UKRDC   Quality Assurance when using calculated data

On 12 May 2016 the BBC reported that software embedded in an electronic patient record system used by some GPs in England was displaying an incorrect cardiovascular risk score. http://www.bbc.co.uk/news/health-36274791

Concern was expressed that this could have influenced the decision to prescribe statins.

At a UKRDC Board meeting on 30 June 2016 it was decided that to reduce the chance of similar errors occurring in our systems we should keep a simple record of what calculations are being done and run basic checks that they are done properly.

Requests for the addition of calculations to the UKRDC should be sent to the UK Renal Terminology Committee (email address on the RA website). They will maintain a log of all calculations embedded in the UKRDC data repository and will ask an IT expert to write the code. They will then ask the author to check the code and then ask an independent clinical expert to check the whole thing.

The table below can be used as a guide. Add any important additional information and insert N/A for bits that are not applicable. The aim is simply to ensure that we use good procedures to produce reliable and useful data.

The person requesting the addition of a calculation should try to provide information about the following.

1	Your name, job title, work address and email address
2	Name of the derived result
3	Abbreviation
4	Purpose and likely uses
5	Units of measurement for the result
6	Data required
7	The calculation described in normal mathematical notation and if necessary in words.
8	Number of decimal places to be displayed (eg 2 or same as the longest raw data)
9	Should normal arithmetic rounding rules be applied (Y or explain what you need)
10	Reference range
11	A range of implausible results (that suggests an error eg negative body weight)
12	Any constrains on its use (eg age, sex, renal function, only applies to, does not apply to ...).

If the same function is served using different equations in different circumstances, seek help from an expert in that area and submit a request that will useful to as wide a range of patients as possible. Remember in particular the requirements of paediatrics.

If using other time related data, how far back or forwards can we look for a usable data? eg mean art BP needs Syst&DiasBP at the same time (or wave form analysis) while it might be OK to calculate a BMI using a current weight and a previously recorded height.

If you request a running summary eg a time averaged result, specify all the rules. |

13	Validation rules other than simply out of range. ie an explanation of how the UKRDC validation software could spot and report unusual or unlikely result. You don't need to suggest validation for the raw data being use unless they are also being added to the UKRDC for the first time.
14	Action if some of the data required are missing? eg leave blank
15	A reference to a publication that documents the calculation with URL
16	A URL address for a web page about this topic that will be useful to a clinician
17	A URL address for a web page about this topic that will be useful to a patient
18	If not you, suggest a UK expert who could advise us on any changes required in the future eg new versions of the formula.
19	Supply worked examples to illustrate the calculation and any important constrains you have set
20	Add any other important information particularly notes for the IT expert who will write the code. Mention for example if there are any obvious traps, where rounding of numbers is not permitted (eg drug dose)
	The UKRTC will fill in the details in the next 4 rows
21	LOINC Long Name
22	LOINC Code
23	SNOMED CT Fully Specified Name
24	SNOMED CT Concept id

An IT expert will then be asked to write the code and explain in English and using diagrams if necessary how it produces the result. They can assume that the clinicians are familiar with ordinary mathematical notation and the nesting of logical operators but not with any syntax that is specific to a programming language.

The author and the reviewer will then check the equation or rules being used and the explanation of the computer code.
Once agreed, the code will be added to a test computer site for the author and reviewer to try-out. They should check that the code returns the correct and expected result by entering a range of allowed raw data. This should include the output remaining blank if the input was nonsense and displaying any message they have requested according the result. They should also try to make it fail by entering out of range raw data results or leaving required raw data blank.

The UKTC will then ask for the new calculated item to be added to the live data repository, added to the dataset on the UKRDC website and published
This exercise is intended to enhance the value of the data stored in the UKRDC data repository. It does not relate to the epidemiological and statistical techniques used when these data are summarised and published.