### servicenow



# Addressing Clinician Burden through Usability

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Director of User Experience

Allscripts



#### We Believe

Clinician burden is not a new phenomenon

Burden impact is not limited to clinicians

Clinician burden requires a system approach to solve the problem





#### **Causes of Burden**

#### **External Factors**

Socio-cultural

Regulatory, Business, & Payer

Organizational factors

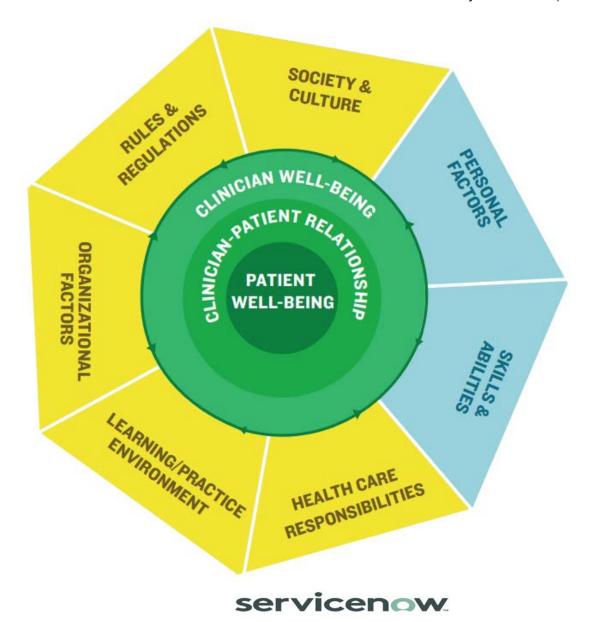
Learning/Practice Environment

#### **Individual Factors**

Health Care role

Personal Factors

Skills and Abilities





#### **Causes of Burden**

Autonomy

Collaborative vs. competitive environment

Curriculum

## Health IT Interoperability and Usability of Electronic Health Records

Learning and practice setting

Mentorship

Physical learning and practice conditions

Professional relationships

Student affairs policies

Student-centered and patient-centered focus

Team structures and functionality

Workplace safety and violence





#### We Believe

Clinician burden is not a new phenomenon

Burden impact is not limited to clinicians

Clinician burden requires a system approach to solve the problem

HIT vendors have a great opportunity to address





### **Usability Reduces Burden**

Efficiency

Effectiveness

Satisfaction

Speed

Less steps

Intuitive

No waste

Outcomes

Safe

Learning

Goal-centered

Less burdened

Respected

Peace of mind

Trust



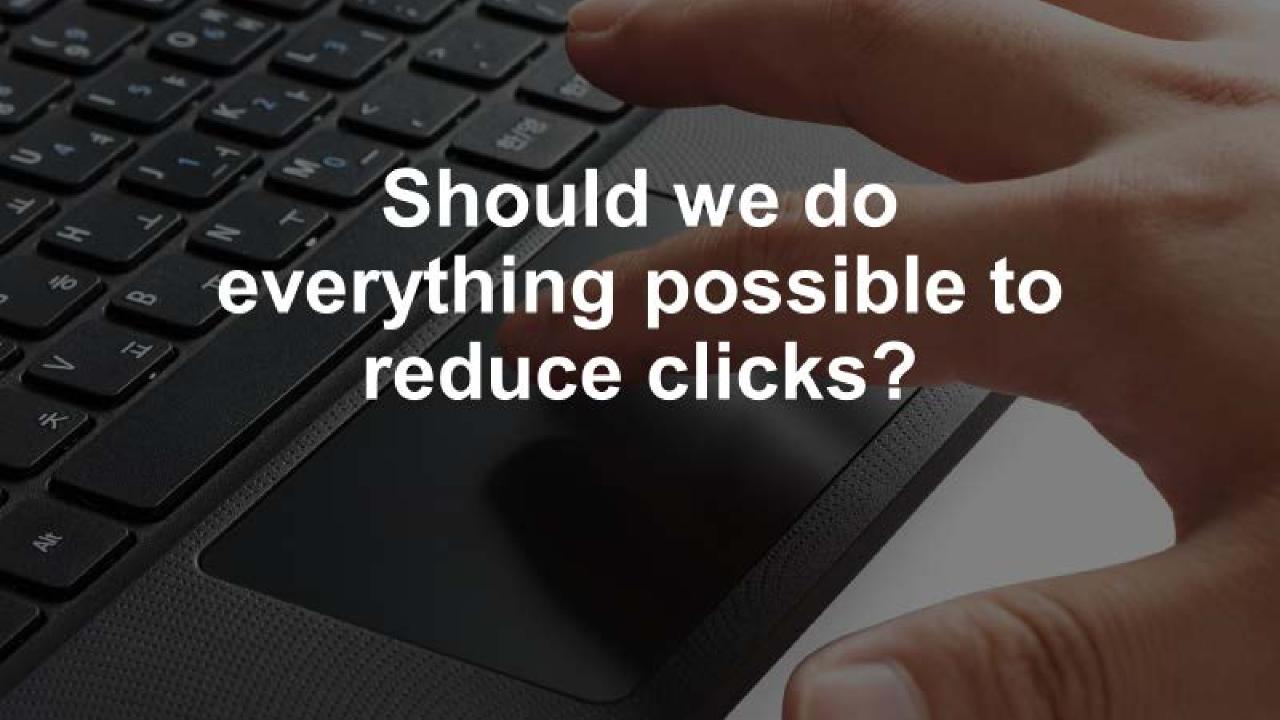




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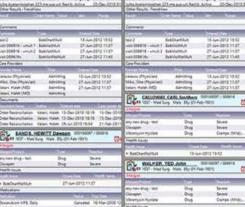
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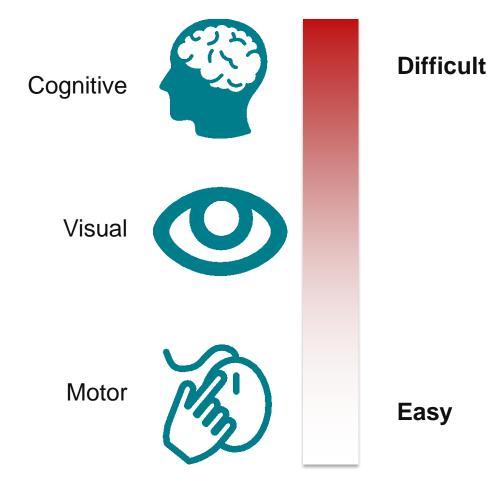
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Advisory







# Cognitive Friction and the Science of Usability



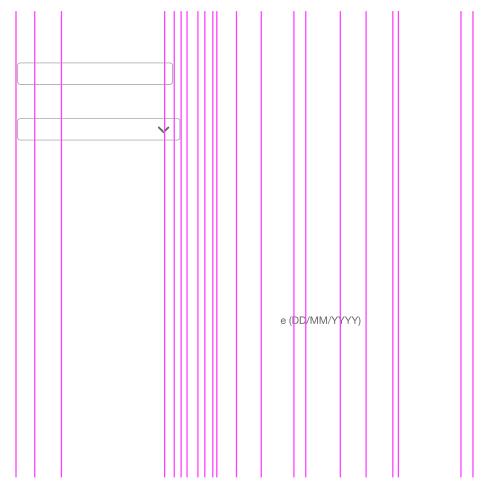


$$P(A_r|B) = \frac{P(B|A_r)P(A_r)}{P(B)} = \frac{\frac{1}{2} \cdot \frac{1}{3}}{\frac{1}{2}} = \frac{1}{3}$$

$$P(A_g|B) = \frac{P(B|A_g)P(A_g)}{P(B)} = \frac{1 \cdot \frac{1}{3}}{\frac{1}{2}} = \frac{2}{3}$$

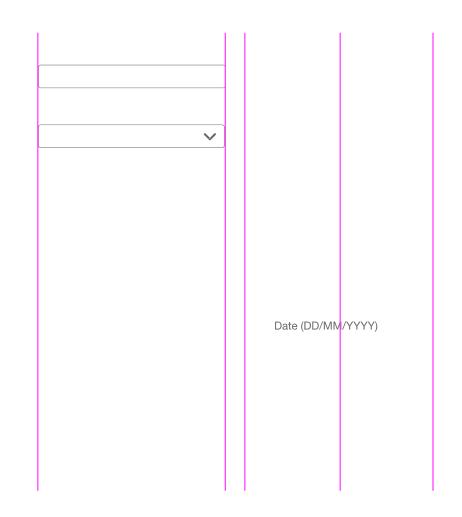
$$P(A_b|B) = \frac{P(B|A_b)P(A_b)}{P(B)} = \frac{0 \cdot \frac{1}{3}}{\frac{1}{2}} = 0.$$





More time More cognitive burden Increased risk of mistakes

**ARIZONA** Chapter





Feb-12-2016

Nov-01-2013

Nov-11-2010

Jun-28-2015

Aug-04-1998

May-19-2017

Sep-10-2014

July-09-2014

2/12/2016

11/01/2013

11/11/2010

06/28/2015

08/04/1998

05/19/2017

09/10/2014

07/09/2014

More time
More cognitive burden
Increased risk of mistakes





Feb-12-2016

Nov-01-2013

Nov-11-2010

Jun-28-2015

Aug-04-1998

May-19-2017

Sep-10-2014

July-09-2014

8-10 sec.

2/12/2016

11/01/2013

11/11/2010

06/28/2015

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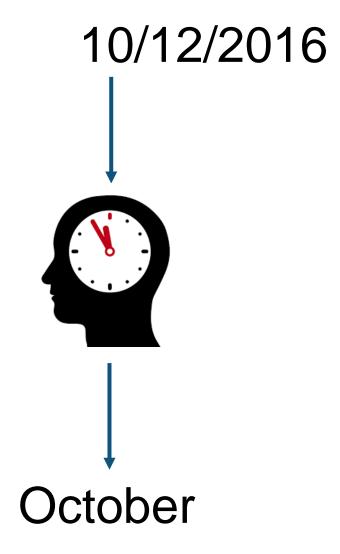
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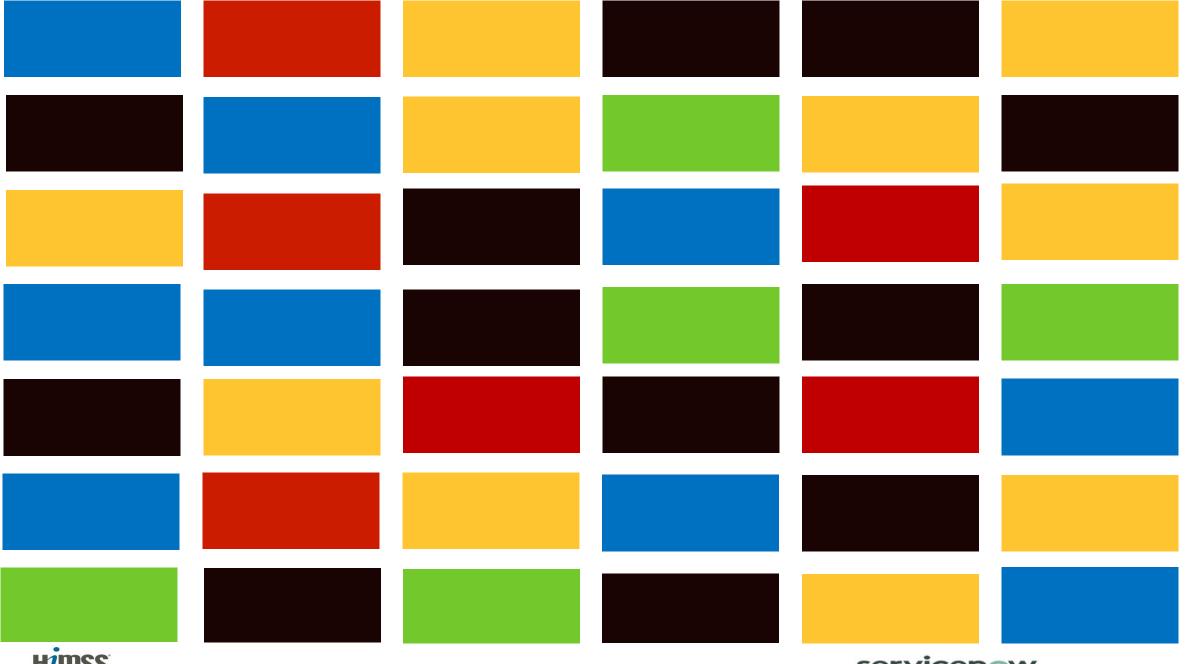
14-18 sec. + more errors











ARIZONA Chapter

#### **BLUE**



BLUE	YELLOW	RED	GREEN	BLACK
YELLOW	BLUE	BLACK	RED	BLUE
RED	YELLOW	GREEN	YELLOW	BLACK
YELLOW	BLACK	YELLOW	BLUE	BLUE
GREEN	RED	YELLOW	BLACK	GREEN
YELLOW	BLUE	GREEN	RED	YELLOW
imss.				servicenow

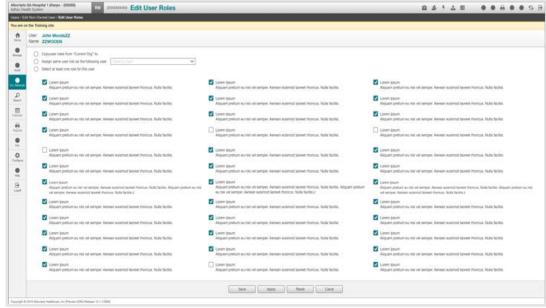
**ARIZONA** Chapter



Green means "everything is fine" (and it doesn't mean that here)

Poor contrast reduces readability





More time, more cognitive burden, and increase the risk of mistakes?

The color green draws our attention.

In this case, away from the data that is most important





Location	# of Patients	Target	Trend
ICU	43	35	<u>43</u> 🛪
Pediatric	12	10	10 M
Cardio	27	25	25 ¥
Surgery	22	20	22 ×
Other	15	10	10 ⅓



Location	# of Patients	Target	Trend
ICU	43	35	<u>43</u> 🛪
Pediatric	12	10	10 M
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ICU	43	35	<u>43</u> 🛪
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# Contrast is important

because it has a HUGE

impact on fluency and

adds to the cognitive tax

that our users have to pay.

Ratio: 4.5 to 1

WCAG 2.0 level AA requires a contrast ratio of **4.5:1**. Level AAA requires a contrast ratio of 7:1 for normal text and **4.5:1** for large text. (http://webaim.org/resources/contrastchecker/)



# Contrast is important

5:1

because it has a HUGE

1.1:1

impact on fluency and

7.21:1

adds to the cognitive tax

1.6:1

that our users have to pay.

3.71:1

Ratio:

4.5 to 1

3.0:1

WCAG 2.0 level AA requires a contrast ratio of **4.5:1**. Level AAA requires a contrast ratio of 7:1 for normal text and **4.5:1** for large text. (http://webaim.org/resources/contrastchecker/)

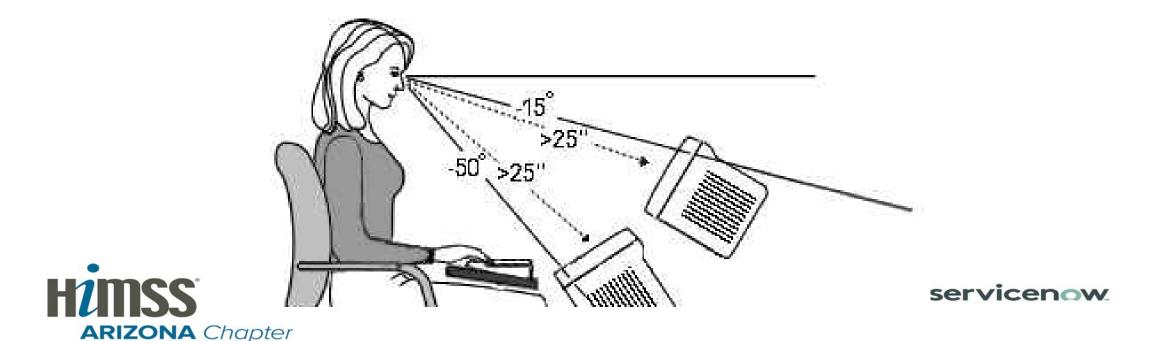




#### 007 Rule

Distance X.007 = Text Height

Distance from computer ( $\sim$ 18 inches) X .007 = .126









#### The Science Tells Us...

- Larger fonts
- Less color
- Narrower columns
- Less information
- More white space
- Alignment and hierarchy
- . . .



#### The Science Tells Us...

- Larger fonts
- Less color
- Narrower columns
- Less information
- More white space
- Alignment and hierarchy

• . . .

Greater efficiency

More effective

Higher satisfaction

Safer

Better decisions





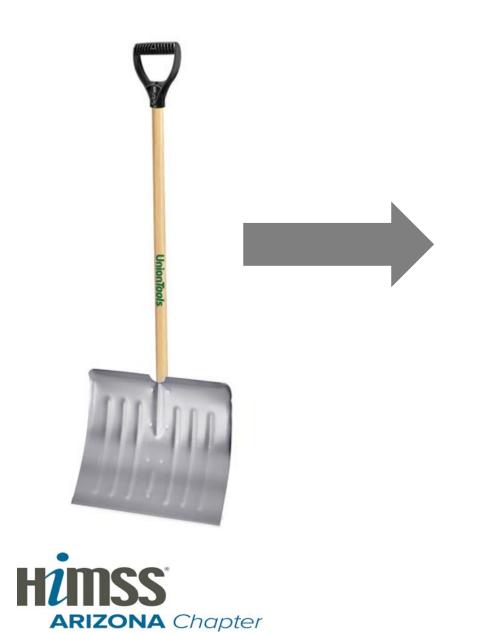
## **Helper Philosophy**













servicenow



Ross: Tell me about your day.

**Doctor**: I work in the office and I work at home. After I put my kids to bed...around 9pm...I get onto my EHR and I start getting ready for the next day.

I go in and prep every note for the next day. I want to make sure that I'm aware of what's happening ahead of time. I'm looking through each client to know why they are coming in, what's happened since I last saw them, just getting ready. I figure out what these codes mean. I know that the information I need is here, I just have to find it that way I relieve my stress. I'm also getting things out of the way that I don't need to see and making sure the things I will need are easy to get to.

It takes a lot of time (and clicks) but it's worth it. It helps to make the patients feel confident and for me to get out of the office in time for dinner with my kids.





Ross: Tell me about your day.

Doctor: I work in the office and I work at home. After I put my kids to bed...around 9pm...I get onto my EHR and I start getting ready for the next day.

Mobile

#### Note prep feature

#### Care plan view

of time. I'm looking through each client to know why they are coming in, what's happened since I last saw Schedule view Code dictionary them, just getting ready. I figure out what these codes mean. I know that the information I need is here, I just have to find it that way I relieve my stress. I'm also getting things out of the way that I don't need to see and More data making sure the things I will need are easy to get to.

Another icon

#### Less clicks

It takes a lot of time (and clicks) but it's worth it. It helps to make the patients feel confident and for me to get out of the office in time for dinner with my kids.



servicenow

Ross: Tell me about your day.

Doctor: I www affine fice and I work at home. After I put my kids to bed... around 9pm. Compare and I start getting ready for the next day. **Translate** 

Assure
I go in and prep every note for the next day. I whideake sure that I'm awstathus happening ahead of time. I'm looking through each client to know why they are coming in, what's happened since I last saw them, just getting read **Glitch** that these codes mean. Tknow that the information I need is here, I just have to find it that way I relieve my strengthso getting things out Removesurerises machine I will need are easy to get to.

Guide

Orient

It takes a lot of time (and clicks) but it's worth it. It helps to make the patients feel confident and for me to get out of the office in time for dinner with my kids.

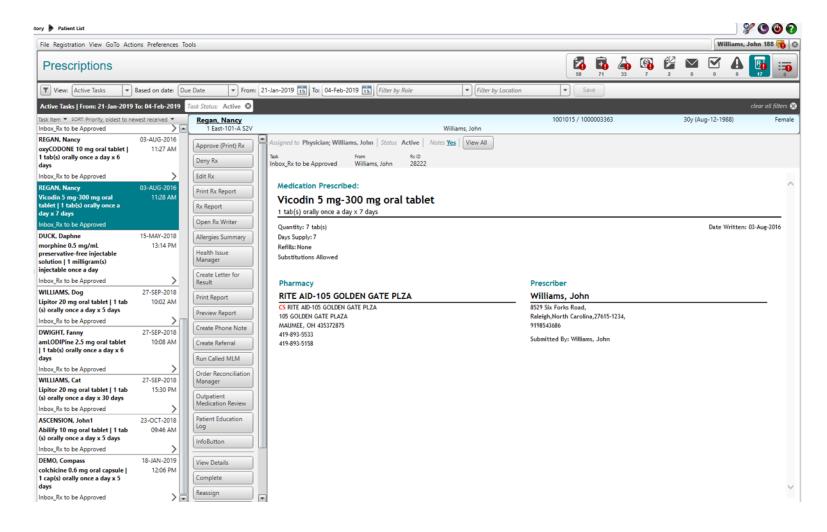


servicenow

#### Design Science + Helpfulness



#### **Acute - Tasking**

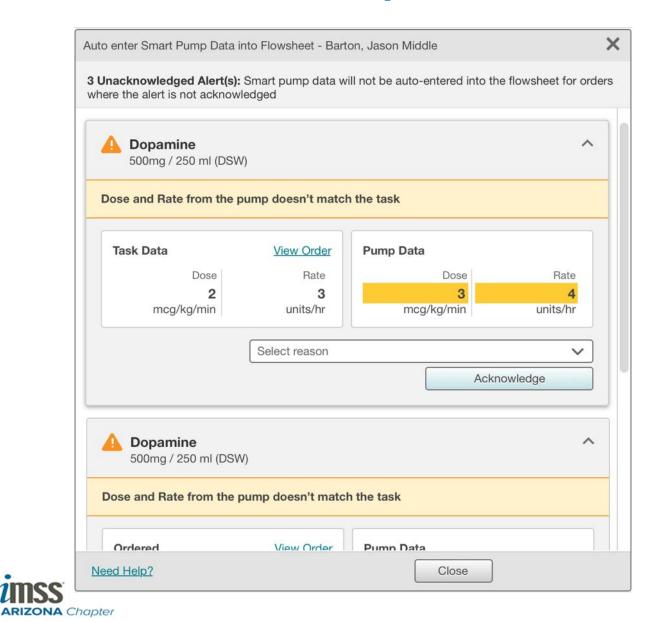


- Reduced icons and colors to focus on tasks
- Access relevant information without leaving the screen
- Tasking-centric view to reduce distractions
- Improved subjective usability by almost 200%





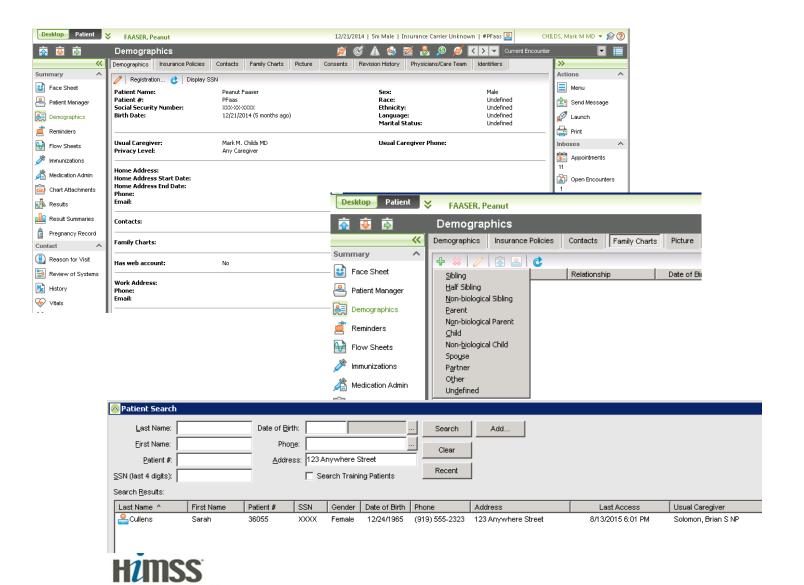
#### **Acute – Smart Pump**



- Visual design to enhance readability and understanding
- System points out differences to the user instead of the user having to determine
- "This is the best alert window I've ever seen by any of the vendors!" – smart pump vendor comment



### **Ambulatory – Linking Family Members**

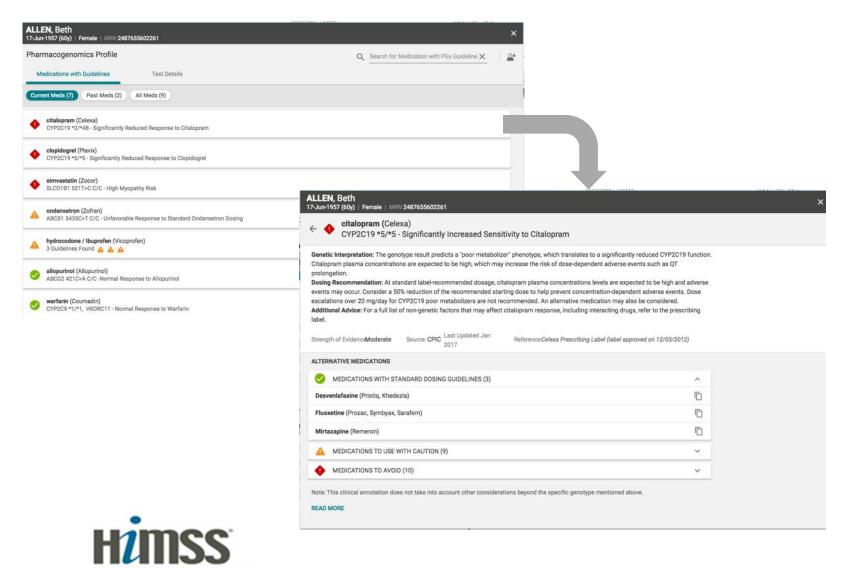


**ARIZONA** Chapter

- Family Charts provide the capability of linking family members and sharing pertinent history items
- Saves time and increases accuracy
- Search query pre-filled with most likely search terms
- "I've got to go and tell everyone in the practice about this!"



#### Pharmacogenomic - Progressive Display



**ARIZONA** Chapter

- Appropriate use of color and organization to reduce cognitive effort
- Organizes information by medication and alternatives to help those new to using pharmacogenomic information



# Usability + Helpfulness

CMERCHIE PARTIE Ved deserve





## Questions?

