

Technical Test Instructions

M&E Advisor HQ

Read all the instructions before starting

Introduction

The objective of this technical test is to ascertain your spreadsheet skills for data analysis. You will be working on the results of a nutrition survey.

Survey Context

The survey took place in rural communities. The surveyors randomly selected houses and surveyed the mothers and the children present in the house at the time. The surveyors were sometimes accompanied by a supervisor that had to double check some of the measurements made by the surveyor.

The output of this survey is a couple datasets:

- Children: data about the children that were surveyed
- Mothers: data about the mothers of the children that were surveyed

One of the key measurements that is used to assess malnutrition is called [Mid-Upper Arm Circumference](#) (MUAC). It is generally accepted that a child with a MUAC ≥ 125 mm is healthy, while a child with a MUAC < 115 mm is malnourished.

Test

The test aims at assessing your data analysis skills with the use of Excel / Google Sheets. In order to elegantly and efficiently solve the exercises you will need to know how to use pivot tables.

Feel free to add as many columns to the dataset as you need. We advise you to keep some time to cover the Open Question (Question #22) since it allows you to demonstrate your analytical skills.

You will be evaluated based on the following criteria:

- The correctness of your answers - Do you have the right answer, regardless of the approach you took to get there.

- Your approach - The approach you took to achieve your answer, i.e. the level of automation (the higher the better), the ingenuity, the complexity and the clarity of your approach.
- The formatting of the spreadsheets - How readable are your answers (tables and charts).

You should work on the Excel / Google Sheet file directly and submit back the completed file.

Data Dictionary

The following tables provide a detailed data dictionary for each dataset, allowing you to understand the data that you will have to analyze.

Children

Variable	Description
id	Unique identifier for a child
date_survey	Date of the survey
district	Unique identifier of the district where the child lives
age	Age of the child in months at the date of the survey
sex	Sex of the child <ul style="list-style-type: none"> • 1 => Male • 2 => Female • --- => No answer
vaccination_card_present	Does the child have a vaccination card? <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer <p>If the answer is “no”, no answer will be captured for questions “vaccination_penta” and “vaccination_measles”.</p>
vaccination_penta	Has the child received the penta vaccine? <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer

vaccination_measles	Has the child received the measles vaccine? <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer
oedemas_surveyor	Does the child have oedemas? (measure made by the surveyor) <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer
oedemas_supervisor	Does the child have oedemas? (measure made by the supervisor) <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer (no supervisor present or supervisor did not take the measure)
muac_surveyor	MUAC of the child in mm (measure made by the surveyor) <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer
muac_supervisor	MUAC of the child in mm (measure made by the supervisor) <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer (no supervisor present or supervisor did not take the measure)
mother_id	Unique identifier of the mother
surveyor_id	Unique identifier of the surveyor

Mothers

Variable	Description
id	Unique identifier for a child
date_survey	Date of the survey
age	Age of the mother in years. “---” means no answer.
muac_training	Has the mother received MUAC

	measurement training? <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer
muac_tape_present	Does the mother have a MUAC tape? <ul style="list-style-type: none"> • yes => Yes • no => No • --- => No answer
muac_tape_state	State of the MUC tape of the mother <ul style="list-style-type: none"> • good => Good condition • bad => Bad condition • --- => No answer
muac_use_frequency	How often does the mother use the MUAC? <ul style="list-style-type: none"> • never • sometimes • every_week • every_two_weeks • once_a_month • child_sick <p>Several answers are possible for this question. Answer modalities are separated by a “space/blank” character. “---” means no answer.</p>

Exercices

Child Dataset

1. Add a column (at the end of the dataset) with the date of birth of the child.
 - The data format should be the same as for the variable “date_survey”.
 - If the date of birth is not computable, display “---” instead.
2. Add a column (at the end of the dataset) with the age group of the child according to the following age ranges:
 - 0-12 months
 - 13-24 months
 - 25+ months
3. Plot the overall distribution of children according to their age group
 - Use the dedicated sheet (3. *Distribution Age Groups*) for your answer.
 - You can use this sheet to place data, if relevant

4. Plot the distribution of children by age group per day
 - Use the dedicated sheet (*4. Distribution Age Groups Per Day*) for your answer.
 - You can use this sheet to place data, if relevant
5. Add a column (at the end of the dataset) that recodes the sex of the child using the following labels:
 - "m" for males
 - "f" for females
 - "---" for unknown
6. On a single chart, plot the number of child surveyed per day and the number of mothers surveyed per day
 - Use the dedicated sheet (*6. Children + Mothers*) for your answer.
 - You can use this sheet to place data, if relevant
7. Considering that the supervisor's measurement of oedemas is considered correct, what is the proportion of children for which a correct measurement was done by a surveyor?
 - Use the dedicated sheet (*7. % Correct Oedemas*) for your answer.
 - You can use this sheet to place data, if relevant
8. What is the % of correct oedema measures for each surveyor?
 - Use the dedicated sheet (*8. Correct Oedema per Surveyor*) for your answer.
9. Considering that the supervisor's measurement of MUAC is considered correct, what is the proportion of children for which a correct measurement was done by a surveyor? A measurement is considered correct if the difference with the supervisor's measurement is ≤ 2 units of measure.
 - Use the dedicated sheet (*9. % Correct MUAC*) for your answer.
10. What is the frequency of each MUAC measurement (made by surveyors)?
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
11. What is the smallest MUAC measurement (made by surveyors)?
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
12. What is the biggest MUAC measurement (made by surveyors)?
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
13. What is the average MUAC measurement (made by surveyors)?
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
14. What is the median MUAC measurement (made by surveyors)?
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.

15. Plot the frequency of MUAC measurements (made by surveyors).
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
16. Automatically identify the most frequent MUAC measurements (local maximums).
 - Use the dedicated sheet (*10-16. MUAC Analysis*) for your answer.
17. Create a pivot table that displays, for each day of the survey, the number of children surveyed, the number of mother surveyed and the number of children with a “green” MUAC, i.e. MUAC ≥ 125
 - Use the dedicated sheet (*17. Survey Progress*) for your answer.
18. Add a column (at the end of the dataset) with the age of the mother.
19. Automatically highlight the rows for which the MUAC measured by the surveyor is < 115 .

Mother Dataset

20. Add a column that displays the number of answers (modalities) for the question “muac_use_frequency”.
21. Display the frequency of each modality.
 - Use the dedicated sheet (*21. MUAC Use Frequency*) for your answer.

Open Question

22. How would we correlate the malnutrition level of children and the training level of mothers? Explain your approach and show the resulting data (if any).
 - Use the dedicated sheet (*22. Correlations*) for your answer.