

# PCI Database by Peter F Ludman

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## *Release Notes for Version 18.0*

Jan 2017

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|----------|---|-----------|
| <b>1</b> | <b>Introduction.....</b>  | <b>3</b>  |
| <b>2</b> | <b>New to Version 18 .....</b>  | <b>3</b>  |
| <b>3</b> | <b>Using the database .....</b>   | <b>3</b>  |
| 3.1      | <i>To set up the database with your own defaults click here.....</i>                              | <i>4</i>  |
| 3.1.1    | Defaults.....   | 5         |
| 3.1.1.1  | Selecting your hospital.....  | 5         |
| 3.1.1.2  | Click on “All other default settings” to bring up the defaults menu:.....                         | 5         |
| 3.1.2    | Contents of drop Down Lists.....  | 6         |
| 3.1.2.1  | Operator and consultant names.....  | 6         |
| 3.1.2.2  | Consultant GMC numbers .....  | 6         |
| 3.1.2.3  | Equipment lists.....  | 6         |
| 3.1.3    | Update Menu Items .....   | 6         |
| 3.1.3.1  | Volatile field lists.....   | 6         |
| 3.1.4    | Login Access Controls.....  | 6         |
| 3.1.5    | Audit Trail .....   | 6         |
| 3.2      | <i>To enter patient data (usually in the catheter lab during or at end of PCI procedure).....</i> | <i>7</i>  |
| 3.3      | <i>Procedure reports and letters .....</i>  | <i>10</i> |
| 3.4      | <i>Searching for a previous entry.....</i>  | <i>11</i> |
| 3.5      | <i>To enter patient data (after discharge) .....</i>  | <i>12</i> |
| <b>4</b> | <b>Data manipulation .....</b>  | <b>15</b> |
| 4.1      | Analyse dataset.....  | 15        |
| 4.2      | Check missing data prior to export to NICOR.....  | 15        |
| 4.3      | Export dataset .....  | 17        |
| 4.3.1    | Sending data to NICOR.....  | 17        |
| 4.3.2    | Other export options .....  | 18        |
| <b>5</b> | <b>Database Administration.....</b>   | <b>19</b> |
| <b>6</b> | <b>Getting inside the database .....</b>  | <b>20</b> |
| <b>7</b> | <b>Common issues .....</b>  | <b>21</b> |

|           |   |           |
|-----------|---|-----------|
| 7.1       | <i>Records</i> .....  | 21        |
| 7.2       | <i>Time / Date fields</i> .....   | 21        |
| 7.3       | <i>CSV file export</i> .....  | 22        |
| 7.4       | <i>Running PCI database with Access 2010</i> .....                                    | 22        |
| 7.5       | <i>Issues after filling in a number of missing values in different patients</i> ..... | 25        |
| <b>8</b>  | <b>Notes on the structure of the database</b> .....                                   | <b>25</b> |
| <b>9</b>  | <b>Current datasets and format of CSV export file</b> .....                           | <b>26</b> |
| <b>10</b> | <b>Key Web Links</b> .....  | <b>26</b> |
| <b>11</b> | <b>The End</b> .....  | <b>26</b> |

## 1 Introduction

This PCI Database is designed to capture details about percutaneous coronary interventional procedures. Procedure reports and GP letters can be created, the data can be analysed within the database, or exported for analysis. This database has been specifically programmed so that all fields of the BCIS-NICOR dataset are included. It can create the comma separated values (CSV) file required to upload data to NICOR through their web portal. It also has a number of in built analysis tools to provide a variety of cuts of the data, and options to look at risk stratified outcomes. I have written the database in Access 2002, but it can be run in 2007 or 2010 with small modifications

This database is not locked so the code can be explored and modified if necessary (see Release Notes 'getting inside the database'). You can ask your IT department to set up a link between this database and your local hospital Patient Administration System, so that patient demographics, NHS numbers etc. do not have to be entered manually. A link to the lab results server is also helpful. In my centre the database is stored on the hospital server and so is accessible from any networked computer in the trust and is automatically backed up each night. Microsoft Access is designed so that it copes with a number of users simultaneously interacting with the database, so for example it can be running in several PCI labs and offices at the same time.

The database is designed so that most of the data is entered during or at the end of a PCI procedure, and a procedure report can be printed for the patient notes at that stage. A final set of data is entered after patient discharge.

The data can be analysed using the queries I have written, and in addition the full dataset (excluding sub-tables) can be exported to Microsoft Excel to be analysed elsewhere. In addition once the data are uploaded to NICOR application, all those analysis tools are also available.

The current database version is 18.0, and the latest dataset is version 5.6.x. These are available on the BCIS web site (<http://www.bcis.org.uk/>).

Users of earlier versions of this database can find instructions for upgrading to the current version on the BCIS web site

## 2 New to Version 18

This version is compatible with dataset 5.6.x. It is almost identical to version 17.0 but there are some minor additions. A bug in version 17 could cause blood gas data to inadvertently scroll. This has been corrected in Version 18.0

## 3 Using the database

You need to put **two files** in the same location on the computer or server on which the database is to reside:

1. The database itself (called **PCI version 18-0**)

2. The file called **mousehook.dll** (this prevents the mouse wheel scrolling inadvertently through records by accident).

No password has been set. Double click “**PCI version 18-0**” to open.

**3.1 To set up the database with your own defaults click here**

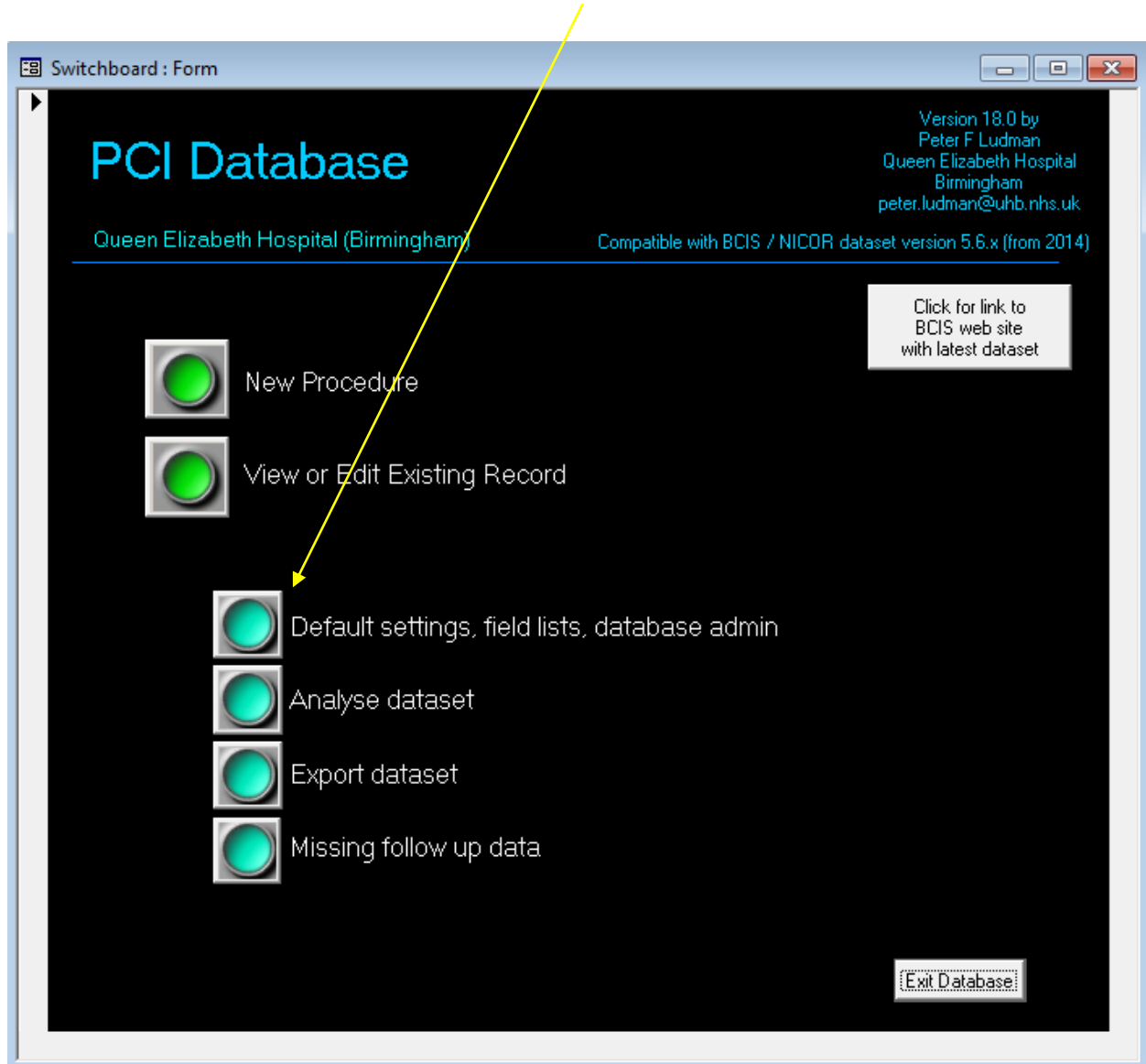


Figure 1

You then will be presented with the following screen:



Figure 2

### 3.1.1 Defaults

#### 3.1.1.1 Selecting your hospital

Once selected, you need to close down the database and re-open it. Your hospital should now appear on the main (and all other) switchboards, report forms etc.

If your hospital is not in the list, it will need to be added to the table called “centers” inside the database – see ‘getting inside the database’ below

#### 3.1.1.2 Click on “All other default settings” to bring up the defaults menu:

If you want all drop down lists in the data entry form to automatically open on focus – pick this option. The alternatives are

1. use **F4** to show all options, and arrows to move through them
2. enter the **first letter** of the selection you want and auto-complete will put the appropriate selection in the field, or
3. use the **mouse**

You can also modify the default Surgical cover and Brachytherapy options

### 3.1.2 Contents of drop Down Lists

#### 3.1.2.1 **Operator and consultant names**

Enter the names of local consultants and operators (need to enter consultants into both lists). Format is First initial, full stop, space, Surname

#### 3.1.2.2 **Consultant GMC numbers**

This opens up a table that will allow you to store all consultants GMC numbers. Initially there is the option for this table to automatically populate from the existing consultant table, and then GMC numbers can be added. This will allow GMC numbers to be automatically entered into the db whenever a consultant name is picked from a drop down list.

#### 3.1.2.3 **Equipment lists**

Modify the list of stent names and balloon names that will appear in the drop down menus when you use the database.

### 3.1.3 Update Menu Items

#### 3.1.3.1 **Volatile field lists**

The eight volatile fields in the BCIS / NICOR dataset can also be altered from this menu, under the heading "Update Menu Items"

### 3.1.4 Login Access Controls

This button gives you the ability to restrict access to some aspects of the database's inbuilt analysis options. The ability to either get to the export switchboard, or to get to the consultant or operator based analysis options can be set up to be blocked except for specific users. This block is not intended to do more than discourage inappropriate use by casual users. Users familiar with programming in access can easily bypass this restriction. I will give you the administrator password to get into this on request. Once the access restriction is switched on, the database looks to see the windows username (i.e. the windows user name of the person logged into that computer). If this matches the user names in the admin list, then access is granted, and if not, access is denied

### 3.1.5 Audit Trail

If you turn on this feature, changes made to many of the fields in the database are recorded. The logged in user (windows log in username), the initial value of the field, and the value it has been changed to are stored in a table. This does tend to generate a very large table over time, and if you use this feature, then you may wish to delete its contents periodically. This is work in progress as the table currently also record some of the automatic changes that occur to the data, calculated by the database behind the scenes. However it does work well in capturing changes to timing fields for emergency PCI

### 3.2 To enter patient data (usually in the catheter lab during or at end of PCI procedure)

From the main menu (figure 1), click the top green button 'New Procedure', and the following form will open:

Figure 3

The cursor will start in Hospital Number field in the dark grey section at the top. After entering number hit enter or return or tab to move to next field. The procedure date / time field (top right) defaults to the current time and so does not need altering if the data are being entered at the time of the procedure (otherwise these need to be entered manually). Once the top 4 fields are filled, you will move down to the first field under the tab heading "Patient". When you get to a field with a drop down arrow, the list will appear if you click the mouse, or if you hit **F4**. The list will appear automatically if you have selected this to occur in the defaults section (above section 2.1).

I have set up the Queen Elizabeth Hospital database so that after entering the hospital number, the rest of the patient demographics, NHS number (and the GP details) are automatically pulled into the database from the PAS server. I recommend that you get your IT team to do this. I have also created links to the lab results server (these buttons are disabled on your version, but the code behind them is still in place in case your IT want to modify it for your own systems).

The hospital name will be the one you have chosen as your default. If the patient is not being treated at your default hospital, you can change this for this particular patient using this field (which won't alter your default).

Height converter: If you only know height in feet and inches, then the cm height will be calculated after you have entered the inches and hit enter or return (so if a patient is 6 foot, you need to enter 6 foot 0 inches). Weight converter works in the same way.

The multi-selection tables work by holding down the control key and clicking on any selection(s) you want to make. You can check you've got the correct ones by looking at the **'selected items' list which reflects what is actually stored in the database.** Whether a selection remains highlighted or not as you move about is irrelevant.

'Drug therapy before procedure' is intended to capture all drugs that are biologically active during the PCI. The only exception is the GP IIb/IIIa receptor blockers which have their own section under the 'Devices used' tab.

Once this sheet is complete, click on the next tab "clinical / indications" and complete this. Note that once you have selected the clinical syndrome and indications for PCI, the subset of fields that need to be filled in are made visible. If you want to see the full set of possible fields, the button top right ('show all fields') will expose them all.

"OOHA" tab. A patient ventilated for any reason (whether OOHA or not) is described in the first question 'ventilated pre PCI'. Below are the fields specific to a patient who has had a cardiac arrest whether ventilated or not. If a patient is not ventilated and has not sustained a cardiac arrest – enter 'No' to the first 2 questions and no further data are required. If they have had an arrest and / or need ventilation then fill in all appropriate fields.

"Operator data" tab. The form will look to see if your name also appears in the consultant field list, and if so automatically enter appropriate status, but non-consultant grades will have to pick their status from the drop down list. If GMC number has been entered in the 'consultant GMC number' table (administration section), then GMC number will be automatically filled in once consultant operator is picked from drop down list.

"Angio segments" tab

This gives you the opportunity to enter details about the entire coronary anatomy. I have used the coronary tree segment classification that has been adopted by the European working party (CARDS project 2004) for the unification of European PCI datasets. This section is **not** required for the current BCIS dataset.

"Epicardial data" tab. For the BCIS / NICOR dataset, this is the mandatory way in which coronary anatomy is described. If you have filled out the "angio segments" tab, then clicking 'update epicardial data from angiosegment chart' will pull the data across. Note you are describing **epicardial territories**, not vessels. This is intuitive except in patients with patent coronary bypass grafts. If for example the native LAD is occluded but there is a good LIMA graft to LAD, then the stenosis supplying the LAD territory = 0% (not 100%). If the Duke score does not auto calculate, then you can click the button to force the calculation or to update it if you've modified the epicardial data.

"All guide/wires" tab

If you wish to modify the contents of the drop down menus, you can do it from the buttons on this page, or from the administration section

“Lesions” tab

I have provided up to 4 lesion details that can be entered. If you have treated more, and wish to record this, then the total numbers can be entered under the next tab.

“Procedure overview” tab

You can check that the program has correctly calculated the summary data by clicking the button ‘view edit lesion summary data’. The number of lesions treated is the total number, of which the number of CTOs, restenoses etc. are all subsets.

“Devices used”. This is the last tab to be completed at the time of the procedure. After discharge, the next tab can be completed to capture, post procedure data.

### 3.3 Procedure reports and letters

Once the procedure information is entered (i.e. after the patient is about to leave the catheter lab but before data has been entered under the “outcome” tab), you can create a procedure report, letter, or Save and Exit. (Clicking either of these buttons saves the record).

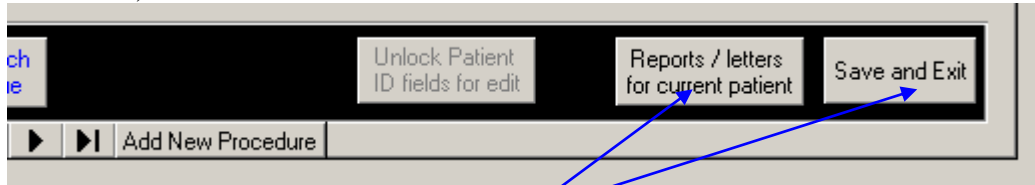


Figure 4

Once you click on either of these buttons if there are any fields that have not been filled in (excluding the “outcome” tab data) you will be presented with a list of them (figure 5), and the actual fields will be highlighted in red. You are given 2 chances to complete data entry. If after the second warning you haven't done it, you will be allowed to progress as you had originally intended to the reports or exit.

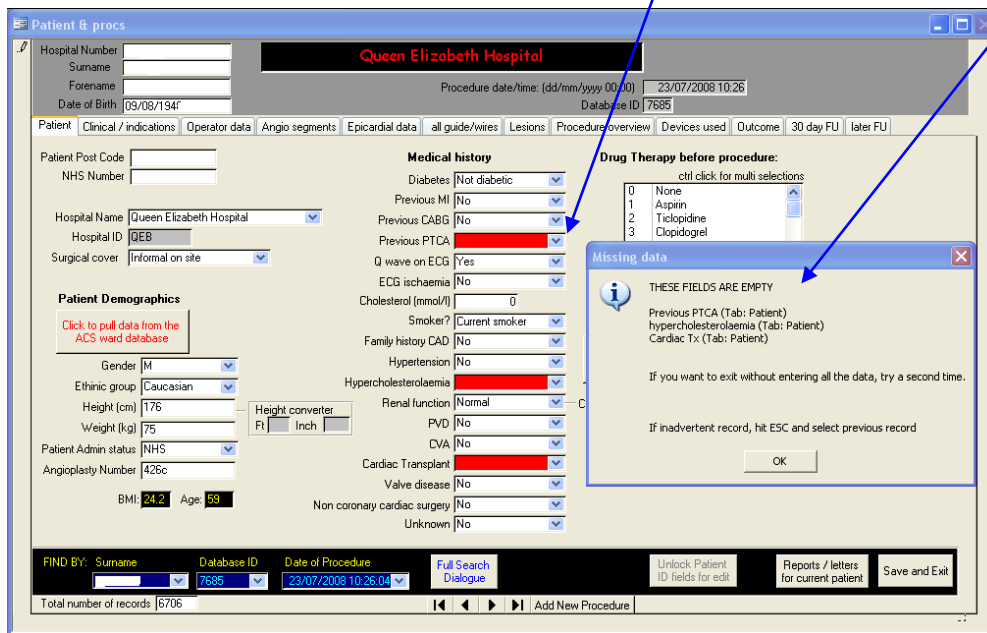


Figure 5

The procedure report will automatically have your hospital name at the top, and is intended to go in the notes as the patient leaves the catheter lab.

The GP letter is still under development, and I would suggest you use it as a first draft. You will want to alter it by placing your hospital's official logo / header in place etc. I have set up the database at the Queen Elizabeth Hospital so that after entering the patient's hospital number, not only are the patient demographics automatically pulled into the database, but also the patient address and GP data are pulled from the PAS system into these fields. The form allows you to do this manually if you wish.

### 3.4 Searching for a previous entry

You can search for a previous entry in four ways

1. Use the 'Surname', 'Database ID' or 'Date of Procedure' drop down boxes. Click on the arrow and scroll to the appropriate record, or highlight the whole box and then enter the first few letters of the surname, the list will scroll straight to all appropriate entries. Once you click correct entry, all the data for that procedure are brought into the data entry form.
2. Use a full access database search dialogue
3. Use the navigation buttons as shown below

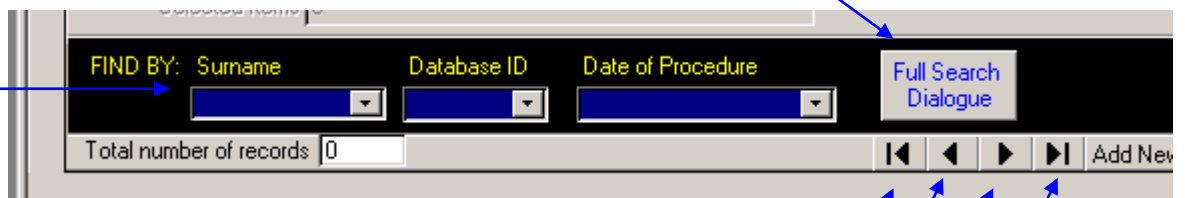
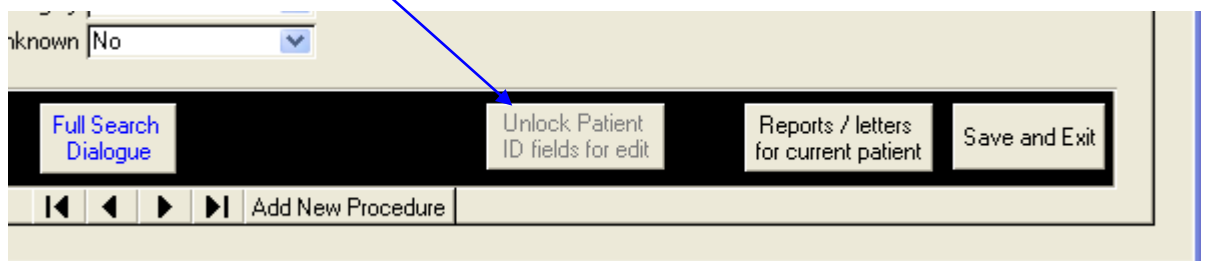


Figure 6

To first record  
Back one record  
Forward one record  
To last record

4. In addition, from the first switchboard (figure 1), if you click the second green button 'view or edit existing record', the first record will open as in figure 3, but the Patient name and ID fields will be locked, preventing inadvertent modification. The navigation buttons can then be used to move through the dataset as before. The locked fields can be unlocked by clicking on the greyed out button at the bottom of the screen 'unlock patient ID fields for edit' if required.



### 3.5 To enter patient data (after discharge)

All tab sections up to and including “Devices used” need to be filled in up to the time the patient leaves the catheter lab.

To find patients who have had procedures, but whose data up to hospital discharge is still not entered (i.e. “Outcome” tab data not yet entered), go to ‘missing follow up data’:

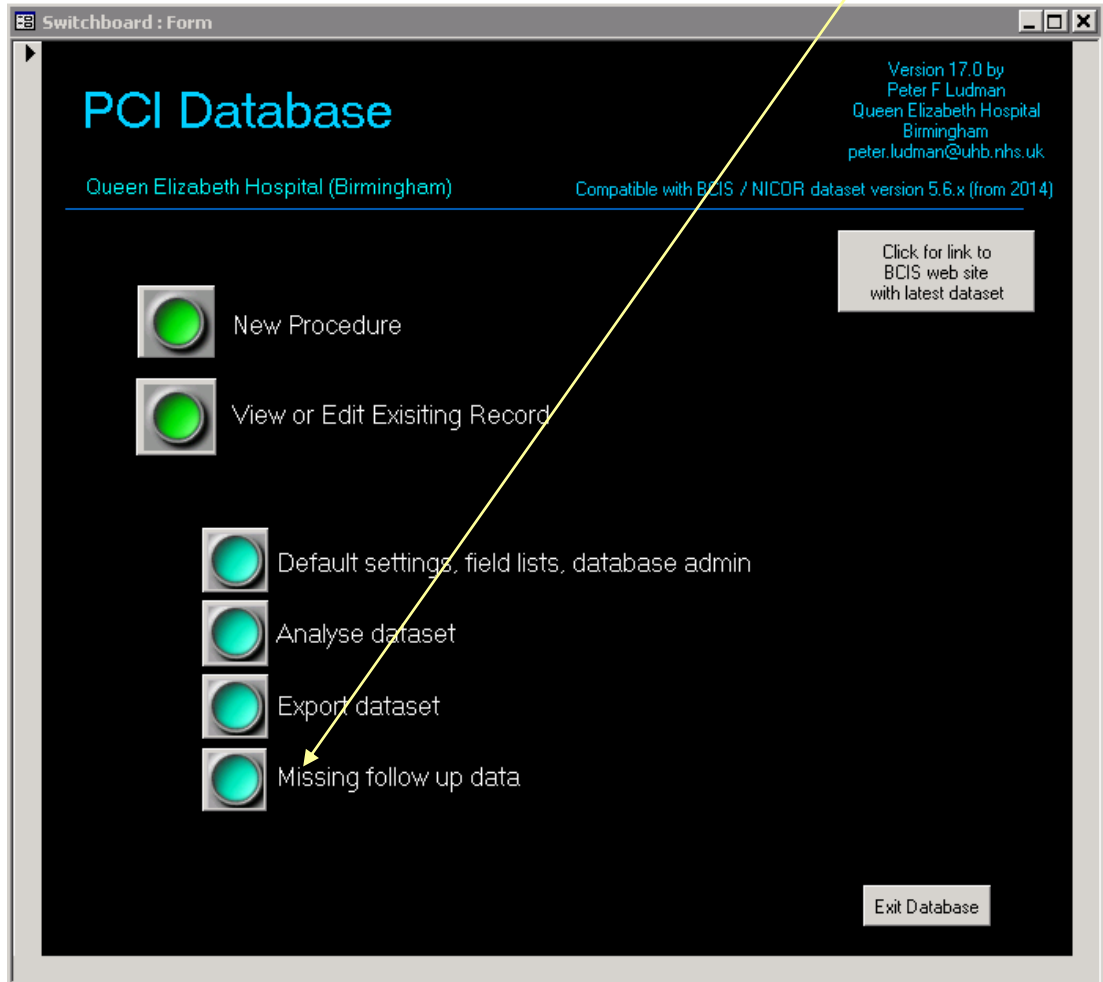


Figure 7

This will bring up the next dialogue box:

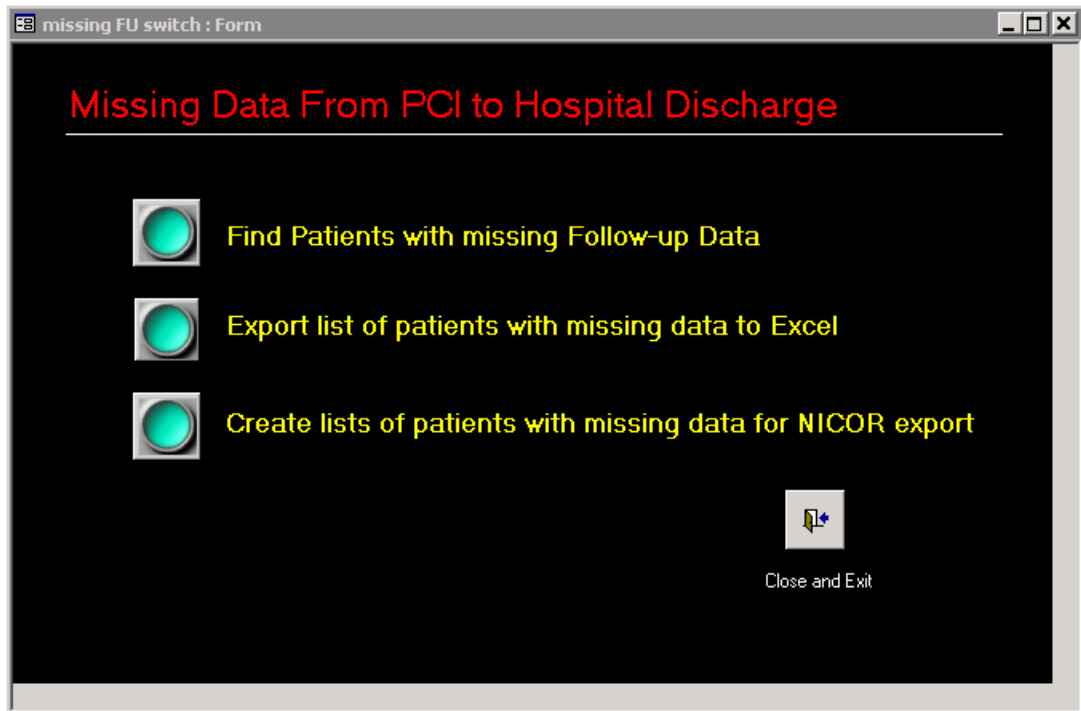


Figure 8

Click on this to get list

| Unique ID | Hospital No | First name  | Surname | Procedure date | Operator 1:  | Operator 2:  | Discharge status | Discharge date: | Complication free? | QMI |
|-----------|-------------|-------------|---------|----------------|--------------|--------------|------------------|-----------------|--------------------|-----|
| 9779      |             | Robert      | -       | 06/04/2010 12  | H. Routledge | S. Doshi     |                  |                 |                    |     |
| 9780      |             | William     | -       | 06/04/2010 14  | S. Doshi     | H. Routledge |                  |                 |                    |     |
| 9781      |             | Keith       | -       | 06/04/2010 15  | H. Routledge | S. Doshi     |                  |                 |                    |     |
| 9783      |             | Faid        | -       | 06/04/2010 17  | S. Doshi     | H. Routledge |                  |                 |                    |     |
| 9793      |             | Roger       | -       | 10/04/2010 15  | H. Routledge | P. Davison   |                  |                 |                    |     |
| 9794      |             | Joan        | -       | 12/04/2010 01  | H. Routledge | L. Williams  |                  |                 |                    |     |
| 9806      |             | Noor        | -       | 14/04/2010 07  | V. Subraman  | P. Ludman    |                  |                 |                    |     |
| 9819      |             | Dora        | -       | 19/04/2010 02  | N. Prasad    | P. Davison   |                  |                 |                    |     |
| 9827      |             | Bernard     | -       | 21/04/2010 14  | J. Townend   | P. Jordan    |                  |                 |                    |     |
| 9831      |             | Ann         | -       | 22/04/2010 16  | B. Freestone | J. Townend   |                  |                 |                    |     |
| 9834      |             | Shaun       | -       | 24/04/2010 15  | J. Townend   | P. Davison   |                  |                 |                    |     |
| 9854      |             | Christopher | -       | 01/05/2010 06  | J. Trevelyan | S. Chalfi    |                  |                 |                    |     |
| 9865      |             | Roy         | -       | 05/05/2010 17  | P. Ludman    | V. Subramani |                  |                 |                    |     |
| 9872      |             | Graham      | -       | 07/05/2010 14  | S. Doshi     | V. Subramani |                  |                 |                    |     |
| 9878      |             | Gillian     | -       | 11/05/2010 10  | J. Trevelyan |              |                  |                 |                    |     |
| 9879      |             | Barbara     | -       | 11/05/2010 11  | J. Trevelyan |              |                  |                 |                    |     |
| 9880      |             | Stephen     | -       | 12/05/2010 15  | P. Ludman    | V. Subramani |                  |                 |                    |     |
| 9883      |             | Raymond     | -       | 12/05/2010 22  | J. Townend   | S. Doshi     |                  |                 |                    |     |
| 9885      |             | John        | -       | 14/05/2010 05  | R. Smith     | P. Davison   |                  |                 |                    |     |
| 9886      |             | John        | -       | 14/05/2010 11  | P. Ludman    | V. Subramani |                  |                 |                    |     |
| 9890      |             | Kam         | -       | 17/05/2010 12  | A. Epstein   | S. Deepak    |                  |                 |                    |     |
| 9892      |             | Betty       | -       | 17/05/2010 14  | A. Epstein   | J. Spiro     |                  |                 |                    |     |
| 9895      |             | James       | -       | 18/05/2010 16  | S. Doshi     | H. Routledge |                  |                 |                    |     |
| 9904      |             | Anthony     | -       | 19/05/2010 14  | P. Ludman    | V. Subramani |                  |                 |                    |     |
| 9907      |             | Damien      | -       | 20/05/2010 12  | R. Smith     | J. Townend   |                  |                 |                    |     |

Figure 9

If you now double click on any of the names of these patients, the data entry form will automatically open to that particular procedure, and allow you to fill in the final set of data.

If the patient's procedure was uncomplicated, then you need only answer 4 questions (stable cases) or 3 questions (acute cases).

Thus:

1. Click complication free 'Yes' - and all other options are auto filled
2. Enter discharge date – as many patients go home the next day, if you click the check box, the day after procedure date is auto-entered
3. Fill in the discharged to where question(s)
4. In stable patients, you also need to enter the post procedure cardiac markers (this data field is hidden in patients treated for acute coronary syndromes).

There is the option to put any cardiac marker result in the database whether or not the patient is stable, but this is not required for the BCIS/NICOR minimum dataset.

Figure 10

#### 4.1 Analyse dataset

Once you have closed down the patient entry form, and patient report etc. the database can perform a number of analyses on the entire dataset.

From the first switchboard (figure 1) click on Analyse dataset, to get to this menu:

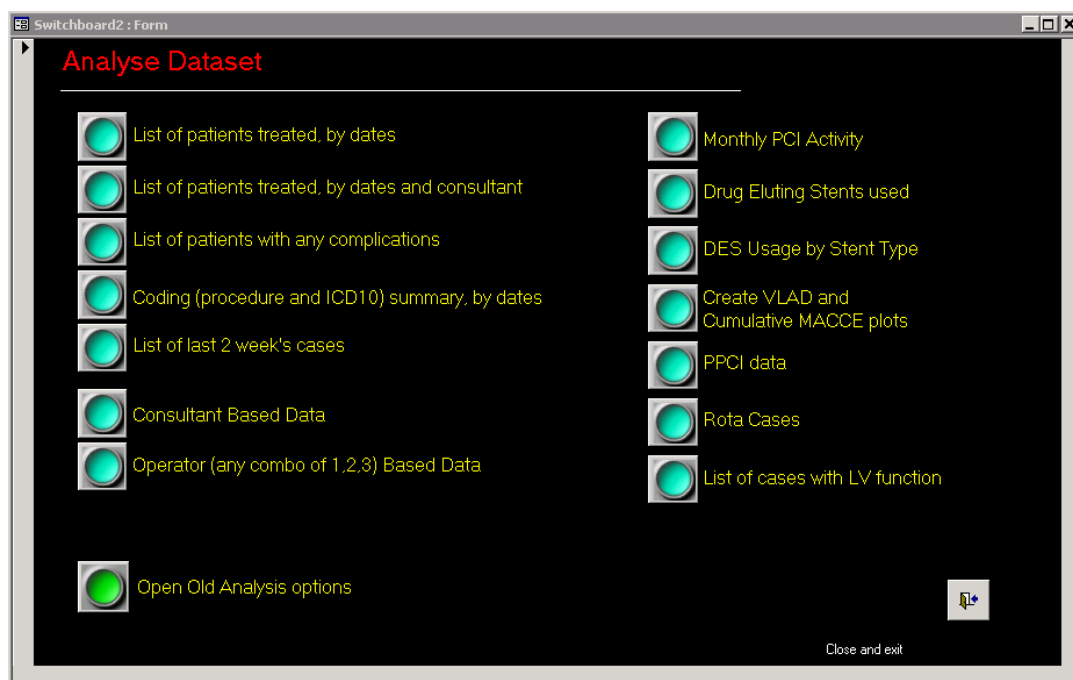


Figure 11

Explore these analysis options which should be self explanatory. The ‘operator’ and ‘consultant’ based data analysis provides quite a detailed breakdown of individual activity. It is also possible to create operator specific cumulative funnel plots and VLAD plots. There is a fairly detailed breakdown of PPCI also available. You can also get to all the previously programmed data cuts via the ‘open Old Analysis options’ button, bottom left.

The monthly activity button will prompt for dates. Note that all Januaries and Februaries in the time period you select will be added, so if you specify 2 years, this will be sum of 2 Januaries, 2 Februaries, etc. activity.

#### 4.2 Check missing data prior to export to NICOR

Although it is suggested that all fields are completed for every patient treated, certain fields are critical and are therefore the focus of data completeness scores from NICOR. You can explore your data to assess the completeness of these key fields prior to an export. Lists of patients with missing data are created that can be used to help improve data completeness.

From main switchboard (figure 1) click on 'Missing follow up data' to bring up the following switchboard:

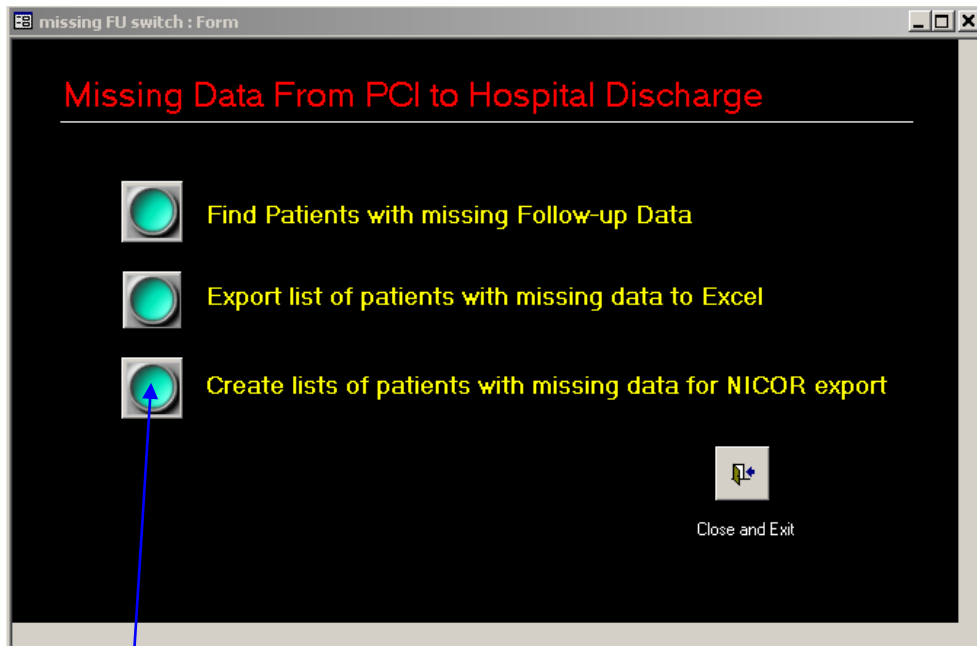


Figure 12

Click here and then here to bring up:

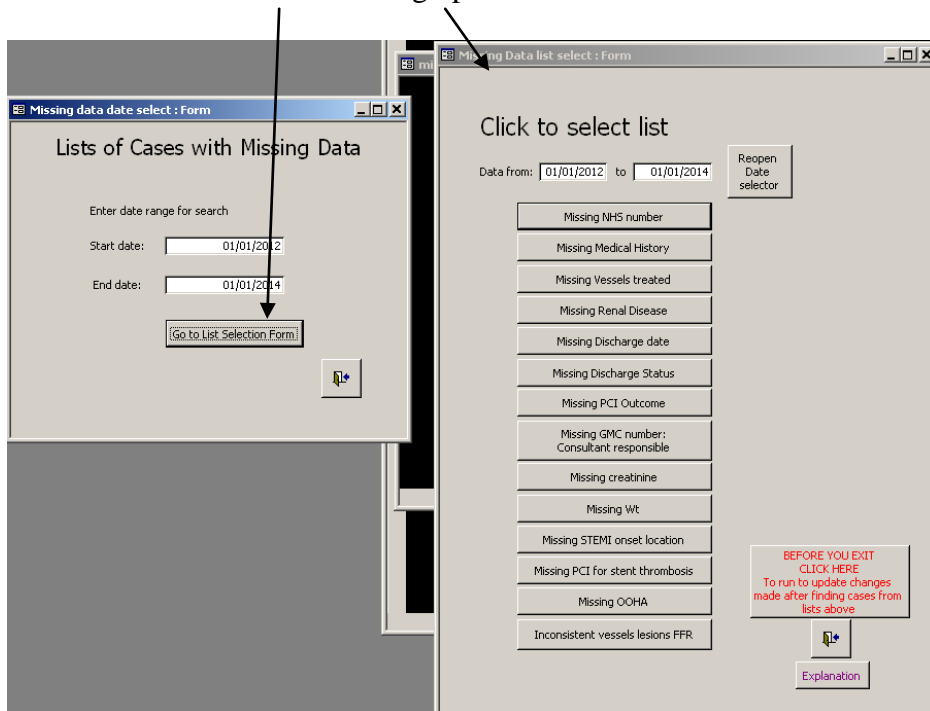


Figure 13

Use these lists to find missing data fields that need completion.

### 4.3 Export dataset

From the first switchboard (figure 1) click on Export dataset to be presented with the following options:



Figure 14

#### 4.3.1 Sending data to NICOR

Use the top button to send you PCI data securely to NICOR. This is a 2 stage process. Firstly the data in this access database are extracted and formatted into a file called BCIS.csv. The NICOR web portal is then used to upload this file in a secure way to the NICOR servers.

##### Stage 1

After clicking the top button you will be presented with an export dialogue that allows you to pick the dates for the extract.

Figure 15

After picking the date range, click on the ‘click to generate export’ button. The database will first update internal fields (there will be 3 questions that you answer yes to), and then the counter will run and give you the total number of procedures that have been extracted to create the csv file. This file will be placed in the folder labelled ‘temp’ on your C drive. **If you don’t have a folder labelled ‘temp’ on the C drive, you will get an error message – in which case create a folder called ‘temp’ on your C drive and the export will work.**

### Stage 2

Open the NICOR web portal (<https://nicor4.nicor.org.uk/>) and log in. Go to the BCIS section select ‘import’. Follow the on screen dialogue.

#### 4.3.2 Other export options

The second button (figure 14) allows you to download your raw dataset between selected dates into an excel spread sheet for custom analysis. The only data not extracted are the data contained on the sub forms (i.e. the list of guides, wires, balloons, stents and associated pressures).

The third button (figure 14) generates a CSV file just like to top button, but with patient and operator identifiers anonymised

The fourth is an initial attempt to create an export compatible with the CARDS European dataset. There are important structural differences between CARDS and BCIS-CCAD, so this section is work in progress

## 5 Database Administration

There are some administration tools that allow you to set user access and deletion controls. To get to this part of the database select the admin section from to open this menu

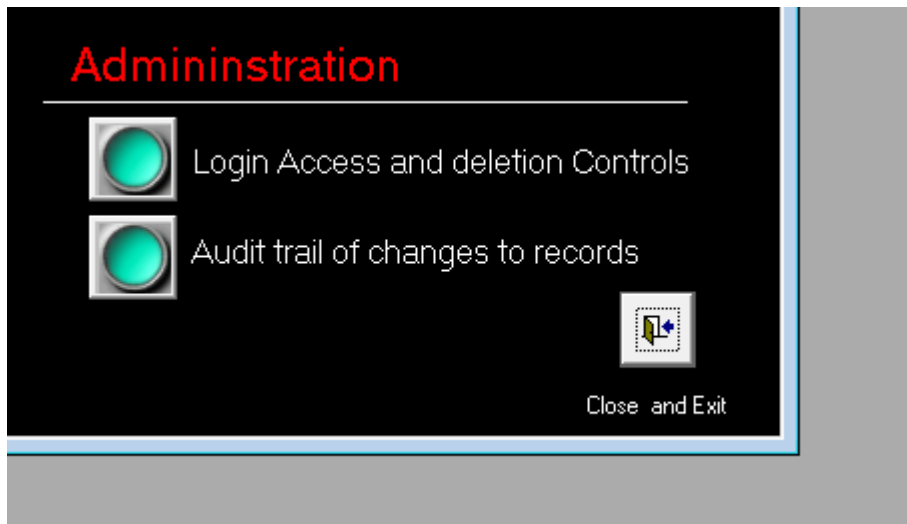


Figure 16

To get past Login Access and deletion controls you will need to enter a password which is set to 'Oranges'

This then allows you to get to here:

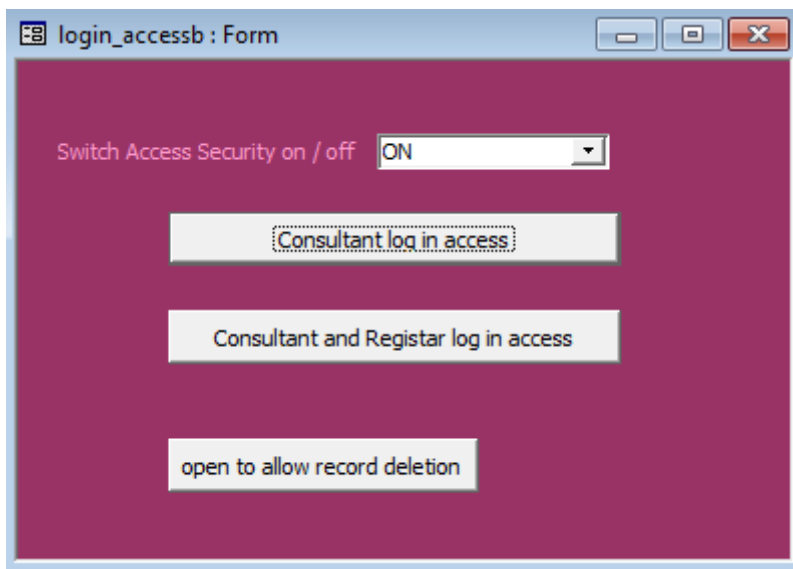


Figure 17

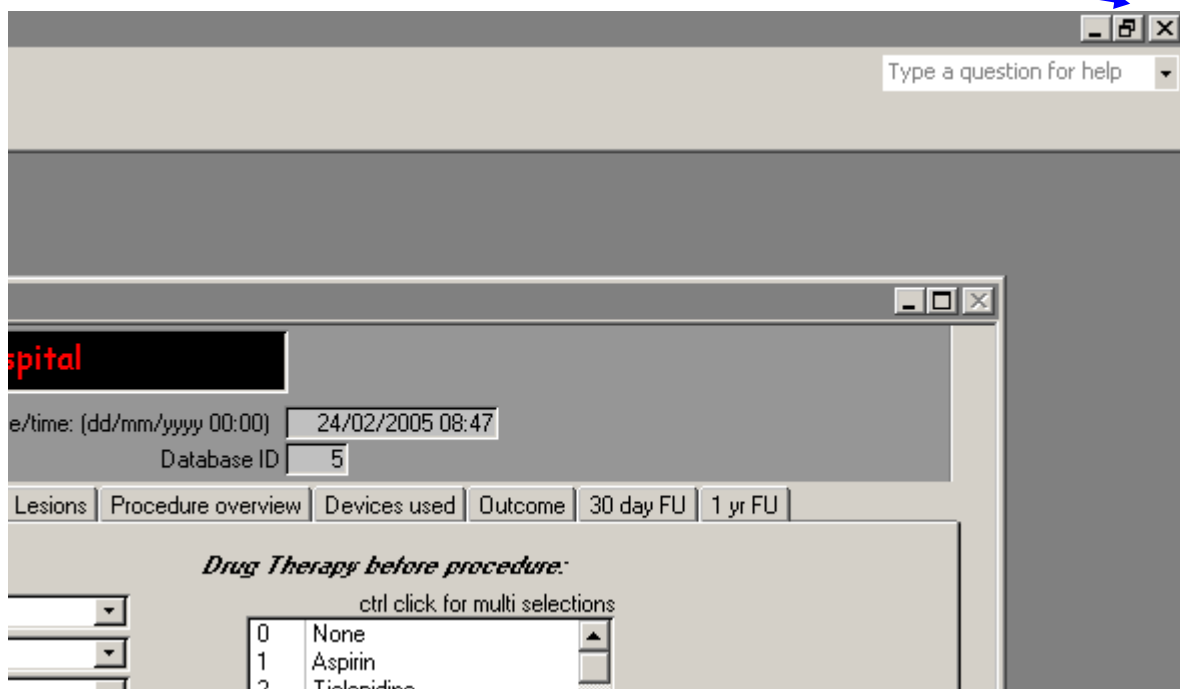


### 7.1 Records

If you start a new record, you *must* enter data at least into the hospital number and patient surname fields. These are required fields, and no data can be stored in the record without something in these fields. If you inadvertently start a new record, but don't wish to continue to enter data you can:

either: Press **Esc** key and then go back to the previous record (with the navigation buttons see figure 6)

or: Quit Access (very top right of screen)



You will get a warning that the record can't be saved – answer OK.

### 7.2 Time / Date fields

Sometimes the time date fields in Access are awkward. There is an input mask on these fields, so provided you have landed on the field using the tab or entry key, you can simply type in the numbers without the place holders (i.e. the “/” or “.”):

So to enter 10/12/2002 18:00, you just type 121220021800

It should all look fine once you've done it.

If you got to the field with the mouse, make sure the cursor is at the left end of the empty field.

If you then wish to change the date, it is sometimes not happy with you simply altering a part of it. You may need to select the whole field by dragging the mouse across it and enter the entire date / time again, (even though they do not show, you still do not need to put in the place holders). You can always use the **Esc** key to get back out of the field.

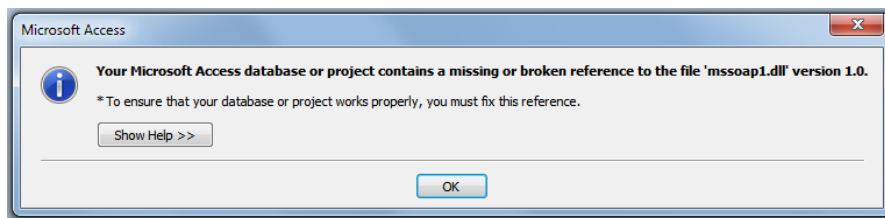
All years must be entered as full four digit years.

### 7.3 CSV file export

Remember that you need to have a folder labelled 'temp' in the C drive, because that is where the CSV exported file will be sent to. If you have not made a temp folder on the C drive, you will get an error message when you try to create the CSV export file.

### 7.4 Running PCI database with Access 2010

When trying to run my database using the latest versions of Microsoft Access (2010), you may get a message that there is a missing or broken reference. A couple of examples are shown below:



or

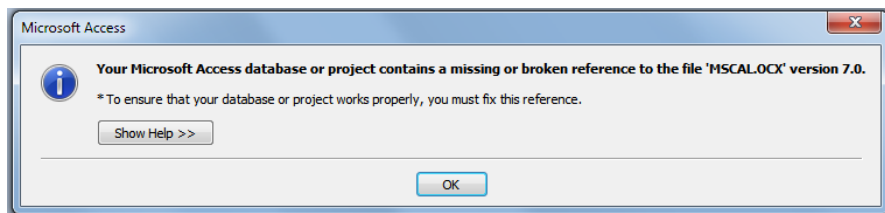


Figure 18

This is easy to solve.

Option 1: You may find that when you get the error message the database automatically drops out to open the Visual Basic window as below. You will need to stop the code running before you can progress. You will see a view like this:

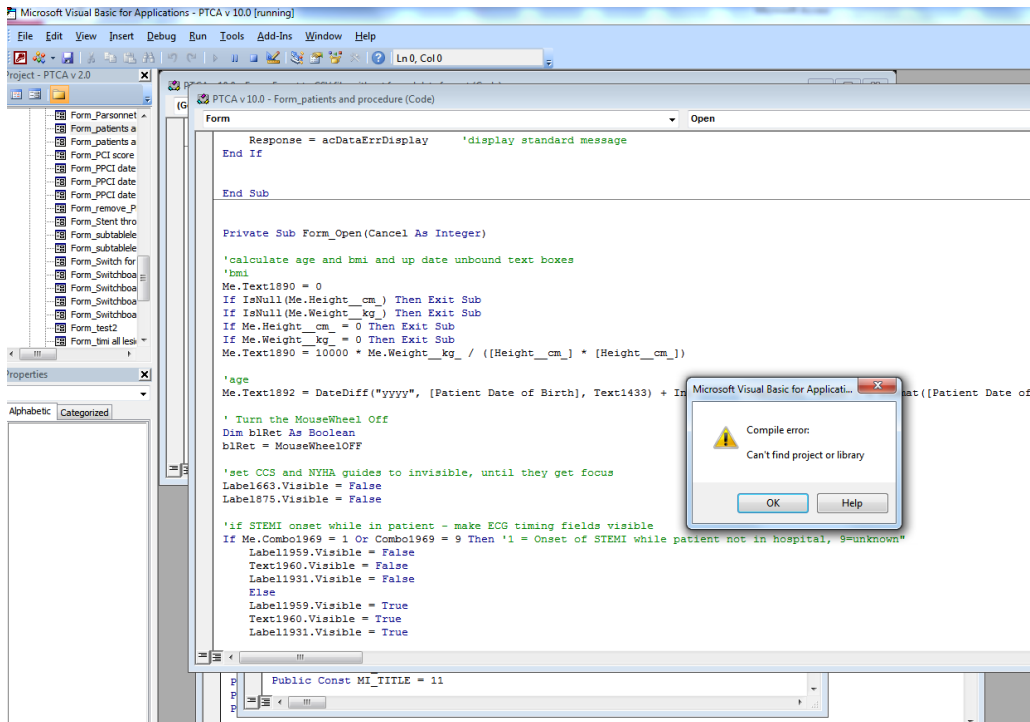
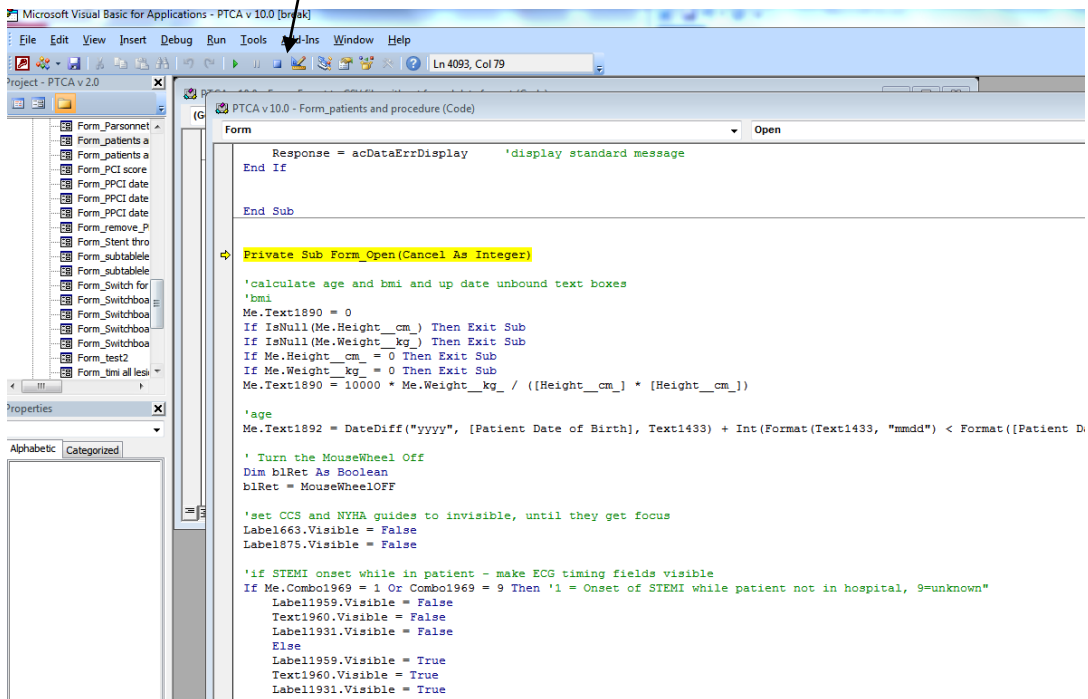


Figure 19

Click OK - the window changes so that some code is highlighted in yellow (see below figure 20):

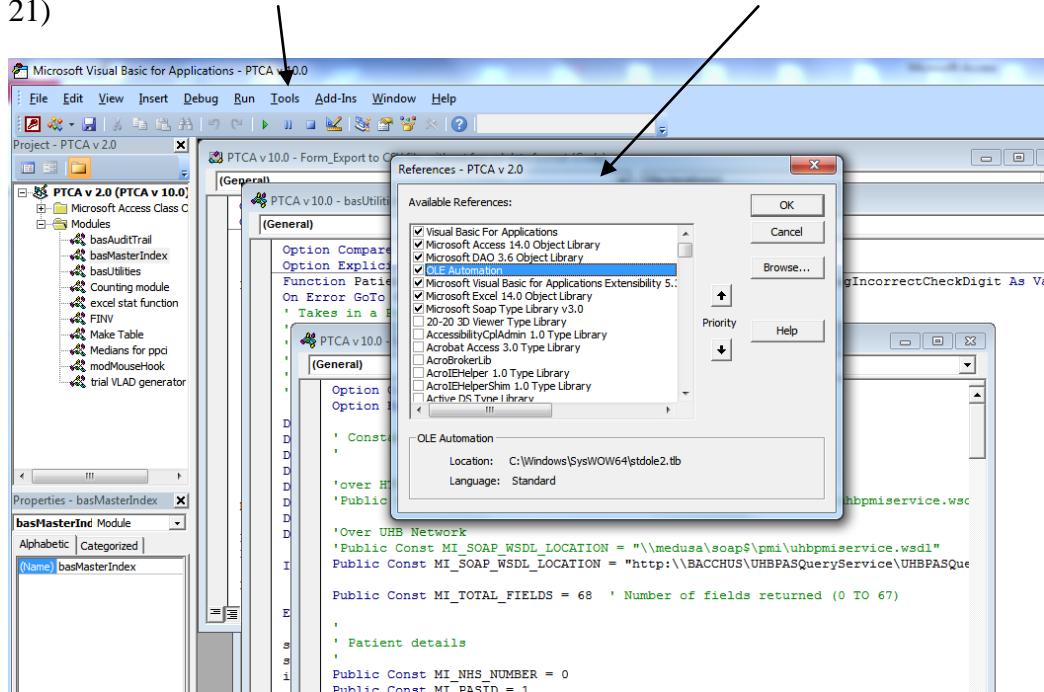
You need to click the stop button and the highlight will clear, and the code stop running. Now you can fix the problem.



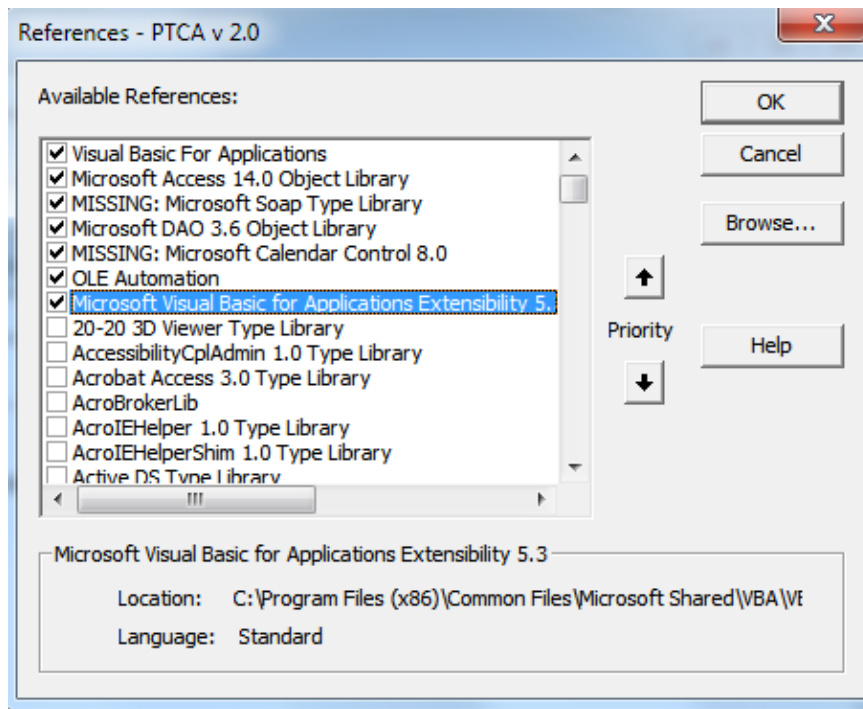
Figure

Option 2: If the Visual basic window doesn't open automatically, then once the database is started you can force it open by using the keyboard short cut - hold 'ctrl' and type 'g'.

Once the Visual Basic window is open (and in option 1, the code has been stopped), click on 'tools' and select 'references' to open dialogue box as shown below (figure 21)



Figure



Figure

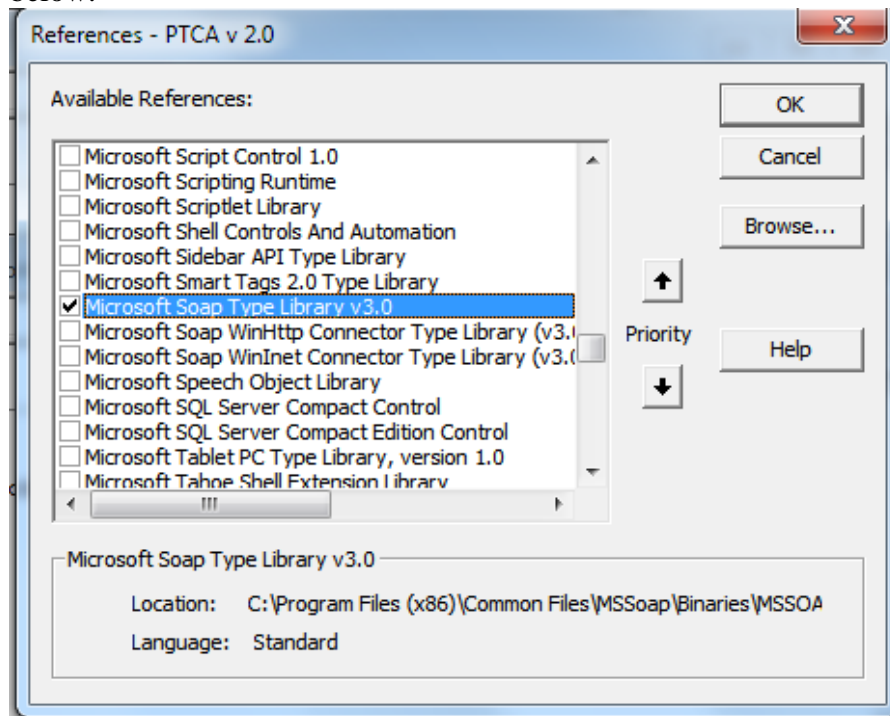
What is shown in here will vary according to your set up, but you will find some references labelled as missing. In the example above, you can see:

MISSING: Microsoft Calendar Control 8.0

MISSING: Microsoft Soap Type Library

Uncheck all the ones labelled missing.

You may not need to do anything more. However if one of the MISSING references is the 'Soap Type Library', then scroll down the list to see if you can find another version of the Soap Type library and if so then tick this instead as shown in figure 23 below.



Figure

Now close the database. On restart, the database should run normally.

### 7.5 Issues after filling in a number of missing values in different patients

When filling in gaps in the database, you will find yourself jumping from record to record filling in different empty or unknown fields. Sometimes you may see an error message 'unable to update...'. If you press escape once or twice, this often frees the database up so you can continue to enter values.

## 8 Notes on the structure of the database

The database is structured so that each procedure is stored as a separate record in the table 'Patients and procedures'. If a patient has more than one procedure, each will appear as a separate line in this table. Virtually all the data for the procedures is stored here. The only additional place data are stored is in the subtables that contain

information about balloon and stent sizes and deployment pressures, and guides and wires. It is possible to enter detailed lesion specific data, with balloons and stents used etc. on up to 4 lesions (data entry form tab “Lesions”). If in fact you have treated 6 lesions, then enter the correct totals in the section under tab “Procedure overview”. The correct totals will be counted in all the analysis sections, and exported to NICOR in the CSV file, which does not look at the data entered under tab “Lesions”.

## 9 Current datasets and format of CSV export file

The evolution of the datasets and the resultant csv file formats are documented on the BCIS web site.

## 10 Key Web Links

British Cardiovascular Intervention Society (BCIS):

<http://www.BCIS.org.uk>

National Institute for Cardiovascular Outcomes Research (NICOR)

<http://www.ucl.ac.uk/nicor>

## 11 The End

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