



Using Technology to Measure Adherence of Complicated Medication Regimens



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ABSTRACT

Our client would like to monitor his patient's medication adherence. He would prefer to have a device that can be attached to a standard medication box that allows his patients to take pills up to four times daily. This device would record the time and date of when a specific compartment is accessed by the patient. This log file could be exported to a computer to be read by the client to review with the patient in hopes of ensuring proper adherence. We have designed a prototype circuit that records adherence data coupled with an alarm to remind the patient. Future work includes conducting clinical testing to ensure that device is easy to use by the patient and healthcare employees.

BACKGROUND

Motivation

- Physicians lack the ability to record a patient's medication adherence
- Patients may lie to display an 'ideal patient' attitude
- Forgetfulness is the number one cause of nonadherence
- 75% of patients take their medications incorrectly

Current solutions:

MEMS (Medication Event Monitoring System)

- o Recorded with micro-electronic circuit
- o Time-stamped medication events sent to computer
- o Single vial, doesn't apply to medication box



E-Pill MD 2

- o Monitored Automatic Medication Dispenser
- o Stores 3-4 weeks of medications
- o Built-in Alarm via Light or Sound
- o Support Center monitoring
- o \$899
- o Internet Connection Required for Logging



PROBLEM SPECIFICATIONS

- Device must accurately obtain data regarding patient's adherence of their medication
- Lightweight and durable
- An adjustable alarm to alert patient
- Total prototype cost may not exceed \$500
- Normal use should not interfere with recording
- Must consume low amounts of power
- Data should be viewable in Microsoft Excel



LAST SEMESTER'S DESIGN

- 2 x 2 pill box
- Switch matrix
- Can scale up or down
- Micro-controller / micro-processor
- Circuitry was viable to user
- Inaccurate switch activation
- Locked graphical user interface
- Unable to record and store data



FINAL DESIGN

- Microprocessor (Microchip PIC 18F4550)
- Accurately tracks time and date
- Efficient power utilization
- USB capability
- User-friendly computer program interface
- Alarm clock



FUTURE WORK

- Redesign Circuitry
- Aesthetics
- Application Testing
- Clinical Testing

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