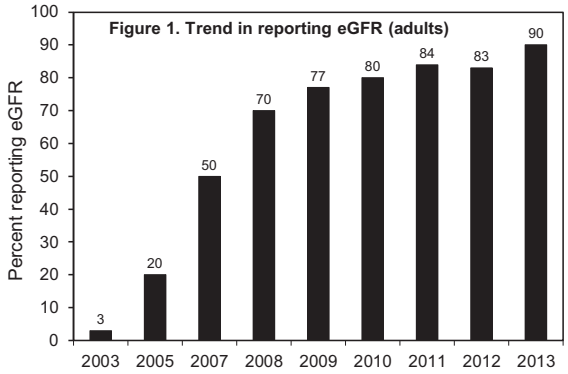
Practices and Recommendations for Reporting Estimated Glomerular Filtration Rate (eGFR)

The general chemistry C-B 2013 Survey included questions regarding practices for reporting eGFR from serum creatinine results for adult and pediatric patients.

ADULTS (≥18 years old)

The National Kidney Disease Education Program (NKDEP) recommends reporting eGFR along with serum (or plasma or whole blood) creatinine for adults because an eGFR value is more easily related to a patient's kidney disease condition than is a creatinine concentration by itself. The NKDEP promotes reporting eGFR to assist practitioners to more easily identify patients at increased risk for CKD.

Of the 3696 laboratories that responded, 90% (up from 83% in 2012) were reporting eGFR for adults as recommended by the NKDEP (Figure 1). Figure 2 shows that, of those reporting eGFR for adults, 86% reported eGFR with all creatinine results as recommended by NKDEP because most computer systems are not able to discriminate clinical conditions when eGFR is less reliable. Selective reporting of eGFR was practiced by 15% of respondents. The NKDEP web site cautions that there are clinical conditions when creatinine is less reliable as an indicator of kidney function due primarily to alterations in the rate of production of creatinine from muscle. These conditions include: very large or very small body size or muscle mass, clinical conditions which decrease muscle mass (e.g. cancer, paraplegia, amputation), nutritional status (e.g. meat increases and a vegan diet decreases blood creatinine concentration), pregnancy which increases GFR and decreases creatinine concentration, and patients with serious comorbid conditions or with metabolically unstable kidney function such as for some inpatients and those with acute kidney injury. However, reporting eGFR with all adult creatinine results is still recommended because the clinician is able to determine the suitability of an eGFR result for a patient's condition.



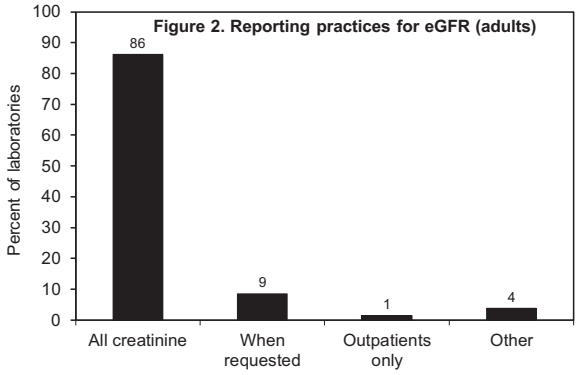
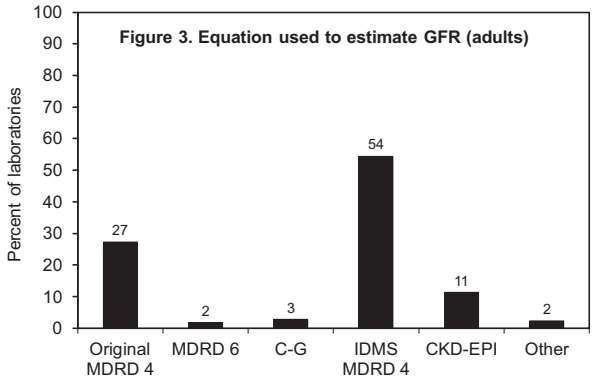


Figure 3 shows that 54% of laboratories were using the isotope dilution mass spectrometry (IDMS) traceable version of the MDRD 4-variable equation and 11% (up from 4% the past two years) were using the newer IDMS traceable CKD-EPI equation[1,2,]. All major global manufacturers have now standardized creatinine calibration to be traceable to an IDMS reference measurement procedure. Consequently, all laboratories should be reporting standardized creatinine results and using an eGFR equation that is suitable for standardized creatinine values.

Of concern in Figure 3 are the 34% of laboratories that are still using the original MDRD 4-parameter, 6-parameter, Cockcroft-Gault (C-G) or other older equation. IDMS traceable calibration caused a method dependent 5-30% reduction in creatinine results compared to older calibration schemes[3]. Thus, when an IDMS traceable creatinine result is used with an older estimating equation, the eGFR will be erroneously high which may lead to erroneous decisions regarding patient treatment. Laboratories using an older equation should change to either the IDMS traceable version of the MDRD equation or to the newer CKD-EPI equation.



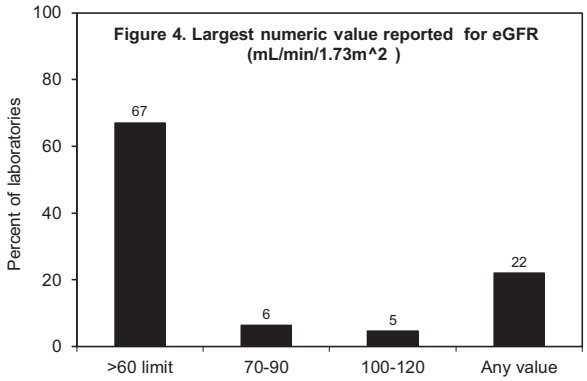


Figure 4 shows that 33% of laboratories are reporting eGFR values above 60 mL/min/1.73 m^2. However, Figure 3 indicates that only 11% of laboratories are using the appropriate CKD-EPI equation for reporting higher eGFR values. The MDRD equation should not be used to calculate values greater than 60 mL/min/1.73m^2 because the values are biased lower than true measured GFR values. Laboratories reporting numeric values for eGFR above 60 mL/min/1.73 m^2 should be using the CKD-EPI equation. The CKD-EPI equation uses the same variables as the MDRD equation, is more accurate than the MDRD equation at values above 60 mL/min/1.73m^2, and may improve classification of patients into risk categories at eGFR values near the 60 mL/min/1.73m^2 decision area[2, 4.]

CHILDREN (<18 years old)

Among the respondents to the survey questions, 8% indicated they report eGFR values for pediatric patients calculated from a creatinine result. It is more difficult to automatically report values for pediatric patients because information on the height of the patient is needed which is typically not available in a LIS or instrument middleware computer. Consequently most laboratories do not report an eGFR for pediatric patients. Estimating equations appropriate for use in children with IDMS standardized creatinine results are not as well developed as for adults. The only equation suitable for use with IDMS standardized creatinine results is referred to as the "bedside" Schwartz equation[5.] The term "bedside" was suggested by Dr. Schwartz to indicate that the value is an estimate suitable for general clinical purposes but may not be suitable for critical decisions such as some drug dose decisions.

In this Survey, only 28% of respondents were using the newer IDMS "bedside" version of the Schwartz equation, with 23% using the original Schwartz equation which will give erroneously high estimates of GFR when used with IDMS traceable creatinine results. Of particular concern was the observation that 19% of laboratories were using an adult eGFR equation for pediatric patients. None of the adult equations have been validated for use in children. Laboratories should use the newer IDMS traceable "bedside" Schwartz equation to estimate eGFR from a creatinine result for children.

Additional information on reporting eGFR is available at the NKDEP web site: http://www.nkdep.nih.gov/.

References

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