

WISQARS™ Data Visualizations: Implementation, Lessons Learned, and Future Plans

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NCIPC BSC Meeting

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Fatal Injury Data by Urbanization Level Now Available



CDC's WISQARS™ (Web-based Injury Statistics Query and Reporting System) is an interactive, online database that provides fatal and nonfatal injury, violent death, and cost of injury data from a variety of trusted sources. Researchers, the media, public health professionals, and the public can use WISQARS™ data to learn more about the public health and economic burden associated with unintentional and violence-related injury in the United States.

FATAL INJURY DATA

COST OF INJURY DATA

NONFATAL INJURY DATA

FATAL INJURY MAPPING

VIOLENT DEATHS

ABOUT US

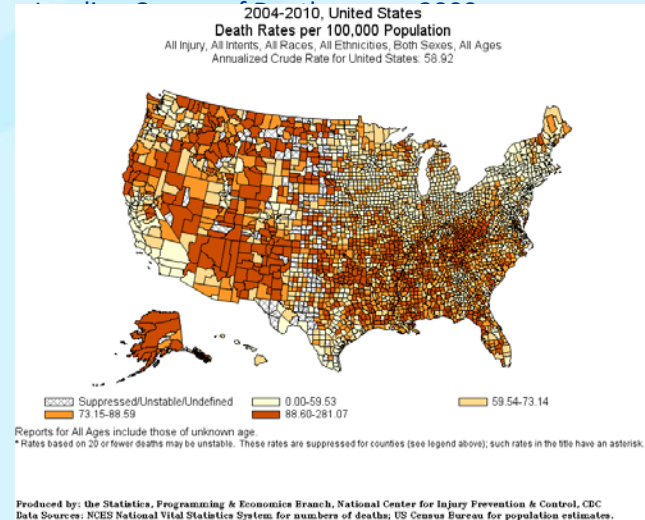
WISQARSTM Modules

Module	Year Launched
Fatal Injury Reports	2000
Leading Causes of Death	2000
Nonfatal Injury Reports	2001
Leading Causes of Nonfatal Injury	2001
Years of Potential Life Lost (YPLL)	2002
Violent Deaths	2008
Fatal Injury Maps	2010
Cost of Injury Reports	2011
Mobile Applications (Fatal Injury)	2014
Data Visualization (Fatal Injury)	2018

National Estimates of the 10 Leading Causes of Nonfatal Injuries Treated in Hospital Emergency Departments, United States - 2013

Rank	Age Groups										Total	
	<1	1-4	5-9	10-14	15-14	25-34	35-44	45-54	55-64	65+		
1	Unintentional Fall	Unintentional Fall	Unintentional Fall	Unintentional Struck By Object	Unintentional Struck	Unintentional Fall	Unintentional Fall	Unintentional Fall	Unintentional Fall	Unintentional Fall	Unintentional Fall	Unintentional Fall
2	Unintentional Struck By Object	Unintentional Struck	Unintentional Struck	Unintentional Fall	Unintentional Struck	Unintentional Struck	Unintentional Struck	Unintentional Struck	Unintentional Struck	Unintentional Struck	Unintentional Struck	Unintentional Struck
3	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
4	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body	Unintentional Foreign Body
5	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
6	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
7	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
8	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
9	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other
10	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other	Unintentional Other

* The "Other Assault" category includes all assaults that are not classified as sexual assault. It represents the majority of assaults.
 ** Injury category is unstable because of small counts.
 Data Source: NCHS All Injury Program (operated by the Consumer Product Safety Commission (CPSC)).
 Produced by: National Center for Injury Prevention and Control, CDC, www.cdc.gov/ipeds



2017 Web Metric Usage

Module	Queries
Fatal Injury Maps	752,831
Fatal Injury Reports	197,671
Leading Causes of Death	138,036
Nonfatal Injury Reports	32,021
Violent Deaths	30,321
Cost of Injury Reports	13,062
Leading Causes of Nonfatal Injury	12,322
Years of Potential Life Lost (YPLL)	8,541

WISQARS Portfolio Review (2015) Evaluation Questions

- **Utilization:** *Are WISQARS™ data being fully utilized for scientific and programmatic purposes by key stakeholders?*
- **Technology and Innovation:** *How can modern technology and innovation be used to enhance the use of WISQARS™?*
- **Data Sources:** *What are the opportunities to expand WISQARS™ data sources/data sets?*
- **Tools and Training:** *What trainings, tools and resources would facilitate actionable data translation?*

Portfolio Recommendations: Technology and Innovation

- **How can modern technology and innovation be used to enhance the use of WISQARS™?**
 - Develop more capacity for users to export both data and graphics.
 - Explore the possibility of a query tool capable of accessing and aggregating across disparate datasets.
 - **Improve visualization functionality in the system.**
 - Shift the mobile strategy from the proliferation of mobile apps to mobile responsiveness.

Goals of the Project

- To develop a visualization application to demonstrate the potential of interacting with fatal injury data in a visual format
- To enhance the tool and move it fully onto the WISQARS website



Data Visualization: Explain or Explore?

- **EXPLAIN**—to tell a story
 - Answers a question
 - Communicates message
- **EXPLORE** – to discover many stories
 - Leads to new research questions
 - Discovers new areas of interests

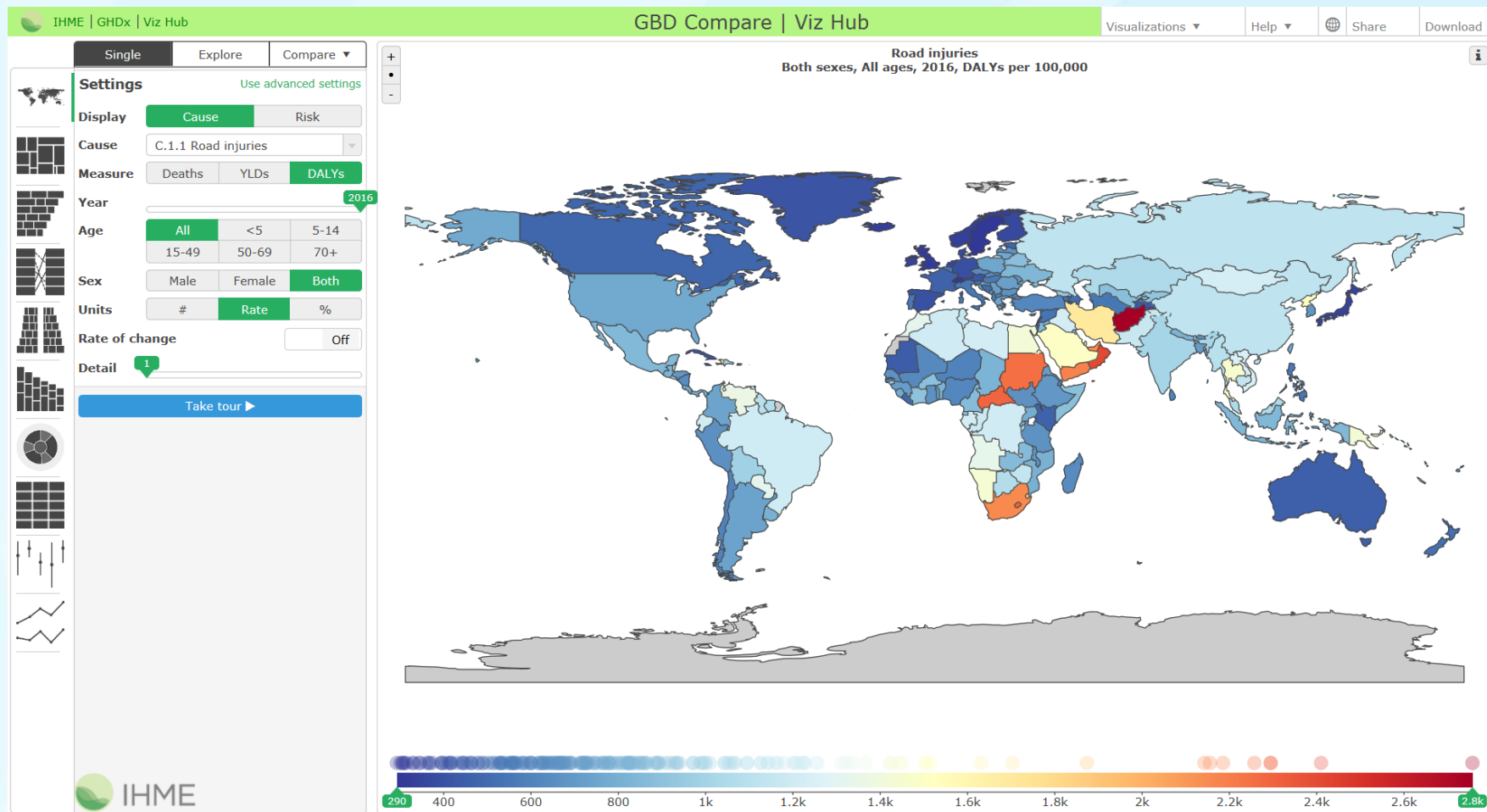
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Data Visualization: Explain or Explore?

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Our Process

Visioning Session



PERSONA IDENTIFICATION

EXTERNAL
NON-TECHNICAL
STAKEHOLDER

- policy makers
- grant writers
- media/reporter
- researchers

R&R PUBLIC/
R&R UNPEOPLE

ACTIVITIES

- use WISQARS as a source to understand a data point (eg. drowning)
- understand data to inform decisions + program development
- communicate findings to their organization
- rank & compare across dimensions (eg. cause of death; state)
- show data to support initiatives/programs they've implemented
 - programs
 - media (eg. after an event)

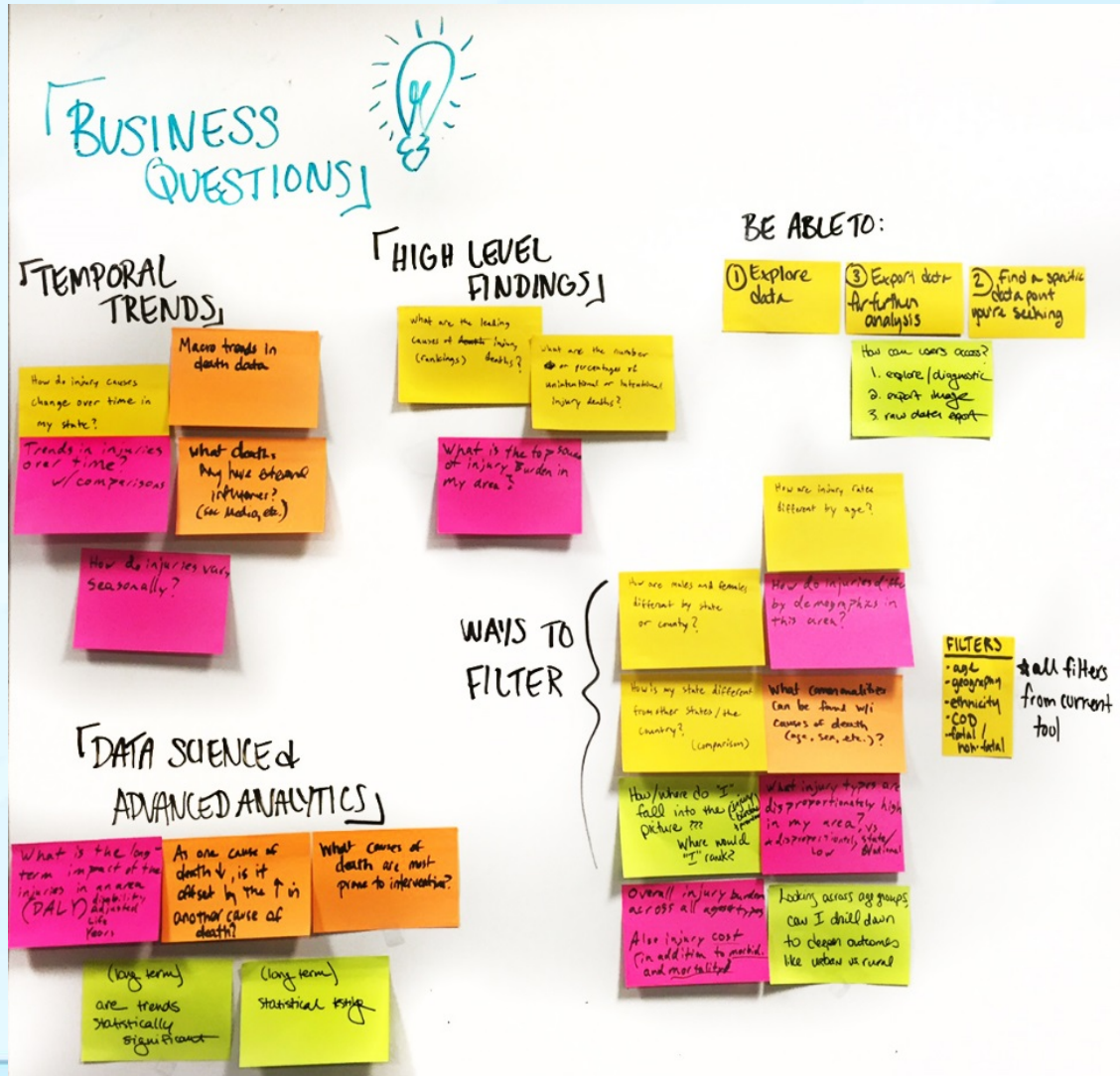
GOALS

- enhanced ability to explore data at a high level & drill down after exploring
- access data / query suggestions to guide search
- link program information related to a query to the results
- beyond state/country: view urban vs rural
- compare results from multiple states/causes
- apply filters graphically
- fewer words / more visuals
- help find insights they aren't necessarily looking for
- common user experience across platforms + devices including API
- enable user input to generate visuals

CHALLENGES

- data is antiquated (at least a year)
- need to access multiple reports to access all desired data
- PI / data limitations — can only get to a limited depth of data (eg. no zip codes)
- 508 compliance / accessibility / usability
- rate stability less than 20 in numerator, can be leading
- software platform → approval

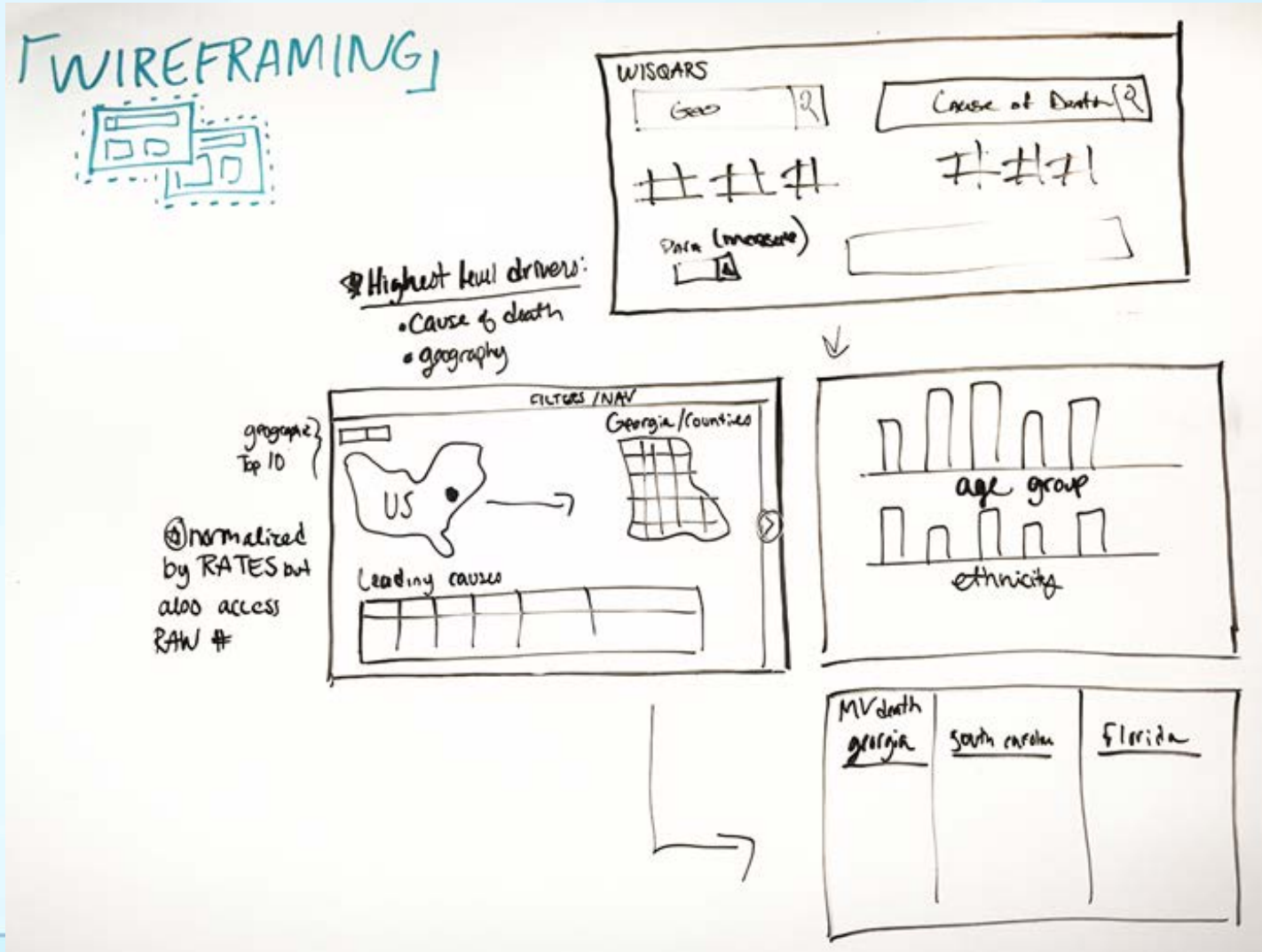
Journey Mapping & Business Questions



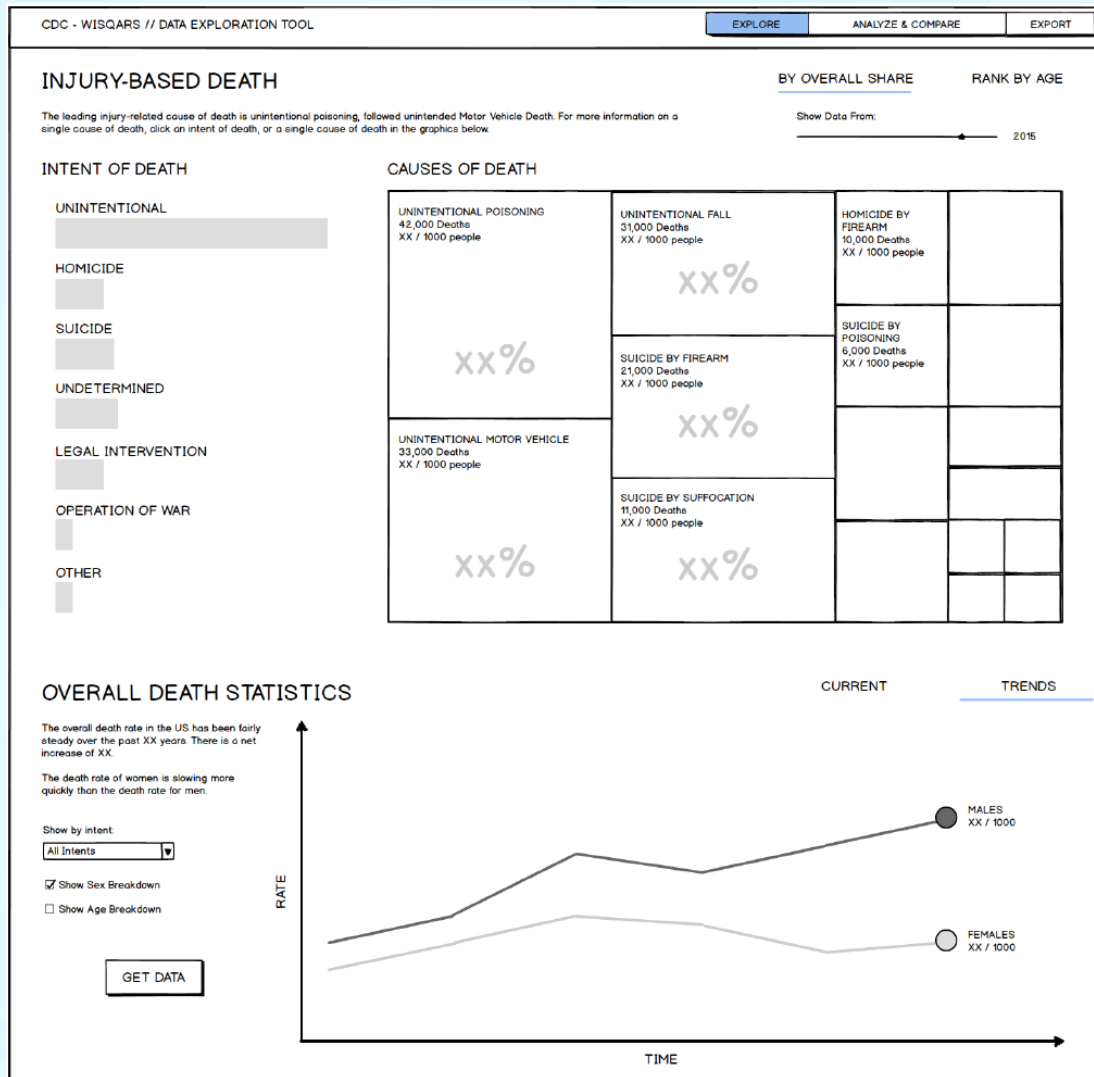
Initial Requirements and Functionalities

- Data to include injury mortality & population data from 1999-2015
- Data presented in highly visual manner (e.g., charts, graphs, maps)
- The user interacts, queries, and changes parameters by clicking on visuals
 - Less dependence of checkboxes and drop down menus
 - Parameters to filter on same as current WISQARS fatal module
- Results shown as numbers and rates (crude and age-adjusted)
- Charts and data tables available for download
- Global filtering
- Documentation and knowledge transfer from developer

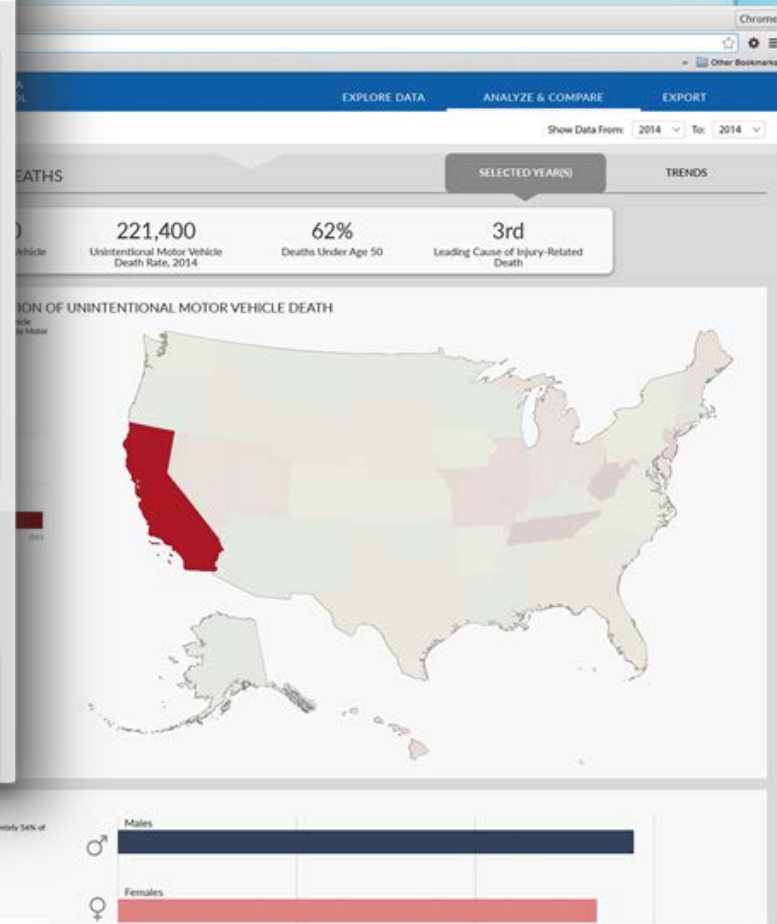
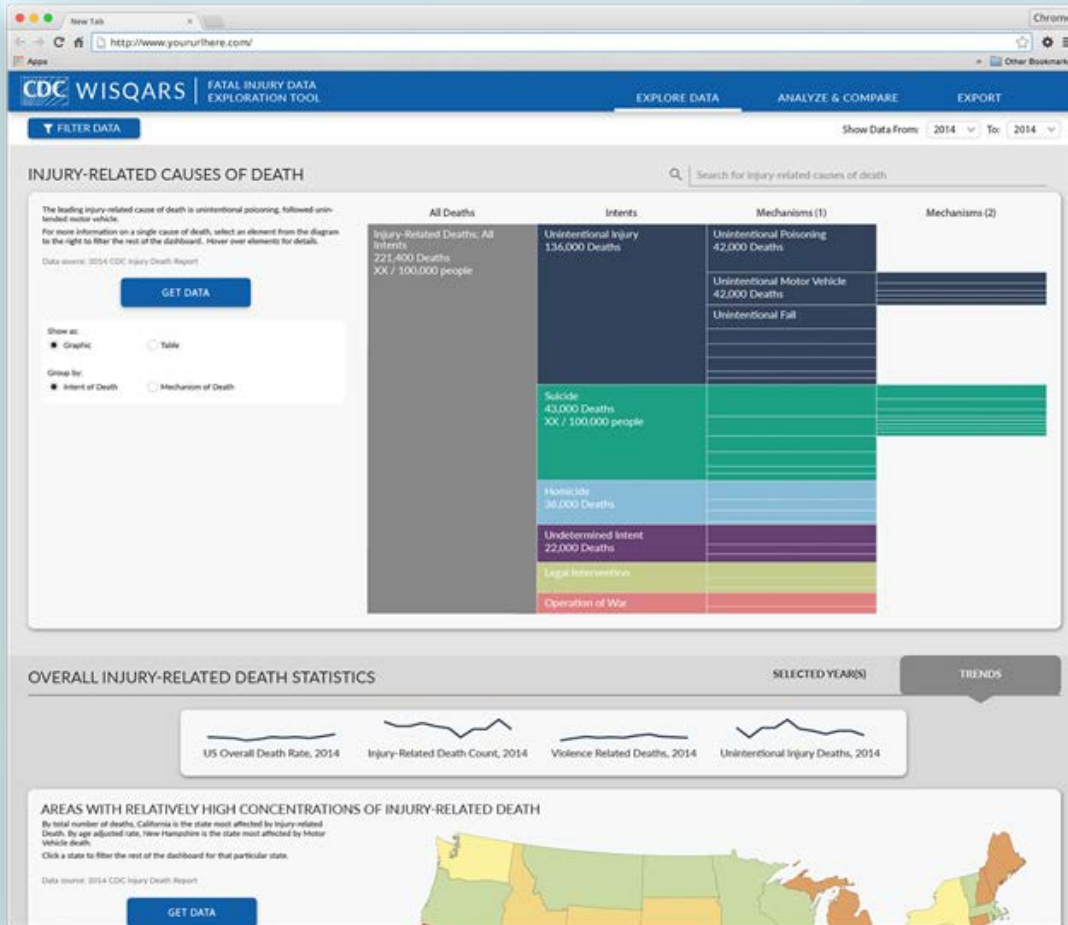
Wireframing - Brainstorming



Wireframing – Lo Res

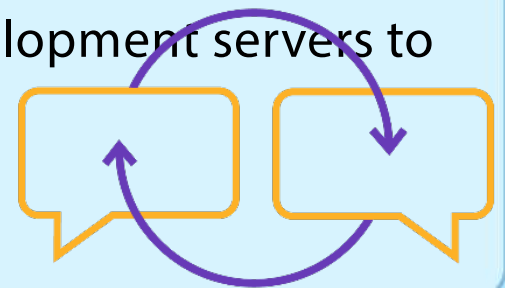


Wireframing – Hi Res



“Scrum Agile” Process for Development

- Started development in January 2017
- Identified all the actions that need to be done
- Established 2 week “sprints”
 - 1st sprint included first critical actions tackled
 - After each sprint, reviewed the current version, discussed and gave feedback, outlined actions for next sprint
 - A total of 5 sprints initially planned
- Mirrored application versions on internal CDC development servers to test



Challenges along the way

- Data use agreements
- Approval for software technology stack used for development inside CDC firewall
- Initial slow application response
- Suppression of low counts
- 508 Compliance
- Knowledge transfer

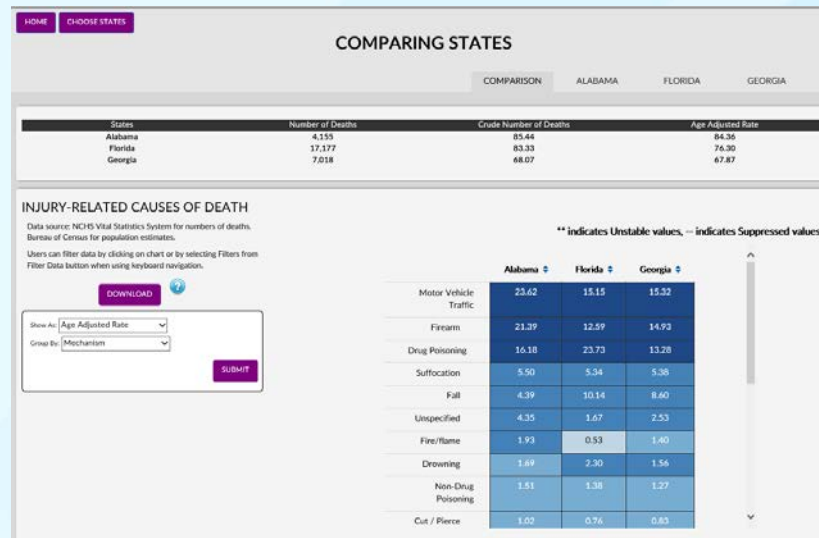


Do Demo Here

Discussion

Future Plans

- Companion “Compare” tab/application



- Non-fatal Visualization application
- Integration of Mapping, YPLL, Leading Causes
- Exploration of other datasets and topic areas to build out

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 - Melvin Crum
 - Tad Haileyesus

BSC Discussion Questions

- How have you used data visualization tools or approaches for working with data? How have data visualization approaches been most useful for you?
- Are you aware of other data visualization sites or tools that you find useful and think we should review?
- Have you used legacy WISQARS (Fatal Injury Reports) and WISQARS Data Visualization? Which did you find more useful and why?
- Are there other types of data or data tools you would like to see on WISQARS? How does WISQARS address or not address your needs?

Thank you!

Discussion and Questions

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

