



Modernizing lead exposure tracking and response for Minnesota families



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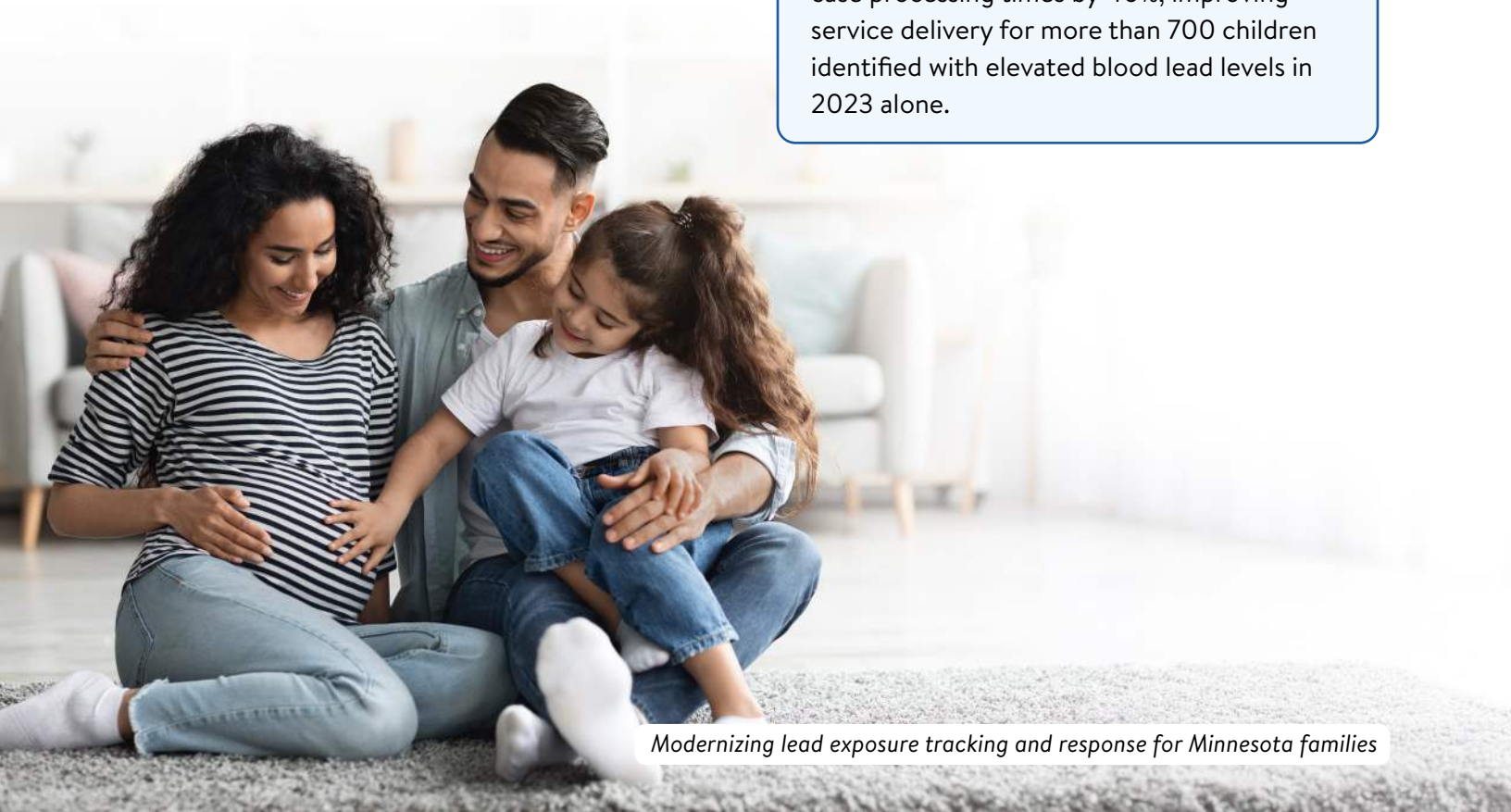
Executive summary

For decades, the State of Minnesota has tracked and addressed the public health threat of lead exposure, with particular attention to children under six and pregnant individuals—two groups vulnerable to the long-term neurological, behavioral, and developmental effects of lead toxicity. Minnesota’s Blood Lead Information System (BLIS), developed in the 1990s, was a foundational tool for identifying cases, guiding interventions, and shaping prevention policy.

However, in recent years, public health guidelines have changed, increasing both the volume and complexity of blood lead testing data. In 2022, Minnesota adopted universal screening guidelines for all children at ages one and two, and in 2021, the CDC lowered the threshold for identifying elevated blood lead levels (EBLLs) from 5 to 3.5 mcg/dL. The outdated BLIS system was not capable of keeping up with these increased demands, risking delays in critical follow-up for vulnerable populations.

Recognizing the need for modernization, the Minnesota Department of Health (MDH) partnered with Minnesota IT Services (MNIT), to successfully migrate over 2 million BLIS records to the Minnesota Electronic Disease Surveillance System (MEDSS). MEDSS is a CDC-aligned, secure, cloud-based platform already used by Minnesota health professionals to manage, process, and analyze disease-related data. MEDSS now serves as a centralized platform for blood lead surveillance, offering faster processing, better data accuracy, and streamlined communication with local health agencies.

Why it matters: This transformation means children with elevated blood lead levels are now identified and served up to two days faster, local health agencies can act immediately, and vulnerable families receive critical environmental investigations and follow-up care without delay—ensuring fewer children are harmed and more homes are made safe. As a result, Minnesota reduced case processing times by 40%, improving service delivery for more than 700 children identified with elevated blood lead levels in 2023 alone.



Idea

Lead exposure remains one of the most preventable yet serious environmental health risks in Minnesota. Despite the 1978 ban on lead-based paint, nearly one million homes in the state still contain lead hazards. While anyone can be affected by lead, pregnant people and young children are most at risk.

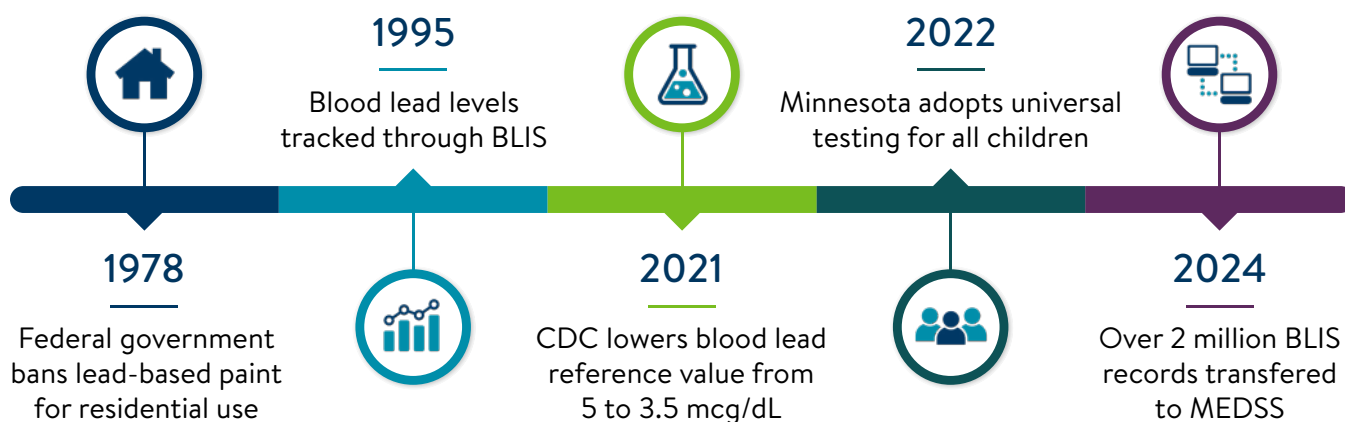
During pregnancy, the body can release stored lead from bone due to dietary changes, and lead can pass through the placenta to the developing fetus. Children under six are especially vulnerable due to their rapid development, hand-to-mouth behaviors, and frequent contact with dust and floors where lead particles often settle.

The health effects of lead exposure can be profound and long-lasting—interfering with brain development, behavior, and learning—but symptoms are often invisible until a child enters school and begins to struggle. Although the number of children with EBLLs has declined over the years, disparities persist. Children in older housing, low-income families, and immigrant or refugee communities continue to be disproportionately impacted due to housing inequities, prior exposures, or limited awareness of U.S. lead regulations.

This project directly supports Minnesota’s public health equity goals by prioritizing those most affected and removing long-standing barriers to timely intervention. By improving surveillance for populations historically underserved by government systems, the state is making measurable progress toward narrowing health disparities.

MDH, through its Lead and Healthy Homes Program (LHHP), is responsible for tracking and responding to blood lead levels in adults and children. Since 1995, this has been managed through BLIS, which collects lab results mandated by state law. The data support case management, identify high-risk groups, guide environmental interventions, and inform prevention programs and statewide standards of care.

Over time, BLIS has helped MDH establish and maintain guidelines for testing and follow-up, but the system was designed for a smaller and less complex data environment. In 2021, the CDC lowered the blood lead reference value from 5 to 3.5 micrograms per deciliter (mcg/dL), and in 2022, Minnesota adopted universal testing for all children at ages one and two. In 2023 alone, roughly 84,628 children were tested, with 1% resulting in elevated blood lead levels that required further action. The increased testing and refined guidelines created an influx of records that overwhelmed the outdated BLIS infrastructure.



The limitations of the legacy system—daily batch uploads, limited user access, manual case management, and dependence on a single IT staff member—posed risks to timely intervention and public health outcomes. To address this, MDH and MNIT launched a project to modernize the state’s lead surveillance system.

Rather than building a new platform from the ground up, the team expanded the capabilities of MEDSS. MEDSS is a secure, cloud-based platform already used for infectious disease tracking. The system’s person-centric design made it an ideal foundation for modernizing lead case management. The team migrated more than 2 million records using a dual strategy: direct conversion for records being actively tracked and the Rhapsody Integration Engine for historical data and live feeds of incoming data. They also added geocoding tools from MnGeo to standardize addresses, automated duplicate detection, and created new connections like a first-time data pathway between blood lead surveillance and the Refugee Health Program, enabling better support for newly arrived families.

This strategic reuse of a statewide enterprise system reflects a cost-effective, agile approach to modernization that reduces technical debt and promotes long-term sustainability. This effort demonstrates how a human-centered and data-driven approach can produce operational efficiency and social impact.

This technical upgrade project also demonstrates how states can modernize public health systems in a scalable, citizen-centered way. Because federal law requires lead surveillance for all Medicaid-eligible children, states must respond swiftly and effectively as guidelines evolve. Minnesota’s approach delivers a repeatable, adaptable model that helps other jurisdictions meet federal mandates while advancing health equity and managing limited resources.

By reusing an existing enterprise platform, Minnesota avoided costly system duplication and set a replicable standard for other states managing federally mandated lead surveillance reforms.

Implementation

To modernize Minnesota’s blood lead surveillance system, the project team executed a complex, high-stakes data build out and migration, successfully transferring over 30 years of records and more than 2 million test results into MEDSS, a secure, cloud-based Software as a Service (SaaS) platform. This strategic move preserved historical continuity while unlocking real-time data access, faster case management, and long-term scalability. By building on an existing enterprise platform, the team accelerated implementation, reduced risk, and delivered immediate value to public health users across the state.

Blood Lead Information System (BLIS)

In the decades since its launch, BLIS has reliably tracked and addressed the risks of lead exposure. However, daily batch processing required more time and slowed down the actions MDH staff, public health officials, and residents could take to address lead exposure. The system, supported by a single retiring IT staff member, could not respond agilely to the increased processing needed for lead tests.

Project team

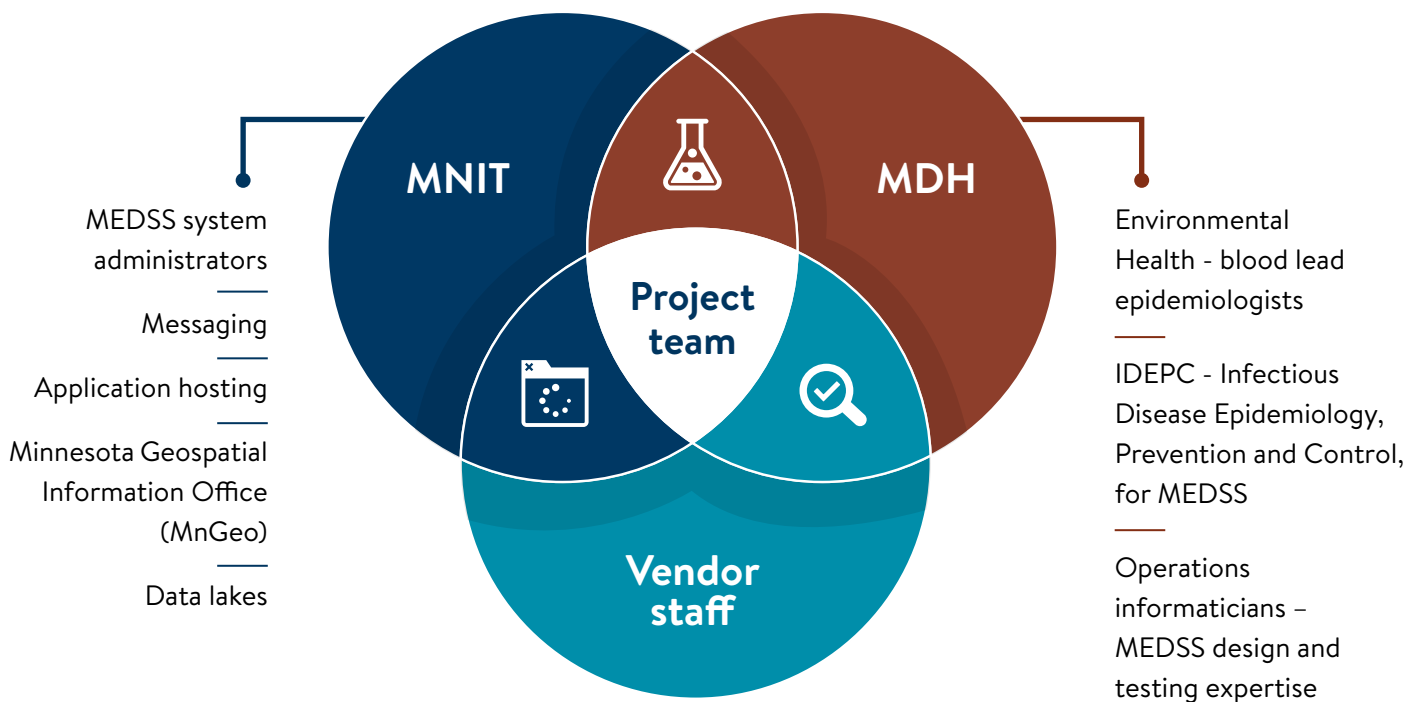
To start this effort, MDH assembled a collaborative project team of staff from MNIT, MDH and contractors with a third-party vendor, Conduent. Project sponsors and members invested a lot of time and effort to make this project a success. The project team tracked timelines and development/testing cycles to ensure efficient and clear hand-off and feedback.

The project required technical expertise and cross-agency collaboration and stakeholder trust. MDH blood lead brought needs and issues to MNIT, MDH informaticians and the vendor. MNIT worked with MDH and the vendor to implement those plans and respond to testing feedback. MDH Informatics worked with MDH LHHP to educate them about how MEDSS works and point out opportunities to optimize MEDSS for maximum efficiency and ease of use.

The team adopted a hybrid implementation model to manage complexity and minimize service disruption. They migrated active cases directly through traditional data migration the weekend of go live, while transforming and importing legacy records using the Rhapsody Integration Engine over the following months.

To enhance data quality and spatial accuracy without building a custom mapping tool, the team partnered with the MnGeo office within MNIT, showcasing the power of shared enterprise services. This partnership combined census bureau information with GIS tools and geocoding to standardize address data, improving targeted environmental interventions.

Weekly meetings and collaborative testing cycles established a continuous feedback loop, allowing users to shape system enhancements in real-time. This agile, user-centered approach helped the team respond quickly to evolving needs and uncover workflow improvements early. The team's cross-functional collaboration and strong public sector delivery framework built a solid project culture to weather some turnover. The shared mission and clear governance structure enabled new team members to onboard quickly and contribute immediately to the project.



Key technical achievements

- **Custom MEDSS enhancements:** Adapted MEDSS to track blood lead at both the person and site level—an essential requirement for identifying environmental risks tied to locations (e.g., homes or daycare centers).
- **Geospatial data integration:** Used MnGeo geocoding tools to standardize addresses, enabling targeted interventions in high-risk communities.

- **Interoperability:** Enabled data exchange with the Refugee Health Program, providing holistic insights for immigrant and refugee children newly arriving in Minnesota.
- **Training & support:** Delivered end-user support and training across MDH and local public health users, ensuring a seamless transition.

Thanks to the collaborative approach, the transition was frictionless: BLIS was turned off on the same day MEDSS went live for lead surveillance without service interruption.

Impact

The modernization of the blood lead tracking system has transformed how public health professionals identify, manage, and respond to lead exposure across the state. By sunseting BLIS and centralizing surveillance under MEDSS, Minnesota eliminated redundant infrastructure, improved user experience, and created a model for future disease surveillance modernization.

Faster public health response

The most immediate impact: faster case processing. In public health, speed saves futures. A delay of even a few days can mean prolonged exposure to a lead-contaminated environment. Now, cases are flagged and routed in near real-time to local health departments for follow-up, site inspections, and family outreach.

Better data, smarter interventions

- **Timeliness:** In 2023, 95% of blood lead test results were received electronically, vastly improving data completeness and timeliness.
- **Follow-up testing:** Among the 805 children with elevated blood lead levels found through capillary screening, 74% received a follow-up venous test within 90 days—a major improvement that reflects both system efficiency and proactive case management.
- **Environmental risk assessments:** 500 newly identified children with confirmed EBLLs had environmental investigations initiated, allowing homes to be remediated and future exposures prevented.



Since moving to the MEDSS database, data processing times have decreased by about two working days. That means children with elevated blood lead levels receive services faster.

– Stephanie Yendell, MDH Epidemiologist

Equity and access

Prior to this modernization effort, local public health agencies did not have direct access to BLIS. MDH staff needed to share reports with local public health officials, stretching out processing timelines. By integrating lead surveillance into MEDSS, local public health agencies now have direct access to case information, removing previous bottlenecks that required MDH intermediaries. This empowers local teams to act swiftly and locally.

MEDSS also includes important demographic fields like preferred language, pregnancy status, and occupation, making the data more responsive to Minnesota’s diverse population. This helps tailor communication and services for residents, particularly for refugee, immigrant, and low-income families.

Real results

- **Decreasing EBLLs:** In 2023, only 575 children had blood lead levels of ≥ 5 mcg/dL—a continued decline from prior years, despite increased screening.
- **Nimble responses for vulnerable families:** Case processing times have been reduced by 40%, which means that local health agencies can act up to two days faster to connect families with critical environmental investigations and to provide follow-up care.
- **New data partnerships:** A new data-sharing pathway with the Refugee Health Program helps track and respond to exposures among new Minnesotans, many of whom arrive from countries with less stringent environmental standards.
- **System improvements:** MEDSS undergoes regular biweekly updates guided by user feedback, to ensure continuous evolution and responsiveness.

Before and after snapshot

Aspect	BLIS	MEDSS
Performance	Slow for end users, difficult to update	Faster with continuous updates, twice-monthly release and testing cycle
Accessibility and collaboration	Only available for MDH users, causing communication issues	Statewide LPH users and risk assessors can access cases, full life-cycle view for MDH staff
Site inspection functionality	No support for tracking and storage of site inspection data	Supports person-centric and site-centric tasks through linked records
Timeliness	Outdated data import, clunky workarounds for manual processing	Direct data import, no extra delays, automated workflows for priority cases
Customizability	Limited, static variables, long process to add new fields	Easy to request and deploy new data fields within weeks
Patient duplication	No automated deduplication, handled via SAS query	Built-in standardized deduplication code for people and sites
Support	Supported by a single IT staff	Faster, reliable, dedicated IT and informatics team, vendor support from Conduent