NHS
Oxfordshire
Clinical Commissioning Group

The GP Surgeries
Via the OCCG Weekly Bulletin

14th November 2018

Regarding: Changes to reporting of eGFR (Kidney Function)

Dear Colleagues,

On Monday 14th January 2019, our Kidney Function results will use a new equation to report Estimated Glomerular Filtration Rate (eGFR), and therefore a new code.

The MDRD equation for eGFR is being phased out internationally, in favour of a new, better equation called CKD-EPI. The clinical benefits of the new equation are described in an appendix to this letter, in a paper from Dr Brian Shine at the OUH. The key advantage is that it is more accurate in younger patients who don't actually have CKD, but were given a low eGFR using the original equation. I find those discussions very challenging sometimes, telling a young patient they are "probably" ok while also simultaneously diagnosing "kidney disease".

I am happy to say that EMIS have responded to my request to change their coding, and so all of their programming will now also recognise CKD-EPI codes when considering kidney function (e.g. safety checks with medication and popups).

I am informing you in advance of this change, because you need an opportunity to consider what impact this may have on your own practice programming. If you have programmed your own Data Concepts / Document Templates / Data Entry Templates to look for eGFR, they will need to be adapted for the new codes within the next 2 months. Please find overleaf the details of how to do so, and how to get help if you need it.

Yours sincerely

Dr Tom Nichols
GP Clinical Lead for IT

Attachments:

- Reprogramming for CKD-EPI
- The case for changing from using MDRD to CKD-EPI for estimating glomerular filtration rate (eGFR)

Reprogramming for CKD-EPI

Some of your patients will already have CKD-EPI codes in their record, as many other areas of the country have already replaced the MDRD equation, and your newly registered patients may have come to your practice with those codes in their records via GP2GP.

After the transition, any programming which looks for eGFR should look for ALL 6 of the following codes:

Code	Code Term	Rationale
451E	GFR calculated abbreviated MDRD	Current code used by the Oxfordshire labs
451G	GFR calculated abbreviated MDRD adj for African Americ origin	The other eGFR code available (which is not used by the labs, but may be present from manual data entry or have come in via GP2GP)
451K	Estimated GFR using CKD-Epi formula per 1.73 square metres	The parent code for the new equation
451N	eGFR using creatinine (CKD-EPI) per 1.73 square metres	The code the Oxfordshire labs will be using from 14th January
451M	eGFR using cystatin C (CKD-EPI) per 1.73 square metres	An eGFR code which may be used in other areas of the country
451F	Glomerular filtration rate	Although very few records will have a record of the patients actual GFR, if it is found, it is more accurate than an eGFR so all programming should look for this code too

All OCCG data entry tools will be programmed to look for these codes, and all OCCG Document Templates (in our Pro Forma Library) will be updated for both EMIS and Vision so you don't need to change anything in those products.

If you need help on reprogramming any of your practice programming, please consider contacting the CSU Training Team:

0300 123 567 or Training.SCWCSU@nhs.net

The case for changing from using MDRD to CKD-EPI for estimating glomerular filtration rate (eGFR)

Brian Shine

March 2017

Introduction

Identifying people with impaired renal function is important, since, with appropriate management, many people with early impaired function can recover function or avoid further decline in renal function. Since 2006, we have been reporting renal function in terms of estimated glomerular function (eGFR), using the MDRD (Modification of Diet in Renal Disease study) equation. We propose to change to the CDK-EPI (Chronic Kidney Disease Epidemiology Collaboration) equation for calculating and reporting eGFR, because this equation better reflects renal function, especially in younger people without clinical renal disease, and therefore reports fewer false positive results. We already have agreement from the renal physicians, and are seeking agreement from TOITF on behalf of the Oxfordshire CCG.

Glomerular filtration rate

The glomerular filtration rate (GFR) measures how much plasma the kidneys filter in one minute. In principle, this can be calculated by measuring the amount of a substance that appears in the urine over a given amount of time and the concentration in the blood (for substances with a constant concentration) or the rate of disappearance from the blood (for exogenous substances). The ideal substance for this measurement should be freely filtered at the glomerulus, and not reabsorbed or excreted by the rest of the nephron. Several exogenous substances that fulfil these criteria have been identified, including inulin, EDTA (ethylene diamine tetra-acetic acid), and iohexol. However, they have to be administered, sometimes linked to a radioactive tracer, to the patient, and the rate of disappearance of the substance from the blood has to be calculated either by measuring the substance in blood specimens taken at timed intervals, or by collecting timed urine specimens.

Creatinine is an endogenously produced substance that has been used to assess renal function for many years. It is produced by conversion of creatine, which is found mainly in muscle. Under normal circumstances, its concentration is more or less constant, although the daily standard deviation of concentration is up to 10%, mostly in response to diet, especially meat, which contains creatine. In the past, the GFR was calculated by measuring the output of creatinine in a 24-hour urine collection and measuring the concentration in blood at some point in the collection.

A problem with creatinine measurements in the past was the method, orignally developed in the 1880s, is subject to positive interference from other substances, and to negative interference in the presence of ketones. Some of these intereferences can be avoided by changes to the method, and a major realignment in the method was introduced in 2009. However, most of these intereferences can be avoided altogether by using an enzymatic method, and our laboratory has used this since 2015.

Another endogenous substance, cystatin C, has been proposed for calculating GFR. This is produced by many cells in the body, and is freely filtered at the glomerulus. It is broken down in the tubular system, and little reaches the urine, so its concentration in plasma reflects glomerular filtration. This is a better reflection overall of GFR, and has been suggested by NICE [1], but, at the moment, it is not offered by many laboratories.

Equations for estimating GFR

In the 1970s, Cockroft and Gault proposed that GFR could be estimated from the plasma creatinine, using the age, sex and weight of the patient, thought only 4% of their study population were women.[2]

The MDRD equation is based upon measurements in patients with established renal disease. It uses creatinine, sex, age, and the ethnicity of the patient to calculate the glomerular filtration rate (GFR). Since it does not require the laboratory to know the weight of the patient, it is much more convenient than the Cockroft-Gault equation. It also reflects GFR much more closely.[3]

The realignment of creatinine in 2009 led to a slight change in MDRD equation. [4]

The group that developed the MDRD equation subsequently developed the CKD-EPI equations, using data from patients who had normal and impaired renal function. These equations are thought to reflect renal function better than the MDRD equation. There is also a version that incorporates the measurement of cystatin C .[5]

Classifying impaired renal function

Because kidney size is related to body size, reporting GFR may not give a true reflection of renal function, since, all other things being equal, a smaller person will have smaller kidneys and thus a lower GFR than a larger person. The Cockcroft-Gault formula incorporates weight, and uses an assumption that females have a 15% lower GFR than males, although they had few females in their study. Subsequent equations have relate GFR to a standard body surface area of 1.73 m^2. This allows someone's renal function to be placed in bands, the cut points being 120, 90, 60, 30, and 15 ml per minute per 1.73 m^2, giving CKD classifications of 1 (above 120), 2 (between 60 and 90), and so on, with CKD being defined by an eGFR less than 60 ml per minute per 1.67 m^2.

Present situation in Oxford

NHS England mandated that laboratories should report estimated GFR in 2006. At that time, the only viable equation was the MDRD equation, and we have reported eGFR since then using this equation.

Many laboratories in the UK are using the CDK-EPI euqation, and we feel that the laboratories in Oxford should do so as well. This has the agreement of the renal physicians, and, in principle, of the Oxfordshire Clinical Commissioning Group. However, the laboratories liaison group between the OUH and the Oxfordshire CCG has recently disbanded, so there is no apparent mechanism for agreeing this change.

We seek the agreement of TOITF to propose to the CCG that we change the equation.

Effect of the change

We examined the difference in reported eGFR using these two equations, and found that the change would classify fewer young people and more older people with chronic kidney disease (See Figure). [6] This has also been found by authors. [7] As pointed out by Earley and colleagues [8], "neither the CKD-EPI nor the MDRD Study equation is optimal across all populations and GFR ranges. Using a single equation for reporting estimated GFR requires a tradeoff to optimize performance at either higher or lower GFR ranges. A general practice and public health perspective favors adopting the CKD-EPI equation in North America, Europe, and Australia".

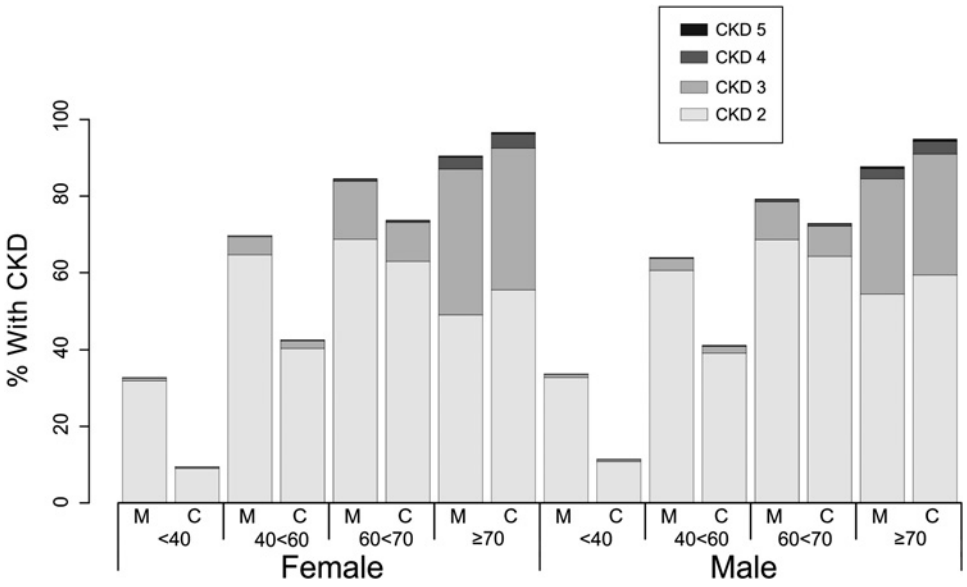

Figure 1: CKD classification by gender, age group and eGFR calculation equation [M = MDRD, C = CKD-EPI]

Conclusion

While none of the available equations is universally optimal, opinion favours the CKD-EPI equation as being better for most purposes than the MDRD equation. We would therefore like to change to using this equation for reporting eGFR. This has support from renal physicians in Oxford, and, informally, from the Oxfordshinre CCG, and we therefore wish to implement it. We would propose a 3-month consultation, with a view to implementing the change in June, 2017.

References

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