



Web Accessibility in Online Dashboard Design

Abby Stamm & Eric Kvale

Data Technical Assistance Unit, Office of Data Strategy & Interoperability
Minnesota Department of Health

Tribal-State Relations Acknowledgment Statement

The State of Minnesota is home to 11 federally recognized Indian Tribes with elected Tribal government officials. The State of Minnesota acknowledges and supports the unique political status of Tribal Nations across Minnesota and their absolute right to existence, self-governance, and self-determination. This unique relationship with federally recognized Indian Tribes is cemented by the Constitution of the United States, treaties, statutes, case law, and agreements. The State of Minnesota and Tribal governments across Minnesota significantly benefit from working together, learning from one another, and partnering where possible.

Minnesota Department of Health recognizes, values, and celebrates the vibrant and unique relationships between the 11 Tribal Nations and the State of Minnesota. Partnerships formed through government-to-government relationships with these Tribes will effectively address health disparities and lead to better health outcomes for all of Minnesota.

In our work at the Office of Data Strategy and Interoperability, we demonstrate our commitment to Tribal-State relations by providing free assistance upon request and promoting health equity in data collection and use.

- Considerations in dashboard design
- Importance of web accessibility
- Select Web Content Accessibility Guidelines (WCAG)
- Shiny Dashboard Demonstrations
- Q&A

Dashboard design considerations

1. Who is your audience?
2. What is your dashboard's purpose?
3. What kind of information do you want to convey?
4. How can you convey that information if your user is, for example:
 1. Blind?
 2. Deaf?
 3. Unable to use a mouse?

Why prioritize accessibility?

- Expands audience for your content
- Demonstrates social responsibility
- Local, state, and national laws may require it
- Many enhancements improve user experience for everyone

How? [Web Content Accessibility Guidelines](#) (WCAG)

WCAG met by default in Shiny

- 1.3.2 Meaningful Sequence
- 1.3.4 [Orientation](#)
- 1.4.4 Resize Text
- 1.4.10 [Reflow](#)
- 1.4.12 [Text Spacing](#)
- 2.1.1 [Keyboard Navigation](#)
- 2.1.2 [No Keyboard Trap](#)
- 2.4.3 [Focus Order](#)
- 2.4.7 Keyboard Focus Visible
- 3.2.2 Content Change On Input
- 3.2.3 Consistent Navigation
- 3.2.4 Consistent Identification

WCAG the programmer needs to address

- 1.1.1 [Non-text Content](#)
- 1.3.3 Sensory Characteristics
- 1.3.5 Identify Input Purpose
- 1.4.1 [Use of Color](#)
- 1.4.3 [Contrast \(Minimum\)](#)
- 1.4.11 [Non-Text Contrast](#)
- 1.4.13 [Content on Hover or Focus](#)
- 2.4.2 [Page Titled](#)
- 2.4.4 Link Purpose
- 2.4.6 Headings and Labels
- 3.3.1 Error Identification
- 3.3.2 Labels or Instructions

2.4.2 Page Titled

- Browser tab and dashboard have short informative names
- Names should identify the dashboard topic or purpose

2.4.4 Link Purpose

- Provide meaningful link names

2.4.6 Headings and Labels

- Text contains headings using `<h#>` or `##` syntax
- Non-text elements contain labels, captions, or aria text

1.3.3 Sensory Characteristics

- Provide information via text as well as images and sound
- Label all non-text elements with short, clear function descriptions

1.3.5 Identify Input Purpose

- Instructions for text boxes, drop-downs, buttons, and sliders

3.3.2 Labels or Instructions

- Dashboard contains instructions to navigate and use it

1.1.1 Non-text Content

Alternative (Alt) text

- Explains visualizations
- Describes key features

Accessible Rich Internet Applications (ARIA) text

- Labels buttons and menu items

1.4.1 Use of color

- Use other elements with color
- Examples: textures, bold, different shape or size

1.4.3 Color contrast between text and background

- Font size > 18 requires 3:1 ratio
- Font size 18 or smaller requires 4.5:1 ratio

1.4.11 Non-text color contrast

- Touching elements require 3:1 ratio
- Outlines and textures can help differentiate colors

3.3.1 Error Identification

When an element fails:

- Tell the user what went wrong
- Tell the user what to do about it

Related, if an element is slow to display, tell the user what to expect

1.4.13 Content on Hover or Focus

This content is accessed by hovering over an image

- Usually not accessible to keyboard
- Usually not read by screen readers

Provide information in another format

- Table
- List
- Downloadable text file

R packages that address accessibility

- [shinya11y](#): creates an overlay in your shiny app to test accessibility
- [BrailleR](#): provides text descriptions of charts for blind users
- [sonify](#): creates sounds in the shape of charts
- [tactileR](#): creates tactile charts with braille text
- [htmltools](#): tools to manipulate HTML code

Accessibility testing tools we use

- [shinya11y](#): review shiny app accessibility
- [ANDI](#): check webpage for Section 508 compliance
- [WAVE](#): check webpage for WCAG compliance
- [Axe Accessibility](#): check code for accessibility issues
- [NVDA](#): screen reader

Note: Section 508 and WCAG are sets of accessibility criteria

Questions

Thank You!

Email: health.dsi@state.mn.us

Shiny Demonstrations

Online: <https://github.com/tidy-MN/shiny-a11y-apps>