SmartDrip

April 2008

Global Health Challenge

Today, in developing countries, there is often no affordable, reliable solution for monitoring and controlling intravenous therapy (IV). Though IV therapy is a vital component of healthcare, in these regions of the world, it is difficult to continuously monitor IV fluid administration to patients. If a clamp slips, or if the IV line becomes kinked, an improper amount of fluid can be given to the patient, causing otherwise preventable injury. This is especially true for small children, who are most susceptible to the adverse affects of over-infusion. Often connected to adult sized IV bags, the chance for overhydration is very great and can easily cause death in pediatric patients. There is a clear need for a device that solves this problem.

Appropriate Solution

As part of the BIOE 451-452 Senior Design course, an interdisciplinary group of Bioengineers (Neha Kamat and Ketan Shah) and Electrical Engineers (Tyler Barth, Aaron Cottle, and Chris Vaucher) have created a low-power, low-cost device that monitors the infusion drip rate and adjusts it through physical clamping. This simple device will clip on to a normal IV drip chamber. The physician can then set the drip rate and volume to be infused and begin infusion. With infra red sensors to detect each drop of fluid and a custom-built motorized clamp to control the rate of fluid flow, SmartDrip continuously detects the drip rate of fluid and then clamps to change that rate to the physician set rate. With a low cost of less than $100 for the initial prototype, low power, with solar charged batteries, a durable hard plastic case, and light and portable package, SmartDrip can be used in the harsher environments of developing country clinics. The device should be used for at least 1 year. This project was mentored by Dr. Maria Oden, Dr. Lin Zhong and Dr. J.D. Wise.

Current Status

SmartDrip currently has the ability for users to set the drip rate and volume, detect the flow rate, and alter the rate with a motorized clamp. The device displays a 4% accuracy in volume infusion and quickly returns the drip rate to within 10 % of the set rate if it deviates. SmartDrip will be taken to Lesotho, Africa this summer for field testing. SmartDrip will help improve heath care in developing nations by offering a lost cost, low power device to monitor and control the flow rate of IV fluid.

An initiative for the advancement of appropriate, high-value innovations in global health biotechnology

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SmartDrip

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HSEMB 2008
2nd Place Design Award
Bioengineering and Electrical Engineering
1st Place Design Award

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