

# Anti-Retroviral Adherence Monitoring System (AMS) for BIPAI Clinics in sub-Saharan Africa



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BEYOND TRADITIONAL BORDERS

## Mission Statement

To create a device for the Baylor International Pediatric AIDS Initiative (BIPAI) Clinics that measures adherence to anti-retroviral regimens in a **time-efficient** manner.

## Motivation

- Adherence is *"the extent to which patients take medications as prescribed by their health care providers."*<sup>1</sup>
- Cost of poor adherence<sup>2</sup>:
  - Advancement of illness
  - Development of resistant strains
  - Greater health care cost
  - Death

Current methods are **time consuming** and **tedious** → less time to counsel patients

## Current Limitations

- Syrup medications measured in graduated cylinders → greater risk of spills
- 5-10 min.** to manually count and measure adherence to pill medications/person<sup>3</sup>
- 10-15 min.** to manually measure adherence to syrup medications/person<sup>4</sup>

## Design Criteria

- Time: < 5 min.
- Precision/Accuracy: sensitive to pill weights as small as 15 mg
- Tech. Feasibility
- Short implementation period: < 1 week
- Portable: < 30% of body weight

## AMS Prototype



FIG. 1. Adherence Monitoring System (AMS)

### Design Components:

- 1 AccuLab VIC series scale for pill weights
  - Capacity: 300g
  - Readability: 0.001g
- 1 AccuLab VIC series scale for liquid medication weights
  - Capacity: 1500g
  - Readability: 0.1g
- Pocket PC with adherence software program
- Cost = scales + PDA/Computer

## How it Works:

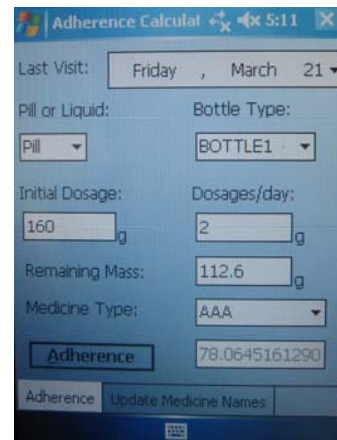
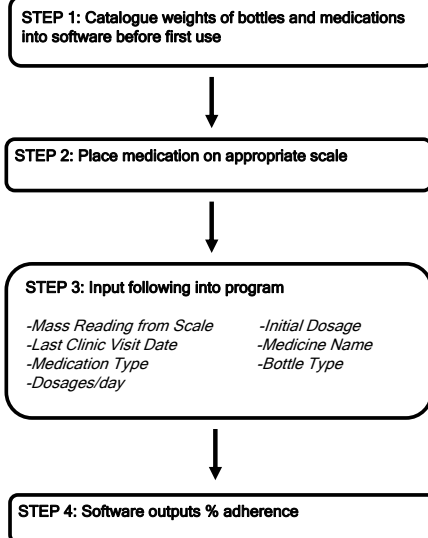


FIG. 2. Adherence Monitoring System (AMS) Graphical User Interface

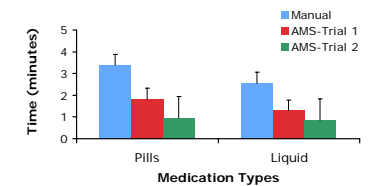


$$\% \text{ adherence} = (\text{dosage taken} / \text{dosage recommended}) * 100$$

## Field Testing

- Field tested peers with AMS against current method to observe time difference in calculating adherence

AMS Decreases Time to Measure Adherence



- Time to measure adherence using AMS is significantly different (n=10, Paired T-test)
  - Pills: p=0.00016 (Trial 1); 3e-5 (Trial 2)
  - Liquids: p=0.0010 (Trial 1); 4.4e-5 (Trial 2)
- AMS decreased calculation time by 60%

## Conclusion

- Using AMS, pharmacists only need 30 min. to calculate adherence for 30 patients. Currently, it takes them 7.5 hrs.
- Results are promising for successful AMS implementation in the Lesotho and Botswana BIPAI clinics for Summer 2008
- "AMS is user friendly and the adherence program is convenient and appealing."* -Field Test Participant

## Acknowledgements

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## References

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3,4. BIPAI pharmacist. E-mail. 21 February 2008.