All Wales Clinical Biochemistry Audit Group

Standards for the Provision and Reporting of Lipid Analyses

INTRODUCTION

Recommendations about treatment of dyslipidaemias for prevention of cardiovascular disease[1] have now been endorsed in the National Service Framework (NSF) for Coronary Heart Disease.[2] Clinical biochemistry laboratories have a major role not only in measuring lipids but also in reporting the results in such a way as to assist clinicians in implementing these guidelines.

A recent survey of laboratories in Wales, presented at an audit meeting in October 2001, showed significant variations in practice in the provision and reporting of lipid analyses. The following standards are recommended in the light of the survey findings, discussion at this meeting and national guidelines for the prevention of cardiovascular disease, together with some more recent guidance.[3,4]

STANDARDS

1. **Measurements**

a) Laboratories should measure both total cholesterol and triglycerides, even if only one of these tests is requested, in order to ensure that dyslipidaemias are fully characterised.

b) HDL cholesterol measurements should be freely available on request, without vetting, and are required for the full assessment of cardiovascular risk.

c) Each laboratory should ensure that appropriate internal quality control (IQC) and external quality assessment (EQA) procedures are in place for HDL cholesterol as well as total cholesterol and triglyceride assays.

2. **Derived Results**

a) LDL cholesterol should be reported whenever HDL cholesterol is requested, providing that the triglyceride concentration is $\leq$ 4.5 mmol/L. It can be calculated using the Friedewald formula[5] as follows: LDL Cholesterol = Total Cholesterol – HDL Cholesterol – (Triglycerides/2.19)
This calculation should not be used when the triglyceride concentration exceeds 4.5 mmol/L.

b) The total/HDL cholesterol ratio should be reported whenever HDL cholesterol is measured, in order to assist clinicians in assessing coronary risk using the Joint British Societies' charts.[4]

c) It is recommended that other derived ratios of cholesterol fractions should not be reported.

3. **Reporting of Results**

a) It is recognised that the provision of reference ranges and target levels is controversial and subject to change, particularly for total and LDL cholesterol, but it is recommended that laboratories should highlight ("flag") results outside the following limits:

Total Cholesterol	> 5.0 mmol/L
HDL Cholesterol	< 1.0 mmol/L
LDL Cholesterol	> 3.0 mmol/L
Triglycerides	> 2.0 mmol/L

b) It is recommended that laboratories should include on reports a general statement about interpreting lipid results in the context of overall cardiovascular risk.

c) It is recommended that request forms should include an option to state whether the patient is fasting and that if the patient is stated to be fasting, this fact is included with the report.

4. **Clinical Interpretation of Results**

a) It is recommended that grossly abnormal lipid results should be "clinically" as well as technically validated by qualified laboratory staff.

b) The following limits are suggested for reviewing abnormal results, but it is recognised that the ability to undertake this task depends on the interests and numbers of staff available:

Total Cholesterol	< 2.0 or > 8.0 mmol/L
HDL Cholesterol	< 0.6 or > 2.4 mmol/L
LDL Cholesterol	< 1.0 or > 6.0 mmol/L
Triglycerides	> 4.0 mmol/L

c) It is recommended that staff clinically validating lipid results should provide comments on reports as appropriate, including the need to exclude secondary dyslipidaemias, in particular diabetes mellitus and hypothyroidism.

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REFERENCES

1. Wood D, Durrington P, Poulter N, *et al*. Joint British recommendations on prevention of coronary heart disease in clinical practice. Heart 1998; **80 Suppl 2**: 1-29.
2. National Service Framework for Coronary Heart Disease. National Assembly for Wales 2001. http://www.wales.nhs.uk/sites/documents/442/coronary%2Dheart%2Ddisease%2De%2Epdf
3. NICE and the Royal College of General Practitioners. Clinical Guidelines for Type 2 Diabetes: Lipids Management. October 2002. http://www.nice.org.uk/pdf/lipidsfull_guideline.pdf
4. Williams B, Poulter NR, Brown MJ, *et al*. Guidelines for Management of Hypertension: Report of the Fourth Working Party of the British Hypertension Society, 2004 – BHS IV. J Hum Hypertens 2004; **18**: 139-185. http://www.bhsoc.org/pdfs/BHS_IV_Guidelines.pdf
5. Friedewald WT, Levy RI, Fredrickson DS. Estimation of the concentration of low-density lipoprotein cholesterol without use of the preparative ultracentrifuge. Clin Chem 1972; **18**: 499.

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APPENDIX Calendar of audit process for standards for provision/reporting of lipid analyses

Oct. 2001	Findings of a survey of 16 Welsh biochemistry laboratories, undertaken by Dr D Oleesky (Caerphilly/Cardiff), presented at an All Wales Clinical Biochemistry Audit Group meeting in Aberystwyth.
April 2002	Initial draft standards prepared by Dr D Oleesky, considered at an audit group committee meeting, presented at an audit meeting in Merthyr Tydfil and sent for consultation to clinical biochemists within Wales to seek their views.
April 2005	Further draft of standards prepared and sent for consultation.
May 2005	Standards ratified at All Wales Clinical Biochemistry Audit Group committee meeting on 19th May 2005 by Dr K Griffiths (chairman).