# Proposal for a Fluid Replacement Calculator for Nurses in Remote Areas using a Python Program

# The Problem the Python Program will solve

In many remote areas of Malawi, nurses are often faced with managing cases of dehydration without quick access to detailed clinical guidelines or digital tools. This can lead to inaccuracies in fluid replacement calculations, delayed treatment, and compromised patient care. WHO provides clear guidelines for fluid resuscitation, especially in pediatric patients, but these calculations are often done manually, requiring significant time and attention from already overburdened healthcare workers.

To address this, I propose to develop a Python-based desktop program that automates fluid replacement calculations using WHO parameters. The program will work offline and feature a simple, lightweight interface to support nurses in rural healthcare settings. It will calculate the correct volume of fluids required based on the patient's weight and level of dehydration and inform the healthcare provider of the duration over which the fluids should be administered.

# Possible modules to be used in this project

* 1. Tkinter – for creating the desktop user interface (UI)
  2. MySQL – for storing patient data, fluid schedules, and usage logs
  3. NumPy – for precise mathematical operations in fluid volume calculations
  4. Datetime – for calculating and displaying treatment durations
  5. Matplotlib – for optional visual display of fluid schedules or historical trends
  6. re – for validating user inputs such as patient names and numerical fields

# Dataflow

1. The user launches the application via a desktop icon and logs in.
2. The nurse enters patient details (name, weight, dehydration level, etc.) into the UI form.
3. **The system uses WHO algorithms to calculate**
   1. Fluid deficit (based on % dehydration × weight × 10)
   2. Maintenance fluid requirements
   3. Duration and recommended schedule of administration
   4. The result is displayed with clear instructions (e.g., “Administer 1500ml over 4 hours”).
   5. The nurse can save the session in a local MySQL database for future reference.
   6. The program can optionally plot a time and volume schedule using Matplotlib.

# Input and Output

* 1. **Input:** Patient name, age, weight (kg), level of dehydration (mild/moderate/severe)
  2. **Output:** Total fluid volume required (in mL), Duration over which to administer the fluid, Suggested hourly rate (mL/hour), Stored records in the database, and Optional time-volume graph.