

TURF: A Unified Framework for Defining, Evaluating, Measuring, and Designing EHR Usability

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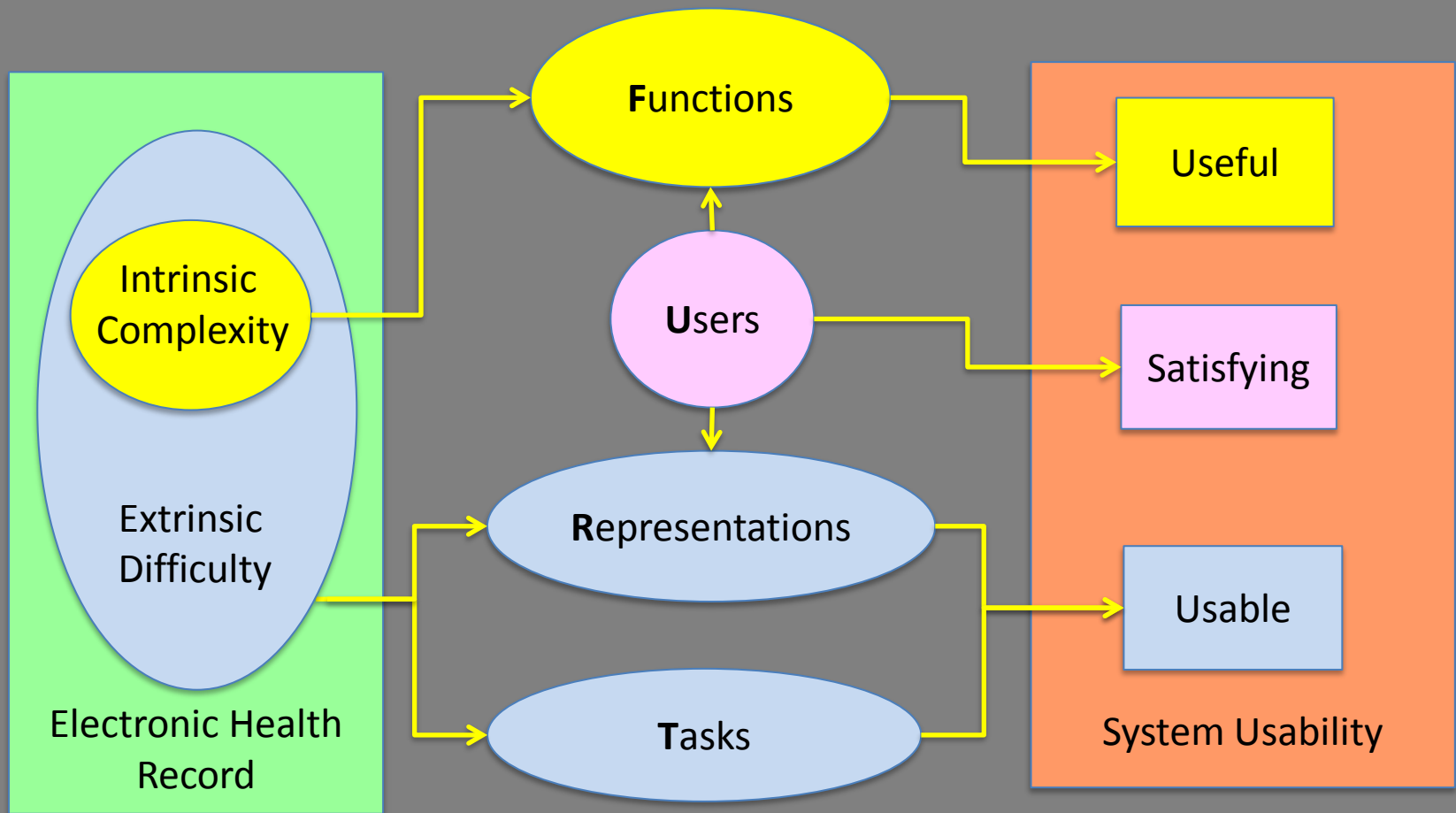
National Center for Cognitive Informatics & Decision Making
in Healthcare



What is Usability?

- Usability refers to how
 - useful,
 - usable,
 - satisfying
 - a system is for the intended users to accomplish goals in the work domain by performing certain sequences of tasks

TURF Framework for EHR Usability



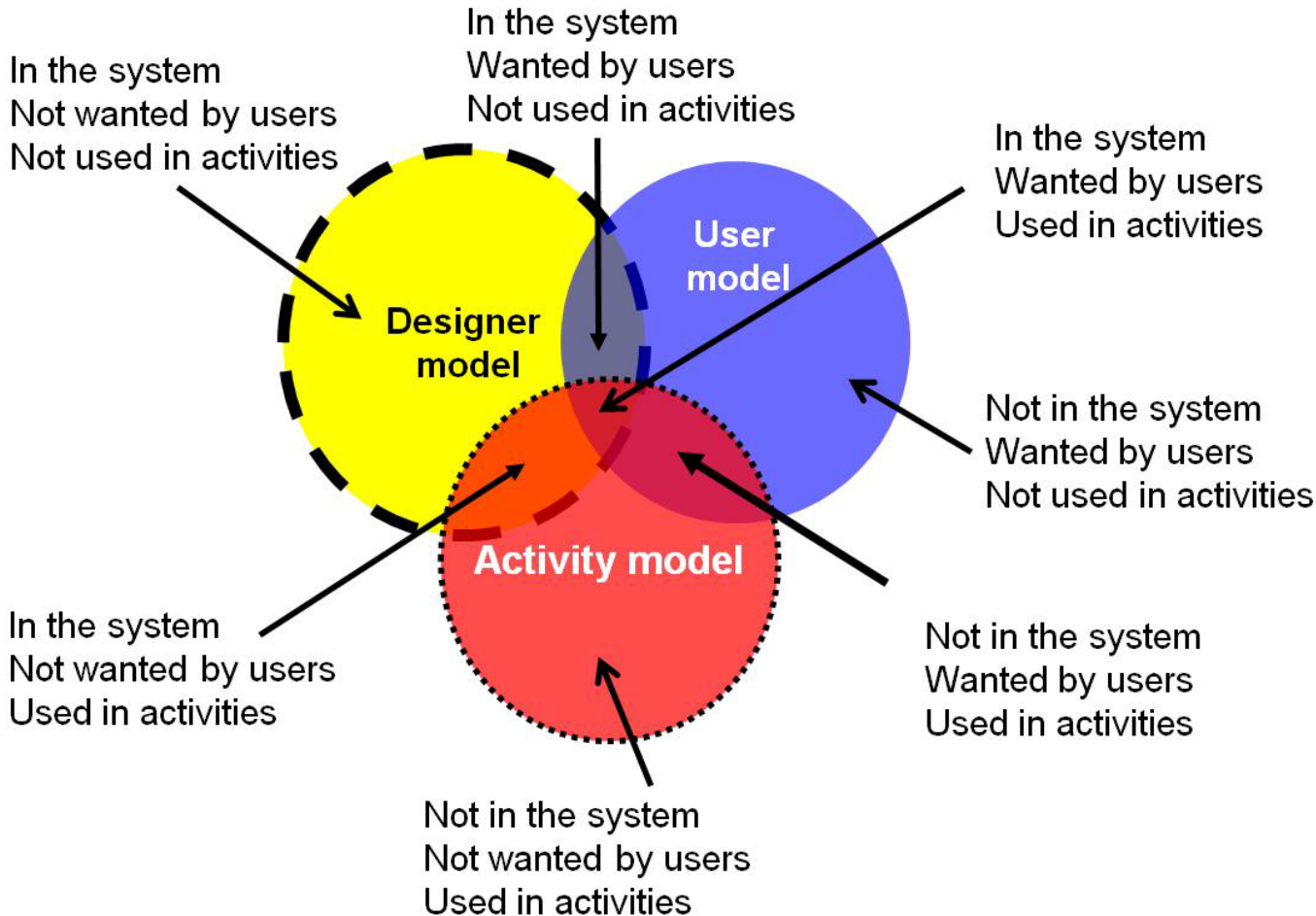
How to Measure Usefulness?

- Function Saturation
- Overhead

Function Saturation =

#Domain Functions in Designer Model

#Domain Functions in All Three Models



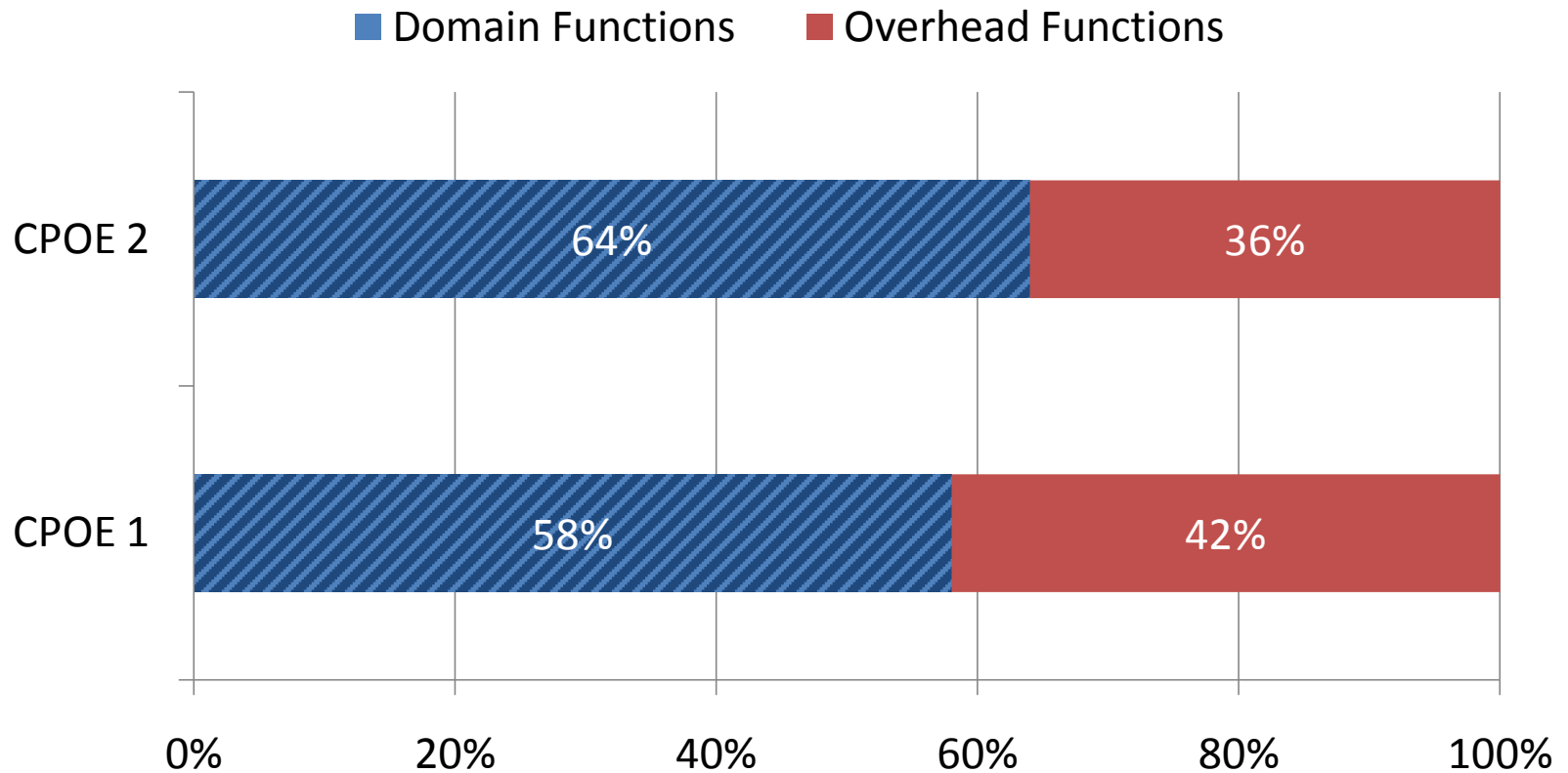
$$\frac{37}{80} = 46\%$$

A Small EDR System

Overhead in Designer Model =

Overhead Functions

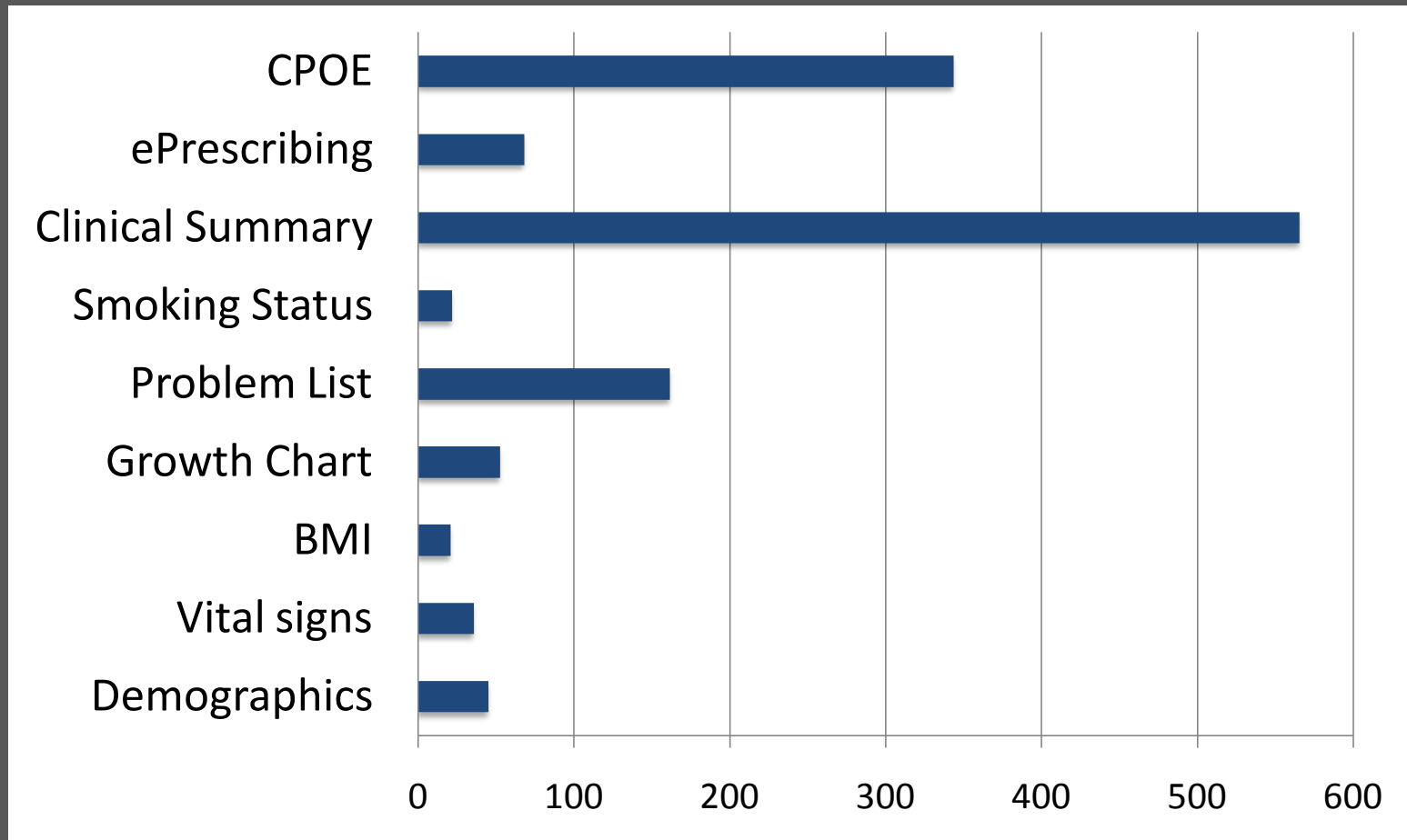
#Domain Functions + #Overhead Functions



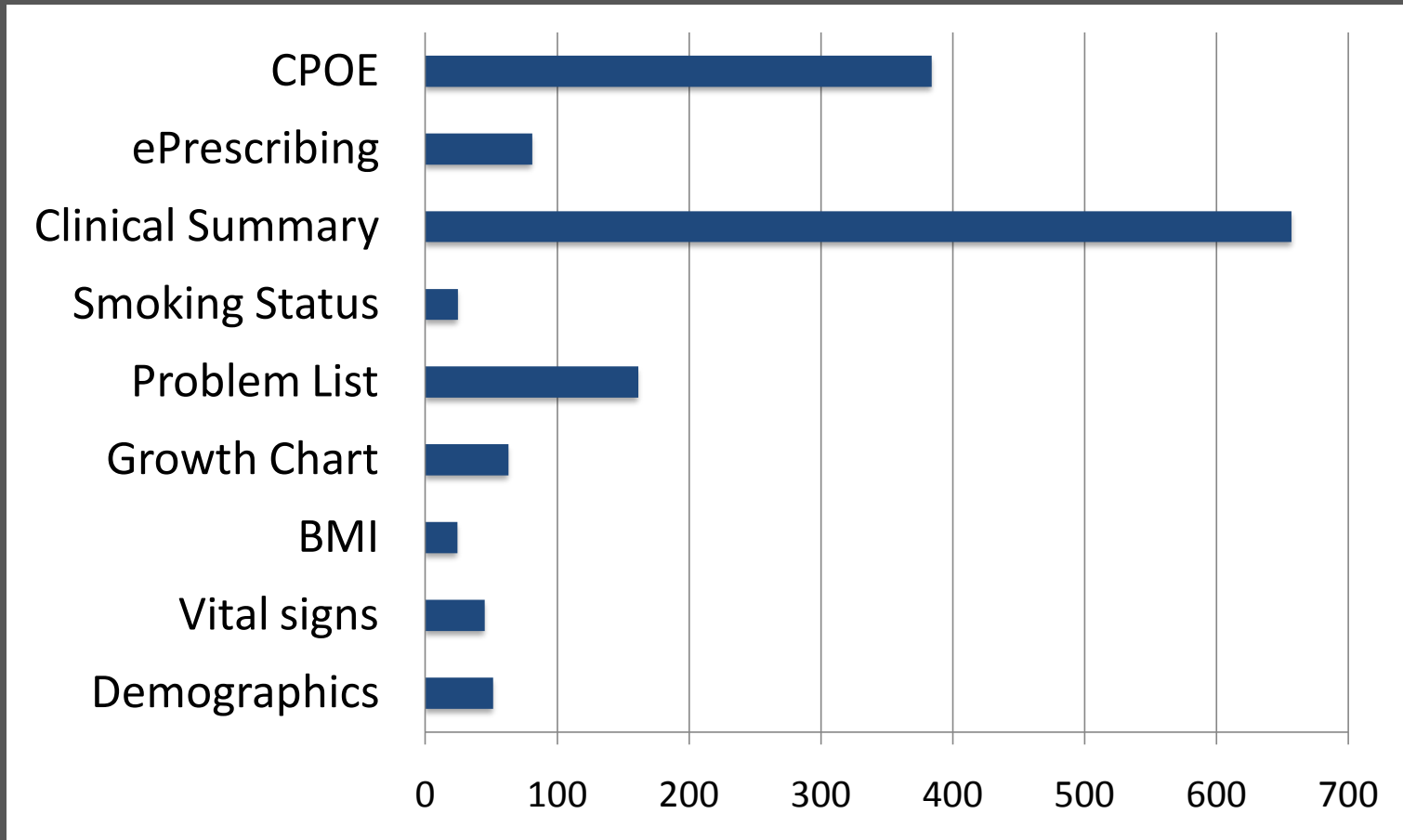
How to Measure Usableness?

- Learnability
 - # trials to reach a certain performance level
 - # items that need to be memorized
 - # sequences of steps that need to be memorized
 - Etc.
- Efficiency
 - Time on task
 - Task steps
 - Task Success
 - Mental effort
- Error Prevention and Recovery
 - Error occurrence rate
 - Error recovery rate

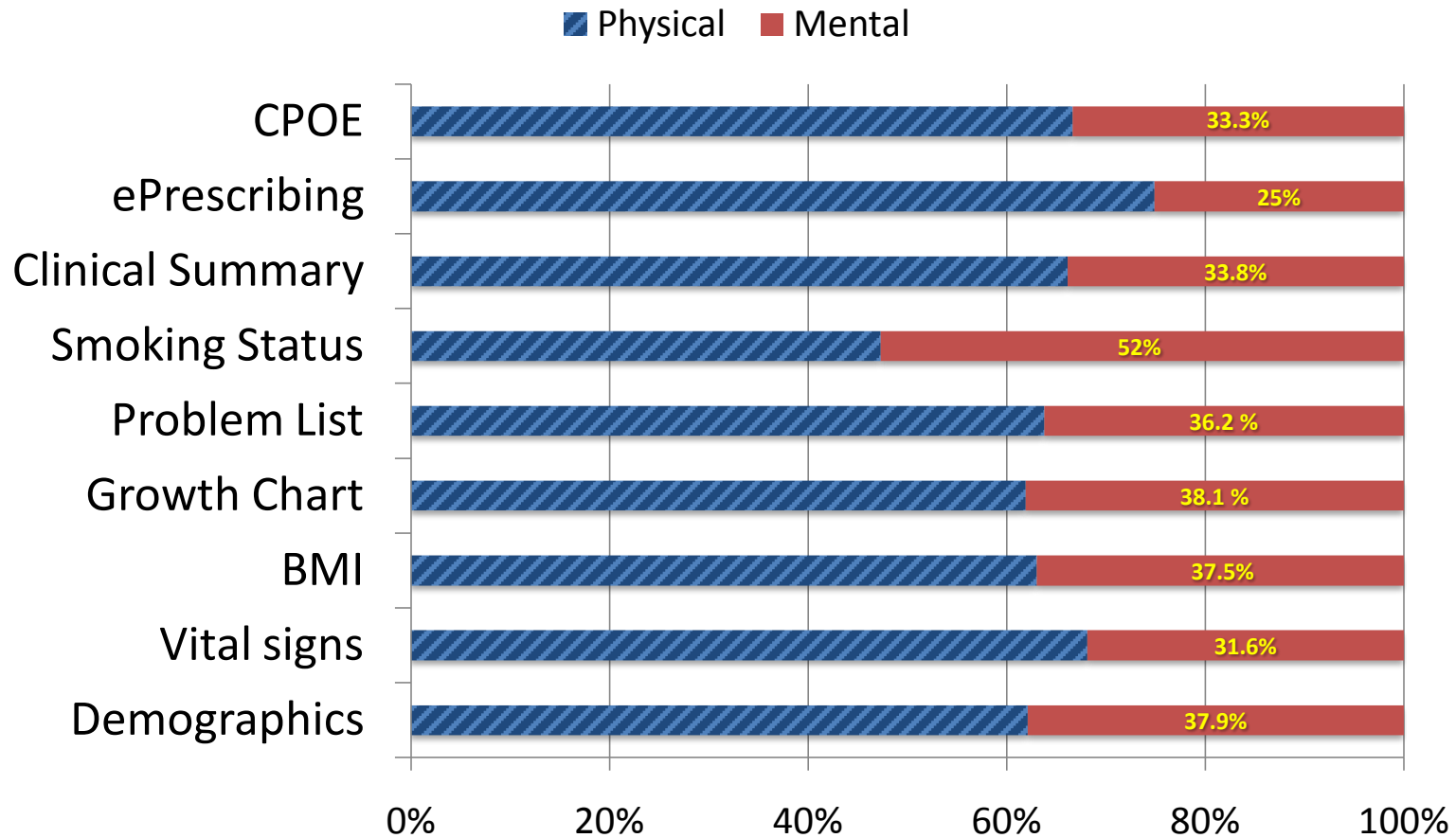
Time on Task (seconds)



of Task Steps



Mental Effort



How to Measure Satisfaction?

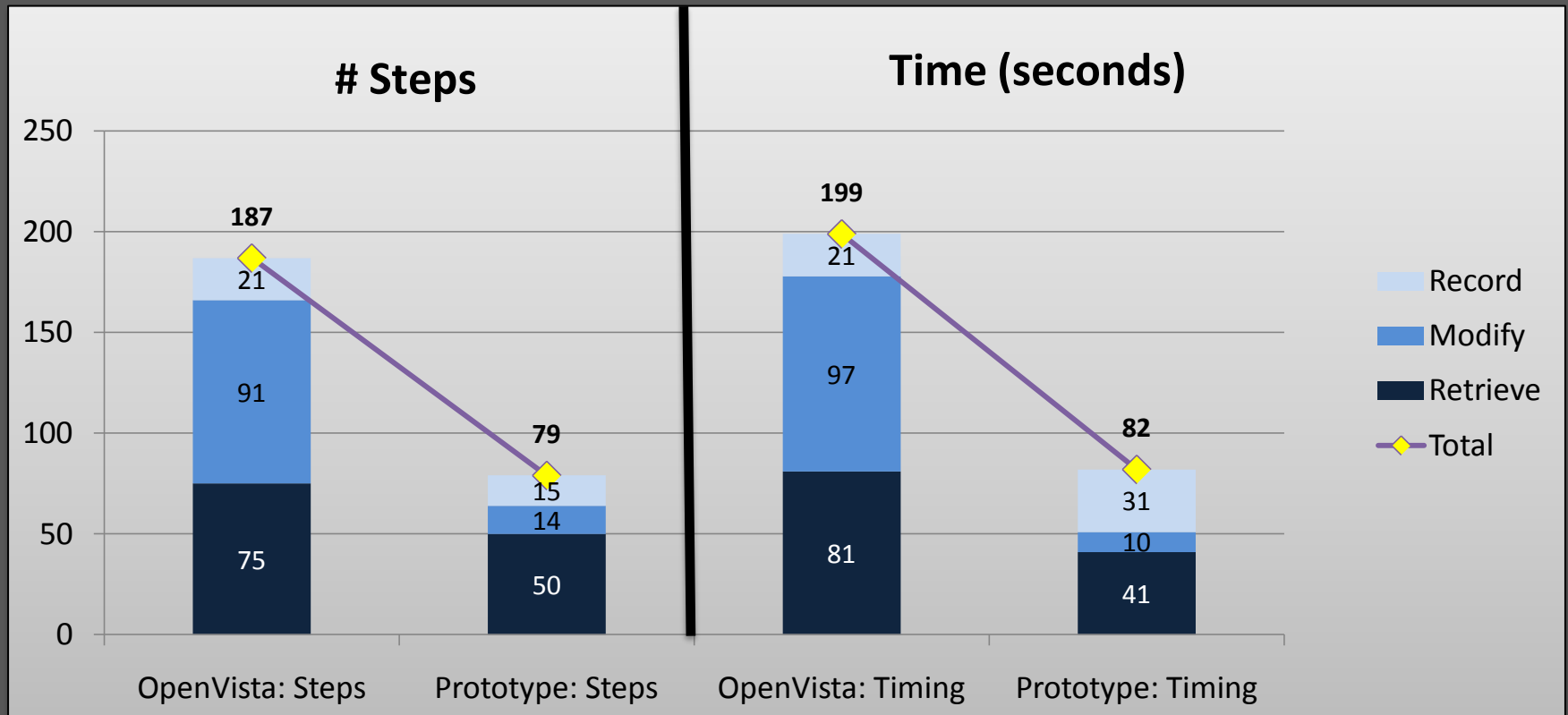
- User's subjective impression of how likable the system is
- Likert scale type of evaluations
 - System Usability Scale (SUS)
 - AHRQ Survey Instruments for EHR usability (in development)
 - Other measures

How to Improve Usability?

TURF in Action

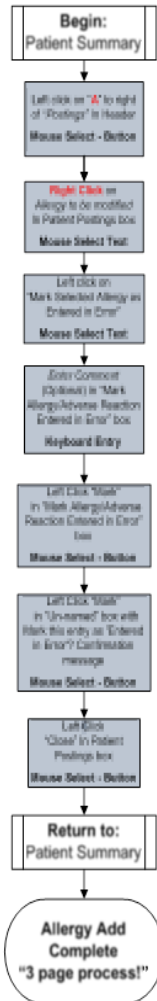
TURF in Action: Redesigning EHR

- OpenVista: Open Source EHR
- NIST Use Case §170.302(e)
- Maintain active medication allergy list
 - Add allergy; Modify allergy; Review allergy

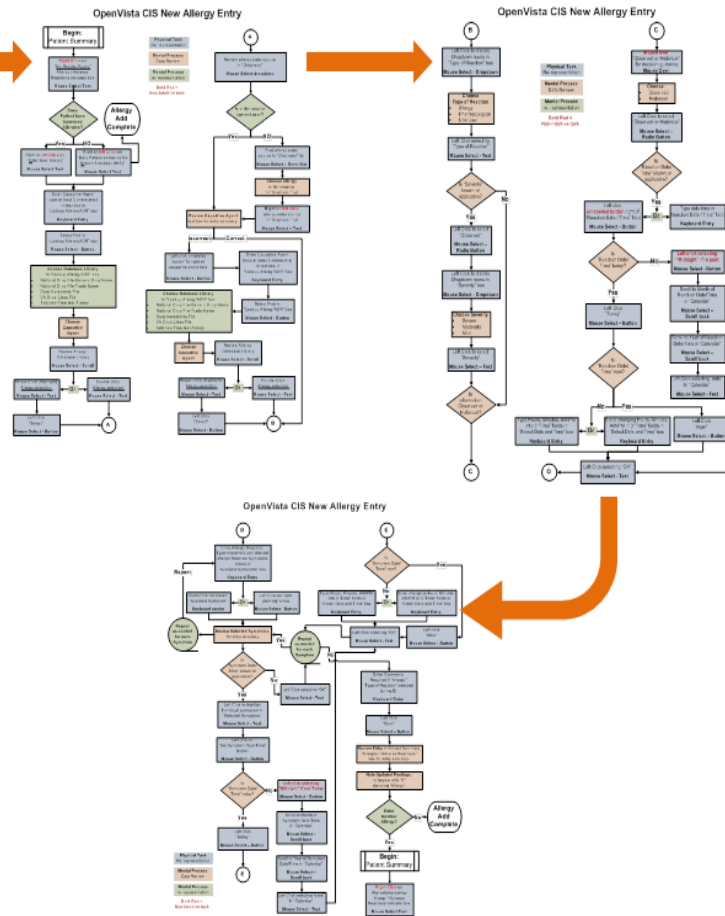


TURF in Action: Redesigning EHR

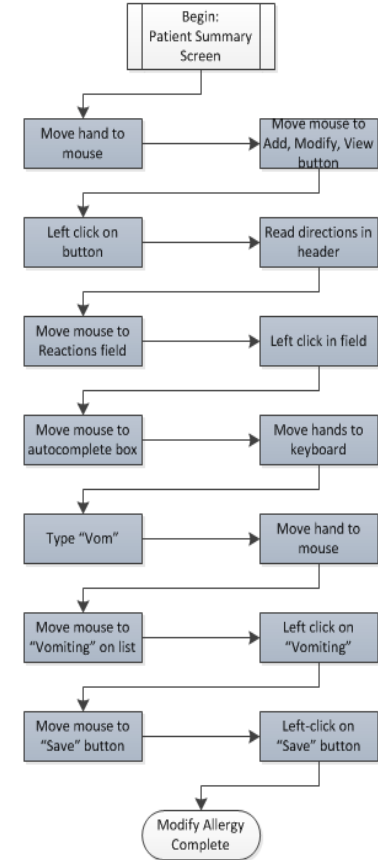
OpenVista CIS Modify Allergy Entry



91 Steps

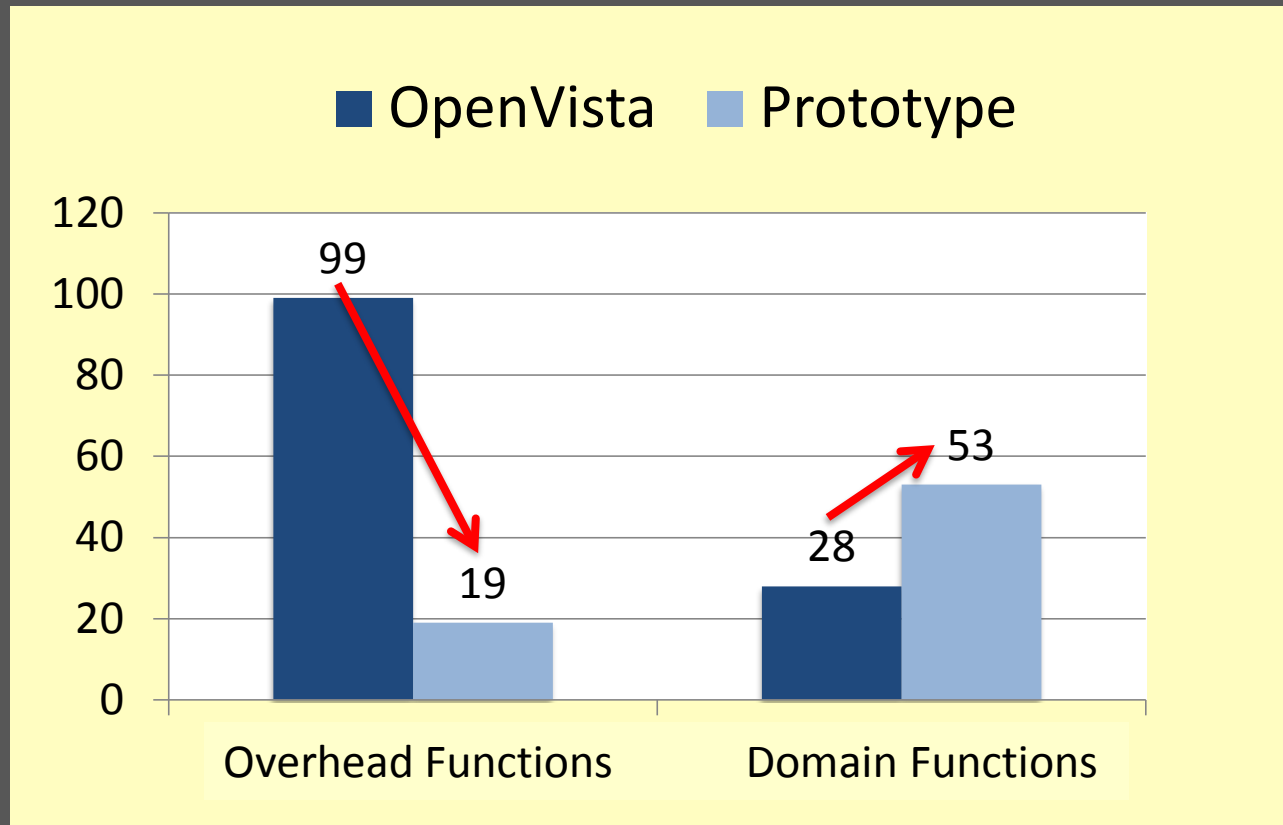


14 Steps Prototype Modify Allergy Entry



TURF in Action: Redesigning EHR

- 81% reduction in Overhead Functions
- 89% increase in Domain Functions



Usability at SHARPC

- Rapid Usability Assessment Protocol
- Comprehensive TURF Evaluation
- Redesign
- Training
 - Short Course
 - AMIA 10x10 Course
 - Certificate, MS, & PhD

Summary

- Usability is defined
- Usability is measurable
- Usability is doable

EHR Usability Symposium

October 21, 2011

Washington Hilton

Pre-AMIA Event

