Assessing Effects of Folic Acid Flour Fortification on Neural Tube Defect Incidence in Cameroon: Protocol Development For Data Collection in a Low-Resource Setting

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**BACKGROUND**

- Studies in high-income countries, like the US, have reported significantly lower incidence of neural tube defects (NTD) following folic acid fortification of staple foods.
- In 2008, the incidence of NTD in Cameroon was found to be 1.99 per 1000 live births, 4 times the rate in the US\(^1\).
- In 2011, a wheat flour folic acid fortification program was implemented in Cameroon.
- A regional micronutrient survey revealed significant increases in plasma folate concentrations in women of reproductive age one year after fortification\(^1\).
- The plasma folate results suggest that the fortification program has been successful, but the impact on NTD incidence has not been studied.

**OBJECTIVES**

- Main Objective: To assess the incidence of neural tube defects in urban hospitals in Cameroon prior to and following fortification of wheat flour with folic acid.
- Pilot study objective: To adapt the data collection protocol and tools to the context of Cameroon

**METHODS**

- Design: Retrospective chart review
- Inclusion criteria: Births between 2007-2017 in selected hospitals in urban cities of Cameroon
- Exclusion criteria: Non-English or non-French charts and those with minimum information unavailable
- Target sample size: 70,000 births, to detect a difference in NTD incidence of 20 vs 10 cases per 10,000 births.

**RESULTS**

- Biggest challenges to performing data collection included lack of electronic medical records (EMR), birth record discrepancy among local hospitals, and delay in Cameroon Institutional Review Board (IRB) approval (Figure 1).
- Tablet-based data collection forms and a manual of procedures have been modified based on each hospital’s sample birth chart.
- Upon approval from Cameroon IRB, data collectors will be hired and trained to review birth charts from local hospitals in Yaoundé.
- Data collection is expected to be completed six months after initiation.
- Data will be reviewed for quality control, managed, and analyzed remotely throughout the study.

**CONCLUSION**

- Settings with limited resources, such as lack of electronic records and training in research methods, present challenges for studying disease.
- Challenges can be overcome with appropriate adaptations; these necessitate visiting the site and collaborating with local researchers.
- Based on other studies, the post-fortification incidence of NTDs in Cameroon is expected to decrease by as much as 50%.
- Given the relatively low cost of fortifying food flour, fortification programs could be a cost-effective means for reducing the burden of disease in developing nations.
- If the projected decrease in NTDs is confirmed, the results would generate increased support for the fortification program and serve as a model for other countries.

**REFERENCES**


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**Figure 1:** Field adaptations to Data Collection Challenges

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![Pilot Study Methods](https://example.com/pilot_study_methods)

- **Pilot Study Methods**
  - Submit IRB protocol to UCD (approved) and Cameroon (pending)
  - Prepared standard operating procedure and data collection forms
  - Set up tablet-based system for secure data collection and management using DNA® software
  - Arranged hospital visits and interviews with local experts to make field adaptations and standardize data collection