School of Applied Sciences

Assessment Instrument Coversheet

Module Code: LSC103
Module Title: Principles of Biomedical Sciences
Unit of Assessment: 3
Learning Outcomes Assessed 1,2 (In addition, see module descriptor)
Lecturer / Assessor: Anne Savage
Latest Submission: Monday 7th December 2020 **23:59**
Latest Feedback: Monday 4th January 2020 **23:59**
Feedback Type: Verbal formative feedback in class and written summative feedback via MyLearningSpace
Grading Criteria Refer to Page 2

Submission Requirements:
This is a copy of the on-line workbooks (MyLS quizzes). Your assignment should be submitted by completing and submitting the quizzes on-line via MyLS. This copy is for information, rough working and ease of access off-line
Your assessment must be submitted via MyLearningSpace. **There will be two links for each workbook. One link is for the workbook/quiz and the other is, for the MS Excel workbook which should contain all your calculations.** The maximum file size which can be submitted is 20MB so you may need to reduce the size of any image files within your document.
If you have any problems with submitting your work on the MyLearningSpace, please contact the Support Enquiry Zone on 01382 308833 or sez@abertay.ac.uk
Submission of your work after the submission date deadline will be deemed as late submission and will incur penalty, including the possibility of the work being awarded a non-submission (NS) grade.

Unit Grading Criteria

Literal grade	Grade point	Evaluative descriptor
A+	4.5	Excellent overall. • Demonstrates an excellent grasp of the subject matter and methods. • Excellent effort to use appropriate resources and format the references. • Excellent understanding of the purpose of the calculations. • Excellent ability to compute and interpret answers • Excellent written communication skills. • MS Excel spreadsheet complete and correct for requested calculations.
A	4	Excellent overall. • Excellent understanding of the purpose of the calculations. • Excellent effort to use appropriate resources and format the references. • Excellent ability to compute and interpret answers • Excellent written communication skills. • MS Excel spreadsheet complete and correct for requested calculations. • One or two minor errors but overall the candidate has demonstrated an excellent grasp of the subject matter and methods
B+	3.5	Very good overall. • Very good understanding of the purpose of the calculations. • Very good effort to use appropriate resources and format the references. • Very good ability to compute and interpret answers • Very good written communication skills. • MS Excel spreadsheet complete and correct for requested calculations. Some minor errors and/or misunderstandings but overall the candidate has demonstrated a very good grasp of the subject matter and methods

B	3	Very good overall. • Very good understanding of the purpose of the calculations. • Very good effort to use appropriate resources and format the references. • Very good ability to compute and interpret answers • Very good written communication skills. • MS Excel spreadsheet complete and correct for requested calculations. • Some minor errors and/or misunderstandings but overall the candidate has demonstrated a very good grasp of the subject matter and methods. • There may be one or two omissions or areas that lack clarity.
C+	2.5	Good overall. • Good understanding of the purpose of the calculations. • Good effort to use appropriate resources and format the references. • Good ability to compute and interpret answers • Good written communication skills. • MS Excel spreadsheet mostly complete and correct for requested calculations. • Minor errors and/or misunderstandings but overall the candidate has demonstrated a good grasp of the subject matter and methods but there may be some omissions or areas that lack clarity.
C	2	Good overall. • Good understanding of the purpose of the calculations. • Good effort to use appropriate resources and format the references. • Good ability to compute and interpret answers • Good written communication skills. • MS Excel spreadsheet mostly complete and correct for requested calculations. • Minor errors and/or misunderstandings in some sections but overall the candidate has demonstrated a good grasp of most of the subject matter and methods but there may be some areas of weakness, omissions or areas that lack clarity.

D+	1.5	Satisfactory overall. • Satisfactory understanding of the purpose of the calculations. • Satisfactory ability to compute and interpret answers but there may be omissions or areas that lack clarity • Satisfactory effort to use appropriate resources and format the references. • Satisfactory written communication skills. • MS Excel spreadsheet mostly complete and correct for requested calculations but there may be some omissions or weaknesses.. • Minor errors and/or misunderstandings throughout but overall the candidate has demonstrated a satisfactory grasp of most of the subject matter and methods but there may be some areas of weakness, omissions or areas that lack clarity.
D	1	Adequate. Achievement of all threshold standards but grasp of some subject areas and graduate attribute development may be more limited.
MF	0.5	Marginal fail. Performance just below the threshold standard. A reasonable expectation that a pass is achievable by reassessment without the need to repeat the module.
F	0	Performance well below the threshold level. Some limited evidence of achievement of the outcomes.
NS		No assessments submitted.

Weightings

Workbook 1	25% of Module	Anne Savage
Workbook 2	25% of Module	Anne Savage
Workbook 3a & 3b	25% of Module	Anne Savage
Workbook 4	25% of Module	Kevin Smith

Weightings for individual parts within each workbook are shown in parenthesis after each question.

Please Read Carefully.

Unit 3 comprises Workbooks 3a and 3b. Together these two Workbooks are worth 25% of the module and should be submitted on the same date

Basic Instructions

Read the narrative and answer the questions by typing in the boxes. This word document can be used for a rough draft of your answers but when you are ready to submit your assessment, please copy all your answers into the online electronic version of Workbook 3b which is in the same folder on MyLS as this document. Some questions require just a number e.g. a numerical answer to a calculation, but other questions require a sentence or paragraph.

Supporting Material

Supporting material is available in the form of recorded lectures and PDFs/PowerPoints of the lectures. Topics will be discussed during class meetings so **please take notes** during these meetings.
For Case Study 4 (workbook 3b) on-line resources and textbooks **are required** to answer some of the questions. **Please read the section 'Written Answers' very carefully**.

What am I assessing in workbook 3b?

For this part of the assessment, I need to see that you

- Can select **appropriate** internet and literature sources to research a topic.
- Understand the terms disease cluster, outbreak and epidemic.
- Understand the steps taken by the investigator in the study to pin-point the source of a disease outbreak.
- Understand the difference between person to person transmission of a disease and a point source outbreak.
- Understand the value of data in a disease outbreak and how the data can be visualised in epidemic curves.
- Calculate and compare food-specific attack rates to identify possible vehicles;
- Have basic MS Excel skills e.g. data entry and calculations. All calculations should be carried out using MS Excel calculations and functions and your spreadsheet should be submitted at the same time as your workbook.

Written answers

A key outcome of a statistical analysis is turning numbers or data into a clear narrative. Written answers in Case Study 4 test specific interpretive, analytical and written communication skills.

- Have you understood and answered the question?
- Use the internet and literature for research when directed to do so but make sure that you can you filter out unnecessary and repetitive information. For all other questions, you are more likely to include unnecessary information if you by-pass the lecture notes and class activities and go straight to Google to search for answers. You will not find the answers to many of these questions on the internet moreover, you may encounter information on-line that is related but not appropriate for your level of study and this invariably leads to confusion.

(Remember **P**oint, **E**vidence, **E**valuate)

- Can you use numerical information and results to answer clinical questions? (make your **P**oint concisely)
- Can you identify and present relevant numerical evidence to support your point? (present **E**vidence to support your point)
- Can you identify unanswered questions in the case studies and suggest further areas of research or improvement? (**E**valuate the study)

MS Excel Calculations

All calculations should be carried out in MS Excel using appropriate cell referencing. All worksheets for a Case Study workbook should be contained within one MS Excel workbook. The MS Excel should be uploaded via MyLearningSpace as part of the assessment for this Unit. Please refer to the grade criteria for more information on how the MS Excel document contributes to the final grade.

General considerations:

If you have or suspect that you may have difficulty with any of the following, please contact student services who can offer specialist advice. During the BMS programme, you will produce numerous documents so, if required, please seek help as soon as possible so that you can concentrate on the course content without worrying about your writing skills.

- Can you write in sentences?
- Are you confident in your numerical skills?
- Are you confident at spelling, grammar and using punctuation?
- Can you write concisely i.e. answer the question without excess or repetitive information. Most written questions have a word limit.

N.B. In this exercise, marks are not deducted for poor spelling, punctuation and grammar if the answer is understandable. Marks will be reduced if the answer is not understandable and the marker cannot ascertain if the learning objective of the question has been addressed

Workbook 3b, Case Study 4: An outbreak of Gastrointestinal illness in Oswego

Background

A sudden increase in the number of cases of acute gastrointestinal illness was reported in a rural community. All persons suffering from the illness had attended a meal at a local church on the previous evening and family members who were not present at the meal did not become ill. Eighty people attended the meal and 75 and 46 persons of these reported gastrointestinal illness. Information was relating to the occurrence and time of onset of symptoms, and foods eaten at the meal. The onset of the illness was acute and symptoms developed included nausea, vomiting, diarrhoea, and abdominal pain. None of the ill persons reported had an elevated temperature and all recovered within 24 to 30 hours. Only 20% of the ill persons visited physicians but no faecal specimens were obtained for bacteriologic examination.

Exercise 1:

You will need to use reliable epidemiological websites to answer these questions. Please see the guidance notes on suitable websites.

Part 1:

Was this incident an epidemic, an outbreak or a cluster? Briefly justify your answer. **(5% Max 50 words)**

It was an outbreak. Outbreak refers to an increase of cases in a disease above what is usually anticipated in a limited geographic area. This incident happened in a rural community, a limited geographic area, and it was an increase in the number of cases of acute gastrointestinal illness.

Part 2:
What is the difference between a chronic and an acute illness? **(5% Max 30 words)**
A chronic illness is a disease continuing for a long period of time. On the other hand, an acute illness is a disease suffered in a short period of time.

Part 3:

There are three broad categories of diseases that should be considered in the differential diagnosis of an outbreak of gastrointestinal illness;

(1) infectious (bacterial, viral, parasitic)

(2) toxic / environmental and

(3) sociogenic.

Define each type and give an example. **(15% Max 90 words)**

Infectious diseases are caused by microscopic germs and organisms that live in the environment such as bacteria (tetanus), viruses (ebola) or parasites (malaria).

When people are exposed for a long period of time to toxic environments, usually triggered by chemicals, environmental diseases can come up. Chemicals in cigarettes can caused lung cancer.

Sociogenic diseases are socially produced. It only affects a part of the society. This could be caused by poverty or crime. Schizophrenia can be an example of a result of stressful social conditions.

Part 4:

Diseases can be transmitted by vectors or vehicles, what's the difference and provide an example of each type. **(10% max 70 words)**

Animals carrying and transmitting diseases to other people are known as biological vectors. Mechanical vectors are animals who transmit pathogens but without infecting themselves. Mosquitoes can transmit malaria.

Vehicle transmission refers to the conduction of pathogens through elements like air, drugs, water or food. Aerosols can flote in the air carrying pathogens facilitating the transmission of the disease. Contaminated water is a big problem in many regions throughout the world.

Exercise 2:

Part 1:

The meal in the church hall was a community affair with residents each bringing a dish of their choice along and arranging the food on open tables for the participants to help themselves. during the course of the evening. The meal started at 7pm and the tables cleared at 11pm.

List all the potential food hygiene issues that you can see in the last paragraph. **(5% max 40 words)**

Hygiene issues like tasting the food with the different forks, not having their hands clean or putting the aliments in a dirty surface. The food is exposed to all types of animals who can carry diseases on the open tables.

Part 2:

A health inspector visits the village and questions all participants who attended the meal about what food they had eaten. She collates the data in the spreadsheet.

Open the MS Excel workbook 'Case Study 4 Oswego.xls' which can be found in the same folder as this quiz on MyLS to view the data.
Using **MS Excel formulae and autofilling,** calculate the attack rate ratio for each item. (See Lecture 8_Attack Rate for details of the attack rate ratio calculation). Save the workbook and rename it with your name or ID.

You must submit the workbook for assessment. Full marks will not be awarded for correct answers if the workbook is not submitted or MS Excel formulae are not used.

Which food item do you think is the most likely source of contamination and why? **(15% max 20 words)**

The vanilla ice cream has the highest attack rate ratio (5.57), which shows the source of the food poisoning outbreak.

Part 3:

The health inspector wanted to know whether the suspect product was home-made or a commercial product. Why do you think it was important? **(5% max 30 words)**

If it was an error of a commercial product, this disease could affect all the other people who has bought the same aliment and can cause deaths.

Part 4:

The health inspector also gathers information relating to the time of onset of the illness. The data are shown in sheet 2 of '*Case Study 4 Oswego.xls*' which you downloaded for Exercise 2: Part 2. Plot the data as a histogram. The x-axis should display time since first case and the y-axis should show the number of people who became ill during this period. When you have finished, submit your workbook for assessment and click 'True' to indicate that the task is complete. **(10%)**

- **Label you axes**
- **Remember the units for time**
- **Include an informative title for the histogram.**

MS Excel Worksheet complete and uploaded?
(Enter T or F)

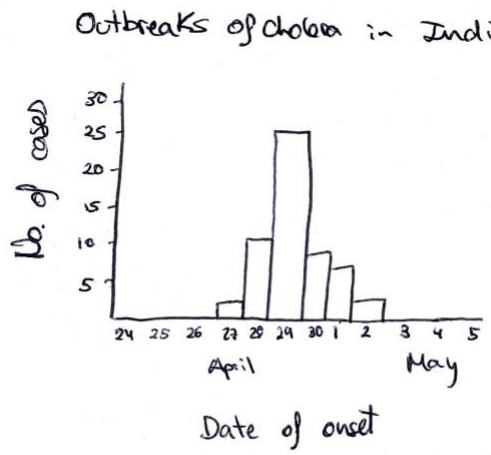
Exercise 3:

Part 1:

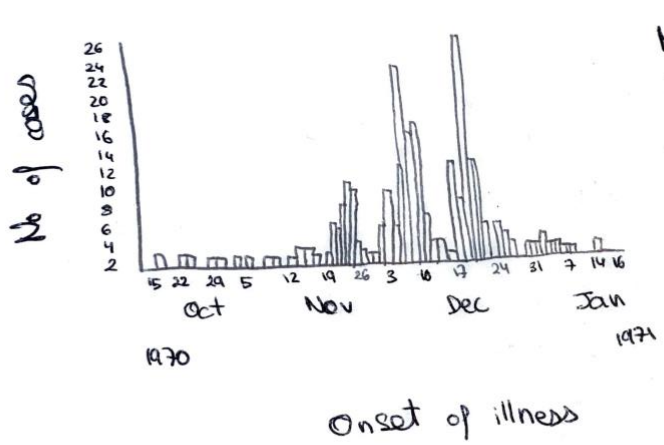
Using a reliable website, research
1. What a point-source epi-curve should look like and draw a sketch.
2. What a person to person transmission epicurve should look like and draw a sketch).

Your sketch should be hand drawn and not cut and pasted from a website. You may refer to on-line information but you must draw the diagrams yourself and include:

- Axes labels and units e.g. days, weeks
- Title
- Important features that identify a curve as a point source or person-to-person curve.
- For the person-to-person curve, what is the period of time between each peak called? Label this time period.
- Include reference(s) for your information using the correct format (consult library services for advice) (**20%)**



Rita Mukherjee, Debasish Halder, Rudra Shyamali (2011) Five food-carried Outbreaks of cholera in villages of west bengal, India: Evidence for focused interventions. (outbreak no. 2)



Measles Cases by date of onset in Aberdeen, South Dakota, October 15, 1970 - January 16, 1971

When you have finished your sketches, photograph them and in the electronic version of the workbook, click on the camera icon to upload them into the box. Resize before uploading if required**.**

Part 2:

Compare the description of the outbreak and the histogram you drew of the outbreak data with the epicurves. Do you think this outbreak was a point source or person to person transmission? Explain your answer clearly by referring to specific features of the curves **(10%) (max 50 words)**

This outbreak was a point source. People were exposed to the same contaminated meal for a short period of time. The number of cases raised quickly to a peak (15-16 cases) and fell gradually.

References:

(1) Gross MB. Oswego County revisited. *Public Health Reports* 1976;91:160-70.

Further Reading:

(1) The Open University (2007) M249 Practical Modern Statistics Book 1 'Medical Statistics' ISBN 978 0 74921366 4

Exercises have been adapted from:

Centers for Disease Control and Prevention (Epidemic Intelligence Service) 2016
http://www.cdc.gov/eis/casestudies.html