Scores Presented)

AHA Goal = 90 mins

180 STEMI’s per year
Best Practice Initiatives:

1. STEMI Coordinator:

   Liaison with Health Authorities, ACP crews, medical oversight, operations, technology groups, tracks false positives, identifies and resolves issues; clinical feedback

2. Clinical Feedback:

   Timely provision of feedback to all crews attending a STEMI event; includes performance times and any educational materials as required

3. STEMI Workshop:

   4 hour workshop focusing on acquisition of a high quality 12-lead; STEMI recognition; transmission of 12-lead; troubleshooting; protocol algorithm
PCP STEMI Recognition and Intervention Clinical Trial: STRICT

- In certain geographic areas of lower mainland of BC, (Fraser Valley), PCPs were involved in large number of STEMI primary transfers
- As per current practise, these were often transports to non-PCI Hospitals
- Secondary transfer may then have to be undertaken by ACP crews...
Fraser Valley - ACP/PCP STEMI Transports to Hospital

April/09 to Dec/11

n=1022
PCP STEMI Recognition and Intervention Clinical Trial

PCI Hospital

Trial PCP Units (12-Lead capability)

Non-PCI Hospital

Fraser Valley Catchment
British Columbia Ambulance Service

Vision
To be a world leader in the provision of emergency medical services

Mission
To provide timely and high quality emergency medical services

We do this by:
- caring for and about our patients and staff;
- providing creative solutions for changing health care needs;
- collaborating with our partners in the health care system and the community as a whole.

Values
In fulfilling our mission, we recognize that the patient is the focal point of BC Ambulance Service. We will, individually and corporately, uphold the following values:

Professionalism — a conscientious awareness of our dual role as emergency health care/public safety personnel, high ethical standards, and a personal commitment to achieving a caring, high quality service and positive public image.

Accountability — providing appropriate, evidence-based, cost-effective services.

Responsiveness — striving to meet the needs of patients and their families, colleagues, our stakeholder partners, communities, government and allied agencies.

Teamwork — working collaboratively to achieve success.

Wellness — building a workplace in which employee health, safety and well-being, and patients' quality of care, are mutually supported and reinforced.
Special Thanks to Drs. Jim Christensen and Karen Wanger

Thank you

Contributions by: Carl Glinsbockel; ACP
BCAS STEMI Coordinator