

MIHIVE MHEF FINAL REPORT

1. How did this funding support your organization's strategic priorities and mission?

This funding enabled the Interoperability Institute (IOI) and its partners to build workforce HIT skills capacity within the State of Michigan by establishing a Michigan Health Interoperability Virtual eLaboratory (MiHIVE). Thirteen colleges and universities across Michigan have come together to create the MiHIVE collaborative, housed at Interoperability Institute as the backbone organization. MiHIVE's mission is to provide students and faculty with an electronic laboratory of simulated health IT platforms for hands-on health informatics training and skill building. Through needed technology platforms, data, tools, and corresponding curricula, Michigan colleges and universities can collaboratively create the nation's most proficient health IT, health informatics, and entrepreneurial healthcare workforce. MiHIVE is positioned to ensure Michigan's health informatics graduates can "hit the ground running" as they enter the job market in the areas of health information exchange, data analytics, artificial intelligence (machine learning and natural language processing), cybersecurity, and emerging skills required by companies that support Michigan's economy and health sector businesses.

MiHIVE was able to achieve the following initial capacity building goals, as of August 2024:

- Gain participation from 13 colleges/universities
- Engage with 27 industry advisors (nonprofit, for-profit, and government entities)
- Create two classroom-ready Core Curriculum Modules (CCMs) with 5 interactive, classroom-ready lessons related to data standards and data analysis to debut in university classrooms Fall 2024
- Establish a MiHIVE governance structure and relevant working groups
- Partner with industry for sourcing real-world software tools to use in the classroom via the e-lab platform
- Develop a financial sustainability model that furthers academic and industry participation and offers ongoing revenue to support activities and the eLab

2. How did the individuals and communities you serve directly or indirectly benefit from this grant?

Utilizing the MHEF Capacity Grant funding, MiHIVE has impacted the following people and communities in the following ways:

- Academic Institutions:
 - Instructors in health informatics programs throughout Michigan now have access to new classroom-ready materials and open-source software for teaching hands-on lessons about health data standards and health data analysis. Students in health informatics programs where these materials and technologies are used gain valuable hands-on training that they would otherwise miss.

- University/college faculty participating in MiHIVE have confirmed that MiHIVE is building a connection between academic institutions that did not exist before.
- The Core Curriculum Modules (CCM) MiHIVE is creating are accessible to all students across Michigan via their higher education academic organization, and carry a Creative Commons license, making them available to the widest possible audience.
- MiHIVE resources are cross-disciplinary, but use health sector use case scenarios. These resources are relevant to engineering, data science, cybersecurity, natural resources (biology) and other colleges, in addition to Public Health, Medicine, Nursing, Pharmacy, Dentistry, and more.

Public Sector:

- Through MiHIVE, Michigan colleges and universities are more closely engaged in many of the priorities outlined in the Michigan Health IT Commission's [strategic roadmap](#) including the following : advancing health data utility services; promoting data integration and sharing involving social determinants of health to reduce health disparities and social inequities; and improving data sharing and analytics for population and public health, health information exchange, and interoperability.
- Private Sector:
 - Companies have contributed software and tools to MiHIVE. Clinical Architecture/SyMedical, Qvera, and CareFluence (OpenEHR) are all in various stages of classroom readiness on the Meld open-source technology platform. The MiHIVE platform currently runs on AWS to provide cloud native infrastructure.
 - Engagement in MiHIVE provides private sector companies with a pool of early career candidates who have been exposed to their software offering(s), have knowledge of health sector data standards, have experienced interoperability workflows, and may have useful certificate trainings to complement their university degree.
 - In the future, electronic marketplace(s) that provide private sector companies with another mechanism to market their products could enable sponsored projects to support additional learning opportunities to address industry challenges.

3. What lessons did you learn (if any)?

Building capacity is hard and takes persistence. A few key lessons learned as an outcome of this opportunity include:

- To reach the full potential of MiHIVE, outreach needs to be extended beyond teaching faculty to the leadership at academic institutions—such as the Dean of Research and the Provost/Chancellor office— to more fully understand the higher education value propositions for financial impacts, educational resource requirements, and research resources.
- Setting metrics to enable the MiHIVE to evaluate its educational offerings could have been introduced at the very beginning of this effort.



- The sustainability subcommittee that is now meeting could have been initiated earlier after the first workshop or earlier in the collaborative's formation.
- The mechanism for private sector companies to provide contributions and subject matter expertise to the eLaboratory needs to be consistent and not to be a company-by-company process.
- Public sector engagement was accomplished with representation of the Michigan State HIT Commission on the MiHIVE Steering Committee and presentation to the HIT Commission. A regular touch point with the public sector was not (yet) formalized for a variety of reasons.

4. Beyond direct funding support, do you need any additional technical assistance from the Health Fund? If so, what can we help with?

While not technical in nature, MiHIVE would appreciate assistance in these areas as it continues to grow its community and expand to additional college/university programs:

- *Sustainability Planning.* MiHIVE would appreciate introductions to relevant contacts at MEDC and Michigan foundations that may offer funding opportunities.
- *State of Michigan engagement.* MiHIVE would appreciate guidance in ensuring MiHIVE aligns with relevant State of Michigan priorities. In November 2023, MiHIVE was presented to the State HIT Commission and engagement with several commission members is on-going (e.g., Commission members participated in MiHIVE Steering Committee, workshop activities and offered input on MiHIVE's developed curriculum materials).

5. Are there any funds remaining from your awarded grant amount? If so, please list the amount and provide a detailed plan for using the funds and when you anticipate the funds will be exhausted. Please upload your final budget detailing how the grant funds were spent.

MiHIVE utilized all its awarded grant amount. Please refer to the attached budget to review how the grant funds were spent.

6. Describe your progress toward the short- and long-term outcomes identified in your proposal and for the 2023 Capacity Building program.

Short-Term Outcome: Aligned community vision or strategy to address health disparities, social determinants of health, or the 8 focus areas (technology enhancements).

Short-term outcome progress:

- There is an aligned MiHIVE vision and strategy to address the technology enhancements focus area and a health informatics workforce, both of which will indirectly address health disparities

and social determinants of health via eLab classroom exercise use cases and hands-on data access.

- A MiHIVE Steering Committee has been established and has been providing collective decision making as of October 2023.
- A MiHIVE Student Consultant Instructional Resource Working Group (IRWG) is in place and will recruit student members as advisors for MiHIVE moving forward.
- The MiHIVE home office successfully facilitated three workshops with a cumulative attendance of 68 individuals, spanning faculty from 13 academic institutions, students from 5 universities, and professionals from 27 companies/organizations, including MDHHS, Michigan HIT Commission, Michigan HIMSS, and MiHIN.
- The Cybersecurity IRWG has convened relevant stakeholders from organizations and government entities to develop a collective vision for better integration of risk management skills into university programs.

Long-Term Outcome: Sustainable collaborative

- MiHIVE has begun developing a membership structure for academic institutions and industry, which includes a fee structure and/or in-kind contributions for sustainability.
- MiHIVE debuts its first batch of Core Curriculum Module resources for use in university classes in Fall 2024.
- MiHIVE's steering committee meets monthly to review MiHIVE's progress and determine steps forward.
- Several Instructional Resource Working Groups meet bi-weekly and continue to develop more Core Curriculum Modules. Additional Working Groups are anticipated to be chartered by the MiHIVE Steering Committee.
- MiHIVE is beginning an evaluation study to define metrics for MiHIVE resources and determine a process of evaluation the use of the Core Curriculum Modules.