2). Environmentally Powered Blood Pressure project

Problem statement, Area of investigation, Un-met clinical need, etc.

Blood pressure is measured most commonly by auscultatory method and also using oscillometric techniques. These methods are well established with auscultatory being considered the gold standard. Each method has its strengths and weaknesses. In the developing world auscultatory technique is the most common way of measuring blood pressure. It has the advantage of being inexpensive and does not require any power source beyond the human operator. These features are important in an environment where money and power sources are not available. However, the method does require considerable skill to obtain an accurate measurement and inexpensive gages are prone to breakage and go out of calibration when dropped.

Oscillometric (digital) BP is less technique dependent and more robust but the equipment costs considerably more and battery power is required to operate it. These issues do not make it a practical solution in developing nations.

The problem is to re-engineer an oscillometric BP device such that it can be powered by alternative energy sources readily available in developing nations and meet a cost point comparable to auscultatory equipment while providing a robust, low skill level BP measurement system for deployment in developing nations.

Project field:

Device development

Electronic and mechanical engineering skills are required.

Criteria for success or key milestones

The objective is to select a piece of oscillometric BP equipment and re-engineer it to run from an alternative power source(s). An argument will be made to explain why the end result could be considered to be at a similar cost point to auscultatory equipment without sacrificing any accuracy and ease of use of the original device. Data will be collected and arguments will be made to explain how the resulting product is more robust than other oscillometric or auscultatory devices.

Other relevant materials or resources needed for the project.

Students will need access to electrical & mechanical engineering laboratory. They will be expected to have standard test equipment to be able to operate it.

Skills students will learn during the project if they are not already inherent.

Students will learn about how Blood Pressure is measured and the strengths and weaknesses of the available techniques. By dissection of commercially available products they will learn how power is consumed in the devices and look at ways to reduce the power consumption by re-engineering the components of the system until the goals are met.
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