

Creating Accessible Digital Experiences

#PTW19 @HeroDigitalHQ



HERO_digital.



Intro to Web Accessibility



What is web accessibility?

Web accessibility means that websites, tools, and technologies are designed and developed so that people with disabilities can use them.

Why is accessibility important?

For the 20% with a disability.

For everyone's ease of use.

For the bottom line.

It's the right thing to do

American with Disabilities Act (ADA)

The American with Disabilities Act (ADA) is a civil rights law that “prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public”. The law guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications.

<https://www.logicsolutions.com/508-ada-wcag-accessibility-difference/>

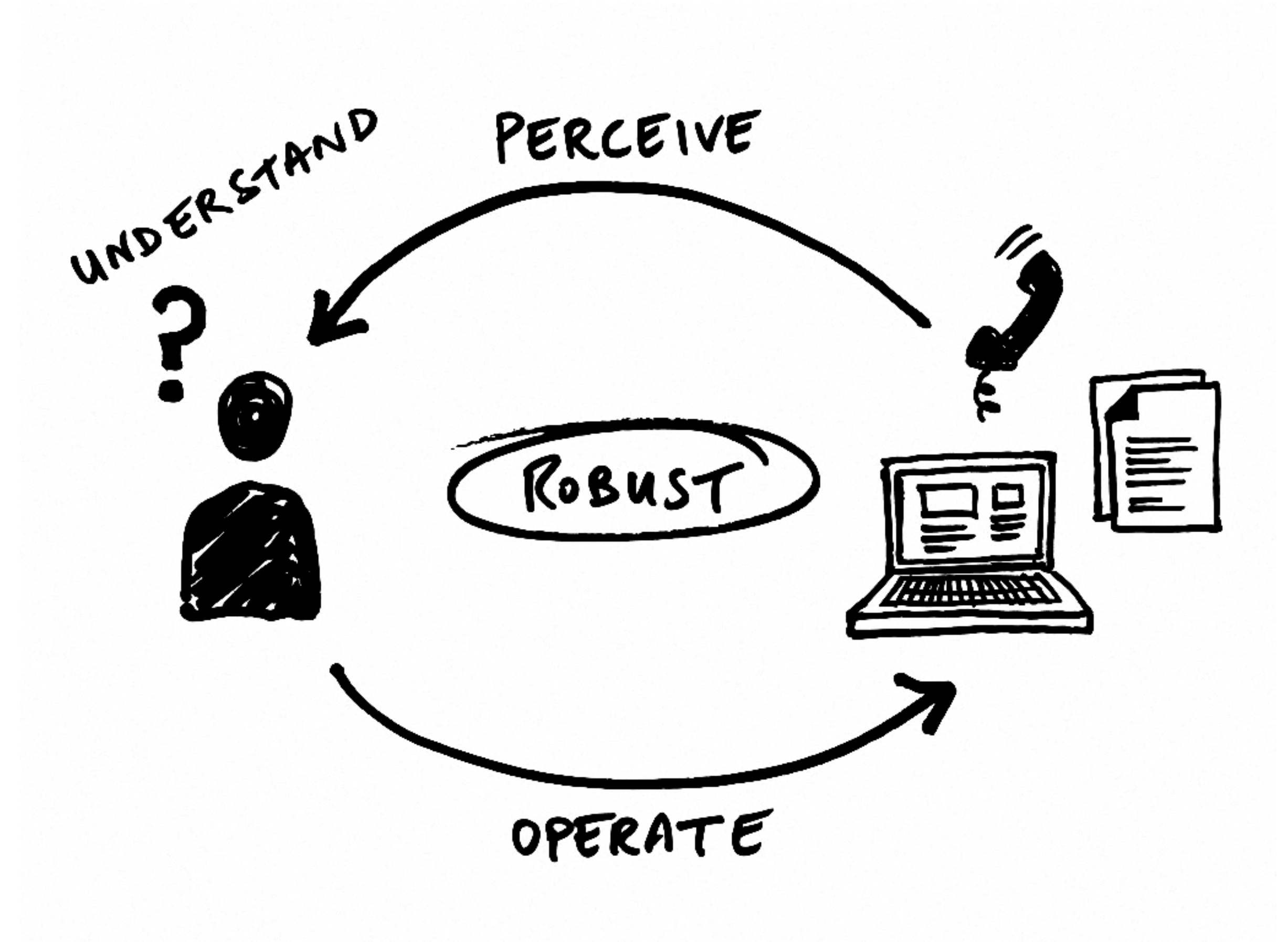
<https://www.newmediacampaigns.com/blog/website-accessibility-and-the-law-ada-wcag20>

<https://www.boia.org/blog/is-website-accessibility-required-under-the-ada>

WCAG

The Web Content Accessibility Guidelines (WCAG) are part of a series of web accessibility guidelines published by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C).

WCAG consists of twelve guidelines organized under four guiding principles.



<https://accessibility.blog.gov.uk/2016/05/16/what-we-mean-when-we-talk-about-accessibility-2/>

A

Good

AA

Better

AAA

Great

Intro to Spaulding Rehabilitation Network



Spaulding Rehabilitation Network

Spaulding is a recognized leader in rehabilitative medicine nationally, internationally. They offer inpatient and outpatient care through a network of 4 inpatient facilities and over 25 outpatient centers located throughout Eastern Massachusetts. Their mission is to provide exceptional clinical care, promote medical education, and advance research in rehabilitation medicine.



Patients of Spaulding



Brian

Brian slipped and fell, breaking his right wrist (his dominant hand). He's trying to surf the web with his left hand and the keyboard.



Ophelia

Ophelia has age-related macular degeneration. It's a lot like having the center of everything she looks at removed. She uses magnifiers and screen readers to try to compensate.



Paula

Paula has Multiple Sclerosis, which affects both her vision and her ability to control a mouse. She often gets tingling in her hands that makes using a standard computer mouse for a long period of time painful and difficult.



Winston

Winston had a stroke in his early forties. Now he's re-learning everything from using his primary arm to reading again.





Be Patient First

Improve website usability and accessibility for patient audiences of varying abilities and needs.

- Design & UX
- Development
- Validation With Users

Our Approach



Design & UX



Challenges

AA vs. AAA



Brand



Scale of Website



Hover and Focus States



Print Collateral Assessment

Burn Rehabilitation Program



Let the healing process begin. Outside and in.

Find your strength.



At Spaulding we recognize that recovery is more than skin-deep. Our holistic approach treats the whole patient—body, mind and spirit—with exceptional care. And with world-class burn experts and state-of-the-art technology, you can rest assured you’re in the most capable hands.

Our interdisciplinary teams provide comprehensive care to individuals with acute burn injuries—in our renowned Burn Rehabilitation Program in Boston as well as at other Spaulding locations throughout our network. Tailored to meet each patient’s needs, teams may include physical, occupational and speech therapists; plastic surgeons, physiatrists and wound care specialists; psychiatrists, psychologists, peer counselors and social workers. Everyone involved in a patient’s recovery at Spaulding is dedicated to delivering the highest quality burn rehabilitation and medical management in the industry. This includes our rehabilitation nurses who work around the clock to facilitate wound healing, manage pain and ensure continuity of critical care 24 hours a day.



Rehabilitation is always challenging, but in certain cases it can be especially demanding—for both patients and families. Multiple medical diagnoses can mean a complicated road to getting your life back in order. The Complex Medical Rehabilitation Programs of the Spaulding Rehabilitation Network come in.

Our programs are designed for people recovering from multiple medical or surgical problems. As experts in rehabilitative care, our physicians, experienced nurses and therapists offer a broad spectrum of comprehensive services, including:

- Physician-led, interdisciplinary medical management
- Access to a wide range of medical specialists, diagnostic tests and treatment
- Customized physical, occupational, speech and respiratory therapy
- Social services and case management to coordinate complex discharge needs
- Extensive training and support for patients and their families, including overnight stays as needed
- Pastoral and psychological support for coping and adjustment

Each patient’s care is coordinated by a specialty team of professionals, all with advanced training in the treatment of stroke. Team members may include physicians, rehabilitation nurses, physical and occupational therapists, speech-language pathologists, nutritionists, therapeutic recreation specialists, case managers, social workers and psychologists.

Special features of the Spaulding Stroke Rehabilitation Program include:

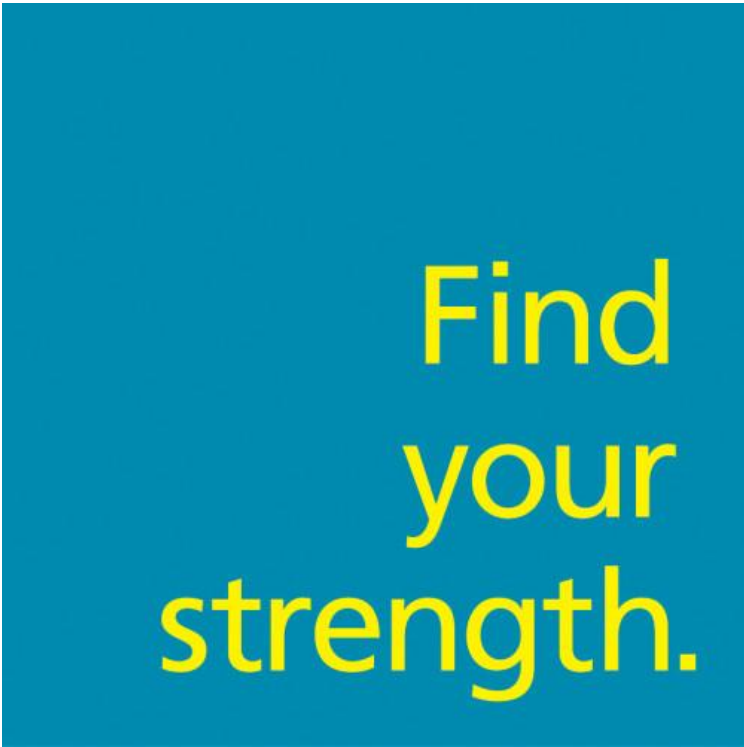
- On-site physicians specializing in Physical Medicine and Rehabilitation (also called Physiatry), Neurology and Internal Medicine
- Intensive, evidence-based therapy services
- Advanced rehabilitation technologies to improve patient outcomes, including balance systems, electrical stimulation devices and robot-assisted devices
- Ability to coordinate medical and rehabilitation stroke care
- Recreational and adaptive sports programs
- Patient/family support and education services
- Community integration and advocacy
- Specialized outpatient services to continue stroke-specific treatments



Primary Brand Colors

CHALLENGE:

The current primary blue and yellow brand colors and brand box combined do not pass accessibility standards according to the Center for Persons with Disabilities



Spaulding Rehabilitation Hospital

14pt OR LARGER TYPE

Spaulding Rehabilitation Hospital

12pt TYPE

Spaulding Rehabilitation Hospital

14pt TYPE

Spaulding Rehabilitation Hospital

12pt TYPE

Spaulding Rehabilitation Hospital

14pt TYPE

Spaulding Rehabilitation Hospital

12pt TYPE

- Fail AA
- Fail AAA
- Fail AA
- Fail AAA
- Pass AA
- Fail AAA



Secondary Brand Colors

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

Value of this hue that would allow white type to be compliant

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

Value of this hue that would allow white type to be compliant

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

Value of this hue that would allow white type to be compliant

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

● Spaulding Hospital

14pt TYPE

● Spaulding Hospital

12pt TYPE

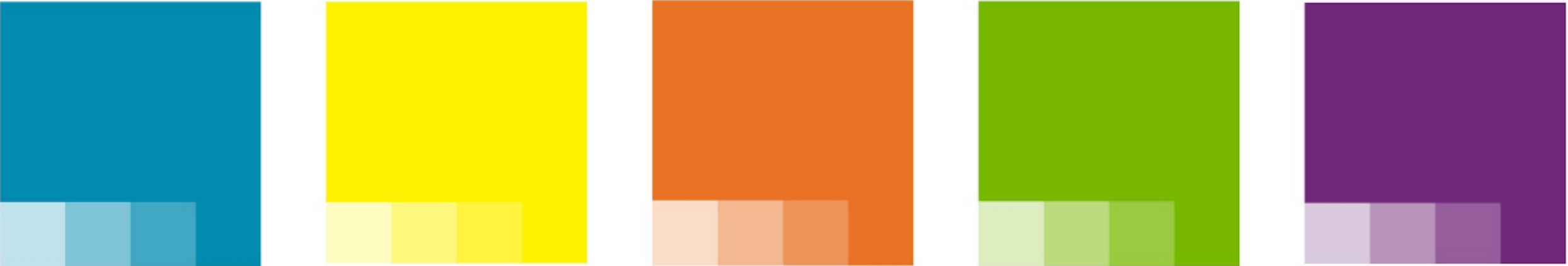
Value of this hue that would allow black type to be compliant

● Spaulding Hospital

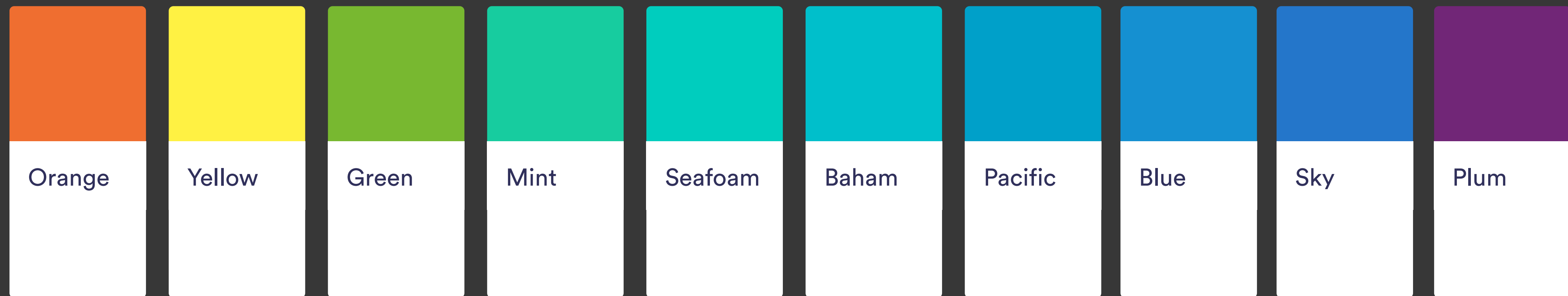
14pt TYPE

● Spaulding Hospital

12pt TYPE



Expanding and Optimizing the Brand Color Palette for Digital



Spectrum of cool hues added into the existing brand palette



Text Usage

JADE 1	BAHAMA 1	SKY 1
AA	AA	AA
JADE 2	BAHAMA 2	SKY 2
AAA	AAA	AAA
JADE 3	BAHAMA 3	SKY 3
AAA	AAA	AAA
JADE 4	BAHAMA 4	SKY 4
AAA	AAA	AAA
JADE 5	BAHAMA 5	SKY 5
AAA	AAA	AAA



Examples



50k+

Patients treated in 2018

\$25 Million

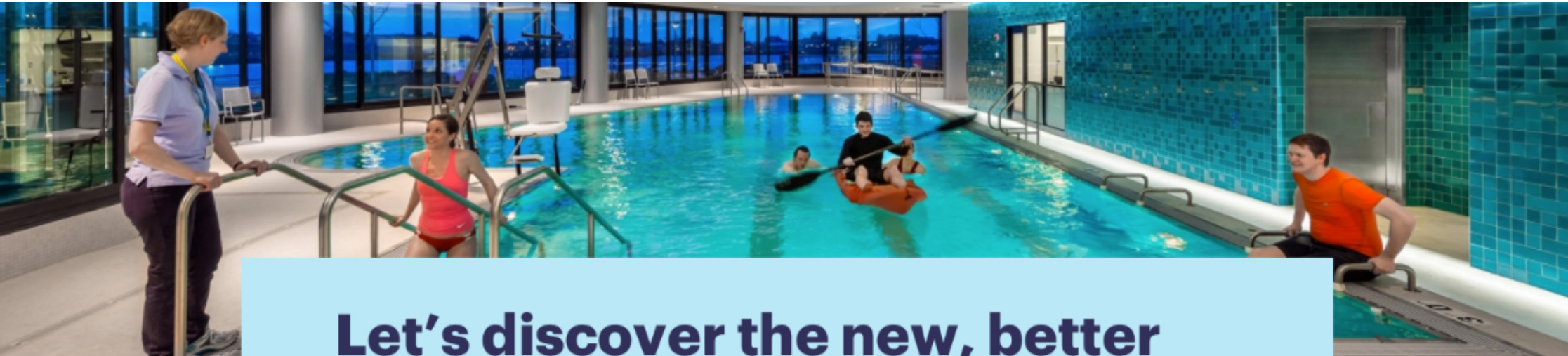
Funded Research in 2018

#1

Rated Residency Program

#1

Place to work for people with disabilities



Let's discover the new, better you, together

Learn about the staff and advanced rehabilitation at Spaulding Rehabilitation Hospital Boston.

Rehabilitation Programs & Services

Adaptive Sports	Arthritis & Joints	Brain Injury
Orthopedic	Neurological	Spinal Cord
Sports Medicine	Stroke	Pediatrics

View our full [list of services](#)



Spaulding Innovation

We want to identify start-ups, researchers and teams with solutions and technologies aimed at improving functional ability and quality of life to those with physical impairments or disabilities.

[Learn More](#)

Deanna's Recovery from a Severe Spinal Cord Injury

At Boston Rehabilitation Hospital

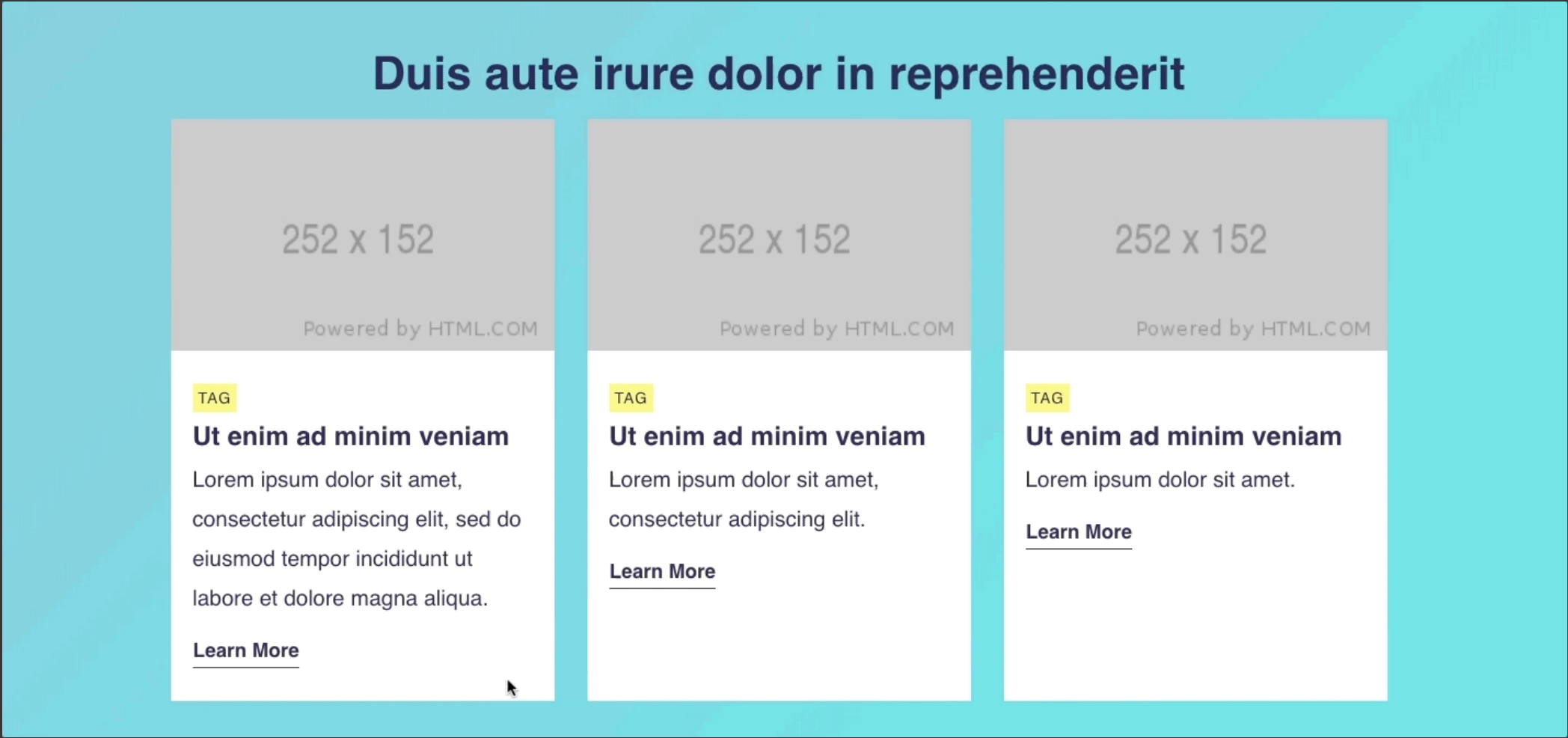
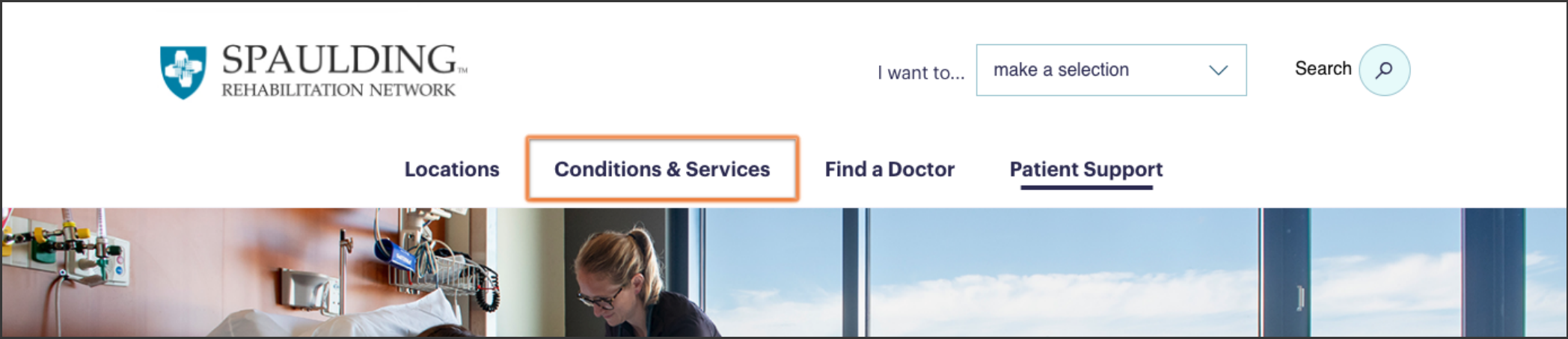
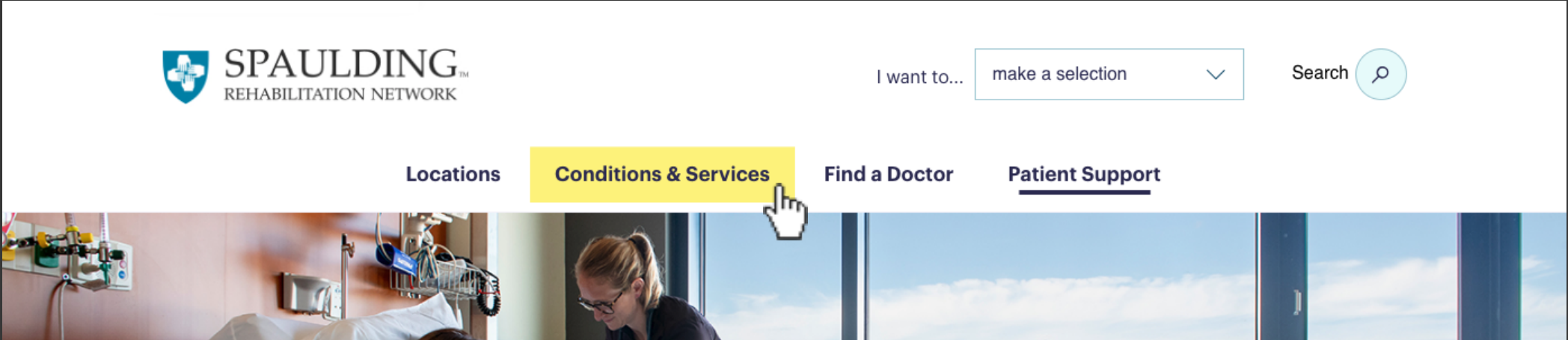
 Dr. Cheri Blauwet



What is a focus state?



Hover & Focus States



Development Involvement



Challenges

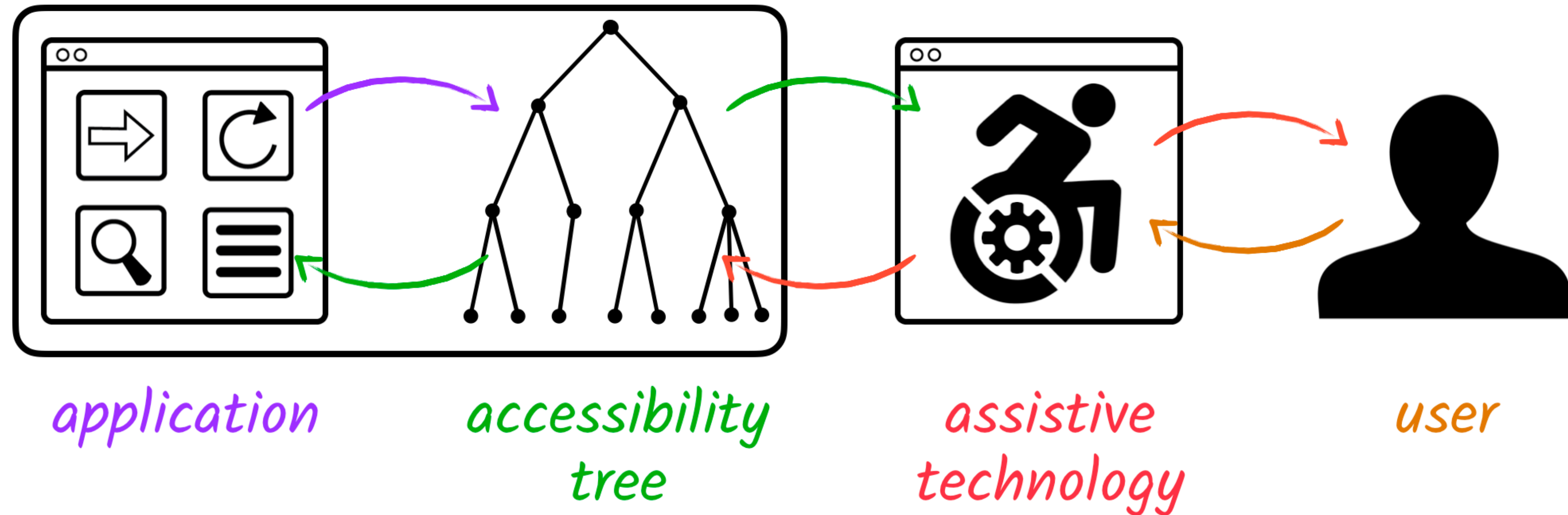
Balance UX and Semantics

Significant Mobile Changes

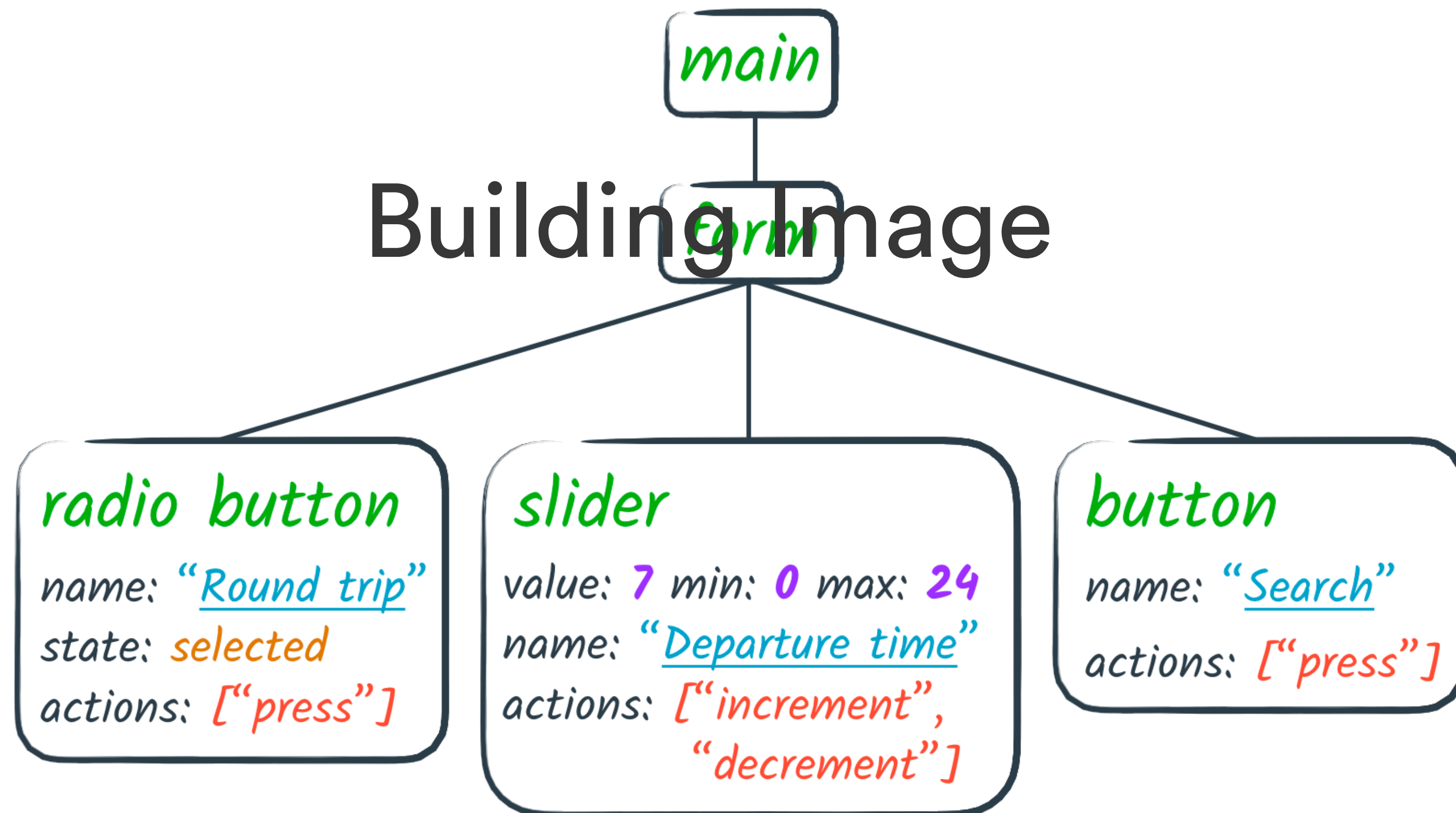
Landmarks and Identification



What is a screen reader and how does it work?



What are semantic elements?





Seemingly Simple

Tables are traditionally elements that are very screen reader friendly. And although visually, people can understand multi-level headers fairly easily, making something like this understandable for AT is a bit challenging.

Each header needed to be identified with an ID and each cell needed a scope attribute denoting which headers applied to it. Without these key attributes, screen reader users would not be able to put each cell into the appropriate context without a lot of memorization.

Need help selecting the right Level of Care for you?			
	Spaulding Rehabilitation Hospital Boston	Spaulding Rehabilitation Hospital Cape Code	Spaulding Eileen M. Ward Outpatient Center for Children Sandwich
Level of Care	Outpatient	Inpatient	Outpatient
Overnight Stay Required	No	Yes	No
Patient Age Requirements	15+ years old	15+ years old *	0-15 years old
Level of Therapy Intensity	1-2h per day, 1d per week, minimum	3h per day, 5d per week, minimum	1h per day, 1d per week, minimum
	Schedule an appointment	View inpatient facilities	View pediatric facilities



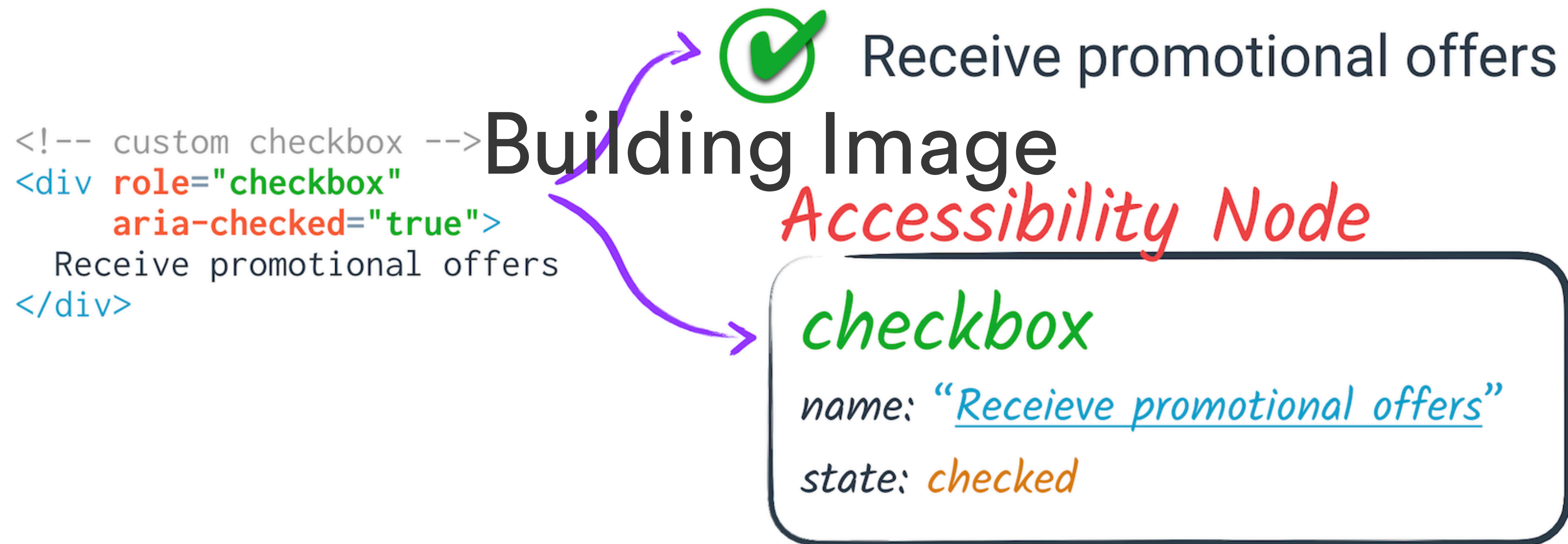
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Need help selecting the right Level of Care for you?			
	<th id="spaulding-rehabilitation-hospital">Spaulding Rehabilitation Hospital Boston	<th id="spaulding-hospital-capecod">Spaulding Rehabilitation Hospital Cape Code	<th id="spaulding-eileen-m-ward">Spaulding Eileen M. Ward Outpatient Center for Children Sandwich
<th id="levels-of-care">Level of Care	Outpatient	Inpatient	Outpatient
<th id="overnight">Overnight Stay Required	No	<td headers="spaluding-hospital-cape-cod overnight">Yes	
<th id="patient-age">Patient Age Requirements	15+ years old	15+ years old *	0-15 years old
<th id="therapy-intensity">Level of Therapy Intensity	1-2h per day, 1d per week, minimum	3h per day, 5d per week, minimum	1h per day, 1d per week, minimum
	Schedule an appointment	View inpatient facilities	View pediatric facilities

What is ARIA?



Focus management is one of the things we broke when we moved towards designs that leverage custom styled inputs and components

Closed

 Locations

Filters

Service

All Services

▼

Location Type

All Location Types

▼

Apply

1 to 10 of 29

<


1

2

3

>

Open

 Locations

Filters

Service

Select One

▼

All Services

Acupuncture

Adaptive Sports

Location Type

All Location Types

▼

Apply

1 to 10 of 29

<

1

2

3

>



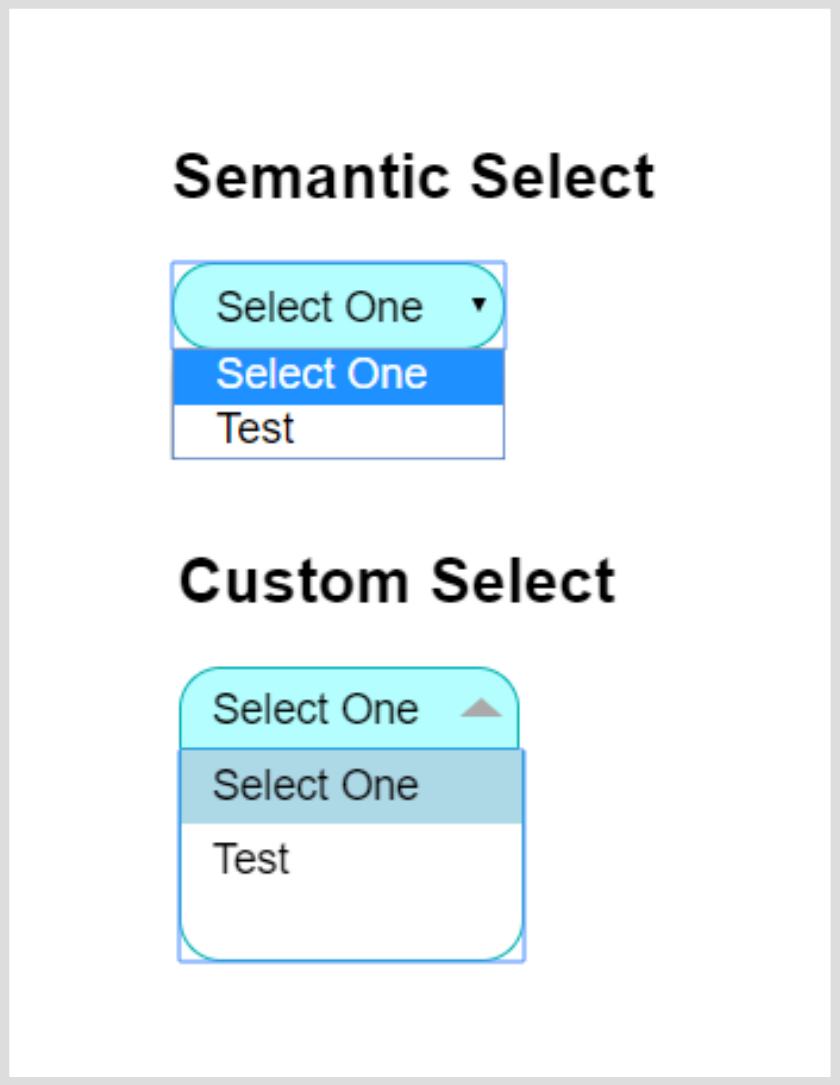
Retrofitting Stylized Dropdowns

Though we tried to use semantic elements as much as possible, there were times when the design called for us to code something new. Dropdowns or select fields are not able to be styled on their own, so it requires a lot of extra effort to rebuild the basic functionality.

We used ARIA attributes to help convey the intention and meaning of these non-semantic elements, leveraging Javascript to manage the state of those attributes.

All of this means we needed to be very careful in our design reviews to limit the number of complex or custom components.

https://developer.mozilla.org/en-US/docs/Web/Accessibility/ARIA/Roles/listbox_role#Examples
<https://codepen.io/wzielinski/pen/dLedoL?editors=1111>



```
<select id="select">
  <option value="option1">Option 1</option>
  ...
</select>
```

```
<div class="dqpl-field-wrap">
  <div class="dqpl-label" id="select-label">Do you like pizza?</div>
  <div class="dqpl-select">
    class="dqpl-combobox" role="combobox" tabindex="0" aria-readonly="true"
    tocomplete="none" aria-owns="select-list" aria-expanded="false"
    belledby="select-label"></div>
    ss="dqpl-listbox" role="listbox" id="select-list">
      class="dqpl-option" role="option">Option 1</li>
```

```
tion]").on("mousedown", function(e) {
  .parent().find("[aria-selected=true]").attr("aria-selected", "false");
  .attr("aria-selected", "true");
  ntDefault();

stbox]").on("keydown", function(e) {
  rentItem = $(this).find("[aria-selected=true]");
  (e.keyCode) {
e 38: // Up arrow
    if (currentItem.prev().length) {
      currentItem.attr("aria-selected", "false");
      currentItem.prev().attr("aria-selected", "true").focus();
    }
    e.preventDefault();
    break;
case 40: // Down arrow
    if (currentItem.next().length) {
      currentItem.attr("aria-selected", "false");
      currentItem.next().attr("aria-selected", "true").focus();
    }
    e.preventDefault();
    break;
  }
});

$("[role=listbox]").on("focus", function() {
  // If no selected element, select the first by default
  if (!$ (this).find("[aria-selected=true]").length) {
    $(this).find("[role=option]:first").attr("aria-selected", "true").focus();
  } else {
    $(this).find("[aria-selected=true]").focus();
  }
});
```


Along with focus state management and logical tab ordering, ensuring that animations were able to be disabled was key for best UX



Accounting for Animation

We needed to employ a combination of Javascript and CSS animations to provide visual representation of Spaulding's levels of care. Expressing the differences between each type of care was vital to telling the story of Spaulding.

Including focusable and accessible tooltips was a key part of the development process for this component, as well as providing a method to stop the animation. Using Javascript we were able to enable and disable the SVG animation pause state.

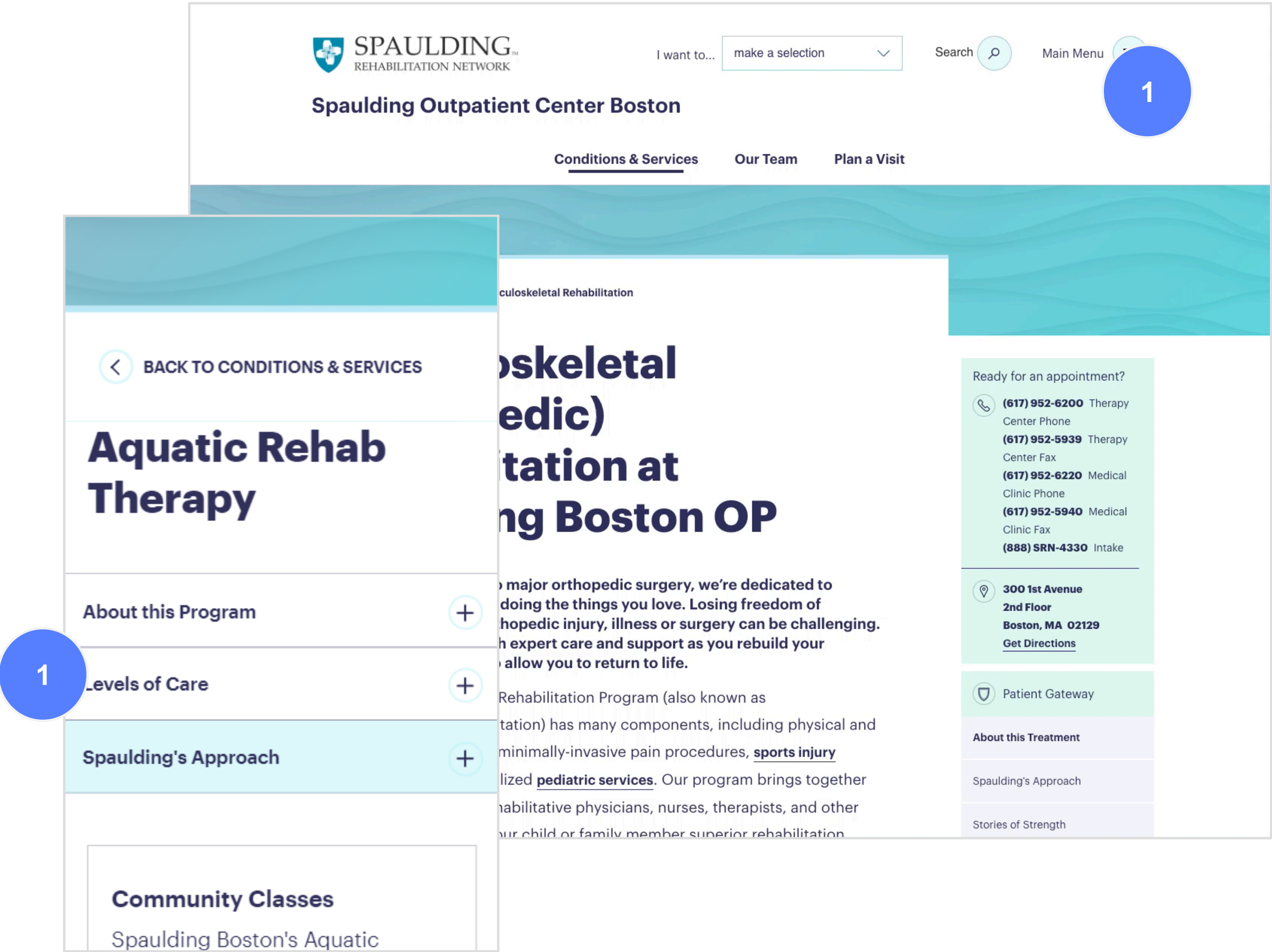


Some components were so drastically different between mobile and desktop, we had to change markup on the fly

Optimizing Mobile Experiences

Mobile experiences often need to be completely reimaged against their desktop counterpart. In this example, the desktop experience called for a sticky nav that scrolled the user to specific portions of content. While on mobile, this was changed to an accordion.

To meet the functionality and WCAG guidelines, we used the Javascript’s matchmedia method to change the visual layout and a11y attributes between device sizes.



Navigation elements are
arguably the most important
core functionality of a site

Elements List

Type:

☐ Links

☐ Headings

☐ Form fields

☐ Buttons

☒ Landmarks

BBC; banner

BBC; navigation

search

news; banner

news; navigation

Nations; navigation

main

Top Stories; region

In case you missed it; region

Must See; region

Most watched; region

Full Story; region

Local news; region

Long Reads; region

Filter by:

Activate

Move to

Cancel

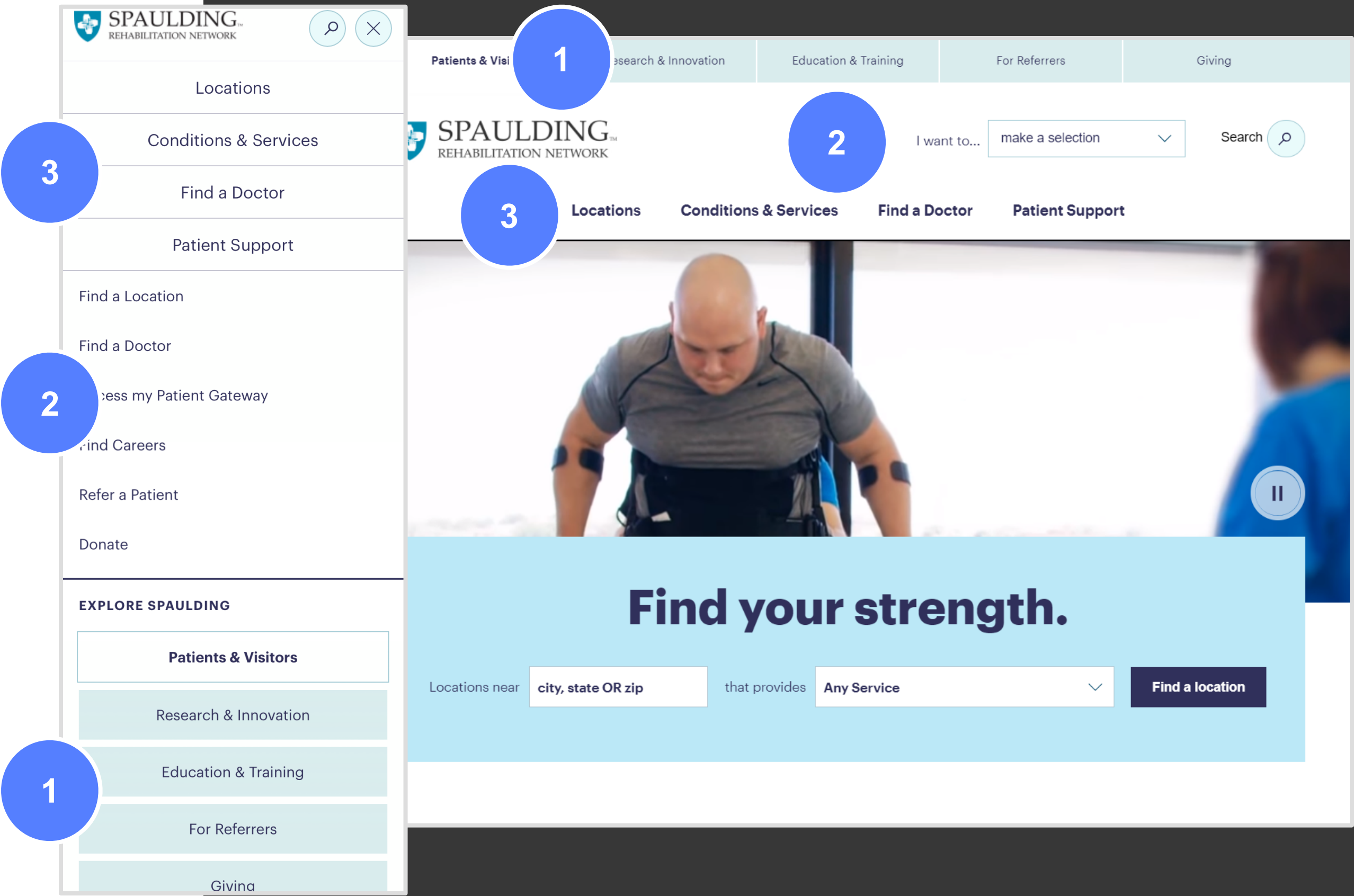


Organizing and Identifying Navigation Structure

One important rule we struggled with is that all elements should have a logical tab order. Due to the structure and organization of the different types of menus, we had to make some judgement calls about how closely we would follow this rule.

In the end, we opted to order the HTML in a logical way based on the desktop experience, and used flex CSS properties to manage the visual order on mobile.

In addition, we needed to ensure each navigation was named appropriately in code. For this, we utilized aria-label tags on each nav to describe its purpose.



Validation With Users



There's automated accessibility testing tools that will scan a site for WCAG compliance, but these tools will not check for usability or comprehension. That's why it's important to test with users of varying abilities.

User Testing

Perkins Access conducted user testing with six users who had various disabilities and used different devices and assistive technology to access the website.

Participant	Condition	Assistive Technologies
Participant 1	Blind	PC with Internet Explorer and NVDA (screen reader)
Participant 2	Deafblind (limited vision)	Mac with Safari and Screen Magnification
Participant 3	Quadriplegic	iPhone with Pop Socket Mount
Participant 4	Stroke Survivor	iPad with Safari
Participant 5	Stroke Survivor, Aphasia	PC with Chrome and Mouse
Participant 6	Neuro disease, limited feeling in extremities	PC with Chrome and Trackball Mouse



Finding Search Function

Observation:

The blind participant, when looking for a way to search the site, tried to navigate by finding input (edit) fields on the page. Because the search function was implemented as a button (which then opened the input field) he was unable to find it.

Who will be affected:

People using screen readers who cannot see if there is a site search available and people with cognitive disabilities.

How we addressed:

Ensure that the button had a proper label and landmark role.



“ There’s no other search...in JAWS and NVDA if you type an “E” it will jump you if there are any edit boxes on the page.”

– Participant 1, blind using a screen reader

Color for Selected Tabs

Observation:

The visually impaired participant had difficulty knowing which tab was selected.

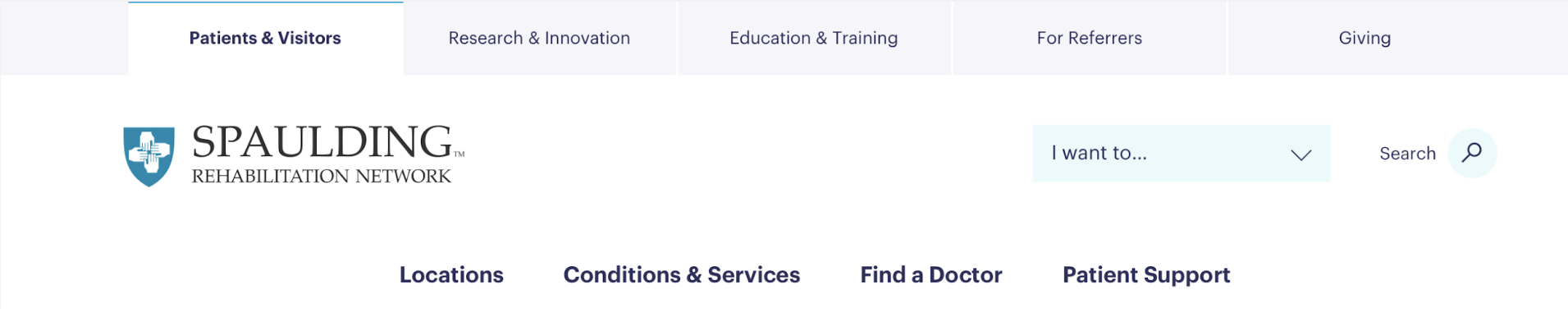
Who will be affected:

People with low vision and users who have trouble differentiating color and may have color blindness.

How we addressed:

Added a stronger visual cue with a darker shade for the unselected tabs and a shadow behind the selected tab to show which tab is selected.

Before



After



“ I want to make sure you can see the tabs...you can barely tell...”

– Participant 2, limited vision using screen magnification

Pausing Animations and Videos

Observation:

Buttons provided to pause a video or animated graphic were somewhat confusing to users due to their location / proximity to the content they controlled.

Who will be affected:

Users with attention deficits who wish to stop animations that are causing them to be distracted, as well as users in general who may not see a visible relationship between the button and content.

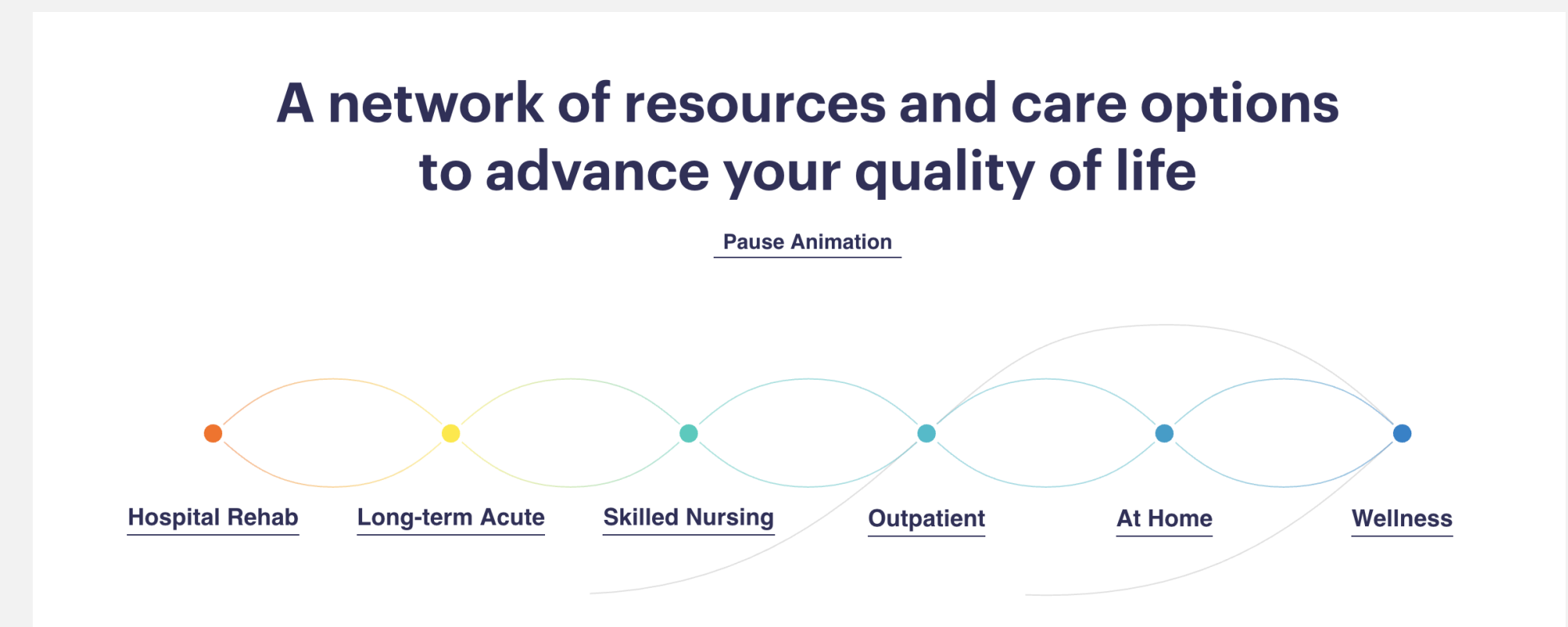
How we addressed:

Made a stronger correlation to the graphic by moving the pause function and changing it to a link that says 'pause animation'.

Before



After



“ I didn’t notice that this graphic was moving, which is why I was confused about seeing a pause button there.”

– Participant 6, limited feeling in extremities using a trackball mouse

Overall Impressions

“ I think the site is well organized. It doesn't seem cluttered and I didn't find any unlabelled links or buttons. Information seems to be organized in lists and (the site) makes good use of headings.”

– Participant 1, using a screen reader

“ It's a major upgrade from what we have. Its attractive and has less clicks to find what you are looking for. The tasks you gave me were easy. Accessibility-wise I think this will work for a number of people, amputees, visually impaired, blind, and those with limited dexterity like myself.”

- Participant 6, using a trackball mouse

Key Takeaways/Things We Learned



Wins

Screen Reader
Optimized



Highly Visible
Focus



Documented



Patient First



Things We Learned

**Have an a11y expert
on your team!**

**Achieve AAA
where possible**

a11y takes time

**a11y is an ongoing
process**



Product



QA



Marketing



Back End



Front End



Product



Visual



Back End

Accessibility



Back End

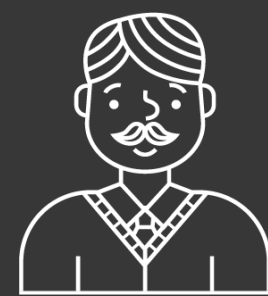


Front End



UX

It's a process -- Not a product



Back End



Third Party



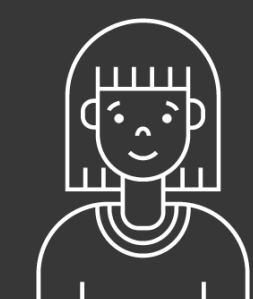
Product



UX



UX



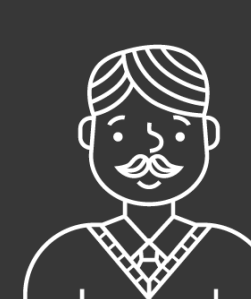
Content Entry



QA



Back End



Back End



Third Party



Back End



Wally

*Manager, Front End
Engineering*

Web Accessibility
Specialist (WAS) from IAAP



Brooke

*Business Engineering for
Web Development*

Certified Professional in
Accessibility Core
Competencies (CPACC)
from IAAP



Leah

*Principal, User Research &
Insights*

Certified Professional in
Accessibility Core
Competencies (CPACC)
from IAAP

To start your accessibility
audit email:

business@herodigital.com

HERO_digital.

PTW19 PRESENTED BY
PHILLY TECH WEEK COMCAST

convene