Health problem addressed

According to MicroClinic, 70% of people in sub-Saharan Africa live in rural areas, while 90% of their healthcare facilities are in urban areas. Many people in Africa, Latin America, and Asia do not have ready access to healthcare facilities where diseases can be diagnosed. At the same time, most diseases from which people in the developing world suffer are preventable.

Product description

The Diagnostic Lab-in-a-Backpack contains tools to perform physical exams and laboratory tests in a point-of-care setting; tools include an oil immersion microscope, centrifuge, otoscope, ophthalmoscope, glucometer, pulse oximeter, sphygmomanometer, rapid diagnostic tests, and first aid supplies. An integrated battery, charged via wall power or a solar panel, provides power for more than 8 hours.

Product functionality

In response to challenges provided by healthcare providers working in resource-poor settings, a backpack was designed for point-of-care health providers in rural areas in the developing world. The Diagnostic Lab-in-a-Backpack contains tools to diagnose major health issues such as malaria and tuberculosis.

Developer’s claims of product benefits

The existing technologies to diagnose disease in developing countries are located in medical lab facilities. These resources are not readily accessible in low- and middle-income countries, especially for those who must travel great distances at personal expense to reach a hospital or health clinic. The Diagnostic Lab-in-a-Backpack allows health care personnel to travel to remote locations with the tools necessary to diagnose diseases and provide basic health care in areas without ready access to power and infrastructure. This assembly of tools is innovative for it enables point-of-care diagnosis of neglected diseases common to the developing world, such as malaria and tuberculosis, eliminating the need for an advanced medical lab facility and patient travel to distant hospitals for basic diagnostics.

Operating steps

The user sets up backpack in a remote area where medical care is needed and uses the diagnostic tests and basic first aid materials to screen for, diagnose, and treat illness.

Development stage

The backpack has been used in rural clinics and by medical brigades in 14 developing countries and US rural areas. A long-term feedback project in Ecuador is underway for final product development prior to commercialization. US manufacturers of custom components are being contracted. Once feedback is incorporated into design, the backpack will be ready to be manufactured for commercialization in LM countries.

Future work and challenges

The capital to establish an entity to oversee the large-scale assembly and distribution of the backpacks has not yet been secured. Approval of the device will need to be obtained (from country’s government / individual healthcare entities), to enter new markets. There is also the need to provide end-user training. Supply chain issues may disrupt regular utilization. Replacement parts need to come from the US.

Use and maintenance

User: Nurse, physician, technician

Training: A manual and instructional DVD, paired with a half-day training, fully introduces user.

Maintenance: Nurse, physician, technician

Environment of use

Setting: Rural health posts and health centers.

Requirements: Occasional sunlight or access to electricity to recharge the batteries that power the medical devices.

Product specifications

Dimensions (mm): 460 x 815 x 330

Weight (kg): 18

Consumables: Glucometer test strips, lancets, otoscope covers, urinalysis test strips, gloves, cotton-tipped applicators, face masks, tongue depressors, cotton balls, pregnancy tests, gauze, band-aids, microcapillary tubes, microscope slides, microscope cover slips

Life time: 2 years (backpack)

Other features: Portable and reusable.

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