



The ABC Pump: A Dosing Device for Pediatric AIDS Patients

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Mission Statement

We aim to provide a device that is easy to use and delivers accurate and precise doses of liquid oral medication for the treatment of pediatric HIV/AIDS in Africa.

Motivation

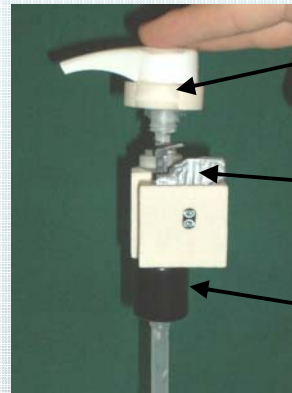
- **Clinical Significance:**
 - Pediatric deaths in Africa due to HIV/AIDS total >500,000 per year
 - Failure to dose medication is a major problem due to difficulty in dosing liquid medication
 - Overdosing and underdosing are life-threatening
- **Problems with Current Solution:**
 - Medicine cup and syringe usage lacks adequate accuracy and precision
 - Caregivers with poor vision and dexterity often spill medication
 - Clinics are unable to accurately track if dosing regimen is completed successfully

Design Objectives

Accurate and precise	± 0.25 mL at each volume setting
Range of adjustable volumes	1.0 - 5.0 mL
Low size and small weight	< 250 cm ³ , < 1kg
Low cost	< \$5 per unit
Easy to use (comfort, resistance, simplicity)	High user survey rating (average >4)

The ABC Pump: Two Possible Designs

Design #1: Bottle Pump

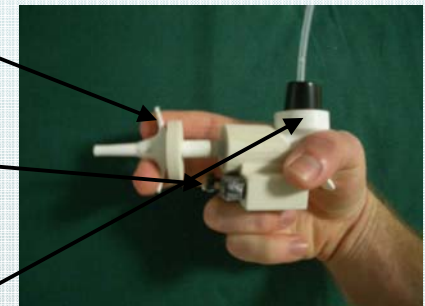


Variable dosage controlled by variable spout sizes (set by clinician)

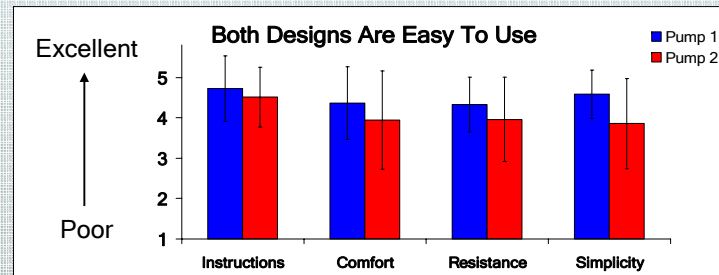
Spout pushes mechanical counting device when fully depressed

Flexible cap enables fitting to a variety of bottle neck sizes

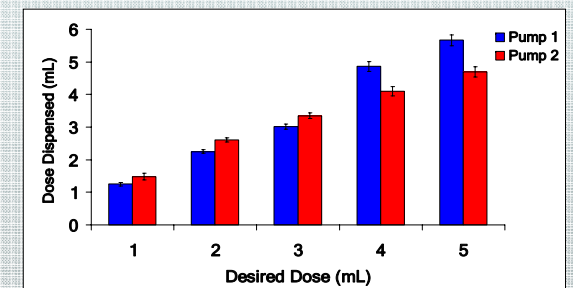
Design #2: Trigger Pump



Survey Results

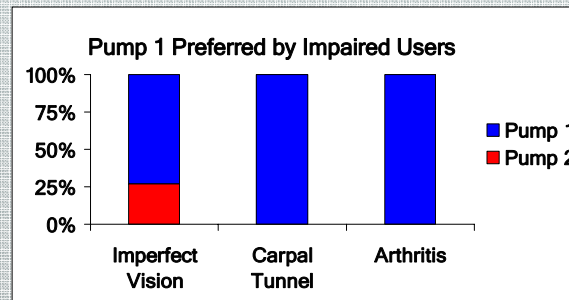


Accuracy & Precision Results



Preference by Impairment:

Participants with limited vision or dexterity were asked which pump was easiest for them to operate (n = 37).*



Conclusions

Pump 1 appears to be the best choice based on user survey and precision tests. In the future, we will work with clinics to test these prototypes in Africa.

References and Acknowledgements

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1. The Joint United Nations Programme on HIV/AIDS

*Survey was IRB approved.