

OFFICE OF THE STATE AUDITOR

DIANA DIZOGLIO

Official Audit Report – Issued June 12, 2025

Massachusetts Life Sciences Center

For the period July 1, 2021 through December 31, 2023



OFFICE OF THE STATE AUDITOR

DIANA DIZOGLIO

June 12, 2025

Kirk Taylor, MD, President and Chief Executive Officer
Massachusetts Life Sciences Center
1075 Main Street, Suite 100
Waltham, MA 02451

Dear Dr. Taylor:

I am pleased to provide to you the results of the enclosed performance audit of the Massachusetts Life Sciences Center. As is typically the case, this report details the audit objectives, scope, methodology, findings, and recommendations for the audit period, July 1, 2021 through December 31, 2023. As you know, my audit team discussed the contents of this report with agency managers. This report reflects those comments.

I appreciate you and all your efforts at the Massachusetts Life Sciences Center. The cooperation and assistance provided to my staff during the audit went a long way toward a smooth process. Thank you for encouraging and making available your team. I am available to discuss this audit if you or your team has any questions.

Best regards,



Diana DiZoglio
Auditor of the Commonwealth

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LIST OF ABBREVIATIONS

HSAC	High School Apprenticeship Challenge
MLSC	Massachusetts Life Sciences Center
URL	uniform resource locators
W3C	World Wide Web Consortium
WCAG	Web Content Accessibility Guidelines

EXECUTIVE SUMMARY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor has conducted a performance audit of the Massachusetts Life Sciences Center (MLSC) for the period July 1, 2021 through December 31, 2023.

The purpose of this performance audit was to determine whether MLSC’s administration of the High School Apprenticeship Challenge (HSAC) program was in compliance with Section 6(c)(5) of Chapter 23I of the General Laws. Per MLSC’s website, the HSAC program is designed to promote equitable access to career opportunities by providing internships to high school students from underrepresented and low-income communities across the Commonwealth. By placing these interns at life science companies and research institutions, the program aims to foster diversity, inclusion, and pathways to success in the life science sector.

We also determined whether the annual report that MLSC is required to submit to the House and Senate Committees on Ways and Means was in compliance with Section 6(c)(9) of Chapter 23I of the General Laws. The annual report is used by the members of the House and Senate Committees on Ways and Means to ensure that MLSC is expanding life science–related employment opportunities in the Commonwealth and promoting health-related innovations by supporting and stimulating research and development, manufacturing, and commercialization in the life sciences.

Additionally, we determined whether MLSC’s website adhered to the accessibility standards established by the Web Content Accessibility Guidelines (WCAG) 2.0 for user accessibility, keyboard accessibility, navigation accessibility, language, error identification, and color accessibility. WCAG ensures that all users, regardless of ability, can access the content and functions of MLSC’s website.

Below is a summary of our findings, the effects of those findings, and our recommendations, with links to each page listed.

Finding 1
Page 19

MLSC did not ensure that all interns who participated in the HSAC were eligible to do so.

Effect	The HSAC exists to fund paid internships for underrepresented and low-income high school students in Massachusetts. The eligibility criteria set by MLSC are meant to ensure that only underrepresented and low-income students participate in the HSAC program. Without uniform enforcement of these requirements, students who do not meet the criteria (and therefore are not likely to be part of the population of underrepresented and low-income high school students) can benefit from the HSAC program. This consumes resources that are dedicated to the students this program is intended to serve, potentially displacing eligible students in order to serve ineligible ones.
Recommendations Page <u>20</u>	<ol style="list-style-type: none"> 1. MLSC should ensure that all students apply through the centralized MLSC Application system. 2. MLSC should ensure that students are sufficiently screened for eligibility before being allowed to participate in an internship through the HSAC program.
Finding 2 Page <u>21</u>	MLSC did not ensure that all annual reports were submitted in a timely manner.
Effect	If MLSC does not submit its annual reports to the House and Senate Committees on Ways and Means on time, then these governing bodies may not have the information necessary to adequately review MLSC’s funding and activities for the preceding year. This may impact their funding decisions and result in the underfunding or overfunding of key programs that serve the Commonwealth and its underrepresented and low-income residents. Also, this could negatively affect MLSC’s achieving its mission.
Recommendation Page <u>21</u>	MLSC should develop and implement policies and procedures, including a monitoring component, to ensure that annual reports are delivered no later than the December 1 deadline.
Finding 3 Page <u>22</u>	MLSC’s website was not fully accessible for all Massachusetts residents and users.
Effect	<p>Broken or faulty hyperlinks limit users from having equitable access to critical information and key online services offered by MLSC. Broken or faulty hyperlinks also increase the likelihood that users may either access outdated or incorrect information or be directed to webpages that no longer exist.</p> <p>Also, if MLSC’s website does not provide mechanisms to skip repeated content, then users who navigate sequentially through webpages are forced to navigate through repeated content every time a webpage is loaded. This increases the time needed to reach the desired information on a webpage and may, for users who have motor impairments, make the task of navigating through repeated content cumbersome and difficult.</p>
Recommendation Page <u>23</u>	MLSC should review its webpages to ensure that all hyperlinks lead to related information and provide equitable access to critical MLSC-offered information and services. In addition, MLSC should work with its website accessibility vendor to add a mechanism to its website that allows users to skip repeated content.

In addition to the conclusions we reached regarding our audit objectives, we also identified issues not specifically addressed by our objectives. For more information, see [Other Matters](#).

OVERVIEW OF AUDITED ENTITY

The Massachusetts Life Sciences Center (MLSC) was established by Section 24 of Chapter 123 of the Acts of 2006 and codified in Section 3 of Chapter 23I of the Massachusetts General Laws as a public instrumentality.¹ As per Section 3 of Chapter 23I of the General Laws, MLSC is placed in the Executive Office of Economic Development but is not subject to the supervision or control of said office, or of any board, bureau, department, or other center of the Commonwealth. Instead, MLSC is governed, and its corporate powers exercised, by a board of seven directors. One director each is appointed by the secretary of the Executive Office for Administration and Finance, the director of the Executive Office of Economic Development, and the president of the University of Massachusetts. The remaining four directors are appointed by the Governor. MLSC’s mission statement, found on its website, states,

The Massachusetts Life Sciences Center’s mission is to serve as the hub of the world’s life sciences ecosystem, encourage innovation through investments in good science and business, strengthen and protect Massachusetts’ global leadership position in the life sciences, accelerate the commercialization of promising treatments, therapies, and cures that will improve patient care, create jobs, drive economic development and [science, technology, engineering, and mathematics] workforce development.

Included within MLSC is the Massachusetts Life Sciences Investment Fund,² which exists to finance MLSC’s activities. While MLSC was established in 2006, the center had no significant activity until 2008, when Chapter 130 of the Acts of 2008 (also known as the Life Sciences Act) was signed into law.

As of December 31, 2023, MLSC had 25 active employees. It is located at 1075 Main Street in Waltham.

Year	2008	2018
Amount Granted in Bonds	\$500,000,000 (one time)	\$472,970,000 (one time)
Amount Granted to the Massachusetts Life Sciences Investment Fund	\$250,000,000 (\$25 million each year for 10 years)	No Appropriation
Amount Granted as Various Tax Incentives	\$250,000,000 (\$25 million each year for 10 years)	\$150,000,000 (\$30 million each year for 5 years)
Total	<u>\$1,000,000,000</u>	<u>\$622,970,000</u>

- Section 39 of Chapter 3 of the General Laws defines authority as a “public instrumentality . . . which is not subject to the supervision and control of either the legislative, executive or judicial departments of state government, or of any city, town, or county within the commonwealth, and which does not receive state appropriations either for operations or the payment of debt obligations.”
- With the passing of the Economic Development Bill, signed by the Governor on November 20, 2024, the Massachusetts Life Sciences Investment Fund has been renamed as the Massachusetts Life Sciences Breakthrough Fund.

Massachusetts Life Sciences Investment Fund

The Massachusetts Life Sciences Investment Fund, according to Section 6(c) of Chapter 23I of the General Laws, is to “be held and applied by [MLSC], subject to the approval of the board [of directors], to make qualified investments, grants, research and other funding and loans designed to advance the following public purposes for the life sciences in the commonwealth.” For the purposes of this audit, Clauses 5 and 9 of Section 6(c) of Chapter 23I of the General Laws are of particular note. Clause 5 states that the fund is to be applied for high school internships and other employment opportunities. The high school internship has the additional note, which states that “additional consideration shall be given to [students within marginalized populations] at schools where at least 80 per cent of the student population is eligible for free or reduced lunch.”³ Clause 9 states, “to otherwise further the public purposes set forth herein,” and additionally states, “[MLSC] shall file an annual report, not later than December 1, with the house and senate committees on ways and means detailing the following.”⁴ Section 6(c)(9) of Chapter 23I of the General Laws then lists eight requirements for the annual report. For more information, see the [eight requirements here](#).

High School Apprenticeship Challenge Program Overview

The High School Apprenticeship Challenge (HSAC)⁵ is a program that MLSC offers, which started in 2016 and exists to help MLSC achieve Clause 5 of Section 6(c) of Chapter 23I of the General Laws.⁶ The program seeks to grant internships to students interested in the life science field at applicable host organizations⁷ and to, according to the program overview on MLSC’s website, give aid for “pre-internship lab training programs [at select] school districts which provide biotechnology/biomedical skill development.” For the HSAC program, host organizations are allowed to hire up to two interns per program year⁸ and are

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3. All students in Massachusetts have been eligible for free lunch since the COVID-19 pandemic, and as such, the “80 per cent of the student population is eligible for free or reduced lunch” consideration of this clause has become functionless.
 4. The Economic Development Bill removed Clause 9 from Section 6(c) of Chapter 23I of the General Laws. MLSC is still required to produce an annual report by Section 15 of Chapter 23I of the General Laws, which states that “the center shall annually complete a detailed report setting forth its operations and accomplishments.” As the Economic Development Bill was passed after the audit period, we will hold the annual reports to the requirements set forth by Clause 9 of Section 6(c) of Chapter 23I of the General Laws.
 5. See more information about the High School Apprenticeship Challenge program here: <https://www.masslifesciences.com/programs/high-school-apprenticeship/>.
 6. Clause 5 of Section 6(c) of Chapter 23I of the General Laws states “to provide fellowships, co-ops, high school internships, for which additional consideration shall be given to [students within marginalized populations] at schools where at least 80 per cent of the student population is eligible for free or reduced lunch, college internships, for which additional consideration shall be given to [students within marginalized populations] enrolled full-time or part-time at a community college, loans and grants.”
 7. A host organization can be a life sciences company or a research institution engaged in life sciences studies in some capacity.
 8. Research institutions are granted an exemption to this and are allowed to hire up to 35 interns per program year.

reimbursed up to a maximum amount MLSC sets.⁹ The maximum amount that MLSC reimburses host organizations has increased over the years. For the 2022 school year, MLSC reimbursed up to a maximum of \$3,240 per intern, while as of the 2024 school year,¹⁰ MLSC reimburses up to a maximum of \$4,080 per intern.

Fiscal Year*	Expenses Incurred for the HSAC Program
2021	\$279,355
2022	\$395,766
2023	\$516,127

* While fiscal year 2021 covered July 1, 2020 through June 30, 2021, the audit period started on July 1, 2021. Additionally, while fiscal year 2023 covered July 1, 2022 through June 30, 2023, the audit period ended on December 31, 2023.

During the audit period, in order to be enrolled in the HSAC program and be given consideration for an internship, students had to meet the requirements MLSC set. These requirements are meant to ensure that only underrepresented and low-income students are eligible for the HSAC program. For more information, see the [eligibility requirements here](#).

HSAC Program Evolution and Outreach

Changes to the HSAC program requirements and functions arise from mutual conversations with MLSC stakeholders, primarily the host organizations that use the program. This often results in modifications, such as increasing the hourly pay rate for interns—to ensure that the internship is competitive—or expanding the student requirements—to allow more underrepresented and low-income populations to join the HSAC program. Before any changes to the HSAC program are enacted, suggested modifications are reviewed by the board of directors.

MLSC uses multiple outreach methods to notify people about the HSAC program and other programs MLSC offers. These methods include a weekly newsletter sent out on Mondays; an email campaign sent out to staff members at schools¹¹ that have been part of previous MLSC programs; and attending science, technology, engineering, and mathematics conferences to spread the word verbally. MLSC also taps into its partnerships with the Executive Office of Education and the Massachusetts Department of Elementary

9. The actual reimbursement amount given depends on the hours worked by the intern.

10. The 2022 school year was from May 2021 to April 2022, while the 2024 school year was from May 2024 to April 2025.

11. These staff members can be teachers, administrators, or support staff members such as school resource officers, counselors, or librarians.

and Secondary Education to help raise awareness about the program. MLSC also reaches out to the Massachusetts Association of Vocational Administrators when the HSAC program opens so that the association can include it in its newsletter(s).

“Additional Considerations” as Required by the General Laws

MLSC does not refer or recommend specific candidates for HSAC internships. Instead, MLSC acts as an intermediary and created the MLSC Application System as a platform on which students and host organizations can come together. Therefore, in order to comply with Clause 5 of Section 6(c) of Chapter 23I of the General Laws, which states that “additional consideration shall be given to [students within marginalized populations] at schools where at least 80 per cent of the student population is eligible for free or reduced lunch,” MLSC designed the HSAC program’s eligibility criteria to increase the number of students within marginalized populations in the pool of applicants. MLSC also established partnerships with several host organizations that historically have made intentional efforts to select students within marginalized populations to be part of their internship programs.¹²

MLSC Application System

The MLSC Application System is used by both college and high school students to apply for internships from host organizations. Both students and host organizations need to register with MLSC by creating an account. Students must provide some basic information about themselves in order to create their account, such as where they go to school, whether they are part of the Metropolitan Council for Educational Opportunity program,¹³ and contact information. Once their account is created, students need to upload a cover letter and a resume and answer questions about their academic interests and their job availability, such as where they would be willing to work or whether they will be full- or part-time. When students submit their application, they agree to a disclaimer that states that all the information they have submitted is accurate. Host organizations undergo a similar process and answer questions such as where their organizations are located or which life science subsector(s) their organizations focus on.

12. These partners include, but are not limited to, the Dana Farber Continuing Umbrella of Research Experiences program, American Dental Association Forsyth Student Scholars, and Massachusetts General Hospital Youth Neurology.

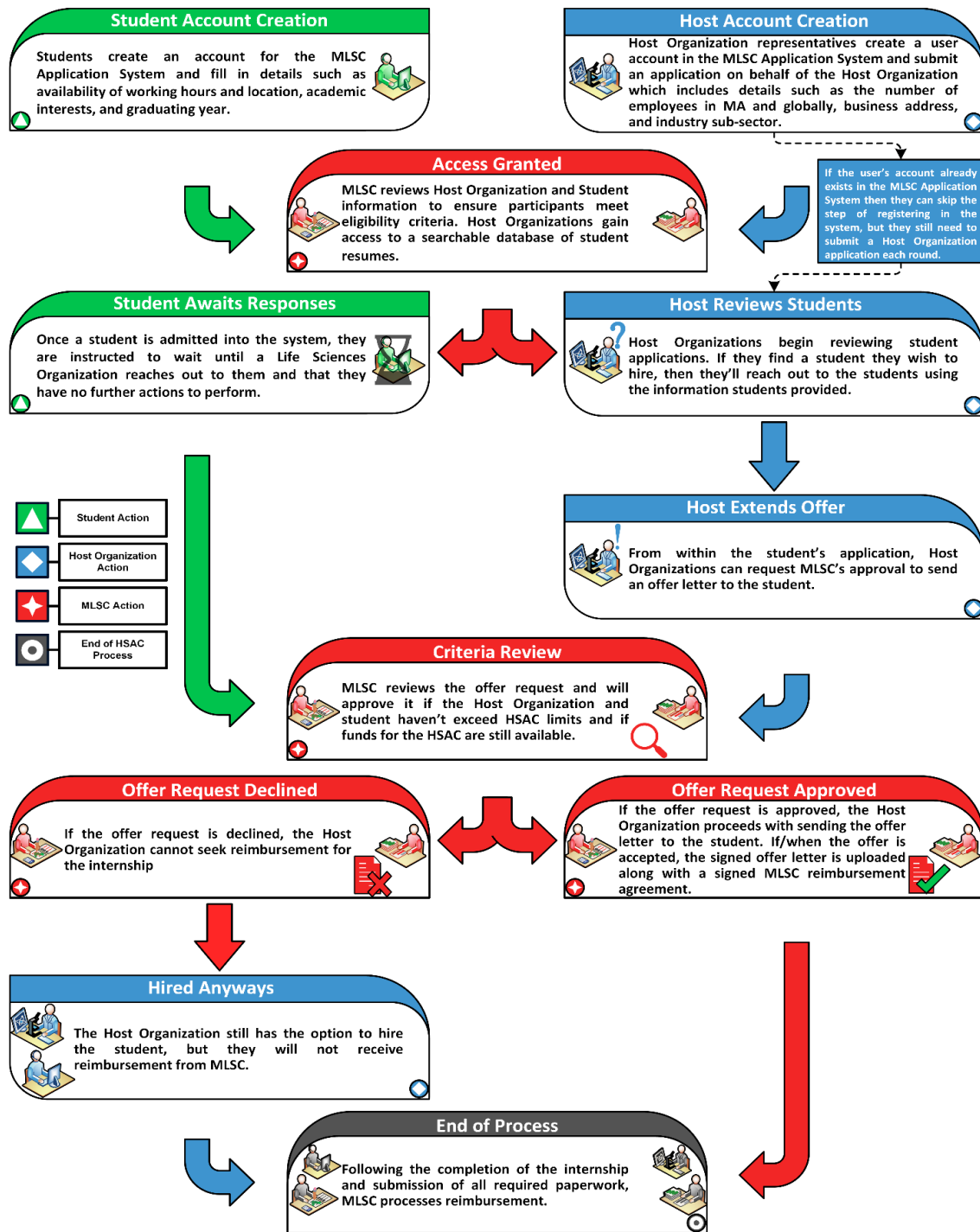
13. According to the Massachusetts Department of Elementary and Secondary Education’s website, “the METCO (Metropolitan Council for Educational Opportunity) Program is a grant program funded by the Commonwealth of Massachusetts. It is a voluntary program intended to expand educational opportunities, increase diversity, and reduce racial isolation for students in urban and suburban communities, by fostering the opportunity for children from Boston and Springfield to attend public schools in neighboring communities in order for students to develop a deeper understanding of one another in an integrated public school setting.”

MLSC staff members review student and host organization applications. If a student's application is accepted by MLSC staff members, then the student is added to MLSC's database of potential interns. If a host organization's application is accepted, then it can view the database of potential interns. Host organizations may then reach out to students found in the database. If both parties agree to work together, then the host organization adds the student to its list of interns it wishes to hire. Once a host organization has selected all the interns it wishes to hire, the organization changes the students' application statuses to "extend offer," which prompts MLSC to review the offer request(s). At this point, MLSC staff members give the profiles of the students a thorough review to ensure that they meet the requirements necessary for MLSC to reimburse the host organization for the wages of the intern(s). Additionally, MLSC reviews both student and host organization accounts to ensure that HSAC limits have not been exceeded.¹⁴ If a student is found to not meet the requirements during this review, then the host organization is informed that it will not be reimbursed should it choose to hire the ineligible student as an intern, but that it is still allowed to hire the student, should it wish.

When the student has been hired as an intern by the host organization, the organization then needs to sign an agreement with MLSC that sets the terms of the internship and reimbursement. In addition, it is expected for host organizations to upload both the intern's signed offer letter and the signed agreement to the MLSC Application System. Once the internship is completed, MLSC processes the reimbursement for the host organization.

14. The HSAC limits are as follows: a host organization is only allowed to hire up to 2 interns per program year (unless the host organization is a research institution, in which it is allowed to hire up to 35 interns per program year), while an intern cannot be hired by the same host organization more than two times. (Note that the host organization is allowed to hire the same intern three or more times, but it will not be reimbursed for those subsequent times.)

How the MLSC Application Process Works¹⁵



15. Under "Criteria Review," we mention that students can exceed HSAC limits. Students can do this in a few ways. One way for a student to exceed HSAC limits is by attempting to participate in more than two sequential, subsidized internships with the same host organization within two program years. Another way is for a student to participate in more than one subsidized internship in the same program year.

Annual Reports

As required by the General Laws, MLSC publishes an annual report, which provides an overview of MLSC's activities, investments, and impact on Massachusetts's life science sector. This annual report is shared with the House and Senate Committees on Ways and Means. Section 15 of Chapter 23I of the General Laws, added by Chapter 130 of the Acts of 2008, requires that the "center shall annually complete a detailed report setting forth its operations and accomplishments."

Sections 6¹⁶ and 15 of Chapter 23I of the General Laws were both active during the audit period, with each section requiring MLSC to file an annual report with the House and Senate Committees on Ways and Means.¹⁷ Section 6 gave MLSC a deadline to submit the annual report "not later than December 1," while Section 15 gave MLSC a submittal deadline of "on or before October 1." While this issue was solved after the audit period, during the audit period, there was a two-month timeframe when the annual report was required to be submitted both "on or before October 1" and "not later than December 1." The Section 6 deadline of December 1 was used, as Section 6 gave exact requirements for the elements that the annual report needed to contain.

Website Accessibility

Americans with Disabilities Act

In 1990, the Americans with Disabilities Act, a comprehensive civil rights law prohibiting discrimination based on disability, came into effect. Title II of the Americans with Disabilities Act covers state-funded services and programs, including all activities of state and local governments, regardless of whether these entities receive federal financial assistance.¹⁸

Web Content Accessibility Guidelines

In 1999, the World Wide Web Consortium (W3C), an international organization overseeing internet standards, released the Web Content Accessibility Guidelines (WCAG) 1.0. These guidelines aimed to offer directions on enhancing the accessibility of web content for people with disabilities. In 2008,

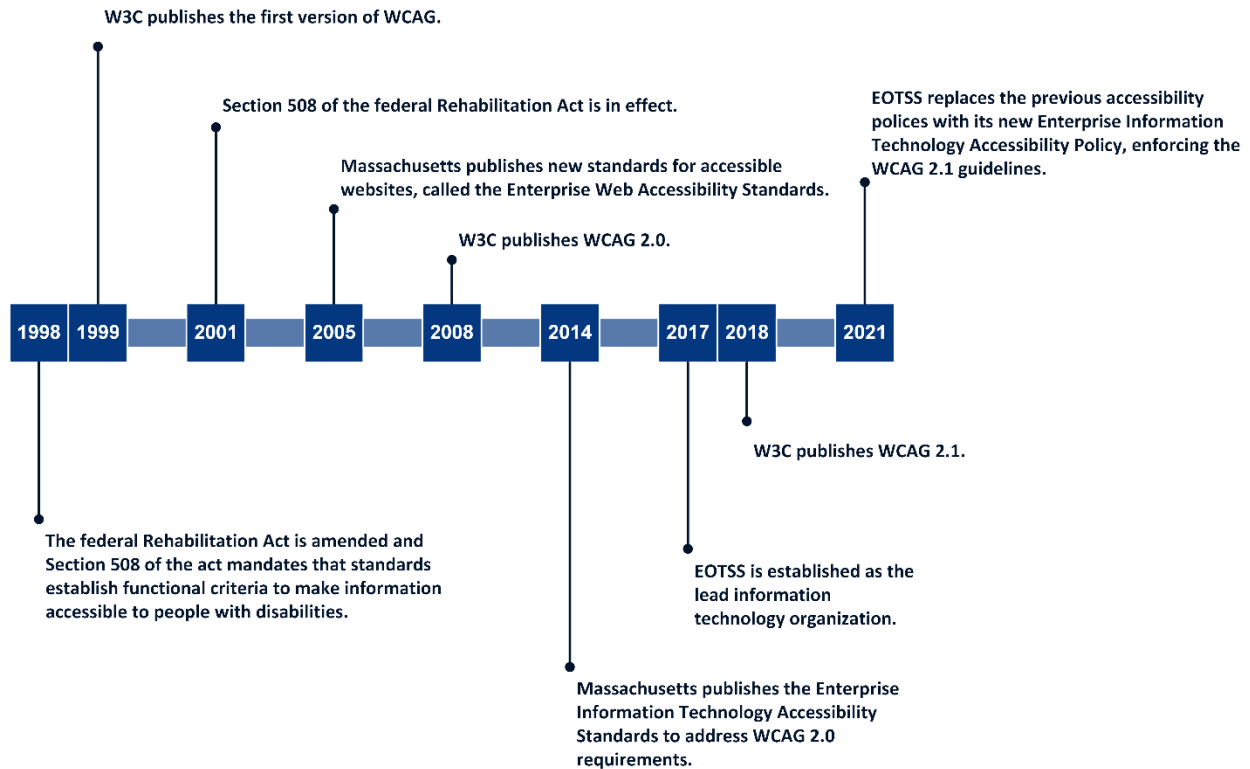
16. Section 6 of Chapter 23I of the General Laws was also added by Chapter 130 of the Acts of 2008.

17. Section 6 Chapter 23I of the General Laws only requires filing with the House and Senate Committees on Ways and Means, while Section 15 of Chapter 23I requires that MLSC submit the report to "the governor, the secretary of administration and finance, the state comptroller and the clerks of the house of representatives and senate, who shall forward the same to the house and senate committee on ways and means and the joint committee on economic development and emerging technologies."

18. For more information, see Section 12131B65 of Title 42 of the US Code.

W3C published WCAG 2.0. In 2018, W3C published WCAG 2.1, which was built on WCAG 2.0 to improve web accessibility on mobile devices and to further improve web accessibility for people with visual impairments and cognitive disabilities.

Progression of Internet Accessibility Standards



How People with Disabilities Use the Web

According to W3C, people with disabilities use assistive technologies and adaptive strategies specific to their needs to navigate web content. Examples of assistive technologies include screen readers, which read webpages aloud for people who cannot read text; screen magnifiers for individuals with low vision; and voice recognition software for people who cannot (or do not) use a keyboard or mouse. Adaptive strategies refer to techniques that people with disabilities employ to enhance their web interaction.¹⁹ These strategies might involve increasing text size, adjusting mouse speed, or enabling captions. To make web content accessible to people with disabilities, developers must

19. Web interaction refers to the various actions that users can take while navigating and using the internet. It encompasses a wide range of online activities, including, but not limited to, clicking on hyperlinks, submitting forms, posting comments on webpages, and engaging with web content and services in other forms.

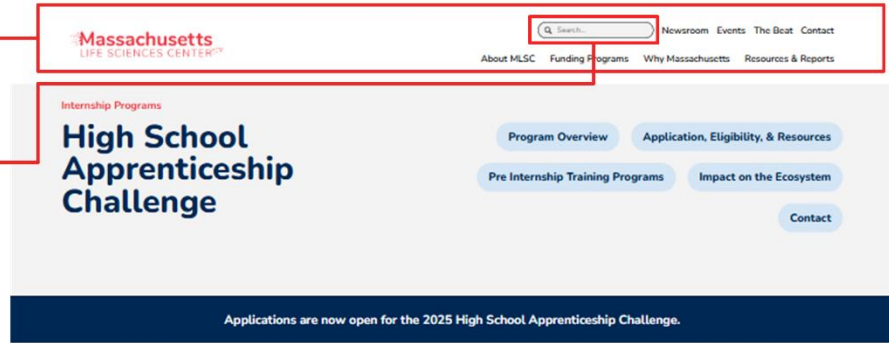
ensure that various components of web development and interaction work together. This includes text, images, and structural code; users' browsers and media players; and various assistive technologies.

MLSC has made efforts to create an accessible website for the public. Before we started our audit, MLSC reviewed the contract it signed with its previous website vendor and found that the previous vendor's contract excluded website accessibility as one of its obligations to MLSC. Because of this, MLSC informed us that it did not extend its contract with that vendor and instead brought on a new vendor that would help MLSC with its website accessibility. This new vendor meets with MLSC weekly to discuss MLSC's website and improvements that could be made.

Common Accessibility Features of a Website²⁰

A site's header can appear throughout an entire site and contain links to main content areas

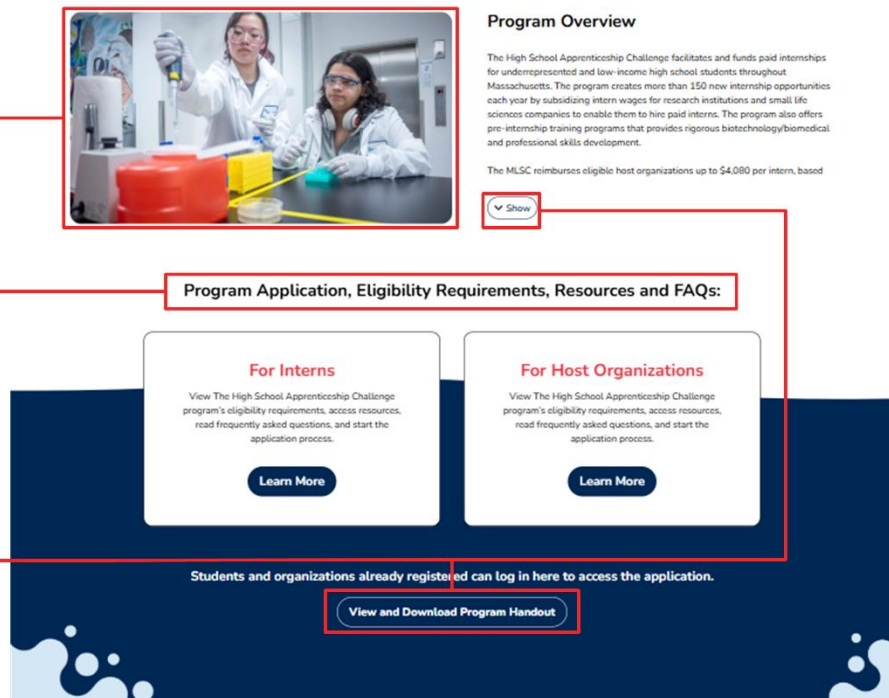
By properly labeling fields where text can be entered, screen readers will read aloud the type of information that a user should enter.



Alternative text should provide a description of an image so screen readers can describe the image

Headings organize web content in a logical manner and allow users to navigate content easily.

Screen reader users and persons with motor disabilities rely in part on the Tab key to navigate between major portions of the website's content.



20. This webpage was modified to fit in the audit report.

AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor has conducted a performance audit of certain activities of the Massachusetts Life Sciences Center (MLSC) for the period July 1, 2021 through December 31, 2023.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Below is a list of our audit objectives, indicating each question we intended our audit to answer; the conclusion we reached regarding each objective; and, if applicable, where each objective is discussed in the audit findings.

Objective	Conclusion
1. Did MLSC administer the High School Apprenticeship Challenge (HSAC) program in compliance with Section 6(c)(5) of Chapter 23I of the General Laws?	No; see Finding <u>1</u>
2. Did MLSC prepare and submit the annual report in compliance with Section 6(c)(9) of Chapter 23I of the General Laws?	No; see Finding <u>2</u>
3. Did MLSC's website adhere to Web Content Accessibility Guidelines (WCAG) 2.0 for user accessibility, keyboard accessibility, navigation accessibility, language, error identification, and color accessibility?	No; see Finding <u>3</u>

To accomplish our audit objectives, we gained an understanding of MLSC's internal control environment relevant to our objectives by interviewing MLSC staff members and management. In addition, to obtain sufficient, appropriate evidence to address our audit objectives, we performed the procedures described below.

HSAC Program

To determine whether MLSC properly administered the HSAC program as required by Section 6(c)(5) of Chapter 23I of the General Laws, we took the following actions:

- We interviewed knowledgeable staff members regarding the administration of the HSAC program.

- We reviewed the documentation MLSC provided that explains how it provides “additional considerations”²¹ to students within marginalized populations who attend schools where at least 80% of the population is eligible for free or reduced lunch. We also interviewed knowledge staff members about these “additional considerations.”

Additionally, to ensure that all interns were eligible for the program, we performed the procedures below on a random, nonstatistical sample²² of 40 internship applicants out of a population of 273 internship applicants.

- Applicant age: We reviewed the ages of interns, found within the list of interns provided by MLSC, to determine whether interns were, at the time the internship started, at least 16 years old.
- Applicant school: We reviewed the interns’ schools, found within the list of interns provided by MLSC, to determine whether interns had met one of the following descriptions:
 - The intern was enrolled in, or had recently graduated from,²³ a school that meets at least one of the following descriptions:
 - A vocational technical high school as determined by Chapter 74 of the General Laws or a comprehensive public high school with a life science Chapter 74 program.
 - A public high school (including charter schools) located in one of the following gateway cities²⁴ as determined by Section 3A of Chapter 23A of the General Laws: Attleboro, Barnstable, Brockton, Chelsea, Chicopee, Everett, Fall River, Fitchburg, Haverhill, Holyoke, Lawrence, Leominster, Lowell, Lynn, Malden, Methuen, New Bedford, Peabody, Pittsfield, Quincy, Revere, Salem, Springfield, Taunton, Westfield, or Worcester.
 - A public high school (including charter schools) with a student population who is at least 25% eligible for free or reduced lunch as defined by the Massachusetts Department of Elementary and Secondary Education.
 - The intern was enrolled in the Metropolitan Council for Educational Opportunity program.

See Finding 1 for issues we identified with the HSAC program.

21. As mentioned earlier in this report, MLSC does not refer or recommend specific candidates for the HSAC internships. Instead, MLSC acts as an intermediary and created the MLSC Application System and has structured the HSAC eligibility criteria to increase the number of students within marginalized populations in the pool of applicants.

22. Auditors use nonstatistical sampling to select items for audit testing when a population is very small, the population items are not similar enough, or there are specific items in the population that the auditors want to review.

23. Recent graduates must have received their high school diploma no earlier than the past two calendar years and must not yet be attending college. High school graduates can intern the summer before their first year of college.

24. According to Section 3A of Chapter 23A of the General Laws, a gateway city is “a municipality with a population greater than 35,000 and less than 250,000 with a median household income below the commonwealth’s average and a rate of educational attainment of a bachelor’s degree or above that is below the commonwealth’s average.”

Annual Reports

To determine whether MLSC's 2021, 2022, and 2023 annual reports included the criteria set forth in Section 6(c)(9) of Chapter 23I of the General Laws, we determined whether the following elements were present in the annual reports issued by MLSC during the audit period:

1. the submission date of the annual report (which was not later than December 1 of the respective year);
2. the total funds expended on high school internships;
3. the total funds expended on college internships;
4. the number of students participating in the internship programs from each high school, school district, college, and university in the Commonwealth;
5. the percent of high school internships awarded to students of color attending schools where at least 80% of the student population is eligible for free or reduced lunch;
6. the percent of college internships awarded to students of color enrolled full-time or part-time at a community college;
7. the racial and ethnic composition of the high school and college internship programs; and
8. an analysis of the impact of the college internship program on the ability of its participants to enter the full-time job market in life science industries after graduation.

See Finding 2 for issues we identified with the MLSC's annual reports.

Web Accessibility

To determine whether MLSC's website meets the requirements of WCAG 2.0 for user accessibility, keyboard accessibility, navigation accessibility, language, error identification, and color accessibility, we performed accessibility testing procedures on a random, statistical sample²⁵ of 60 MLSC webpages out of

25. Auditors use statistical sampling to select items for audit testing when a population is large (usually over 1,000) and contains similar items. Auditors generally use a statistics software program to choose a random sample when statistical sampling is used. The results of testing using statistical sampling, unlike those from judgmental sampling, can usually be used to make conclusions or projections about entire populations.

a population of 1,498 MLSC webpages, using a 95% confidence level,²⁶ a 0% expected error rate,²⁷ and a 5% tolerable error rate.²⁸

User Accessibility

- We determined whether content zoomed in to 200% was undamaged and without any issues.

Keyboard Accessibility

- We determined whether all elements²⁹ of each webpage could be navigated using only a keyboard.
- We determined whether any elements on each webpage prevented a user from moving to a different element when using only a keyboard to navigate the webpage.
- We determined whether the first focusable control³⁰ was a hyperlink that redirects to the main content of the website. The first focusable control is known as either a bypass block or a skip link.

Navigation Accessibility

- We determined whether each website contained a title that was relevant to website content.
- We determined whether there was a search function present to help users locate content.
- We determined whether related hyperlinks allowed navigation to the intended webpage.
- We determined whether headings within websites related to the content of the header's section.

Language

- We determined whether video content found within the website had all important sounds and dialogue captioned.
- We determined whether the language of each webpage was tagged with the correct language attribute.³¹

26. Confidence level is a mathematically based measure of the auditor's assurance that the sample results (statistic) are representative of the population (parameter), expressed as a percentage.

27. Expected error rate is the number of errors that are expected in the population, expressed as a percentage. It is based on the auditor's knowledge of factors such as prior year results, the understanding of controls gained in planning, or a probe sample.

28. The tolerable error rate (which is expressed as a percentage) is the maximum error in the population that is acceptable while still using the sample to conclude that the results from the sample have achieved the objective.

29. An element is a part of a webpage that contains data, text, or an image.

30. The first focusable control is the first element a user will be brought to on a webpage when navigating with a keyboard.

31. A language tag identifies the native language of the content on the webpage or PDF (e.g., a webpage in English should have an EN language tag). The language tag is listed in the webpage's or PDF's properties. This, among other things, is used to help screen readers use the correct pronunciation for words.

-
- We determined whether words that appeared on each webpage matched the language to which the webpage was set.

Error Identification

- We determined whether mandatory form fields alerted users if the field was left blank.
- We determined whether there was a label for elements that required user input.
- We determined whether the label was programmed correctly.
- We determined whether examples were given to assist the user in correcting mistakes (for example, a warning when entering a letter in a field meant for numbers).

Color Accessibility

- We determined whether there was at least a 3:1 contrast in color and additional visual cues to distinguish hyperlinks, which WCAG recommends for users with colorblindness or other visual impairments.

See Finding [3](#) for issues we identified with MLSC's website.

We used a combination of statistical and nonstatistical sampling methods for testing and did not project the results of our testing to any corresponding populations.

Data Reliability Assessment

MLSC Site Map

To determine the reliability of the site map that we received from MLSC management, we interviewed knowledgeable MLSC staff members and checked that certain variable formats (e.g., dates, unique identifiers, or abbreviations) were accurate. Additionally, we ensured that none of the following issues affected the site map: abbreviation of data fields, missing data (e.g., hidden rows or columns, blank cells, or absent records), and duplicate records. We also ensured that all values in the dataset corresponded with expected values.

Furthermore, we selected a random sample of 20 uniform resource locators (URLs)³² from MLSC's site map and traced them to the corresponding webpages on MLSC's website, checking that each URL and webpage title matched the information on the MLSC webpage. We also selected a random sample of

32. A URL uniquely identifies an internet resource, such as a website.

20 webpages from MLSC’s website and traced each URL and webpage title to the site map to ensure that we received a complete and accurate site map.

List of Interns Hired by Host Organizations

To determine the reliability of the list of interns hired by host organizations that we received from MLSC management, we reviewed the MLSC Application System’s system controls for access control, configuration management, contingency planning, segregation of duties, and security management. Additionally, we reviewed System and Organization Control reports³³ for the MLSC Application System. We also checked that certain variable formats (e.g., dates or abbreviations) were accurate. Additionally, we ensured that none of the following issues affected the list: abbreviation of data fields, missing data (e.g., hidden rows or columns, blank cells, or absent records), and duplicate records. We also ensured that all values in the dataset corresponded with expected values.

Furthermore, we obtained from MLSC physical documents known as Host Agreements and Reimbursement Summaries, which outline information for interns hired by host organizations during the audit period. We selected a random sample of 20 interns from the list of interns hired by host organizations and traced them back to the information compiled from physical documents, ensuring that the intern’s full name and hiring host organization matched. We also selected a random sample of 20 interns from the compiled physical documents and traced them back to the information pulled from the list of interns hired by host organizations to ensure that the intern’s full name and hiring host organization matched and that we received a complete and accurate list.

Based on the results of the data reliability assessment procedures described above, we determined that the site map and list of interns hired by host organizations were sufficiently reliable for the purposes of our audit.

33. A System and Organization Control report, issued by an independent contractor, is a report on controls about a service organization’s systems relevant to security, availability, processing integrity, confidentiality, or privacy.

DETAILED AUDIT FINDINGS WITH AUDITEE'S RESPONSE

1. The Massachusetts Life Sciences Center did not ensure that all interns who participated in the High School Apprenticeship Challenge were eligible to do so.

The Massachusetts Life Sciences Center (MLSC) did not ensure that all interns met the eligibility criteria for the High School Apprenticeship Challenge (HSAC). During our testing, we found that 2 interns out of the 40 interns tested (5%) were students who did not meet any of MLSC's eligibility criteria (see the "Authoritative Guidance" section below for more information).

Despite MLSC's discovery that two ineligible students were part of the program, MLSC still fulfilled the agreements with the host organizations and provided reimbursement for the cost of these two students' internships.

The HSAC exists to fund paid internships for underrepresented and low-income high school students in Massachusetts. The eligibility criteria set by MLSC are meant to ensure that only underrepresented and low-income students participate in the HSAC program. Without uniform enforcement of these requirements, students who do not meet the criteria (and therefore are not likely to be part of the population of underrepresented and low-income high school students) can benefit from the HSAC program. This consumes resources that are dedicated to the students this program is intended to serve, potentially displacing eligible students in order to serve ineligible ones.

Authoritative Guidance

MLSC's eligibility requirements state the following:

- *[The following regards the intern:] Enrolled in or have recently graduated from a school that meets at least one of the following descriptions:*
 - *Vocational technical high school as determined by Chapter 74 of the General Laws of Massachusetts or a comprehensive public high school with a life sciences Chapter 74 program.*
 - *Public high school (including charter) located in one of the following "Gateway Cities" as determined by Section 3A of Chapter 23A of the General Laws of Massachusetts: Attleboro, Barnstable, Brockton, Chelsea, Chicopee, Everett, Fall River, Fitchburg, Haverhill, Holyoke, Lawrence, Leominster, Lowell, Lynn, Malden, Methuen, New Bedford, Peabody, Pittsfield, Quincy, Revere, Salem, Springfield, Taunton, and Westfield, and Worcester.*

- *Public high school (including charter) with a student population of at least 25 percent classified as "low income" by the Massachusetts Department of Elementary and Secondary Education. . . .*

OR

- *Enrolled in the [Metropolitan Council for Educational Opportunity] program.*

Reasons for Issue

According to MLSC management, the host organizations hired ineligible interns through their own independent outreach and application processes, and submitted the intern information to MLSC for reimbursement after the internships were completed or nearly completed.³⁴ MLSC, upon reviewing the submitted information and learning that these interns were ineligible for the HSAC program only after the internships were completed or nearly completed, elected to reimburse the host organizations.

Recommendations

1. MLSC should ensure that all students apply through the centralized MLSC Application system.
2. MLSC should ensure that students are sufficiently screened for eligibility before being allowed to participate in an internship through the HSAC program.

Auditee's Response

1. *Beginning in 2024, MLSC requires that all interns complete an MLSC application regardless of host organization or recruitment method. MLSC staff reviews applications and confirms applicant eligibility prior to Agreement execution and disbursement of funds.*
2. *As stated above, beginning in 2024 MLSC requires that all interns complete an MLSC application for screening and eligibility review by MLSC staff before HSAC program participation.*

Auditor's Reply

Based on its response, MLSC has taken measures to address our concerns regarding this matter. As part of our post-audit review process, we will follow up on this matter in approximately six months.

34. During the audit period, and especially earlier in the audit period, host organizations had much greater freedom to perform their own independent outreach when selecting students for internships. As a result, host organizations would, according to MLSC management, sometimes adopt their own application processes for selecting interns. This was the case with the two identified interns in the finding. Because of these independent outreach and application processes, some host organizations were unaware of the requirements students had to meet in order to be admitted into the HSAC program.

2. The Massachusetts Life Sciences Center did not ensure that all annual reports were submitted in a timely manner.

MLSC did not ensure that all of its annual reports were submitted to the House and Senate Committees on Ways and Means before the December 1 deadline. Specifically, the 2023 annual report was not submitted.³⁵

If MLSC does not submit its annual reports to the House and Senate Committees on Ways and Means on time, then these governing bodies may not have the information necessary to adequately review MLSC's funding and activities for the preceding year. This may impact their funding decisions and result in the underfunding or overfunding of key programs that serve the Commonwealth and its underrepresented and low-income residents. Also, this could negatively affect MLSC's achieving its mission.

Authoritative Guidance

Section 6(c)(9) of Chapter 23I of the Massachusetts General Laws states, "To otherwise further the public purposes set forth herein; provided further, that [MLSC] shall file an annual report, not later than December 1, with the house and senate committees on ways and means."

Reasons for Issue

MLSC management stated that, while the 2023 annual report was completed and uploaded to MLSC's website by October 5, 2023, the annual report was not sent to the House and Senate Committees on Ways and Means. This oversight happened due to organizational changes that occurred around the same time.

Recommendation

MLSC should develop and implement policies and procedures, including a monitoring component, to ensure that annual reports are delivered no later than the December 1 deadline.

Auditee's Response

MLSC's audited financial statements and component reports were filed with the Executive Office for Administration and Finance and the Office of the Comptroller on time. MLSC's annual report includes the financial information relative to the HSAC and was completed by a separate process. The Economic Development Bill (Mass Leads Act) removed the reporting requirements specific to the HSAC and extended the annual report requirements to December 31.

35. The audit team last confirmed that this was still the case on March 27, 2025.

With the Mass Leads Act update, MLSC's annual reporting requirements are now aligned and subject to one deadline. MLSC is implementing a standard operating procedures and policies regarding the preparation, review and filing of the annual report which includes review by the Finance Team, Legal Team, Government Relations Team and the President and [Chief Executive Officer] to monitor and ensure compliance.

Auditor's Reply

Based on its response, MLSC has taken measures to address our concerns regarding this matter. As part of our post-audit review process, we will follow up on this matter in approximately six months.

3. The Massachusetts Life Sciences Center's website was not fully accessible for all Massachusetts residents and users.

MLSC's website was not fully accessible. We determined that 6 webpages out of our sample of 60 (10%) were not accessible in accordance with the Web Content Accessibility Guidelines (WCAG) for navigational accessibility. Of these, we determined that all 6 webpages contained broken hyperlinks. In addition, all 60 webpages out of our sample of 60 (100%) were not accessible in accordance with WCAG for keyboard accessibility. Of these, we determined that all 60 webpages (100%) did not have a method to skip repeated content.

Broken or faulty hyperlinks limit users from having equitable access to critical information and key online services offered by MLSC. Broken or faulty hyperlinks also increase the likelihood that users may either access outdated or incorrect information or be directed to webpages that no longer exist.

Also, if MLSC's website does not provide mechanisms to skip repeated content, then users who navigate sequentially through webpages are forced to navigate through repeated content every time a webpage is loaded. This increases the time needed to reach the desired information on a webpage and may, for users who have motor impairments, make the task of navigating through repeated content cumbersome and difficult.

Authoritative Guidance

The Web Accessibility Initiative's WCAG 2.0 states,

[Success Criterion] 2.4.1 . . . A mechanism is available to bypass blocks of content that are repeated on multiple Web pages. . . .

[Success Criterion] 2.4.5 . . . More than one way is available to locate a Web page within a set of Web pages except where the Web Page is the result of, or a step in, a process.

Reasons for Issue

MLSC management stated that the previous website vendor it employed had in its statement of work a clause that excluded any regulatory compliance, including specifically Americans with Disabilities Act compliance, when creating and updating MLSC's website. As a result of this, MLSC's website was designed with no accessibility requirements in mind. MLSC stated that it ended its work with that vendor upon its review of the statement of work and seeing that Americans with Disabilities Act—regulatory compliance was excluded. MLSC hired a new website vendor, which has been aiding MLSC with improving the accessibility of its website.

Recommendation

MLSC should review its webpages to ensure that all hyperlinks lead to related information and provide equitable access to critical MLSC-offered information and services. In addition, MLSC should work with its website accessibility vendor to add a mechanism to its website that allows users to skip repeated content.

Auditee's Response

MLSC began working with a new website accessibility vendor in 2024. All pages of the MLSC website have since been brought into compliance with all applicable state and federal accessibility laws and regulations. MLSC's engagement with the website accessibility vendor is ongoing and includes regular meetings to ensure continued compliance.

MLSC and its vendor have already addressed or are working to address the recommendations set forth in "Other Matters," including any webpage or table contrast issues.

Auditor's Reply

Based on its response, MLSC has taken measures to address our concerns regarding this matter. As part of our post-audit review process, we will follow up on this matter in approximately six months.

OTHER MATTERS

The Massachusetts Life Sciences Center's website contained certain accessibility challenges.

The Massachusetts Life Sciences Center's (MLSC's) website contained the following accessibility challenges.

- **The webpage element "Hear from the Heart of the Hub" caused a partial keyboard trap.** During testing of Objective 3, it was noted that the element labeled as "popmake-21267" (alternative text name of "Hear from the Heart of the Hub") would take initial focus when some webpages were loaded and place the focus on a sub-element, which was collapsed and hidden within the "popmake-21267" element. While the user could exit the element by pressing the Close button, the highlight color had poor color contrast (1.434:1) against the background color of the button, which would impact users who navigate sequentially through webpages.
- **The button hover-over text color had poor contrast.** During testing, it was noted that some buttons had a hover-over text color that would result in a poor color contrast against the background color of the button (2.484:1) when the user interacted with said buttons.
- **A table heading was missing the <th> tag.**³⁶ During testing, a table had improper formatting by having no designated <th> tags (which designate table header cells) when said table contained clear headers.

If MLSC's website contains elements that do not have sufficient contrast between the highlight and background colors, then the user experience is negatively impacted by making it difficult to locate relevant information, such as the exit button. As a result of this lack of contrast, a pseudo-keyboard trap is formed. The presence of a keyboard trap means that users who have mobility issues, and therefore rely on keyboard navigation, may not be able to access certain features and content. Without properly labeled tables, users who rely on screen readers may get confused as to which column and row they are in because the screen reader cannot accurately communicate this information without the context proper labels would have provided.

36. There are many ways to define a table in HTML. However, the most basic and standard way to define a table is by declaring three elements. The first is <td>, which defines the individual cell for a table. The second is <tr>, which defines all the cells that create a row. The third and last is <th>, which defines a header cell. Other benefits, aside from using proper formatting, include the following: <td> elements, by default, contain text and are left-aligned, while <th> elements, by default, are bolded and centered.

Authoritative Guidance

The Web Accessibility Initiative’s WCAG 2.0 states,

[Success Criterion] 1.3.1 . . . Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text. . . .

[Success Criterion] 1.4.1 . . . Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element. . . .

[Success Criterion] 2.1.2 . . . If keyboard focus can be moved to a component of the page using a keyboard interface, then focus can be moved away from that component using only a keyboard interface, and, if it requires more than unmodified arrow or tab keys or other standard exit methods, the user is advised of the method for moving focus away.

Reasons for Issue

MLSC management stated that the previous website vendor it employed had in its statement of work a clause that excluded any regulatory compliance, including specifically Americans with Disabilities Act compliance, when creating and updating MLSC’s website. As a result of this, MLSC’s website was designed with no accessibility requirements in mind. MLSC stated that it ended its work with that vendor upon its review of the statement of work and seeing that Americans with Disabilities Act–regulatory compliance was excluded. MLSC hired a new website vendor, which has been aiding MLSC with improving the accessibility of its website.

Recommendations

1. MLSC should alter the webpage element “Hear From the Heart of the Hub” (popmake-21267) by either ensuring that the element does not take control when a webpage is loaded or by ensuring that the element is fully expanded when a webpage is loaded so that it is more apparent to users that the focus is set there. Either solution should also implement a different color outline that results in a color contrast of 3:1 or greater.
2. MLSC should alter the button styles on its website by either changing the highlight color, background color, or how the highlight color interacts with the button style, to ensure that a color contrast of 3:1 is achieved for all button styles.
3. MLSC should ensure that tables use proper programmatic formatting so that they can be interpreted by screen readers.

Auditee’s Response

MLSC began working with a new website accessibility vendor in 2024. All pages of the MLSC website have since been brought into compliance with all applicable state and federal accessibility laws and

regulations. MLSC's engagement with the website accessibility vendor is ongoing and includes regular meetings to ensure continued compliance.

MLSC and its vendor have already addressed or are working to address the recommendations set forth in "Other Matters," including any webpage or table contrast issues.

Auditor's Reply

Based on its response, MLSC has taken measures to address our concerns regarding this matter. As part of our post-audit review process, we will follow up on this matter in approximately six months.