



Heart Attack Care

Ireland 2016

Report of the National Clinical Programme for
Acute Coronary Syndrome (ACS)

on standardising treatment of patients with STEMI in 2016

May 2018

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Forward

This document sets out the second heart attack report from the national clinical programme for Acute Coronary Syndrome (ACS) with a focus on the Optimal Reperfusion Service (ORS) protocol in its fourth year in operation, 2016.

The national clinical programme for ACS was initiated in 2010, as a joint venture between the Irish Cardiac Society (under the auspices of the Royal College of Physicians of Ireland, RCPI) and the Health Service Executive. Its defined role was to standardise national delivery of treatment of patients with acute coronary syndromes.

The ORS has matured in its four years in operation with expansion of the facilities in the National Ambulance Service to include ECG transmission and a successful cross border negotiation resulting in an ORS service to the population of Donegal in Altnagelvin hospital, Derry, Northern Ireland.

The monitoring programme shows that the shift to PPCI as the main treatment for ST elevation myocardial infarction (heart attack) has been maintained and improved upon in 2016 putting Ireland on a par with international standards or indeed above. Timeliness of this treatment is also improving and the focus now should turn to getting more people straight to the treatment centres as rapidly as possible. This set of achievements is a tribute to the cooperation between the dedicated hospital teams and the ambulance service. The report also outlines areas for more attention going forward especially a focus on smoking cessation counselling.

Having achieved a shift in treatment from thrombolysis in all general hospitals to PPCI in a small number of dedicated centres with attendant pre-hospital development it is important to ensure the sustainability of this service and its monitoring system. To this end the extra staffing resource for each PPCI centre in 2017 to support the programme and especially to put the data collection on a firm footing is a welcome development.

As well as acknowledging the hard work of our colleagues in providing this service we would like to thank all members of the working group and in particular Brendan Cavanagh, programme manager, who has managed all facets of this programme expertly from the beginning, and Prof Kathleen Bennett, RCSI who collaborated on the analysis of Heartbeat database.

Prof Kieran Daly

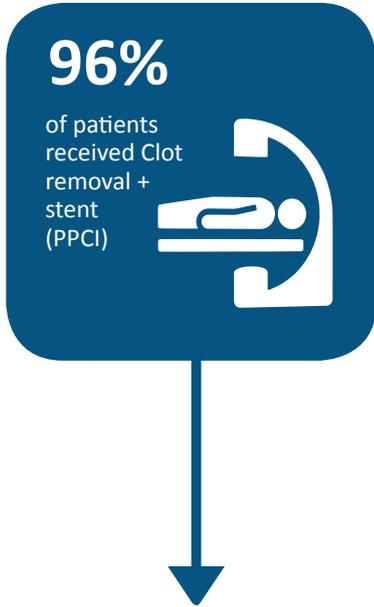
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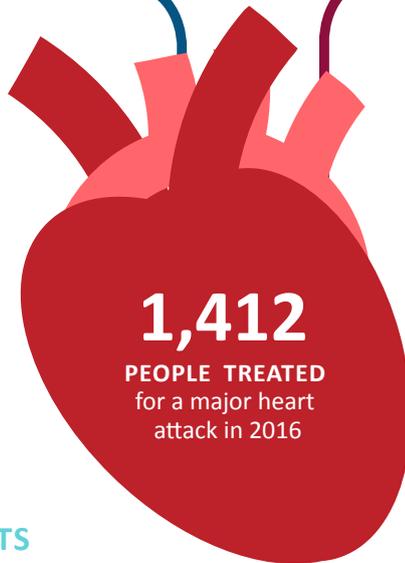
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Progress in Heart Attack care in Ireland, 2016

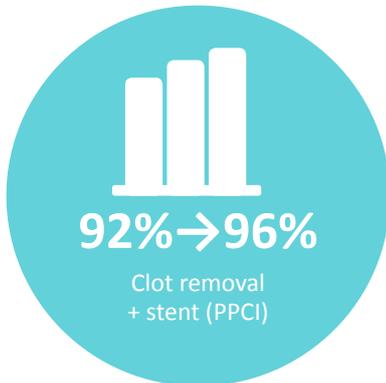
TYPE OF TREATMENT



RAPID TREATMENT (PPCI TREATMENT WITHIN 120 MINUTE)



IMPROVEMENT FOR PATIENTS 2014→2016



IMPROVEMENT FOR PATIENTS 2014→2016



PPCI is a procedure to remove clot and insert stent into coronary artery

DEDICATED PPCI CENTRES ARE:
Mater H, St James' H, Cork U H, Galway U H, U H Limerick (24/7) U H Waterford (9-5pm, Mon-Fri) (+ Altnagelvin H, NI for Donegal)

Executive Summary

The national clinical programme for Acute Coronary Syndrome (ACS) implemented an Optimal Reperfusion Service (ORS) protocol for care of patients with ST elevation myocardial infarction (STEMI) in January 2013 with the aim of saving lives by standardising care across the country. The protocol with its monitoring system, Heartbeat, is operational countrywide for over four years. The purpose of this document is to report on key findings of STEMI care in 2016.

Key features of the Optimal Reperfusion Service

Key features of the ORS include a) an evidenced based protocol, b) a standardised pre-hospital response (presumptive pre-hospital diagnosis with 12 lead ECG transmitted to primary PCI (PPCI) centre followed by rapid transport), c) designated PPCI Centres meeting agreed criteria, and d) standardised response by other hospitals managing 'walk-in' patients. The protocol, the monitoring system and results in 2014 are documented in **Heart Attack Care in Ireland 2014** at <http://www.lenus.ie/hse/handle/10147/620576>

Changes in the protocol since 2014

Changes in the programme since 2014 include a reduction in the number of PPCI centres to six (list page 8) as well as a contracted service from Altnagelvin Hospital, Derry, Northern Ireland for the Donegal population and an increase in the availability of ECG transmission from Ambulance to PPCI centre with all areas due to be covered in Spring 2018.

Results

Data on 1,412 patients with confirmed diagnosis of STEMI were entered by nine of the ten PCI centres in 2016. 96.2% of eligible patients got PPCI in 2016, an increase on 92% in 2014. This compares favourably with England (99.3%), Wales (86%) & Northern Ireland (99.9%).

Timeliness of PPCI improved overall to 71% in 2016 – this was especially evident in patients who arrived directly at the PPCI centre with 82% receiving treatment within 120 minutes from diagnosis compared with 77% in 2014. However, timely PPCI treatment was achieved in only 41% of patients who were transferred from another hospital.

Improvements in the pre-hospital setting in 2016 included an increase in the proportion of positive ECGs (47.3%) undertaken prior to arrival at hospital compared with 2014 (41%), and an increase in patients arriving directly - 66.4% in 2016 compared with 56% in 2014.

Progress in the hospital setting in 2016 included a) an improvement to 87% in the door to balloon (D2B) time within 90 minutes compared with 82% in 2014 with D2B time in Ireland now similar to the UK (89%) and b) an increase in radial access - 86% compared with 59% - such that this is now the dominant route as seen internationally.

While smoking levels are high in STEMI patients (38%) documentation of smoking cessation counselling occurred in only two out of three smokers. Mortality from STEMI decreased consistently over the 4 years from 6.6% to 4.9% in 2016 bringing Irish performance within the European norm.

Next steps

The national ACS working group undertook a review of all PPCI and PCI centres throughout the country in 2017 to assess strengths and weaknesses and steps necessary to maintain the ORS (STEMI) protocol and to introduce a NSTEMI-ACS protocol. The report on this review will be complete in Q2 2018.

Other areas to be addressed include ensuring the sustainability of the monitoring system, instigating national and regional audits and mounting a public awareness campaign to promote the use of 999 or 112 and to increase direct presentations to PPCI for people with chest pain and relevant symptoms.

1. Overview of the ACS programme

Introduction

The national clinical programme for ACS was set up in Ireland in 2010 with the aim of saving lives by standardising the care of ACS patients across the country. The initial focus of the programme for ACS was to develop a national Optimal Reperfusion Service (ORS) protocol for care of patients with STEMI. The ORS protocol was implemented across the country in January 2013.

1.1 Developing the Optimal Reperfusion Service (ORS) protocol

In 2010 – 2011 the national clinical programme for ACS undertook the following reviews and assessments:

- **International evidence base** for primary PCI (PPCI) over thrombolysis was studied along with models of care in place and how the transition to PPCI was undertaken in various countries and populations including site visits and conferences.
- **A review of the situation on the ground** for responding to calls for help, detecting and treating patients with STEMI was undertaken prior to the instigation of the ORS protocol (Box 1.1).
- **Strengths and weaknesses of provision of PPCI in 2010-2011** across the country including the hospital arrangements and the ambulance protocols in place.
- **A needs assessment** was undertaken including the study of the demography and population projections for Ireland as well as a mapping exercise showing that 81% of the population aged 55 years and over lived within a 90 minute drive time of Dublin, Cork and Galway (**Map - page 9**).

A 2010 international review of practice in 30 European countries¹ proposed a provision of one centre per 500,000 to 1 million population. This translated into 4-8 centres for Ireland depending on distribution across the population, existing resources in cardiology centres, required developments and cost.

1.2 Key features of the Optimal Reperfusion Service protocol

The programme for ACS, in conjunction with stakeholders in pre-hospital, hospital settings and the RCPI Clinical Advisory Group, developed the ORS service with key features outlined below. Furthermore, a model of care document was developed to capture the rationale, the protocol and relevant detail available at: <http://www.hse.ie/eng/about/Who/clinical/natclinprog/acsprogramme/modelofcare/>

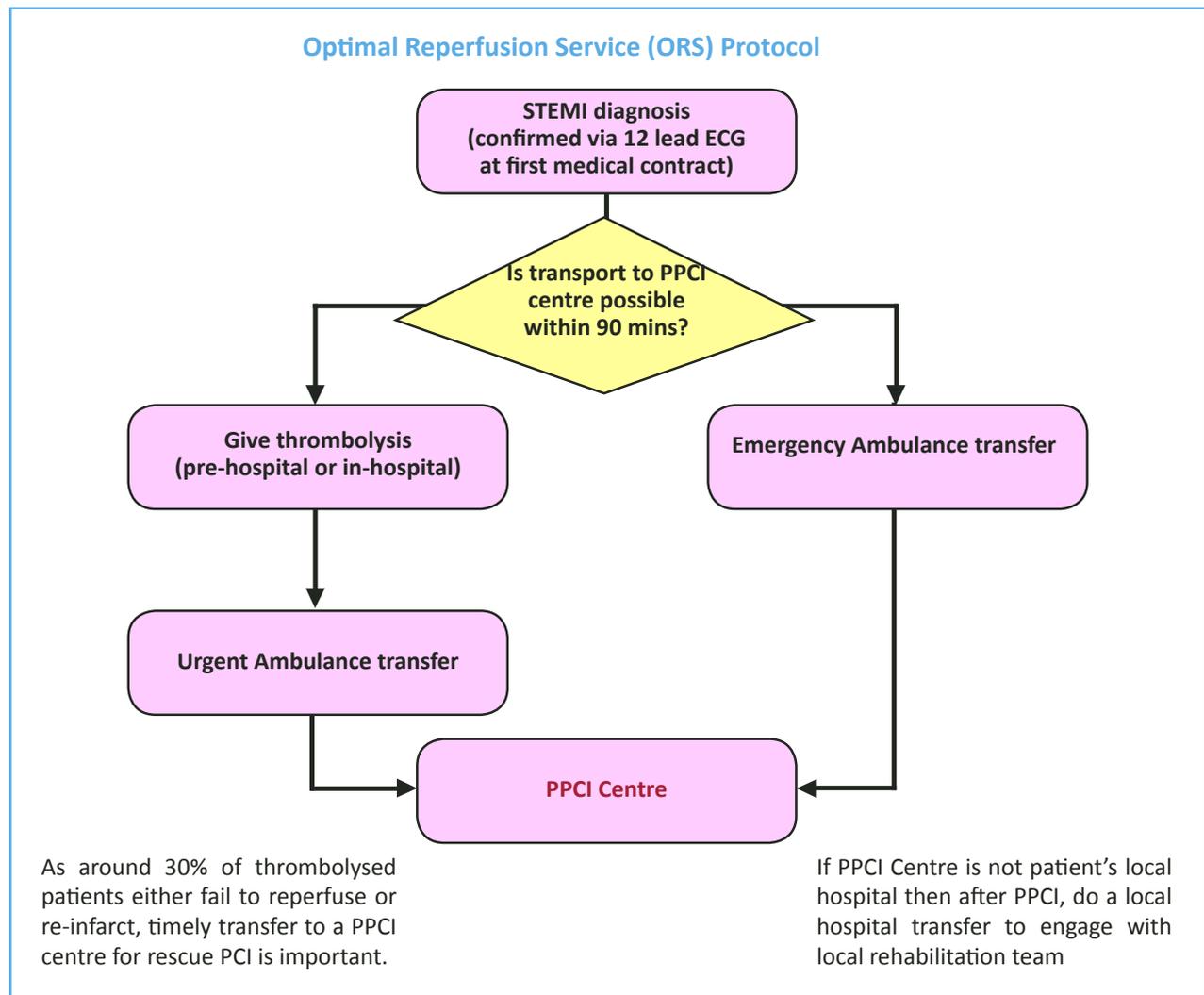
- ORS protocol (Box 1.1) which was initiated in the West and South in October 2012 and implemented nationally in January 2013.

- Standardised pre-hospital response
 - triage, early treatment and transport of patients (including by-pass of local hospitals, equipping vehicles with 12-lead ECGs, training paramedics in ECG use, interpretation and transmission).
 - establishing a 'Code STEMI' freefone line to facilitate direct conversation between ambulance crew and cardiology staff at the PPCI centre as well as direct ambulance access to PPCI centre Catheter labs without going through the Emergency Department.
 - enabling helicopter transfer for STEMI patients to PPCI centre in certain areas

- Designated primary PCI Centres PPCI centres were designated based on population and on current staff and facilities using international best practice principles with the following recommended characteristics:
 - A minimum of 2 cath labs were recommended at PPCI centre to ensure access at all times
 - A minimum roster of 1:5 Interventional Cardiologists was recommended
 - 24/7 provision being the preferred option to avoid confusion.
 - The target for the national PPCI programme being to achieve 80% PPCI initially with 90% achieved after 5 years.
 - National protocol with local adaptation if necessary
 - Standardised data collection as described in <http://www.lenus.ie/hse/handle/10147/620576>

- **Standardised hospital response in a primary PCI Centre (and in referring hospitals)** as well as immediate transport of STEMI patients to a primary PCI centre, the programme for ACS recommended the urgent transfer of the small number of patients who have received thrombolysis as soon as possible to a primary PCI centre to ensure that angiography can be performed in a timely manner.

Box 1.1: ORS protocol – implemented nationally January 2013



1.3 Current situation

Since the establishment of the national protocol in January 2013, there has been one report, Heart Attack care in Ireland 2014 with this second report covering the year 2016. The 2014 report can be viewed at <http://www.lenus.ie/hse/handle/10147/620576>.

Since 2014 the protocol has worked well with the following improvements and changes occurring:

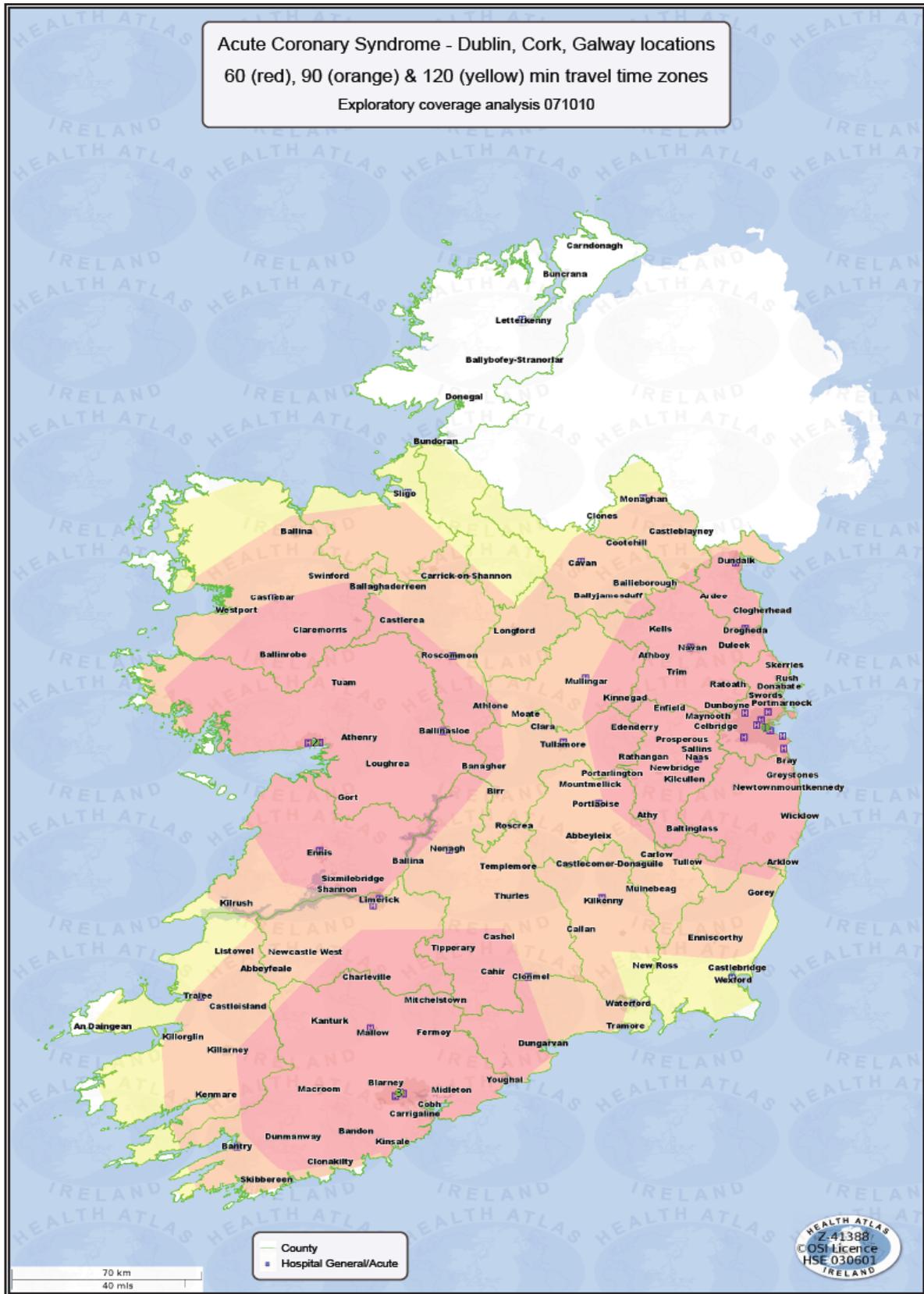
1. The increasing availability of ECG transmission from Ambulance to PPCI centre in 2016 helped to refine the referral process. ECG transmission is currently established in all areas except HSE South.
2. From November 2015, Dublin and its catchment area has been served by Mater Misericordiae University Hospital (MMUH) and St James's Hospital (SJH) with three PCI centres (SVUH, AMNCH and BH) taking 'walk-in' or in-house patients with STEMI during daytime (Mon to Fri).
3. In May 2016 arrangements were finalised for 24/7 PPCI service in Altnagelvin Hospital, Derry, Northern Ireland to be initiated for patients with STEMI from Donegal.
4. The current PPCI centres are outlined in Box 1.2
5. PPCI centres with a wide hinterland (GUH and CUH) have reviewed the need for appropriate use of thrombolysis due to long travel times.

Box 1.2: The designated PPCI centres in 2016

Cork University Hospital (24/7) - CUH	St James's Hospital, Dublin (24/7) - SJH
University Hospital Limerick (24/7) - UHL	University Hospital, Galway (24/7) - UHG
Mater Misericordiae University H, Dublin (24/7) - MMUH	University Hospital Waterford (9-5, Mon-Fri) - UHW
Altnagelvin Hospital, Derry, Northern Ireland (24/7) contracted for Donegal catchment	

Note: PCI centres, St Vincent's University Hospital, AMNCH (Tallaght) and Beaumont Hospital undertake PPCI on self-presenting STEMI patients 9-5, Mon to Fri.

Map Drive times from PPCI centres in Dublin, Cork, Galway



2. Results of monitoring heart attack care

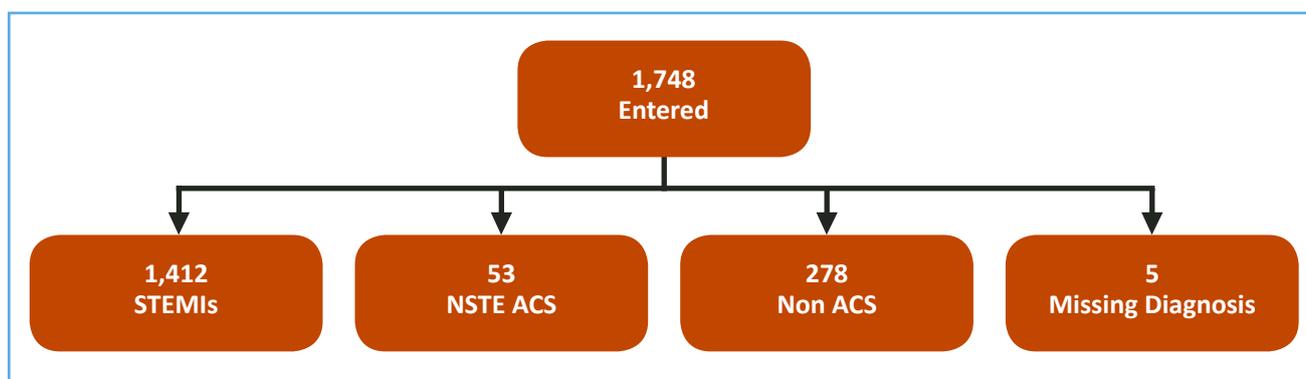
Background

With the initiation of the STEMI optimum reperfusion protocol in 2013 a monitoring system was established which included agreement on clinical indicators, defining a data set, setting up an electronic data collection mechanism in each PCI centre and a number of quality assurance measures including a data governance committee. The details of the monitoring of heart attack care with clinical indicators and underpinning dataset collected electronically and reported upon is available in Heart Attack in Ireland, 2014 at: <http://www.lenus.ie/hse/handle/10147/620576>.

2.1 Results

In 2016, 1,748 cases were entered onto the Heartbeat Portal database by nine of the ten PCI centres in Ireland with 1,412 having a confirmed diagnosis of STEMI. The remaining 336 (20%) cases reflect Cath Lab activation in patients who transpired to have other diagnoses (Box 2.1). The number of STEMI cases is greater than 2014 (n= 1,247) which is likely to reflect increased reporting.

Box 2.1 Reasons for entry on Heartbeat Portal, 2016



Details of key elements of the treatment regimen for all STEMI patients were recorded on Heartbeat Portal by the PPCI/PCI centres whether brought directly or referred from surrounding general hospitals. Hence performance at the PPCI centres reflects the hinterland served, the response of the National Ambulance service, as well as, the functioning of the centre.

2.2 Patient profile

The mean age of patients with STEMI was 62.9 years with an eight year difference between males (60.9 years) and females (69.2 years). Three quarters of STEMI patients were male (76.5%) with little difference in age between males in 2014 and 2016. However females were noticeably older in 2016 (69.2 years) compared with those presenting in 2014 (67.5 years). The current admission was the first myocardial infarction for most patients who presented in 2016 (83.7%). This was similar to 2014.

While documentation of smoking status was higher (90.7% of records) in 2016 the rate of current smoking was lower at 38.3% (44% in 2014). Alarmingly the current smoking rate among those presenting with recurrent myocardial infarction was 30.7%. Type 2 diabetes mellitus was recorded in 15.4% of STEMI patients with the smoking rate in this subgroup of patients also found to be high (33.2%).

2.3 First assessment and presentation

The location of the first positive ECG was either in the ambulance (47.3%) or in the Emergency Department (41.1%) with 5.9% in General Practice and 5.9% in other hospital locations. The proportion of first positive ECGs undertaken in the ambulance in 2016 was significantly increased on 2014 ($p < 0.0001$) which denotes a shift to greater pre-hospital detection and diagnosis.

Two thirds of all STEMI patients (66.4%) presented to the PPCI centre by ambulance either from home/ community/via GP surgery or self-presented to the PPCI centre Emergency Department (DIRECT route), with a further one-third (31.3%) being transferred from a general hospital or non PPCI centre (INTER HOSPITAL transfer). This was broadly similar to 2014. The number of patients transported by helicopter was 83 in 2016, a reduction on the number in 2015 ($n = 128$).

2.4 Acute reperfusion therapy

Acute reperfusion therapy (RT) is outlined in table 2.1 with the final column showing the distribution of STEMI cases being treated across all centres.

- a. *Type of treatment: Overall, of the 1,412 confirmed STEMI patients 1,177 (83.4%) received PPCI, 47 (3.3%) received thrombolysis (TL) with 188 (13.3%) contraindicated or having another reason for receiving no acute reperfusion therapy (table 2.1).*
- b. *Among reperfusion treated patients ($n = 1,224$): 1,177 (96.2%) received PPCI and 47 (3.8%) received TL. Importantly, the rate of PPCI was significantly higher than 2014 (92%) ($p < 0.0001$). All PPCI centres had rates of PPCI above the national target of 80% (Figure 2.1).*
- c. *Timeliness of PPCI ($n = 1,177$): Timeliness of PPCI, first medical contact to balloon (FMC2B) within 120 minutes, was achieved in 832 (70.9%) patients nationally. This is a statistically significant improvement on 2014 report (68.3%) ($p < 0.0001$).*

Variation in timeliness: representing pre-hospital & in-hospital activity, variation still persists for the full treatment window across the 7 PPCI centres (Fig 2.2). Importantly, data from two centres met the national target of 80% PPCI within 120 minutes FMC2B (CUH and UHL) and four centres have shown improvement from 2014 (CUH, UHG, SJH and MMUH). However, four centres remain below the national target of 80% - two in Dublin (MMUH, SJH), UHW and UHG with the latter having a wide hinterland in the West of Ireland. The numbers, reported by Letterkenny Hospital, for patients treated in Altnagelvin Hospital, NI are small with the service starting in May 2016.

The route of admission: For all STEMI patients ($n = 1412$) more people presented directly to PPCI

centre than in 2014 (66.4% compared with 56% in 2014). Furthermore, there was a significant improvement in timeliness of PPCI within the target time window for those arriving by the DIRECT route (82.6% c/w 77% in 2014) ($p < 0.0001$) (Figure 2.3).

In-hospital timeliness: Overall the door to balloon time (D2B) showed an improvement in 2016 (87%) compared with 2014 (82%) with progress in all but two centres (Figure 2.4).

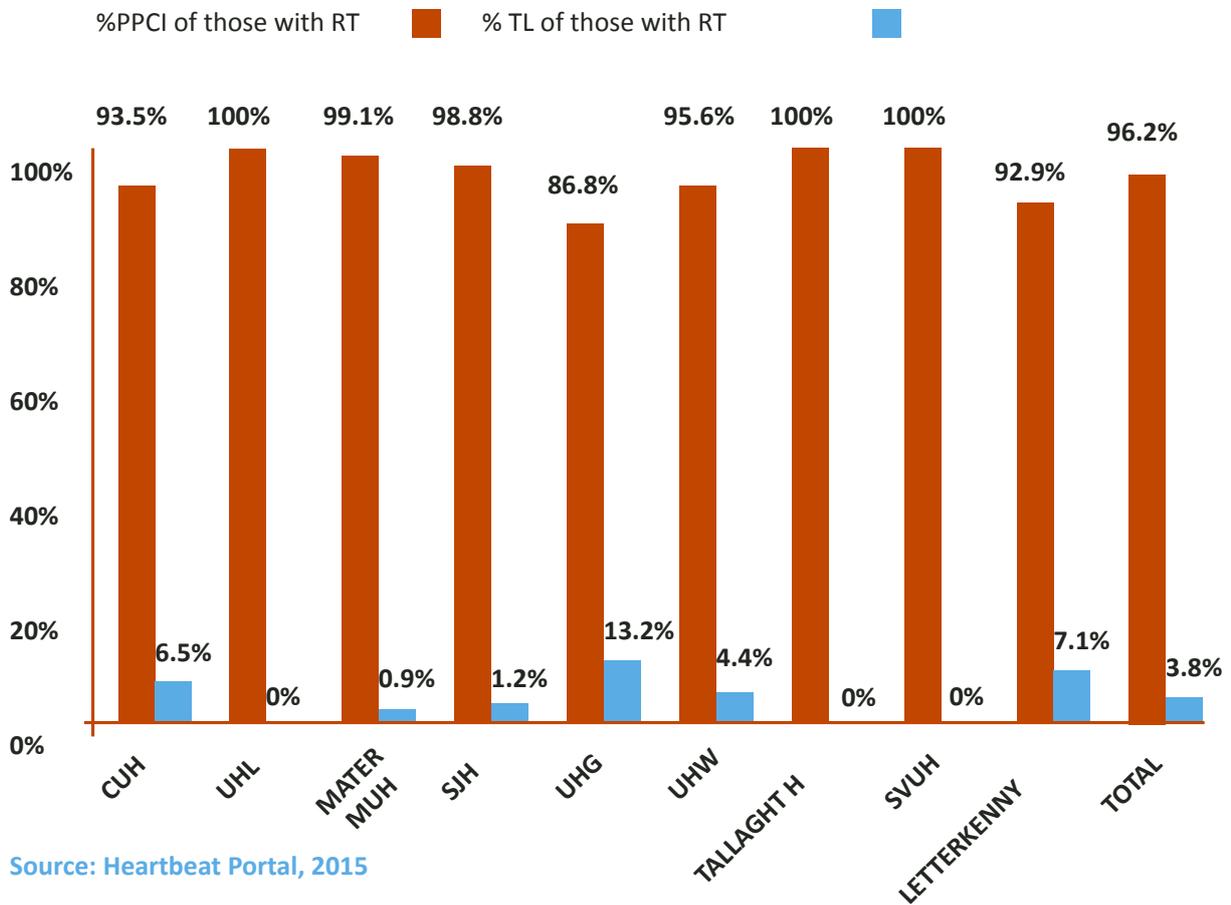
- d. *Timeliness of thrombolysis* (n= 47): Timeliness of thrombolysis (door to needle within 30 minutes) was improved in 2016 (50%) compared with 35% in 2014 but this did not reach statistical significance.
- e. *Arterial access:* Radial access was employed in 85.9% in 2016 compared with 59.9% in 2014

Table 2.1 Acute reperfusion treatment by PCI Centre, 2016

Centre	PPCI	T'lysis	Contra indicated or no RT	Total	% national cases
	n	n	n	n	
UCHG	165	25	19	207	14.7%
UHL	198	0	25	223	15.8%
CUH	172	12	42	226	16.0%
MMUH	215	2	43	260	18.4%
SVUH	12	0	0	12	0.8%
SJH	320	4	40	364	25.8%
WRH	65	3	3	71	5.0%
AMNCH	17	0	17	34	2.4%
Letterkenny/ Altnagelvin hosp	13	1	1	15	1.1%
TOTAL	1177	47	188	1412	100%

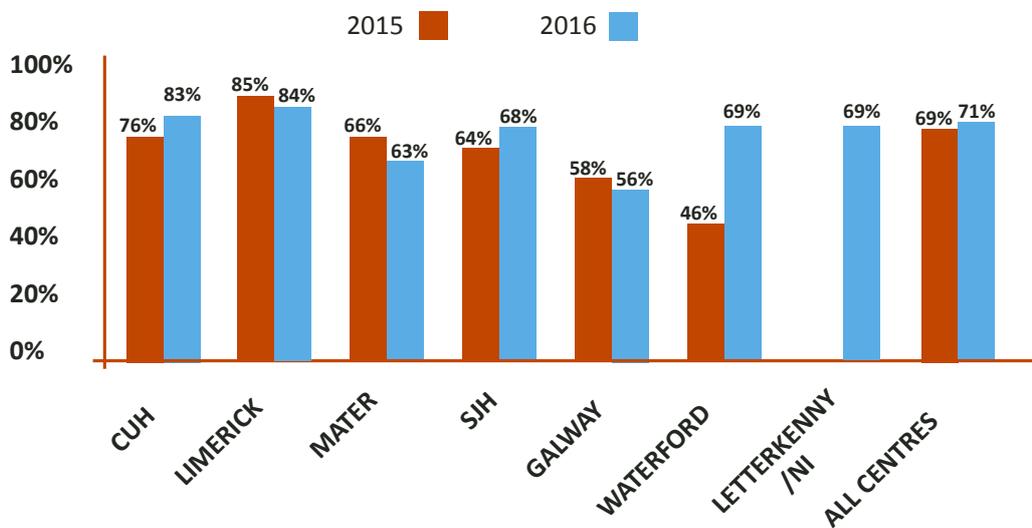
Source: Heartbeat Portal, 2016 (BH data not available)

Figure 2.1 Type of reperfusion therapy among reperfusion treated patients, 2016



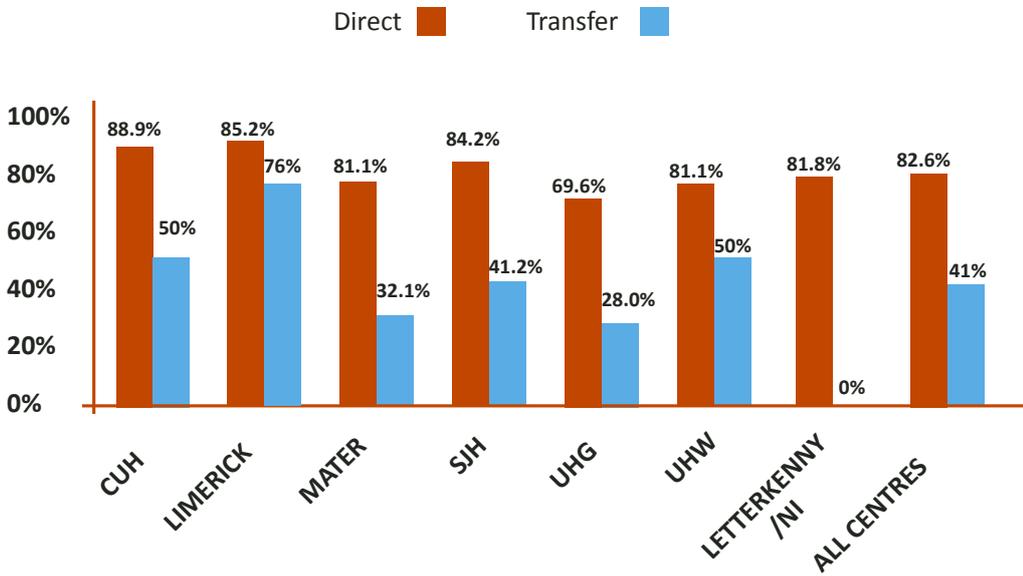
Source: Heartbeat Portal, 2015

Figure 2.2 Timely* PPCI by PPCI Centre, 2015 & 2016



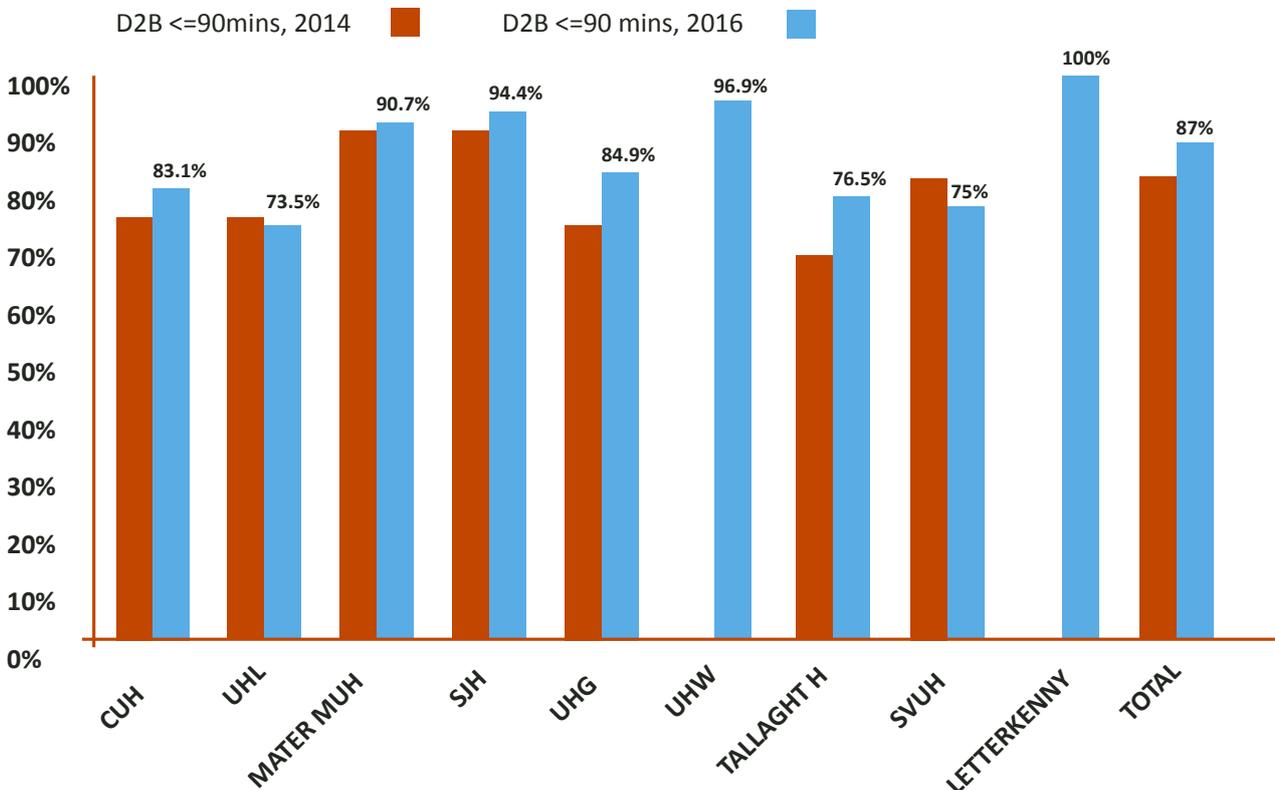
Source: Heartbeat Portal, 2015 & 2016. * Timely = First medical contact to Balloon within 120 minutes

**Figure 2.3 Timely PPCI by route of admission, 2016
(Direct or Inter-hospital transfer)**



Source: Heartbeat Portal, 2016

Figure 2.4 Comparison of Door to Balloon <= 90 mins by PCI Centre, 2014 & 2016



Source: Heartbeat Portal, 2014 & 2016

2.5 Outcome

Mortality: Sixty nine patients died giving an in-hospital mortality rate of 4.9%. The in-hospital mortality rate has declined steadily since 2013 (figure 2.5). Of note is that this data, entered at the PPCI centre, reflect the early and critical time to treatment for STEMI. However, the full treatment window, including time after PPCI on return to the referral hospital, is not included in this statistic.

2.6 Hospital stay

Length of stay: The mean length of stay (LOS) for this group of STEMI patients was 4.6 days, a small reduction compared with 2014 (LOS = 4.94 days).

The shortest LOS at the PPCI centre in 2016 was for inter-hospital transfer patients (LOS 3.2 days) compared to those presenting directly via ambulance/self-presentation (LOS 4.8 days). Of note is the fact that this reflects LOS at a PPCI centre and does not include the LOS in a referral hospital, a feature which will vary across the country. The policy of the Centre in relation to repatriation/discharge may vary: a) return to referral or local general hospital within a number of hours post PPCI, b) repatriation after overnight observation or c) discharge directly home.

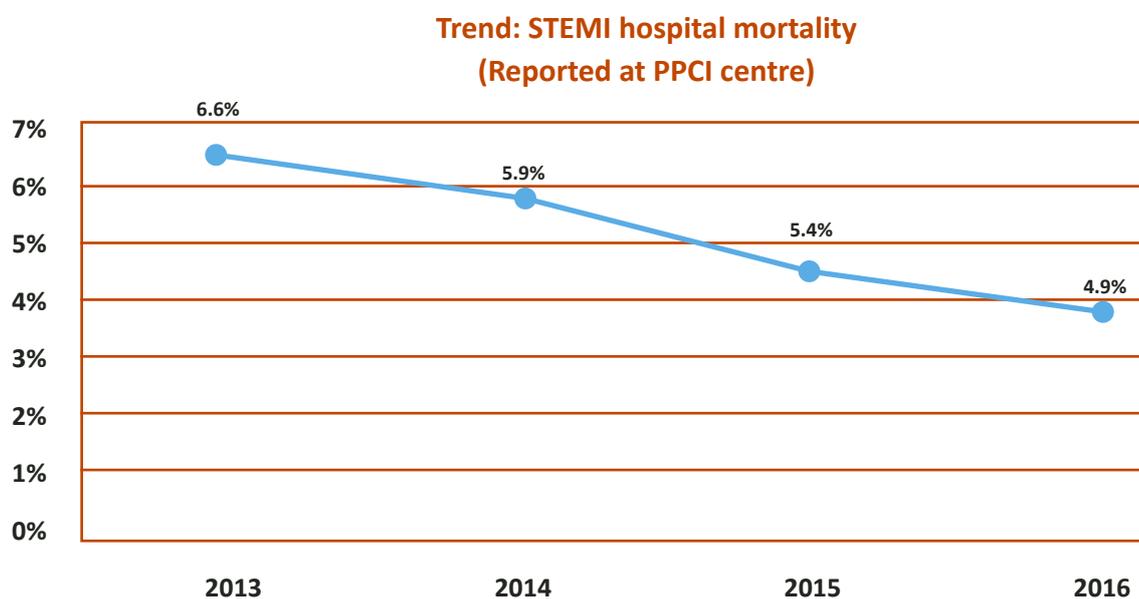
2.7 Secondary prevention

Smoking cessation While smoking rate in patients with STEMI is high (38.3%) smoking cessation counselling was documented in only 68.8% of patients – this was similar to 2014 (72%).

Referral to cardiac rehabilitation (CR) Two thirds of patients (66.2%) were referred to CR, a further one in ten (9.8%) were noted to be ineligible due to co-morbidities and 16.2% declined CR.

Secondary prevention medicines Documentation of anti-platelet medication and statins is very high (~ 90%) for eligible patients (table 2.2). For ACEI/ARBs and beta blocker agents in eligible patients the prescription rate is lower (78% - 84%)

Figure 2.5 Trend in in-hospital mortality for STEMI patients (reported by PPCI centre)



Source: Heartbeat Portal, 2016

Table 2.2 Prescription of secondary prevention medication, 2016

Medication	Eligible patients	Number prescribed medication	%
Aspirin	1337	1264	94.5%
Other anti-platelet	1318	1234	93.6%
Beta blocker	1303	1092	83.8%
ACEI/ARB	1279	996	77.9%
Statin	1332	1187	89.1%

Source: Heartbeat Portal, 2016 Note: missing values 5% - 15%

3. What has been achieved and what is next?

Introduction

The optimal reperfusion protocol (ORS) for patients with STEMI (heart attack) has been successfully implemented across the country for four years now (2013 - 2016). Furthermore a monitoring programme with data collection and performance indicators is in place. This has happened at a time of austerity and major reduction in the health service budget. The purpose of this chapter is to reflect on the key changes as well as areas for further attention after four years of the ORS protocol around the country.

3.1 High proportion of patients getting PPCI – Ireland on a par internationally

There has been an increase in the level of PPCI treatment for STEMI patients in Ireland over the four years of the ORS protocol. 96.2% of eligible patients got PPCI in 2016. This compares favourably with England (99.3%), Wales (86%) and Northern Ireland (99.9%)² and puts Ireland on par with international centres. This is the result of a focussed protocol operated and co-ordinated by skilled ambulance personnel and dedicated specialist cardiology teams in conjunction with colleagues in referral hospitals and General Practice.

3.2 Timeliness of PPCI improving but more to be done

Timeliness of PPCI overall has improved significantly in 2016 (71%) which is evident in most Centres.

Timeliness of PPCI improved especially in patients who get to the PPCI centre *directly* with more than four out of five patients (82.6%) receiving treatment within 120 minutes from diagnosis compared with 77% in 2014. Furthermore, those who go directly to a PPCI centre, whether by ambulance or through their own resources, had double the likelihood of getting timely treatment with PPCI compared with patients who arrived following inter-hospital transfer (41%). Due to difference in treatment times comparison with the UK is not possible.

With the protocol in place since 2013 and many improvements coming to fruition, including widespread availability of ECG transmission, a focus on maximising timeliness is now the next challenge. This means timeliness across the full treatment window (FMC to balloon), direct and inter-hospital transfer windows or in-hospital windows. Ultimately timely recognition at the patient level is also important as well as promoting awareness of calling 999/112 with symptoms in order to trigger early treatment and direct transport to a PPCI centre.

3.3 Improvements in pre-hospital setting

There was a noticeable increase in the proportion of positive ECGs (47.3%) undertaken in the pre-hospital setting prior to arrival at hospital in 2016 compared with 2014 (41%). This is a testament to the work of the NAS in training and equipping personnel.

Further the national ambulance service contributed to the increase in patients presenting directly - two thirds (66.4%) in 2016 compared with 56% in 2014. Of note is that 80% of people are taken directly to PPCI centre in the UK suggesting further work is needed at institutional level as well as increasing awareness among the public.

3.4 Timely treatment within the hospital setting is on a par internationally

Overall the door to balloon time of 90 minutes was increased to 87% in 2016 compared with 2014 (82%) with most centres showing commendable improvements. D2B time in Ireland is now on a par with the UK (89%). Also radial access increased in 2016 (86%) and is now the dominant route as seen internationally.

3.5 Levels of smoking are high and it appears that there is less smoking cessation counselling

While smoking levels are high in STEMI patients, documentation of smoking cessation counselling occurred in only two out of three smokers. This is an area that would benefit from scrutiny as helping the patient to quit smoking is essential and is as important as other treatment measures. Initially it is important to clarify if this is an issue of incomplete documentation or a real reduction in attention to helping smokers to quit?

Notably levels of smoking in those who presented with recurrent STEMI is also high as is smoking among patients with diabetes. As all of these patients have had multiple exposures to healthcare staff the question is – can we do more to help these patients to quit?

3.6 Improved survival

Mortality from STEMI decreased consistently over the 4 years from 6.6% to 4.9%, and while not reaching statistical significance this brings Irish performance within the European norm.

3.7 Next steps include

- **Addressing sustainability of the programme** Activity has shifted from early STEMI treatment in all general hospitals to interventions in PPCI centres along with greater pre-hospital care by the national ambulance service. This has brought challenges including staffing 24/7 rosters, ongoing training and repatriation.
- **Ensuring sustainability of the monitoring system** This monitoring system is new and while data collection has been resourced recently, areas that need attention now are finalising a feedback mechanism (NQAIS ACS), continued focus on quality assurance including a validation exercise, securing leadership and a 'home' for Heartbeat Portal.

To this end the extra staffing resource for each PPCI centre in 2017 to support the programme and especially to put the data collection on a firm footing is a welcome development.

- **Establish national and regional audits** Agreeing key audits with a national reporting structure is needed to bring focus to areas needing attention:
 - How to improve timeliness of both patients who arrive directly and those who arrive by inter-hospital transfer
 - How to improve smoking cessation counselling for this group of patients
 - How to improve certain aspects of secondary prevention (medication, CR referral, etc)
- **Mounting a communications campaign** to alert the public to the need to call 999/112 with symptoms suggestive of a cardiac problem so that the diagnosis is made in the pre-hospital setting and the patient is taken directly to the PPCI centre.

3.8 Introducing a NSTEMI-ACS protocol

The ACS clinical programme initially concentrated on the STEMI population of patients. However the larger group of patients, those with Non ST elevation acute coronary syndrome (NSTEMI-ACS) greatly outnumber STEMI cases by a factor of four. A protocol to streamline diagnosis and timely management of these cases on a national basis has the potential of saving 10,000 bed-days per year. The ACS clinical programme plans to introduce a NSTEMI-ACS protocol as part of the 2017 review.

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- PPCI/PCI centre hospitals
- Acute general hospitals
- HSE National Ambulance Service
- Dublin Fire Brigade Ambulance Service
- ACS Clinical Programme Working Group
- HPO/HIPE Office of the HSE
- Prof Kathleen Bennett, Associate Professor, RCSI Population and Health Sciences

Appendix A

Summary of overview of STEMI care, 2010 by ACS Programme

A review of the situation on the ground for responding to calls for help, detecting and treating patients with STEMI was undertaken prior to the set-up of the national clinical programme for ACS in 2010. The following is a summary of what was found.

- Hospitals 36 hospitals taking patients with acute cardiac conditions (with Emergency Departments and coronary care units) with the majority providing thrombolysis as the mainstay of treatment for patients with STEMI.
- Catheter labs 9 hospitals in Ireland that had at least one permanent Cardiac Catheter lab - 5 of these hospitals had 2 Cath labs each and reported the provision of PPCI on a 24/7 service though varying levels of staff and agreements were in place regarding out of hours rosters.
- Three hospitals had a visiting mobile lab (one day per week) with the cardiologist, or physician with interest in cardiology, undertaking angiography for the local population – Tullamore, Letterkenny and Sligo. A further 7 Private hospitals provided interventional cardiology across the country though acute treatment was limited (West 1, South 2, Greater Dublin area 4).
- Pre-hospital service A recently formed National Ambulance Service with no national agreements in place to mandate pre-hospital diagnosis, treatment initiation and transport of patients directly to the Cath lab bypassing local hospitals. A number of remote parts of the country had a pre-hospital reperfusion service delivered by GPs, hospital outreach or advanced paramedics. There was no direct communication between ambulance personnel in the field and clinicians in cardiology units. Vehicles were not set up to undertake or transmit 12 lead ECGs.
- Performance 1466 STEMI were recorded on HIPE in 2010. Information on reperfusion therapy in 14 hospitals in 2010 showed that while 83% of STEMI patients received reperfusion therapy only 46% were treated with PPCI and that timeliness (to international standards) was 60% (Heartbeat Bulletin, 2010).

Glossary of Acronyms

ACS	Acute Coronary Syndrome
CR	Cardiac Rehabilitation
CUH	Cork University Hospital
ECG	Electrocardiogram
FMC	First Medical Contact
HIPE	Hospital In Patient Enquiry (system)
HPO	Health Pricing Office (of HSE)
HSE	Health Service Executive
LOS	Length of Stay
MINAP	Myocardial Infarction National Audit Programme (UK)
MMUH	Mater Misericordiae University H, Dublin
NAS	National Ambulance service
NQAIS	National Quality Assurance Information System (Ireland)
NSTE ACS	Non ST Elevation Acute Coronary Syndrome
NSTEMI	Non STE Elevation Myocardial Infarction
ORS	Optimal Reperfusion Service
PCI	Percutaneous Coronary Intervention (aka Angioplasty)
PPCI	Primary Percutaneous Coronary Intervention
RCPI	Royal College of Physicians of Ireland
SJH	St James's Hospital, Dublin
STEMI	ST Elevation Myocardial Infarction
TL	Thrombolysis (aka Fibrinolysis)
UHG	University Hospital, Galway
UHL	University Hospital Limerick
UHW	University Hospital Waterford

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