Heartbeat: Improving AMI care in Irish hospitals

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Background
Ireland has one of the highest rates of mortality from coronary heart disease in Europe. A national study, CCU 2003, showed an in-hospital mortality from acute myocardial infarction (AMI) of 9%. In 2005 a campaign (‘Heartbeat’) was initiated to reduce in-hospital mortality using the American Institute for Healthcare Improvement (IHI) methodology in five initial hospitals.

Aim
To save lives by a) increasing % of patients who receive key components of care for AMI (unless contraindicated) and b) reducing in-hospital mortality from major heart attack – termed ST elevation MI (STEMI). Key components of care (n=8) - aspirin on admission and discharge, beta blocker on admission and discharge, timely reperfusion, ACEI or ARB on discharge, lipid lowering drug on discharge and referral for smoking cessation advice.

Methods
We decided to use the IHI methodology as it was thought to be a simple, evidenced based set of interventions which would be measurable. IHI methodology uses the Plan, Do, Study, Act (PDSA) cycle to recognise and implement improvements and supports quality improvement processes. IHI methodology also encourages the spread of improvement to other interventions and hospitals. In adherence with this methodology we:
1. Developed an Irish ‘How to’ kit and a simple single page (double-sided) data entry form.
2. Sought interest from 5 hospitals initially and visited each, meeting the multidisciplinary team – Cardiologists, ED consultants and management.
3. Trained at least one person in each hospital in the PDSA approach with benefit of an IHI Fellow from Belfast, Northern Ireland.
4. Initiated collection of data on STEMI patients in each hospital in October 2006 after piloting the data form.
5. Established analysis and developed feedback bulletins quarterly showing each hospital’s performance against the aggregate of all hospitals.
6. Encouraged each hospital to initiate their own quality improvement programme to improve in areas indicated in the reports.

What we found after 36 months of Heartbeat

- **Therapy on admission** – Achievement of 90% or greater performance in 8 (of 9) hospitals for aspirin and in 5 hospitals for beta blocker (figure 1)
- **Timely Reperfusion Therapy** – 78% of patients were given reperfusion therapy with 20% contraindicated (figure 4), Timely reperfusion therapy for the 36 month period was 72.9% (figure 1), with fluctuation across time periods (figure 3). In the past year (Oct 2008 to Sept 2009) one hospital has achieved over 90% timely reperfusion therapy for the first time.
- **Therapy on discharge** – Achievement of 90% or greater performance in all 9 hospitals for aspirin and lipid lowering drugs, but only by 7 hospitals for beta blockers, 5 hospitals for ACE inhibitors/ARBs and 4 hospitals for smoking cessation counseling. Around 37.6% of STEMs were smokers and smoking cessation advice was given for over 95% of the these patients (figure 2).
- **In Hospital Mortality** - In-hospital mortality improved significantly from year 1 (12.4%) to year 2 (7.3%). Further improvement was seen in year 3 (5.4%) but not reaching significance (figure 5).

![Figure 1: Admission medications and reperfusion therapy - Oct 2006 to Sept 2009](image1)
![Figure 2: Discharge medications & smoking cessation - Oct 2006 to Sept 2009](image2)
![Figure 3: 6-monthly timely reperfusion therapy for all hospital data - Oct 2006 to Sept 2009](image3)
![Figure 4: STEMI reperfusion data for all 9 hospitals – 36 months](image4)
![Figure 5: In-hospital mortality rates by year for all hospital data - Oct 2006 to Sept 2009](image5)
**Heartbeat: Improving AMI care in Irish hospitals**

**Comparison with international AMI care programmes**

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<tr>
<td>Early ASA</td>
<td>97.5%</td>
<td>NA</td>
<td>97.4%</td>
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<tr>
<td>Early Beta Blockers</td>
<td>94.5%</td>
<td>NA</td>
<td>94.7%</td>
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<tr>
<td>Timely Reperfusion</td>
<td>Throm 75.9% PPCI 70.2%</td>
<td>Throm 83% PPCI 84%</td>
<td>Throm 51% PPCI 72.3%</td>
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<tr>
<td>ASA on discharge</td>
<td>98.0%</td>
<td>98%</td>
<td>97.2%</td>
</tr>
<tr>
<td>Beta Blockers on discharge</td>
<td>97.1%</td>
<td>93%</td>
<td>97.2%</td>
</tr>
<tr>
<td>ACEI/ARB for LVF</td>
<td>94.5%</td>
<td>92%</td>
<td>91.5%</td>
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<tr>
<td>Smoke cess. advice</td>
<td>95.8%</td>
<td>NA</td>
<td>98.2%</td>
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<tr>
<td>Lipid lowering meds</td>
<td>97.2%</td>
<td>97%</td>
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**What we have done to improve quality in AMI care**

We have adapted and promoted the IHI approach to quality improvement which includes the PDSA cycle through presentations, examples, reference in documentation, and training of data collators in each hospital. The IHI approach points to local improvement teams that: set clear aims; establish measures that will tell if changes are leading to improvement; identify those changes that are likely to lead to improvement; and use the Plan-Do-Study-Act (PDSA) cycle to conduct small-scale tests of change in real work settings by: - planning a test, trying it, serving the results, acting on what is learned; and repeating the cycle to spread the change.

We reviewed our approach to Heartbeat improvement relating to Kotter’s eight steps to successful change - increase urgency; build the guiding team; get the vision right; communicate for buy-in; empower action; create short-term wins; don’t let up; and make change stick.

**What participants have said about Heartbeat**

*The Heartbeat bulletin data is extremely useful. We were very concerned about the previous quarterly report on our delays to reperfusion therapy. Based on this we audited our delays to therapy for the 4th quarter of 2009. A number of correctable issues were identified and changed…. We looked at the time to triage, time to 1st dr review, time to diagnosis, time to cardiology review, time to lab/lysis and time to balloon. There were delays in each of these…. Since then we have had 9 STEMI patients and the mean door to balloon time has fallen to just under 52 minutes (down from 107 minutes).* Consultant Cardiologist and Heartbeat data collator

*It [Heartbeat] has heightened awareness of reperfusion times and has encouraged improvements. Regular bulletins are necessary to maintain vigilance. As a result of Heartbeat there has been an increased communication between Emergency Department and Cardiology teams. There is a heightened awareness in the Cath Lab to ensure that the necessary data required is recorded accurately. It has created an environment of high achievement to reach and maintain the gold standards, and anything below this is scrutinised and steps are taken to avoid future delays.* Heartbeat data collator

*The monthly [Heartbeat data] presentations of patients presenting with an acute STEMI continues. At this presentation there is a discussion about the patient's ECG and if applicable the reason for delay in administering thrombolysis. On discussion with the A&E consultant and doctors they find this most useful and feel it has been very beneficial.* Heartbeat data collator

**What has worked well**

- Heartbeat programme is welcomed by hospitals and hospital teams.
- Heartbeat has produced its own documentation – a data sheet, an Irish ‘How to’ kit and quarterly bulletins – accepted well by stakeholders.
- There has been a positive reaction to Heartbeat from the Department of Health and Children, and within the HSE.
- A dedicated multi-professional steering group has committed time to data quality, addressing change management and quality improvement.

**What is needed for the future**

- Clear governance in the HSE structure, resting within the ACS programme, and continued top level support for the initiative in association with proposals to implement primary PCI and pre-hospital thrombolysis around the country.
- Opportunities and resources for hospital teams and the Heartbeat project team to meet and discuss issues – meetings/forums/workshops.
- Continued communication and consultation prior to with hospitals joining the programme.
- Better use of information technology (IT) to more efficiently and effectively record and report data.

**Comment and lessons learned**

1. Spending time engaging people about the programme is important and necessary as many of these people will drive change locally.
2. Improving outcomes is an ongoing task not just once off – it is time consuming and requires leadership and persistence.
3. Sustainability of quality improvement is a challenge especially without robust IT and sustainability of leadership is also essential.
4. The major change made to date has been improved communication along with improved training and adjustment of care processes.
5. We discovered that performance was very good in areas previously undocumented and that timely reperfusion is achievable but challenging.
6. Presentation of data needs refinement to convey messages clearly - trend (‘run’) charts are an effective way to present changes over time.
7. Feedback must be timely and this relies on prompt submission of data by participating hospitals and prompt preparation of quarterly reports.

**References**


**Acknowledgements:**

- Heartbeat Phase 2 Steering Committee – (Dr Sobhan Jennings (HSE), Mary Morrissey (HSE), Anne Marie Ogleby (State Claims Agency), Brendan Cavanaugh (HSE), Dr Peter Kearney (Cork University Hospitals), Professor David Kendis (University College Cork), Dr Declan McKown (HSE), Kate O’Donovan (Irish Cardiovascular Nurses Association/ Mater Hospital Dublin), Dr Kathleen Bennett (Trinity College Dublin), Chris Quinn (patient representative))
- Heartbeat (Phase 1) Steering Committee members – Dr Davida De LA Harpe (HSE), Dr Mary Hynes (HSE), Gerry O’Dwyer (HSE)
- The 9 participating Heartbeat Hospitals 2006 to 2009
- Heartbeat data collators within the Heartbeat hospitals

**De LA Harpe (HSE), Dr Mary Hynes (HSE), Gerry O’Dwyer (HSE).**

**Heartbeat data collator**