



# **Usability Assessment of Missouri Cancer Registry's Published Mapping Interactive Reports Using Health Professionals**

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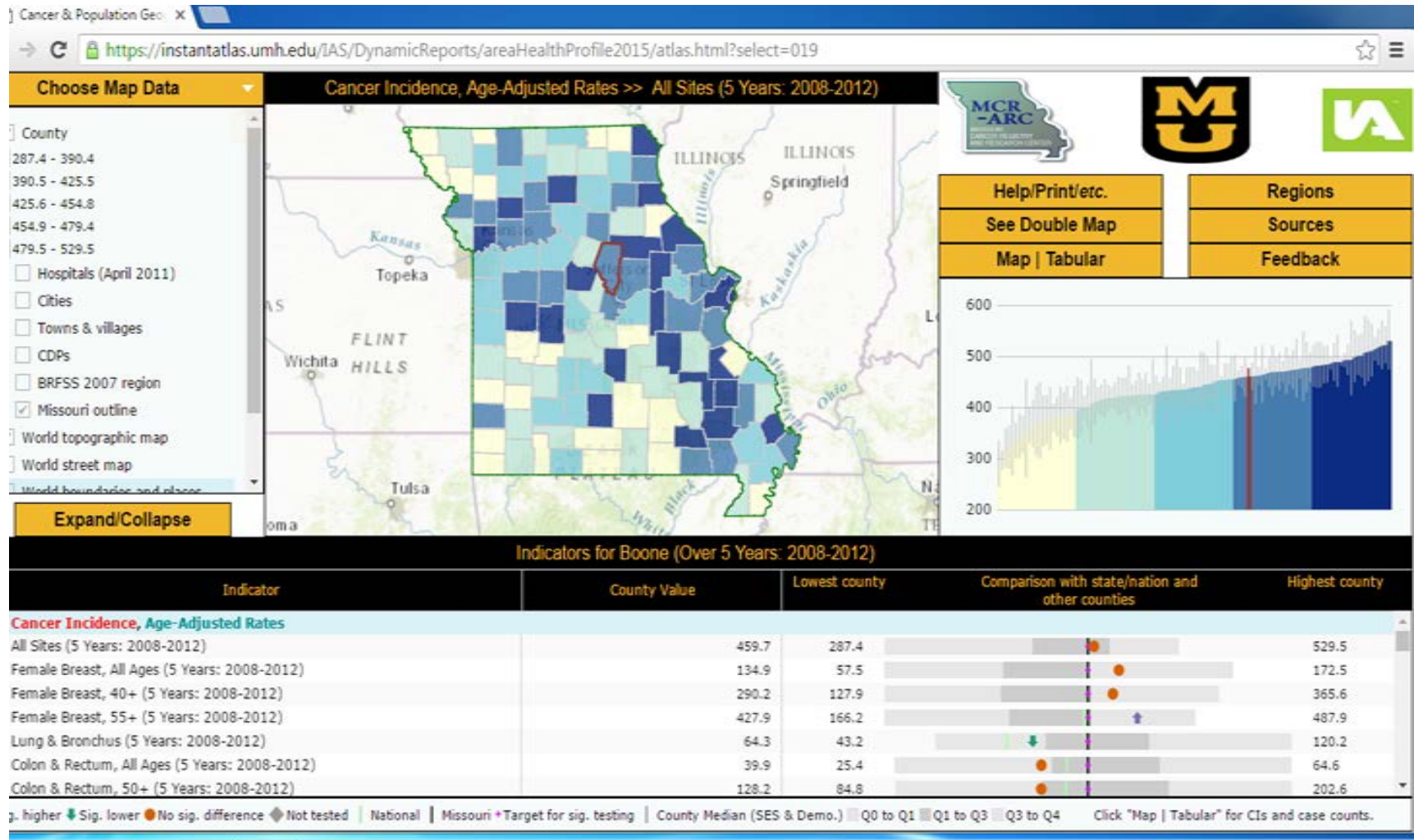
Missouri Cancer Registry and Research Center

Health Management and Informatics Department/ School of Medicine

# Background

- Users of spatial data may have difficulties in interpreting information in health-related spatial reports
- Mapping reports should be tested for usability before & after reports' release
- MCR-ARC produced interactive reports using a specific software for years
- These reports have never been tested for usability

# MCR-ARC Mapping Reports



# MCR-ARC Mapping Reports

**Choose Indicator 1**

- County
- 332.6 - 414.7
- 414.8 - 437.2
- 437.3 - 455.7
- 455.8 - 478.3
- 478.4 - 530.9
- Hospitals (April 2011)
- Cities
- Towns & villages
- CDPs
- BRFSS 2007 region
- Missouri outline
- World topographic map

**Indicator 1**

**Help/Print/etc.**

[See Area Profile](#)

[Plot | Tabular](#)

**Choose Indicator 2**

- County
- 175.5 - 221.2
- 221.3 - 241.6
- 241.7 - 256.5
- 256.6 - 269.1
- 269.2 - 316.7
- Hospitals (April 2011)
- Cities
- Towns & villages
- CDPs
- BRFSS 2007 region
- Missouri outline
- World topographic map

**Indicator 2**

**Correlation (r) = 0.62, R-squared = 0.38,**  
**Regression Equation: y = 45.09 + 0.45x**

**Indicator 1: Cancer Incidence, Age-Adjusted Rates**  
All Sites  
15 Years: 1998-2012

**Indicator 2: Cancer Incidence, Age-Adjusted Rates**  
Female Breast, 40+  
15 Years: 1998-2012

**Sources**

**Feedback**

# Study Aims

- Assess the usability of MCR-ARC's published InstantAtlas reports:
  - Measure effectiveness and efficiency of reports
  - Measure the satisfaction of the study participants about the tested maps

# Methods

## 1. Study Design:

- Mixed methodology approach
- Per participants, the researchers conducted:
  - ***A pretest questionnaire,***
  - ***A multi-task usability test, and***
  - ***System Usability Scale (SUS)***

# Methods

## *1.a. The pretest questionnaire*

- Includes questions on every participant's demographics, work type, and experience in healthcare field and with GIS tools

# Methods

## *1.b. Multi-Task usability test*

- The investigators developed this multi-task scenario based on the expected functionality of the tested maps
- The tasks were in the same order for all participants



# Methods

## *1.c. The System Usability Scale (SUS)*

- Is an industrialized and simple ten-item scale to measure the participants' satisfaction
- The SUS score range between 0 and 100

# Methods

## 2. Participants:

- Recruiting emails were sent to faculty in the Master of Public Health Program (MPH), and faculty and staff in the Department of Health management and Informatics (HMI) at the University of Missouri- Columbia

# Methods

- The convenience sampling technique
- Investigators ran the study's trial on the first seven participants who responded

# Methods

## 3. Study Procedure:

- A computer laptop was used to conduct the trial
- Specific Microsoft Windows software was used to audio-video record the laptop screen

# Results & Discussion

## 1. Participants demographics:

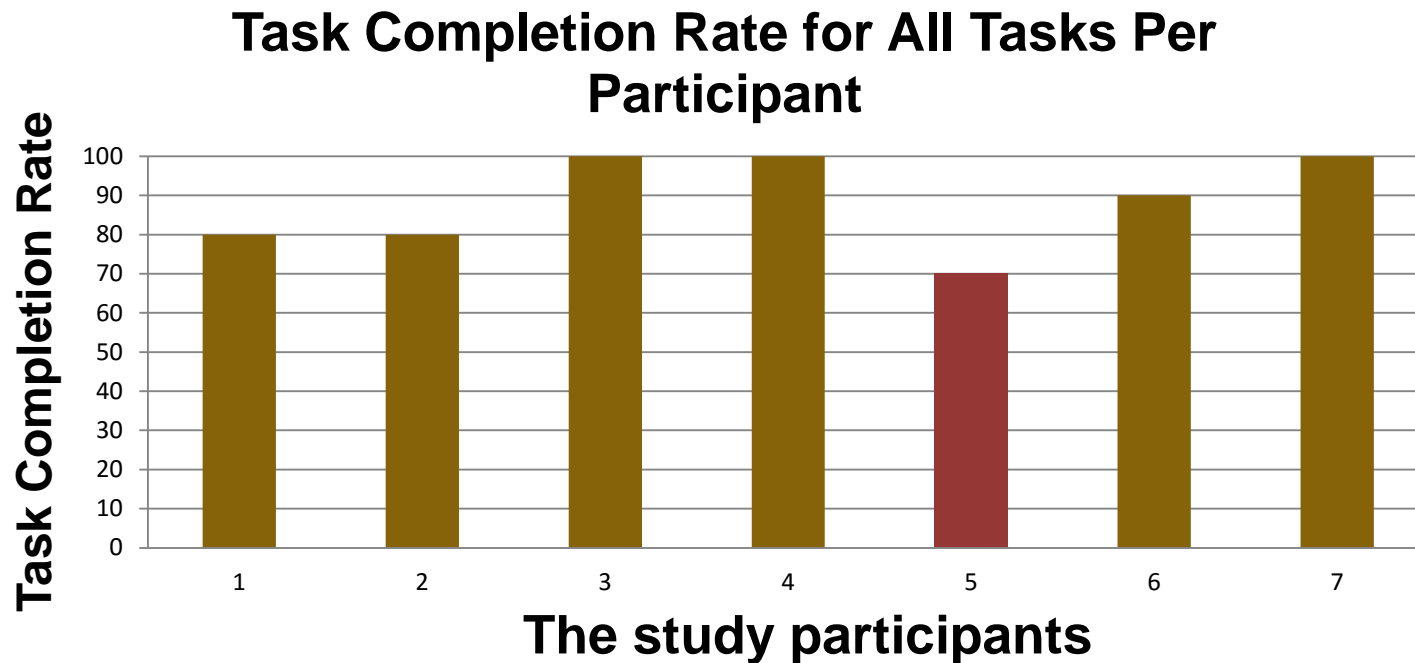
- 7 health professionals, one male and six females
- 31-68 years old (**Mean**=49.57 years old, **Median**=49.14 years old)
- **Three** from the MPH and **four** from the HMI
- **Four** carrying PhD in healthcare related fields, and **three** have either MPH or HMI master

# Results & Discussion

- The participants have experience in healthcare from **3 to 38 years** (**Mean = 17.75 years, Median= 13 years**)
- The participants' total experience in using GIS tools was from **few months to 15 years** (**Mean=5.5 years, Median= 2 years**)

# Results & Discussion

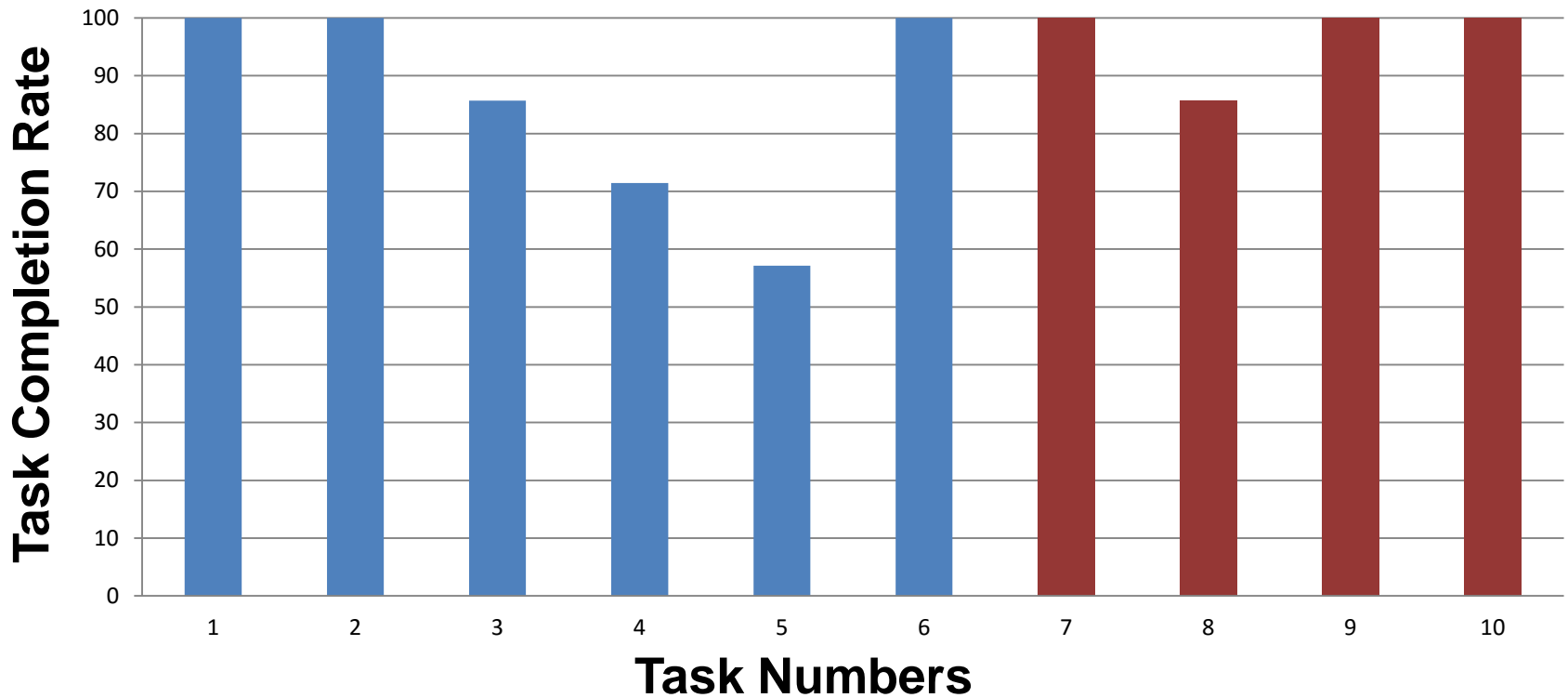
## 2. The reports' effectiveness:



$$\text{Effectiveness} = \frac{\text{Number of tasks completed successfully}}{\text{Total number of tasks undertaken}} \times 100\%$$

# Results & Discussion

**Task Completion Rate Per Task for All the Participants**

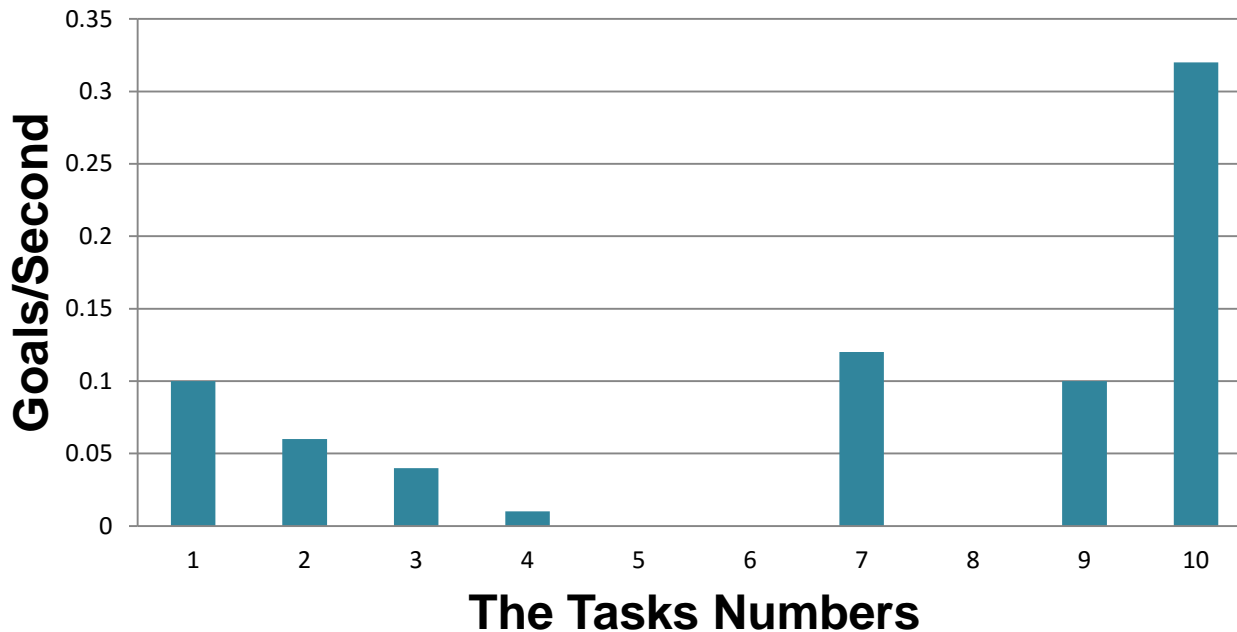




# Results & Discussion

## 3. Efficiency:

Time Based Efficiency Per Task



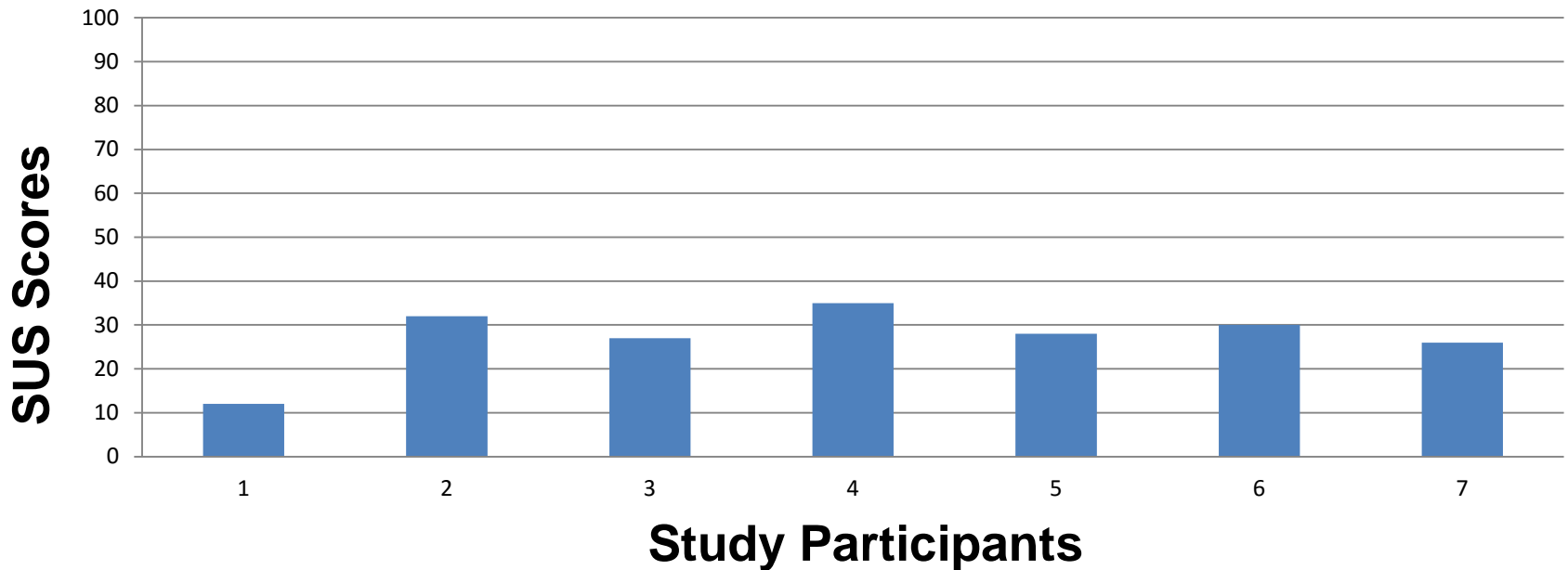
$$\bar{P}_t = \frac{\sum_{j=1}^R \sum_{i=1}^M \frac{N_{ij}}{t_{ij}}}{NR}$$

Mean = 0.08 goals/second    Median = 0.05goals/seconds

# Results & Discussion

## 4. User Satisfaction:

### SUS Scores of the Study's Participants



# Conclusion & Recommendations

- According to the study results and because the map developer and the study researchers are aiming the maximum usability for the MCR-ARC mapping reports:
  - The mapping reports need to be refined and updated
  - The final versions should re-tested through a pilot usability study/ies before their re-publishing for the potential users

# Conclusion & Recommendations

- Include the users in the refinement process and any future mapping plans by doing further need assessment survey/s and pilots for the potential users
- Assess our MCR-ARC mapping reports to satisfy not just health professionals in academia
- Clinicians, public health practitioners, as well as public health policy makers should be included in future usability testing studies

# Future Research

- Apply for an IRB amendment for the usability study to evaluate and assess MCR-ARC's published mapping reports using public health practitioners and cancer policy makers
- Retest the refined versions using the same participants before publishing them
- Evaluate and assess the un-published senate districts' mapping reports using the same methodology

# References

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**Thank you  
Questions??**