



Lead Registry Annual Surveillance 2024 Report

Maryland Department of the Environment

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Maryland General Assembly

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Maryland Lead Registry Annual Surveillance Report Calendar Year 2024

Executive Summary

Lead poisoning remains a critical, yet preventable, public health issue in Maryland, particularly for children under six, with the primary risk coming from deteriorating lead-based paint and contaminated dust in older housing. The Maryland Department of the Environment (MDE) Lead Poisoning Prevention Program aims to eliminate childhood lead poisoning through surveillance, environmental investigation, and regulatory enforcement. The MDE Lead Registry maintains a centralized repository for child and adult blood lead test results in the state, coordinates medical and environmental case management between local health departments and healthcare providers, and facilitates proactive lead poisoning prevention efforts. The Program strives to shift the focus from reactive treatment to proactive primary prevention by enforcing registration and lead-safe standards for rental properties built before 1978.

The 2024 surveillance data is based on an analysis of 111,925 blood lead test results. A major concern is the 14% decrease in the overall testing rate compared to 2023, which may mask the true extent of exposure. This decrease could be attributed to parental apprehension, loss of follow-up, health literacy, or testing not being performed during the visit. The Maryland Department of Health (MDH) is actively working on testing strategies and increasing point of care testing in health clinics. Data integrity for the report is maintained by using the Centers for Disease Control and Prevention (CDC)-supported Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) for secure, HL7-standardized electronic record imports, focusing on elevated venous blood lead results aligning with the current CDC reference value for public action (≥ 3.5 $\mu\text{g}/\text{dL}$).

Key statistical findings for 2024 include:

- Testing Volume: 111,925 total tests received for lead and other heavy metals.
- Demographics: Children aged one and two years represented the largest tested cohorts, accounting for 27.4% and 28.1% of tested children, respectively.
- Lead Sources: Environmental investigations identified lead paint as the leading source of exposure, followed by spices and contaminated dust.
- Geographic Trends: Baltimore City, Baltimore County, and Prince George's County reported the highest numbers of completed environmental investigations and confirmed lead paint hazards.
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To address the decline in testing rates and the persistence of environmental hazards, the program is prioritizing the following actions:

1. **Reinvigorating Testing Initiatives:** We must address "parental apprehension" and "loss to follow-up" by strengthening partnerships with pediatric providers to ensure every child is tested at ages 12 and 24 months.
2. **Targeting Non-Traditional Sources:** While paint remains the primary hazard, the high prevalence of lead in spices—particularly in Baltimore and Montgomery Counties—requires targeted consumer education and potentially stricter oversight of imported goods.
3. **Enhancing Data Quality:** We will continue to move away from manual data entry toward HL7-standardized electronic reporting to improve the accuracy and accessibility of patient profiles for case management.

The Lead Program's Rental Registration efforts are vital for operational sustainability, ensuring compliance of owners of "Affected Properties" (pre-1978 rental units) through annual registration and inspection. In 2024, Baltimore City alone accounted for 21,594 renewed units, with registration fees generating essential revenue for surveillance and abatement. A noted operational burden is the number of "no contact" or "refused" investigations in Baltimore and Prince George's Counties, which represents a missed opportunity for early hazard mitigation.

Equity is central to the Program's mission, as data confirms lead exposure is concentrated in areas with older housing and high-density rentals, specifically Baltimore City and Baltimore County. Lead source distributions underscore the need for culturally competent outreach. Providing registry data to stakeholders like Medicaid and local health departments empowers them to direct resources to the most impacted communities.

The Lead Poisoning Prevention Program remains committed to a lead-free Maryland. While thousands of hazards were identified in 2024, the drop in testing rates is a critical call to action.

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Lead Health Surveillance

The Maryland Department of the Environment (MDE) Lead Health Surveillance (LHS) Division tracks, reports, and disseminates blood lead results statewide. The Lead Registry receives reports of all blood lead testing performed in Maryland on children to adults. The MDE lead registry provides blood lead (Pb) results to the Maryland Department of Health (MDH), Medicaid, Immunet, local health departments, and, upon request to third parties for research and planning. This current report represents lead test results for the calendar year (CY) 2024; all data in this report are based on elevated venous blood lead results (≥ 3.5 $\mu\text{g}/\text{dL}$).

In 2024, the MDE Lead Health Surveillance processed a total of 111,925 blood lead test results. While this volume represents a robust screening effort, the data indicate a 14% decrease in the testing rate compared to the previous year. This decrease could be attributed to parental apprehension, loss of follow-up, health literacy, or testing not being performed during the visit. The Maryland Department of Health (MDH) is actively working on testing strategies and increasing point of care testing in health clinics. Among the children tested, those aged one and two years were the largest demographic, collectively accounting for over 55% of the total pediatric testing volume. Despite the decrease in overall testing, the program continues to maintain a 100% venous blood specimen verification rate for analyzed cases to ensure clinical precision in our statewide reporting.

Lead Health Surveillance Methodology

MDE Lead Health Surveillance (LHS) receives blood lead results from laboratories, clinics, and providers statewide and outside of Maryland. Blood lead results are required to report the following information: <https://dsd.maryland.gov/regulations/Pages/26.02.01.02.aspx>.

All blood lead results received are verified and reviewed for any missing information. If blood lead results are received with missing information, the reporting laboratory/clinic, provider, and/or parent is contacted to provide the correct information. The lead registry does not sample data received; all results from the twenty-four jurisdictions are analyzed and reported. The lead registry does not receive or process any reports on lead screening based on the lead risk assessment questionnaire.

HHL PSS is a web-based data management platform developed and supported by CDC, used by state and local childhood lead poisoning prevention programs to provide a centralized surveillance repository (CDC, 2024). MDE LHS uses HHL PSS as a repository for individual-level data, which includes data on blood lead values ($\mu\text{g}/\text{dL}$), test method (capillary/venous), age at test in months, sex, date of birth, date of blood draw, and address of the child at the time of test.

“HL7 standardized formatting of files enables the secure exchange of confidential health data between laboratories, healthcare providers, and the Maryland Department of the

Environment (MDE). These HL7 files are electronically imported into the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), where the data is accessed and reviewed by case management. By utilizing this electronic import process, we can efficiently enter records for hundreds of patients into HHLPSS simultaneously. This transition away from manual data entry significantly reduces administrative time and improves the accuracy and accessibility of patient profiles.”

Table 1 shows statewide testing rates from 2019 to 2024. The testing rate for 2024 has decreased by 14%. The year 2020 includes children aged 0-18 years old*. The following years include children 0-17 years old.

Table 1: Testing Rates 2020-2024

	Maryland Testing Rates		
	Total Population of Children Ages 0-17 Years Old	Total Number of Tests	Testing Rate
2024	1,371,237	111,925	81.6
2023	1,361,916	130,305	95.6
2022	1,346,589	126,903	94.2
2021	1,375,607	120,729	87.8
2020*	1,466,661	120,936	82.5

Statistical Report

The annual report presents elevated venous blood lead results $\geq 3.5 \mu\text{g/dL}$ for the CY 2024. MDE LHS received 111,925 blood lead test results during calendar year 2024; of those, 70,976 were elevated blood lead tests $\geq 3.5 \mu\text{g/dL}$. Table 2 provides a summary of statewide blood lead testing in CY 2024.

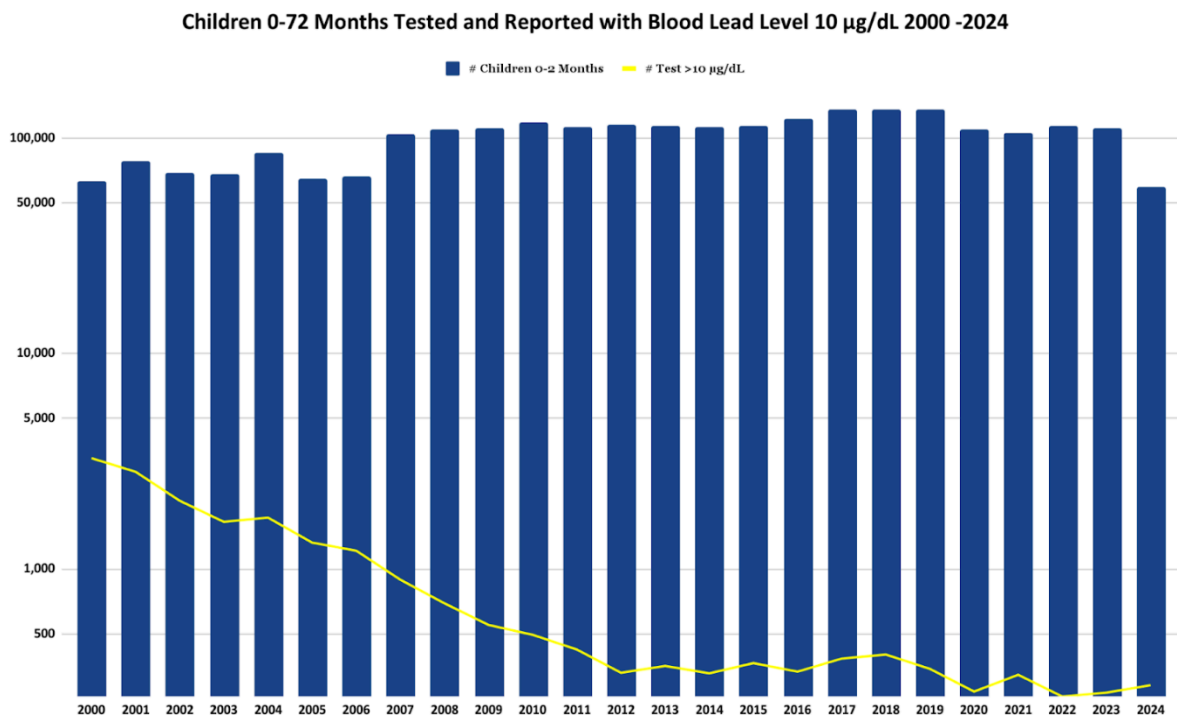
Table 2: Demographic Summary

Calendar Year 2024 Statistical Report

Item	Number	Percent
All Children (0-17 Years)		
Number of Tests	70,976	
Number of Children	66,926	
Children 0-72 Months		
Number of Tests	62,859	
Number of Children	59,138	
Age		
Under One	4,492	6.7
One Year	18,335	27.4
Two years	18,791	28.1
Three Years	6,170	9.2
Four Years	6,301	9.4
Five Years	4,725	7.1
Six Years	324	0.5
Sex		
Female	28,789	48.7
Male	30,309	51.3
Undetermined	40	0.0
Blood Lead Level (µg/dL)		
<3.4	56,787	96.0
3.5-4.9	1,116	1.9
5-9	946	1.6
10-14	186	0.3
15-19	49	0.1
≥20	54	0.1
Mean BLL (Geometric)	1.18	±0.002
Blood Specimen		
Capillary	----	
Venous	59,138	100
Undetermined	----	

Point-of-care testing/screenings and venous blood draw are preventive measures to check for potential lead exposure. Maryland encourages universal lead testing for all children under the age of six, with testing required at 12 and 24 months (Maryland, 2025). Figure One shows the number of children 0-72 months old tested from CY 2000 - 2024. The bar lines for CY 2024 reflect venous blood draws only; capillary and unknown test results are not included. The number of tests $\geq 10 \mu\text{g/dL}$ shows a slight increase from CY 2023 (n=267) to CY 2024 (n=289).¹

Figure 1: Number of Children 0-72 Months Tested and Reported with a Blood Lead Level $\geq 10 \mu\text{g/dL}$ CY 2000-2024.



There is a slight increase (0.65%) from 2023 (0.95%) to 2024 (1.60%) in the percentage of children with a blood lead level of 5-9 $\mu\text{g/dL}$.

¹ Maryland Department of Health, Office of Environmental Health and Food Protection. (2025). *Lead poisoning prevention and testing*. <https://health.maryland.gov/phpa/OEHFP/EH/pages/leadtesting.aspx>

Figure 2: Percent of Children 0-72 Months Tested and Reported with a Blood Lead Level 5-9 µg/dL CY 2000-2024.

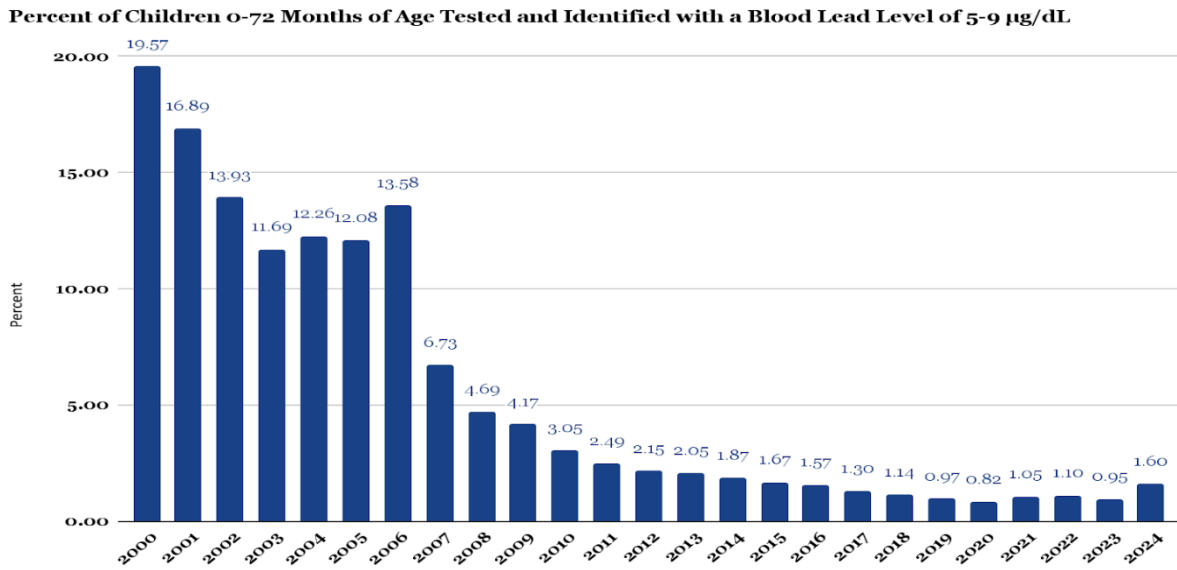
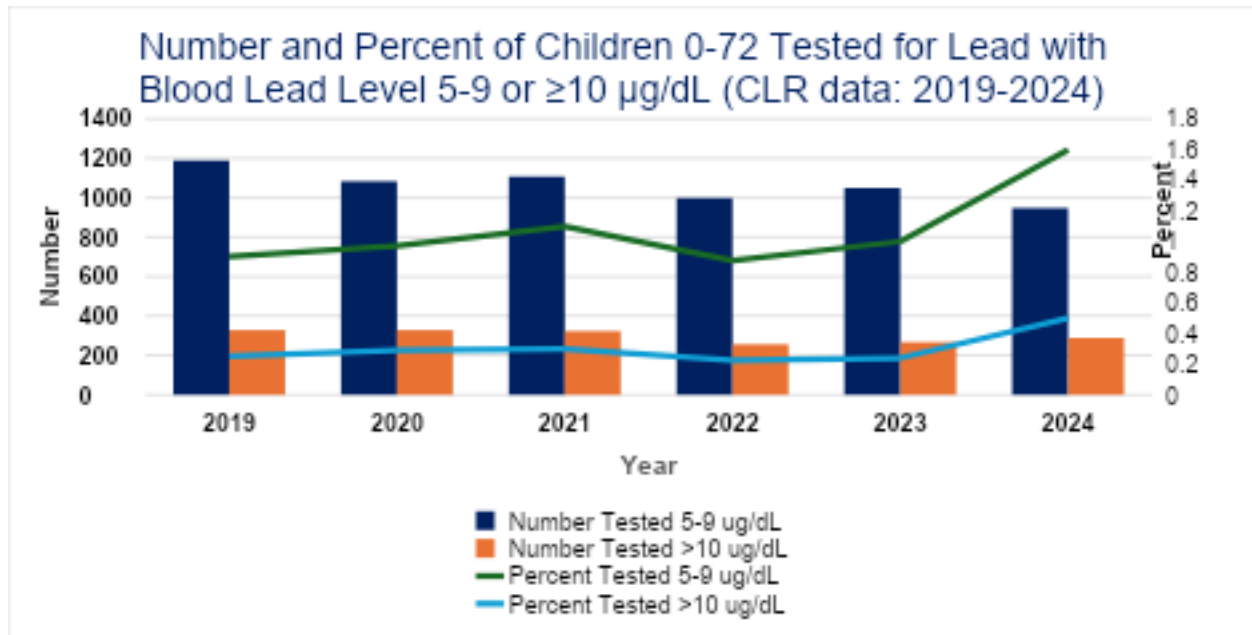


Figure three shows the side-by-side comparison of blood lead testing levels 5-9 µg/dL and ≥10 µg/dL for CY's 2019–2024.

Figure 3: Number and Percent of Children 0-72 Months Tested for Lead (Pb) Levels 5-9 or ≥ 10 $\mu\text{g}/\text{dL}$, CY 2019-2024.



Statewide lead testing is critical to the prevention of lead exposure hazards. The incidence rate measures the number of new lead poisoning cases over a period of time, Jan 1, 2024 to December 31, 2024, providing evidence of children at risk. The prevalence rate shows the proportion of children with lead poisoning present in the population. Table three shows the cumulative incidence at the new blood lead reference value of ≥ 3.5 $\mu\text{g}/\text{dL}$. The rates are not age-adjusted. The highest venous blood lead test for each child was selected. The population estimates for the children were provided by the Maryland Data Center, Maryland Department of Planning (MSDC, 2025).²

² Maryland Department of Planning, State Data Center. (2025). *Intercensal population estimates and annual growth rates*. https://planning.maryland.gov/MSDC/Pages/pop_estimate/InterCensalPopEst-AGR.aspx

Table 3: Blood Lead Testing of Children 0-11 Months Old by Jurisdiction, CY 2024

2024 Blood Lead Testing of Children 0-72 months by jurisdiction															
County	Population of Children	Number	Rate	Blood Lead Level ≥ 3.5 $\mu\text{g}/\text{dL}$				Blood Lead Level 5-9 $\mu\text{g}/\text{dL}$				Blood Lead Level ≥ 10 $\mu\text{g}/\text{dL}$			
				Incidence		Prevalence		Incidence		Prevalence		Incidence		Prevalence	
				Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Allegany	4,321	226	5.2	52	1.2	28	0.6	23	0.5	11	0.3	6	0.1	3	0.1
Anne Arundel	49,285	3,413	6.9	79	0.2	24	0.0	28	0.1	9	0.0	8	0.0	4	0.0
Baltimore	67,350	9,401	14.0	238	0.4	92	0.1	87	0.1	41	0.1	31	0.0	17	0.0
Baltimore City	46,996	9,075	19.3	1100	2.3	360	0.8	477	1.0	178	0.4	156	0.3	70	0.1
Calvert	7,295	995	13.6	8	0.1	3	0.0	3	0.0	2	0.0	0	0.0	0	0.0
Caroline	3,215	406	12.6	26	0.8	13	0.4	16	0.5	6	0.2	2	0.1	1	0.0
Carroll	13,705	580	4.2	40	0.3	11	0.1	21	0.2	6	0.0	4	0.0	2	0.0
Cecil	8,361	474	5.7	17	0.2	10	0.1	7	0.1	7	0.1	4	0.0	1	0.0
Charles	13,806	1,751	12.7	17	0.1	6	0.0	6	0.0	2	0.0	2	0.0	1	0.0
Dorchester	2,564	293	11.4	15	0.6	6	0.2	5	0.2	4	0.2	0	0.0	0	0.0
Frederick	24,787	1,239	5.0	47	0.2	18	0.1	17	0.1	7	0.0	7	0.0	6	0.0
Garrett	1,735	136	7.8	6	0.3	0	0.0	2	0.1	0	0.0	0	0.0	0	0.0
Harford	20,177	1,364	6.8	27	0.1	10	0.0	14	0.1	5	0.0	0	0.0	0	0.0
Howard	25,497	1,991	7.8	62	0.2	21	0.1	34	0.1	6	0.0	5	0.0	2	0.0
Kent	1,063	142	13.4	7	0.7	2	0.2	0	0.0	0	0.0	3	0.3	2	0.2
Montgomery	86,426	8,911	10.3	175	0.2	67	0.1	58	0.1	25	0.0	19	0.0	11	0.0
Prince George's	79,969	13,592	17.0	276	0.3	67	0.1	108	0.1	29	0.0	22	0.0	12	0.0
Queen Anne's	4,034	217	5.4	2	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0
Saint Mary's	10,046	1,494	14.9	4	0.0	2	0.0	1	0.0	1	0.0	0	0.0	0	0.0
Somerset	1,668	321	19.2	13	0.8	2	0.1	4	0.2	1	0.1	3	0.2	1	0.1
Talbot	2,657	177	6.7	12	0.5	6	0.2	5	0.2	1	0.0	2	0.1	2	0.1
Washington	12,066	1,112	9.2	47	0.4	21	0.2	15	0.1	9	0.1	8	0.1	6	0.0
Wicomico	9,371	1,535	16.4	71	0.8	21	0.2	10	0.1	7	0.1	6	0.1	4	0.0
Worcester	3,115	293	9.4	10	0.3	3	0.1	4	0.1	0	0.0	1	0.0	2	0.1
Statewide	499,509	59,138	11.8	2351	0.5	794	0.2	946	0.2	358	0.1	289	0.1	147	0.0

Adult Lead and Heavy Metals

Lead and heavy metal exposure in adults primarily occurs through occupational hazards, such as dermal contact, inhalation of dust, fumes, vapors, or ingestion of contaminated food or water. Exposure to lead can affect multiple body systems. Health risks often lead to chronic illnesses, neurological damage, organ damage, cardiovascular disease, and impacts on fertility and reproductive health (EPA, 2025). MDE LHS notifies all adults with an elevated level of Lead (Pb), Arsenic (As), Cadmium (Cd), Chromium (Cr), and Mercury (Hg). ³

In 2024, there were a total of 9,788 lead tests for adults aged 18 and older. The population estimate of adults residing in Maryland for 2024, ages 18 to 85+ years old, was 4,891,983 (MSDC, 2025). The testing rate for adults in Maryland is 2.0 per 1,000 in the population.

Table 4: Adult Blood Lead Results CY 2024

Adult Blood Lead Results, CY 2024						
Month	Total # of Tests	Male	Female	Unknown	Average Blood Lead Level (µg/dL)	Highest Lead Level (µg/dL)
January	1299	687	610	2	2.15	9.20
February	1090	602	487	1	2.16	9.90
March	862	471	390	1	2.23	9.90
April	876	438	438	0	2.22	9.00
May	685	347	337	1	2.44	9.00
June	646	332	313	1	2.52	9.90
July	755	438	315	2	2.41	9.80
August	704	381	322	1	2.64	9.90
September	679	381	295	3	2.26	9.60
October	798	412	384	2	2.17	9.70
November	749	379	368	2	2.2	9.90
December	645	345	299	1	2.56	9.00
Total	9,788	5,213	4,558	17	2.33	9.57

³ Environmental Protection Agency. (2024). *CompTox chemicals dashboard* (Report No. 336581). https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NCCT&dirEntryId=336581

Medical Case Management

Case management is utilized to prioritize and coordinate essential services, including home visitation and follow-up, environmental investigations, and telephonic case management, for Maryland's most at-risk pediatric populations. The 2024 data tracked a total of 1,109 open cases for children with elevated blood lead levels (EBL) across Maryland's jurisdictions. Baltimore City bears the highest burden of active cases, with 347, followed closely by Prince George's County with 179 cases and Baltimore County with 131 cases. The majority of these open cases (610) involve blood lead levels in the 3.5–4.9 µg/dL range, while 116 children are at the most critical threshold of 10 µg/dL or higher.

Table 5: Case Management CY 2024

2024 Case Management LHD Data				
	3.5 - 4.9 µg/dl	5 - 9.9 µg/dl	10> µg/dl	Total
Allegany	10	12	1	23
Anne Arundel	28	19	6	53
Baltimore Co	67	46	18	131
Baltimore City	190	121	36	347
Calvert	3	1	1	5
Caroline	6	7	2	15
Carroll	12	11	3	26
Cecil	3	4	1	8
Charles	6	7	1	14
Dorchester	7	5	0	12
Frederick	19	12	4	35
Garrett	4	1	0	5
Harford	6	6	0	12
Howard	11	16	3	30
Kent	2	0	0	2
Montgomery	70	38	10	118
Prince George's	104	56	19	179
Queen Anne's	0	0	0	0
Somerset	3	2	1	6
St. Mary's	2	1	0	3
Talbot	4	1	2	7
Washington	19	9	5	33
Wicomico	33	6	2	41
Worcester	1	2	1	4

Lead Rental Registry

Rental Registration Summary

The Reduction of Lead Risk in Housing Act, set forth in Title 6, Subtitle 8 of the Environment Article, Annotated Code of Maryland (the Act), requires owners of rental dwelling units constructed before 1978 (defined in the Act as “Affected Properties”) to register their Affected Properties with the Maryland Department of the Environment (MDE), to renew those registrations annually, and to provide certain occupancy and inspection information.

MDE’s Lead Rental Registry unit administers this program, assists property owners with ACT requirements, and accepts payments for registrations and renewals. By keeping property owners compliant and informed the Rental Registry unit contributes to ensuring reduced lead risk to Maryland’s residents, particularly those most at risk.

Figure Four illustrates the volume of annual renewals across Maryland's 24 jurisdictions, highlighting that Baltimore City accounts for the vast majority of the state's 46,357 renewed rental units.

Figure 4: Rental Registry Renewed Properties

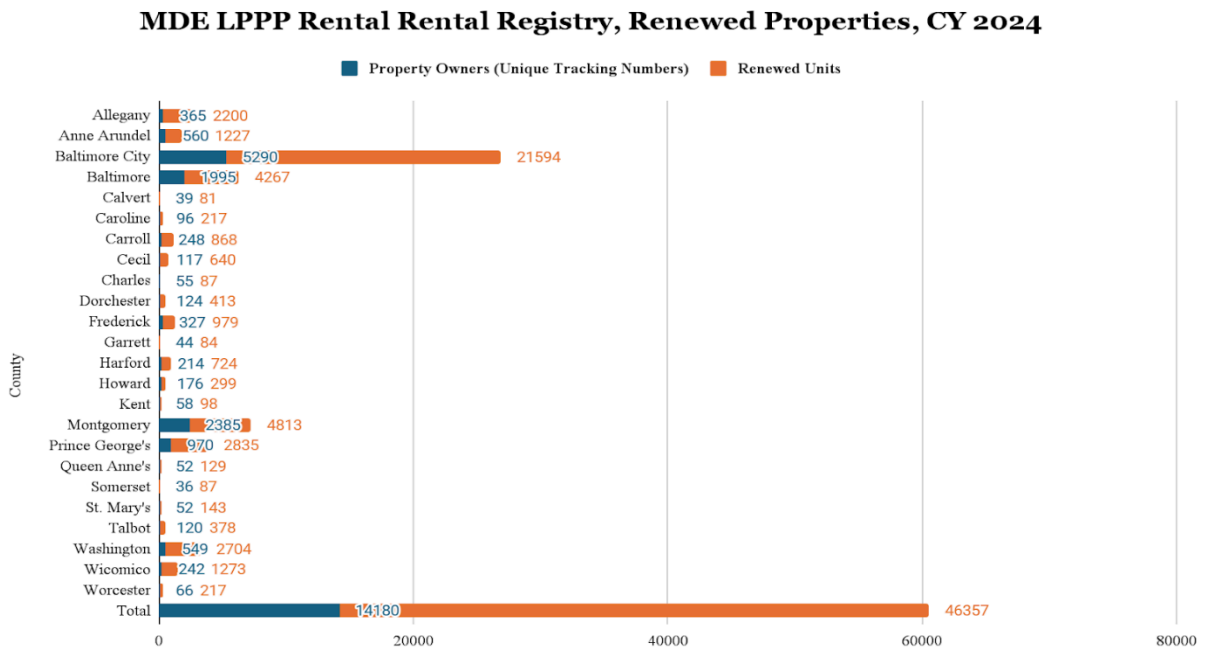
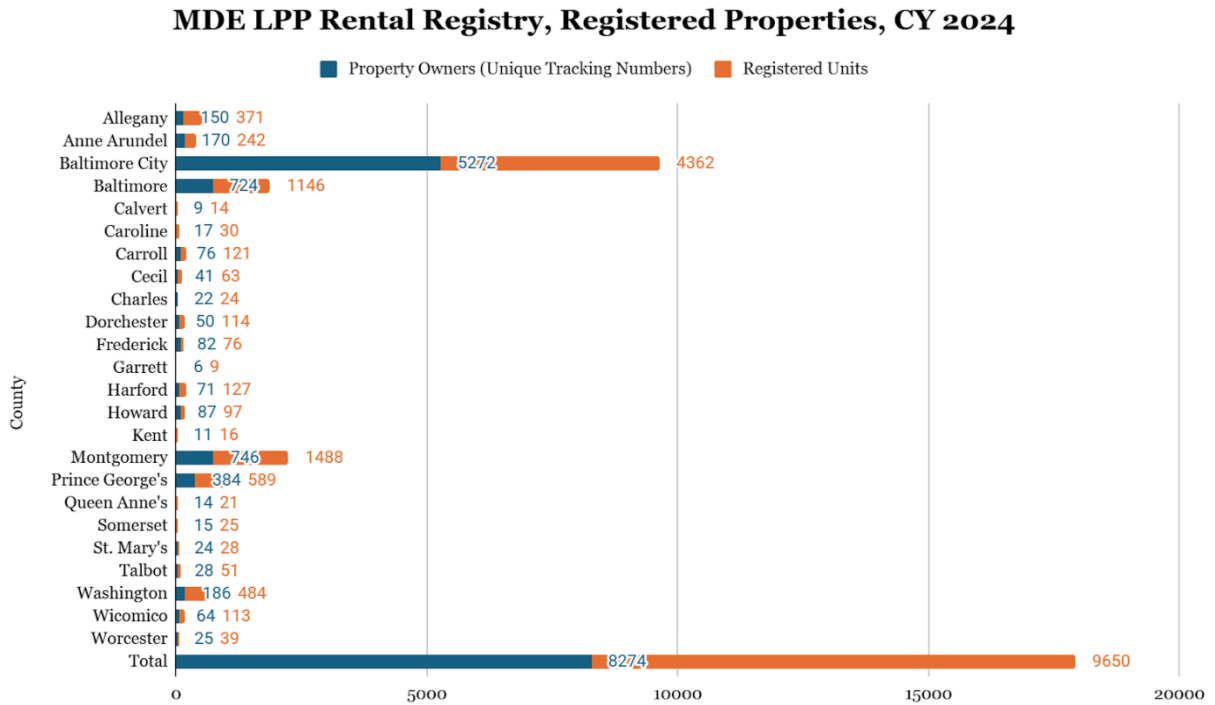


Figure Five shows new property registrations for the year. While over 8,200 unique owners registered properties, the program successfully brought 9,650 individual rental units into compliance with lead safety standards.

Figure 5: Rental Registry Registered Properties



Environmental Enforcement

Figure Six shows the number of environmental investigation outcomes by county for calendar year 2024. The graph shows the number of completed, incomplete, refused, no contact, and moved. In 2024, Baltimore (n=63), Montgomery (n=55), and Prince George’s (n=61) had the most completed investigations.

Figure 6: Environmental Investigation Outcomes by County

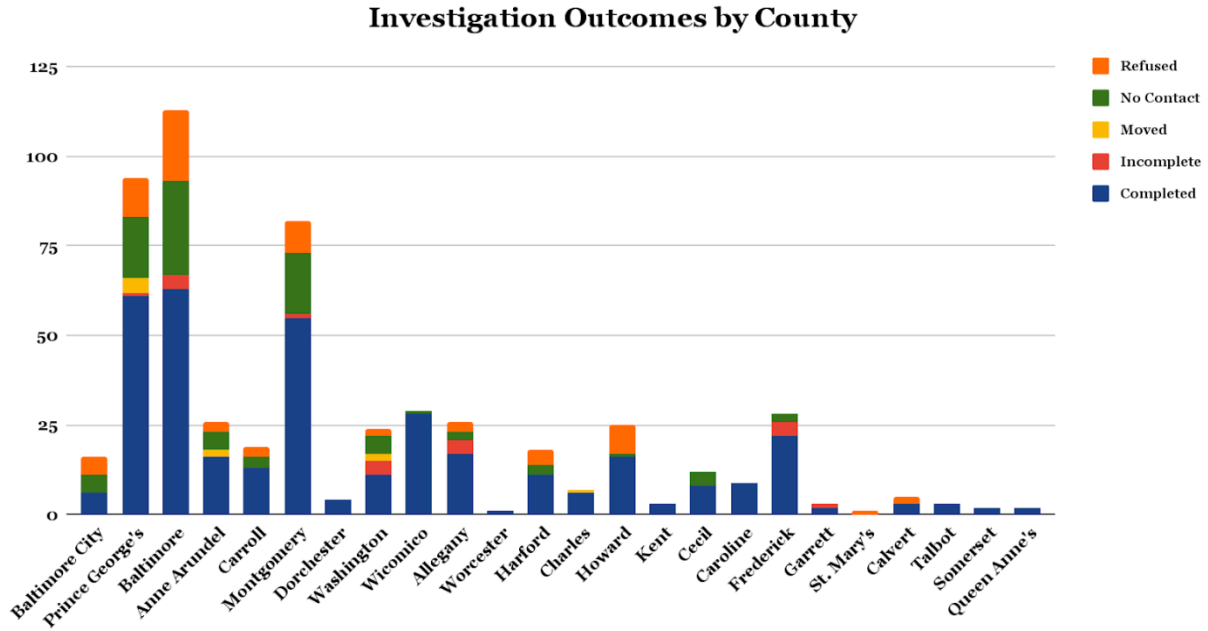


Figure Seven shows the distribution of lead sources by county for CY 2024. The sources are identified as paint, dust, soil, immigrants, travel, blinds, hobbies, occupation, spices, toys, cookware, ceramics, makeup, renovations, water, jewelry, medicine, sinkers, bullets, industry, and other sources. Environmental investigations may identify potential sources of lead in the home and outside the home. The leading source of lead in 2024 is paint. Baltimore (n=28), Prince George's (n=29), and Montgomery (n=18) had the highest distribution of paint as the source of lead. The next leading source of lead in 2024 is spices. Baltimore (n=31), Prince George's (n=18), Montgomery (n=17), and Frederick (n=14) Counties had the highest distribution of spices as the source of lead. The last leading source of lead in 2024 is dust. Baltimore (n=20), Allegany (n=12), Carroll (n=8), Wicomico (n=8), and Washington (n=8) Counties had the highest distribution of dust as the source of lead.

Figure 7: Distribution of Lead Sources

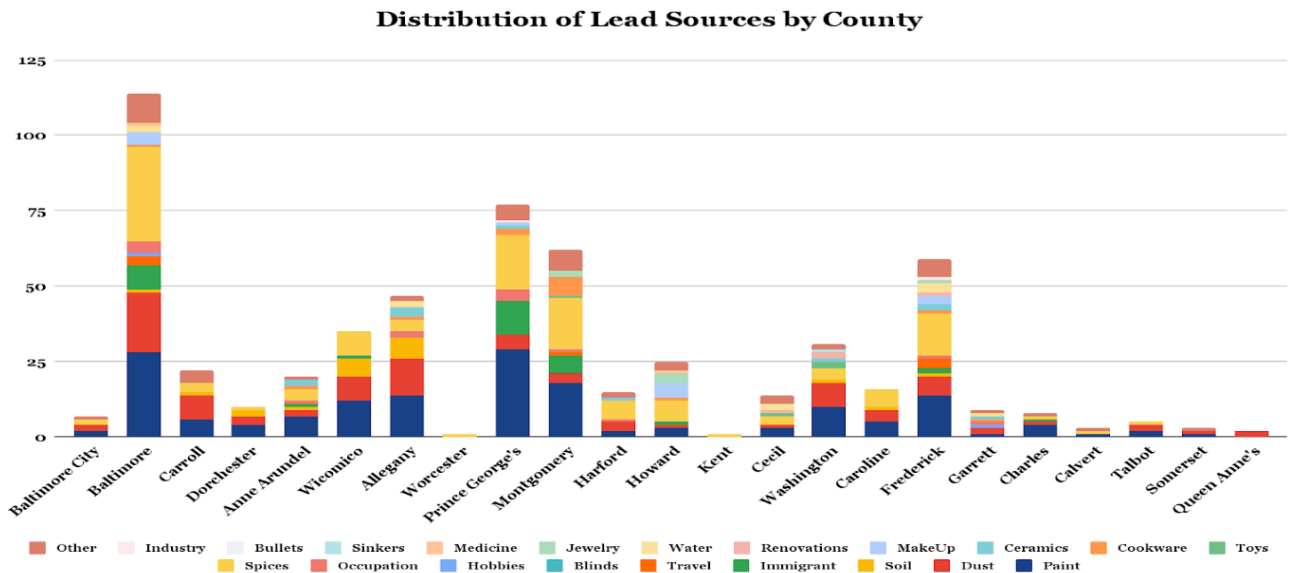


Figure Eight provides evidence for primary prevention strategies by demonstrating a direct correlation between older housing stock and lead risk, with pre-1950 homes containing the highest concentrations of both lead paint and dust hazards.

Figure 8: Lead Hazards by Housing Age

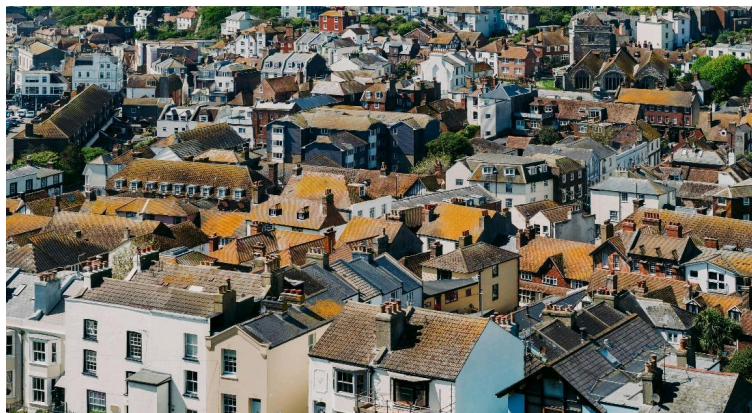
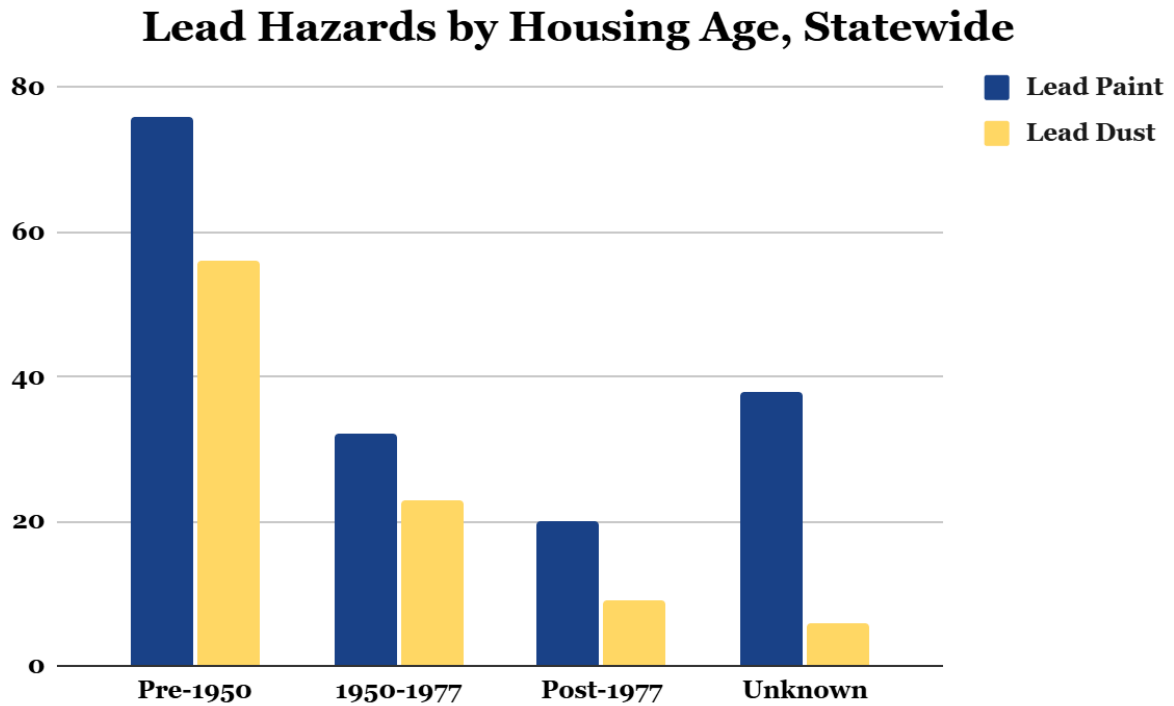


Figure Nine breaks down environmental investigations by the age of the structure, highlighting that the majority of intensive investigation resources are currently directed toward properties built before 1977.

Figure 9: Investigations by Construction Year

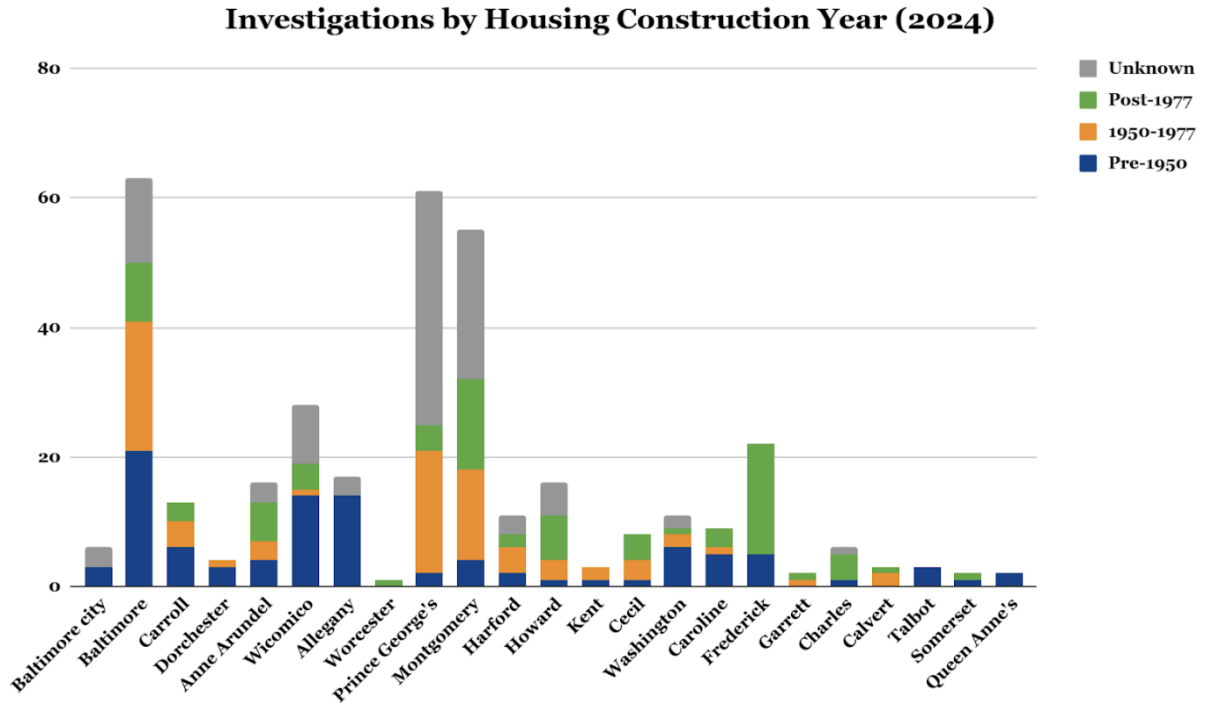


Figure Ten visualizes the distribution of enforcement actions, showing that Baltimore City issued the largest share (39.4%) of abatement notifications, followed by Baltimore, Montgomery, and Prince George's counties.

Figure 10: Lead Abatement Notifications by County

