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SWASTHYA SLATE – A MEDICAL INNOVATION FROM INDIA

Dr. Kanav Kahol, returned to India from US in 2011 to create a technology that would enable even the poor people in India and throughout the world to get better care. He teamed up with a non-profit Public Health Foundation of India and has created a new device called Swasthya Slate, which is a mobile diagnostic tablet for frontline health workers that can conduct 33 diagnostic tests including ECG, blood pressure (BP), malaria, and pregnancy tests. It is also capable of generating real-time data for local and national budget planning applications.

As sensors made by large companies are very expensive, he decided to develop inexpensive sensors that can be hooked up to personal computers thereby making diagnostics affordable. Swasthya Slate is basically a mobile platform that allows one to do various kinds of diagnostic tests on a mobile phone or a tablet. In June 2012, Swasthya slate was sent to 80 medical labs and the result generated by the Swasthya tablet was comparable to those obtained by conventional methods.¹ The current model of the Swasthya tablet kit costs \$800 USD.

The kit consists of a digital thermometer, a BP monitor, an easy to use heart rate sensor, an ECG system, a blood sugar monitor, and a unit to determine water quality. It is very easy for

any user to plug all the systems into the interface and conduct the tests. The tablet collects the data and sends it to a central server, creating a record of patient's health. All tests can be done in a single location and the results can be delivered to patients via SMS. They may be made available online and can be easily downloaded.

Imagine someone going to the hospital to get tested for dengue. He/she gets tested, goes back home, and waits for about a day to get the result before any kind of treatment can begin. However, with the Swasthya Slate, the patient has the results within few minutes and the doctor can get started at least with the empirical treatment right there. Decision-support algorithms in the tablet guide healthcare workers to give medical recommendations and make referrals when needed. The automated systems in the device also send reminders to patients in the form of SMS, letting them know when they have to go to their next appointments or vaccinations. You can even share your reports with your well-wishers. The system is currently available in Hindi, English, Punjabi, Telugu, and Gujarati. Swasthya Slate is being used in 80 locations worldwide like Nigeria, Peru, Norway, and Canada while most of the other places are in India.²

Swasthya Slate was launched by the Ministry of Health and Family Welfare in Jammu and Kashmir state in India as part of the Reproductive Maternal Newborn Child and Adolescent Health program (RMNCH+A) in six districts. Of the mortality during child-birth, 15% is attributed to pre-eclampsia. Major symptoms of pre-eclampsia include high BP, proteinuria, RBC breakdown, low blood platelet count, impaired liver and kidney functions, swelling, shortness of breath (SOB) and visual disturbances. It takes 3-14 days to detect pre-eclampsia as antenatal care health checkups are not regularly followed by the rural population in India as it takes several hours or even days for rural people to attend the



checkups in urban hospitals. In Jammu and Kashmir, screening of 10,000 pregnant women by Swasthya slate detected 120 pre-eclamptic cases. Early detection was able to reduce fatality rate to zero in this population.

The device comes as a kit where all the sensors are connected to the main unit, a (computer) tablet through which we can see and enter the information into the central database, and finally sensors like a thermometer, water quality meter, 4 lead ECG, etc. The kit weighs 2.3kgs, light enough that it can be carried in a backpack.

Parameters measured by the kit:

1. Blood sugar
2. Blood pressure
3. Blood hemoglobin
4. 12 lead ECG
5. Heart rate
6. Water quality
7. Urine protein
8. Urine sugar
9. Urine blood
10. Urine bilirubin
11. Urine pH
12. Urine specific gravity
13. Urine leukocytes
14. Body temperature
15. Syphilis
16. Urine ketone
17. Urobilinogen
18. Malaria check
19. Stethoscope
20. Foetal doppler
21. Pulse oximetry
22. Urine nitrite
23. Routine blood grouping and typing
24. Widal antigens for slide and tube tests
25. Onsite typhoid IgG/IgM rapid test

26. Rapid immunochromatography test for HIV-1 and HIV-2
27. Rapid pregnancy test
28. Troponin I whole blood/serum test
- Hepatitis B virus (HBV) (detection of (HBsAG) in plasma)
29. Immunodot test kit (HCV)
30. Slide test for anti streptolysin-o
31. Slide test for rheumatoid factor
32. Slide test for C-reactive protein

Swasthya slate is a great electronic-aided healthcare device. It can be used in any place of the world. In fact it may help create a huge medical revolution by its properties, features, and usage. Dr. Kanav Kahol stated that these devices can be made as cheap as 150 USD if, they were manufactured in bulk. Unfortunately, this device has not been approved by FDA and may not be approved as it will disrupt the current business practices. If this device is widely accepted, all the medical devices used at present to test these 33 parameters may go down in their respective markets.

Like any disruptive technology, sooner or later, economics of health care may bring about the required breakthrough and the use of “Swasthya Slate” in your Doctor’s office.

References:

1. Non-Profit Pilots Novel Diagnostic Tablet. (2015). <http://theindiaexpert.com/tag/swasthya-slate>; accessed/Dec 2017
2. Slate, S. (2013). Swasthya Slate Device testing Summary Introduction. <https://pdfs.semanticscholar.org/b9f1/0f51f280c658ad3d06f9f6ca59e11b011143.pdf>; accessed/Dec 2017