

BACK TO THE FUTURE

Where we're going, we don't need roads

© Linda Harrington, PhD,DNP,RN-BC,CNS,CENP,CPHQ,UXC,CPHIMS,FHIMSS

DISCLOSURE

- Lead author, *Usability Evaluation Handbook for Electronic Health Records* (second edition underway). We will talk about usability today.
- My husband is an IT guy – who went on to get degree in informatics. I respect IT. There are learning opportunities for all.
- Work for Baylor College of Medicine (BCM), the international leader in genomics which we will talk about today.

LEARNING OBJECTIVES

Upon completion of this program, participants should be able to:

- Discuss important lessons learned from the healthIT journey to date.
- Evaluate key healthIT strategies underway now.
- Envision the future of healthcare delivery and informatics in the digital age.



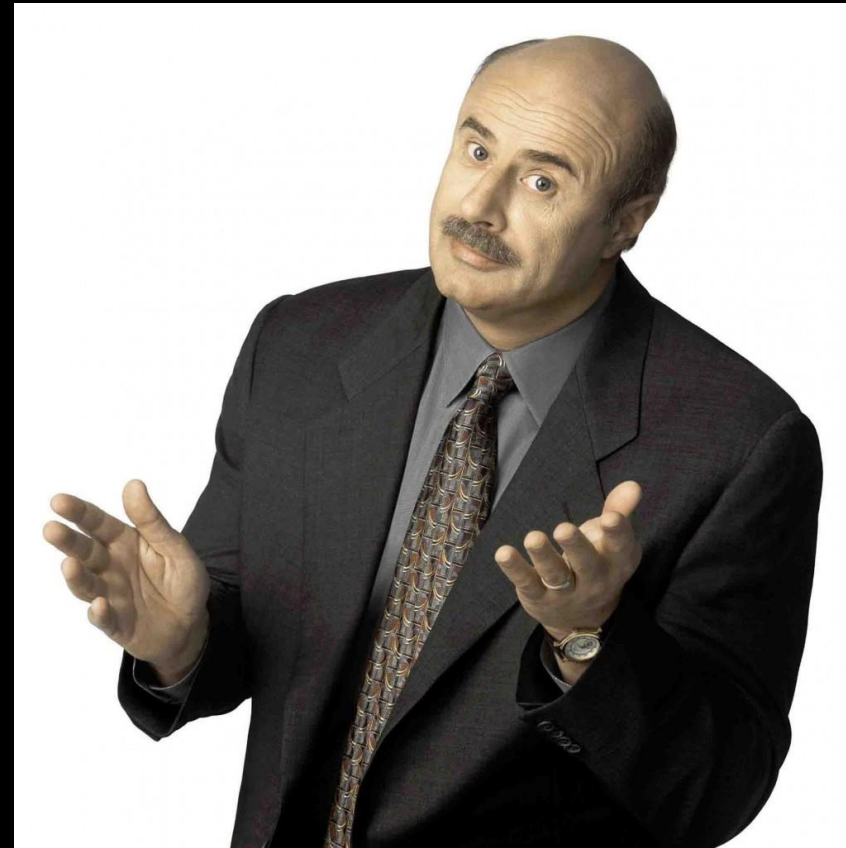
WHY GO **BACK**?



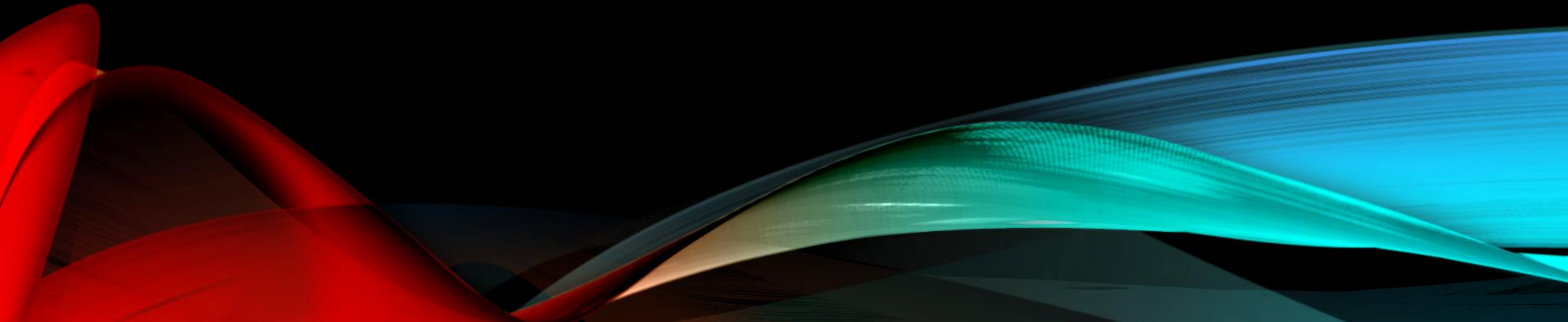
WHAT DOES IT MEAN

- Back to the future
- Is it an oxymoron?
 - Like “jumbo shrimp”?
- **Those who fail to learn from history are doomed to repeat it.**

**YOU CAN'T FIX
WHAT YOU
DON'T KNOW
IS BROKE.**



KEY LESSONS FROM THE “**BACK**” SIDE



DIFFERENCE BETWEEN BUSINESS AND HEALTH CARE:

BIG MISS #1

- Health care is a business BUT
- It is unlike other businesses AND
- Patients are unlike other kinds of customers in other businesses THEREFORE
- The implementation and use of technology is different in health care.

BUSINESS PROCESSES

Business

- Linear
- Static
- Redundant
- Easily measured
- Easy to comprehend
- Easy to implement
- Some individualization

Health Care Business

- Non-linear
- Evolving
- Changing
- Dynamic
- Multidimensional
- Routinely Individualized
- Narrow tolerance of disruption

SIMPLE VS COMPLEX SOFTWARE APPLICATIONS:

BIG MISS #2
RELATED TO #1

- **Users**

- Simple applications
 - Many types of users - children to adults, min education level – eg. email or MS Word
 - One type of user – eg. financial or supply chain application
- Complex applications
 - Many types of users, higher levels of education, different knowledge - EHRs

- **Number of screens**

- Simple applications - one or few screens
- Complex applications - many (drawers, slides, etc. not necessarily included)

- **Workflows**

- Simple applications - simple workflows, few steps, minimal cognitive requirements
- Complex applications - complex workflows, high cognitive requirements



instructional designers, train-the-trainers, super users, end-user training, one-on-one training, at-the-elbow support, sandboxes and playgrounds, weekly updates, tip sheets and pocket guides, clinical help desks and remote support, user groups and list serves, adoption programs, scribes, and more

= COMPLEX SOFTWARE APPLICATION

USABILITY: **BIG MISS #3** **RELATED TO #1 AND #2**

- **Easy to use AND useful**
- Efficient and effective
 - ISO
 - Not specific to EHRs
 - Definition has poor usability
- Applies to all technology (and other things) and not just EHRs
 - How are those infusion pump alarms working for you?

POOR USABILITY

- Dissatisfaction > poor use
 - Physicians
 - Nurses
 - Workarounds > safety risks
- Inefficiencies > time that could be better spent elsewhere
- Frustrations > decreased morale
- Errors > injury, death, costs
- Degradation of data > loss of healthcare transformation potential
- More



Have you ever been asked to build something in the EHR only to have the end user say,
“I know I told you to build it this way but it doesn’t work the way I thought it would.”



USABILITY EXPERTS ARE NOT END USERS AND END USERS ARE NOT USABILITY EXPERTS.

This is not to say they don't have good ideas or
that they can't tell you where the issues you are.

But where does their knowledge of how to fix them come from?

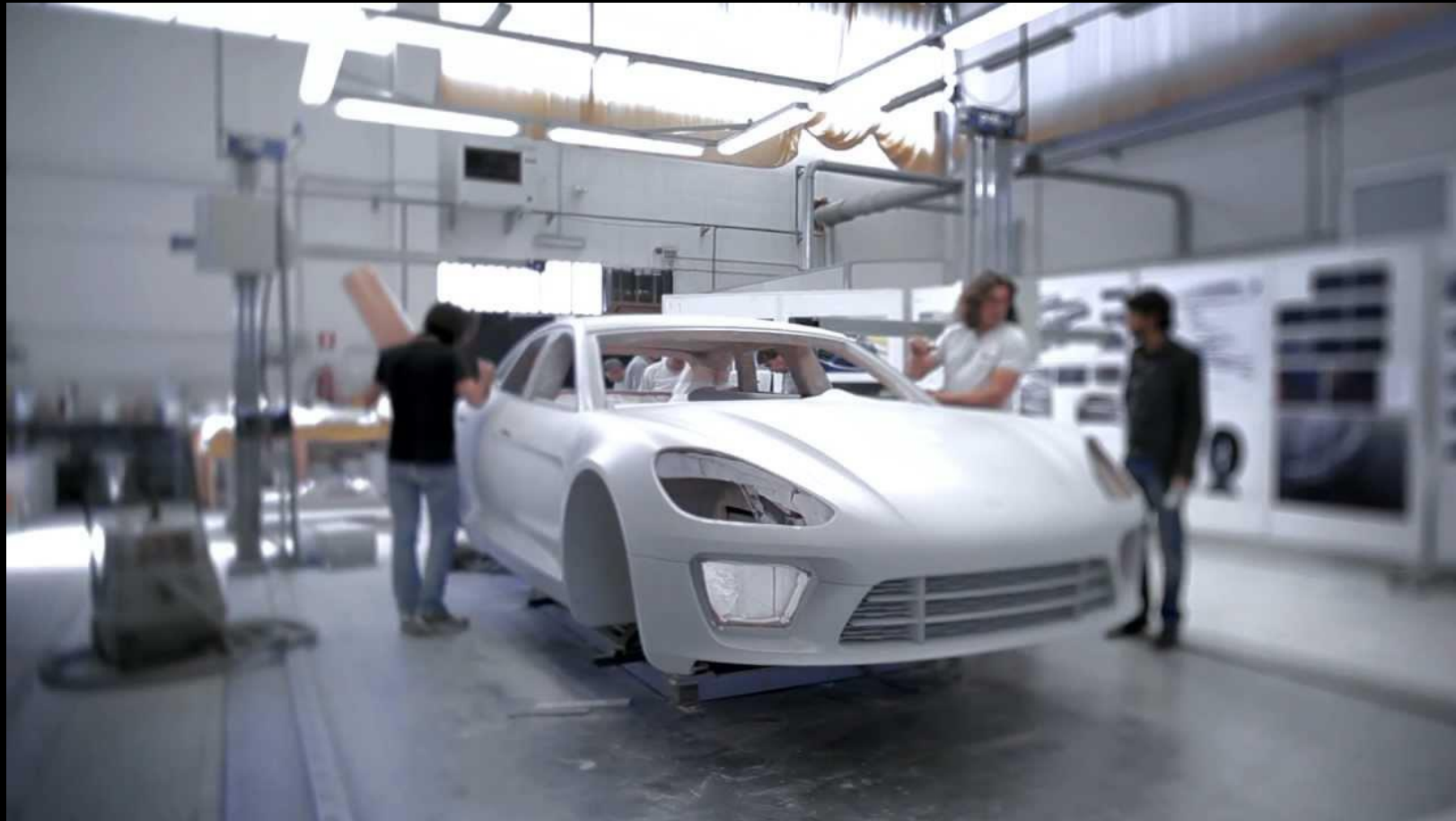
(This is not a rhetorical question)

The bottom of the slide features an abstract graphic of flowing, translucent waves. On the left, a vibrant red wave flows upwards and outwards. On the right, a bright blue wave flows downwards and outwards. These two waves meet in the center, creating a greenish-teal hue where they overlap. The waves have a smooth, liquid-like texture with subtle gradients and highlights.

SOLUTIONS

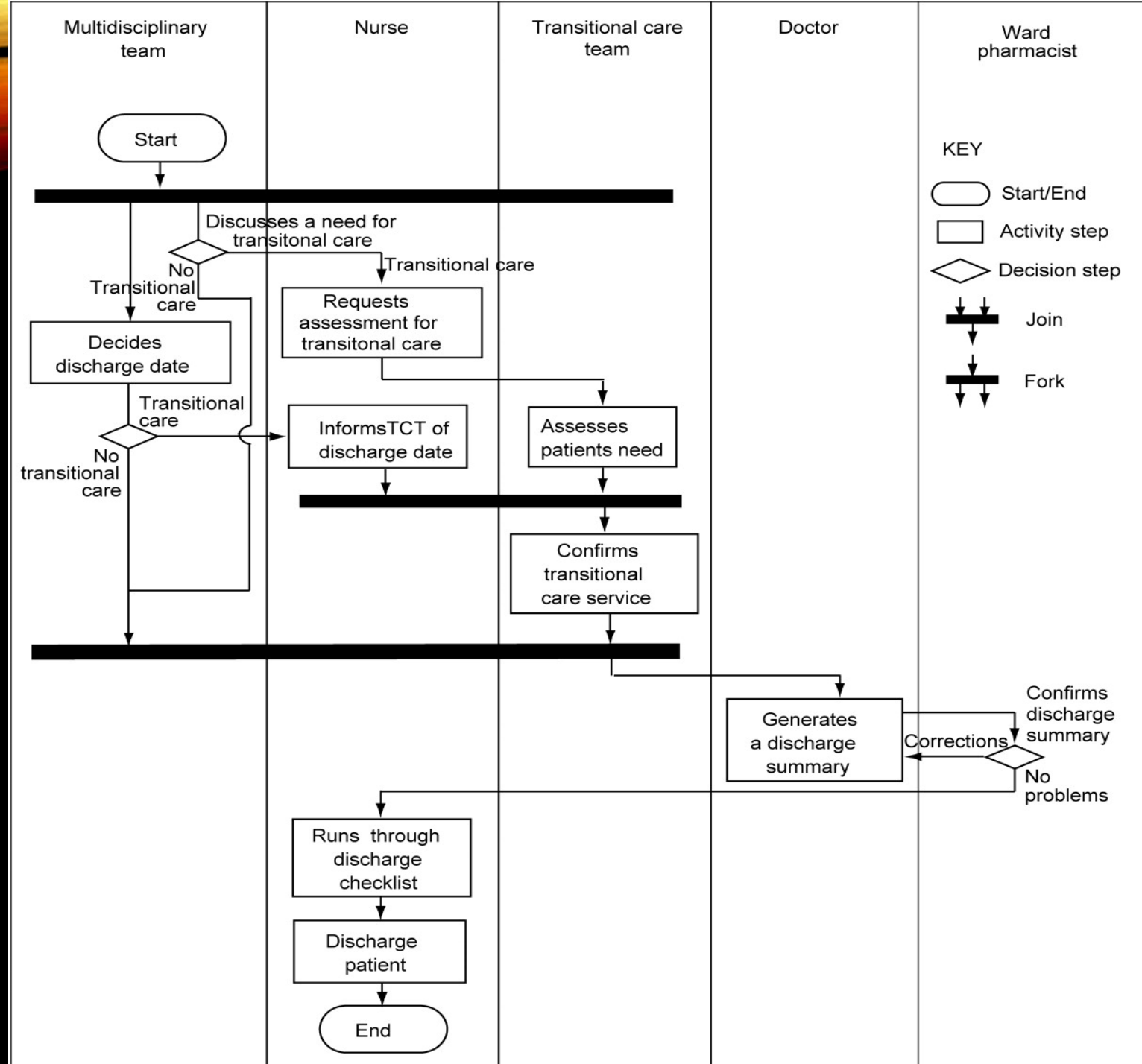
- Solutions are based on what we know
- If we have **not** studied
 - Complex software applications
 - Usability
 - Workflow
 - Things yet to come in this presentation
 - The growing field of informatics
 - Where do our solutions come from?
- They are based on what we know

I'M AN END USER: I DRIVE A CAR



WORKFLOW: THE BIG MISS THAT IS PART OF BIG MISS #3 RELATED TO #1 AND #2

- Part of usability
- Swim lane diagrams came out of business world
- Use of swim lane diagrams = lack of understanding of clinical workflow



REMINDER: BUSINESS PROCESSES

Business

- Linear
- Static
- Redundant
- Easily measured
- Easy to comprehend
- Easy to implement

Health Care Business

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CLINICAL WORKFLOW IS MULTIDIMENSIONAL

- Cognitive
- Context
- Communication
- Collaboration
- Coordination
- Exceptions

HR 40

Medication Reconciliation			
Medications			
bisacodyl (DULCOLAX) EC tablet 10 mg Oral, daily as needed for constipation	Continue	Discontinue	Modify
captopril (CAPOTEN) tablet 25 mg Oral, 1 tablet every 12 hours	Continue	Discontinue	Modify
docusate (COLACE) capsule 100 mg Oral, 2 times daily, HOLD for loose stools	Continue	Discontinue	Modify
enoxaparin (LOVENOX) syringe 30 mg Subcutaneous, 30 mg every 24 hours	Continue	Discontinue	Modify
hydrochlorothiazide (HCTZ) tablet 25 mg Oral, 1 tablet daily	Continue	Discontinue	Modify
HYDROcodone-acetaminophen (NORCO) tablet 5-325 mg Oral, 1 tablet every 4 hours as needed for moderate pain (4-6/10)	Continue	Discontinue	Modify

Filter by:		Drug Classification	
Medication Reconciliation			
Analgesic			
HYDROcodone-acetaminophen (NORCO) tablet 5-325 mg Oral, 1 tablet every 4 hours as needed for moderate pain (4-6/10) Not to exceed more than 4,000 mg acetaminophen daily.	Continue	Discontinue	Modify
Anticoagulant			
enoxaparin (LOVENOX) syringe 30 mg Subcutaneous, 30 mg every 24 hours	Continue	Discontinue	Modify
Antihypertensive			
captopril (CAPOTEN) tablet 25 mg Oral, 1 tablet every 12 hours Maintenance: 25-150 mg q8-12hr; 450 mg/daily maximum	Continue	Discontinue	Modify
hydrochlorothiazide (HCTZ) tablet 25 mg Oral, 1 tablet daily Maintenance: 25-50 mg daily; 100 mg/daily maximum	Continue	Discontinue	Modify
Laxative/Stool Softener			
bisacodyl (DULCOLAX) EC tablet 10 mg Oral, daily as needed for constipation	Continue	Discontinue	Modify
docusate (COLACE) capsule 100 mg Oral, 2 times daily, HOLD for loose stools	Continue	Discontinue	Modify

*Clinical workflow is
the multidimensional,
transforming processes
clinicians use
to achieve patient-centered goals.*

COGNITIVE LOAD: **BIG MISS #4** **RELATED TO #1, 2 AND 3**

- The total amount of mental effort being used in the working **memory**.
 - Example: distractions while preparing or administering medications.
- Question
 - Do EHRs increase cognitive load or decrease it?
 - What should they do?

WHY IS THIS IMPORTANT

- Question
 - Does training increase cognitive load or decrease it?
 - Do infusion pump libraries increase cognitive load or decrease it?
- The role of informaticists?
 - **Decrease cognitive load**
 - Support decision making
 - Improve usability

SYSTEMS DEVELOPMENT LIFE CYCLE (SDLC): WATERFALL MODEL

- AKA applications development life cycle
- Number of clearly defined and distinct work phases
- **Plan, Design, Build, Test, Implement**
- When does optimization occur?

OPTIMIZATION: **BIG MISS #5** **RELATED TO #2**

Optimization according to informatics
vs
Optimization according to health IT

OPTIMIZATION: **BIG MISS #5** **RELATED TO #2**

- Optimization according to informatics?
 - **Design**
- Optimization according to health IT?
 - **Post implementation**
 - Works with simple applications
 - Does NOT work with complex applications implemented in complex environments

COST OF CHANGE CURVE: WATERFALL MODEL

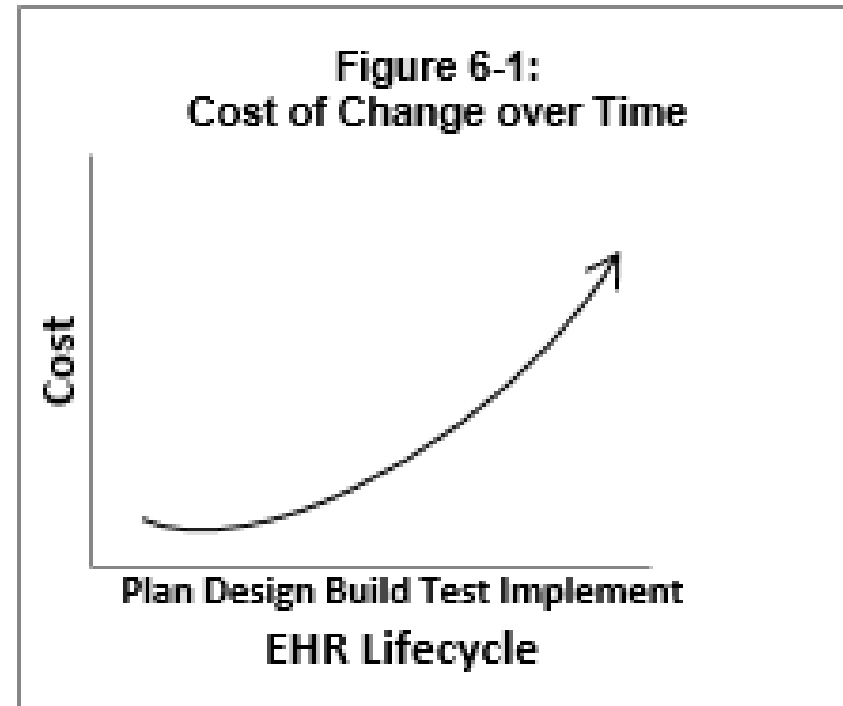


Figure 6-1: Cost of Change Curve

INFORMATICS OR IT OPTIMIZATION?

- Poorly understood
- Lack of familiarity with tools to improve optimization
- Difficulty in correctly anticipating where issues are
- Lack the knowledge to know where to start
- Do what they have seen done
 - Which sometimes is nothing or wrong
- Do what they've seen or read about elsewhere without determining if they're impactful and appropriate

IT ALL COMES DOWN TO ONE THING

Fixing people vs fixing technology.

What is informatics about?

(said another way . . .)

Train and “fix” people
Or
Improve usability and “fix” technology
What is informatics about?
Make technology so that it does not require training.

WHAT'S HAPPENING **TODAY**
ON THE WAY TO THE FUTURE



RIGHT NOW, THIS MINUTE

- Computing power exploding
- Speed of data production accelerating
- Connectivity between man and machine increasing
- Connectivity between machines increasing
- Data aggregation, analysis and knowledge discovery improving
- Information access improving
- Innovation abounds!

IMPACT PROFOUND AND ACCELERATING



HEALTHCARE IS NOW A DIGITAL BUSINESS

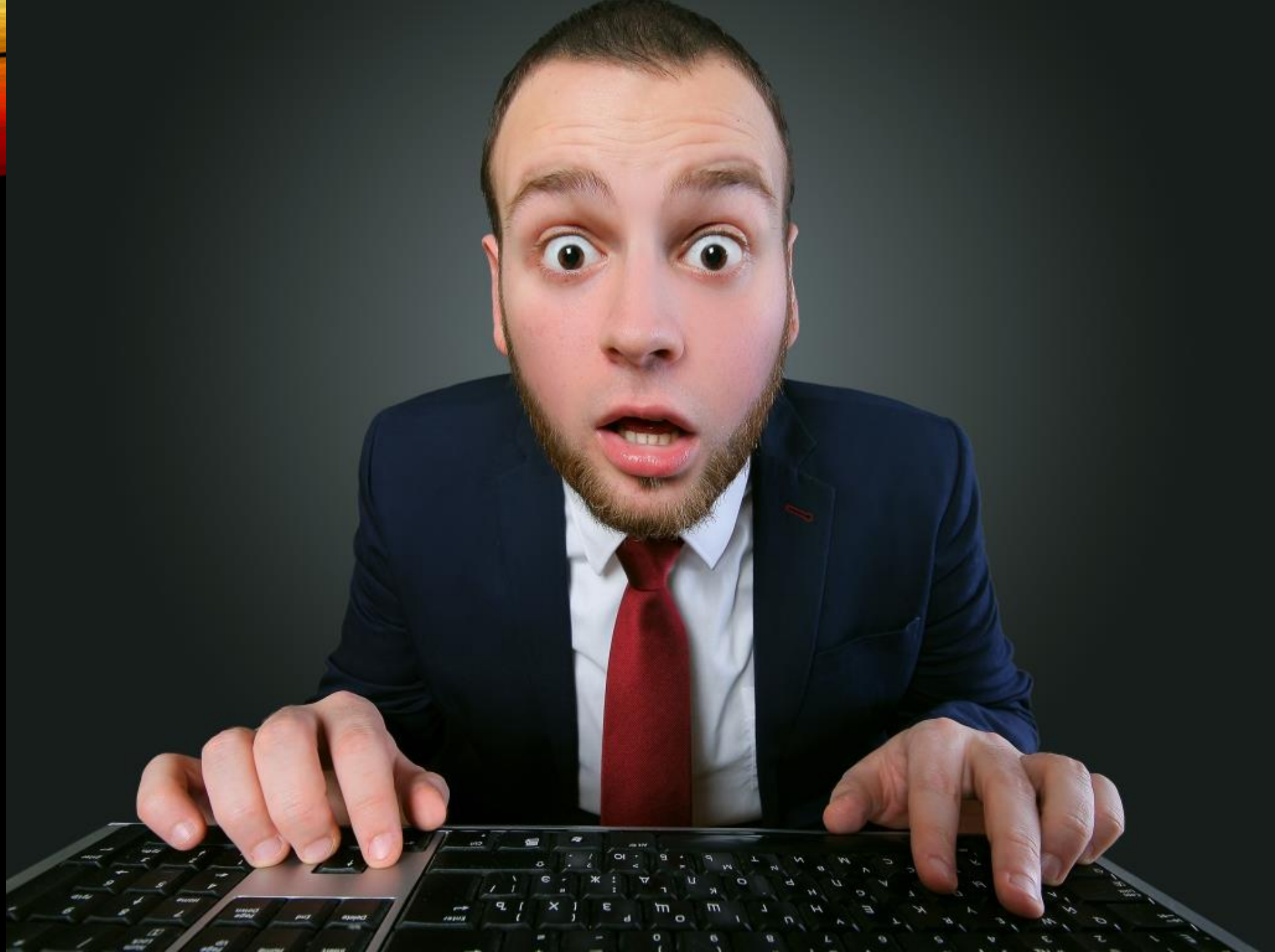


THE **FUTURE**



#1

FUTURE MODEL OF NURSING DOCUMENTATION





MANUAL DOCUMENTATION

EHRs

1. A fundamental change in mindset that must occur in order to successfully navigate beyond nursing documentation is the realization that the EHR is a database and **not** a documentation system.

- **HCI moving from data “getting” to “information” giving**
- **Why automating data “getting” AKA entry is so important**

2. We can't transform health care without it!

- **Key to information giving in real time**
- **For greatest impact**

HIMSS

EHRs do not meet all of the needs that healthcare organizations have in the emerging value-based world. As such, these systems are not capable of fully supporting care delivery under the new model where population health, virtual health services and chronic-care management programs are likely to become industry staples.

HIMSS Media

May 2016

http://pages.healthcareitnews.com/index.php/email/emailWebview?mkt_tok=eyJpIjoiTnpsaVIUVTFOVGcwWTJGaSIsInQiOiJsdTlwSFJ2ZEwwQjZ4dkwwQXlGNndLbHB3cUZuMmJZS1B6T1NSZjhmTmJ4VkJNeXpESnp2aIRaQjFGUnhGaDZEQTJGVW1qWGNVb0dLK2J4R09DeTVvSnM1ZjIva2hDMEtJdXdLVXQ2NFA5Zz0ifQ%3D%3D



ALEXA: THE BRAIN BEHIND AMAZON'S ECHO

- Cloud-based, hands-free, voice recognition **connected** device
 - Adapts to your speech patterns, vocabulary and personal preferences
 - Wirelessly connected to cloud; thus updates are delivered automatically
- Turns lights on and off and dims, controls thermostat, plays music, reads the news, reads text-to-speech for Kindle eBooks, turns up or down the volume, reports traffic and weather, tells jokes, gives info on local businesses, provides sports scores and schedules, informs new movies and times, gives recipes, creates and adds to shopping list, sets an alarm, informs what is on schedule, orders food delivery, puts in request for Uber

**Imagine Alexa in a
patient's hospital room.**

MOVING FROM MANUAL DATA ENTRY

To automated data collection . . .

PRESSURE ULCERS

- Handheld, portable electron scanners
 - detect early-stage pressure ulcers at the point of care before skin discoloration or breakdown
- With device integration images scanned, transferred to HER and saved
- Currently used in Great Britain and Ireland; clinical trials in US



BEHAVIORAL HEALTH

- Measures are increasingly being automated
 - Speech recognition
 - Facial recognition
 - Body movement
 - Sleep patterns
 - Phone usage
- Depression, schizophrenia, bipolar, etc.
- Medication compliance

GOAL

Treatment → Early Intervention → Prevention

WE ARE AT A TURNING POINT



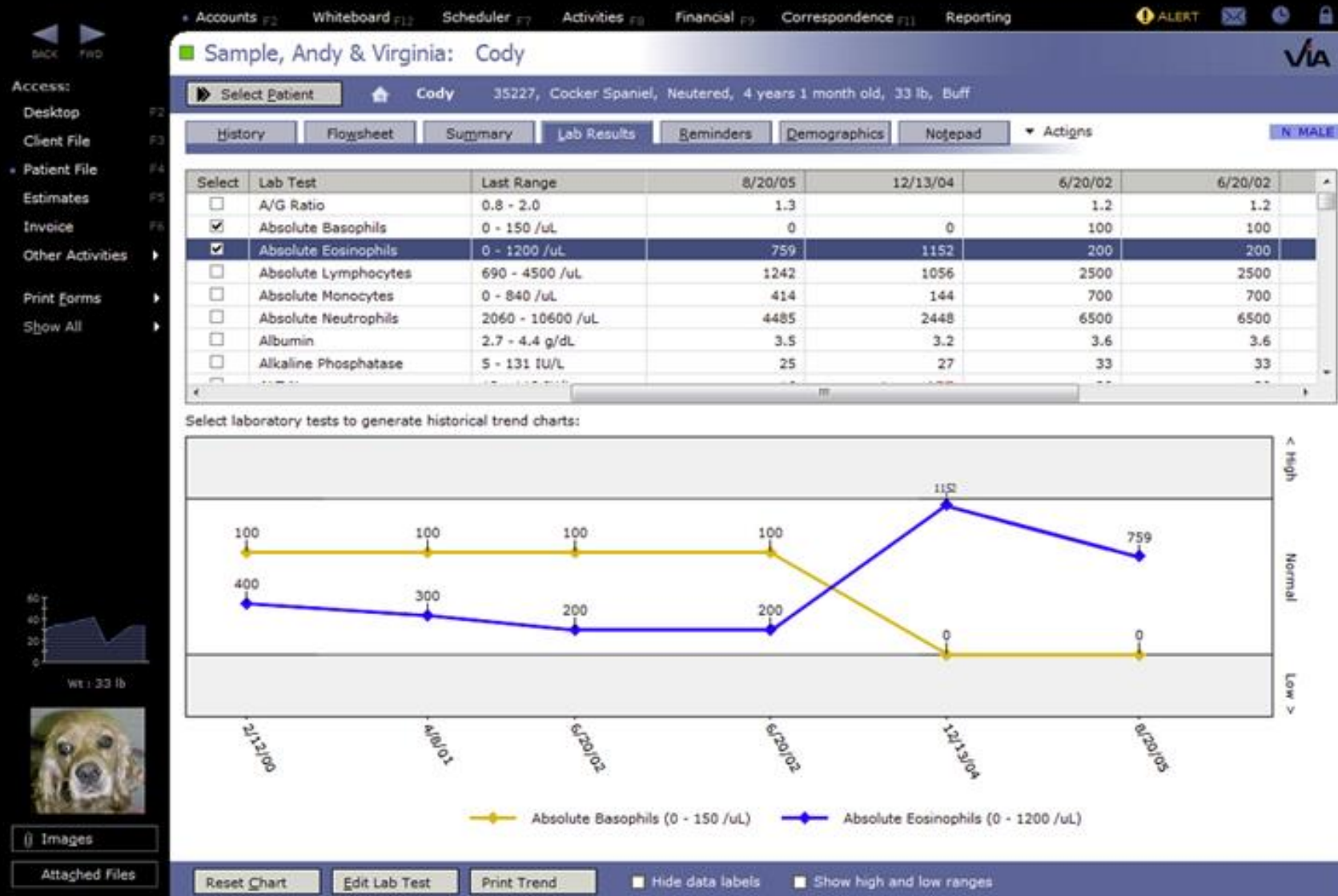
**Optimize
or
Automate**

**Optimize
or
Automate
or**

#2

FUTURE MODEL OF DATA VISUALIZATION

CURRENT



INFORMATION VISUALIZATION

Computer interface that collects data

vs

Computer interface that provides information

INFORMATION VISUALIZATION

**Computer interface that
collects data**

VS

**Computer interface that
provides information**

WE ARE AT A TURNING POINT



Monitoring
vs
Diagnosis
vs
Treatment

Mobility
vs
Device
vs
Information

#3

CONNECTED HEALTH

- Definition - a web of intelligent communication and actionable insights to drive better and more integrated care and health outcomes.
- Historically, healthcare has been episodic in nature, with clinicians making decisions without seeing a comprehensive picture of the patient.
- Connected Health seeks to improve traditional healthcare pathways by putting the patient at the center of the healthcare system, and aggregating and linking data from many different sources to enable more informed care decisions.

CONNECTING WAYS

- Medical device integration
- Voice recognition
- Natural language processing
- Wearables
- Nearables
- Imaging
- Sensors, biosensors, nanosensors
- IoT
- Genomics



#4

~~PATIENT ENGAGEMENT~~

Patients and health care will get closer and closer, quicker and quicker.

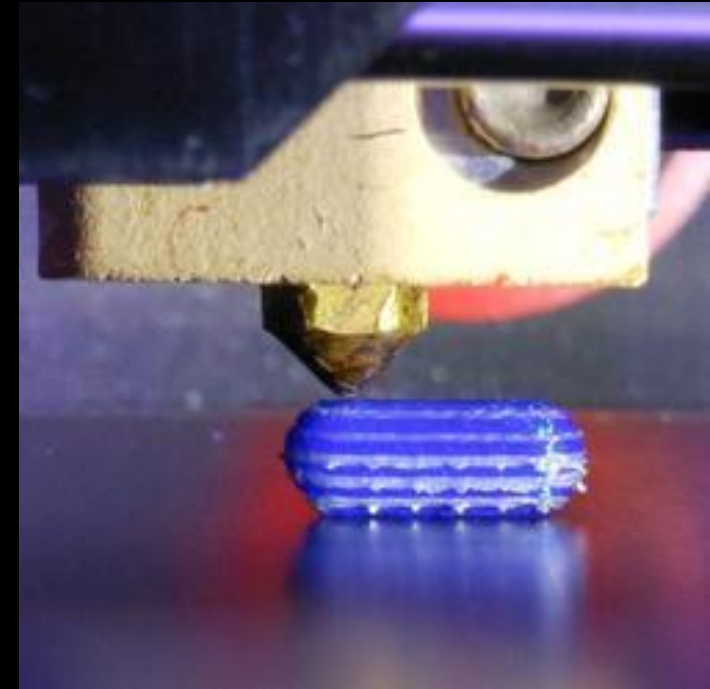
Patients have always been engaged with their health.

What they lack is easy-to-use and useful tools and information to make the best decisions for prevention, early intervention and treatment.

**What does Dimetapp and 3D printing
have in common?**

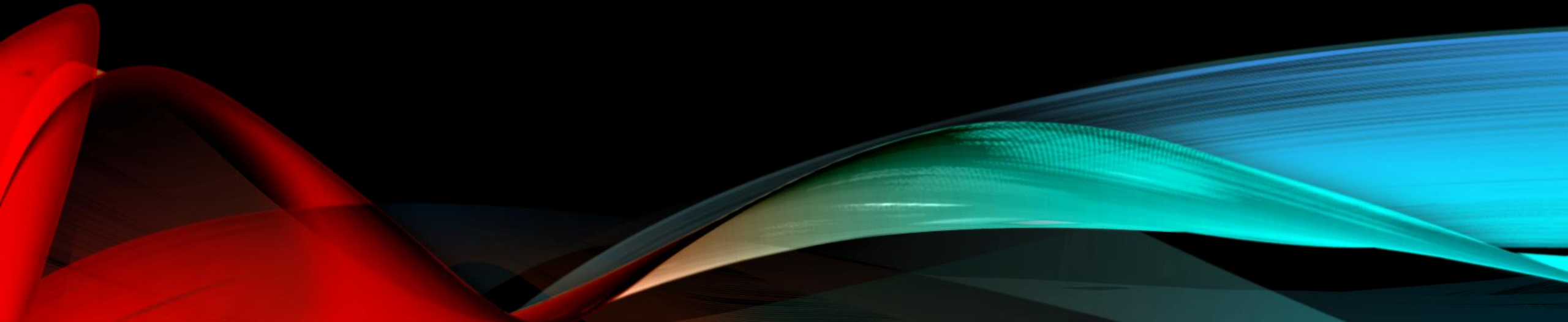
**Dimetapp use to be prescription, then
it came closer.**

**3D printing will bring medications even
closer.**



**What happens as people get closer
and closer and closer to health care?**

HOW TO GET THERE



KEY TAKEAWAYS

- Plan
 - Know where you're at, where you're going and how to get there
 - Ensure digital is part of your nursing organization's strategy
 - Nurse-driven strategy vs technology driven strategy
 - EHRs were technology driven – how did that work for you?
- Focus on health and not just health care
- **Transform!**

