



Higher National Unit specification

General information

Unit title: Biomedical Investigations (SCQF level 8)

Unit code: H924 35

Superclass: PE

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Version: 01

Unit purpose

This Unit is designed to enable learners to understand key aspects of biomedical investigations, encompassing techniques used in medical laboratory sciences in the diagnosis of disease, interpretation of results and patient management. The Unit is suitable for learners studying at HND level, and will provide the necessary underpinning knowledge to enable progression to further study of biomedical investigations at degree level or to seek employment in science based industries.

Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Investigate the roles of medical laboratory sciences in the diagnosis of disease.
- 2 Investigate the roles of medical laboratory sciences in the management of patients.
- 3 Relate clinical results to diagnosis of disease and patient management.

Credit points and level

1 Higher National Unit credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Entry is at the discretion of the centre, however it is recommended that learners should have completed the HN Unit H92C 35 *Human Body Structure and Function* or equivalent.

Higher National Unit specification: General information (cont)

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

Higher National Unit specification: Statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Investigate the roles of medical laboratory sciences in the diagnosis of disease.

Knowledge and/or Skills

- ◆ Sample taking
- ◆ Scanning methods
- ◆ Medical laboratory techniques

Outcome 2

Investigate the roles of medical laboratory sciences in the management of patients.

Knowledge and/or Skills

- ◆ Concept of reference range
- ◆ Concept of variation
- ◆ Data handling on statistical analysis of reference range

Outcome 3

Relate clinical results to diagnosis of disease and patient management.

Knowledge and/or Skills

- ◆ Medical laboratory data
- ◆ Results relevant to patient diagnosis
- ◆ Results relevant to patient management
- ◆ Monitoring of drug therapy

Higher National Unit specification: Statement of standards (cont)

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Evidence Requirements for this Unit

Written and/or oral recorded evidence for Outcomes 1–3 should be assessed using a holistic closed-book assessment under supervised conditions. It is recommended that the assessment be completed within one hour.

Outcome 1

The assessment will cover all of the Knowledge and/or Skills items. A learner's response will be judged satisfactory where the evidence shows that the learner can:

- ◆ Describe different sample taking methods and their uses.
- ◆ Describe scanning methods and their uses.
- ◆ Describe medical laboratory techniques.

Outcome 2

The assessment will cover all of the Knowledge and/or Skills items. A learner's response will be judged satisfactory where the evidence shows that the learner can:

- ◆ Describe the concept of reference range.
- ◆ Describe the concept of variation.
- ◆ Perform a data handling exercise on statistical analysis of reference range.

Outcome 3

The assessment will cover all of the Knowledge and/or Skills items. A learner's response will be judged satisfactory where the evidence shows that the learner can:

- ◆ Evaluate medical laboratory data.
- ◆ Identify results relevant to patient diagnosis.
- ◆ Identify results relevant to patient management.
- ◆ Describe monitoring of drug therapy.



Higher National Unit Support Notes

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Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended as part of the framework for HND Applied Biological Sciences but may be suitable for inclusion in other HN Science awards. It is designed to develop the theoretical aspects of biomedical investigations introduced in the HN Unit H92C 35 *Human Body Structure and Function*, and also to examine the techniques used in medical laboratory sciences in the diagnosis of disease and the interpretation of results.

Outcome 1 — Investigate the roles of medical laboratory sciences in the diagnosis of disease

Different sample taking methods, including body fluids (blood, urine, CSF, sputum), tissue samples (biopsy, smear) and faeces and how information obtained from each type of sample can be used in the diagnosis of disease.

The key scanning methods and their uses including x-rays, CAT scan, ultrasound and magnetic resonance imaging (MRI).

Various medical laboratory techniques including analytical chemical methods, microscopic study of blood, clotting, biochemical analysis of blood, immunology testing, microbiological techniques and tissue studies.

Outcome 2 — Investigate the roles of medical laboratory sciences in the management of patients

The term reference range, and the relevance of a reference range in interpreting a clinical laboratory test, eg RBC count, blood gases, mineral levels, blood sugar, hormone levels, enzyme function, liver function, renal function.

The concept of variation within and between individuals (biological), within and between laboratories (analytical) and quality control.

Data handling exercises on statistical analysis of reference range, eg statistical exercises on blood glucose results.

Higher National Unit Support Notes(cont)

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Outcome 3 — Relate clinical results to diagnosis of disease and patient management

Medical laboratory data such as hormone imbalances, enzyme disturbances, poisonous agents, infection, tumour growth, immunity status and tissue typing and relating the data to patient diagnosis.

The use of clinical results in managing patient treatment for diseases including diabetes and thyroid disease, and in the study of antibiotic sensitivity and paracetamol poisoning.

Applications of therapeutic drug monitoring, including individual examples and their treatment uses.

Guidance on approaches to delivery of this Unit

Outcomes 1–3 would best be delivered in order.

It is envisaged that the delivery of Outcome 1 could commence with coverage of the different sampling methods, scanning methods and medical laboratory techniques. Practical experiments, for example, examining slides of RBC in different types of anaemia, tissue sections and microorganisms could be included as appropriate. Physiological measurement of lung or circulatory function and ELISA could also be incorporated.

In Outcome 2, reference range and its relevance in interpreting clinical laboratory tests are explored. The concept of variation within and between individuals (biological) and between laboratories (analytical) and quality control should be covered. Data handling exercises on statistical analysis of reference range should be included, eg statistical exercises on blood glucose results.

It is envisaged that in Outcome 3, learners could build on the underlying theory covered in Outcomes 1 and 2 to evaluate medical laboratory data and relate it to patient diagnosis. Patient treatments and application of therapeutic drug monitoring should also be covered. Contextualised case studies with associated questions could play a part in this Outcome.

Laboratory experiments and data handling/case study exercises should be carried out at appropriate times during each Outcome. Examples of these could include examining slides of RBC in different types of anaemia, physiological measurement of lung or circulatory function, ELISA and statistical exercises on blood glucose results.

Where possible, Outcomes 1 and 2 lend themselves to visiting a NHS hospital biomedical laboratory.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Outcomes 1–3 could be assessed by a single holistic closed-book assessment with an appropriate cut-off score. Assessment should be carried out in supervised conditions, and it is recommended that the assessment be completed within 60 minutes.

Higher National Unit Support Notes(cont)

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An exemplar instrument of assessment with marking guidelines has been produced to indicate the national standard of achievement for SCQF level 8.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

The delivery and assessment of this Unit will provide learners with the opportunity to develop the Core Skills of *Communication*, *Numeracy* and *Problem Solving* at SCQF level 6.

Communication — Written Communication (Reading) at SCQF level 6

Learners will be required to evaluate medical laboratory data, relate the data to patient diagnosis and discuss management of patient disease. This will require preparation of well-structured written communication on complex topics.

Numeracy — Using Number at SCQF level 6

Learners will be required to carry out and solve sustained and complex calculations, eg performing calculations relating to standard deviation and coefficient of variation.

Problem Solving — Critical Thinking at SCQF level 6

Learners will be required to use critical thinking skills in evaluating medical laboratory data, patient diagnosis and management. Learners will also be required to reach sound conclusions on the basis of data analysis.

Sustainability

Sustainability can be embedded in delivery of the Unit in a variety of ways. For example, by encouraging minimum usage of paper based materials by providing materials on virtual learning environment (VLE), correct disposal procedures and possibly recycling during practical experiments.

History of changes to Unit

Version	Description of change	Date

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General information for learners

Unit title: Biomedical Investigations (SCQF level 8)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This is a 1 credit Unit at SCQF level 8, which you are likely to be studying as part of the second year of an HND science programme. Before progressing to this Unit it would be beneficial to have completed the HN Unit H92C 35 *Human Body Structure and Function*. The Unit is designed to enable you to understand key aspects of biomedical investigations, including techniques used in medical laboratory sciences in the diagnosis of disease, interpretation of results and patient management.

On completion of the Unit you should be able to:

- 1 Investigate the roles of medical laboratory sciences in the diagnosis of disease.
- 2 Investigate the roles of medical laboratory sciences in the management of patients.
- 3 Relate clinical results to diagnosis of disease and patient management.

Outcome 1

In this Outcome you will investigate different sample taking methods, including body fluids (blood, urine, CSF, sputum), tissue samples (biopsy, smear) and faeces, and you will learn how the information obtained from these samples can be used in the diagnosis of disease.

You will also cover key scanning methods and their uses including x-rays, CAT scan, ultrasound and magnetic resonance imaging (MRI).

In addition, you will gain an understanding of various medical laboratory techniques including microscopic study of blood, clotting, biochemical analysis of blood, immunology testing, microbiological techniques and tissue studies.

Outcome 2

In this Outcome you will consider the term reference range and explore its relevance in interpreting a clinical laboratory test, eg RBC count, blood gases, mineral levels, blood sugar, hormone levels, enzyme function, liver function and renal function.

You will also gain an understanding of the concept of variation within and between individuals (biological) and between laboratories (analytical) and quality control.

In addition, you will undertake data handling exercises on statistical analysis of reference range.

Outcome 3

In this Outcome you will relate clinical results to diagnosis of disease.

You will also investigate the use of clinical results in managing patient treatment for diseases including diabetes and thyroid disease and in the study of antibiotic sensitivity and paracetamol poisoning.

General information for learners (cont)

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In addition, applications of therapeutic drug monitoring will be covered, including individual examples and their treatment uses.

Assessment

For Outcomes 1–3 you will take a closed-book, end of Unit assessment.

Core Skills

Although there is no automatic certification of Core Skills in the Unit, you will have opportunities to develop the Core Skills of *Communication*, *Numeracy* and *Problem Solving* at SCQF level 6.