Data collection for the Myocardial Ischaemia National Audit Project - MINAP

Application Notes

Version 8, December 2013

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1. Introduction

The Myocardial Ischaemia National Audit Project (MINAP) was established in late 1999. Since then it has developed from a project covering the audit requirements of the National Service Framework (NSF), into a tool with which it is possible to audit most aspects of inpatient care for acute coronary syndromes. All hospitals in England, Wales and Belfast continue to enter records (with exception of Scarborough Hospital). There are now more than 1 million records in the database providing a very powerful tool for monitoring trends in care over time.

MINAP is managed by NICOR (the National Institute for Cardiovascular Outcomes Research), which is based in the Institute of Cardiovascular Science at University College London. NICOR manages seven national cardiac clinical audits. Specialist clinical knowledge and clinical leadership for MINAP is provided by the British Cardiovascular Society and the audit Steering Group, which determines the strategic direction and development of the project, and which includes stakeholders from participating hospitals, patient groups and representative from newly developed CCGs.

The audit is funded and commissioned by HQIP (the Healthcare Quality Improvement Partnership) and is one of 29 audits in the National Clinical Audit and Patient Outcomes Programme (NCAPOP).[1]

The dataset has grown from just over 50 items in 2000 to 130 in the present version in order to cover all aspects of care of patients having acute coronary syndromes (ACS). It does not follow that all fields in the dataset are to be used for every record. This revision (version 10.3.1, February 2013) adds fields, makes additions to options in existing fields and refines some of the definitions in response to the rapidly changing management of acute coronary disease. We have not removed any fields and tried to keep the number of additional fields to a minimum. Every field that is added is considered carefully for value and applicability.

The central purpose of the dataset, and of MINAP, is unchanged. It is to allow hospitals to record and analyse, in a consistent fashion, the care that they provide for patients with ACS. The summary of revisions can be found on MINAP website: https://www.ucl.ac.uk/nicor/audits/minap/dataset.

MINAP and National Audit of Percutaneous Coronary Interventional Procedures (formerly known as BCIS audit)

BCIS maintains a database of all coronary interventional work performed within the UK, including primary angioplasty for STEMI, and more delayed intervention for nSTEMI. While BCIS records what happens in the cardiac catheter laboratory, there are about 28 fields that are identical between MINAP and BCIS and a further 10 or so that are fairly closely aligned, but in need of revision in order to be completely congruent. We have added two additional options to further align with the BCIS dataset. The next step is the development of the joint MINAP – BCIS

[1] http://www.hqip.org.uk/national-clinical-audit-and-patient-outcomes-programme/.

application and we hope this will take place within the next year or so.
MINAP has enjoyed enormous support from colleagues in hospitals throughout England, Wales and Belfast – many of whom we have come to know in person through the regional roadshows. **Without you the project would have failed. We are very grateful for your continuing efforts and support.**

2. Contact us

MINAP provides clinical helpdesk support during working hours Monday to Friday (with exception of bank holidays).

Clinical Helpdesk queries

Email: minap-nicor@ucl.ac.uk

Tel: 020 3108 3931

Project Management queries

l.gavalova@ucl.ac.uk

Tel: 020 3108 3926

Technical Helpdesk queries

E-mail: helpdesk-nicor@ucl.ac.uk

Tel: 020 3108 1978

Clinical Lead

Dr Clive Weston – contact via minap-nicor@ucl.ac.uk

General information including dataset, import files, public reports and newsletters as well as this guide is available on our website: https://www.ucl.ac.uk/nicor/audits/minap.

3. Data collection

3.1. What is a clinical audit

Clinical audit is a method of assessing the quality of care that patients receive and more recently it has also been used to drive improvements in patient care. It does so comparing the care provided to patients against an agreed set of quality standards or indicators.

Participation in national clinical audit - and MINAP - is now mandated by the DH – see section SC26, Clause 26.1.2 of the NHS Standard Contract 2013/14[2]: '*The provider must participate in the national clinical audits within the National Clinical Audit and Patient Outcomes Programme (NCAPOP) relevant to the Services'*.

3.2. Which patients to record

MINAP covers all Acute Coronary Syndromes of **Type 1** i.e. spontaneous myocardial infarction related to ischaemia due to a primary coronary event such as plaque erosion and/or rupture, fissuring, or dissection.

Type 3 MI (resulting in sudden death) should only be recorded if acute myocardial infarction is confirmed by ECG, albeit it is unusual to have ECG evidence where sudden unexpected cardiac death occurs.

Patients that receive no investigation/intervention

All patients with suspected heart attack should be recorded in MINAP whether or not they receive an intervention. Approximately 8% of STEMI patients that activate the pPCI pathway do not undergo an intervention, even though most do have a coronary angiogram. There are often good reasons for this e.g. they may have significant co-morbidity or severe frailty, or they may be diagnosed at angiography to have Takotsubo Cardiomyopathy. It is important that these patients are recorded in MINAP and the reasons why no intervention was performed is recorded using 3.47-3.52 fields. Inclusion of these patients in MINAP will help us to determine the number of patients activating the pPCI pathway.

nSTEMI records

Every two years MINAP reviews the dataset in order to keep up with the rapidly changing world of cardiology. Where all patients with acute coronary syndromes are admitted to the same ward or area, patients can be readily identified. However this is not always the case, and it is much harder to collect information where patients are not all cared for in one area, and are looked after in several wards. For example, some patients develop MI whilst in

[2] http://www.england.nhs.uk/wp-content/uploads/2013/03/contract-service.pdf

hospital for an unrelated condition, thus in an unusual ward and as a result of this will not be cared for by cardiological team. Evidence suggests that patients not managed by specialist cardiology teams have worse outcomes than those that are.

Under-reporting of nSTEMI patients varies between hospitals. The quality of care for patients not entered into MINAP remains unknown. In addition, the variable nature of recording nSTEMI between hospitals may distort some analyses. It is expected that **all** patients with discharge diagnosis of ACS troponin positive / nSTEMI are recorded in MINAP.

Logging patients with cardiac arrest in A&E
It is important that all arrests occurring to patients with infarction occurring in A&E, or patients surviving an out of hospital arrest, are recorded. Not all patients who suffer arrest and then who fail to survive A&E are recorded in MINAP, sometimes because the diagnosis is uncertain, and sometimes because of difficulties with record keeping. You may need to liaise with your Resuscitation Officer or A&E staff to identify all arrests in MI patients.

Which patients not to record
Many patients arrive at your hospital with chest pain of unknown cause with normal ECG. When an episode turns out to be other than acute coronary ischaemia, such patients do not need to be recorded in MINAP.

Do not record patients with MI that results from another clearly defined pathological event e.g. anaemia, arrhythmias, hypertension, or hypotension, secondary to sepsis, pulmonary embolism etc.

3.3. How the quality of care is measured

MINAP was set up to measure whether the care described in national and international guidelines for heart attack care is provided by ambulance and hospital services. For example, the speed with which treatments for heart attack are delivered, and the drugs prescribed to help reduce the risk of a further heart attack, are important measures of the quality of care.

Currently MINAP reports against following indicators and outcomes:

<table>
<tr><th colspan="2">STEMI</th><th>nSTEMI</th></tr>
<tr><td>Call to Balloon (CTB150) within 150 minutes from calling for professional help.</td><td>With direct admission
Involving inter-hospital transfer</td><td rowspan="2">Cardiological care during admission</td></tr>
<tr><td colspan="2">Door to Balloon (DTB90) within 90 minutes from arrival at the heart attack centre</td><td rowspan="2">Admission to cardiology ward</td></tr>
<tr><td colspan="2">Call to Needle (CTN60) within 60 minutes from calling from professional help</td></tr>
<tr><td colspan="2">Door to needle (DTN30) within 30 minutes from arrival at hospital</td><td rowspan="2">Referral for/performance of angiography</td></tr>
<tr><td rowspan="2">Reperfusion rates</td><td rowspan="2">Primary PCI
Pre-hospital lysis
In-hosiptal lysis
No reperfusion</td></tr>
<tr><td colspan="2">Angiography following thrombolysis</td><td rowspan="2">Delays to angiography</td></tr>
<tr><td colspan="3">Secondary prevention medication at discharge</td></tr>
</table>

Please note the above are evolving set of indicators for quality improvement.

30-day adjusted mortality will be reported at the hospital level in the near future.

3.4. Patient consent

NICOR has section 251 approval from the NIGB, which allows it to collect and process patient identifiable data for all of the cardiovascular audits, including MINAP, without requiring consent. However we recommend that you inform patients that their anonymised data will be used for national audit and research purposes to improve patient care. A patient information leaflet, along with more information about NICOR, is available on the NICOR website.[3]

3.5. Patient confidentiality and identification

MINAP collects patient identifiable data in order to track life status by linkage with MRIS/ONS mortality data, and to enable linkage with the other cardiac databases, such as BCIS, Heart Failure and CRM. However, there are strict rules for the use of potential patient identifiers; although patient identifiers are entered into MINAP, these can only be seen by staff at your own hospital with access to the database, and by specific NICOR staff who manage the database.

When datasets are released to third parties for research purposes for example, the following safeguards are in place to protect patient identity:

[3] http://www.ucl.ac.uk/nicor/audits.

- NHS number, hospital number (patient case record number), forename and surname are pseudonymised. This is done using an encryption key to which the third party using the data does not have access. They cannot convert the details back to their original, identifiable form.
- Date of birth is converted to age at admission.
- Postcode can be an identifier where small numbers of individuals share a post code in rural areas. Postcode is used to derive dependant variables such as Index of Multiple Deprivation (England only), and only these derived fields are available for secondary use.
- Hospital identifier is also pseudonymised, so that third parties outside of NICOR cannot undertake identifiable hospital-specific analysis.

Important: Do not email us or otherwise send the MINAP team or any NICOR staff patient identifiable information unless specifically agreed using appropriate routes of data transmission.

3.6. How MINAP data is used

Audit data are used by increasing numbers of groups outside of your hospital which have a legitimate interest in the analysis. These include:

The QRP (Quality Risk Profiles) - is a tool used for gathering together key information about your organisation to support how the CQC monitor your compliance with essential standards of quality and safety. The QRP enables compliance inspectors to assess where risks lie and may prompt front line regulatory activity, such as further enquiries. For the second year running, MINAP has provided CQC with data to work out QRP for your hospital.

Data.gov.uk – since 2012 MINAP data has been published on the data.gov.uk website as part of the Government's Transparency Agenda[4].

Public reporting – MINAP has been publishing an annual report since 2003 and the report is available to the public.

Clinical Commissioning Groups – since establishment of CCGs in April 2013, MINAP has been received many requests for data by commissioning groups.

Patient Groups – MINAP has developed patient friendly versions of its 2012 Public Report and will continue to improve the way it presents data to the public. Patient groups/representatives have increasingly louder voices for example, in commissioning of services.

Quality Accounts – all health service providers in England have to submit a report for 30 June each year about the quality of their services in the previous financial year. This report is called a Quality Account.

Quality Accounts are required to be submitted to the Secretary of State and published on the NHS Choices website so that they are available to the public.

[4] https://www.gov.uk/government/news/letter-to-cabinet-ministers-on-transparency-and-open-data

MINAP is included in the DH Quality Accounts.

Research groups – anonymised MINAP data have been available to external research groups since 2006. This has resulted in numerous publications.

Monthly Ambulance Quality Indicators – ambulance services report on CTN and CTB on monthly basis using MINAP data.

…and **Freedom of Information requests**

3.7. Data quality

Having taken into account the wide use of MINAP data, it is essential that data are reflective of the care that is provided by your hospital. The MINAP team cannot and will not take responsibility for the incorrect or incomplete data.

Timeliness of data entry – the importance of prospective data entry cannot be emphasised enough. The longer the interval between admission and record being created, the greater rate of data missingness and data quality is observed.

Data completeness - Assessment of data completion is presently based on patients with discharge diagnosis of ACS troponin positive / nSTEMI. The completeness of 20 key fields is continually monitored and is to available for you in an online view that is refreshed daily. Currently these fields continue to be 99% complete. Analysis criteria for the data completeness view are available in the MINAP portal via the 'Help' button.

Data validation study - MINAP also performs an annual data validation study to assess the agreement of data held on the NICOR servers. Hospitals are required to re-enter data from case notes in 20 key fields (different fields to the data completeness fields, with some overlap) in 20 randomly selected nSTEMI records in an online data validation tool. Agreement between the original and re-entered data is assessed for each variable and each record. Reports showing the agreement of each variable compared to national aggregate data are sent to you to allow you to identify areas for improvement.

Importing into MINAP database – number of hospitals import data into the database. This is a perfectly acceptable way of submitting your data providing it is done on monthly basis at the very least. It is also essential that your import file is fully compatible with the latest MINAP dataset and the variables match exactly to those in the dataset. MINAP cannot and will not take responsibility for any incorrectly imported entries. Please ensure you check your import log and that you export your data from MINAP after each import to check the data that are held in MINAP. Dataset and the import file are available on MINAP webpages.

Exporting data – we recommend regular exporting of your data to allow you to

perform manual analyses and to compare the figures as they are available to us. You can also check for missing data or examine your data in more details if results are not what you expected.

You can export your data into an excel file which allows you local storage of your data with additional comments where appropriate. Only a block of ~3 years of data is available in the live database (whilst the rest is archived) to ensure that the database runs with the best possible speed available to you.

Analyses views – provide you with up to date aggregate figures allowing you to check the figures that will be reported in the annual report on a quarterly basis.

Regular review of the aggregate figures can identify potential data entry problems where numbers don't appear to be reflective of the perceived hospital performance.

Error-checking routines - the MINAP data application contains error-checking

routines, including range and consistency checks, designed to minimise common errors.

…and **MINAP helpdesk** – see contact us section.

3.8. Important timelines

The audit year runs from **1st April to 31st March**. Unless otherwise stated, all data for the preceding financial year must be uploaded to the database by **31st May**. Data will be exported for analysis on 1st June, and no data submitted after this point will be included in the audit report.

The annual data validation study runs between **3 January and 28 February** and covers the previous calendar year i.e. January till December inclusive. All data should be submitted for the study no later than **31 December**.

4. Getting started – technical guidance

There are two portals for submission of data to MINAP:

- **Lotus Notes** – requires a licence and is a desktop-based application
- **Webportal** – requires an internet connection and a browser (internet explorer only) and this means that it can be accessed on any computer with an internet connection. The URL for the webportal is: http://web.nicor.org.uk

Both portals require a user ID, which can be obtained from NICOR helpdesk (see *Contact us* section).

It is also possible to **import data** into MINAP where hospitals are using locally or commercially developed clinical information systems to reduce the burden of the data entry. MINAP import file is available on our website: https://www.ucl.ac.uk/nicor/audits/minap/dataset. We strongly recommend that your importing routine is aligned with the provided import file to ensure that imported data comply with the MINAP dataset and thus all information is included in the analyses. MINAP cannot take responsibility for data imported in the incorrect format.

To start a record, click on the '*Create patient record'* button.

The following four fields must be completed for a record to be saved:

Once those fields are entered you can access the record at any time to add to or modify the record, even after it has been sent to NICOR servers. The Hospital number (patient case record number) is an important field. It is used to identify when a patient is re-admitted. Please ensure that it is recorded accurately.

4.1 Overview of the data application

This section should be read by those who record and input data.

When using the application you will normally use the central servers on which to store the data rather than the hard drive on your PC. Depending on line speed this could be slow. You can, if you have a slow connection, make a local replica of the MINAP database. This is essentially a copy of a server database, containing only your records, that resides on your local PC. However, you must upload your records frequently to NICOR servers, for if you

have a local 'crash' you will have no backup. You are advised to upload at least weekly. Alternatively you can set up an automatic replication schedule to upload your data regularly. Incomplete records can be completed or corrected later on your local copy of the database, and when these are subsequently sent to the servers they will overwrite the originals without duplication.

4.2 Field definitions

Additional information is available for almost every field in the Application. Advice on data entry, definitions, etc. is available by clicking on the field options and then the Field Help buttons on the text bar above the data entry screen, next to the Save and Close buttons.

On the webportal, click on '?' button for the field definition.

4.3 When information is not available

If you are completing a multiple option field where the answer is unknown never leave the field blank. Importantly: Blank (an empty field) and 'Unknown' do not mean the same thing! Always enter an available option, such as 'Unknown'. All MINAP fields have options for unknown; please use them as appropriate.

However, for **numeric responses** (cholesterol, troponin etc.,) **never enter 0**, zero when the answer is not known; here you must leave a blank.

4.4 Deleting entries and records

The 'Clear Current Field' button allows you to clear the value of the current field but there are some fields that you can only change from one value to another and not set back to blank again. It is possible to remove the records for the database by marking them for deletion and these should be deleted the following day.

4.5 Consistency, range checks and data cleaning

To prevent data entry errors in MINAP there are number of consistency and range checks to alert a user when a potentially erroneous entry is made. Some checks will generate a warning whilst others will prevent from the record being saved.

4.6 Navigation on the webportal

The Webportal interface is quite different to the Lotus Notes application however it is quite self-explanatory. Do not use back/forward function in the browser, instead use 'back' and 'next' buttons provided.

The webportal aims to provide one-stop-shop facility with ready access to the supporting documentation e.g. application notes, newsletters, dataset available on MINAP website. The link opens in the new tab on your browser so there is no need to exit the record that you working on.

The patient 'document' contains a 'compass' icon leading a user to the navigation page. The page allows you to move to different sections within the document without having to pass each section page.

4.7 Online view analyses

Lotus Notes – accessed via CCAD analyses v3
Webportal – via the tab on the left hand side 'Analysis views'

Online views analyses provide aggregate figures comparable to the overall national average, and are 'refreshed' overnight.

4.8 Exporting your data

MINAP offers an export facility in Lotus Notes only at present. This facility allows you to export your data in excel which can be used for manual analysis, keeping a backup of your records (data are archived in MINAP every year to the performance of the database) and/or if you wish to add additional comment to a specific field. The user has a choice to export by a date range if preferred.

4.9 User defined fields

- There are 32 user definable fields linked to the rest of the patient record
- There is help on entering a title for the field and any combination of text or figures can be entered for local use.
- The fields have expanding brackets into which you can type data. Beware of using free text, it is very hard to analyse!
- If you enter too much, the data will spread onto a new line.
- The data can be downloaded for you to analyse.
- NICOR will store these data centrally and they are given the same degree of security as the other data. They cannot be accessed by MINAP or another hospital. You can perform local research or audit, and can link up with other hospitals to do collaborative work.

4.10 Replication

Replication is a process that synchronises the data on your local PC with that on the NICOR servers. The replication facility allows you to work off line without a permanent network

connection to the NICOR servers. While off-line you build up a database which is not synchronised with the central server until the process of replication has been performed. The advantage of not being permanently linked to the server is that your application will work much more quickly, especially if you have a slow internet connection. Replication performs a 'send and receive' operation with the NICOR servers. We only recommend using local replica if the slow connection is making the application unworkable.

The first stage in the process of replication is to make a local replica of the MINAP database. This can be achieved through the Welcome Portal functionality. The Lotus Notes set-up has been configured by NICOR to replicate on Notes start and exit. This allows users to manually enter or import data into a local MINAP database that is located on their PC. When exiting Notes users may be informed by the message *'Do you want to send/receive documents to the server*?' Choose 'Yes' and this will run a replication event. The replication process will only send and receive information which is new or has changed since the last replication event. The replication process is very efficient and usually operates on checking for field level changes within a document. This will only update the corresponding field in the target document with the new value rather than copying an entire document between the source and target databases. Automatic replication is strongly recommended, and if you need help with setting it up, contact NICOR technical helpdesk.

5. Dataset version 10.3.1

Summary of the latest MINAP revision is available on MINAP website: https://www.ucl.ac.uk/nicor/audits/minap/dataset

5.1 New fields

2.42 Stress echo – as per NICE guideline

3.45 Bivalirudin – only applies to hospitals performing an intervention.

3.53 Date/time of start of insulin infusion – in combination with other diabetes fields will help to inform future management of hyperglycaemia.

4.30 Delay to performance of angiogram – there is an increasing interest in the time interval from admission to performance of angiography; NICE guidelines recommend that angiography is performed within 96 hours from admission, however at times there are delays outside of a hospital's control and this field will enable us to further understand the reasons behind those delays.

4.31 Discharged on ticagrelor – NICE recommended ticagrelor because, in certain cases it is more effective than other treatments available on the NHS. It is assumed that the patient was started on this drug during admission.

4.32 High risk nSTEMI – hospitals in Greater London have, following a successful pilot project, implemented a pathway for high risk nSTEMI patients who are taken directly to the heart attack centre bypassing non-interventional hospital to reduce delays to angiography/intervention. This field will help those interested in similar schemes to monitor the care and outcome for this group of patients more readily.

5.2 Revision of existing fields

2.33 Cardiological care during admission – revised definition to clarify what is considered to be a cardiological team.

2.35 Haemoglobin – to align with the latest change of reporting of blood test results – new units

2.40 Patient location at the time of STEMI – definitions have been refined for greater clarity.

3.10 Delay before treatment:

7. Hospital administrative failure – revised definition to include missed diagnosis of STEMI

17. Convalescent STEMI – added option to align with BCIS in preparation for the joint MINAP-BCIS application.

3.19 Peak troponin – simplified definition in light of the large variety of available tests.
3.37 Troponin assay – addition of widely used high sensitivity troponin I

3.39 Initial reperfusion treatment – additional option (4. pPCI already peformed at the interventional hospital) to record patients that were repatriated to non-interventional hospital following an intervention elsewhere, to ensure that these patients are not included in the 'no reperfusion' analysis.

3.41 In-patient management of hyperglycaemia/diabetes – definition was revised to eliminate erroneous data entry.

4.02 Discharge diagnosis – addition of two diagnoses to allow us to establish the incidence of Takotsubo cardiomyopathy. PCI related MI is again an attempt to further align with BCIS.

4.03 Bleeding complications – revised options to align with the new reporting of blood test results.

4.06 Discharged on angiotensin converting enzyme inhibitor or angiotensin receptor blocker – revised field name.

4.15 Date/time of referral for investigation/intervention – revised field name to ensure that time as well as date is recorded.

4.18 Angio date/time – Revised field name and definition to ensure to help us to analyse delays to angiography.

4.29 What procedure was performed at the interventional hospital – a revised definition for clarity.

5.3 Takotsubo Cardiomyopathy

This additional 'dataset' is not a formal part of the MINAP dataset and consists of an additional 23 fields that you are encouraged to complete when discharge diagnosis is 9. Takotsubo cardiomyopathy. The full Takotsubo cardiomyopathy dataset is available in the Summary of changes v6.5 on MINAP website.

Why collect this information?

There is still much unknown regarding this recently described condition, not least the precise cause and the best treatment. Using new fields added to the MINAP dataset it should be possible to determine the frequency of the condition in the UK, the types of individuals it affects, their long-term prognoses and, through observation, associations of treatments in hospital and at discharge with long-term outcome.

Although the fields in this section are not formal part of MINAP dataset, collection of this information would help us to achieve a great deal of understanding of this rare (or not) condition.

For more information on Takotsubo Cardiomyopathy, click on the following links below:

- For clinicians: http://www.bhf.org.uk/publications/view-publication.aspx?ps=1002057
- Lay summary: http://theconversation.com/a-broken-heart-has-some-truth-to-it-after-all-13764

Unlike in the MINAP dataset, some of these fields have multiple options and the option to add free text. The TC dataset consists of 23 fields.

The multiple choice fields are *Stress precipitant* and *Positive Inotropic support;* there are in-built checks to prevent data entry errors e.g. it is not possible to selection option 0. No and 2. Noradrenaline as these are mutually exclusive options.

Free text window becomes available when option *6. Other* in Stress precipitant is selected giving an opportunity to give more detail on the stress precipitant not covered in the existing options. The free text window **is limited** to 100 characters.

Similarly when option 4. Other is selected in the Regional LV dysfunction distribution field; the free text window is populated and limited to 100 characters.

If LVEDP is measured (thus *1. Measured* option selected), a free text window is populated to enter the value limited to two numerics (scale mmHg).

6. Creating a patient record in MINAP

The MINAP dataset has been divided in number of sections and the fields have been grouped based on their relevance to a specific section.

The following fields must be completed for a record to be saved:

Hospital code (default when you log in)

Hospital number

Initial diagnosis

Date/time of admission

6.1 Demographics

Hospital number, Surname, First name, and Date of birth appear in the top panel of the screen and remain there to identify the patient. Age on admission will appear after you have entered the Admission date in the *Reperfusion* tab. After entering these, click on the *Demographics* button at the top of the column of buttons to access the rest of the demographic details.

Hospital identifier (1.01) - Your hospital code should default from your user ID.

Patient gender (1.07) - The presence of 9. Not specified as an option reflects a field shared with paediatric cardiology.

Post code (1.10) - This is the post code of the main permanent residence. Full post code is required by the NHS. This is very important for local mortality/morbidity and other analyses by geographical location. For visitors from abroad you should use a pseudo post code for the country of patient's residence. See appendix 2 for the list of pseudo-postcodes.

NHS number (1.03) - The NHS number is the unique identifier used to track the patient for mortality flagging via the Office for National Statistics or to track MINAP patients through the coronary intervention and surgical databases held at NICOR. All hospitals should now have access to NHS numbers for all patients. There is an algorithm in the Lotus Notes software to check the validity of the NHS number.

NHS Number verification status - This is a new field, which is not part of the dataset. It is now included following a Department of Health Dataset Change Notice that requires that the NHS number is decrypted and displayed in all databases. Hospitals are required to verify each patient's NHS number and upload the verification status. The options are:

1. NHS number present and verified.
2. NHS number present but not traced

3. Trace required
4. Trace attempted – no match or multiple match found
5. Trace needs to be resolved (NHS number or patient detail conflict)
6. Trace in progress

Leave blank for overseas visitors, members of the armed services and travellers who have no NHS number.

Patient ethnicity (1.13) - The patient's ethnic group as perceived by the patient. The recording of ethnicity has a single purpose: to identify patients whose ethnicity may have some bearing on co-morbidity and outcome. For example, Asians are known to have higher rates of diabetes and premature coronary artery disease. Some years ago we were advised to change our recording of ethnicity to align this with the more detailed NHS classification. This, on reflection, was not helpful for MINAP's purposes, and we have agreed to revert to the original less complex field, which is a lower level classification that remains consistent with the NHS classification.

1. Caucasian - Includes British, Irish, any other White ethnic group.
2. Black - Includes Caribbean, African, Black British, any other Black ethnic group
3. Asian - Includes Indian, Pakistani, Bangladeshi, Asian British, any other Asian ethnic group.
5. Mixed - Includes White and Black Caribbean, White and Black African, White and Asian, any other ethnic group
6. Not stated - Where the patient cannot or does not wish to state his/her ethnic group.
8. Other - Includes Chinese, any other ethnic group.
9. Unknown

Admin status (1.09) - Options 4. Other and 5.Visitor have been removed. Option 4 was very rarely used, and option 5, used to identify holidaymakers and foreign visitors (option 1. NHS should be used) is redundant as these can be identified by postcode and pseudo postcodes which can be used to identify the country of origin of all foreign visitors.

GP practice/ PCT code (1.11) - Please enter either the code for the practice of the patient's registered GP or if unavailable select the PCT code from the drop down list. These codes should be available from your PAS system.

NHS number, Date of birth, GP practice/ PCT code and post code are fields which are stored encrypted on the NICOR servers and can only be accessed with your local hospital encryption key.

Configure PAS link - NICOR has developed a generic PAS link that will allow you to import demographic data from your local PAS system into the MINAP patient record. This may be helpful to you to reduce the chore of entry of demographics. The PAS link feature is not supported by NICOR so please do not contact the NICOR helpdesk for support with this feature. Click on *Configure PAS* link to configure the settings for your hospital. The client software and/or drivers for each of these connection types will need to be configured on the PC in order for the link to work. This is something that the local IT staff will need to configure.

6.2 Admission details

Initial diagnosis (2.01) - The Initial diagnosis is a working diagnosis whose primary purpose is to identify those patients with a diagnosis of definite ST elevation MI. This can include an Initial diagnosis made by an ambulance paramedic crew, or other clinician in a position to provide definitive treatment. Do not change Initial diagnosis on the basis of further ECGs or markers. The options are:

1. Definite myocardial infarction - The correct use is vital for analysis of Call to Needle times and Call to Balloon times. This option is only to be used where there are unequivocal changes of **new** ST elevation infarction or **new** LBBB on the initial ECG and appropriate history.

LBBB of uncertain duration should be recorded as *3. Acute coronary syndrome*. If the initial ambulance ECG does not show ST elevation and the first hospital ECG does, the patient should be entered as *1. Definite myocardial infarction.* The new field, Patient location at the time of STEMI should be entered as *1. Onset of STEMI while patient not in hospital (STE on first ECG).* Patients with ST elevation AMI, in whom the diagnosis was initially missed should be entered as *1. Definite myocardial infarction.*

Other points:

- If thrombolytic treatment has been given on the basis of either a pre-hospital ECG or the initial ECG then the Initial diagnosis must be *1. Definite myocardial infarction*, whether the use of thrombolytic treatment was correct or not. Similarly, for interventional centres, if a patient is referred to you from another hospital with a working diagnosis of ST elevation MI, you should enter these as *1. Definite myocardial infarction.* Where this is incorrect the Discharge diagnosis will make this clear.
- Patients who are incorrectly diagnosed as having ST elevation MI should always be logged regardless of treatment or outcome. (See Section 6.4 Interventional audit)
- Where there is LBBB and interventional treatment is given the Initial diagnosis is invariably *1. Definite myocardial infarction*.
- Where there is LBBB without ST elevation and reperfusion treatment was not given the Initial diagnosis should be *3. Acute coronary syndrome* unless it is clear from the notes that the clinician thought reperfusion treatment was contraindicated for any reason.

3. *Acute coronary syndrome* **-** Covers all other suspected acute coronary syndromes. Confirmation of the diagnosis awaits results of troponin assay. This should be used where there is strong likelihood of infarction on history and an abnormal ECG without significant

ST elevation or new LBBB without ST segment elevation. When this option is selected, 4.32 High risk nSTEMI field is populated.

4. Chest pain ? cause **-** A single episode of chest pain of possible cardiac origin where admission was thought necessary to exclude cardiac ischaemia. This covers all other admissions where no clear initial diagnosis has been made, but where there is an index of suspicion that the symptoms may be ischaemic in nature.

5. *Other initial diagnosis* - A patient admitted with either another initial diagnosis (? pericarditis, pancreatitis etc.), or who was already in hospital at the time of the event.

What procedure was performed at the interventional centre (4.29) - This field is for use by non-interventional hospitals only, where the procedure concerned is performed at another hospital and the patient is returned to you. Hospitals performing less than 24/7 primary PCI should only use this for patients who following admission are sent for primary PCI elsewhere. It should also be used when a patient is repatriated after direct admission to an interventional centre for primary PCI or rescue. **This field is not intended for use for patients with nSTEMI.** It has the following options:

0. No angio or primary reperfusion treatment performed
1. Angiogram only
2. Primary angioplasty
3. Rescue angioplasty
4. CABG
5. Thrombolytic treatment
9. Unknown

Key times

Please record times for all patients who have ST elevation AMI diagnosed on the initial ECG, regardless of where performed, and whether they receive thrombolytic treatment or primary PCI. If a patient does not have definite ST elevation infarction then treatment delays need not be recorded. There is no need to enter Date/time of symptom onset, call for help, arrival of first responder and arrival of ambulance service for nSTEMI/other ACS patients.

Date/time of symptom onset (3.01) - The time to within 10 minutes, if possible, when symptoms began. Where there is a prodrome of intermittent pain the time recorded should be the time of onset of those symptoms which led the patient to call for help. **Where an admission followed an out of hospital cardiac arrest, with no better information available, use the time of the arrest for onset of symptoms.**

Date/time of call for help (3.02) - The time of the initial call by the patient, relative or attendant to a GP, NHS Direct, or the ambulance service. If a 999 call, use the call connect

time which is the time the emergency call is connected to local ambulance control. It is not the time of the first ECG to show ST elevation. The call connect time should be taken from the ambulance CAD form. If the call was to a GP (or deputising service), or NHS Direct the call time is the call to the ambulance service. Call times only required for STEMIs.

When patients are transferred from a non-interventional hospital to an interventional centre for primary PCI, the interventional centre should enter the time of the first call for help, as well as the time of arrival at the interventional centre. Call to balloon time is based on the initial call for help and the interventional centre may have to liaise with the non-interventional hospital or ambulance service to obtain it.

Date/time of arrival of first responder (3.03) - This includes a community first responder or a paramedic in a car.

Date/time of arrival of ambulance (3.04) - This is the time of arrival of an ambulance capable of transporting the patient. This will help address concerns about prolonged call to hospital times (not infrequently a first responder can be there much earlier than the ambulance).

Date/time of arrival at hospital (3.06) - This refers to arrival at <u>your</u> hospital and must be completed - all patients must have an admission date and time. Time of arrival in hospital is the time of arrival of the ambulance at the front door. An accurate time is vital for any patient eligible for reperfusion treatment. Please use the time recorded by the ambulance service, not the time of the first ECG, nor the time of registration in A&E or admission to the CCU. Use A&E registration time only if patient self-presented in A&E. The time 00.00 is reserved for date/time of admission for patients already in hospital and for STEMI patients that come to your hospital for the first time following an intervention elsewhere. If a patient arrives on the stroke of midnight, enter 00.01.

Interventional centres should use 3.06 Date/time of arrival at hospital as the Date/time of arrival at the intervention centre and use 3.46 Date/time of arrival at first (non-interventional) hospital for arrival at the non-interventional hospital if a patient is transferred to an interventional centre for primary PCI.

Admission method (2.39) - Patients that have no admission method entered are excluded from Door to Needle, Call to Needle, Door to Balloon and Call to Balloon analyses so it is essential to complete this field for patients that receive primary PCI or thrombolytic treatment.

The options are:

1. Direct admission via emergency service - implies arrival by ambulance, helicopter.

2. Self-presenter to this hospital - implies that the patient made their own way (public transport, brought by relative etc.,) to hospital. Includes those advised to do so by GP.

3. Already in this hospital – this option should be used if the patient is already in hospital with another diagnosis. As you need to enter a date and time of arrival at hospital to save a record, you may enter 00.00 as the admission time if it is unknown. Patients already in hospital are excluded from Door to Needle, Call to Needle, Door to Balloon and Call to Balloon analyses but this may change. Use if the patient is attending a Rapid Access Chest Pain Clinic.

4. Inter-hospital transfer for specific treatment - specifically covers transfer to specialist centre for proposed treatment.

5. Repatriation after coronary intervention - return from interventional centre (after intended primary PCI etc.) The patient need not have been admitted to your hospital before repatriation.

6. Other - covers patients admitted from clinics, or becoming ill while visiting hospital

9. Unknown.

Ambulance job number (3.05) - select the relevant 3 letter ambulance trust code from the drop down box and enter the PRF/CAD number. The Ambulance job number is then automatically created from the *date of call for help, the ambulance trust code and the PRF number*. The ambulance job number allows ambulance trusts to identify their patients which are transferred from the MINAP database into the ambulance outcome database. It is important that you complete this field for all ACS patients but if the PRF/CAD is not available please make sure you enter the ambulance trust code so that records are populated in the ambulance outcome database. Some Ambulance trusts attach a date to their PRF number; enter the complete number including the date.

Admitting consultant (2.02) - it is accepted that care may be shared between cardiologists and general physicians. Enter the clinician that has **primary** rather than advisory care of the patient during the **first 24 hours** or longer after admission to hospital. This will be subject to local procedures. In general, if the local arrangement is for a same day transfer to a cardiologist – within a few hours of admission, then record as a cardiologist. If it is a next day transfer then the admitting physician should be entered

Admission ward (3.17) - the purpose of this question is to determine where immediate care took place. It refers to the unit to which the patient is admitted either from A&E or directly by ambulance service and where patient will spend the majority of the **first 24 hours** in hospital. If patient admitted direct to catheter lab, enter facility to which patient admitted on leaving lab. The options are:

1. Cardiac care unit – a unit providing level 2 facilities. This may be a cardiac care facility shared with ITU or HDU, or might be part of a cardiac ward or general ward, but providing a higher level of monitoring and cardiac nursing numbers and expertise.

3. General medical ward - a medical ward without fixed monitoring facilities or additional cardiac nursing expertise.

7. Cardiac ward (non CCU) - a cardiac ward, having staff with specific cardiac nursing expertise, but without necessarily higher numbers of staff/patient or central monitoring facilities. This would also cover admission to a Chest Pain Assessment Unit or to a section of a non-cardiac ward where the patient is admitted to a section with permanent monitored beds and specialist cardiac nurses.

Where was aspirin/other antiplatelet given (2.04) - identifies whether and where aspirin or other antiplatelet drug was first given to patient. This includes Clopidogrel and other thienopyridine inhibitors that may become available. The options are:

1. Already on aspirin/antiplatelet drug Regular use of aspirin/antiplatelet before this episode. Ignore the administration of additional doses by paramedics.
2. Aspirin/antiplatelet drug given out of hospital Aspirin or other antiplatelet drug started for this episode before admission.
Patient not previously taking any antiplatelet drug.
3. Aspirin/antiplatelet drug given after arrival in hospital
4. Aspirin/antiplatelet contraindicated
8. Not given
9. Unknown

Place first 12 lead ECG performed (2.23) - this refers to the 1st ECG recorded, not necessarily the diagnostic ECG. It has the following options:

1. Ambulance An ECG performed in any location by ambulance paramedic staff as a result of an emergency call.
2. In hospital
3. Other healthcare facility - includes general practice or care home where the ECG was performed by a non-paramedic. This could include a non-interventional hospital before a patient is transferred for primary PCI.
9. Unknown

Referring hospital code (4.21)

Code of hospital from which the patient was referred for any investigation or intervention. It should be entered by the interventional hospital when patients are transferred for primary PCI/intervention. This will enable the linkage of the records for the same patient during the same episode of ACS.

6.3 Reperfusion

This section gives advice on completing data entry for specific circumstances

a) **Patient is ineligible for reperfusion treatment (too late etc.)**
b) **Patient is eligible for reperfusion treatment. See Section 7 for data entry for patients that are transferred for primary PCI.**
c) **Patient is initially not eligible for reperfusion treatment**
d) **Patient is already in hospital with another condition**

Initial reperfusion treatment (3.39) - this refers to the initial reperfusion strategy performed in your hospital. The options are

0. None
1. Thrombolytic treatment
2. pPCI in house Primary PCI for STEMI/LBBB.
3. Referred for consideration for pPCI elsewhere. Intended primary PCI for STEMI/LBBB. At the time of referral (or data entry) it may not be known if reperfusion treatment was actually performed, but if the patient was transferred with this intention, this option should be used. These cases will subsequently be linked with the interventional centre record.
4. *pPCI already performed at interventional hospital* – this new option is for use by non-interventional hospitals only and should be used for patients that come to your hospital for the first time following an intervention elsewhere.
9. Unknown.

If a non-interventional hospital refers a patient for primary PCI, Initial reperfusion treatment should be *3. Referred for consideration for pPCI elsewhere* and not *2. pPCI in house.* If a hospital performs primary PCI less than 24/7, and sends patients elsewhere for primary PCI out of hours, care must be taken to select the correct option.

Reason reperfusion treatment not given (3.08) - reperfusion treatment refers to both primary PCI and thrombolytic treatment and applies only to patients with ST elevation infarction. If the Initial diagnosis is Definite (meaning ST elevation) myocardial infarction you must record details of reperfusion (thrombolytic treatment or primary PCI treatment), or the reason why it was not given or delayed.

ECG determining treatment (2.03) – this field serves to capture the ECG appearance upon which the treatment strategy is based. Record the appearances even if the patient did not receive reperfusion treatment. The ECG can include any 12 lead ECG performed before admission. If ST elevation consistent with infarction is recorded on any ECG during the episode, regardless of treatment, this should be recorded and the Discharge diagnosis should be Myocardial infarction (ST elevation). NB: if ECG appearances are consistent with

true posterior infarction this should be recorded as ST elevation, and noted in *Site of infarction.*

Any pre-existing changes, such as old ST elevation, that do not alter during this admission, should be recorded as option 0.

0. No acute changes - ECG is normal or unchanged from one recorded before this admission.
1. ST segment elevation
2. Left bundle branch block
3. ST segment depression
4. T wave changes only
5. Other acute abnormality - other ECG abnormality related to this acute event.
9. *Unknown.*

ECG QRS complex duration (2.37) - this field allows audit of compliance with the NICE guidance on evaluation for use of implantable defibrillators. The ECG QRS complex duration must be a stable feature on ECGs during admission and has the options:

0. QRS complex <120 msec
1. QRS complex >=120 msec
9. Unknown

Site of infarction (2.36) - the options refer to the site of new ST segment elevation.

1. Anterior
2. Inferior
3. Posterior (where anterior ST depression replaces ST elevation)
4. Lateral
5. Indeterminate - Use in the presence of very extensive changes.
9. Unknown

Enter the cardiographic site having the most extensive ST segment elevation. It follows that anterior embraces antero-septal, and antero-lateral, inferior embraces infero-lateral and infero-posterior, etc. Usually the site of the infarction will have been recorded in the patient record.

a) Patient is ineligible for reperfusion treatment

If reperfusion was not attempted enter Initial reperfusion treatment as *0. None*.
Enter Reason reperfusion treatment not given which has the following options:

0. None - this is the default value which may be changed to the appropriate option.
1. Ineligible ECG - no ECG shows unequivocal ST elevation or new LBBB.

NB: this choice is not compatible with an Initial diagnosis of *Definite myocardial infarction* because that diagnosis implies

that an ECG was diagnostic of ST elevation infarction.
2. Too late **-** a decision made in the light of a local protocol. If there is more than one reason for treatment not being given which includes *2. Too late*, then this option takes precedence over any other contraindication.
3. Risk of haemorrhage - includes risk of bleeding from any site, and from prolonged resuscitation.
4. Uncontrolled hypertension - a level of blood pressure determined by local protocol.
5. Administrative failure - use when, in the opinion of a senior clinician, primary PCI or thrombolytic treatment was withheld incorrectly.
6. Elective decision -use where a decision is made not to offer reperfusion treatment (e.g. severe co-morbidity or dying patient).
7. Patient refused treatment
8. Other - for reasons not included above
9. Unknown **-** use where an eligible patient fails to receive treatment without a stated reason.

b) Patient is eligible for reperfusion treatment

If Initial reperfusion treatment is entered as *1.Thrombolytic treatment*, the screen changes in appearance and *Reason reperfusion treatment not given* disappears.

Where was initial reperfusion treatment given (3.11) - record where reperfusion treatment was started. There is additional information in Section 8 on how to enter patients that are transferred between interventional centres and non-interventional hospitals before and after primary PCI.

Pre-hospital thrombolysis - patients receiving pre-hospital thrombolytic treatment must have *1. Definite myocardial infarction* as the Initial diagnosis, even if review of ECG appearances on which treatment is based suggests otherwise. Patients having pre-hospital thrombolytic treatment are identified when the 'Where was initial reperfusion treatment given' field is *1. Before admission to hospital.*

Date/time of reperfusion treatment (3.09) - the time of onset of lytic treatment, whether infusion or injection. The time the first device is used in coronary artery (balloon, stent or extraction catheter). It is not the time the angioplasty guidewire is first introduced, even if this restores flow.

Delay before treatment (3.10) - applies to all forms of reperfusion treatment and can occur at any time from the moment of arrival of the ambulance crew. However not all delays exclude patients from Call to Needle and Door to Needle analyses and only *15. Pre-PCI complication* excludes a patient from Door to Balloon or Call to Balloon analyses. Where it is policy for pre-hospital treatment to be given, any of the reasons for delay can be used with

respect to the paramedic crew. The default is *0. No* and means there was no operational delay regardless of the time to treatment.

The following options are available:

1. Sustained hypertension - use according to local protocol.
2. Clinical concern about recent cerebrovascular event or recent surgery - use where delay results from the need to check on the significance of a recent cerebrovascular event or operative procedure.
3. Delay obtaining consent - for use only where there is patient delay in confirming consent to routine thrombolytic/PCI treatment. Use only when the patient wishes to take time to consider use of a conventional (non-trial) thrombolytic drug. Not to be used while consent or randomisation is obtained for any therapeutic trial. Use *6. Obtaining consent for therapeutic trial* in this circumstance.
4. Initial ECG ineligible should be used where, after an initially ineligible ECG, reperfusion treatment is used after development of ST elevation. These patients are not included in Door to Needle and Call to Needle analyses.
5. Cardiac arrest - includes an arrest occurring before arrival in hospital or later in hospital.
6. Obtaining consent for therapeutic trial - use only for an approved study.
7. Hospital administrative failure - includes any procedural reason why treatment was delayed in hospital. This would include instances of misdiagnosis/misinterpretations of ECG.
8. Ambulance procedural delay - this includes any pre-hospital delay outside the control of the ambulance service, e.g. incorrect address, difficulty finding address, unable to gain entry to patient's house, patient reasons e.g. initial refusal to go to hospital or extended domestic arrangements, adverse weather conditions, crew had to wait for boat, helicopter delay, wait for police to gain entry, failure to cannulate.
9. Other - use for any delay not covered by other options. If you wish to record other delays for local interest use one of the free fields.
10. Ambulance 12 lead ECG not diagnostic of STEMI - when initial ambulance 12 lead ECG is non-diagnostic of STEMI.
11. Consideration of primary PCI - where initial consideration for primary PCI leads to a delay in providing subsequent thrombolytic treatment.
12. Ambulance administrative delay - when initial ambulance 12 lead ECG is diagnostic of STEMI but patient outwith local criteria for paramedic thrombolytic treatment.
There are some specific options for primary PCI.
13. Cath lab access delayed
14. Delay in activating cath lab team
15. Pre-PCI complication Includes only cardiogenic shock with insertion of IABP and ventilation. Cardiac arrest is not considered as a pre-PCI complication.
16. Equipment failure.
17. Convalescent STEMI – this option was added to align with BCIS.

Only *1. Sustained hypertension, 2. Clinical concern about recent cerebrovascular event or recent surgery, 3. Delay obtaining consent, 4. Initial ECG ineligible, 5. Cardiac arrest, 8. Ambulance procedural delay & 9. Other* exclude patients from Door to Needle or Call to Needle analyses. Only 15.Pre-PCI complication excludes records from Door to Balloon and Call to Balloon analyses**.**

It is not mandatory to use a delay option if it is felt that the delay was trivial as this may exclude the record from analysis.

Thrombolytic drug (3.36) - the agent used for first thrombolytic treatment. Where streptokinase is started, and replaced because of side effects the second drug should be recorded.

Additional reperfusion treatment (3.40) - This is a field for further emergency reperfusion treatment where initial treatment is perceived to have failed. It has the options

0. None

1. *Rescue PCI in house* - emergency PCI for acute ST elevation MI for failed thrombolysis - commonly performed for failure of ST segment resolution or continuing ischaemic symptoms following lytic treatment. Performed in this hospital for either patients admitted directly or transferred from another hospital
2. *Referred for rescue PCI elsewhere* - intended rescue PCI. At the time of referral (or data entry) the treatment performed may not be known.
3. *Facilitated PCI* - use of this option should be restricted to use where primary PCI is intended as the reperfusion strategy with an upstream pharmacological agent used to try and "facilitate" the reperfusion process. The upstream agent might be a lytic **or** a 2b3a agent or a combination. These are now rarely used as the meta-analysis of trials to date suggest no benefit from studies involving facilitation.

4 *Additional dose of thrombolytic - u*se where a second thrombolytic is given for perceived failure of reperfusion. Do not use when another lytic is substituted for streptokinase because of adverse effects occurring during SK infusion.

Patient location at time of STEMI (2.40) - This is a field developed in conjunction with BCIS in 2010 to identify where ST elevation was first recognised to determine which records should be included in Call to Balloon and Door to Balloon analyses. Please note that the definitions have changed slightly in the latest revision:

1. Onset of STEMI while patient not in hospital (STE on first ECG)
This implies that ST elevation was found on first ECG performed in an ambulance or other medical facility (GP surgery etc.) before arrival at the first hospital or on the first ECG recorded in hospital for a self-presenter. If no ECG was taken prior to arrival at the first hospital (whether admitted or not) and first ECG recorded in hospital shows ST elevation then it should be assumed that STEMI developed before reaching hospital. This option should also be selected where an ECG was not considered diagnostic before admission, but STE is diagnosed on arrival at A&E.

2. STE first recorded on a subsequent ECG in, (or before arrival at) a non-interventional hospital.
The word subsequent applies to any ECG taken after an initial non-diagnostic ECG was performed in the ambulance or at the non-interventional hospital. This group of patients will have arrived in hospital without a diagnosis of STE MI, and then develop ST segment elevation after hospital arrival (whether admitted or not). The subsequent ECG may be at any time after admission to hospital. This option covers a spectrum from patients initially presenting with features consistent with ACS who go on to develop STEMI through to patients who are admitted for some other condition who develop STEMI while in hospital.

3. STE first recorded on a subsequent ECG in, (or before arrival at) the interventional hospital
The word subsequent applies to any ECG taken after an initial non-diagnostic ECG was performed in the ambulance or at the interventional hospital. This group of patients will have arrived in hospital without a diagnosis of STE MI, and then develop ST segment elevation after hospital arrival (whether admitted or not). The subsequent ECG may be at any time after admission to hospital. This option covers a spectrum from patients initially presenting with features consistent with ACS who go on to develop STEMI through to patients who are admitted for some other condition who develop STEMI while in hospital.

NB: Even if patients have long transfers (for example in a rural setting), if on arrival at hospital they are diagnosed as having STEMI, call to treatment times will be from initial call that resulted in initiation of emergency ambulance transport.

Place STE was first recognised	Option
First ECG before arrival in any hospital (either interventional or non-interventional)	1
First ECG after arrival in any hospital for self-presenter	1
First ECG in hospital after non-diagnostic ECG in community	1
First ECG in hospital when no ambulance ECG performed	1
Subsequent ECG in non-interventional hospital	2

Subsequent ECG in interventional hospital	3

The following intervals are calculated from your data

- Call to hospital
- Door to reperfusion (Door to Needle or Door to Balloon)
- Call to reperfusion (Call to Needle or Call to Balloon)
- Onset of symptoms to arrival in hospital
- Onset of symptoms to reperfusion (Onset to Needle or Onset to Balloon)

Reperfusion is the time of the onset of thrombolytic treatment or time of first balloon inflation. For primary PCI the time of arrival at hospital is the time of arrival at the interventional centre. Time of arrival at a non-interventional hospital is recorded with the field 3.46 Date/time of arrival at non interventional hospital.

c) Missed diagnoses

The diagnosis of ST elevation MI may be missed by inexperienced junior staff and as a result the use of reperfusion treatment may be delayed. Where an ECG is subsequently considered sufficiently diagnostic that in the opinion of a more experienced clinician treatment should have been given on the basis of an earlier ECG, this should be recorded as Delay before treatment using the option *7. Hospital administrative failure.* The Initial diagnosis should be recorded as *1. Definite myocardial infarction***.** If these patients received thrombolytic treatment they are now included in Door to Needle analyses when previously there were excluded. You should keep a local record of these for training purposes.

Inappropriate thrombolysis

Sometimes thrombolytic treatment is given where in retrospect the indication may have been uncertain (old MI with persisting ST elevation and new non cardiac chest pain is an example). Please enter all cases of 'inappropriate' thrombolytic treatment whether in hospital or pre-hospital. The discharge diagnosis will identify these cases. If they are not entered there is no chance of anyone learning by experience.

d) Patient is already in hospital

Patients already in hospital with another condition have a high mortality if they then have a myocardial infarction. Logging them is important in order to analyse case fatality. So far if these patients receive thrombolytic treatment or primary PCI , MINAP has excluded them from Door to Needle and Door to Balloon analyses, however we will be reporting on the timeliness of treatment of this group of patients separately.

6.4 Interventional audit

These fields are for use by the Heart Attack Centres only. They allow examination of the process of evaluation for **primary PCI and rescue PCI**. Other hospitals, including those referring patients for coronary intervention, should ignore these fields but use investigations/interventions fields instead.

These fields should also be used to record patients for whom the intended reperfusion was pPCI but did not proceed to have one as they turned out to have normal coronaries for example. Although initial reperfusion treatment is recorded as 0. None, it is necessary to record what the intended reperfusion treatment was and why the PCI was not performed. This will be used for analysis to understand reasons behind no reperfusion rates. Complete all fields that apply.

A MINAP record should be started, and these fields completed, if the primary PCI pathway is activated even if the patient did not receive the expected intervention.

NB: Where a hospital does not provide 24/7 intervention it is a non-interventional hospital outside of these hours.

The interventional audit section covers the following fields:

Date/time of arrival at non interventional hospital (3.46) - Date and time of arrival (when the wheels stop turning) at non-interventional hospital.

Assessment at the non-interventional hospital (3.47) - Place of assessment after arrival at non interventional hospital with options

0. No contact with a non-interventional hospital - Where a hospital provides a less than 24/7 interventional service, it should be categorised into interventional / non-interventional depending on whether the lab is open at the time of presentation.
1. Patient remains in ambulance - When the ambulance is parked in hospital grounds in order to facilitate assessment by a member of hospital staff.
2. A&E Patient is moved into A&E for assessment.
3. Acute assessment unit - Other non-cardiac specific ward.
4. CCU / cardiac facility - A cardiac facility is any area with specialised nursing staff
5. Self-referral - The patient made own way to non-interventional hospital. These patients are excluded from Call to balloon analyses.
6. Already in hospital - The patient was admitted prior to this event. e.g., already in hospital with ACS, and develops new symptoms with ST elevation or after admission with ACS, transferred for intervention as part of routine care for ACS.
7. Other

9. *Unknown*

Assessment at interventional centre (3.48) - Place of initial assessment after arrival at interventional centre with options

1. *Assessed in A&E* - Self presenters might be assessed here.
2. *Acute assessment unit* - A nonspecific area for assessment of acute admissions.
3. *CCU / cardiac facility* - A facility with specialised nursing staff.
4. *Catheter laboratory* - Including areas immediately adjacent.
5. *Already in hospital* - Already in interventional hospital.
9. *Unknown*

Intended reperfusion procedure (3.49) - This field covers intended reperfusion treatment after assessment at the Heart Attack Centre. Where the diagnosis is nSTEMI, option 4 must be used.

0. *None*
1. *Primary PCI*
2. *Rescue PCI* - A procedure for continuing symptoms / features of non-reperfusion for STEMI.
3. *Thrombolytic treatment* - If intended reperfusion treatment was with lytic drug - which was not given - use MINAP 3.08 to explain why. If lysis is used, existing MINAP fields will cover this scenario.
4. *Other coronary intervention* - Covers all interventions other than for acute management of STEMI, e.g. elective intervention for STEMI / nSTEMI or for new symptoms.
9. *Unknown*

Procedure performed (3.50) - Intended treatment may not necessarily occur e.g. lab may be unavailable, etc.

1. *No angiogram*
2. *Angiogram but no PCI*
3. *Angiogram and PCI*
9. *Unknown*

Why was no angiogram performed? (3.51) - This field will identify the reasons why patients for whom primary PCI was intended did not receive it.

0. *Not applicable* - Where angiography has been performed.
1. *Diagnosis not ACS* - Another diagnosis, not an acute coronary syndrome, was established.
2. *Patient refused*
3. *Patient died*
4. *Complication before angio could be performed* - An acute medical event resulting in cancellation of a planned angiogram / intervention.

5. *Angio inappropriate due to co-morbidity* - For use where there is advanced malignancy, dementia, progressive neurological disease or other conditions having an immediate impact on prognosis. Includes other clinical reasons identified by the clinician.
6. *Technical failure* - Any operator related failure, including failure of arterial access.
7. *Lab unavailable* - Access to lab not possible at a time when lab normally available.
8. *Other* - Including absent staff or equipment problems.
9. *Unknown*

Why was no intervention performed? (3.52) - Where an angiogram has not been performed this field should be left blank.

0. *Not applicable* – use this option where primary PCI or other coronary intervention has been performed.
1. *Patient refused* - Patient refused intervention after angio.
2. *Patient died* - Patient died after angio.
3. *Complication before PCI could be performed* - An acute medical event preventing intended intervention from starting.
4. *PCI felt to be inappropriate* - e.g. because of co-morbidity, e.g. acute VSD, cardiac rupture; acute MR; coronary spasm, spontaneous dissection; thrombus treated with drug therapy (e.g. ReoPro and heparin), etc.
5. *Angiographically normal coronaries / mild disease / Infarct Related Vessel unclear*
6. *Surgical disease*
7. *Technical failure* - Any technical / operator failure after starting interventional procedure, including no arterial access
8. *Other*
9. *Unknown*

Referring hospital code (4.21) has been moved to the 'admission details' section as it is relevant for both primary and elective PCI.

6.5 Examinations

Systolic BP (2.20) - The first systolic blood pressure recorded after index admission to hospital. The patient should be in a stable cardiac rhythm, i.e. sinus or chronic AF. Where the presenting rhythm is a treatable tachyarrhythmia, the first stable systolic BP after treatment should be used.

Heart rate (2.21) - The heart rate is recorded from the first ECG after admission to hospital, whilst in a stable cardiac rhythm i.e. sinus rhythm, or chronic AF. In complete heart block record ventricular rate. Where the presenting rhythm is a treatable tachyarrhythmia, the first stable heart rate after treatment should be used.

No need to record BP and Heart Rate for repatriated patients unless you require this for local purposes, however do remember to record these measures taken by the first hospital.

Killip class (2.41) - This field is an integral part of the GRACE predicted mortality score**. It should be scored as the worst category developing during the first 24 hours of admission (often this is at its worst in the first few hours before definitive treatment is offered).**

1. *No evidence of heart failure*
2. *Basal crepitations and/or elevated venous pressure*
3. *Pulmonary oedema* - Extensive lung crepitations consistent with pulmonary oedema, or confirmatory X-ray evidence
4. *Cardiogenic shock* - Hypotension, poor tissue perfusion and oliguria due to ventricular dysfunction in the presence of raised filling pressures.
8. *Not applicable* - Where patient dies or is transferred early in the admission.
9. *Unknown*

Height (2.29) and Weight (2.30)

Values for height and weight may be entered in imperial units only in the MINAP application which will be converted to metric units and the BMI is calculated automatically. Local or commercial applications must use metric measure, with height recorded in cm and weight in kg. If this information is unknown, this field should be left blank. **NB**: if left blank the application will populate a warning but it will not stop you from saving the record.

6.6 Tests

Serum cholesterol (2.15) - A value recorded during the **first 24 hours** after index admission. There is an in-built range check checking that the entered value is 2.5 – 25 mmol/L.

Serum glucose (2.28) - taken **on index admission** (not necessarily fasting). A non-lab capillary glucose with a calibrated glucometer is acceptable. There is an in-built range check checking that the entered value is 3-60 mmol/L.

Haemoglobin (2.35) - Recorded **within 24 hours of index admission** (g/L). There is an in-built range check checking that the entered value is 50 -250 g/L.

Creatinine (2.34) - Recorded **within 24 hours of index admission** (micromol/L.) There is an in-built range check checking that the entered value is 30 – 1000 micromol/L.

If the entered value is outside of the above range checks, a warning message will ask you to check that the entered value is the intended value.

Cardiac markers raised (2.14) - This field is only to be used for biomarker changes due to the acute event or re-infarction, and not for post procedural values.

0. No - An absence of any rise in cardiac bio-markers (usually troponin) to a value above the 99th centile of the upper reference limit for the assay

1. Yes - A rise in cardiac bio-markers (usually troponin) with at least one value above the
99th centile of the upper reference limit for the assay employed.

Peak troponin (3.19) - Should be the highest value recorded and is valuable for prognostic reasons regardless of any diagnostic label given to the patient. This field allows to record any value, whether with decimal places or an integer, BUT remember to record the type of assay used (field 3.37). It only needs to be recorded during the index admission.

Troponin assay (3.37) - Please indicate which assay is used locally. A new option has been added 3. High sensitivity Troponin I. **Do not enter zero for any numeric field where the value is not known - leave blank instead!**

Non-invasive tests

Only records Exercise test (4.10), Echocardiography (4.11), and Radionuclide studies (4.12) that was performed during this admission. The new field to record Stress echo (2.42) has been added as per the NICE guideline and this also relates to a stress echo performed during this admission. If there is no mention of these in the medical notes then record *9. Unknown* rather than *0. No*.

Left ventricular ejection fraction (2.31) - Measured during this admission by echo, angiogram, radionuclide or magnetic resonance study. These values correspond with BCIS definitions of good, moderate and poor function and are resting (rather than stress) values.

1. *Good* - corresponding to an LVEF of >=50%
2. *Moderate* - corresponding to an LVEF of 30-49%
3. *Poor* - corresponding to an LVEF of <30%.

6.7 Previous medical history

Not all conditions are strictly risk factors, but the list includes conditions which might have some impact on use of treatments, such as the use of Beta blockers in the presence of chronic obstructive pulmonary disease.

There is a choice for each condition of:

0. No
1. Yes
9. Unknown.
Diabetes and Smoking status have additional options.

Previous AMI (2.04) - Any previously validated episode of acute myocardial infarction.

Previous angina (2.06) - Symptoms due to cardiac ischaemia developing or already in existence at least 2 weeks prior to admission, and continuing up to admission.

Hypertension (2.07) - A patient already receiving treatment (drug, dietary or lifestyle) for hypertension or with recorded BP >140/90 on at least 2 occasions before admission..

Hypercholesterolaemia (2.08) - Elevation of serum cholesterol requiring dietary or drug treatment.

Peripheral vascular disease (2.09) - Presence of peripheral vascular disease, either presently symptomatic or previously treated. Include renovascular disease and aortic aneurysm.

Cerebrovascular disease (2.10) - A history of cerebrovascular ischaemia, including transient cerebral ischaemic episodes as well as events with deficit lasting >24 hours.

Asthma or COPD (2.11) - Any form of obstructive airways disease.

Chronic renal failure (2.12) - Defined as creatinine consistently more than 200 micromol/L. Do not enter 1. Yes for values less than 200 micromol.

Heart failure (2.13) - Pre-existing treated heart failure.

Smoking status (2.16)

Diabetes (2.17) - *0. Not known diabetic* – use this option when, regardless of admission glucose, a patient is not diabetic until this is formally confirmed by appropriate investigation. This must not be changed even if a diagnosis of diabetes is subsequently confirmed.

Previous PCI (2.18) - A percutaneous coronary intervention at any time prior to this admission.

Previous CABG (2.19) - Coronary artery bypass grafting at any time prior to this admission.

Family history of CHD (2.32) - Identifies a family history of premature CHD by diagnosis in males before 55 years or females before 65 years.

6.8 Drug therapy

The purpose of the section is to allow you to record therapy in use prior to admission and that given during the admission.

Drug therapy on admission

There are four fields to record the use of **Beta blockers (2.24)**, **ACE inhibitors/ Angiotensin receptor blockers (2.25), Statins (2.26)** and **Thienopyridine inhibitors (2.38)** (e.g. Clopidogrel and Prasugrel) prior to admission.

Each has options of:

0. No,
1. Yes
9. Unknown

Where was aspiring/other antiplatelet given (2.04) - Identifies if and when aspirin or other antiplatelet drug was first given to patient.

1. *Already on aspirin / antiplatelet drug -* Regular use of aspirin/antiplatelet before this episode. Ignore the administration of additional doses by paramedics.

2. *Aspirin / antiplatelet drug given out of hospital* - Aspirin or other antiplatelet drug started for this episode before admission i.e. patient was not previously taking any antiplatelet drug.

3. Aspirin / antiplatelet drug given after arrival in hospital

4. Aspirin / antiplatelet contraindicated

8. Not given

9. Unknown

Drug therapy given during admission (3.20 - 3.34, 3.45)

For all drugs there are options

0. No
1. Yes If introduced while in hospital or on treatment at admission and continued..
9. Unknown.

New field has been added to the dataset **Bivalirudin (3.45)** – this should be recorded by the interventional hospitals as a drug given during PCI.

Drug therapy at discharge

Secondary prevention medication at discharge includes:

- Beta blocker (4.05)
- Angiotensin converting enzyme inhibitor or angiotensin receptor blocker (4.06)
- Statin (4.07)
- Aspirin (4.08)
- Aldosterone antagonist (4.28)
- Thienopyridine inhibitor (4.27)
- Ticagrelor (4.31) – new field added in June 2013.

For all drugs, record

1. Yes - if treatment was started in hospital, or continued if taking it before admission.
0. No - when a patient should have been prescribed such medication, but was not.
2. Contraindicated
3. Patient declined treatment - should be used for patients who self-discharge.
4. Not applicable - should be used for patients who die or are transferred to another hospital. Assume that the receiving hospital will arrange secondary prevention. These patients will not be included in analyses. DO NOT USE *9. Unknown.*
8. Not indicated - when there is no clinical reason for the patient to be on the medication
9. Unknown - used where information about this field is not available or not known.

Analysis of the use of secondary prevention medication on discharge is based on all troponin positive ACS patients. These include discharge diagnoses of:

1. Myocardial infarction (ST elevation)
3. Threatened MI
4. Acute coronary syndrome (troponin positive)

6.9 Diabetes

Management of hyperglycaemia/diabetes - Patients presenting with significant hyperglycaemia have a considerably increased mortality, especially those who are not known to be diabetic. There is increasing evidence that control of hyperglycaemia in the acute phase of ACS may be important.

In-patient management of hyperglycaemia/diabetes (3.41) – use this field to record the treatment given during the first 24 hours (or longer) of admission, even if this regime is subsequently changed. Each insulin regime may be in combination with oral therapy. Diabetic treatment should be recorded regardless of whether the patient is known to be diabetic or presents for the first time with hyperglycaemia.

The options are:

0. None - No pharmacological diabetic treatment (either oral or by injection) was given during the admission. See option 7.

1. Glucose insulin regime - Insulin by pump with additional IV glucose according to local protocol.

2. Insulin pump - Insulin by pump without additional IV glucose.

3. Multi dose insulin - 3 or more individual doses of subcutaneous insulin/24 hours, either as regular doses or sliding scale insulin. This may be a continuation of the preadmission regime.

4. Other pre-admission insulin regime - Insulin regime of 2 or less doses per 24 hours.

5. Oral medication only - Any form of oral medication without any insulin.

7. Diet only - For known diabetics continuing (low carbohydrate) diet without additional medication.

9. Unknown.

Diabetic therapy at discharge (3.42) - Please record the therapy at discharge regardless of whether it was introduced at the hospital or the original therapy.

If oral therapy is given in combination with insulin, record under the appropriate insulin regime.

0. None
1. Multi dose insulin regime - Insulin given three or more times daily.
2. Other insulin regime - Insulin less than three times daily.
3. Oral medication - Any oral medication used without insulin.
4. *Insulin plus oral medication*
5. Diet only - A low carbohydrate diet for diabetes.

6. Not applicable – use for patients who die or are transferred to another hospital.

9. Unknown

Date/time of start of insulin infusion (3.53) – This is a new field and refers to the time of start of any insulin infusion. This will allow an estimation of the timing of treatment of hyperglycaemia in relation to other interventions such as PCI.

6.10 Complications

Bleeding complications (4.03)

This should be used for bleeding following any therapeutic intervention, including pre-hospital thrombolysis or primary PCI (including sheath removal), and anticoagulant or antithrombotic treatment, but excluding bleeding complications following repeat angiography/intervention. Use should be limited to bleeding occurring within 24 h of the finish of any therapeutic intervention. Options are given in order of precedence: use the first option that applies.

0. None
1. Intracranial bleed Of any severity, should ideally be confirmed by scanning.
2. Retroperitoneal haemorrhage Of any severity, should ideally be confirmed by scanning.
3. Any bleed with Hb fall >50g From any site except options 1 and 2.
4. Any bleed with Hb fall >30 and < 50g
5. Any bleed with Hb fall < 30g
9. Unknown.

Death in hospital (4.04) - This is important for analysis of case fatality, particularly deaths related to treatment. Please check that details of the cardiac arrest have been completed, even if resuscitation was not attempted. Death in hospital is recorded in several places; please ensure your entries do not contradict each other.

Re-infarction (4.24) - Refers to re-infarction occurring during this admission. This is defined as ischaemic pain or other symptoms consistent with acute cardiac ischaemia (e.g. sweating, nausea, hypotension) persisting until relieved by analgesia or nitrates, accompanied by new cardiographic changes (new ST elevation or depression or T wave changes in the territory of the initial event). These features must be accompanied by acute marker of cardiac necrosis to more than the upper limit of normal or an increase to a value >= 50% greater than the last recorded value. The options are

0. No
1. Yes
9. Unknown

MINAP makes no attempt to record re-occlusion, which can really only be confirmed angiographically. Re-infarction is a clinical presentation of re-occlusion, which can be silent.

Cardiac arrest - You should record cardiac arrests for patients with infarction who arrest in hospital. You should also log patients with infarction who have an out of hospital cardiac arrest and who survive to be admitted to hospital. **Entries to the four fields on this form should relate to the first arrest and not to any subsequent event.** Cardiac arrest excludes

syncope or profound vagally-mediated bradycardia. Enter the date and time of death if resuscitation not attempted. Arrests occurring in patients with AMI in A&E who do not survive may not come to your notice. Please attempt to log these patients when the underlying cause of the arrest was thought to be AMI.

Cardiac arrest location (3.14) - The default is *1. No arrest*. If you enter any option other than *1. No arrest* further fields appear for Date/ time of first cardiac arrest, Presenting rhythm and Outcome of arrest.

Date/time of first cardiac arrest (3.13) - The dataset only applies to FIRST arrests.

Arrest presenting rhythm (3.15)

2. VF/ pulseless VT - Includes any other haemodynamically catastrophic tachyarrhythmia.

3. EMD - Also referred to as pulseless electrical activity.

Outcome of arrest (3.16) - Applies only to outcome of the first arrest. This should include arrests in which resuscitation was deemed to be inappropriate. Please enter the fact that resuscitation was not attempted for whatever reason (such as severe co-morbidity). If further arrests occur the outcome must be recorded in the field Death in hospital, and in Discharge Destination.

If **Outcome of arrest** is entered as *1. No return of circulation*, then Death in hospital will default to From MI and Discharge destination will default to Death in the MINAP application. The Discharge date will be the Date of death. **NB**: Those using commercial / local applications must ensure that when 1. No return of circulation is recorded as the outcome of arrest, and then Death in hospital must also be completed.

6.11 Investigations/interventions

These fields serve to record number of patient pathways:

5. nSTEMI patients who had investigation locally (non-interventional hospital) or elsewhere (at the interventional hospital and patient returned to the referring hospital
6. STEMI that had further investigation/intervention following pPCI locally or elsewhere
7. STEMI that received lysis as their initial reperfusion treatment locally or elsewhere and patient was sent for angiography (and intervention if appropriate) as NICE guideline recommends.
8. STEMI that received no reperfusion due to late presentation, for example.

For STEMI further intervention is often performed on a semi-urgent basis within 12-24 hours of admission. If the procedure is done for continuing symptoms within 24 hours of admission **record this as a rescue procedure**, and do not use the angiography or intervention fields. Rescue procedures should have a MINAP record completed at the interventional centre.

If this is an early semi-urgent procedure following STEMI in a patient without continuing symptoms (e.g. convalescent STEMI), use the angiography and intervention fields. Transferred patients with STEMI do not need a new MINAP record at the interventional centre. For non ST elevation ACS use the angiography and intervention fields.

Developments in provision of angiography and interventional facilities mean that different combinations of site for angiography and intervention may occur. The dataset caters for this.

Coronary angiography (4.13) - Coronary angiography performed or arranged but does not refer to coronary angiography preceding primary PCI or rescue PCI. If, after thrombolytic treatment a patient is then referred to an interventional centre for angio and urgent PCI (i.e. not primary PCI) you should enter 4.13 Coronary angiography as 3. or 4. Symptom/protocol driven investigation at another hospital. If you don't know whether angiography took place or not, record 9. Unknown.

As coronary angiography is a data completeness field, it is particularly important to complete this field for nSTEMI patients. Use 9. Unknown rather than leaving the field blank. For patients that have primary PCI, use 8. Not performed rather than blank as previously recommended.

There are options for:

6. Not applicable - use when there is advanced malignancy, dementia, progressive neurological disease or other conditions having an immediate impact on prognosis. Includes

other clinical reasons identified by the clinician.
7. Patient refused.

Coronary intervention (4.14) - Coronary intervention during this episode performed either in your hospital or by referral to another hospital. Do not use this field for primary PCI or rescue PCI which are covered by Initial reperfusion treatment and Additional reperfusion treatment. Enter the procedure if you know what procedure has been done or if the intervention takes place elsewhere and you have no information use *9. Unknown*. There are options for

6. Not applicable - For use when there is advanced malignancy, dementia, progressive neurological disease or other conditions having an immediate impact on prognosis. Includes other clinical reasons identified by the clinician.

7. Patient refused - There is no need for an interventional centre to start a MINAP record when a patient is transferred for angiography/intervention that is not part of the initial reperfusion treatment.

Unless you know what intervention occurred, 4.14 Coronary intervention should be recorded as *9. Unknown*. The interventional centre will record what actually happened and we will be able to link your record with the interventional centre record. It is essential to enter the code of the interventional centre so that we can link these records.

Date/time of referral for investigation/intervention (4.15) - Whether angiography or intervention is to be performed locally or at another centre it is useful to record delays before angiography or transfer. Dates can be recorded by clicking on the calendar button.

Daycase transfer date (4.17) - If the patient is transferred as a daycase, and is expected to return, the patient is not discharged. If transferred, and not expected to return, then the patient is discharged from you and this must be recorded in Date of discharge and Discharge destination (2. Other hospital). This is done automatically in MINAP. If date of transfer and date of discharge are recorded as the same date, it will be assumed that the patient has been transferred to another hospital (ie not a day case).

Angio date/time (4.18) - Where this takes place during the present admission. It is a Date/Time field, allowing interval from arrival to angiography to be accurately determined. Record the date and time of angio whether it was performed locally or elsewhere (when patient returns to you following an angio elsewhere).

Delay to performance of angiogram (4.30) – This new field has been added to establish the type of delays that typically occur, and how delays impact on the time to performance of angiography.

Local intervention date (4.19) - Where the intervention takes place during the present admission and is performed on site. This date will usually be the same as Local angio date.

Interventional centre code (4.20) - Code of the interventional centre, for use by the referring hospital to record a hospital to which a patient was transferred to for investigation/intervention.

Date of return to referring hospital (4.26) - A field for use when a patient is admitted to a non-interventional hospital, transferred to an interventional centre and returns to the non-interventional hospital. The available options are:

0. None - If no delay occurred, please use option *0. None* rather than leaving it this field blank.
1. Delay due to comorbid clinical condition/ competing clinical issue – this covers for example an infection, barrier nursing, active bleeding, etc.
2. Capacity issues
3. Patient preference – use this for example when a patient initially refused to have angiogram and but changed their mind later on.
8. Other
9. Unknown

If angiogram was performed within 96 hours from admission but there was delay that prevented the angiogram being performed sooner, you may wish to record the delay for assessment of local services.

6.12 Discharge details

Date of discharge (4.01) - Includes date of transfer to another hospital (but not as a day case), and date of death.

Discharge diagnosis (4.02) – current options are:

1. Myocardial infarction (ST elevation) - There should be a history consistent with the diagnosis. The diagnosis requires the presence of (new) cardiographic changes of ST elevation consistent with infarction of =>2mm in contiguous chest leads and/or ST elevation of =>1 mm ST elevation in 2 or more standard leads. (New LBBB is included; although new ST elevation may be apparent in the presence of LBBB). There must be troponin elevation above the local reference range (See 3.Threatened MI). This group includes all patients with STEMI regardless of whether typical changes were evident on the initial ECG or developed subsequently. If ST elevation is present on any ECG during the episode in association with elevated troponin, then the diagnosis must be 1. Myocardial infarction (ST elevation).

3. Threatened MI - With the adoption of a universal definition for myocardial infarction this category has become redundant. If there is a combination of ST segment elevation, no matter how transient and troponin release the final diagnosis must be ST elevation infarction. If there is ST elevation and no troponin release the Discharge diagnosis is 4. Acute coronary syndrome troponin negative.

4. Acute coronary syndrome (troponin positive) - ACS troponin positive now includes all those patients previously defined as nSTEMI. There must be symptoms consistent with cardiac ischaemia and there will normally be cardiographic changes consistent with this diagnosis. Troponin elevation above locally determined reference level is mandatory. Use this option if a patient is transferred to an interventional centre before a troponin is measured, as the probability of troponin being elevated for transferred patients is very high.

5. Acute coronary syndrome (troponin negative). Symptoms consistent with cardiac ischaemia without troponin release associated with dynamic (fluctuant) ECG changes consistent with ischaemia.

6. Chest pain of uncertain cause - A patient admitted with chest pain not accompanied by significant cardiographic change nor troponin release, and where no other clear diagnosis emerges. It is likely that at admission there was a high index of clinical suspicion that the pain was cardiac, but this remains unconfirmed. The cardiograph may be abnormal, but there are no acute or dynamic changes.

7. Myocardial infarction (unconfirmed) - This diagnosis must only be applied to patients who die in hospital or are transferred elsewhere before biochemical confirmation of infarction can be confirmed.

8. Other diagnosis - Use where a patient is admitted with clinical suspicion of cardiac pain and where any diagnosis other than cardiac ischaemia is confirmed.

9. Takotsubo cardiomyopathy - **Essential criteria:** 1) left ventricular wall motion abnormalities, usually apical and midventricular, extending beyond a single coronary artery territory, and 2) absence of obstructive/culprit coronary disease, and 3) ST or T wave abnormalities on the ECG. **Non-essential criteria**: 4) Dynamic prolongation of the QTc interval, 5) Cardiac enzyme rise, 6) Natriuretic peptide rise, 7) Stressful precipitant.

Selecting this option, Takotsubo fields will be populated in the database to collect additional information on this group of patients. See page 56 for more information.

11. PCI related MI - Percutaneous coronary intervention (PCI) related MI is arbitrarily defined by elevation of cTn values (>5 x 99th percentile URL) in patients with normal baseline values (≤99th percentile URL) or a rise of cTn values >20% if the baseline values are elevated and are stable or falling. In addition, either (i) symptoms suggestive of myocardial ischaemia or (ii) new ischaemic ECG changes or (iii) angiographic findings consistent with a procedural complication or (iv) imaging demonstration of new loss of viable myocardium or new regional wall motion abnormality are required.

NB: an elevated troponin value must have an explanation! Unless there is another agreed cause for the elevation a diagnosis of troponin positive acute coronary syndrome must be considered.

Discharge destination (4.16)

8. Other specialty in same hospital - Where a patient is transferred to another specialty for a specific reason, such as rehabilitation following a CVA, or nephrologists for dialysis. It does not include a transfer from cardiologists to general physicians for continuing care of the original event before discharge.

Followed up by (4.23) - Refers to a formal outpatient arrangement. The options are
1. Cardiologist - Includes the cardiology team including nursing staff working semi-autonomously.
2. Non cardiologist
3. No follow up - An option, where no arrangements for hospital follow up is made by the discharging hospital. Do not use when the patient is transferred elsewhere, use 4.Not applicable.
4. Not applicable – use this option for patients who die or are transferred to another hospital

9. Unknown

Cardiological care during admission (2.33) – definition was slightly revised to clarify the definition.
A field with options:
0. No
1. Yes
9. Unknown
Record if the patient was seen by a cardiologist (or member of clinical team working under the supervision of a *consultant* cardiologist) during admission.

Cardiac rehabilitation (4.09) - Refers specifically to further rehabilitation arranged after discharge (as rehabilitation in the sense of lifestyle advice will already have been given).
8. Not indicated - Use when further rehabilitation may not be indicated because of severe comorbidity etc.

6.13 Nice guidance for secondary prevention

These fields are not mandatory but allow you to audit information documented in the case record against NICE secondary prevention guidance.

Smoking cessation advice given (5.1)
The option 2. Planned in rehab has been added.

Dietary advice given during this admission (5.2)
The option 9. Unkown has been added.

6.14 Takotsubo Cardiomyopathy (TC)

There is a lot left to learn about this condition, not least the precise cause and the best treatment. Using new fields added to the MINAP dataset it should be possible to determine the frequency of the condition in the UK, the types of individuals it affects, their long-term prognoses and, through observation, associations of treatments in hospital and at discharge with long-term outcome.

Although the fields in this section are not formal part of MINAP dataset, collection of this information would help us to achieve a great deal of understanding of this rare (or not) condition.

For more information on Takotsubo Cardiomyopathy, click on the following links below:

- **Lay summary:** http://theconversation.com/a-broken-heart-has-some-truth-to-it-after-all-13764
- **For clinicians:** http://www.bhf.org.uk/publications/view-publication.aspx?ps=1002057

Unlike in the MINAP dataset, some of these fields have multiple options and ability to add free text. The TC dataset consists of 23 fields.

The multiple choice fields are *Stress precipitant* and *Positive Inotropic support;* there are in-built checks to prevent data entry errors e.g. it is not possible to selection option 0. No and 2. Noradrenaline as these are mutually exclusive options.

Free text window becomes available when option *6. Other* in Stress precipitant is selected giving opportunity to give more detail on the stress precipitant not covered in the existing options. The free text window is limited to 100 characters.

Similarly when option 4. Other is selected in the Regional LV dysfunction distribution field; the free text window is populated and limited to 100 characters.

If LVEDP is measured (thus *1. Measured* option selected), a free text window is populated to enter the value limited to two numerical characters.

7. Data collection in MINAP

MINAP consists of 130 fields however not all fields need to be completed for every patient and completion depends on the patient pathway. Appendix 3 provides dataset mappings to STEMI and nSTEMI, type of treating hospital as well as the patient pathway. Please refer to the appendix 3 to determine what fields are relevant to what situation to help you work out locally what your hospital should collect. You may wish to adjust MINAP data collection form accordingly. Do remember to collect information that is relevant to your needs locally and not just what MINAP expects you to collect.

7.1 nSTEMI data collection

All patients with discharge diagnosis of ACS Troponin positive/nSTEMI should be recorded in MINAP, including those that are not on cardiac wards.

Why is it important that ALL nSTEMI patients are recorded in MINAP?

Some years ago the Myocardial Infarction National Audit Project became the Myocardial Ischaemia National Audit Project. This subtle change of title was intended to emphasise that participation in MINAP provided an opportunity to analyse the care of all patients admitted to hospital with ACS, and not just those with ST-elevation. Patients presenting with, rather than without, ST-elevation are easier to identify and their immediate management lends itself to audit – through reporting reperfusion rates and delays to reperfusion (e.g. Door-to-balloon). However our annual reports show that most patients with ACS have nSTEMI.

Compared with STEMI, patients with nSTEMI tend to be older and have more associated medical (and presumably social) problems. While most patients with STEMI are taken directly to Heart Attack Centres for primary PCI, those with nSTEMI – who do not require immediate angiography and PCI – are often admitted to the nearest district general hospital. Some of these, while not designated Heart Attack Centres, possess angiography facilities in which diagnostic coronary angiography and later PCI can be performed. In many other cases patients with an identified need for angiography are transferred to Heart Attack Centres sometime after their initial admission. Their length of stay in hospital is longer and their risk of dying is greater – albeit those at greatest risk can be identified using validated risk scoring systems.

With such variation in the nSTEMI case ascertainment rate, the true picture of care provided to patients in nSTEMI is uncertain. It is likely that most patients that appear in MINAP are on cardiac wards and cared for by cardiological team and thus more likely to have a better outcome. However, it is important that data are collected on those patients that were not seen by cardiologist which will allow a more accurate picture to emerge, but more importantly it will give you, a hospital caring for such patients, an opportunity to assess and reflect on the care provided.

The identification of nSTEMI (and therefore the collection of data about these patients) is not always easy but, and with the appropriate resources and systems put in place, it is an achievable tasks – see case studies in 2011, 2012 and 2013 MINAP Annual Reports. Although there has been an improvement in nSTEMI data collection, there are still a number of hospitals that are submitting limited, and in some cases no, data. This is no longer acceptable.

Typical pathways for nSTEMI are:

Non-interventional hospital

- Patient admitted to a non-interventional hospital with angio and PCI facilities and discharged home from there
- Patient admitted to a non-interventional hospital with angio without PCI facilities, 'treat & return' and discharged home
- Patient admitted to a non-interventional hospital without angio facilities and discharged home with intended return for investigation/intervention

Interventional hospital

- Patient admitted to the interventional hospital directly from the community as this happens to be their local hospital and discharged home
- Patient admitted to the interventional hospital from a non-interventional hospital and discharged home
- Patient treated and returned to the referring hospital as a day case

Determine what pathways apply to your hospital, identify fields relevant for this pathway, and if helpful adjust your data collection forms accordingly. Please remember to include all the fields relevant to answer areas of quality monitoring locally. Engage with your clinicians – in our experience, hospital with most comprehensive data have a strong clinical support behind them.

See appendix 3 for the fields required to be completed for a specific care pathway.

7.2 STEMI data collection

Patients having primary PCI for STEMI may be admitted to more than one hospital. This means that two MINAP records, which we will have to link together, may have to be created for a single 'superspell'. It is very important that MINAP has the information with which to link records, and this is explained below.

…for non-interventional hospitals

A MINAP record must be started for a patient with STEMI when the patient is admitted to your hospital. A temporary (pit stop) visit to A&E, whether arriving by ambulance or not, before transfer to the interventional centre does **not** count as an admission. A MINAP record need only be started if the patient is formally admitted to hospital.

Typical patient pathways:

1. **Patient admitted directly from the community or self presents to your hospital with STEMI**
   a. **And given thrombolytic treatment**
      In addition, complete thrombolytic treatment section
   b. **No reperfusion given**
      Complete reason why reperfusion was not given.
      Complete angiography and intervention fields – see section 6.11 for the relevant fields.
   c. **Referred for consideration for pPCI elsewhere**

There are several circumstances in which this might happen, but typically a patient might be admitted with chest pain and develops STEMI sometime after admission for which primary PCI is appropriate.

Complete the following:

- Demographics. Identifiers such as NHS number are vital
- Initial reperfusion treatment is *3. Referred for consideration for pPCI.*
- Consider the patient to be transferred as a day case (even if away >24 h) so no date of discharge need be entered now but should be entered as the discharge date when the patient is finally discharged.
- Interventional centre code (where the patient went for primary PCI)
- If and when the patient returns to you, complete MINAP record with
  - ✓ Date of return to referring hospital (i.e. your hospital)
  - ✓ What procedure was performed at the interventional hospital
  - ✓ Secondary prevention medication
  - ✓ Discharge date

- ✓ Discharge destination
- ✓ Discharge diagnosis

What to do if patient does not return? Complete the record as if patient was discharged to another hospital. Secondary prevention is completed as *4. Not applicable.*

2. **Patient already in hospital with another condition at the time of STEMI**
   All sections as stated above. Important – *date and time of admission is 00:00* which has been reserved for this group of patients. If patient is admitted on the stroke of midnight, please enter 00:01. Admission diagnosis is 5. Other initial diagnosis

3. **Patient is repatriated to your hospital for the first time following an intervention elsewhere**

This should also be used where the patient has a pit stop at the non-interventional hospital (but is not admitted) and is transferred on to the interventional centre. The interventional centre will make the main MINAP record and so the non-interventional hospital record should be a skeleton record.

4. **Patients transferred to an interventional centre for rescue PCI**

A coronary intervention performed for continuing symptoms following thrombolytic treatment performed within 24 hours from onset of symptoms of STEMI is a rescue procedure, and should be recorded as such. Beyond 24 hours after onset this should be no longer regarded as a rescue procedure, and the angiography field (4.13) and associated times should be completed.

Summary: A non-interventional hospital will only make a record if the patient is formally admitted – either before transfer for primary PCI, or on return from an interventional centre after the procedure, (repatriation).

…for interventional hospitals

Interventional centres must always make a MINAP record for a patient admitted with STEMI, even if the patient does not receive the expected intervention.

A MINAP record must be completed for all patients transferred or admitted to your hospital with a working diagnosis of STEMI (this includes patients transferred where the Initial diagnosis is not correct (pericarditis, old MI with persisting old ST elevation, etc.). If the patient stays in the interventional centre to discharge then this hospital must take responsibility for the full MINAP record.

Typical STEMI pathways at the interventional hospital are:

1. **Patient directly admitted from the community or self-presents with STEMI at your hospital**
2. **Patient is transferred to your hospital from the non-interventional hospital**
    a. With STEMI developing in the community
    b. With STEMI developing after admission
    c. With STEMI resolving on arrival at your hospital
    d. Admitted to your hospital via pit stop at the non-interventional hospital
3. **STEMI developing whilst at your hospital with another unrelated condition**

See Appendix 3 for the required fields for different care pathway.

Where patients remain in the interventional centre for limited time a reduced record must still be made. Some interventional centres employ a treat and return strategy a reduced MINAP dataset should be completed:

DEMOGRAPHICS
ADMISSION DETAILS
Initial diagnosis
Date/time arrival at interventional centre
Admission method
Date/time of onset of symptoms/call for help
Ambulance job number
Patient location at time of STEMI
REPERFUSION
Initial reperfusion treatment
Delay before treatment
ECG determining treatment
Date/time of balloon inflation
INTERVENTIONAL AUDIT
Date/time of arrival at non interventional hospital
Assessment at non interventional hospital
Assessment at interventional centre
Intended reperfusion procedure
Procedure performed
Why no angiogram performed
Why no intervention performed
COMPLICATIONS
Bleeding complications
Death in hospital
INVESTIGATIONS/INTERVENTIONS
Referring hospital code if appropriate
DISCHARGE DETAILS
Discharge date
Discharge diagnosis
Discharge destination

Reminder: An interventional centre performing primary PCI must make a MINAP record for every patient having primary PCI or activating the primary PCI pathway.

The patient who does not have a primary PCI

Patients referred for consideration of primary PCI may not have a procedure performed. This may be because of a death before the planned procedure, a misdiagnosis, or that after angiography it was decided not to proceed. Please enter these patients into MINAP and, in particular, the Interventional audit fields that explain why no procedure was performed.

8. Examples of data collection

8.1 Non-interventional hospitals

8.1.5 Patient is already in hospital with infection and complains of chest pain, ECG shows STEMI but is not recognised as such. The true diagnosis is established more than 12 hours after onset of symptoms.

ADMISSION DETAILS

Initial diagnosis = *5. Other initial diagnosis*

Admission method = *3. Already in this hospital*

REPERFUSION

Initial reperfusion treatment = *0. None*

Reason reperfusion treatment not given = *5. Administrative failure*

ECG determining treatment to confirm ECG appearances of definite AMI

If the incorrect diagnosis is noted in time to offer thrombolytic treatment, enter as follows;

Initial reperfusion treatment = *1. Thrombolytic treatment*

Date/time of reperfusion

Was there a delay before treatment = *7. Hospital administrative failure*

Additional reperfusion treatment as appropriate

DISCHARGE DETAILS

Discharge diagnosis = *1. Myocardial infarction (ST elevation)*

8.1.6 Patient admitted via ambulance service with typical history of cardiac pain and ECG showing extensive deep ST depression and elevated troponin. Patient is transferred to interventional centre for angiography/intervention and discharged home from there.

ADMISSION DETAILS

Initial diagnosis = *3. Acute coronary syndrome*

Admission method = *1. Direct admission via emergency service*

REPERFUSION

EEG determining treatment

TESTS

Cardiac markers raised

INVESTIGATIONS

Coronary angiography = *3. Protocol driven investigation performed at another hospital or 4.Symptom driven investigation performed at another hospital* depending on indication

Coronary intervention = *9. Unknown*

Date of referral for investigation

Date of transfer for investigation/intervention

Interventional centre code

DISCHARGE DETAILS

Discharge diagnosis = *4. ACS troponin positive/nSTEMI*

Discharge destination = *2. Other hospital*

Secondary prevention medication = *4. Not applicable*

8.1.7 ST elevation on ambulance ECG, thrombolysed by paramedic, admitted to non-interventional hospital, transferred to interventional centre for rescue for continuing symptoms and repatriated to your hospital.

ADMISSION DETAILS

Admission method = *1. Direct admission via emergency service*
Initial reperfusion treatment = *1. Thrombolytic treatment*
Where was initial reperfusion treatment given = *1. Before admission to hospital*
What procedure performed at interventional centre = *3. Rescue angioplasty*
[information available after return to you after rescue procedure]

REPERFUSION

Initial reperfusion treatment = *1. Thrombolytic treatment*
Where was initial reperfusion treatment given = *1. Before admission to hospital*
Additional reperfusion treatment = *2. Referred for rescue PCI elsewhere*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*
Thrombolytic drug
Date/time of reperfusion

INVESTIGATIONS

Interventional centre code
Date of return to referring hospital = Date patient returned to your hospital
[Note that details of referral for angiography are not required for rescue procedures]

DISCHARGE DETAILS

Secondary prevention medication
Discharge destination = *1. Home*

If the patient is instead discharged home from the interventional centre, the interventional centre is responsible for secondary prevention medication.
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*
[Procedure performed at interventional centre is left blank]

8.1.8 No ambulance ECG performed, patient admitted to non-interventional hospital where first hospital ECG shows ST elevation. Patient transferred to interventional centre for primary PCI and repatriated to your hospital.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of onset of symptoms/call for help
Ambulance job number
What procedure performed at interventional centre = *2. Primary angioplasty*

REPERFUSION

Initial reperfusion treatment = *3. Referred for consideration for pPCI*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INVESTIGATIONS/INTERVENTIONS

Interventional centre code
Date of return to referring hospital = Date patient returned to your hospital

DISCHARGE DETAILS

Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Secondary prevention medication
Discharge destination = *1. Home*

8.1.9 The patient comes to a non-interventional hospital for the first time after having primary PCI.

This should also be used where the patient has a pit stop at the non-interventional hospital (not admitted) and is transferred on to the interventional centre. The interventional centre will make the main MINAP record and so the non-interventional hospital record should be a skeleton record.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time Date is date of arrival at your hospital, enter 00.00 as the time
Admission method = *5. Repatriation after coronary intervention*
What procedure performed at interventional centre = *2. Primary angioplasty*

REPERFUSION

Initial reperfusion treatment = *0.None* as none performed at your hospital

INVESTIGATIONS/INTERVENTIONS

Interventional centre code

DISCHARGE DETAILS

Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Secondary prevention medication
Discharge destination = *1. Home*

8.1.1 Patient dials 999, ambulance ECG shows STEMI. Patient receives thrombolytic treatment in A&E, is referred for angiography/intervention and is discharged home from the interventional centre. This was a 'routine' post-lysis angio with no continuing symptoms.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of onset of symptoms/call for help
Ambulance job number

REPERFUSION

Complete all fields including:

Initial reperfusion treatment = *1. Thrombolytic treatment*
Where was initial reperfusion treatment given = *2. In A&E*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Thrombolytic drug
Date/time of reperfusion
Additional reperfusion treatment as appropriate
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*
Site of infarction

INVESTIGATIONS/INTERVENTIONS

Date of referral for investigation/intervention
Coronary angiography = *3 or 4 depending on indication*
Coronary intervention may be unknown
Interventional centre code

DISCHARGE DETAILS

Discharge date = Date of transfer to interventional centre
Discharge destination = *2. Other hospital*
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Secondary prevention = *4. Not applicable* (Interventional centre is responsible for secondary prevention)

8.1.2 ST elevation on ambulance ECG, thrombolytic treatment given by paramedic. Patient has angiography on site and transferred to intervention centre for intervention, from where they are discharged home.

ADMISSION DETAILS

As for previous example

Admission method = *1. Direct admission via emergency service*

REPERFUSION

Initial reperfusion treatment = *1. Thrombolytic treatment*
Where was initial reperfusion treatment given = *1. Before admission to hospital*
Additional reperfusion treatment as appropriate
ECG determining treatment (to confirm ECG appearances of definite AMI)

Thrombolytic drug
Date/time of reperfusion
Additional reperfusion treatment as appropriate

Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INVESTIGATIONS/INTERVENTIONS

Coronary angiography = *Options 1 or 2* depending on indication
Local angio date/time Note that time should now be recorded
Date of referral for intervention
Coronary intervention may be unknown
Interventional centre code

DISCHARGE DETAILS

Discharge date = Date of transfer to interventional centre
Discharge destination = *2. Other hospital*
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Secondary prevention = *4. Not applicable*

8.1.3 Ambulance ECG not diagnostic of ST elevation infarction but definite myocardial infarction diagnosed on arrival in A&E and patient given thrombolytic treatment.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission method = *1. Direct admission via emergency service*

REPERFUSION

Initial reperfusion treatment = *1. Thrombolytic treatment*
Where was initial reperfusion treatment given
ECG determining treatment (to confirm ECG appearances of definite AMI)
Thrombolytic drug
Date/time of reperfusion
Additional reperfusion treatment as appropriate
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

8.1.4 Patient self presents with typical history of cardiac pain with abnormal ECG on admission. Subsequent ECG shows typical acute ST elevation and patient given thrombolytic treatment.

As for definite MI (see 20.1) with the following variations

ADMISSION DETAILS

Initial diagnosis = *3. Acute coronary syndrome*
Admission method = *2. Self-presenter to this hospital*

REPERFUSION

Initial reperfusion treatment = *1.Thrombolytic treatment*

You may have already entered *0. None* because you did not think it was appropriate at the time. You should go back and change this.

Delay before treatment = *4. Initial ECG ineligible*
Date/time of reperfusion
Additional reperfusion treatment as appropriate
Patient location at time of STEMI = *2. STE first recorded on a subsequent ECG in, (or before arrival at) a non-interventional hospital*

8.2 Interventional hospitals

8.2.1 STEMI identified on ambulance ECG, taken directly to an interventional centre cath lab where primary PCI performed and patient discharged home.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *2. Primary PCI in house*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Date/time of reperfusion
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *3. Angiogram and PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *0. Not applicable* as primary PCI performed

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *1. Home*
Secondary prevention

If patient is discharged to another hospital
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*

8.2.2 Paramedics misdiagnose STEMI on ambulance ECG, patient taken directly to an interventional centre cath lab where diagnosis of pericarditis is made. Angiography and primary PCI are not performed.

ADMISSION DETAILS

Initial diagnosis = *5. Other initial diagnosis*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *0. None*
ECG determining treatment = *5. Other abnormality*
Patient location at time of STEMI = *8. Not applicable*
Additional reperfusion treatment = *0. None*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *0. None*
Procedure performed = *1. No angiogram*
Why no angiogram performed = *1. Diagnosis not ACS*
Why no intervention performed can be left blank as this is clear from above responses.

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *8. Other diagnosis*
Discharge destination = *1. Home*

8.2.3 Patient develops ST elevation some time after admission to a non-interventional hospital acute assessment unit, is then transferred to interventional centre where primary PCI performed and discharged home.

ADMISSION DETAILS

Initial diagnosis = *1. Myocardial infarction (ST elevation)* in your hospital
Admission date/time at interventional centre
Admission method = *4. Inter-hospital transfer for specific treatment*
Date/time of call for help

REPERFUSION

Initial reperfusion treatment = *2. Primary PCI in house*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Date/time of reperfusion
Patient location at time of STEMI = *2. STE recorded on a subsequent ECG in (or before arrival at) a non-interventional hospital*
Additional reperfusion treatment = *0. None*

INTERVENTIONAL AUDIT

Date/time of arrival at non interventional hospital
Assessment a non-interventional hospital = *3. Acute assessment unit*
Assessment at interventional centre as appropriate
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *3. Angiogram and PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *0. Not applicable* as primary PCI performed

INVESTIGATIONS/INTERVENTIONS

Referring hospital code

DISCHARGE DETAILS

Discharge date

Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *1. Home*
Secondary prevention

If patient is discharged to another hospital
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*

8.2.4 Patient self presents at non interventional hospital with STEMI. Patient not admitted, but is transferred to interventional centre cath lab where primary PCI performed, discharged back to non-interventional hospital.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time at interventional centre
Admission method = *1. Direct admission via emergency service*
Date/time of call for help (obtained from non-interventional hospital)
Ambulance job number not required

REPERFUSION

Initial reperfusion treatment = *2. Primary PCI in house*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Date/time of reperfusion
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*
Additional reperfusion treatment = *0. None*

INTERVENTIONAL AUDIT

Date/time of arrival at non interventional hospital = Date/time of registration in non-interventional centre A&E
Assessment at non interventional hospital = *5. Self-referral*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *3. Angiogram and PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *0. Not applicable* as primary PCI performed

INVESTIGATIONS/INTERVENTIONS

Referring hospital code

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *2. Other hospital*
Secondary prevention = *4. Not applicable*

8.2.5 Patient taken directly by ambulance to interventional hospital A&E where initial ECG does not show STEMI. Subsequent ECG shows STEMI, primary PCI is performed and patient discharged back to local non interventional hospital.

ADMISSION DETAILS

Initial diagnosis = *3. Acute coronary syndrome*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *2. Primary PCI in house*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Date/time of reperfusion
Patient location at time of STEMI = *3. STEMI recorded in subsequent ECG in, (or before arrival at) the interventional hospital*
Additional reperfusion treatment = *0. None*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *1. Assessed in A&E*
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *3. Angiogram and PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *0. Not applicable* as primary PCI performed

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *2. Other hospital*
Secondary prevention = *4. Not applicable*

8.2.6 Paramedics diagnose STEMI and give pre-hospital thrombolysis, patient is taken to non-interventional hospital A&E but transferred immediately to interventional centre for continuing ST elevation where rescue PCI performed. Patient repatriated to non-interventional hospital.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time at interventional centre
Method of admission = *1. Direct admission via emergency service*
Ambulance job number of ambulance trust that performed pre-hospital lysis
Date/time of call for help

REPERFUSION

Initial reperfusion treatment = *1. Thrombolytic treatment* to document that pre-hospital thrombolysis was given
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Where was initial reperfusion treatment given = *1. Before admission to hospital*
Delay before treatment from ambulance PRF
Site of infarction
Date/time of reperfusion from ambulance PRF

Additional reperfusion treatment = *1. Rescue PCI in house*

INTERVENTIONAL AUDIT

Date/time arrival at non-interventional hospital from ambulance PRF
Assessment at non-interventional hospital = *2. A&E*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *2. Rescue PCI*
Procedure performed = *3. Angio and PCI*
Why no angiogram performed = *0. Not applicable*
Why no intervention performed = *0. Not applicable*

INVESTIGATIONS/INTERVENTIONS

Referring hospital code

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*

8.2.7 Patient self presents with ST elevation on first ECG in non-interventional hospital A&E where unsuccessful thrombolytic treatment is given. Patient is transferred to interventional centre cath lab where rescue PCI performed. Patient repatriated to non-interventional hospital.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time at interventional centre
Method of admission = *4. Inter-hospital transfer for specific treatment*
Ambulance job number of ambulance performing transfer not required
Date/time of call for help = Date/time of registration in non-interventional centre A&E

REPERFUSION

Initial reperfusion treatment = *0. None* (performed in your hospital)
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Additional reperfusion treatment = *1. Rescue PCI in house*

INTERVENTIONAL AUDIT

Date/time arrival at non-interventional hospital = Date/time of registration in non-interventional centre A&E
Assessment at non-interventional hospital = *2. A&E*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *2. Rescue PCI*
Procedure performed = *3. Angio and PCI*
Why no angiogram performed = *0. Not applicable*
Why no intervention performed = *0. Not applicable*

INVESTIGATIONS/INTERVENTIONS

Referring hospital code

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*

8.2.8 Patient arrives at the interventional hospital with STEMI diagnosed in the ambulance and pPCI pathway is activated. On arrival at the hospital patient is pain free and with resolution of ST elevation. For clinical or logistical reasons angiogram/PCI are deferred until later. Angio and PCI are performed at later stage and patient is discharged with STEMI diagnosis home.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission method = *1. Direct admission via emergency service*

REPERFUSION

Initial reperfusion treatment = *0. None (as none performed)*
EEG determining treatment = *0. No acute changes*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *2. Acute assessment unit* for example
Intended reperfusion procedure = *4. Other coronary intervention*
Procedure performed = select as appropriate
Why no angiogram performed = Complete this if angio did not take place
Why no intervention performed = Complete this if no intervention was performed

INVESTIGATIONS/INTERVENTIONS

Coronary angiography
Coronary intervention
Date of referral for investigation/intervention
Angio date/time
Local intervention date/time

TESTS

Complete as appropriate

DISCHARGE DETAILS

Discharge diagnosis = *1. Myocardiac Infarction (ST elevation)*
Discharge destination = *1. Home*
Secondary prevention medication

8.2.9 The patient was admitted directly via emergency services with ST elevation and on arrival was taken straight to the cath lab for a pPCI. The procedure was complex due to total occlusion of LAD and was not stented at that time. Patient was put on Reopro infusion and taken back later that day when a successful PCI was performed.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*

Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *0. None*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Date/time of reperfusion
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *2. Angiogram but no PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *4. PCI felt inappropriate*

INVESTIGATIONS/INTERVENTIONS

Coronary angiography
Coronary intervention
Date of referral for investigation/intervention
Angio date/time
Local intervention date/time

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *1. Home*
Secondary prevention

If patient is discharged to another hospital
Discharge destination = *2. Other hospital*
Secondary prevention medication = *4. Not applicable*

8.2.10 The patient was admitted directly via emergency services with ST elevation and on arrival was taken straight to the Cath Lab for a pPCI. Angio shows Takotsubo Cardiomyopathy. Patient is discharged home.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time
Admission method = *1. Direct admission via emergency service*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *0. None*

ECG determining treatment (to confirm ECG appearances of definite AMI)
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INTERVENTIONAL AUDIT

Assessment at non interventional hospital = *0. No contact at non interventional hospital*
Assessment at interventional centre = *4. Catheter laboratory*
Intended reperfusion procedure = *1. Primary PCI*
Procedure performed = *2. Angiogram but no PCI*
Why no angiogram performed = *0. Not applicable* as angio performed
Why no intervention performed = *5. Angiographically normal coronaries,…*

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *9. Takotsubo Cardiomyopathy*
Discharge destination = *1. Home*
Secondary prevention

TAKOTSUBO CARDIOMYOPATHY

Please complete this section as well.

8.2.11 Patient is admitted to this hospital from a non-interventional hospital two days after pre-hospital thrombolysis by the paramedics. Several hours/days later patient undergoes angiography but no PCI is performed. Patient is discharged home.

ADMISSION DETAILS

Initial diagnosis = *1. Definite myocardial infarction*
Admission date/time
Admission method = *4. Inter-hospital transfer for specific treatment*
Date/time of call for help
Ambulance job number

REPERFUSION

Initial reperfusion treatment = *0. None*
ECG determining treatment (to confirm ECG appearances of definite AMI)
Patient location at time of STEMI = *1. Onset of STEMI while patient not in hospital (STE on first ECG)*

INVESTIGATIONS/INTERVENTIONS

Coronary angiography - *1.Protocol driven investigation performed in this hospital/ 2.Symptom driven investigation performed in this hospital*
Coronary intervention = 8. Not performed or arranged
Date/time of referral for investigation/intervention
Angio date/time

DISCHARGE DETAILS

Discharge date
Discharge diagnosis = *1. Myocardial infarction (ST elevation)*
Discharge destination = *1. Home*
Secondary prevention

Appendix 1 - Mandatory fields for STEMI and other ACS

Fields have been classified into

- **M** = mandatory
- Y = MINAP would expect this item to be completed to give a useful overview of care
- L = for local use if wanted. If you use these fields it is to your advantage to be consistent about collection
- NA = not applicable

The diagnoses of STE MI and all other ACS are based on final diagnoses which should be apparent within the first 24 hours after admission.

- DC = Fields required for online data completeness view
- DV = Fields required for this year's data validation study

	Field	STE MI	Other ACS	DC	DV	Comment
1.03	NHS number	**M**	**M**	*	*	Necessary for linkage to ONS for vital status and HES.
1.06	DOB	**M**	**M**			Necessary to calculate age on admission also required for the GRACE score calculation/risk model
1.07	Gender	**M**	**M**			Required for analysis
1.01	Postcode	**M**	**M**	*	*	Necessary for the geographical mapping, especially with the establishment of CCGs
1.11	GP/PCT code	**M**	**M**	*		Part of data validation study and data completeness analysis.
1.13	Patient ethnicity	Y	Y			
2.01	Initial diagnosis	**M**	**M**		*	Mandatory field to save a MINAP record
2.03	ECG determining treatment	**M**	**M**	*	*	Important validation check
2.04	Where was aspirin…	Y	Y			Needed for TIMI score
2.05 – 2.13 Previous medical history		Y	Y			Included in risk adjustment and calculation of case mix
2.14	Cardiac markers raised	**M**	**M**	*	*	Determinant of mortality/MI. Required for GRACE score calculation/risk model
2.15	Cholesterol	Y	Y			
2.16	Smoking status	Y	**M**	*	*	Part of data validation study and data completeness analysis.
2.17	Diabetes	Y	**M**	*	*	Included in risk adjustment and

						calculation of case mix
2.18	Previous PCI	Y	Y			Determinant of mortality/MI.
2.19	Previous CABG	Y	Y			Determinant of mortality/MI.
2.20	Systolic BP	**M**	**M**			Together with pulse and age this is a very powerful predictor of 30 day mortality for AMI. Used for predictive scoring
2.21	Pulse rate	**M**	**M**			Together with BP and age this is a very powerful predictor of 30 day mortality for AMI. Used for predictive scoring e.g. GRACE
2.22	Admitting consultant	Y	Y			
2.23	Place first ECG performed	Y	Y			Needed by ambulance service
2.24	Previous drug use Beta blocker	Y	Y			
2.25	Previous drug use ACE I or ARB	Y	Y			
2.26	Previous drug use Statin	Y	**M**	*	*	Part of data validation study and data completeness analysis.
2.28	Glucose	**M**	**M**	*		Very powerful determinant of subsequent morbidity for diabetics and non-diabetics particularly for those without prior diagnosis of diabetes
2.29	Height	Y	Y			Important in assessment of obesity
2.30	Weight	Y	Y			Low body weight is a predictor of bleeding with lytics
2.31	Ejection fraction	Y	Y			Predictive of future heart failure and possible referral for implantable defibrillator
2.32	FH of CHD	L	L			
2.33	Cardiological care during admission	Y	**M**		*	Evidence suggests that patients that are cared by cardiologist /cardiological team have considerably better outcomes than those that are not under management of cardiologist. It is also reported in the Annual Report.
2.34	Creatinine	**M**	**M**			A determinant of mortality; used for predictive scoring e.g. GRACE
2.35	Haemoglobin	Y	Y			A determinant of mortality

2.36	Site of infarction	Y	NA			
2.37	ECG QRS duration	Y	Y			NICE secondary prevention data
2.38	Thienopyridine inhibitor use	Y	Y			
2.39	Admission method	**M**	**M**	*		Needed for analysis to identify inter-hospital transfers and repatriation
2.40	Patient location at time of STEMI	**M**	N/A			Needed for CTB an CTN analysis and to identify patients that had STEMI in the community or whilst in hospital
2.41	Killip class on admission	**M**	**M**			A determinant of mortality; used for predictive scoring e.g. GRACE
2.42	Stress echo	Y	Y			NICE Guideline
3.01	D/T of symptom onset	**M**	L			Needed for analysis
3.02	D/T of call for help	**M**	L			Needed for analysis
3.03	D/T of first responder	L	L			Needed for ambulance reporting
3.04	D/T of ambulance arrival	L	L			Needed for ambulance reporting
3.05	Ambulance job number	**M**	**M**			Essential to link with the ambulance outcomes database; it also allows ambulance colleagues to identify patients that were brought to your hospital.
3.06	D/T arrival in hospital	**M**	**M**	*		Needed for analysis of DTN and DTB. It is also necessary to calculate 30 day mortality from admission. In MINAP a record cannot be saved without this information.
3.08	Reason reperfusion not given	**M**	NA			Needed for analysis
3.09	D/T of reperfusion treatment	**M**	NA			Needed for analysis
3.1	Delay before treatment	**M**	NA			Needed for analysis
3.11	Where was initial reperfusion given	**M**	NA			Needed for analysis
3.13	Cardiac arrest	Y	Y			

	date/time					
3.14	Cardiac arrest location	**M**	**M**			A determinant of mortality; used for predictive scoring e.g. GRACE
3.15	Arrest presenting rhythm	Y	Y			
3.16	Outcome of arrest	Y	Y			
3.17	Admission ward	Y	**M**		*	Reported in Annual Report
3.19	Peak troponin	**M**	**M**			All patients should have peak troponin recorded. It also forms a part of diagnostic criteria of ACS.
3.20 – 3.35 and 3.38 Drugs used in hospital		L	L			For local decision, but see 3.24 for all agents; either use these consistently in your hospital or not at all.
3.22	Thienopyridene platelet inhibitor	L	**M**	*	*	Dual antiplatelet therapy recommended in national guidelines
3.24	2b/3a inhibitor	Y	Y			Given cost and existence of NICE guidance should be collected
3.36	Thrombolytic drug	Y	NA			
3.37	Troponin assay	Y	Y			
3.39	Initial reperfusion treatment	**M**	NA			Needed for analysis
3.4	Additional reperfusion treatment	**M**	NA			Needed for analysis
3.41	Inpatient management of hyperglycaemia	**M**	**M**		*	National guideline suggests treating higher levels of hyperglycaemia with insulin
3.42	Diabetic therapy at discharge	Y	Y			
3.43	Oral beta blocker	L	L			Refers to in hospital use
3.44	Aldosterone antagonist	L	L			Refers to in hospital use
3.45	Bivalirudin	L	L			Refers to in hospital use
3.46	Date / time of arrival at non interventional hospital	**M**	NA			For collection in interventional hospital only
3.47	Assessment at non interventional hospital	**M**	NA			For collection in interventional hospital only

3.48	Assessment at interventional centre	**M**	NA			For collection in interventional hospital only
3.49	Intended reperfusion procedure	**M**	NA			For collection in interventional hospital only
3.50	Procedure performed	**M**	NA			For collection in interventional hospital only
3.51	Why no angiogram performed	**M**	NA			For collection in interventional hospital only
3.52	Why no intervention performed	**M**	NA			Important to determine the reasons behind no reperfusion.
3.53	Date/time start of insulin infusion	Y	Y			Will help to inform future management of hyperglycaemia
4.01	Date of discharge	**M**	**M**	*	*	Necessary to validate vital status data NICOR receives.
4.02	Discharge diagnosis	**M**	**M**	*	*	Essential for number of analyses including outcomes reporting.
4.03	Bleeding complication	Y	**M**	*	*	Bleeding complication is associated with worse ischaemic outcomes, thus required for outcomes analysis. Part of data validation study and data completeness analysis.
4.04	Death in hospital	**M**	**M**	*	*	Essential for secondary prevention analysis as patients who died in hospital are excluded from this analysis. Also needed to validate death in hospital to report on in-hospital mortality.
4.05	Discharged on beta blocker	**M**	**M**			Needed for secondary prevention medication analysis. Secondary prevention is also powerful determinant of patient outcomes. NICE guideline.
4.06	Discharged on ACEI/ARB	**M**	**M**	*	*	Needed for secondary prevention medication analysis. Secondary prevention is also powerful determinant of patient outcomes. NICE guideline.
4.07	Discharged on statin	**M**	**M**			Needed for secondary prevention medication analysis. Secondary prevention is also powerful

						determinant of patient outcomes. NICE guideline.
4.08	Discharged on aspirin	**M**	**M**			Needed for secondary prevention medication analysis. Secondary prevention is also powerful determinant of patient outcomes. NICE guideline.
4.09	Cardiac rehab	Y	Y			NICE guideline
4.10	Exercise test	L	L			
4.11	Echocardiography	L	L			
4.12	Radionucleide study	L	L			
4.13	Coronary angiography	N/A	**M**	*	*	NICE guideline recommends that every high risk ACS patient has angiography as part of the ACS management.
4.14	Coronary intervention	N/A	**M**			Mandatory for interventional centres
4.15	Date/time of referral for angio/ intervention	N/A	**M**			NICE guideline recommends that ACS patients should have angiography within 96 hours from admission. This field is essential for identifying hospital transfer delays.
4.16	Discharge destination	**M**	**M**	*	*	Important to validate patients that died whilst in hospital. It also servers to exclude records for analyses they are not eligible for e.g. secondary prevention medication. It is a hospital discharging a patient home that is responsible for the discharge medication.
4.17	Daycase transfer date	**M**	**M**			Not relevant in every case
4.18	Angio date/time	N/A	**M**			Not all required in every case. This field enables us to report on delays to angiography.
4.19	Local intervention date	N/A	**M**			Likely to be same as 4.18
4.20	Interventional centre code	**M**	**M**			All are very important in order to track referrals.
4.21	Referring hospital	**M**	**M**			This helps receiving hospitals to identify hospitals from which a patient was referred from. It will

						helpful to validate when records between hospitals are linked.
4.23	Followed up by	Y	Y			
4.24	Re-infarction	Y	Y			
4.26	Date of return to referring hospital	Y	Y			For use when a patient is repatriated following primary PCI / rescue
4.27	Discharged on thienopyridine inhibitor	**M**	**M**	*	*	Needed for secondary prevention medication analysis. Secondary prevention is also powerful determinant of patient outcomes. NICE guideline.
4.28	Discharged on aldosterone antagonist	**M**	**M**			NICE guideline
4.29	What procedure was performed at the interventional hospital	**M**	NA			Needed for analysis of no reperfusion rates, for example.
4.30	Delay to performance of angiogram	N/A	**M**			Applies to all patients that received angiography other than part of primary PCI. It will serve to identify the most common delays to angiography at referring or at performing sites.
4.31	Discharged on Ticagrelor	**M**	**M**			Needed for secondary prevention medication analysis. Secondary prevention is also powerful determinant of patient outcomes. NICE guideline.
4.32	High risk nSTEMI	NA	L			
5.01	Smoking cessation advice	Y	Y			NICE guideline
5.02	Dietary advice	Y	Y			NICE guideline

Appendix 2 – Pseudo-postcodes

Appendix 3 – Data fields mapping to patient pathways