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Asthma monitoring on the Web

Micro system lets physicians monitor, control asthma remotely

An inexpensive web-enabled device for measuring lung function in patients with asthma and other disorders is being developed by researchers at Texas Instruments, in Bangalore, India, and co-workers. Writing in the *International Journal of Biomedical Engineering and Technology,* the team explains how the devise could allow physicians to monitor their patients remotely and quickly instigate medical attention in an emergency.

Spirometers are commonly used to measure lung capacity and the response of breathing during therapy. However, the widespread application of spirometers is limited in the developing world and in remote regions because of the high instrument cost of the instrument and a lack of specialist healthcare workers trained in its use.

Texas Instruments researcher N.C.S. Ramachandran is an expert in high-speed and low-power digital design and is working with professor of electrical engineering Vivek Agarwal of the Indian Institute of Technology, Bombay, India, on the development of an inexpensive and easy to operate spirometer that can be quickly hooked up to an internet connection through built-in web and data encryption software.

Simply monitoring cough and wheezing in asthma sufferers does not always provide an accurate assessment of the severity of their symptoms. Breathing tests carried out using a spirometer, on the other hand, are much more accurate and can provide a clear indication of whether or not medication is being effective.

The team has developed the device as a low-cost, portable spirometer built around a pressure sensor for detecting airflow. The sensor is fabricated using technology similar to that for manufacturing computer chips and is based on microelectromechanical system (MEMS). The MEMS spirometer can measures the flow and volume of air moving in and out of the patient's lungs.

The use of mass production techniques for making the MEMS sensor, means the device can be inexpensive (a few dollars per unit), small, and so portable. Embedding of the necessary electronics and software to allow it to connect to a computer and the Web make it ideal for remote monitoring by a patient's healthcare worker. "Not only can the remotely located patient consult a specialist," the researchers say, "the specialist too can instruct the patient for specific test procedures and treatment."

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