

DSHS Grand Rounds

April 29

**Health Information
Technology for
Hypertension and Diabetes**

**Presenter: Kevin Hwang, MD, MPH,
University of Texas Medical School at
Houston**



Logistics

Registration for free continuing education (CE) hours or certificate of attendance through TRAIN at: <https://tx.train.org>

Streamlined registration
for individuals not requesting CE hours
or a certificate of attendance

1. webinar: <http://www.dshs.state.tx.us/grandrounds/webinar-no-CE.shtm>

2. live audience: sign in at the door

For registration questions, please contact Laura Wells, MPH at
CE.Service@dshs.state.tx.us

Logistics (cont.)

Slides and recorded webinar available at:

<http://www.dshs.state.tx.us/grandrounds>

Questions?

There will be a question and answer period at the end of the presentation. Remote sites can send in questions throughout the presentation by using the GoToWebinar chat box or email GrandRounds@dshs.state.tx.us.

For those in the auditorium, please come to the microphone to ask your question.

For technical difficulties, please contact:

GoToWebinar 1-800-263-6317(toll free) or 1-805-617-7000

Disclosure to the Learner

Requirement of Learner

Participants requesting continuing education contact hours or a certificate of attendance must register in TRAIN, attend the entire session, and complete the online evaluation within two weeks of the presentation.

Commercial Support

This educational activity received no commercial support.

Disclosure of Financial Conflict of Interest

The speakers and planning committee have no relevant financial relationships to disclose.

Off Label Use

There will be no discussion of off-label use during this presentation.

Non-Endorsement Statement

Accredited status does not imply endorsement by Department of State Health Services - Continuing Education Services, Texas Medical Association, or American Nurses Credentialing Center of any commercial products displayed in conjunction with an activity.



Kirk Cole
Interim DSHS Commissioner
is pleased to introduce our
DSHS Grand Rounds speaker

Health Information Technology for Hypertension and Diabetes



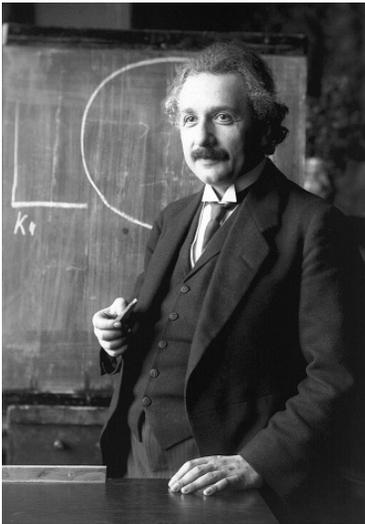
Kevin O. Hwang, MD, MPH
Associate Professor of Medicine
at the University of Texas
Medical School at Houston

Learning Objectives

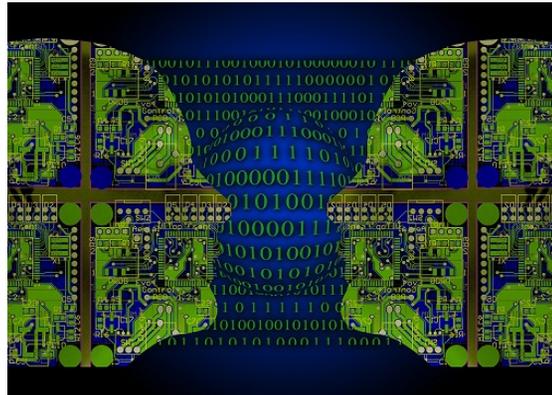
Participants will be able to:

1. Describe major types of health information technology (HIT).
2. Identify opportunities to use HIT to improve quality of care, health behavior, and health outcomes in patients with hypertension and diabetes.
3. Discuss the diversity of team members best suited to taking full advantage of HIT.

Biomedical Informatics



Scientific inquiry,
problem solving,
decision making

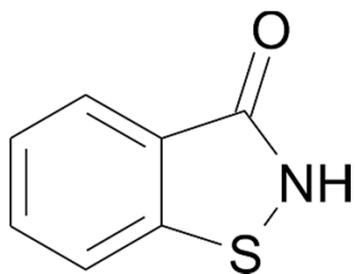


Biomedical data,
information,
knowledge



Health

<https://www.amia.org/biomedical-informatics-core-competencies>



Molecules



Populations



Biological systems



Social systems



Basic
science

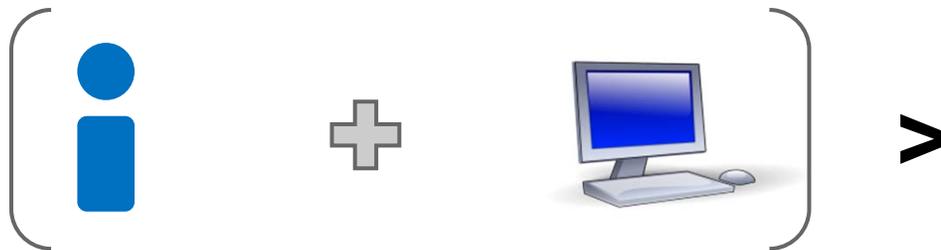
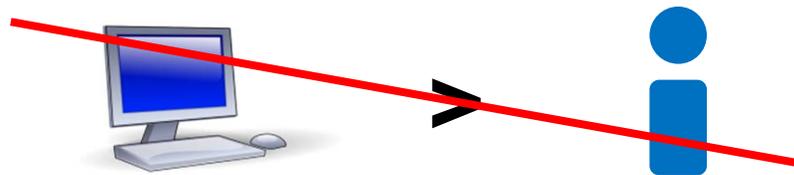


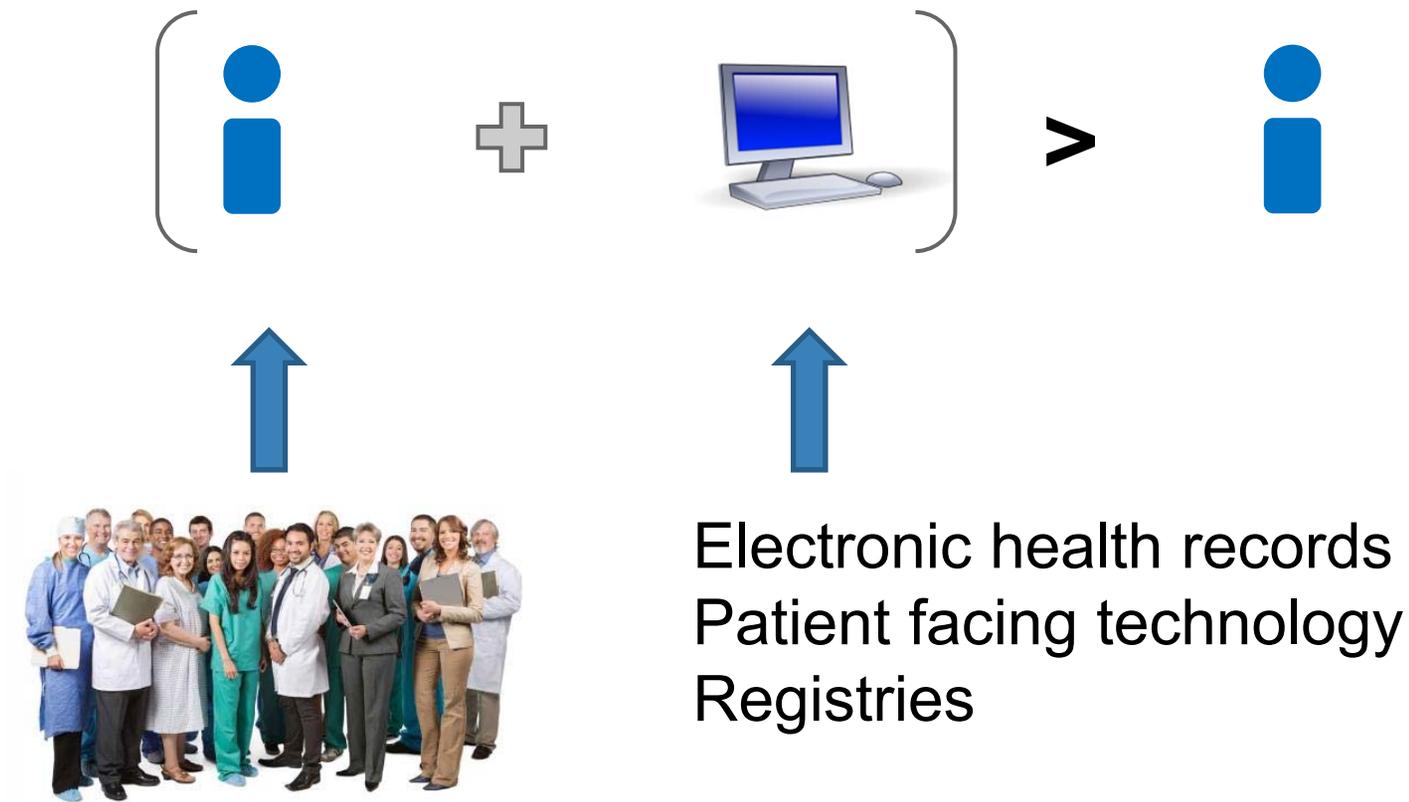
Clinical
care

“A person working in partnership with an information resource is ‘better’ than that same person unassisted.”

Charles Friedman

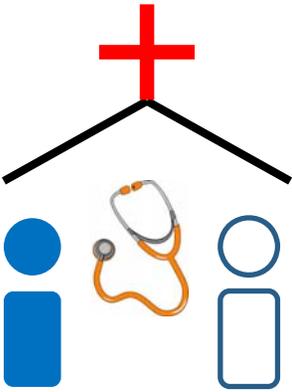
Fundamental Theorem of BMI

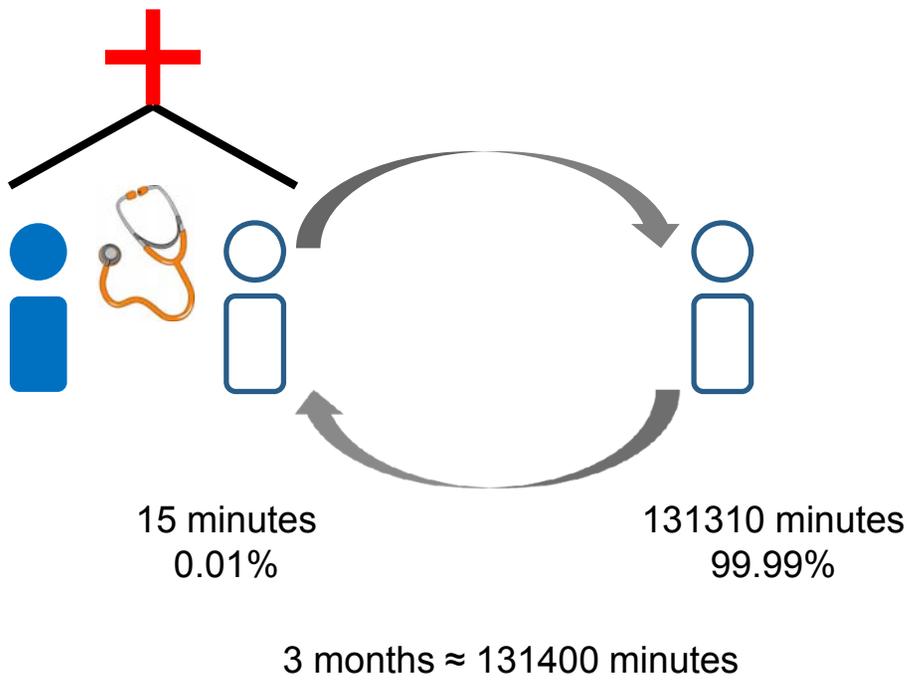


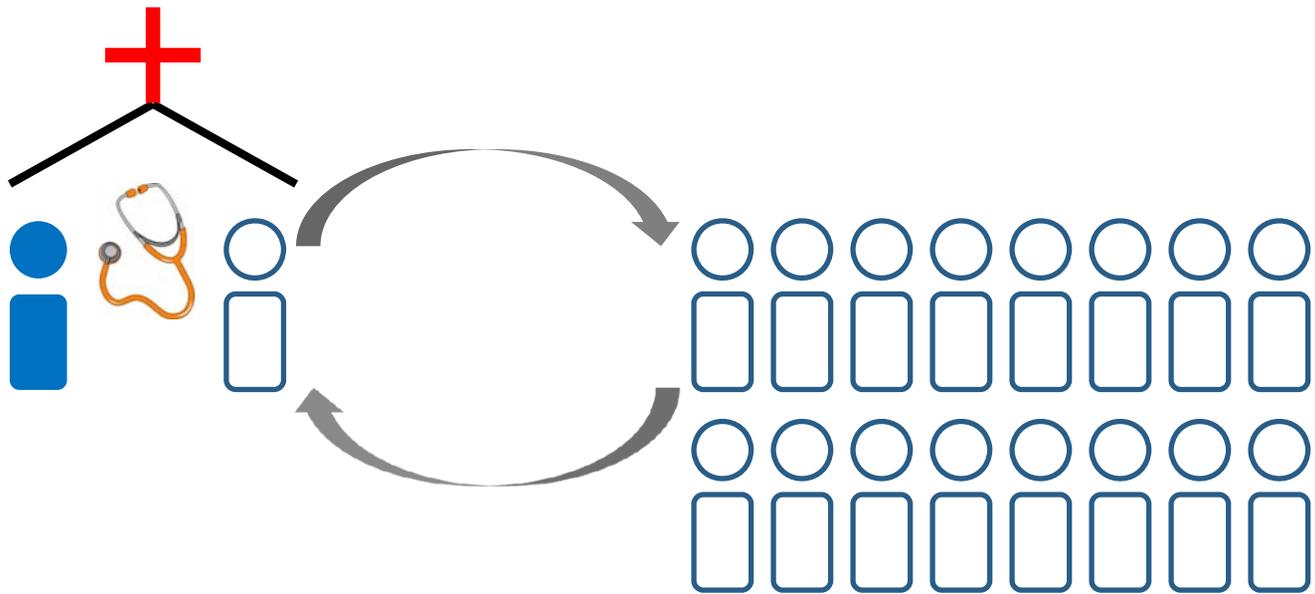


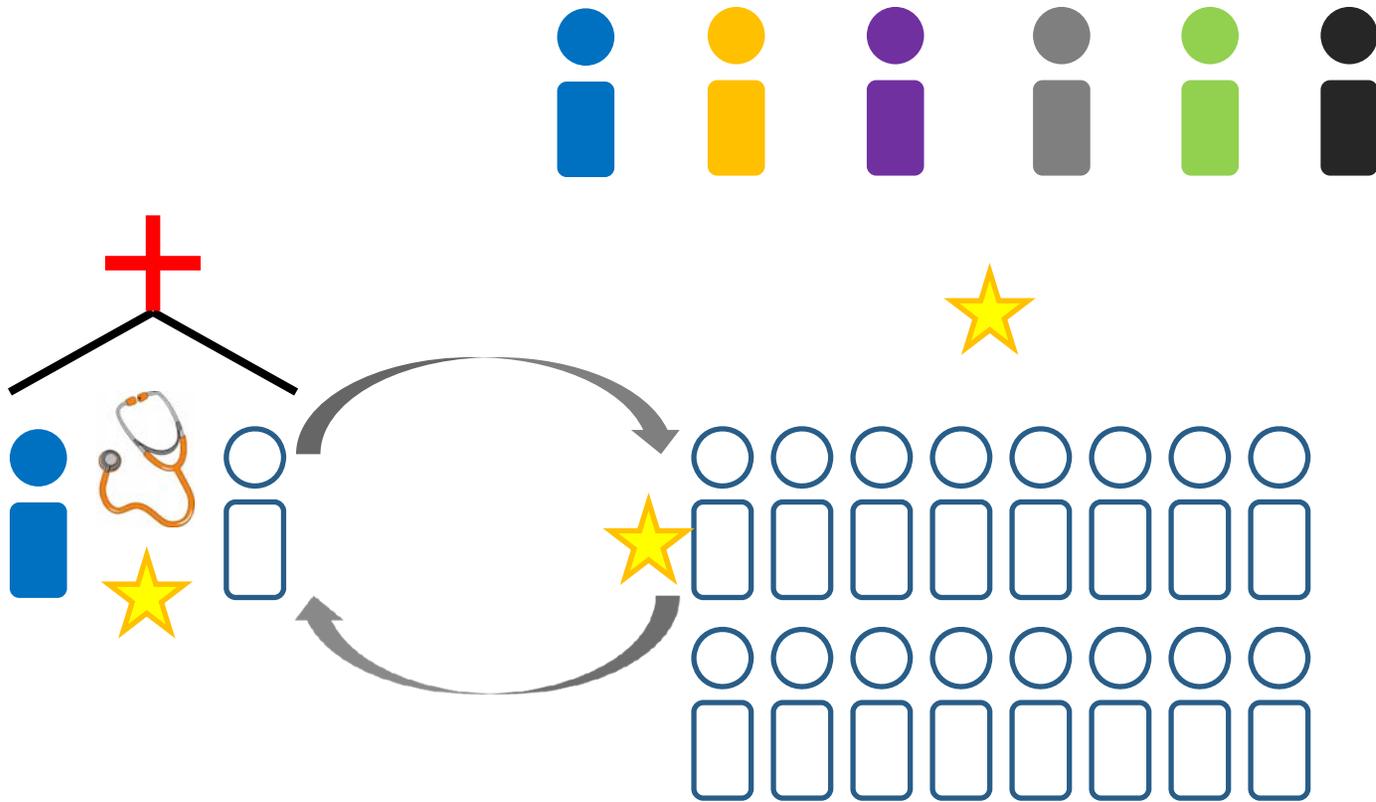














Electronic Health Records (EHR)

EHR

Demographics and contact information

Clinical data

Administrative information

EHR

Computerized Provider Order Entry



EHR

Safety alerts



Hard stops



EHR

Decision support & reminders



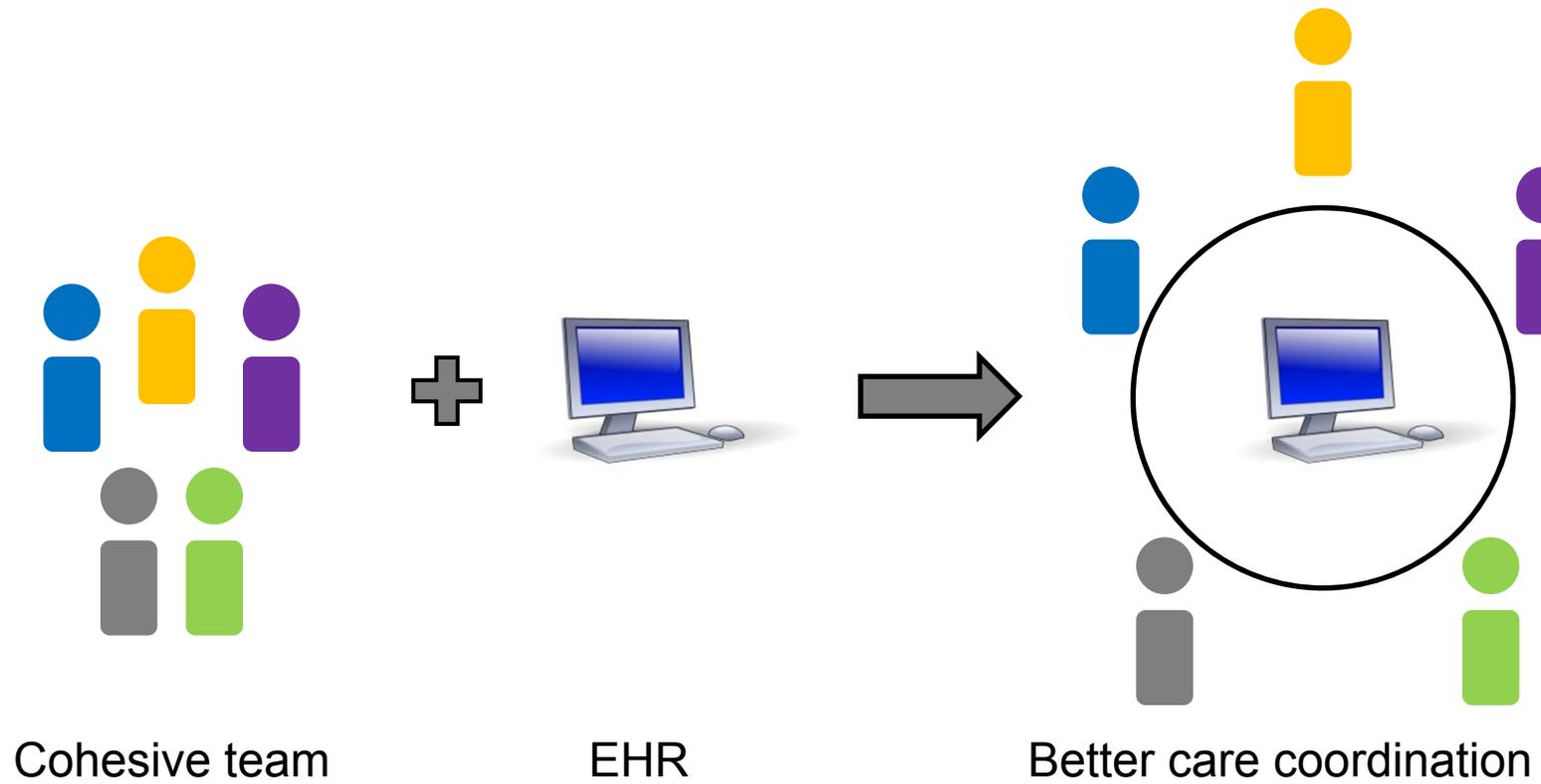
Diabetic patient:

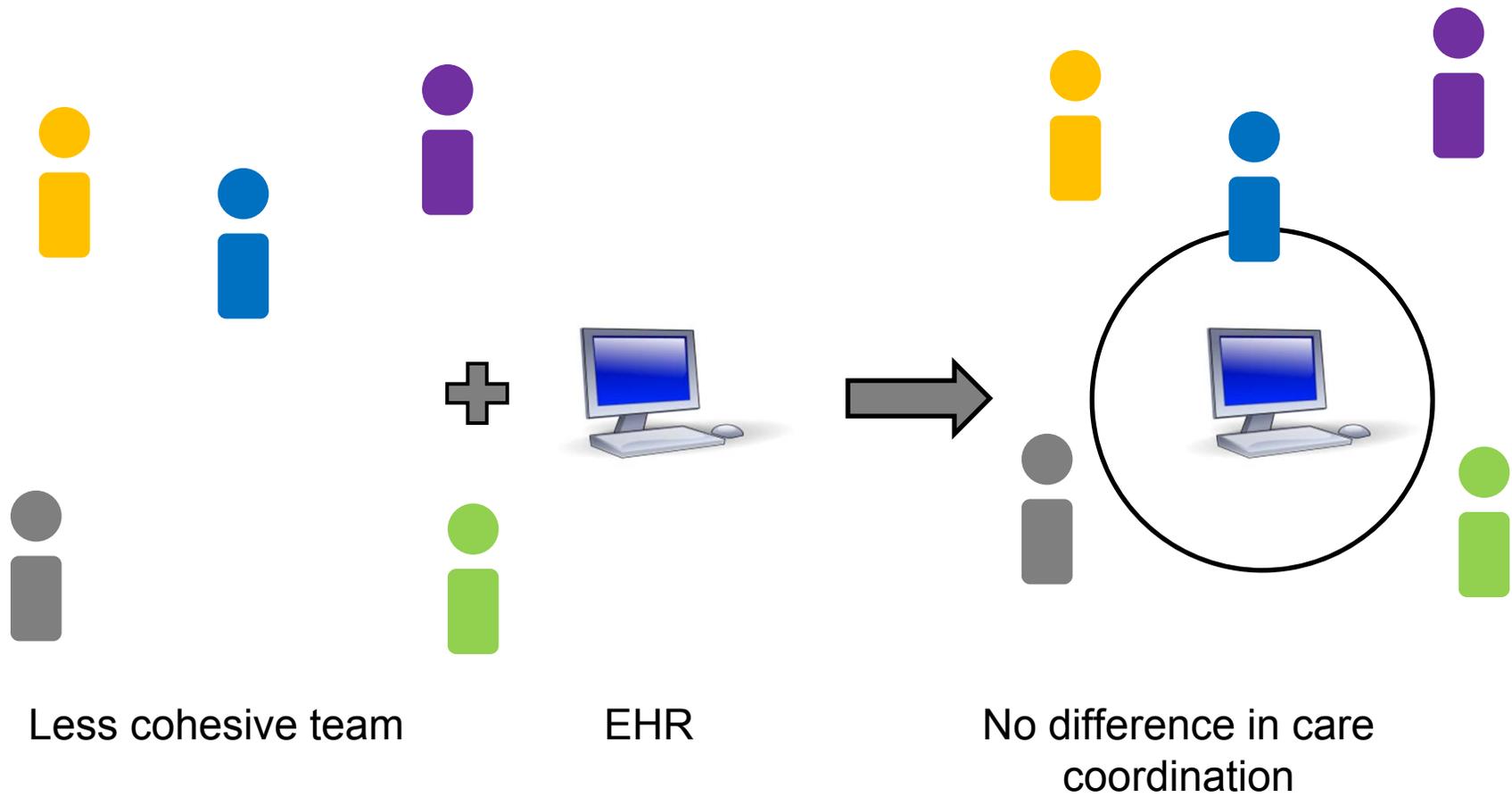
- ASA
- Statin
- Pneumococcal vaccine
- Eye exam

EHR

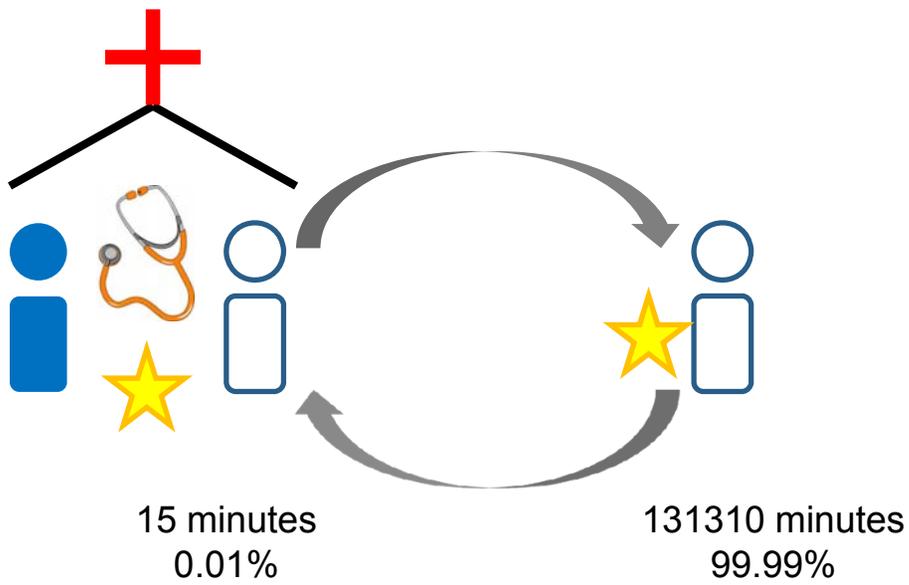
Care Coordination?







“While EHRs have the potential to improve care quality, they are not panaceas and their impact may be limited if deficiencies of the work environment, such as team cohesion, are not addressed.”



3 months \approx 131400 minutes

Patient Facing Technology



**Access
your
Health
Record
Online**

Take control of your health records online, anywhere, anytime!

*My*UTP



Patient Portal

- Schedule appointments
- Request refills
- View test results
- Exchange secure messages
- Improve accuracy of records

Patient portal & statin non-adherence

Observational cohort study

Portal use pattern

Non-users (n=9055)

Occasional users (n=5418)

Exclusive users (n=3287)

Statin non-adherence

No change

26% → 24%

22% → 15%

mHealth for chronic disease

Systematic review of 107 studies

Condition	Studies
DM	67
Cardiovascular: HTN, CAD, CHF	27
Chronic lung: Asthma, COPD	19

mHealth for chronic disease

mHealth tools

- SMS
- video messaging
- phone + app
- phone + device

mHealth for chronic disease

mHealth tools were generally usable, feasible, acceptable and appreciated, even among low-income, elderly, and minority groups

Caveats

- Concern about depending too much on technology
- Technical issues: too many menus; small buttons
- Cost

mHealth for chronic disease

Impact on **adherence to treatment** (n=27 studies)

Condition	Significant effect	No significant effect	Mixed effect
DM	7	5	2
Cardiovascular	5	1	0
Chronic lung	4	4	0
Total	15	10	2

* Some studies addressed DM and cardiovascular

Hamine S et al. J Med Internet Res 2015;17(2):e52. <http://www.jmir.org/2015/2/e52/>

mHealth for chronic disease

Impact on **clinical outcomes** (n=41 studies)

Condition	Significant effect	No significant effect	Mixed effect
DM	11	9	6
Cardiovascular	7	2	4
Chronic lung	0	3	3
Total	16	14	11

* Some studies addressed DM and cardiovascular

Hamine S et al. J Med Internet Res 2015;17(2):e52. <http://www.jmir.org/2015/2/e52/>

Consumer HIT & DM

- 67 RCTs
- Consumer HIT for DM self-management
- Type 1 and type 2 DM
- Meta-analysis for outcomes with ≥ 10 RCTs
- Narrative review for other outcomes

Consumer HIT & DM

Outcome	SMD*	95% CI
HbA1c**	-0.31	-0.44 to -0.19
Systolic BP	-0.17	-0.32 to -0.01
Diastolic BP	-0.27	-0.43 to -0.11
Total cholesterol	-0.29	-0.45 to -0.13
Triglycerides	-0.31	-0.57 to -0.05

*SMD 0.2 ~ small effect
SMD = 0.5 ~ medium effect
SMD = 0.8 ~ large effect

**Publication bias

Consumer HIT & DM

Outcome	SMD*	95% CI
Fasting gluc	-0.15	-0.37 to 0.07
Weight	0.00	-0.11 to 0.12
BMI	-0.13	-0.284 to 0.02
HDL	0.06	-0.17 to 0.28
LDL	-0.17	-0.36 to 0.03
QOL**	0.05	-0.23 to 0.33
Depression	-0.06	-0.17 to 0.05

*SMD 0.2 ~ small effect
SMD = 0.5 ~ medium effect
SMD = 0.8 ~ large effect

**Publication bias

Consumer HIT & DM

Outcome	RCTs with Improvement
Postprandial glucose level	2 of 7
Hyperglycemia incidence	2 of 4
Hypoglycemia incidence	2 of 13
Average glucose level	0 of 5
Waist circumference	0 of 3
DKA incidence	0 of 3

Consumer HIT & DM

Outcome	RCTs with Improvement
Self-monitoring frequency	6 of 8
Physical activity	2 of 4
Dietary behavior	2 of 8
Medication adjustment behavior	1 of 2
Adherence to self-care behavior	4 of 9

Lesson #1

There is **potential** for mHealth and consumer HIT to improve adherence and clinical outcomes among patients with chronic disease like DM and HTN

Lesson #2

Evidence of efficacy is **mixed**, given the heterogeneity in patient populations, target conditions, treatment goals, co-interventions, tools themselves.

Other factors

- Poor usability of technology
- Mismatch between technology, patient needs, and self-management activities
- Social and environmental factors

Lesson #3

mHealth and consumer HIT tools are **communications platforms** and **delivery mechanisms**, but not complete solutions; they won't improve adherence to treatment in a vacuum







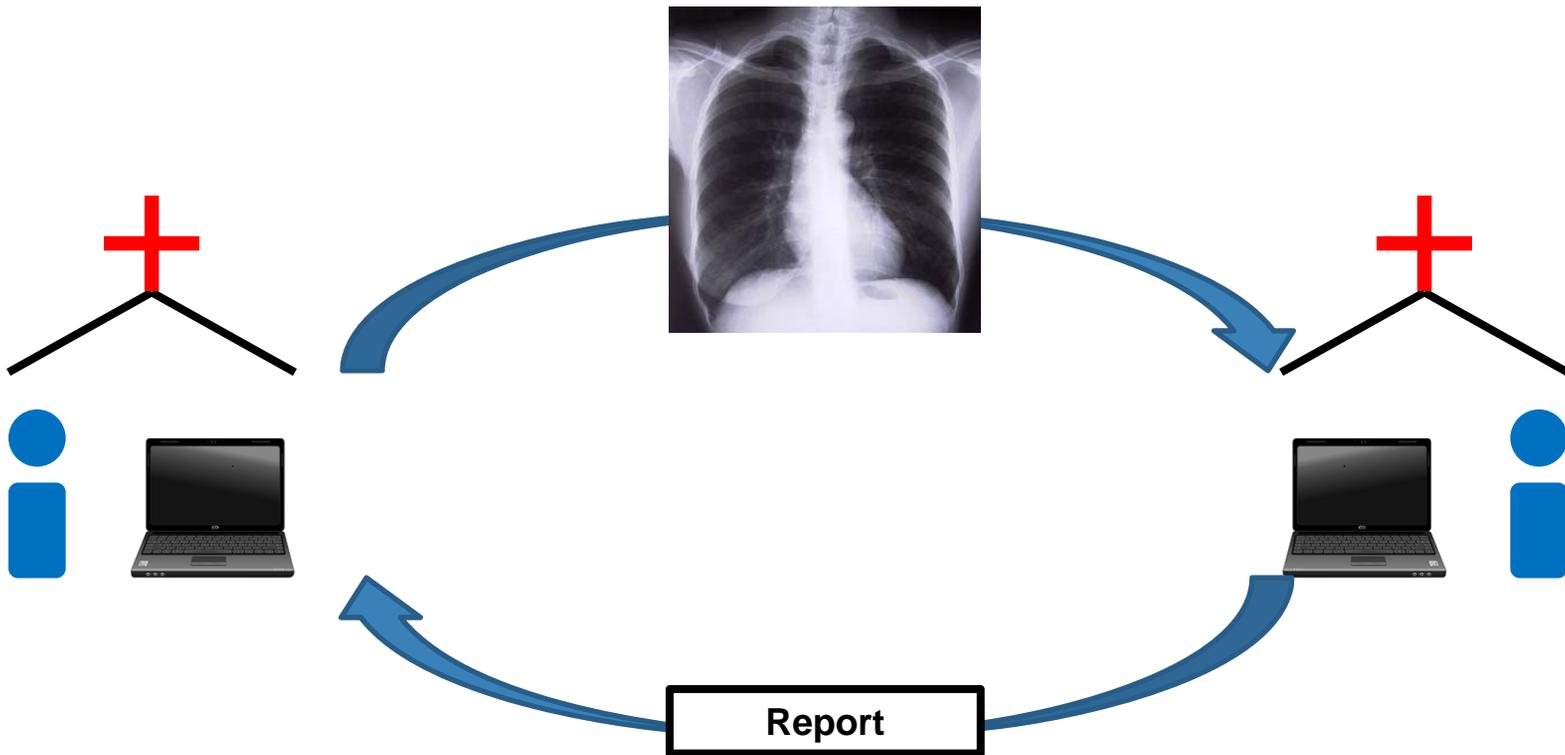
Too much data?

Telemedicine

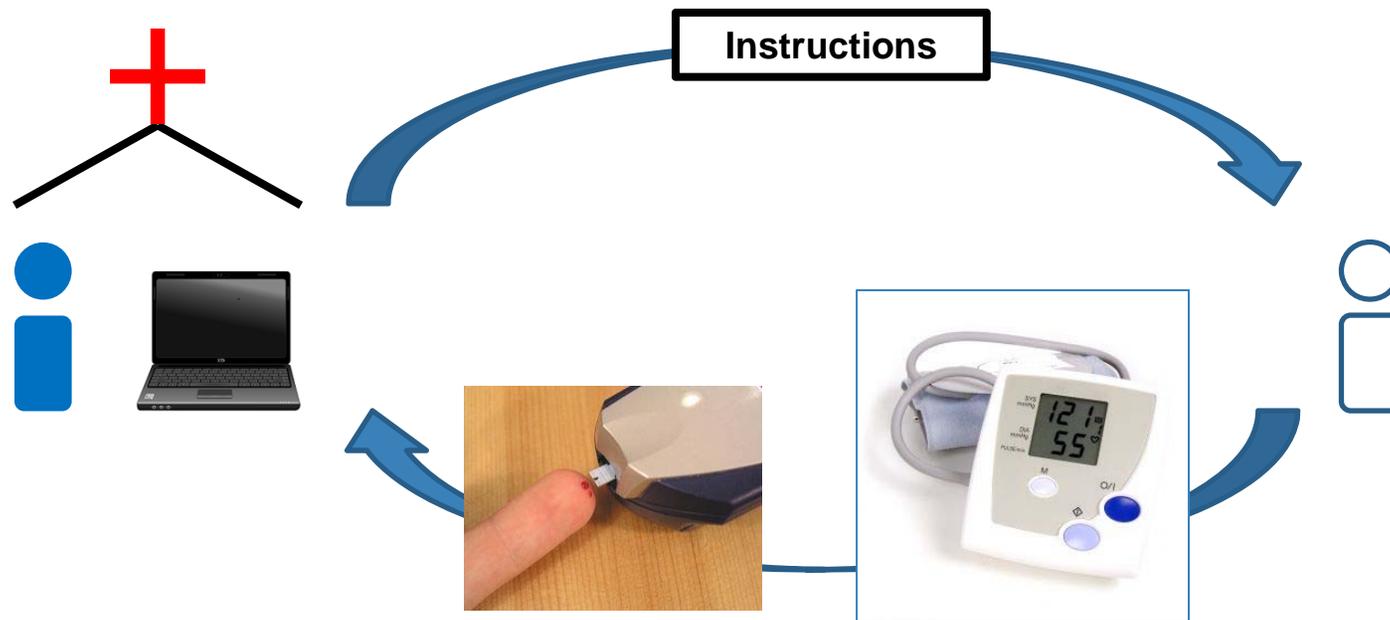
Modes of telemedicine

- Store-and-forward
- Remote monitoring
- Interactive

Store-and-forward



Remote monitoring



Home BP telemonitoring

Leverages greater accuracy of home BP vs office BP

Patient adherence ~ 48 to 90%

Patient acceptance ~ 69 to 100%

Home BP telemonitoring

Home BP telemonitoring vs usual care:

- ↓ SBP and DBP
- ↑ % reach BP goal
- ↑ quality of life
- Same treatment adherence
- Same rate of adverse events
- ↓ medical costs offset by cost of technology

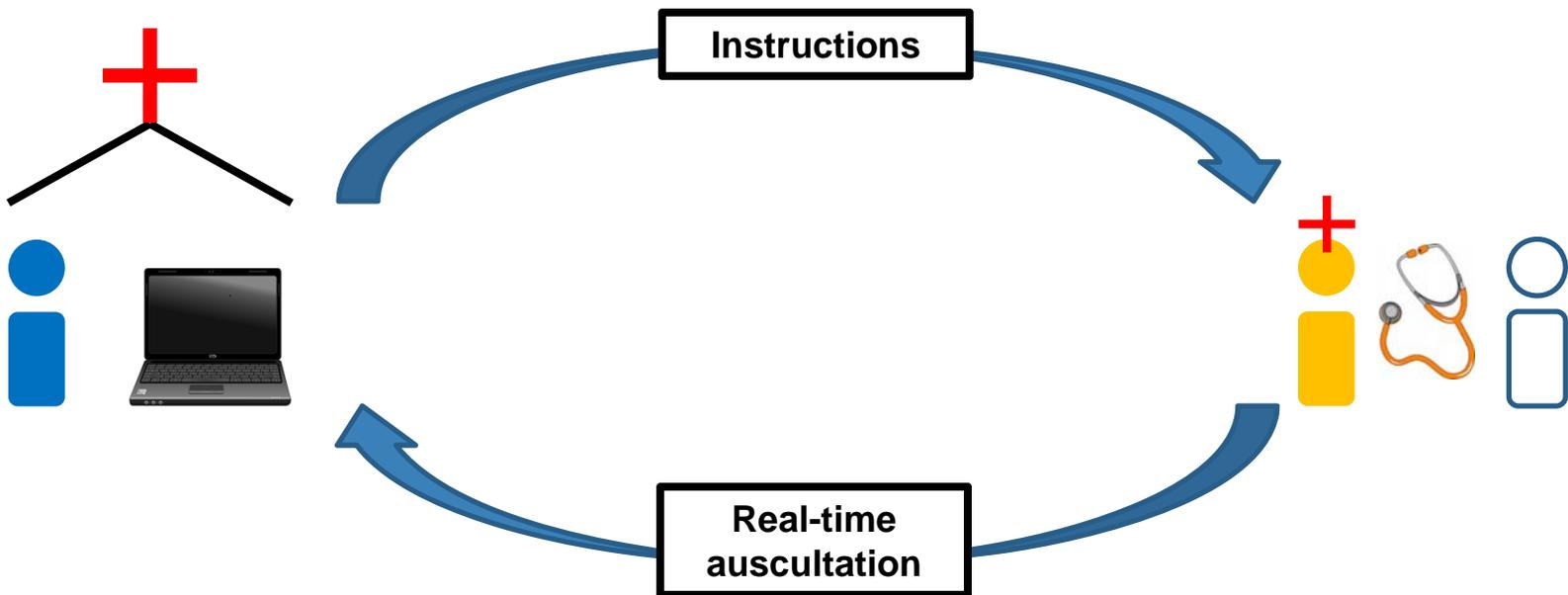
Home BP telemonitoring

Benefits also seen in high risk patients (elderly, underserved diabetic)

Incremental benefit by addition of other team members:

- Clinical pharmacist
- Nurse

Interactive



Telemedicine in Texas

- Ruling by Texas Medical Board in April 2015
- Effective June 2015
- Supported by Texas Medical Association
- Opposed by telemedicine companies

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Requirement

Patient-physician relationship previously established with **face-to-face** visit either **in-person** or **via telemedicine**

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Prohibited scenario

Treatment of an unknown patient using telemedicine, without any objective diagnostic data, and no ability to follow up with the patient.

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Acceptable scenario

Patients can interact with **their physicians** via telemedicine beyond the traditional office visit

“A patient with a heart condition on an oil rig in the Gulf of Mexico can receive telemedicine treatment from a cardiac specialist in Houston as long as the rig has sufficient diagnostic equipment and a trained medical professional, such as a licensed vocational nurse, available to assist in presenting the patient’s vital signs and other objective medical information needed by the Houston physician.”

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Acceptable scenario

Once a physician has made an initial diagnosis of a patient through a **face-to face** visit (**in-person or telemedicine**), the physician can treat patient for **preexisting** condition, via telemedicine, for up to one year in their home. **Second health care provider only required for first encounter.**

“A patient with diabetes in rural north Texas is treated and prescribed medication at home via telemedicine by a doctor in Dallas. The initial relationship was established through face-to-face videoconferencing at the patient’s home where a medical assistant was present to transmit the patient’s vital signs and other objective diagnostic data to the physician.”

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.

<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Acceptable scenario

A physician can provide **mental health services** to a patient via telemedicine. **No other health care provider is required** to be with patient unless there is a behavioral emergency.

“A west Texas patient in an assisted living facility can be treated for bipolar disorder with a mood stabilizer via telemedicine, in keeping with federal guidelines, by an Austin psychiatrist without an additional medical professional being present.”

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

Telemedicine in Texas

Acceptable scenario

Traditional **on-call** coverage by physician in the same medical specialty and provide reciprocal services as patient's regular physician

Texas Medical Board. TMB Adopts Rules Expanding Telemedicine Opportunities. April 14, 2015.
<http://www.tmb.state.tx.us/showdoc/press-releases>

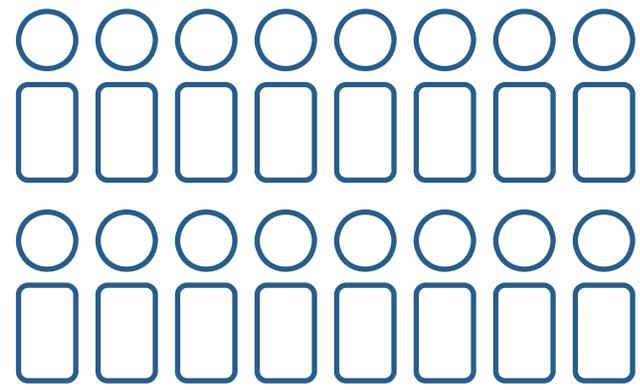
Patient Registries

Patient registry

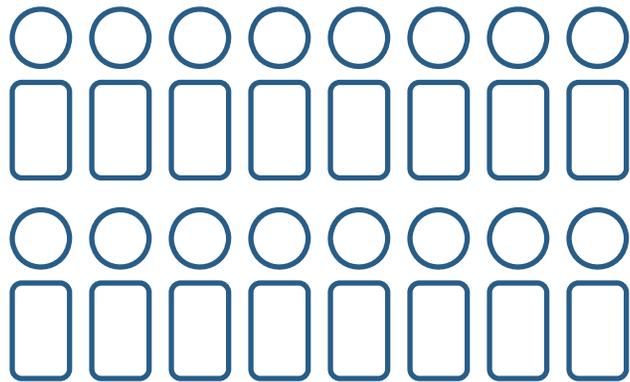
An organized system that uses observational methods to collect data for assessment of outcomes in a **defined** patient **population**



EHR



Registry



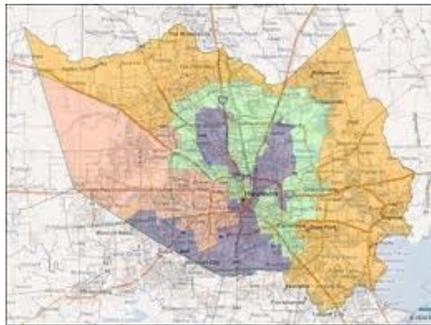
Disease: Asthma

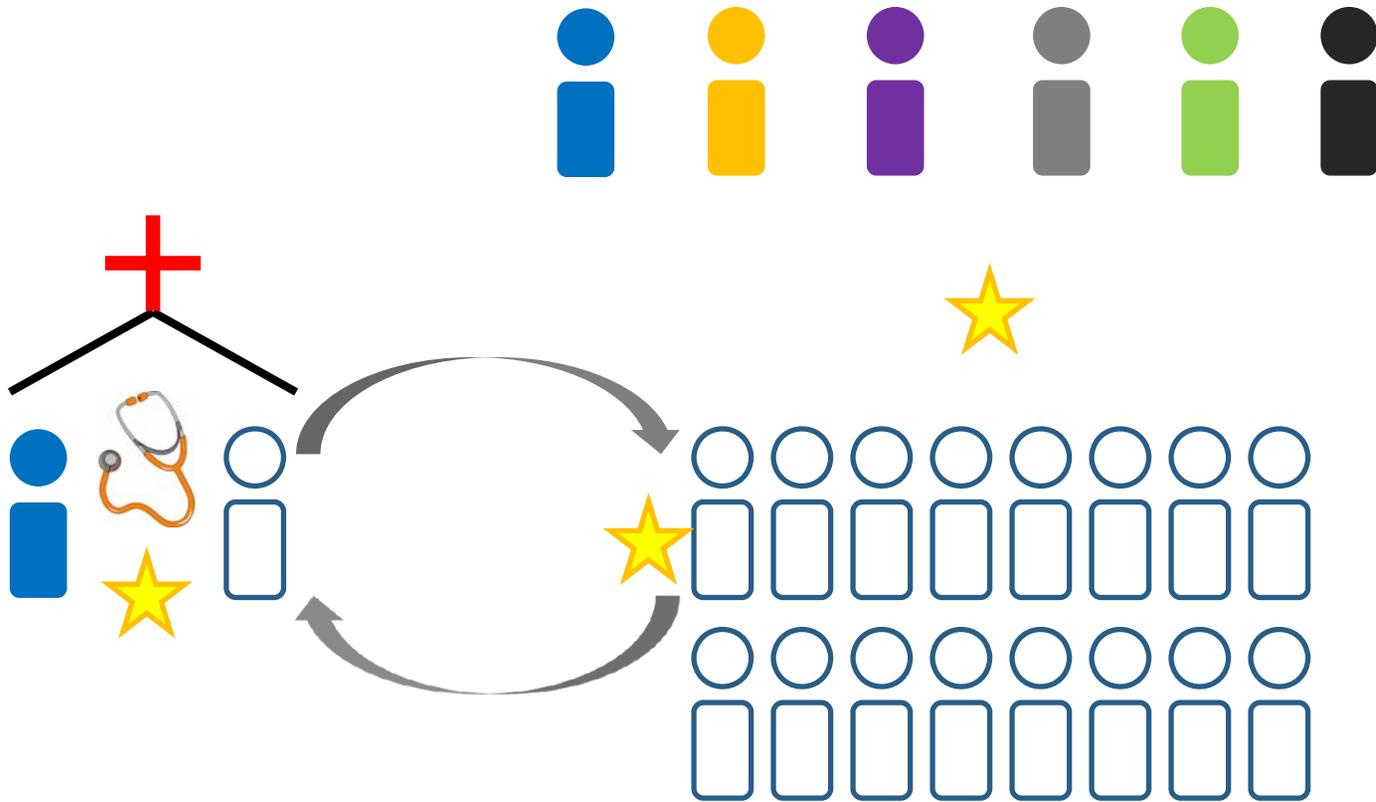
Procedure: Coronary artery
bypass surgery

Exposure: Drugs, vaccines,
toxins

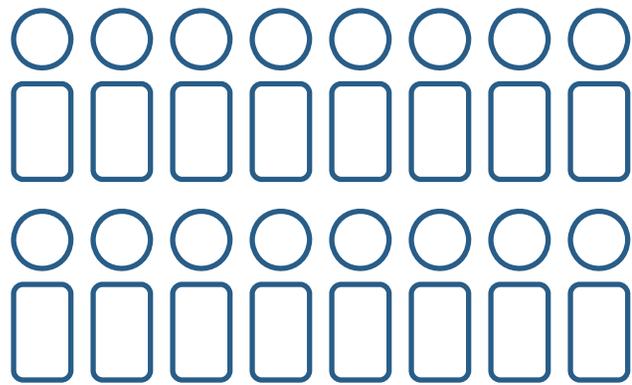
UT★Physicians

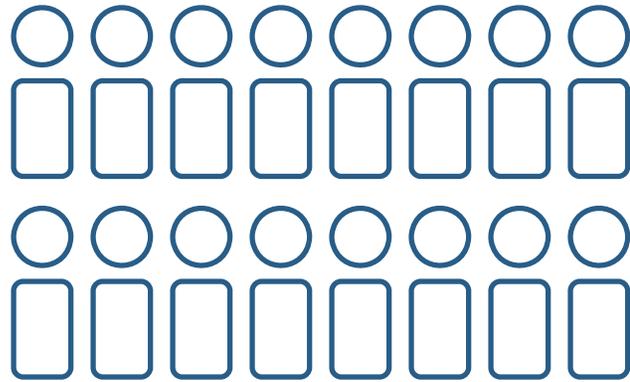
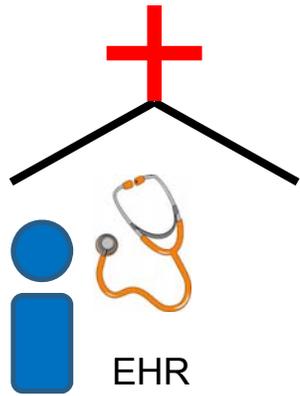
A Part of **UTHealth**

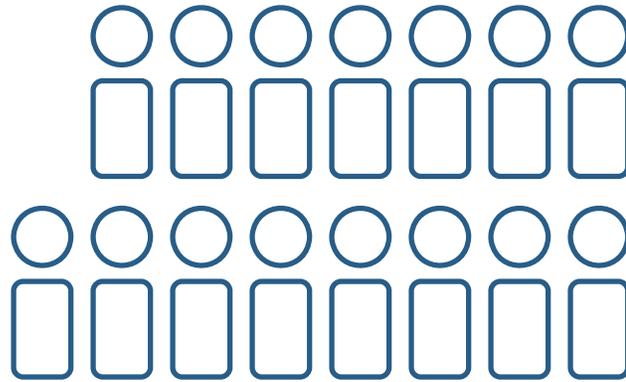
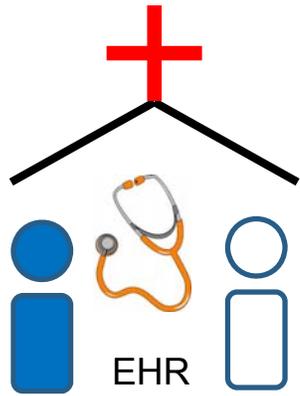


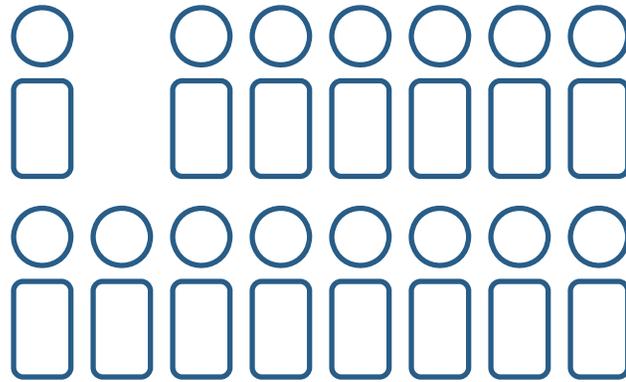
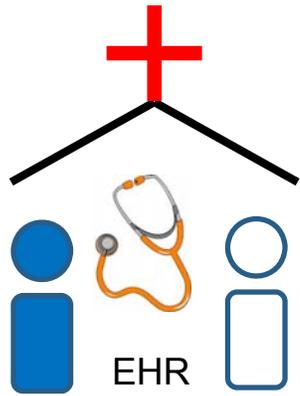


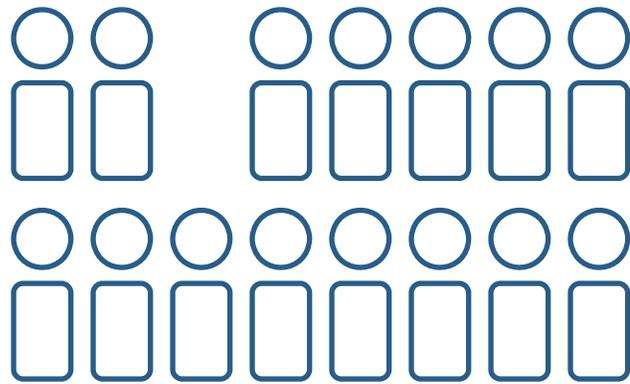
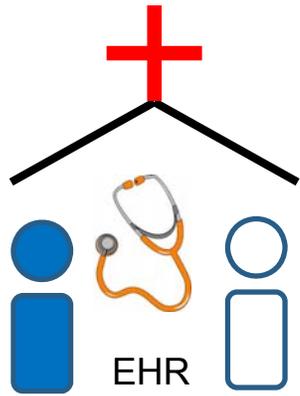
Population Health Management (PHM)

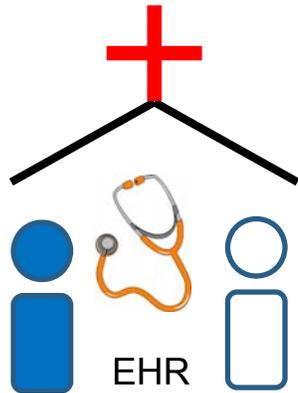




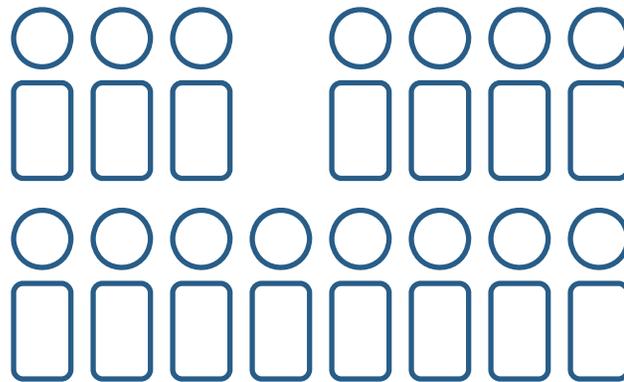


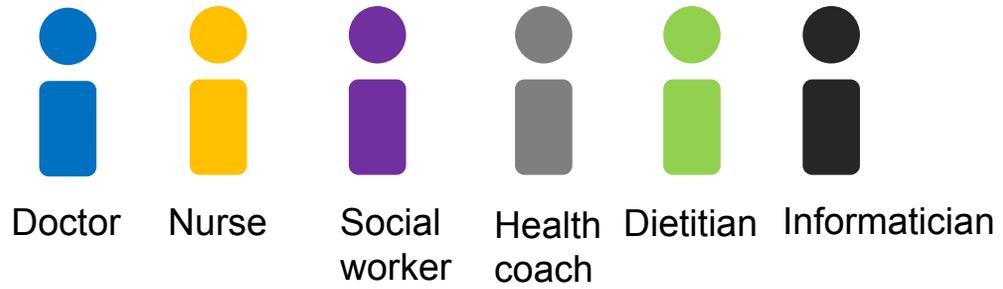




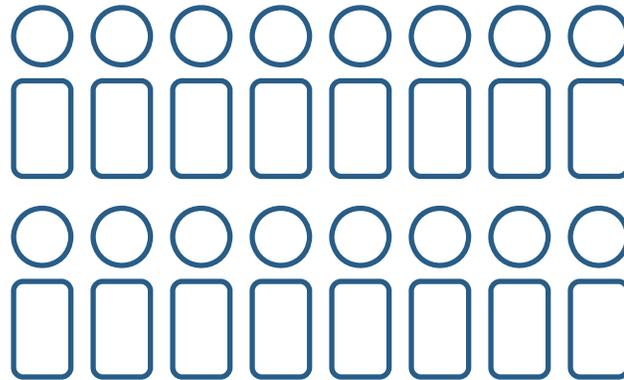


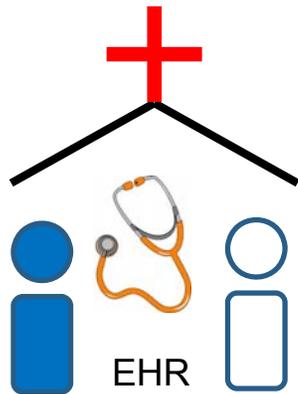
Reactive
Sporadic
1-on-1
Provider-driven
Acute care
Fee-for-service



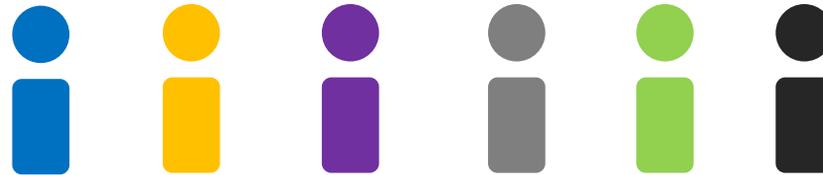


Health information technology



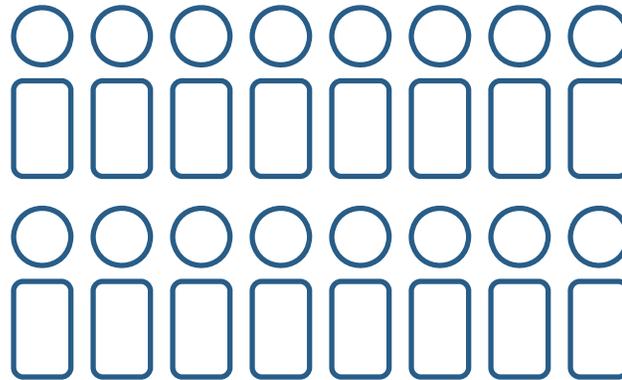


Reactive
 Sporadic
 1-on-1
 Physician-driven
 Acute care
 Fee-for-service



Doctor Nurse Social worker Health coach Dietitian Informatician

Health information technology



Proactive
 Systematic
 Populations
 Team-based
 Prevention, chronic care
 New models

6 steps for pop health

1. Define population
2. Identify care gaps
3. Stratify risks
4. Engage patients
5. Manage care
6. Measure outcomes

Missed appointments



Poor disease control

BP 170
94

A1c 8.6

Glucose Level	112 mg/dl	H	70-99
Adult reference range values reflect the clinical guidelines of the American Diabetes Association.			
Potassium Level	4.0 mEq/l		3.5-5.1
Sodium Level	138 mEq/l		135-145

[QLH] LIPID PANEL 08Jul2014 09:43AM Laing, Susan

Test Name	Result	Flag	Reference
CHD Risk	4.62		4.00-7.30
Cholesterol Total	245 mg/dl	H	<=199
HDL Cholesterol	53 mg/dl	L	>=61
LDL	149 mg/dl	H	<=99
Triglyceride	216 mg/dl	H	<=149
VLDL	43		

Dangerous drug combinations



ACE-Inhibitor
+
Angiotensin II Receptor Blocker

James PA et al. 2014 evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the eighth Joint National Committee (JNC 8). JAMA 2014;311(5):507-520.

Overdue vaccinations



Typical HTN care

Episodic, reactive

Physician prescribes medications

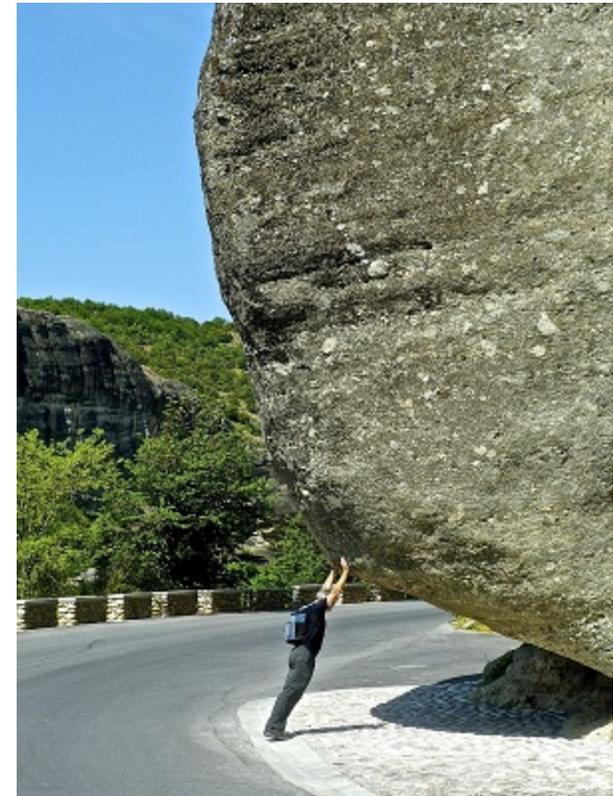
Patient is expected to:

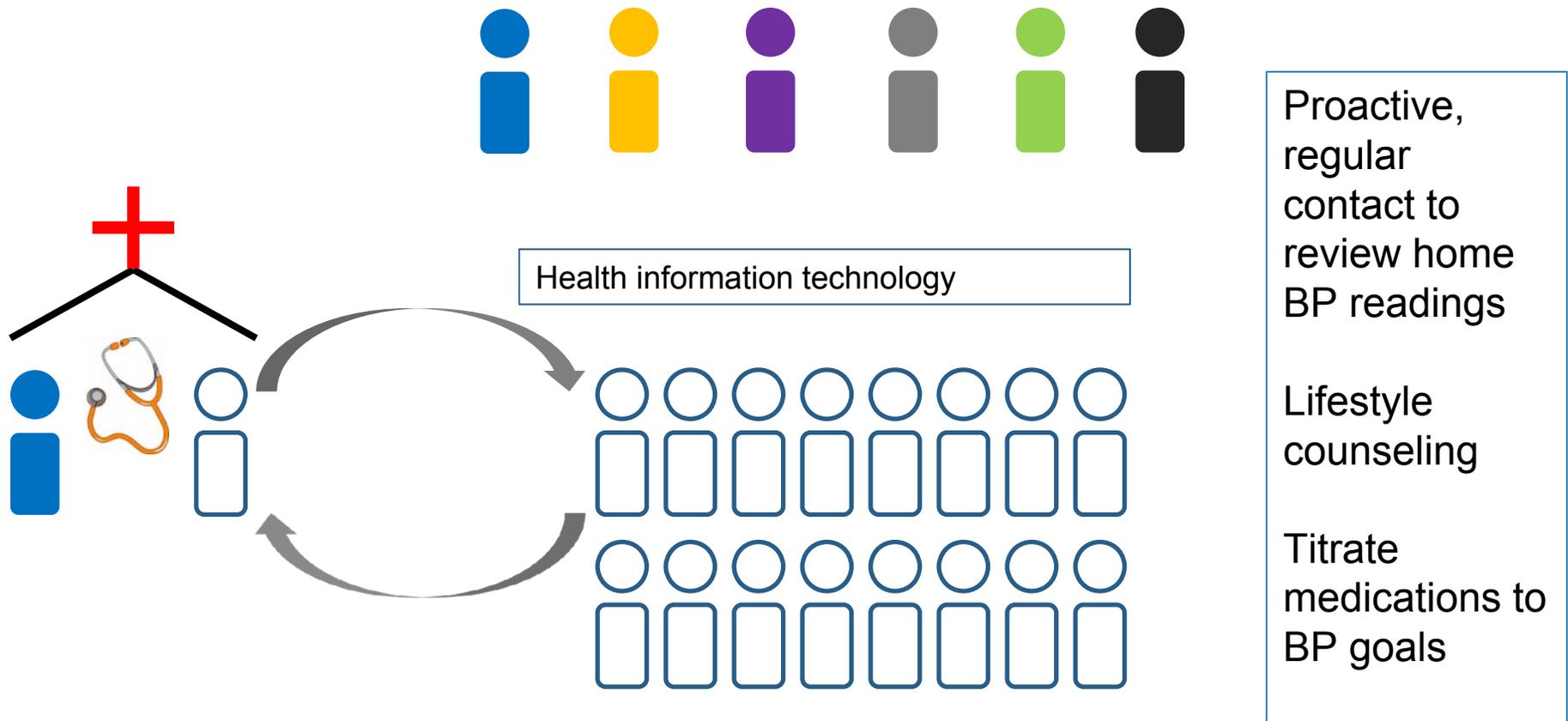
- Comply with medications
- Eat healthy
- Exercise
- Come back weeks or months later

Clinical inertia

- “failure of health care providers to initiate or intensify therapy when indicated”
- No change in therapy despite uncontrolled HTN

Phillips LS et al. Clinical Inertia. Ann Intern Med 2001;135(9):825-834









**Physician
Nurse
Medical assistant
Case manager
Pharmacist
Social worker
Community health worker**

Kevin O. Hwang, MD, MPH

kevin.o.hwang@uth.tmc.edu



@KevinHwangMD



Questions and Answers



Janna Zumbrun, MSSW
Assistant Commissioner
Division for Disease Control and
Prevention Services

Remote sites can send in questions by typing in the *GoToWebinar* chat box or email GrandRounds@dshs.state.tx.us.

For those in the auditorium, please come to the microphone to ask your question.

May 6

The Importance of Breast Milk Use in the NICU

Presenters: Alice K. Gong, MD, University of Texas Health Science Center at San Antonio; Alexander Kenton, MD, Pediatrix Medical Group of Texas-San Antonio

