

How Learned to OP How Learned to OP Norrying & OP Norrying Market Doctor



goinvo.com Design Studio

2.009 Product Design









juhan@mit.edu @jsonin

From Bloodletting to Bloodless

If we feel ok, we think we're ok

1000 years ago

Today

Periodic Issues, Extreme Intervention

1,000 years ago

Amazing Progress

Open for shipping supplies.

Spit Kit Instructions

Do not eat, drink, smoke or chew gum for 30 minutes before collecting your saliva sample. Place the tube in the hole during the collection process to prevent spills or mixing of samples. Ship the sample to the laboratory using the shipping supplies and additional instructions provided inside this envelope.

Step 1

Epit into the barooded tube with the funnel until the amount of liquid saliva (not bubbles) reaches the fit line.

Step 2

Screw the big cap onto the funnel. When closed, liquid in the big cap will be released to mix with your saliva.

Step 3 Unscrew both furmel and big rap from tube and discard.

Step 4 Ciose tube with small cap. Mix by wverting the tube five (5) times.

Make sure you are using the kit labeled with your name.

.5k

ink

DIY CRISPR Kits, Learn Modern Science By Doing

0 San Francisco, United States

If you had access to modern synthetic biology tools, what would you create?

#science #diy #biohacking

Ģ Technology

Gallery 1

	\$70,101 USD total funds raised
	InDemand Original campaign was 3 on December 8, 2015
	\$6 USD
	Biohacker Stickers
You Tube	Our cool Biohacker logo say "Create Something I "BioHack the Planet" for anywhere(we recommen
	except for faces of friend
	12 out of 500 claimed

unds raised

emand nal campaign was 333% funded ecember 8, 2015

cker Stickers

ol Biohacker logo, Stickers that reate Something Beautiful" and ack the Planet" for you to stick ere(we recommend most places for faces of friends).

of 500 claimed Estimated delivery: March 2016 Ships Worldwide

GET THIS PERK

1,000 years ago

Today

Same Feeling, Similar Understanding

Upcoming Appointment Checkup on 13.May.2015 at 9:30am

Ο

0

Labs

HEART		Last 5 years				
277 pmol/L Myeloperoxidase		•				
181 ng/ml I	•					
● 4.7 mg/L						
▶ 155 mg/dl	Apolipoprotein B					
$123 \mathrm{mg/dl}$	123 mg/dl Apolipoprotein A1					
• 1.26 g/L	ApoB/ApoA Ratio					
• 62.6 mg/dl	sdLDL					
o 🛛 🔶 286 mg	/dl Total Cholesterol					
o	Direct HDL Cholesterol					
0 140 mg/dl	Triglycerides	•				
• 251 mg/dl	Non-HDL Cholesterol					
BLOOD COUNT						
$17 \mathrm{gm/dl}$	Hemoglobin (Hgb)	•				
52 %	Homatocrit (Hct)					

 $150k \, \mathrm{ml}$ $5.01 \, \mathrm{pg/ml}$ 9900 mm3

Glucose

Platelets

Red Blood Count

White Blood Count

Alcohol, drugs Exercise Happiness Triglycerides LDL Glucose **Blood** Pressure

Conditions

Environment

Vaccinations

Medications

Labs

277 pmol/L

HEART Myeloperoxidase 181 ng/ml Lp-PLAC2

155 mg/dl 123 mg/dl Apolipoprotein A1

Direct HDL Cholesterol

140 mg/dl 251 mg/dl Non-HDL Cholesterol

 $17 \, \mathrm{gm/dl}$ 52 % 150k ml 5.01 pg/ml 9900 mm3

BLOOD COUNT Hemoglobin (Hgb) Homatocrit (Hct) Platelets Red Blood Count White Blood Count

Triglycerides

101 mg/dl

Glucose

~ ·

Viggo Sonin A

Reality	Non- Non- <t< th=""><th></th><th><image/></th><th></th><th></th><th><image/></th><th><image/></th></t<>		<image/>			<image/>	<image/>
Juhan	Katie	Udo	Viggo	Epp	Aldo	Agnes	Ain
Sonin	Sonin	Sonin	Sonin	Sonin	Sonin	Morrison	Sonin
40 years old 1.Mar.1972 Male	40 years old 22.Jun.1971 Female	5 years old 17.Mar.2007 Male	1 year old 11.Aug.2010 Male	65 years old 9.Jun.1946 Female	33 years old 15.May.1979 Male	89 years old 31.Mar.1921 to 12.Nov.10 Female	73 years old 24.Dec.1937 to 21.Aug.10 Male
5', 10" 208 lbs 36" waist	$5', 4''$ 110 lbs $25'' \text{ waist} \qquad \longrightarrow \qquad$	4', 1" 39 lbs → 16" waist →	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5', 0" 129 lbs	6', o" 205 lbs 34" waist	5', 0" 110 lbs 28" waist	5', 9" 142 lbs
20/15 vision A+ blood type 117/79 BP 220 cholesterol	20/30 vision O+ blood type 120/85 BP 155 cholesterol \longrightarrow	O+ blood type	O+ blood type	20/30 vision AB+ blood type 122/81 BP 200 cholesterol	20/20 vision AB+ blood type 115/70 BP 215 cholesterol	30/30 vision A+ blood type 135/86 BP 195 cholesterol ——•	20/30 vision O+ blood type 140/90 BP 162 cholesterol
Repaired bicep tendon, right arm	Appendicemy Surgery on 28.Feb.93	No history	No history	No history	No history	Dimentia 3 more conditions	Dimentia Alzheimers (stage 2)
Surgery on 11.Dec.09	No allergies	No allergies	No allergies	No allergies	No allergies	No allergies	No allergies
No allergies	Megavitamin, 1/wk	No medications	No medications	Megavitamin, 1/day Aspirin, 81mg/day	No medications	Galantamine, 20mg/	Donepezil, 10mg/day
Megavitamin, 1/day		22 Surry Rd	22 Surry Rd	Zocor, 10mg/day	Fluent in English	2 more meds	5 more medications
Fluent in English, Estonian 22 Surry Rd Arlington, MA 02476	Fluent in English, Russian 22 Surry Rd Arlington, MA 02476 Juhan Sonin	Arlington, MA 02476 Juhan Sonin (father), 40 Kate Sonin (mother), 40	Arlington, MA 02476 Juhan Sonin (father), 40 Kate Sonin (mother), 40	Fluent in English, Estonian 104 Follen Rd Lexington, MA 02476	1205 Embarro Dr San Mateo, CA 92005 Single Juhan Sonin (brother), 40	Fluent in English, Estonian, French, German 820 Mass Ave, #410 Arlington, MA	Fluent in English, Estonian, Swedish 42 Mall Rd Atria LongMeadow Apt #110 Burlington, MA
Anthem Blue Cross	(nuspand), 40 Udo Sonin (son), 5 Viggo Sonin (son), 1 Anthem Blue Cross	Anthem Blue Cross XDX231A60874 800.627.8797	Anthem Blue Cross XDX231A60876 800.627.8797	Ain Sonin (husband), 74 (deceased) Juhan Sonin (son), 40 Aldo Sonin (son), 33	Anthem Blue Cross XDX742A59119 800.627.8797	Widower Epp Sonin (daughter), 64	Epp Sonin (wife), 65 Juhan Sonin (son), 40

and the Problem is...

Increasingly complex systems Tool and Methodology gap

Decision makers are swamped with conflicting data Our work is increasingly multi-dimensional (not a flat decision space)

Artifacts driving decisions need to be coordinated, presented

Minimal transparency into key health metrics

Dreary Old Manhattan...











Communication Issues

Inaccurate Information



Creation in Isolation





Privacy Concerns

DEC

Episodic Review





Patient Noncompliance



What happens when you leave the doctor's office?

Ambulatory Summary for Elizabeth Herlin

Table of Contents

Allergies Medications Problems Procedures Lab Results Past Encounters Social History Vaccine List Plan of Care Vitals Demographics Care Team Members

Allergies		
Name	Reaction	Sev
NKDA		

Medications

Notes: b12 supplement

Problems

Name	St
Hashimoto Thyroiditis	Ac
Vitamin D Deficiency	Ac
Low Blood Pressure	Ac

Procedures



Vaccine List

None recorded.

Plan of Care	
Appointments	None recorded.
Lab	None recorded.
Referral	None recorded.
Procedures	None recorded.
Surgeries	None recorded.
Imaging	None recorded.

Vitals Height 5 ft 11 in

Weight 160 lbs

BMI	Blood Pressure
22.3	118/68



Less than 1% of your care activities happen with your doctor





Less than 1% of your care activities happen with your doctor

the other 99% is up to

The Surveillance Invasion











Smart Sensors















Life first. Health a distant second.

Humans don't want to think about health.

But we can train robots to think about it, to be the hyper vigilant...

for us.

It's the mundane, everyday, minute details, mindless, invisible tasks...

Crappy for humans. Perfect for machines.

Then humans concentrate on the important stuff.

Focus on your dreams.

All of our data will be captured beautifully, without us knowing it.

All of our data will be captured beautifully, without us knowing it.

And when we have to input data, it will be a highly lubricated experience.








The data will be human and machine readable.

The data will be human and machine readable.

...structured, longitudinal, accessible, accurate, always updating...

It includes all of my data.

It includes all of my data. Life data.

My healthcare will help me understand my health status, needed behavior changes, and personalized care plans.

... and also help my entire care team.

My healthcare will help me understand my health status, needed behavior changes, and personalized care plans.

The treatments, my care plans, will dynamically evolve based on my ever-changing health status.

I will own, or co-own, my healthcare data.

I can proxy it to any person,

I can proxy it to any person, any organization,

I can proxy it to any person, any organization, any service,

I can proxy it to any person, any organization,

> any service, parts or whole,

I can proxy it to any person, any organization, any service, parts or whole, for today, tomorrow, or forever.

I will see health in advance.











Sensors throughout



1988



Sensors throughout



2018



Sensors throughout



2028

















Heart Disease Stroke Diabetes Parkinsons Alzheimer's










Source (Courtesy of Winchester Hospital. Do not copy)







Color-amplified (x150)



Nature, Nov 2018 **Reflecting Health, Smart Mirrors for Personalized Medicine** https://www.nature.com/articles/s41746-018-0068-7



Kohler, Jan 2019 **Smart Mirror w/Voice**

https://www.us.kohler.com/us/smarthome/content/verdera.htm







The nose

and breath

are windows into our health







From Data to Algorithm to Measurement to Policy

HEALTHCARE SYSTEM MODEL



precisionprism.org go**invo**





Standard Health Data Elements



What is Health Data?



WIKIPEDIA The Free Encyclopedia

Main page Contents Featured content Current events Random article Donate to Wikipedia Wikipedia store

Interaction

Help About Wikipedia Community portal Recent changes Contact page

Tools

Upload file Special pages Printable version

Ø

Languages

Special page

Search results

Q health data

Content pages Multimedia Everything Advanced

The page "Health data" does not exist. You can ask for it to be created, but consider checking the search results below to see whether the topic is already covered.

Health Data Consortium

The **Health Data** Consortium (HDC) is a Washington, D.C.-based public-private partnership that advocates for the availability and use of **health data**, in 5 KB (482 words) - 19:10, 1 July 2017

Health information exchange

information among different **health** care information systems. The goal of HIE is to facilitate access to and retrieval of clinical **data** to provide safer and more 46 KB (4,009 words) - 20:26, 4 August 2017

Data quality

devices in **health**, or m**Health**, creates new challenges to **health data** security and privacy, in ways that directly affect **data** quality. m**Health** is an increasingly 28 KB (3,525 words) - 15:58, 8 August 2017

Solution Not logged in Talk Contributions Create account Log in



Children's **Health** Insurance Program Reauthorization Act of 2009/Title VI/Subtitle A

Miscellaneous Provisions Subtitle A: Program Integrity and **Data** Collection 370289Children's **Health** Insurance Program Reauthorization Act of 2009 — TITLE



From Wikisource

GNU Health/Health Institutions

contain the parent center, optimizing **data** entry and minimizing human error. Beds are the most basic facilities in a **health** institution.

What is Health Data?



WikipediA The Free Encyclopedia

Main page Contents Featured content Current events Random article Donate to Wikipedia Wikipedia store

Interaction

Help About Wikipedia Community portal Recent changes Contact page

Tools

Upload file **Special pages** Printable version

Languages



Special page

Search results

Q health data

Content pages Multimedia Everything Advanced

The page "Health data" does not exist. You can ask for it to be created, but consider checking the search results below to see whether the topic is already covered.

The page "Health data" does not exist. You can ask for it to be created, but consider checking the search results below to see whether the topic is already covered.

Data quality

devices in health, or mHealth, creates new challenges to health data security and privacy, in ways that directly affect data quality. mHealth is an increasingly 28 KB (3,525 words) - 15:58, 8 August 2017

Solution Not logged in Talk Contributions Create account Log in



contain the parent center, optimizing data entry and minimizing human error. Beds are the most basic facilities in a health institution. Creating a had record





























































Health Data is any information

about a person's life that assists in making decisions about health and wellness.





Health Data is standardized.

Health Data is standardized.

Well....









// CDA Blue Button CCD

J W





Overall Health System Ranking of 11 Industrialized Countries

1	United Kingdom	ŀ
2	Switzerland	ŀ
3	Sweden	ŀ
4	Australia	ŀ
5	Germany	٢
6	Netherlands	I
7	New Zealand	I
8	Norway	ŀ
9	France	ŀ
10	Canada	ŀ
11	United States	Ι

- Has a Standard Health Record
- National Identified but no SHR
- In Process of Creating a SHR
- n Process of Creating a SHR
- Has a Standard Health Record
- Has a Standard Health Record
- Has a Standard Health Record
- Does not have a SHR

#1: United Kingdom

Summary Care Record (Est. 2010: 97% adoption)

- Provides medication list, adverse drug interactions, and allergies
- provided to patients

#2: Switzerland

Statutory Health Insurance Smart Card

- Established in 2007 by the eHealth Strategy for Switzerland
- Medications)

#3: Sweden

National Patient Summary (NPÖ)

- Established in 2008
- The NPÖ makes patients' health records available to all authorized care staff nation-wide
- contacts, Documentation and test results)

• Provides a well-understood and unambiguous representation of critical and core information • Outcomes: 73% agreed that the SCR helped avoid medication errors, In 87% of encounters, SCR provided information that would otherwise be unknown, 92% agreed that SCR has improved service

• Digitally encodes summary information for the patient and all necessary administrative data • Pilots since 2010 storing summary information on the card (National Identifier, Allergies, Diagnoses,

• NPÔ provides a centralized repository of patient summary data (Medication list, Diagnoses, Care

• Information transferred according to the same standard with coordinated data entry templates







#11: United States

No Standard Health Record

- US has failed to define a key component found in all topperforming healthcare systems

Result = Health Information Exchange (HIE) chaos

- Over 120 incompatible private and regional HIEs
- terminology, exchanging, merging, storing, securing, and authorizing 3rd party access

• A common operational picture of the patient does not exist

• What does exist is fragmented, non-standard, and poorly shared

• Significant questions around standards, data models, mapping,

Establish + Evolve SHR

Identity

Patient name(s)* Date of Birth* Local System Identifiers Biometric identifiers (Photograph, fingerprints, etc.) Address(es) (allow for special situations: homeless, migrant worker) Telephone number(s) Email and other e-addresses Emergency contact(s) Matrilineal name (?) Legal guardian (if minor) Languages* (incl. preferred) Race/ethnic group* Religious practice (i.e. Atheist, practicing) National origins Gender (Self-attributed) (if needed, include Phenotypic, Genotypic, Phenotypic, Legal, Administrative genders)

Preferences

Consent for data sharing Healthcare proxy Advance directives Health goals* Preferred pharmacy

Health Status

Current medications* Allergies, Sensitivities, Contraindications, Intolerances (drug*, food, environ) Problems * Concerns* Plan of care* Medical appliances or devices* Disabilities/Activities of Daily Living Biometrics (weight, height, head circumference, length (pediatric)) Vital signs* (BP, temperature, HR, SPO2) Hospitalizations (SHR completeness score includes current and trailing year only) Procedures* Immunizations* Outpatient encounters Lab tests and results (recent)* Other assessments

Support

Payment source Insurance (incl. identifier(s)) Care team members* Resources (social support groups, food support, housing support, religious groups, etc.)

standardhealthrecord.org

Social/Environment Marital status

Income level Education/Literacy level Food status/security Transportation availability Household hazards (e.g. guns, swimming pool, trampoline) Housing situation/security Employment status/security Social isolation/exclusion Domestic violence or abuse Risks to patient, provider, or third party

Behavior

Mental Health Physical activity Smoking status* Drug and alcohol use Medication compliance Sexual behavior (incl. preference)

Heredity/Genetics

Family health history Genetic information (TBD)

Oncology, Genomics, PC = Top Priorities SHR v1 * ONC Common Clinical Data Set

SHR Construction

Simple and prescriptive specification

- Rooted in clinical practice

- Leverage existing data-in-motion standards

Informed by US and International precedents

- ONC Common Clinical Data Set (CCDS)
- UK Summary Care Record & others

• Rendered to be understandable and verifiable by clinicians • Largely structured data (for computability), with narratives

• Bi-directional mapping to FHIR, C-CDA, Blue Button JSON

Standard Health Record Changes the Game

Focusing on exchange standards alone has been pushed hard enough to standardize health data

ineffective because vendors and providers have not been

Providing a clear target in the form of a well designed, computable, digital standard health record will cause a 10x acceleration in health data interoperability in the US

Data Completeness

Standard Health Data Elements







Data Completeness



Patient identification 16% of SHR

> Patient support 4% of SHR

Current health and care plan 36% of SHR

Health history 10% of SHR

Social/environmental factors 7% of SHR

> Behavior 8% of SHR

Emergency 19% of SHR

The macro categories to the left are from the SHR v01 ppt. Categories found in the SHR v02 xl file were nested under related categories from SHR v01
Data Completeness Continuum





Empty



Half complete

Complete



Data Completeness Continuum



- Identity
- Support
- Preferences
- Health Status
- Social/Environment Behavior Heredity/Genetics



Breadth

Complete record





HEALTH DATA MANAGER SYSTEM DIAGRAM v01 18.MAY.18



Consumer services and products

n View
Data
al <u>non hispanic</u> or ast, diagnosed on 13 May 2017, is of aging, and
derwent a sentinel

Determinants of Health

Data Completeness

Standard Health Data Elements





Medical

21%

Biology



23%

7% Physical Environment





7% Physical Environment





Vaccine registries

>

--

Rapid Estimate of Adult Literacy in Medicine (REALM)

Metrics

Provider linguistic

competency

Provider cultural competency

- Single-gene





11% Medical Care

(PAM survey)

Vaccine registries

Rapid Estimate of Adult Literacy in Medicine (REALM)

Metrics

Provider linguistic competency

> Provider cultural competency

Single-gene



Scenarios of Care

Access

Determinants of Health



60,000 ways a human fails

60,000 encounters



-



34 -







Public Health Policy Clinical Research

Next up for designers, engineers, clinicians, and policy wonks: Determine the Top 100 health signals, encounters











Standardize the measurement.



Standardize the algorithms.

Standardize the measurement.



Standardize primary care.

Standardize the algorithms.

Standardize the measurement.

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record.

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

and their personalized care plan.

2. Help the patient understand their health status, any needed behavior changes,

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

2. Help the patient understand their health status, any needed behavior changes, and their personalized care plan. This helps the patient to manage their health.

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

and their personalized care plan. This helps the patient to manage their health.

walk-in, drive thru, by appointment, and EMS.

- 2. Help the patient understand their health status, any needed behavior changes,
- 3. Help the patient access health services via text, email, voicemail, telephone, app,

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

and their personalized care plan. This helps the patient to manage their health.

walk-in, drive thru, by appointment, and EMS. Make health easier.

- 2. Help the patient understand their health status, any needed behavior changes,
- 3. Help the patient access health services via text, email, voicemail, telephone, app,

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

and their personalized care plan. This helps the patient to manage their health.

walk-in, drive thru, by appointment, and EMS. Make health easier.

work with the patient on a consensus standard of care plan.

- 2. Help the patient understand their health status, any needed behavior changes,
- 3. Help the patient access health services via text, email, voicemail, telephone, app,

4. Help the primary care clinician to accurately diagnose, explain, educate, and

1. Help the patient own, control, and understand their complete, merged, accurate, timely, digital standard health record. This helps the patient own their health.

and their personalized care plan. This helps the patient to manage their health.

walk-in, drive thru, by appointment, and EMS. Make health easier.

work with the patient on a consensus standard of care plan.

- 2. Help the patient understand their health status, any needed behavior changes,
- 3. Help the patient access health services via text, email, voicemail, telephone, app,

- 4. Help the primary care clinician to accurately diagnose, explain, educate, and
- 5. Standardize Primary Care digital health data in the United States and in the world by 2020 to begin to achieve #1, #2, #3, and #4 on any standard smartphone.



The patient should own their data, own care plan, and control who sees it.

Legally, this may mean co-ownership.

The patient should own their data, own care plan, and control who sees it.

Legally, this may mean co-ownership.

John's Care Team



John Stevenson 2552 Mass Ave, Cambridge, MA 02140 (781) 315-5029

care plan owner



Dr. Divya Dua Primary Doctor **UMass Memorial Medical** 26 Queen Street # 3, Worcester, MA 01610 (781) 893-2947





Shirley Tozzi Care Manager (619) 282-9284





Emily S. Partner emilys@gmail.com (713) 882-2849

cannot view plan



The patient should own their data, own care plan, and control who sees it.

Rarely the case.



The patient should own their data, own care plan, and control who sees it.

Rarely the case.




Can a patient legally own their health record?

Can a patient legally own their health record?

We're surrounded by closed, proprietary terminologies used in all modern healthcare records.

Can a patient legally own their health record?

We're surrounded by closed, proprietary terminologies used in all modern healthcare records.

Then our health record is in legal reach.

So we, the patients, need a terminology license.

HCAHPS measures the past.

Today

YOUR CARE FROM DOCTORS

courtesy and respect?

5.

- ¹D Never
- ²D Sometimes
- Usually
- ⁴D Always



During this hospital stay, how often did doctors treat you with



Tomorrow

We focused on three easy actions to implement at the patient's bedside—*Knock, Sit, Ask*:

 Knock on the patient's door or curtain as a way to show respect for his or her privacy.

2. Sit at the patient's bedside. Research indicates that patients overestimate the time a physician spends with them by 15% if the physician sits, versus underestimating the time spent by 8% for the same conversation held in a standing position.

3. Ask the question: What is your greatest concern? This serves to address the patient's inner uncertainties that he or she may not otherwise express to the clinician. It demonstrates that the physician is indeed listening to the patient, considering that a

Today

YOUR CARE FROM DOCTORS

- 5. During this hospital stay, how often did doctors treat you with <u>courtesy and respect</u>?
 - ¹ Never
 - ² Sometimes
 - ³ Usually
 - ⁴□ Always
- During this hospital stay, how often did doctors <u>listen carefully</u> <u>to you</u>?
 - ¹ Never
 - ² Sometimes
 - ³ Usually
 - ^₄□ Always
- 7. During this hospital stay, how often did doctors <u>explain things</u> in a way you could understand?
 - ¹ Never

Today

YOUR CARE FROM DOCTORS

- During this hospital stay, how 5. often did doctors treat you with courtesy and respect?
 - ¹ Never
 - ² Sometimes
 - ³ Usually
 - ⁴ Always
- During this hospital stay, how 6. often did doctors listen carefully to you?
 - ¹ Never
 - ² Sometimes
 - ³ Usually
 - ⁴ Always
- During this hospital stay, how 7. often did doctors explain things in a way you could understand?





We focused on three easy actions to implement at the patient's bedside—*Knock*, *Sit*, *Ask*:

1. *Knock on the patient's door or curtain* as a way to show respect for his or her privacy.

2. Sit at the patient's bedside. Research indicates that patients overestimate the time a physician spends with them by 15% if the physician sits, versus underestimating the time spent by 8% for the same conversation held in a standing position.

3. Ask the question: What is your greatest concern? This serves to address the patient's inner uncertainties that he or she may not otherwise express to the clinician. It demonstrates that the physician is indeed listening to the patient, considering that a patient's concerns are often different than those of the treating physician.

http://catalyst.nejm.org/physician-led-coaching/

Catalyst Tomorrow

Patient Experience HCAHPS 2020

New measurements + goals.

Patient Experience Metrics

Chief complaint response submitted from anywhere in the world, at any time, with a response instantaneously from RN-bot + within 5 minutes from a clinician

Primary care diagnosis has a 99% hit rate (clinician + algorithm working together)

Receive an encounter receipt within 5 minutes of session completion. Asynchronous updating if required.

Clinician Experience Metrics

Practice from anywhere, any time, for how long I want.

In concert with the patient, care team, and services, correctly diagnose the issue 99% of the time, at the time of encounter.

Near hands-free data collection and automation, recommendations, and medical record pre/during/postencounter.



This also assumes we know the key problems of Healthcare.

Assessment, measurement requires problem definition.



Healthcare Problems Enumerated

Health Problem #01 Americans do not all have access to Primary Care. [Everyone needs Primary Care. Everyone!]

#02: Too many Americans can't navigate the healthcare [It's too damn complicated!]

#03: Healthcare price data is not standardized.

#04: Prescription drugs prices are too high.

#05: Virtual Primary Care is only on 0.3% of smartphor 2017.

#06: Too few Massachusetts residents can walk to their community health center.

#07: There too few Health Centers and too many Health Clinics in Massachusetts.

svstem.	#08: Medical Schools are not collaboratively standardizing the health data, health metrics, and health system algorithms used to care for human beings.
by beenna	#09: Patients don't own, manage, and fully control their personal health record.
	#10: Too many Americans die from Opioid Use Disorder.
nes in	#11: Mental health is not integrated into everyday healthcare.
	#12: Too many Americans eat shit (ie, are not eating real food).
h	#13: Too many

100% Primary Healthcare = 70% Virtual PC + 30% In-Person PC

Diminishing Health, Gradual Deterioration



20th century Aging Cycle



Diminishing Health, Gradual Deterioration





Traditional Healthcare





Time

Virtual Primary Care





Time

DocBots + Virtual Primary Care



Level of Sickness

Time







Sustained Good Health, Very Rapid Deterioration



Sustained Good Health, Very Rapid Deterioration

iGeneration



We are the must underutilized resource in healthcare.

Less than 1% of your care activities happen with your doctor

the other 99% is up to





DR. CHUN HEY THERE, HOW ARE YOU FEELING TODAY? STILL HAVE THAT BURN? ITHINK IT'S GOT ABOUT WORSE. IT'S ALL THE SAME BETTER!









differential diagnosis



differential diagnosis

treatment selection



differential diagnosis






Section of the

Special thanks to: Sarah Kaiser, Edwin Choi, Eric Benoit, Jen Patel, Craig McGinley, Sharon Lee, Jon Follett, Xinyu Liu, Mark Kramer, Andre Quina, Parsuree Vatanasirisuk Eric Topol, Harry Sleeper

> Juhan Sonin juhan@mit.edu



