

## Introduction

This is a discussion document of "Anonymous Medicine" where Medical tests are stored anonymously on the web, and available to appropriate medical personnel who provide the correct user ID and Password. No personal identifying information is stored on the Internet. The patient identifier used is based on a hashed instrument identifier (and thus undecipherable) linked to the patient only at the hospital.

Fetal Heart Rate monitoring during Labor is quite common. There are computer systems for providing a standardized FDA approved interpretation of these tracings, which, among other things computer the current risk of csection. These computer systems are implemented in an in-hospital computer system reaching the rooms through an Internet cable. The proposal here is to juse the same software routines in a system that can reach out to any hospital or clinic anywhere in the world to provide these calculations through the Internet. The computer code used is exactly the same, updated and modified with the regular offering of the company.

The Anonymous-Medicine company will provide the expertise to implement this system on the Internet.

- Risk management. Legal and computer approaches to minimize and insure against risk both financial and patient safety.
- Marketing. Anon-med's business model is to sell these computer services. Producer companies will maintain ownership and the responsibility to maintain the code.
- Web Hosting. Distributed, secure reliable web hosting is what we do!



## Connection to the Fetal Monitor.

Most fetal monitors use a serial interface to output the FHR and Contraction and other events calculated within or marked at the Fetal monitoring instrument.

One path to get these data to the Internet is to transmit them through Bluetooth of 1m to a smart phone eg the Google Android, near the FHRI monitor. The android communicates with the Fetal Monitor and sends the data out using wi-fi as updates to database at an internet hosting. The nurse may enter on-going observations to the Android as labor progresses. The Android costs about \$500 and the Bluetooth transmitter about \$150. Both prices have downward tendencies. There is no need for a cell phone plan. It communicates to the Internet by wi-fi from probably the nursing station.

The viewing of the tracings and other information from the secure site is done at a web browser in the nursing station.

The smartphone 'belongs' to the patient, and moves with her to different stationary (or movable) fetal monitors. It may be appropriate to attach the cell phone to a clip board for nursing notes so that it does not get stolen or borrowed. The phone is plugged in to the power while it is in use.

## Patient Identification.

The patient is identified by the MD5 hash of the phone hardware serial number. There are only a few phones in any maternity unit and a local system of short names can be readily constructed, linking the patient ID with the phone. The only part of the ID to go across the Internet is the hashed Android ID. The linkage to the patient ID is kept local. The system can be constructed so that there is no way of knowing the patient id except from the browser with access to a local translate table between phone ID and Patient ID.

Hardware Serial Number	Unique number, long and rarely known or used
MD5(HardwareSerialNumber)	The hash of this number. effectively making it un-decipherable
Local Phone Id eg "1","2" etc	This is the number that the nurses will use to link the patient to the phone
Patient Id linked to LocalPhoneID	This link does not go out to the Internet, it is entirely local to the hospital network.
Patient Name	This variable NEVER goes outside the hospital records system.

The Android is chosen because the device is defined by software operating system, not by any quirks of manufacturing company. Such companies and models come and go. The Android is likely to be around for some time and its successor will certainly have the required capabilities described here. There are no expensive bandwidth costs as it will use only wi-fi and bluetooth to

communicate. The android phone is the weakest part of the system and can be readily replaced by any model from any manufacturer, without concern.

(The availability of wi-fi in a hospital is a concern. Overcautious engineering habits make it habitual to forbid phones in hospitals). Evidence is scanty and points to it being OK to use cell phones... see **Use of Cellular Telephones in the Hospital Environment** .JEFFREY L. TRI, MSEE; RODNEY P. SEVERSON, CBET; LINDA K. HYBERGER, MA, CCRC; DAVID L. HAYES, MD **Results:** Interference of any type occurred in 0 of the 75 patient care rooms during the 300 tests performed. These 300 tests involved a total of 192 medical devices. The incidence of clinically important interference was 0% (95% confidence interval, 0%-4.8%).

The serial to Bluetooth device can be one of several currently available for \$30 to \$150, again indifferently as regards to model or type.

Global view.

This approach will bring the most advanced fetal monitoring computer system to the remotest cottage hospital in very small cost increments, one fetal monitor at a time. The payment approach can be flexible, a trial period can be arranged with little effort or cost. There is no serious computer hardware at the hospital, no servers and local area networks.

The budget might be :-

Set up one patient place with an android and a serial-to-bluetooth connector fixed to the FHR monitor, about \$700. This can be done with local resources, over the counter hardware and free Android software.  
Cost per labor of connectivity. The actual connectivity cost is essentially zero, it is provided by the hospital's connection to the Internet. There must be a rental to pay for the software system use, for its costs of development and maintenance. I see this in the range of \$50.00 per labor. The actual server costs are vanishingly small in the order of \$0.50 per labor.  
Numbers. Naturally the whole economic equation of the system rests on how many labors are monitored with this system. If it is 1000 per day then this brings an income of \$18,432,500 per year. There is little reason that the system be restricted to N.America, where the population of say 307M people will produce 11,640 (CIA Factbook) babies per day.

This is one member of a class of applications which leverages the power of the Internet to make medical computing power available everywhere, uncoupling it from the local availability of up-to-date computer and medical instruments. For example EKG interpretation.