COMPETENCES REQUIRED FOR CLINICAL SCIENTISTS TO ATTAIN STATE REGISTRATION					
MODALITY:	**CLINICAL BIOCHEMISTRY**	**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	**xxxxxxxxxxxxxxxxxxxxxx**

APPENDIX 1

This set of documents must be completed and returned in your portfolio.
Please complete the three header sections above on each page.
Refer to the Specific Competences document for guidance in completing this document.
Use typescript or black ink and block capitals for all sections.

EXPERIENCE: The candidate should be able to demonstrate that he/she has worked in an environment that has enabled the individual to receive training and gain experience relevant to the competences set out below.

SCIENTIFIC

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice	PARAGRAPH: 3,5,26 PORTFOLIO EVIDENCE: 1,2,4,11
• demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available	PARAGRAPH: 5,15,23,26,28 PORTFOLIO EVIDENCE: 2,3,4
• experience of searching for knowledge, critical appraisal of information and integration into the knowledge base	PARAGRAPH: 1,2,6,39
• ability to apply knowledge to problems associated with the routine provision, and development, of the service	PARAGRAPH: 25
• ability to identify the clinical decision which the test/intervention will inform	PARAGRAPH: 25
• ability to make judgements on the effectiveness of procedures	PARAGRAPH: 5,25, 26 PORTFOLIO EVIDENCE: 2,3,4
• application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available	PARAGRAPH: 25

Created: 16 August 2002
Modified: 16 August 2002
Reference: DOC-ACS002-Generic Competences
Version: Original

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MODALITY:	**CLINICAL BIOCHEMISTRY**	**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	**xxxxxxxxxxxxxxxxxxx**

CLINICAL

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• ability to provide interpretation of data and a diagnostic (therapeutic) opinion, including any further action to be taken by the individual directly responsible for the care of the patient	PARAGRAPH: 25
• understanding of the wider clinical situation relevant to the patients presenting to his/her specialty	PARAGRAPH: 9,15,19,26,28,29 PORTFOLIO EVIDENCE: 4
• ability to develop/devise an investigation strategy taking into account the complete clinical picture	PARAGRAPH: 25
• understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice	PARAGRAPH: 5,15,25,26,28 PORTFOLIO EVIDENCE: 2,4
• awareness of the evidence base that underpins the use of the procedures employed by the service	PARAGRAPH: 5,25 PORTFOLIO EVIDENCE: 2,4

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TECHNICAL

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• understanding of the principles associated with a range of techniques employed in the modality	PARAGRAPH: 5,7,13,14 PORTFOLIO EVIDENCE: 2,4,11
• knowledge of the standards of practice expected from these techniques	PARAGRAPH: 5,7,13,14 PORTFOLIO EVIDENCE: 2,3,4,10,11
• experience of performing these techniques	PARAGRAPH: 5,7,13,14
• the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)	PARAGRAPH: 27
• understanding of the principles of quality control and quality assurance	PARAGRAPH: 27
• experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates	PARAGRAPH: 27

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Version: Original

COMPETENCES REQUIRED FOR CLINICAL SCIENTISTS TO ATTAIN STATE REGISTRATION					
MODALITY:	**CLINICAL BIOCHEMISTRY**	**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	**xxxxxxxxxxxxxxxxxxx**

RESEARCH AND DEVELOPMENT

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• ability to read and critically appraise the literature	PARAGRAPH: 1,2,6
• ability to develop the aims and objectives associated with a project	PARAGRAPH: 2,6,30,31,32,33
• ability to develop an experimental protocol to meet the aims and objectives in a way that provides reliable and robust data (i.e. free of bias)	PARAGRAPH: 2,6,30,31,32,33
• ability to perform the required experimental work ability to produce and present the results (including statistical analysis)	PARAGRAPH: 2,6,30,31,32,33
• ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions	PARAGRAPH: 2,6,32
• ability to present data and provide a critical appraisal to an audience of peers – both spoken and written	PARAGRAPH: 33, 34 PORTFOLIO EVIDENCE: 12,13,14,15,16,17,18,19,20,21,22,23, 24,25

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COMMUNICATION

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• ability to assess a situation and act accordingly when representing the specialty	PARAGRAPH: 25,29,40
• ability to respond to enquiries regarding the service provided when dealing with clinical colleagues	PARAGRAPH: 25,29
• ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate	PARAGRAPH: 33,36,37,41
• ability to communicate the outcome of problem solving and research and development activities	PARAGRAPH: 33,34 PORTFOLIO EVIDENCE: 12-25
• evidence of presentation of scientific material at meetings and in the literature	PARAGRAPH: 33,34 PORTFOLIO EVIDENCE: 12-25

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Version: Original

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PROBLEM SOLVING

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• to assess a situation	PARAGRAPH: 25
• determine the nature and severity of the problem	PARAGRAPH: 25
• call upon the required knowledge and experience to deal with the problem	PARAGRAPH: 25
• initiate resolution of the problem	PARAGRAPH: 25,27
• demonstrate personal initiative	PARAGRAPH: 42

MANAGEMENT

AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
• to understand the principles of management	PARAGRAPH: 12,15,28,39
• to understand the principles of quality assurance, audit, safety and accreditation relevant to a specific discipline	PARAGRAPH: 10,15,21,22,27,39

Note:

The above are the generic competences that must be met by all Clinical Scientists. These competences have also been mapped onto specific subjects. Copies of these can be obtained from the ACS Administrative Office.

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Reference: DOC-ACS002-Generic Competences
Version: Original

Portfolio for assessment for the ACS Certificate of Attainment

Xxxxxx Xxxxxx

Modality: Clinical Biochemistry

Created: 16 August 2002
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Reference: DOC-ACS002-Generic Competences
Version: Original

Covering report

Paragraph		Evidence
	Pre-Grade A training	
1	I studied Molecular and Cellular Biochemistry at the University of Xxxxx from XXXX – XXXX which gave me a broad training in the concepts of Biochemistry. The first year covered organic chemistry, physical chemistry, biological chemistry, cell biology and mathematics, physics and statistics. I was awarded distinction and a Nuffield Scholarship at this time. At the end of my third year, I took written papers in the Structure and Function of Macromolecules, Energy and Metabolism, Genetics and Molecular Biology, Cell biology and Differentiation of Function and Data Handling and Interpretation. In my final year, I took specialist papers in Immunology and Glycobiology and carried out a literature disseration on "The pharmacological basis of anti-parkinsonian drug therapies" with Professor Xxxxx Xxxxxxxxxx.	
2	I spent 12 weeks carrying out my undergraduate research project with Xxxxx Xxxxx, Professor of Clinical Nutrition in the Xxxxxx Xxxxxxx, Xxxxxx. I studied the "Selective uptake of chylomicron fatty acids by human adipose tissue in the post-prandial period". Each subject was fed a meal containing known amounts of different fatty acids after an overnight fast. Samples taken at 30 minute intervals for 6 h from an arterialised (warmed) hand vein and an abdominal vein were ultracentrifuged to provide a chylomicron fraction and an infiltrate. These samples were separated using thin layer chromatography to separate monoglyceride, diglyceride, triglyceride and phospholipid fractions. These fractions were then analysed for the quantity of each fatty acid using GC-MS and the arterio-venous differences were calculated to determine uptake. This work was the first to demonstrate selective uptake of fatty acids with respect to chain length and degree of saturation in any species and was presented at an international meeting in Toulouse and has been published in the American Journal of Clinical Nutrition. This work gave me experience of collaborating with medical colleagues, of appropriateness in dealing with patients and in careful production and analysis of data.	12,13
3	I left Xxxxxx in XXXX with an upper second class honours degree in Biochemistry.	1

Paragraph Evidence

Grade A training Years 1 and 2

4 I began my training as a Clinical Biochemist in October XXXX as a Xxxxxx Regional Trainee based at Xxxxxxx District Hospital in the Department of Clinical Biochemistry under the supervision of Xxxxxx Xxxxxx. 5

5 During the first two years of my training, I attended the M.Sc course in Clinical Biochemistry at the University of Xxx. The course included over 300 h of lectures covering Biochemical Medicine, Analysis and Instrumentation, Molecular Biology, Immunology, Clinical Endocrinology, Biochemical Toxicology and Specialist Laboratory Services. It also gave tuition and experience of practical techniques such as Blood sampling and collection, Electrolyte analysis, Radioimmunoassay, Atomic absorption, Protein analysis, HPLC and Molecular Biology. Each term I presented a paper at the journal club or gave a case presentation. I completed the MSc successfully in XXXX. 2, 11

6 In the second year of my Grade A training, I carried out my MSc research project looking at “Markers of bone turnover in men with prostatic carcinoma”. In collaboration with the urologists, concentrations of bone markers (total ALP, bone-specific ALP and serum CrossLaps) were compared in men with prostatic carcinoma and men with benign prostatic hypertrophy to study coupling of bone formation and resorption. I was awarded an ACB Scientific Committee Scholarship for this work. It was presented as a poster at the ACB National Meeting in XXXX. 14

7 My theoretical training on the MSc course was supplemented with practical experience in my base hospital. I rotated through each of the sections of the department: Reception; Emergency and NPT; Automated; Toxicology; Endocrinology; Autoantibodies and Proteins. This gave me a wide experience of automated and manual laboratory techniques and analyser maintenance and operation as listed below:

Department	Analysers / Techniques
Emergency / NPT	APEC Glucose analyser; Ciba Corning ISE’s and blood gas analysers; Vitech Advanced™ Micro-Osmometer
Automated	Roche Hitachi 917 analysers

Toxicology	Therapeutic drug monitoring – Abbott TdxFlx; drugs-of-abuse screens – GC, TLC, ETS immunoassay; trace metals – atomic absorption; faecal occult bloods; urine oxalate; urine hydroxyproline; erythrocyte glucose-6-phosphatase activity
Endocrine	Chiron ACS:180; DPC Immulite; Roche Elecsys 2010
Autoants	Indirect immunofluorescence, Direct immunofluorescence, ELISA
Proteins	Protein electrophoresis and densitometry; immunofixation; radial immunodiffusion; Beckman Array nephelometer; alkaline phosphatase isoenzymes; oligoclonal bands by isoelectric focusing

8 As well as the experience gained in Clinical Biochemistry, I also gained an appreciation of the work performed by other diagnostic departments. I spent 1 week in the department of haematology and blood transfusion learning about their technology and test repertoire particularly full blood counts and films, cross matching and clotting screens. I also spent 1 day in each of histology, virology and microbiology. I therefore have experience of the different working patterns and pressures in each of these departments.

9 My clinical experience during this time was developed through attendance at the weekly grand rounds at either Xxxxxx District Hospital or the Xxxxxx Hospital as appropriate. I was also able to attend two haematology out-patients clinics, a lipid clinic and a care of the elderly ward round.

10 Audit experience was gained through collection of data for and participation in monthly audit meetings with urologists, radiologists and histologists. The audit was comparing the effectiveness of total PSA measurement, free-to-total PSA ratio, digital rectal examination, ultrasound and biopsy in the diagnosis of prostatic carcinoma.

11 Attendance at meetings: *(Dates were given but have been removed)*

- ACB Regional Bone Markers Symposium
- ACB Regional Meeting – Tumour Markers
- CME Update and launch of CPD Bulletin – various topics
- Regional Quality Assurance Liaison Group – various topics
- ACB Regional Meeting – Diabetes and Growth Hormone
- ACB Regional Meeting – Hyperlipidaemia and Risk Factors
- RSM Forum on Food and Health – Overweight and Obesity
- ACB Regional Meeting – New Frontiers various topics

12 During this time, the Clinical Biochemistry department merged with the Department of Haematology, which was an interesting insight into change management and department mergers. I successfully completed my end of first and second year grade A appraisals. 8, 9

Paragraph Evidence

Grade A training Year 3

13 In the final year of my training, I was seconded to other departments in the Region to gain experience of more specialist techniques. I spent a week in each of the following departments:

Lysosomal storage disease; Dr X Xxxxxx, Xxxxx Hospital

lysosomal storage diseases, cell culture and harvesting, sugar chromatography, tissue enzyme assays, 2D electrophoresis

Paediatric Laboratory, Dr X Xxxxxx, Xxxxx Hospital

GC-MS of organic acids, tandem MSMS, amino acid analysis by ion-exchange

Toxicology, Xxxxx Hospital

Poisons Information service, anticonvulsants, anti-arrhythmics, drugs of abuse screens, post mortem analysis, trace metal analysis

TLC, HPLC, immunoassay, GCMS, atomic absorption

Neuroimmunology, Dr X Xxxxx, Xxxxx Hospital

Oligoclonal bands, neuronal proteins, anti-neuronal antibodies

Western blots, IEF, PAGE using SDS and gradient gels

14 I also spent four months in the Department of Clinical Biochemistry at Xxxxxx Hospital under the supervision of Dr Xxxxxx Xxxxxx. I participated in the duty biochemist rota and developed further experience in routine clinical biochemistry. I also spent time in their more specialist departments: 6

Urine steroid profiling with Dr X Xxxxxx

Steroid disorders, steroid extraction, gas chromatography

Porphyrin investigations with Dr X Xxxxxx

Porphyrias, ALA and PBG screen, urine and faeces spectrophotometry, fluorescence scans, enzyme analysis

Paediatrics investigations with Dr X Xxxxxx

Amino acid analysis by HPLC

Specialist Haematology with Dr X Xxxxxx

Haemoglobinopathies, cellulose acetate electrophoresis

15 During this year I attended the ACB National Training Courses in Xxxxxx (September XXXX) and Xxxxxx (April XXXX) which added to the clinical and

technical knowledge gained from my MSc course. These courses also include management training and presentation experience.

16 I was a full delegate at the ACB National Meeting in XXXX and was first author on four posters.

17 I investigated a case from Xxxxxx District Hospital of a lady with Graves' disease presenting with cholestatic jaundice. This was published as a case report in the Annals of Clinical Biochemistry and presented as a poster at the ACB National Meeting in XXXX 15, 16

18 I also published a case report in the CPD Bulletin – Clinical Biochemistry and presented this data as a poster the ACB National Meeting in XXXX. Autoantibody testing for coeliac disease can use either IgA or IgG antibodies to endomysium or gliadin with varying sensitivities and specificities. However, there is a high prevalence of selective IgA deficiency in coeliac disease patients. This must be considered when developing testing protocols as IgA deficient patients with coeliac disease will not be identified by protocols measuring only IgA autoantibodies. 17, 18

19 My clinical experience during this time was developed through attendance at the weekly grand rounds at either Xxxxxx District Hospital or Xxxxxx Hospital as appropriate. I was also able to attend outpatients' clinics in Endocrinology and Diabetes Mellitus at Xxxxxx District Hospital and Porphyrias at Xxxxx Hospital. I went on a TPN ward round at Xxxxx Hospital and also spent a day with the Senior Registrar covering the GP Medical referral unit attached to Accident and Emergency at Xxxxxx District Hospital.

20 Attendance at meetings: *(Dates were given but have been removed*:

- ACB National Training Course No 5
- ACB X Region – Members Cases and Trace Elements
- ACB X Region Meeting – Tumour Markers and Vitamin D
- ACB National Training Course No 6
- ACB National Meeting XXXX
- Trainees' Day at ACB National Meeting XXXX

21 I attended all the Clinical Biochemistry Quality Control meetings and Department of Pathology Health and Safety meetings at Xxxxxx District Hospital during my third year of training.

22 I gained audit experience during this time by organising an audit of the turnaround times of Accident and Emergency samples within the joint Biochemistry and Haematology department. Data was obtained for each stage in the handling of samples for U+E's, FBC and clotting i.e. time ordered, sent, received, accessioned, arrived in department, separated, placed on machine, provisional result provided and final result provided. The audit was carried out for a 7 day period and the data was analysed separately for those samples sent from 9am – 5pm, 5pm – 8pm and on-call. A proportion of samples exceeded the agreed 1 hour and the data was able to highlight stages at which improvements could be made. This work was presented as a poster at the National Meeting in XXXX. 19

23 I obtained my completion of Grade A certificate in May XXXX. 3, 10

Paragraph		Evidence
	Grade B experience	
24	In May XXXX, I moved to the department of Chemical Pathology at St Xxxxxx Hospital, London as a Grade B Clinical Biochemist under the supervision of Dr Xxxxxx Xxxxxx.	7
25	I have participated fully in the Duty Biochemist Rota at St Xxxxxx authorising one full day each week since January XXXX. This has given me experience in the interpretation and clinical validation of results from all sections of the laboratory; dealing with clinical enquiries; resolving issues of sample problems and adverse incidents.	
26	I organised and attended the three-weekly X Region MRCPath preparation tutorials. I sat the written and practical parts of Part I MRCPath in September and November XXXX respectively and was awarded DipRCPath.	4
27	During my first year at St Xxxxxx I participated in the monthly rotation of QC Officers. In alternate months, I am now responsible for reviewing external quality assurance data and guiding the BMS QC Officer in the investigation of any problems and reviewing the internal quality control data. In alternate months, I am also responsible for authorising all the requests for tests that are sent to other laboratories and assessing the utility of each request. As part of this duty, I conducted a study looking at the effect of highly icteric samples on the Beckman LX20 Jaffe reaction creatinine method to determine the need for any comments to accompany affected results.	
28	I attended the ACB National Training Courses in Xxxxxx (September XXXX) and Xxxxxx (April XXXX) which added to the clinical and technical knowledge gained from my MSc course. These courses also include management training and presentation experience. Further management experience has been gained from participation in the weekly Operational Management Meetings of the Chemical Pathology department.	
29	I have gained clinical experience by attending intensive therapy unit ward rounds twice each week and attending weekly Grand Round meetings at St Xxxxxx Hospital. I have weekly meetings with the adult endocrinology firm and Metabolic Investigation Unit to discuss results of dynamic function tests and monthly meetings with the paediatric endocrinology teams to discuss their investigations	

30 My initial research at St Xxxxxx was to study the utility of the Roche Cardiac Reader system for analysis of serum troponin T. This work was presented as a poster at Focus XXXX and AACC meeting XXXX. I also produced a precision profile for cTnT concentrations between 0 and 0.1 ng/L on the Roche Elecsys 1010 and 2010. This work was part of a poster presentation at AACC meeting XXXX. 20, 21

31 My main research interest has been studying brain natriuretic peptide (BNP) and N-terminal proBNP (NTproBNP) in a variety of clinical situations. I carried out a full NCCLS evaluation for NTproBNP on the Roche Elecsys 1010 and 2010 which was published in poster format at Focus XXXX and AACC meeting XXXX. 22

32 *This paragraph contained information about collaborative studies that haven't been published yet and has therefore been removed!*

33 I have carried out a study with the cardiothoracic anaesthetists looking at changes in NTproBNP concentrations in perioperative cardiac surgery patients. I presented this work orally and as a poster presentation at Focus XXXX. It was also taken to the AACC meeting XXXX and the Association of Cardiothoracic Anaesthetists annual meeting XXXX as poster presentations. I was selected to present this work at the Royal Society of Medicine President's Prize for the Section of Pathology evening in March XXXX and was awarded second prize. 23

34 In July XXXX, I presented the method evaluation, ITU data and perioperative cardiac surgery data at the ACB X Region meeting.

35 I have also been involved in a study with the Gynaecologists observing hormone profiles in women with proven ovulatory cycles that has recently been published. 24

36 I have given several case presentations. I presented a case of coexistent osteomalacia and primary hyperparathyroidism at a X Region Meeting in March XXXX where I was awarded the prize for the best Junior Case presentation. This case was also presented in poster format at both Focus XXXX and the AACC meeting XXXX. I also presented a case of Septo-optic dysplasia with multiple pituitary hormone deficiency and Type III hyperlipidaemia secondary to hypothyroidism at a X Region meeting in March XXXX. I presented this case and a further case of type III hyperlipidaemia secondary to alcoholism at the St Xxxxxx Grand Round in May XXXX. 25

37 I have given a number of seminars to a variety of audiences. I have spoken to

- GP nurses – monitoring diabetes mellitus and its associated complications
- BMS staff / trainee biochemists – methodology, case presentations
- Medical students – endocrinology rotation
- Medical students – chemical pathology modules

38 Attendance at meetings: *(Dates were given but have been removed)*

- Axis Shield Meeting – Cardiac Marker protocols and BNP
- ACB X Region Meeting – Various topics
- ACB Training Course No 1
- ACB/AACC New Approaches to Quality Control
- X Quality Assurance Liaison Group – various topics
- ACB X Region Meeting – Heart disease
- DPC Meeting – Endocrinology and Tumour Markers
- ACB X Region Meeting – Members Cases and Autoimmunity
- Annual general meeting of Clinical Pathology Accreditation
- ACB Training Course No 2
- ACB National Meeting, Focus Trainees' Day
- ACB National Meeting, Focus XXXX
- ACB X Region Meeting – various topics
- AACC Annual Meeting
- ACB X Region Meeting - CSF
- SpR Training Day – Renal disease and diabetes mellitus
- ACB X Region Meeting – Members Cases, Pituitary Disease
- ACB National Meeting, Focus XXXX
- SpR Training Day – Inborn Errors of Metabolism
- ACB X Region – Pathology Modernisation
- ACB X Region Meeting – Various topics
- SpR Training Day – Recent developments in Metabolic Medicine

Paragraph Evidence

Other experience

39 Through working in three different hospitals, I have experienced different management structures, different stages of preparation for Clinical Pathology Accreditation and three different pathology IT systems. I have attended computer training on Microsoft office. I have used computer technology to aid problem solving through use of databases, internet searches and professional mailbases. I have also made personal contacts in hospitals, the region and nationally who are a great source of personal expertise!

40 I am committed to Clinical Biochemistry as a profession. For three years, I was the Xxxxxx representative and the Xxxxxx representative to the Xxxxxxx Xxxxxxx. I am currently the Xxxxxx for the Xxxxxxx and therefore attend Xxxxxx meetings and the Xxxxxx committee at the Royal College of Pathologists.

41 I have spoken at several careers events promoting the profession to teenagers at Xxxxxxxx High School and undergraduates and postgraduates at the University of Xxxxxx, St Xxxxxx Hospital Medical School and the Life Sciences Careers Fair.

42 I developed and edit the Xxxxxx series in Xxxxxx.

Index of Portfolio Evidence

1 M Biochem certificate from University of Xxxxxx
2 M Sc Certificate from University of Xxxxxx
3 Grade A certificate from Association of Clinical Biochemists
4 DipRCPath certificate from the Royal College of Pathologists
5 Letter from Xxxxxx Xxxxxxx confirming Grade A supervision
6 Letter from Dr Xxxxxx Xxxxxxx confirming Grade A supervision
7 Letter from Dr Xxxxxx Xxxxxxx confirming Grade B supervision
8 Appraisal report – end of year 1 Grade A
9 Appraisal report – end of year 2 Grade A
10 Appraisal report – completion of Grade A training
11 Transcript of MSc academic record
12 American Journal of Clinical Nutrition *Reference, abstract*
13 International Journal of Obesity *Reference, abstract*
14 Proceedings of the ACB National Meeting *Reference, abstract*
15 Annals of Clinical Biochemistry *Reference, abstract*
16 Proceedings of the ACB National Meeting *Reference, abstract*
17 CPD Bulletin – Clinical Biochemistry *Reference, abstract*
18 Proceedings of the ACB National Meeting *Reference, abstract*
19 Proceedings of the ACB National Meeting *Reference, abstract*
20 Clinical Chemistry *Reference* and Proceedings of the ACB National Meeting *Reference, abstract*
21 Clinical Chemistry *Reference, abstract*
22 Clinical Chemistry *Reference* and Proceedings of the ACB National Meeting *Reference, abstract*
23 Clinical Chemistry *Reference*, Proceedings of the ACB National meeting *Reference, abstract* and Critical Care *Reference*
24 Journal of Assisted Reproduction and Genetics *Reference, abstract*
25 Clinical Chemistry *Reference* and Proceedings of the ACB National Meeting *Reference, abstract*