T-LEVELS | Institute for Apprenticeships & Technical Education

T Level Technical Qualification in Healthcare Science

Occupational specialism assessment (OSA)

Assisting with Healthcare Science

Assignment 4 - Pass

Guide standard exemplification materials

v1.1: Specimen assessment materials
September 2021
603/7083/X

Internal reference: HCSci-GSEM-08

NCFE CACHE

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Contents

Introduction

The material within this document relates to the Assisting with Healthcare Science occupational specialism sample assessment. These exemplification materials are designed to give providers and students an indication of what would be expected for the lowest level of attainment required to achieve a pass or distinction grade.

The examiner commentary is provided to detail the judgements examiners will undertake when examining the student work. This is not intended to replace the information within the qualification specification and providers must refer to this for the content.

In assignment 4, the student must carry out sample analysis.

After each live assessment series, authentic student evidence will be published with examiner commentary across the range of achievement.

Extended written task 1: maintenance of complex medical equipment

Scenario

You are working as a healthcare scientist assistant in the medical physics and clinical engineering department.

You are asked to assist a healthcare scientist in the radiology department, checking an x-ray system maintenance schedule within a restricted clinical area. You are aware that x-ray machine maintenance is performed by an external engineering contractor and its maintenance is not within your remit. Your team are responsible for daily routine checks. Teams must comply with Ionising Radiation Regulations 2017 and Ionising Radiation (Medical Exposures) Regulations 2018 in relation to use, maintenance and servicing of equipment.

Task

Discuss the importance of adhering to an x-ray machine maintenance schedule with reference to the existing regulations detailed in the scenario. You should consider how medical x-rays operate when being used on patients, and the risks associated with clinical staff working within this environment when maintenance schedules are not maintained.

Give some examples of how regular maintenance of complex medical equipment limits the risks associated with x-ray equipment. Consider the levels of maintenance performed by different teams and the purpose of specific regulations as discussed in the scenario and how they support healthcare professionals in using and managing specialist x-ray equipment.

(20 marks)

Record your response here:

Exposure to electromagnetic rays such as x-rays can result in several side effects which can affect patients and staff, ranging from vomiting, hair loss, radiation burns and cancer. It is therefore important to follow x-ray system maintenance schedules to ensure machines perform to their optimum capacity and any deterioration in parts are detected and reported as soon as possible. One of the aims of the Ionising Radiation Regulations is to keep exposure to ionising radiations in the workplace to as low a level as possible to protect patients and staff. By setting up and following x-ray machine maintenance schedules, the exposure of patients and staff to ionising radiation is kept within the safety limits which can be easily monitored.

By regularly maintaining an x-ray system the life of the system can be extended, serious faults can be prevented, minimising the risk of over-exposure to x-ray ionisation to patients and staff.

X-ray departments are required to comply with the Ionising Radiation Regulations by implementing a quality assurance system which includes carrying out regular quality checks on the x-ray systems, including preventative maintenance and performance checks. Performance checks are carried out by the trained x-ray department staff at regular intervals, (for example, daily performance checks). Performance checks include specific tests and the use of phantoms. Results are recorded and compared to the tolerances.

Preventative maintenance is generally performed once a year by an externally provided qualified engineer. Preventative maintenance includes cleaning, mechanical and electrical testing of the hardware and IT updates. The engineer also confirms that the equipment is fixed securely in place and tests the machine for electrical safety.

Extended written task 2: testing equipment calibration

Scenario

As part of a quality assurance and audit within a laboratory, you are asked to assist a healthcare scientist in testing calibration of automatic pipettes using a balance and the density of water.

- if the accuracy value lies in the 99 to 101% range, the pipette is considered normal and calibrated – calculating accuracy is done by using the formula A = 100 x V_{avg}/V_0, where A is the accuracy of the pipette, V_{avg} is the average calculated volume, and V_0 is the theoretical volume you tried to dispense
- you have performed the required steps of pipette calibration for a volume of 10µL of water at a temperature of 23°C (item A)
- the formula for calculating the volume dispensed by the pipette is V = w * Z, where w is the weight of the water, Z is the conversion factor based on the density of the water, and V is the calculated volume of how much water was dispensed (item B)

Task

Using the formulas provided as well as the information in item A and item B from the insert provided, calculate the accuracy of the pipette and recommend if the device is in calibration or not. You should also explain the difference between accuracy and precision.

Discuss how audits contribute to the accreditation process and consider why this is important for clinical areas, patients, quality and safety.

(20 marks)

Record your response here:

Formula for checking the pipette is calibrated was taken from the scenario, using item B to determine Z and item A to calculate average weight w

V_{avg}= w * Z = 9.984mg * 1.0035µL/mg = 10.019 µL.
A= 100 x V_{avg}/V_0 = 100 x 10.019/10 = 100 x 1.0019 = 100.19%.
Accuracy should be between 99-101%; this pipette is properly calibrated.

Accuracy is how close a measurement is to its agreed value.

Precision is how close two or more measurements are to each other, regardless of whether those measurements are accurate or not. It is important to note that precision measurements may not be accurate.

Audits performed by laboratories themselves are called internal audits. Audits conducted by organisations from outside the laboratories are called external audits. Audits can be performed as part of an accreditation process which demonstrates that quality standards from regulatory bodies such as ISO have been met by businesses offering services to customers including health. Carrying out audit processes across all aspects of a department/organisation ensures that the quality of the services being offered/delivered remains at its highest and safest level for patients and service users maximising clinical efficiency.

The accreditation quality standards can be linked to customer/patient requirements or clinical needs, regulatory requirements, or to improve business outcomes and are specific to a business sector, such as the pathology laboratory. To help in meeting the standards and gaining accreditation the pathology department uses a quality management system (QMS). Within the quality standards there are management and technical requirements which

must be met, such as staff education and training, writing standard operating procedures (SOPs), processing samples, reporting results, monitoring incidents, and improving services. To check that departmental QMSs are working and standards are being met, the department internally checks through the annual internal audit of the management and technical requirements. The previous year's audit results are used to compare results and note any improvements to service/performance. Audit results are recorded within the department and wider within the organisation, to meet the organisation's own QMS requirements, such as Care Quality Commission (CQC). Periodically, the regulator will visit the department to carry out an external audit to confirm that it is meeting the accreditation standards.

Extended written task 3: escalation of issues related to equipment

Scenario

You are asked to perform a functional check on some devices stocked in the medical equipment library. You have found that one of the tympanic thermometers is showing an error message after turning it on and its audible alarm is very quiet. You have spoken to the user who has confirmed the device has not been dropped. The user has stated that there are no spare devices in their clinical area and this item is needed for the next clinic. You decided to replace the batteries but that has not resolved the issue. You have not been trained to conduct any further checks on a fault such as this one.

Task

Describe how to perform a basic (daily) functional check on a tympanic thermometer and discuss the actions you should take to address this situation.

(20 marks)

Record your response here:

A tympanic thermometer is an electronic thermometer which uses the ear canal for fast, accurate and convenient measurement of a patient temperature. It is a handheld device and requires daily visual and functional checks prior to patient use.

Visual checks include checking that the device had been cleaned after it was last used, ear tips are removed and any ear wax is wiped away with mild detergent and the device is wiped dry with a dry swab. The device casing would be inspected for any signs of damage including cracks/fractures which can occur if the device is dropped. Any damage must be recorded against the device's records in the medical equipment library. In the scenario our user confirmed that the device had not been dropped.

Functional checks are performed by the device when you turn the device on. The device automatically runs through a series of internal tests to confirm that the device is working correctly and is calibrated. During the functional checks an error message has been noted and the error audible alarm is very quiet. The device is not indicating a low battery, but as a precaution the battery is changed, and the functional checks are repeated. The error message still appears with the quiet audible alarm.

The error fault code is not listed on the trouble shooter guide which indicates to me that I have reached my limits of practice and need to seek help to determine what is wrong with the device. I record all my actions in the device's records in the medical equipment library, checking the asset equipment numbers are correct and submit an equipment repair request, providing all the necessary details and location of the device in the equipment library. I contact the user of the device to update them of the action taken and log this communication in the records.

During my contact with the user, they inform me there is a service need for this device which I verbally communicate with my line manager and record in both the devices' records and the equipment fault request highlighting for fast tracking.

Extended written task 4: research and innovation

Scenario

You are working as a healthcare science assistant in a respiratory clinic. You have been given an opportunity to contribute to a diagnostic research and innovation project led by your department.

The study will examine if 30 minutes of light intensity physical activity (for example, fast paced walk) performed 2 hours before sleep has a positive effect on the sleep quality of the patients with sleep apnoea (a type of a sleep disorder). Only adults with a mild condition will be included in the study. Sleep quality will be assessed in an overnight study (using a finger probe pulse oximeter). The study will be carried out over a period of 8 weeks.

Research lead must prepare the study participant information sheet and consent form for the Health Research Authority approval showing that the study proposal is safe, legal and ethical. You have been asked to contribute to the participant information leaflet.

Task

Discuss the information that should be included in the document, considering the following:

- study information
- patient involvement
- possible effects for patients
- additional supporting information
- information about consent and participation
- information about use of patient data
- accessibility requirements

(20 marks)

Record your response here:

The document should cover all the key information and ensure it is clear for the patient who is taking part. I have put an example of what the document should look like below.

Study information:

Examination of effects of light physical activity before sleep on the quality of sleep in the patients with sleep apnoea. We would like to invite you to a study assessing if light physical activity, (for example, 30 minutes of fast paced walk performed 2 hours before sleep) has a positive effect on the sleep quality of patients with sleep apnoea (which is a sleep disorder).

Patient information:

Only adults with a mild condition will be included in the study. Sleep quality will be assessed in an overnight study, using a finger probe pulse oximeter. The study will be carried out over a period of 8 weeks.

We cannot promise any benefits of the study.

Possible effects for patients:

This is a safe study, however, not all potential risks can be eliminated.

Information on consent and participation:

It is up to you whether you decide to take part in this clinical trial. You can choose not to take part or change your mind or withdraw from the clinical trial at any time.

If you have any questions or would like to request help regarding your participation in the study, you can find contact details on the bottom of this leaflet.

Information about use of patient data:

Confidentiality of your personal information will be protected by anonymisation of your results.

I give permission for the research team to have access to my records.

I agree to take part in the above study.

Name of participant: Date: Signature:

Accessibility requirements:

This leaflet is available in other languages to aid understanding.

A patient information leaflet should provide potential study participants with enough information to allow them to make a fully informed decision about taking part in a study and provide their “informed consent”. A well designed and written leaflet can help research teams recruit more participants and retain them in the study.

The information about the study should be relevant but concise. Therefore, I wrote a summary of the study that is an invitation to participate, and I used layman’s terms and plain, everyday language for clarity. I avoided using technical terms but where that was necessary, I provided a definition that the participants can easily understand. The font size I used is big enough to be easily readable. I was avoiding using any words that may come across as forceful, patronising or persuasive. I made sure to inform the participants that their participation in this study is voluntary. I included an overview of the study methodology so that participants know exactly what they will be asked. I made sure to include information about confidentiality and that the research team would like to use some of the participants anonymised data, since without their permission it will not be possible to use patients’ results for the study evaluation and potential publishing of the study findings.

Examiner commentary

Task 1

Generally, the student gave a correct explanation with limited discussion of the importance of equipment maintenance. They provided some examples showing general and limited understanding of the principles of operation and maintenance of medical equipment at different time intervals. They referred to related legislations with a limited amount of detail showing basic understanding of its content and purpose. They considered risks associated with x-ray medical systems at basic level with one example.

Task 2

The student was able to use provided formulas and correctly calculate accuracy of the pipette. They provided a correct answer to the question in the task. However, the presentation of the method and the order of calculations was limited and did not clearly show the student's thinking process. They provided a succinct definition of accuracy and precision which was correct. Relevant discussion of audit, the process, application and its importance with appropriate examples, clearly demonstrated the student's good level of understanding of this working activity.

Task 3

The student shows a good basic understanding of thermometer set up, use and infection control. Response is matter of fact demonstrating student's awareness of issues and how they could be best addressed.

They correctly escalated the situation with correct rationale. The presented consideration of information that should be communicated when reporting an issue/emergency but did not expand on why this information was required showing limited understanding of risks to patients and service in the given scenario. Their discussion showed limited understanding of the procedures carried out in the medical equipment library and their associated links to equipment repair reporting.

Task 4

The student presented information in a clear format of an information leaflet, including a title on the study, and addressed the majority of the bullet points listed in the task, which demonstrated the student's familiarity with the Health Research Authority approval process. However, they provided only very generic information covering each aspect of the study. The student provided an explanatory paragraph of additional information on leaflet layout, font size, language choice which clearly demonstrated thought and understanding of patient/users' needs in the publication of such leaflets.

Overall grade descriptors

The performance outcomes form the basis of the overall grading descriptors for pass and distinction grades.

These grading descriptors have been developed to reflect the appropriate level of demand for students of other level 3 qualifications, the threshold competence requirements of the role and have been validated with employers within the sector to describe achievement appropriate to the role.

Occupational specialism overall grade descriptors:

Assisting with Healthcare Science occupational specialism grade descriptors.

Grade

Demonstration of attainment.

Pass

The student demonstrates good knowledge and understanding of the topics and the healthcare context in which it lies.

The student demonstrates professional practice whilst carrying out tasks/activities showing respect to safety, care and confidentiality for patients, colleagues and oneself.

The student has an appreciation of action to be taken when errors occur.

The student demonstrates a good understanding of their own development with some learning through reflective practice.

The student may not always connect learning to work in practice.

Distinction

The student demonstrates excellent knowledge and understanding of the topics and appreciation of the healthcare context in which it lies.

The student demonstrates excellent understanding of professional practice whilst carrying out tasks/activities applying them in the healthcare context.

The student shows respect for safety, care and confidentiality for patients, colleagues and oneself.

The student fully acknowledges when errors occur and the reporting process.

The student demonstrates a good insight to their own development, demonstrating significant learning through reflective practice.

The student draws on reflective practice and relates their development and learning to work in practice.

Document information

The T Level Technical Qualification is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.

Owner: Head of Assessment Design

Change History Record

Version	Description of change	Approval	Date of Issue
v1.0	Published final version.		June 2021
v1.1	NCFE rebrand		September 2021