**DoseBuddy - Proposal Report**

**Mobility in Aging II**

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Many older adults face treatment adherence challenges, such as forgetting to take medication or double-dosing. This can lead to serious side effects, including death. 1.3 million people in the United States are injured due to preventable medication errors each year, and while these injuries are often reported in inpatient and long-term care settings, many preventable errors happen while medications are under the consumer's control [1]. With 83% of older adults between the age of 60-79 taking prescription medication, there is a large population that could benefit from assistance with taking medication [2]. Our solution is called DoseBuddy; a unique automatic pill dispensing system controlled by a desktop app.

Several automatic pill dispensing systems are already available. HERO [3] and MedaCube [4] automatically sort medications; however, they only have 10 and 16 compartments respectively, limiting their capacity and requiring regular refills. LiveFine [5] has 28 compartments, however the dimensions of these compartments are very small. Lifeline [6] has a mechanism with 60 disposable plastic cups but one drawback is that these cups must not be damaged, otherwise the dispensing will not operate as intended. DoseBuddy will offer unique features that meet user needs including 28 large compartments, dual-operation featuring manual and app-based control, ambient and app-based notifications, and reports based on medication dispensing history.

DoseBuddy will be developed using a spiral organization of compartments that rotate into place via a motor. The dispenser will include an alarm when it is time to take medications. The dispenser will connect to an app through microcontrollers, sensors, and WiFi modules to allow for control of locking and unlocking through the app. DoseBuddy will also offer dual-operation, where the dispenser can be manually unlocked. This feature allows caregivers to have more control through the app, and does not require patients taking medication to use the app if they do not wish to. The app also will have features such as setting reminders, alarms, and interacting with caregivers. History checks and reports will be available for caregivers to ensure that medications are being taken.

Our project will be divided into 3 distinct stages of development, each with their major milestones and deliverables. A) The 3D model design with the proposed compartment logic will have a target deadline of February 15. B) The app and physical prototype controlling the dispensing of medications will have a target deadline of March 1. C) the prototype will be revised and refined based on user feedback by March 25. The final product is estimated to be finished by April 7 as the final deadline. Throughout this process, we plan to share our ideas with the community participants (older adults) to gain understand of their needs and perspectives

Madeline, with expertise in mechanical engineering design and CAD will focus on designing the digital prototype. Nnamdi will lead research and report writing, evaluating user needs, and investigating competitor products. Melvin specializes in computer science and engineering, and will take lead on developing the app and implement core features. Edward specializes in biomedical engineering and health sciences, and will focus on defining user requirements as well as assist with app development.

**References**

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[4] “Usage,” MedaCube. https://www.medacube.com/pages/usage

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[6] “Medication Dispenser Support,” Lifeline. https://www.lifeline.com/support/dispenser/