

Scenario: 8:30 AM Tuesday

Tom drives off to an appointment with his physician at her clinic for his annual check-up. He arrives, parks, and walks up to the reception desk.

Ed drives off to work. Three blocks from home his car is slammed side-on by a delivery truck, and he is knocked unconscious.

At the reception desk **Tom** slots his Medical Storage Device (MSD) – in this case a keychain memory stick – into the reception desk USB receiver to confirm his appointment, his physician, and the date of his last visit; he also scans his thumbprint on a biometric plate to confirm his identity. The top data layer of the MSD shows Tom's picture ID to the receptionist, as well as insurance provider, personal physician, and current medical information (such as blood type, conditions, drug allergies, etc.), and alerts the patient records server at the clinic to access his data. The records server opens Tom's records for his doctor and sends them to her examining-room portable tablet PC via the clinic's secure wireless network, as well as entering the visit in Tom's file in the accounting department's server.

At **Ed**'s accident scene, the Emergency Medical Technician (EMT) arrives in the ambulance, and while stabilizing the unconscious victim, locates his Medical Storage Device – in this case a memory wristwatch. The EMT connects the MSD to his Portable Data Reader and the top data layer stored in the MSD instantly identifies the unconscious driver as Ed, who has a Penicillin allergy, is blood type AB, with no chronic medical issues. The EMT finishes stabilizing Ed, and hits the Send button on his Portable Data Reader to alert the Emergency Room via the ambulance repeater link that Ed is inbound - Ed's top data layer is included in the encrypted transmission. The ER data server will securely link to Ed's medical records in his physicians' data server (listed in the top data layer, with Ed's encryption key) while the ambulance is in transit. The ER server then forwards Ed's medical records to the attending doctor's portable tablet PC via the hospital's secure wireless network, while starting a file for Ed in the accounting department's server.

In both cases, the physicians now have immediate access to their patient's medical data, including referral physicians' reports, laboratory tests, and images (X-Rays, MRIs, CAT scans, photos, and videos), prioritized by life-threatening conditions, latest entries, and drug reactions. The physicians may easily search and cross-reference the patient's records by condition, drugs, therapy, surgery, or any other key menu button or key word. Images the physician wishes to view in detail may be called up on the linked high-resolution video display screen in the examination room. The accounting departments have billing specifics updated in their servers.

When **Tom**'s annual check-up is complete, his doctor will add her text-converted hand-written notes, as well as any e-prescriptions, referrals, images, and lab results to Tom's records. The accounting department will be alerted to any relevant information, and Tom's MSD will be synchronized with today's check-up data.

When the Emergency Room doctor has completed Ed's treatment and has sent the now-conscious (and doing well, thank you) patient to a recovery room, all ER notes and a personal physician notification flag are logged into the ER server, which will synchronize data with Ed's doctor's secure server and with Ed's MSD.

All patient medical records and related data in the above stories are secure, linkable, and searchable due to the data compression and encryption standards offered by Adobe's PDFH (Portable Document Format Health). While exceeding the expectations of consumers, the PDFH system makes electronic health records storage, exchange, transport, and updating simple and reliable for all medical professionals, using multiple-level security implemented in Acrobat HL.

Proposal for Adobe PDFH:

Scope:

- Many governments and corporations are actively and strongly supporting electronic health records initiatives.
- Adobe is the world leader in portable and enterprise document delivery.
- Generator LLC proposes that Adobe adapt the PDF system for electronic health records as a worldwide format, "PDFH", to include major features from the Adobe Intelligent Document Platform.

Implementation:

Consumer: Consumers may securely carry all their medical records on their person, enabling rapid and accurate emergency response; immediate records availability for clinical/hospital visits and referrals (even while traveling); and synchronized duplication of all medical records. The medical consumer (patient) will carry a completely secure portable "Memory Storage Device", or MSD (keychain memory stick, memory watch, or memory jewelry). The MSD may also contain dependents' medical records.

Physician/Nurse: Medical professionals will utilize handwriting-recognition tablet PCs and PDAs that allow easy data entry, updating, and synchronizing. Tablet PCs and Portable Readers will use a portable version of "Acrobat HL". For hospital emergency room personnel, the patients' top layer records will be transmitted ahead of patient arrival using a PDFH-enabled Portable Data Reader via a secure ambulance repeater link.

Administration: The PDFH system automates patient medical and accounting data, updates billing and insurance claims, enables faster records access and transportability, and eases patient records storage requirements (including X-Rays, MRIs, CAT scans, photos, audio, and video). This will be equally effective for large hospitals, small clinics, and medical vendors. The PDFH system also facilitates medical records searches and cross-references (while shielding patient identity) for research and data mining.

Security:

Four security levels provide separate encryption at each level, with Memory Storage Devices (MSD) or USB security "dongles" necessary for access to the three most secure

levels (one security dongle per computer). A registered PDFH Reader would be necessary for the lowest security level. Patients may also read their own records from their own MSD (they may not edit the records). The most secure level requires both physician and patient MSDs to be “slotted” for access. Biometrics will be implemented in many cases. The four security levels are:

- Security Level 1 (top data layer - least secure) Emergency Medical Technician and Administrative use – for clinic and hospital admitting personnel and emergency personnel (office computer and handheld Portable Data Reader), with name, address, photo, blood type, allergies, known conditions, current medications, medical insurance provider / account number, emergency notification and next-of-kin information. Requires qualified PDFH Reader.
- Security Level 2 (referral/therapy data layer) – for non-life-threatening medical use: dental clinics, sports therapy clinics, plastic surgeons, physical therapists, psychiatrists / psychologists / mental health clinics. Requires Level 2 version of “Acrobat HL”.
- Security Level 3 (practitioner data layer)– for doctors and nurses at clinics and hospitals (including emergency rooms). Requires Level 3 version of “Acrobat HL”.
- Security Level 4 (most secure data layer) – for doctors and therapists involved in AIDS/STD, abuse/rape, and psychiatric/drug-dependency cases, and other highly sensitive or patient-requested secure data. Requires Level 3 version of “Acrobat HL” and both patient and physician “Memory Storage Devices” for access.

All PDFH Readers may read all levels above their clearance level.

Images:

In Acrobat HL, compression algorithms for “targeting” high-resolution areas on X-Rays, MRIs, CAT scans, photos, videos, EEGs, EKGs, laboratory charts, and other medical graphics will scale the data density for areas of most critical resolution versus non-critical areas, as determined by the attending physician, technician, or nurse.

HL7:

Health Level 7 (www.hl7.org) should be supported and integrated with PDFH. Currently the HL7 specification is at Version 3. Membership and steering committee participation is highly recommended. HIPAA requirements can also be met with PDFH.

Benefits:

Increased consumer safety, confidence, and convenience; increased physician accuracy and efficiency; decreased administrative time and resources; better research data; and very importantly, lower overall health care costs.

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