wHealth

a window to your future health

Edward Kim, Ph.D. (Co-PI)
James Park, MD MPH MSHP (Co-PI)

Eliza Donne
Jared Krinsky

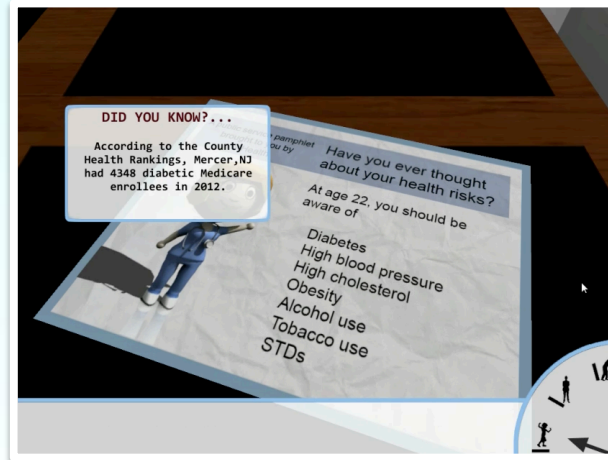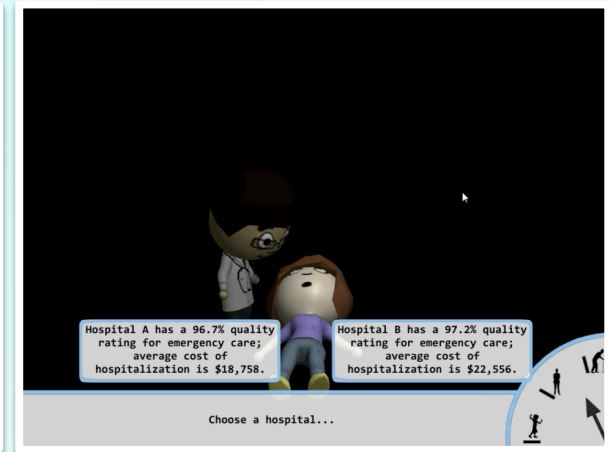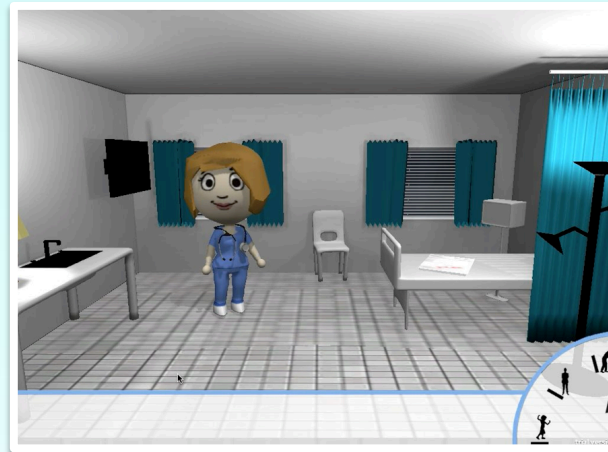# The Game

The game play is simple.

You **watch.**

You **think.**

You **decide.**

wHealth is an interactive storytelling application designed for the Health 2.0 developer challenge sponsored by the Robert Wood Johnson foundation: games to generate data challenge. For this project, our plan was to address **two big questions...**

1. How do we **improve** the health of our users?

2. What useful health data do we **collect**?

wHealth Overview

Big Question 1: How do we improve the health of our users?

We need to **engage** users . To engage the player with our application, we used one of the most powerful techniques available to games, interactive storytelling.

We need to **transfer knowledge** and behavior to users. Using virtual avatars allows the health scenarios and decisions to be relatable to the player

transference - the application of knowledge, skills and attitudes acquired during training to the environment in which they are normally used (Muchinsky, 1991)

We need to **minimize future discounting** of health benefits and behaviors. By showing the immediate consequences of unhealthy behavior, we hope to deter the behavior in real life.

future discounting - the desire to enjoy benefits in the present while deferring any negative effects of doing so. (Torgerson, 1999)

Great! Let's get started!

For the first time, I am out on my own and things seem to be going well for me. I don't have a care in the world...

Dr. A – completes 50% of recommended care, located 30 minutes away, and costs $10 per visit

Dr. S – completes 70% of recommended care, located 30 minutes away, and costs $10 per visit

My insurance company suggests Dr. S and I have gotten several recommendations from some friends... But which one should I choose?

Input Data

The game is driven completely **dynamically.**

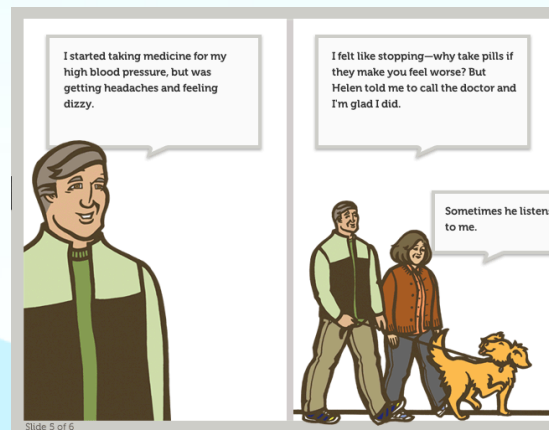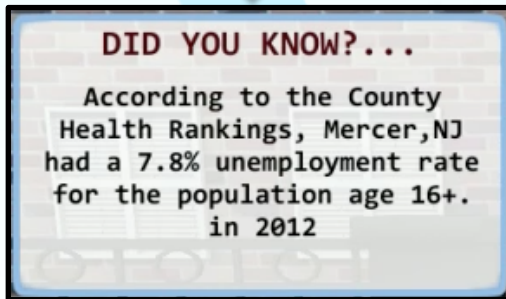Everything is controlled by XML including the **environment, movement**, **actions, questions asked**

The **County Health Rankings** for every county in the USA are accessible by our game through XML and MySQL. If you input your county into the game, it will display relevant statistics based upon the story and your location!

```
<question id='1'>
    <text>Where was I?  Oh yeah...  Drink a beer? Eat some pizza?  Call up that good looking coworker?</text>
    <qtype>button</qtype>
    <option>
        <xpos>0.33</xpos>
        <ypos>0.73</ypos>
        <bwidth>150</bwidth>
        <text>D
        <plotbr
        <animat
        <questi
        <stored
    </option>
    <option>
        <xpos>0
        <ypos>0
        <bwidth
        <text>E
        <plotbr
        <animat
        <questi
        <stored
    </option>
    <option>
        <xpos>0
        <ypos>0
        <bwidth>150</bwidth>
        <text>Call Coworker</text>
        <plotbranchid>1</plotbranchid>
        <animationplay>4</animationplay>
        <questionid>2</questionid>
        <storedata></storedata>
    </option>
</question>
```

```
<option>
    <xpos>0.33</xpos>
    <ypos>0.73</ypos>
    <bwidth>150</bwidth>
    <text>Drink Beer</text>
    <plotbranchid>3</plotbranchid>
    <animationplay>0</animationplay>
    <questionid>0</questionid>
    <storedata></storedata>
</option>
```
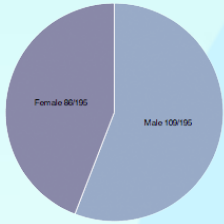
Select your US state   Select your County
Alabama   Autauga
Alaska   Baldwin
Arizona   Barbour
Arkansas   Bibb

Back   Begin!

The Wisconsin Health Report (http://www.wisconsinhealthreports.org/) stories can be easily integrated into our game platform **without changing a line of actual game code**, just the XML!

DID YOU KNOW?...

According to the County Health Rankings, Mercer,NJ had a 7.8% unemployment rate for the population age 16+. in 2012

I started taking medicine for my high blood pressure, but was getting headaches and feeling dizzy.

I felt like stopping—why take pills if they make you feel worse? But Helen told me to call the doctor and I'm glad I did.

Sometimes he listens to me.

Slide 5 of 6

BOB: My doctor had me take a different pill and it's working fine. She said it's not unusual to try several medicines before finding what works best.
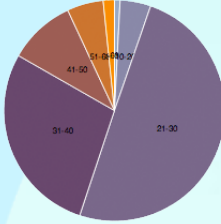
Data Generated

Big Question 2: What useful health data do we collect?

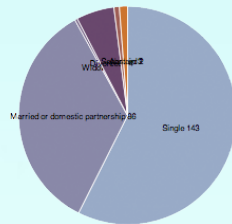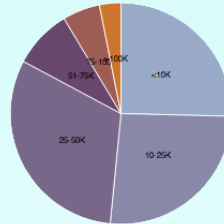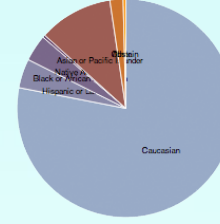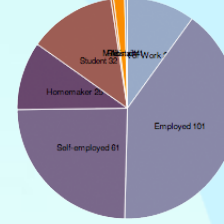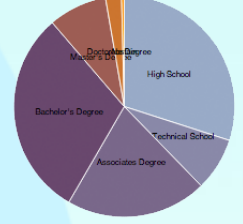Gender · Age · Marital Status · Household Income · Ethnicity · Employment · Education
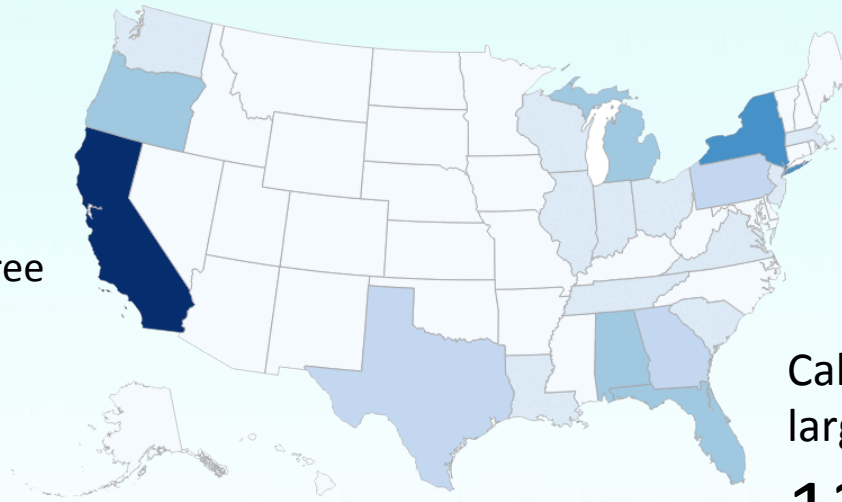
Majority Statistics
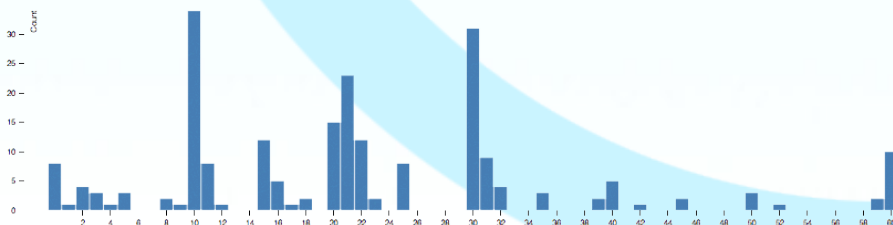
55.89% Male

46.21% 21-30 yrs old

75.37% Caucasian

29.54% Bachelor's degree
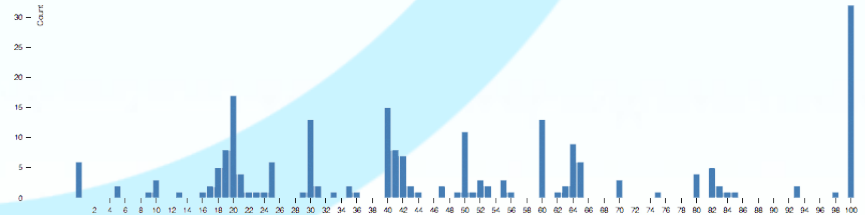
54.16% Single

38.25% Employed

30.30% 25-50K income

201 unique workers from Amazon Mechanical Turk from the USA. The data was collected in 26 hours.

California had the largest participation at 13.6 %

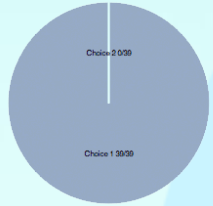**Time Travel in Minutes**

Cost in Dollars

Data Generated

Message Framing* Questions and Answers

Time A
Choice 1 - Dr. A – completes 90% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 0/39
Choice 1 39/39

Time B
Choice 1 - Dr. B – completes 90% of recommended care for diabetes, located 30 minutes away, and costs $10 per visit
Choice 2 - Dr. S – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 11/46
Choice 1 35/46

Time C
Choice 1 - Dr. C – completes 90% of recommended care for diabetes, located 60 minutes away, and costs $10 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 20/49
Choice 1 29/49

Time D
Choice 1 - Dr. D – completes 90% of recommended care for diabetes, located 90 minutes away, and costs $10 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 1 15/41
Choice 2 26/41

Higher Quality A
Choice 1 - Dr. A – completes 90% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 1/28
Choice 1 27/28

Higher Quality B
Choice 1 - Dr. B – completes 90% of recommended care for diabetes, located 10 minutes away, and costs $25 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 4/33
Choice 1 29/33

Higher Quality C
Choice 1 - Dr. C – completes 90% of recommended care for diabetes, located 10 minutes away, and costs $50 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 12/27
Choice 1 15/27

Higher Quality D
Choice 1 - Dr. D – completes 90% of recommended care for diabetes, located 10 minutes away, and costs $100 per visit
Choice 2 - Dr. T – completes 70% of recommended care for diabetes, located 10 minutes away, and costs $10 per visit

Choice 2 15/26
Choice 1 11/26

*Our use of message framing was primarily integrated after our **feedback** from the 1 on 1 mentoring session

the framing effect- framing effect refers to a phenomenon whereby the choices people make are systematically altered by the language used in the formulation of options.
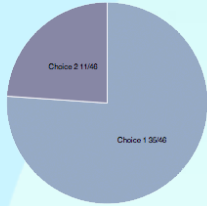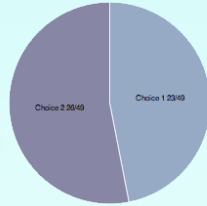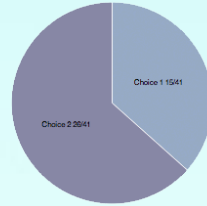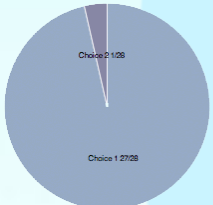
Data Quality Control

Choice 1 - Dr. A – completes 90% of recommended care for diabetes, located 30 minutes away, and costs $10 per visit

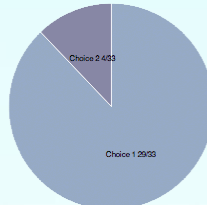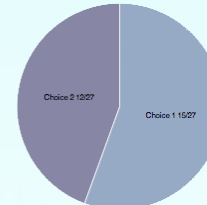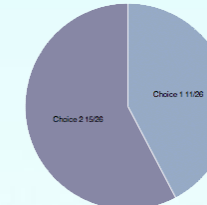Choice 2 - Dr. S – completes 70% of recommended care for diabetes, located 30 minutes away, and costs $10 per visit

Choice 2 4/31
Choice 1 27/31

Data Quality Control is embedded in our system. The data associated with "Choice 2" can be flagged as questionable or discarded.

Here we present **8** of 38 collected questions for doctor / hospital quality, cost, and time

By varying a single piece of information within a question, we can compare the rate of choosing a particular physician or hospital with a control group to determine how cost and quality data influence a user's decision to seek care.
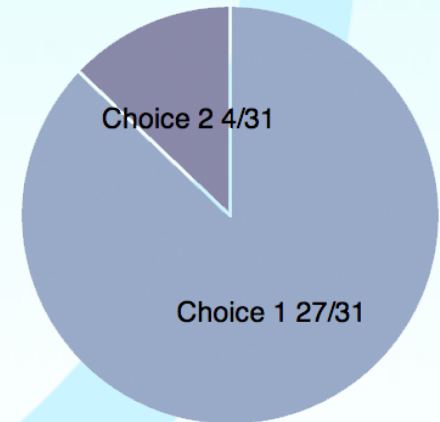
Example shown above:

Choice 1 - Dr. D completes **90%** of recommended care for diabetes, located **10** minutes away, and costs **$100** per visit

Choice 2 - Dr. T completes **70%** of recommended care for diabetes, located **10** minutes away, and costs **$10** per visit

Data Generated
Anonymous Player Comments

This word cloud represents the frequency of the words provided by all comments of our game from 201 anonymous users.

Compatible on iOS and Android devices

fun game cool interesting thanks thank none really character little great screen young age play trying enough overall since end old slept lot covered second informative read stayed middle get thought depressing quickly code kind hit slow leave neat glitches morbid away hard issues comment love better n/a go just nice fast options entertaining even one survey well words time graphics funny sometimes wish still bit floating now choices speed liked bottom version reading see text playing glitchy hospital way also cute check around asked f2581 appeared finish clock date longer went

selected user comments

"Very cute way to get important information out there. I liked it."

"TOO FUNNY!!"

"The game was entertaining and funny."

"Great graphics for a browser game and the subject matter really got to me because I am in a similar situation."

"fun survey. Love this type of survey, especially all the info about my County."

"great game!"

"That was a fun way to get a reality check concerning medical issues as one ages."

"Interesting statistics about my region! Thanks!"

Conclusion and Future Plans

Conclusion

wHealth is an interactive storytelling application that can…
- provide insight into a user's willingness to pay for health care
- provide insight into how quality information, such as that included in AF4Q, influences a user's decision to seek care
- compare aggregate rates or perform subgroup analyses, i.e. gender/age/income differences in what factors are most important

This novel platform can be adapted to investigate or identify new areas that may influence a user's decision to seek care, thus providing AF4Q with more detailed insight about information most useful to users of their website. We can achieve this by varying things such as…
- time/distance/ cost
- physician characteristics e.g. years of experience, training background, etc.
- outcome data measures
- patient satisfaction scores

Future plans

- We will continue developing the game and its innovative platform to conduct health services research in the aforementioned areas of health care quality and cost as it pertains to the individual consumer. We will continue refining the questions to answer empirical questions in this area.

- Because this game allows us to collect real data, we have the opportunity to inform the academic community and public policy makers about how individuals decide to "purchase" health care. We intend to submit peer-reviewed papers with the data derived from this game.