Interoperability ([Summary of EU Report](#) on 1/12/15 in response to [EU Green Paper](#) released on 04/10/14). Respondents deemed the actions of [eHealth](#) Action Plan as regards [interoperability](#) to still be valid (set up an EU eHealth interoperability framework). Series of additional actions were put forward such as promoting the establishment of open EHR [standards for interoperability](#). There was also consensus among respondents that EU and national actions should seek [platforms](#) to ensure interoperability of mHealth solutions with Electronic Health Records to enhance continuity of care. In the US, the potential for future [open standards EHR](#) may benefit from [John Halamka's](#) move to [sell](#) [HMS](#)-[BIDMC](#) EHR to [Athena Health](#) which may help partners in global health to avoid EHR monopoly *status quo*.

GRAND CHALLENGES FOR HEALTHCARE

[1] Devices (patient data generating equipment, imaging, wearables)
[2] Precision Medicine (including personalized genomic profiling)
[3] Data and Analytics (time series and point of care)
[4] Healthcare Integrated Intelligent Platforms (HIIP)
[5] Preventive Health, Informed Wellness, mHealth

US$210 billion ● profit-motivated delivery of unnecessary care

US$130 billion ● remediable inefficiencies in delivery of care

US$116 billion annual cost ● Diabetes

US$75 billion annual cost ● Chronic Obstructive Pulmonary Disorder (COPD)

US$55 billion annual cost ● Congestive Heart Failure (CHF)

Can we reduce costs by targeted intervention using data driven analytics? Yes, we can.

http://bit.ly/MDS-SECURITY

http://bit.ly/MDS-IMDRF

http://bit.ly/MDS-FDA

http://bit.ly/MDS-GOV

To   To Whom It May Concern
Fr   Shoumen Palit Austin Datta
Re   Global Grand Challenges – Grand Challenges in Healthcare: Platforms to Precision Medicine
Dt   02-13-2015

Healthcare Integrated Intelligent Platforms, Medical Device Interoperability, Analytics, Precision Medicine

Problem Space - http://bit.ly/GOLDMAN-M-IoT

In the current healthcare landscape, generally, medical monitoring and imaging devices do not share their data with an integrated clinical environment. Digital health or mHealth are not interoperable with other in-hospital or in-home ehealth services (laboratory, pathology, remote monitoring, out-patient clinic, pharmacy). Fractured visibility of data leads to fatalities [1] and compromises safety [2] of patients.

One Solution – FDA Guidance – http://bit.ly/FDA-MDD-9FEB2015

Transparency of patient data from patient-specific monitoring and imaging devices, if visible on an integrated platform, may reduce mortality and morbidity rates due to fractured data interoperability.

Low Hanging Fruit ? Targeted Intervention of high-risk individuals using connected data & analytics

Deploy open standards based integrated clinical environment as an interoperable healthcare platform. In phase one the model will seek to integrate medical devices from vendors including home monitoring.

Fast Forward Future

In phase II we attempt to integrate data from biomedical imaging instruments. Phase III may include pharmaceutical tracking and prescription networks. Phase IV may converge ehealth, mhealth with EHR.

Economic Value *(Each $ Invested in the Human Genome Project has returned $140 to the US Economy)*

This is not an unique effort to pursue healthcare data related platforms. Restricting access to data through proprietary interfaces in medical devices, imaging tools and lab results are detrimental to life. Monetization of data through *analytics* is encouraged as a necessary economic incentive for the healthcare industry. For example, if blood glucose is 180 mg/dl and blood pressure is 66/178 then this data should be accessible and available (user-defined access, privacy and security). If consumer wants to know "what it means" (making sense of data) then an app for analysis and analytics is accessed (robo-doc type apps analogous to Apple / IBM strategy). Each use of any app generates micro-payments in this pay-per-analytics monetization model (pay 1 cent per use). Please see page 3 in *Internet of Systems* which is here http://bit.ly/MIT-IOT. The analytical response framework may offer distributed intelligence at the point of care (POC). Analytical engines (cloud) may run innovative algorithms to connect patient data, in context and in real-time (data may be perishable) to offer value. Apps may be regulated or verified through a credible institution (eg: partnership agreement between Samsung and UCSF to develop analytics). Future inclusion of precision medicine framework will vastly improve the latter. Profitability may be unleashed by monetizing analytics ($7.3 trillion, Cisco). Access to medical device and imaging data using open yet secure platforms to catalyze interoperability between systems may better manage acute conditions as well as informed health and personalized genomics.

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[1] http://www.propublica.org/article/how-many-die-from-medical-mistakes-in-us-hospitals

[2] http://journals.lww.com/journalpatientsafety/Fulltext/2013/09000/A_New,_Evidence_based_Estimate_of_Patient_Harms.2.aspx

Suggested Paths

The proposed initiative(s) may reside in an industry-academic coalition in affiliation with hospitals and standards organizations. In one approach, the deployment of healthcare integrated platforms (HIIP) may start with the focus identified by the ICE Alliance. Funding for the initiative may be solicited from variety of agencies as well as in-kind contribution from vendors and/or grants from global foundations. Industry may collaborate to create open standards software (HIIP) and monetize the implementation process, maintenance, services and analytics. HIIP aims to stay IP-free and accelerate global healthcare access.

Broad Spectrum of Strategic Vision – From the Future Wireless Hospital to Personal Precision Medicine
One segment of this effort may create the wireless hospital of the future. The need for connectivity in remote locations lacking conventional infrastructure calls for strategic vision beyond typical ideas. The ability to create wireless hospitals will help distribute healthcare to billions of underserved people and may offer medical services to the future war fighter on front lines in hazardous distant geographies. The ability to autonomously monitor the status/health of the war fighter is a potentially valuable outcome. Partnerships to build devices and wearables using emerging technologies may soon add to the progress in precision medicine based on advances in genomics and proteomics of disease states.

Fundamentals – Systems Engineering – Can distributed intelligence from grid platforms help healthcare?
Domain experts in semantics of time, software verification, security and model integrated computing will be key to this initiative. Experts and advisors will guide us in this massive amorphous endeavor.

Building Coalition - http://bit.ly/GOLDMAN-M-IoT ● www.icealliance.org
Engage with OSTP, NIH to explore transformational effort with IIC members as well as UCSF and USC. To observe views in the DSB roadmap initiative in consultation with ONC, FDA, OSEHRA, MDPnP, SEAS in the context of US HIT policy. Liaise with OpenEHR and EU industry and academic institutions, globally.

Global Inclusion: HEALTHCARE INTEGRATED PLATFORMS INITIATIVE – PRECISION MEDICINE INITIATIVE

Hospitals / Universities	Companies / Consortia	Government / Agencies	Organizations
MGH - HMS	RTI	HHS / ONC / NIH	UN / UNDP
Johns Hopkins	Cisco / Intel	NSF / DARPA	WHO
UPenn	GE / TechMahindra	AHA	ADB
NWU	Siemens / Draegerwerk	NHS (UK, Canada)	OSEHRA
UCSF	Toshiba / Fujitsu	US DOD / TATRC	World Bank
UTHSC	Philips / Omron	EU, ROC	IEEE ISTO ICE ALLIANCE
VA Hospital / Mt Sinai	Mitsubishi		Partners in Health (pih.org)
Vanderbilt / UPitt	Ericsson / AT&T		
Nuffield (UK)	Covidien / Kaiser		
AIIMS (India)	Samsung		
Hospital Authority (HK)	Microsoft / SAP		
Bumrungrad Hospital	IIC / OIC / ICE / OMG		

Brainstorming

What type of test beds, ideas and concepts do we want to pursue in the healthcare arena? Which companies, academics and institutions are interested to form one or more coalitions to pursue HIIP or other activities, if we can gather a critical mass? What are the funding options in US, EU or APAC? Can we combine knowledge of medicine with hardware-software interoperability and robotic functions?

GRAND CHALLENGES FOR HEALTHCARE