

Validation rules for BCIS-CCAD data

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I have been working with CCAD to generate a series of rules that are designed to make sure that the data being received by CCAD are of a minimum standard with respect to completeness and internal consistency. From April 2005, we are going to start applying these rules to any data you upload to CCAD, and will provide you with a report to allow you to correct errors and chase missing data fields.

In the document that follows I hope to have clarified several issues relating to the dataset, and have written it as a reference guide to help those involved with the nuts and bolts of data collection.

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I Validation Errors

There will be three categories of error:

- 1. Fatal Error:** if this occurs, the record will **not** be imported into the CCAD dataset. These are data that are sufficiently inconsistent that either they cannot be true (e.g. a procedure is performed in the future) or the data are inconsistent in such a way that they may adversely effect the way we interpret the overall dataset (such as a primary angioplasty that is entered as a stable routine elective)
- 2. Serious error:** These are data that are recognised to be inconsistent, but where acceptance of the record is unlikely to adversely affect analyses of the overall dataset. The record will therefore be imported, and we expect the centre to correct the inconsistency at next data upload.
- 3. Minor error:** the record will be imported, though there are some missing fields.

Each time you send data to CCAD, you will be given a report that will list the following:

- Total records sent
- New records received
- Modified records received
- Existing records
- Fatal errors (rejected)
- Serious errors (accepted)
- Minor errors (accepted)

This will be followed by a list of each record with missing data. For each record in the list, all missing data fields for that record will be given, each characterised as fatal, serious or minor. Details of the three types of errors are given below:

1. Fatal errors (data rejected)

For a record to be accepted, the following criteria must be fulfilled:

1.1 The mandatory fields must be complete.

These fields are:

- a). 1.01 Hospital Identifier
- b) 1.02 Local Patient Identifier
- c) 3.01 Date and time of operation
- d) 1.06 Birth Date
- e) 2.01 Clinical Syndrome
- f) 2.02 Indication for Intervention

1.2 The record must pass the following internal consistency validation rules:

- a) If 2.01 Clinical syndrome = 1 (stable)
Then 2.02 Indication for Intervention must **not** be 3,4,5,6,7 or 8
And 2.03 Procedure Urgency must be 1 (elective)
- b) If 2.01 Clinical syndrome = 2 (acute coronary syndrome)

Then 2.02 Indication for Intervention must **not** be 1 or 2
And 2.03 Procedure Urgency must **not** be 1 (elective)

c) If 2.02 Indication for Intervention is 4,5,6,7, 8 or 12
Then 2.03 Procedure Urgency must be 3 (emergency)

d) 3.01 Date and time of operation cannot be **later than** current date (i.e. in the future)
If 2.01 Clinical syndrome = 2 (acute coronary syndrome), 3.01 Date and time of operation cannot be **earlier than** 3.08 (Date/Time arrival at hospital (ACS only))

e) 4.04 Discharge Date cannot precede 3.01 Date and time of operation

2. Serious Errors (data accepted)

These are listed below:

a) 3.11 (Number of lesions attempted) cannot be less than 3.12 (number of CTOs), 3.13 (number of restenoses), 3.14 (number of instent restenoses)

b) 3.13 (number of restenoses) cannot be less than 3.14 (number of instent restenoses)

c) 3.15(number of stents used) must be greater than or equal to 3.16 (number of drug eluting stents used)

d) If 3.16 > 0 (drug eluting stents were used) then 3.17 (type of drug eluting stent) cannot be 0

e) 3.32 (number Lesions Successful) must be less than or equal to 3.11 (number of lesions attempted)

f) 4.03 Status at discharge cannot be 0 (alive) if 4.01 (PCI Hospital Outcome) = 6 (dead)

g) If 4.01 (PCI Hospital Outcome) = 5 (arterial complication) then 5.19 (Arterial Complications) must **not** be 0 (it can be blank or any other option)

h) 4.01 (PCI Hospital Outcome) must not be 0 if 5.21 (Patient status during transfer to theatre) = 1, 2 or 3

i) if 5.25 (Left Main Stem Protected) = 1 (yes) then 2.14 (previous CABG) must be 1 (Yes), and 3.09 (Vessels attempted) must be 2 (Lmain)

j) If 4.02 (Enzymes PostOp) = 1 or 2 (elevated) then 4.01 (PCI Hospital Outcome) must = 1 or 2

Remember that 4.02 (Enzymes PostOp) is not required at all unless 2.01 Clinical syndrome = 1 (stable).

3. Minor Errors (data accepted)

This is a list of missing data values. Some values can be legitimately blank (see section III).

a) *The following data values are also considered missing if 'unknown' is entered:*

- 1.07 sex (not known or unspecified)
- 1.08 ethnic group
- 1.09 administrative category
- 2.01 Clinical syndrome
- 2.02 Indication for intervention
- 2.03 procedure urgency
- 2.13 previous MI
- 2.14 previous CABG
- 2.15 previous PCI
- 2.16 Diabetes
- 3.36 device failure
- 4.03 status at discharge
- 5.03 smoking status
- 5.04 family history
- 5.05 medical history
- 5.06 history of renal failure
- 5.08 Q on ECG
- 5.09 ECG ischaemia
- 5.11 Follow on (ad hoc) procedure
- 5.12 Training procedure
- 5.13 Research procedure
- 5.15 Arterial access
- 5.24 Surgical cover

b) *In stable patients only:*

- 2.05 NYHA score
- 2.06 CCS score
- 4.02 enzymes post op

c) *In acute coronary syndrome patients only:*

- 2.10 presenting ECG (ACS only)
- 2.11 recent lysis
- 2.12 cardiac markers raised

d) *In STEMI patients only*

- 2.28 flow in IRA pre
- 3.34 flow in IRA post

e) *In patient having emergency CABG only:*

- 5.21 Patient status during transfer to theatre

f) *If no lesion has been successfully treated :*

(i.e. 3.32 Number Lesions Successful is = 0) there should be no values in 5.16 Largest balloon/stent used and 5.17 Longest stented / treated segment, otherwise (i.e. if 3.32 >0) there should be a value in 5.16 and 5.17

II Issues regarding the completeness of the data

There are 2 ways that the CCAD system will help users to identify missing data. The first is the report described above that is generated after each data upload.

The second is a display of data completeness that can be found in the Lotus Notes application under 'procedures' 'data completeness'. The % of complete fields for each patient is calculated, and the overall results are presented for the following data items:

1 Overall scores

% dataset completeness for stable patients

% dataset completeness for unstable patients (excluding those treated for acute STEMI)

% dataset completeness for unstable patients being treated for acute STEMI

2 Selected individual items

1.03 NHS Number

'Age' (derived from 1.06 date of birth)

1.07 Sex

1.10 Post code

2.01 Clinical Syndrome

2.02 Indication for Intervention

2.03 Procedure Urgency

2.04 Cardiogenic shock (Pre-procedure) (only if field 2.01 as Clinical Syndrome = 2 [unstable])

2.05 CCS class (only if 2.01 as Clinical Syndrome = 1 (stable))

2.06 NYHA class (only if 2.01 as Clinical Syndrome = 1 (stable))

2.07 Symptom onset (only if field 2.01 as Clinical Syndrome = 2 (unstable) AND 2.02 Indication for Intervention = 4, 5, 6, 7 or 8)

2.12 Cardiac Enzymes / Markers raised (only if field 2.01 as Clinical Syndrome = 2 (unstable))

2.16 Diabetes

2.19 LV function (even though this can be legitimately unknown)

'Pre score' (derived from 2.23 to 2.27)

3.10 N vessels

3.11 N lesions

'post score' (derived from 3.27 to 3.31)

3.26 Time to first balloon inflation (only if field 2.01 as Clinical Syndrome = 2 (unstable) AND 2.02 Indication for Intervention = 4, 5, 6, 7 or 8)

3.32 N success

4.03 Discharge status

4.04 Discharge date

5.06 History of Renal disease

"Post procedure cardiac markers": If the patient is stable, then field 4.01 (PCI Hospital outcome) and field 4.02 (enzymes post procedure) must not be blank

If the patient is unstable (NSTEMI or STEMI) then field 4.01 only must not be blank.

III. How data completeness is assessed

It is important to recognise that although there are 103 data items for each procedure, a slightly different complete dataset is required for 3 different clinical circumstances:

1. Stable patients
2. Unstable patients NOT being treated for acute STEMI
3. Patients being treated for acute ST elevation infarction

In addition, there are some fields that can be legitimately left blank (such as third operator if there isn't one). The list is:

- 2.19 LV ejection category
- 2.20 LV Ejection fraction
- 3.05 Second Operator
- 3.06 Second Operator status
- 3.07 Third Operator
- 3.08 Third Operator status
- 3.35 Operation report/comment
- 5.14 Research title

In addition

- 5.20 time to bypass is only required
if 5.21 patient status during transfer to theatre is 1, 2 or 3

If NO lesion has been successfully treated (i.e. 3.32 Number Lesions Successful is = 0) there should be no values in 5.16 'Largest balloon/stent used' and 5.17 'Longest stented / treated segment', otherwise there should be a value in both fields.

To clarify, these differences are as follows:

1. **Stable patients**

Definition: field 2.01 as Clinical Syndrome = 1 (stable)

Fields not required:

- 2.04 Cardiogenic shock (Pre-procedure)
- 2.07 Date/time of symptom onset (PCI; ACS only)
- 2.08 Date/Time arrival at hospital (ACS only)
- 2.09 Admission route (ACS only)
- 2.10 Presenting ECG (ACS only)
- 2.11 Recent Lysis (ACS only)
- 2.12 Cardiac Enzymes/Markers Raised
- 2.28 Flow in IRA PreOp (ACS only)
- 3.26 Date/Time of first balloon inflation (PCI)
- 3.34 Flow in IRA PostOp (ACS)

fields that can be blank:

- 2.19 LV ejection category
- 2.20 LV Ejection fraction

- 3.05 Second Operator
- 3.06 Second Operator status
- 3.07 Third Operator
- 3.08 Third Operator status
- 3.35 Operation report/comment
- 5.14 Research title

5.20 if no emergency bypass

Thus a total of $103-10-9 = 84$ fields are the minimum expected for the full dataset.
 This rises to 85 in a patient having an emergency CABG
 This falls to 82 if no lesion successfully treated (and no emergency CABG)

2. Unstable patients NOT being treated for ST elevation MI

Definition: field 2.01 as Clinical Syndrome = 2 (unstable)

AND

2.02 Indication for Intervention IS NOT 4, 5, 6, 7 or 8.

Fields not required:

- 2.05 CCS Angina Status (Pre-procedure; Stable only)
- 2.06 NYHA Dyspnoea Status (Pre-procedure; Stable only)
- 2.28 Flow in IRA PreOp (ACS only)
- 3.26 Date/Time of first balloon inflation (PCI)
- 3.34 Flow in IRA PostOp (ACS)
- 4.02 Enzymes PostOp

fields that can be blank:

- 2.19 LV ejection category
- 2.20 LV Ejection fraction
- 3.05 Second Operator
- 3.06 Second Operator status
- 3.07 Third Operator
- 3.08 Third Operator status
- 3.35 Operation report/comment
- 5.14 Research title

5.20 if no emergency bypass

Thus a total of $103-6-9 = 88$ fields are expected for the full dataset.
 This rises to 89 in a patient having an emergency CABG
 This falls to 86 if no lesion successfully treated (and no emergency CABG)

3. Unstable patients being treated for acute ST elevation MI

Definition: field 2.01 as Clinical Syndrome = 2 (unstable)

AND

2.02 Indication for Intervention = 4, 5, 6, 7 or 8.

Fields not required:

- 2.05 CCS Angina Status (Pre-procedure; Stable only)
- 2.06 NYHA Dyspnoea Status (Pre-procedure; Stable only)
- 4.02 Enzymes PostOp

fields that can be blank:

- 2.19 LV ejection category
- 2.20 LV Ejection fraction
- 3.05 Second Operator
- 3.06 Second Operator status
- 3.07 Third Operator
- 3.08 Third Operator status
- 3.35 Operation report/comment
- 5.14 Research title

5.20 if no emergency bypass

Thus a total of $103-3-9 = 91$ fields are expected for the full dataset.

This rises to 92 in a patient having an emergency CABG

This falls to 89 if no lesion successfully treated (and no emergency CABG)

Thus records that are complete, will have the following number of correct fields completed: (provided no emergency CABG, and at least one successful lesion)

84 if stable

88 if unstable but NOT Rx for STEMI

91 if unstable AND Rx for STEMI

I hope this clarifies rather than confuses.

With kind regards

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