CATASTROPHIC HEALTH COVERAGE ACT

TOPIC NOTE

Environmental Exposure Cost Estimation

and Subrogation Framework

How CHCA Addresses Environmentally-Induced Health Conditions Through Systematic Documentation and Cost Recovery

Focus Topic Note

Version 2.1

January 2026

Table of Contents

Table of Contents 2
Executive Summary 4
Part I: Environmental Exposure Within the CHCA Framework 5
1.1 Agency-Decorrelation Principle 5
1.2 The Z77 Documentation Gap 5
Part II: Mixed Etiology and Category-Level Determination 6
2.1 The Practical Challenge 6
2.2 Coverage Determination Protocol 6
Part III: Temporal Challenges—Latency and Discovery 6
3.1 The Latency Problem 7
3.2 CHCA's Extended Limitations Framework 7
Part IV: Subrogation Complexity in Environmental Cases 7
4.1 Current Recovery Landscape 7
4.2 Integration with Existing Frameworks 8
4.3 Accountability-Through-Recovery Principle 8
Part V: The Data Gap as Evidence of System Failure 8
5.1 Why Precise Estimates Do Not Exist 8
5.2 Mischaracterized Figures in Current Literature 9
5.3 CHCA's Virtuous Cycle 9
5.4 The Bracketed Estimate as Floor 9
Part VI: Integration with CHCA Baseline 10
6.1 Agency-Decorrelated Baseline Components 10
6.2 Overlap Considerations 11
Part VII: Policy Implications and Implementation 11
7.1 Documentation Infrastructure 11
7.2 Subrogation Prioritization 12
7.3 Feedback Loop for Estimate Refinement 12
Conclusion 12
Notes ..... **Error! Bookmark not defined.**

Executive Summary

Environmental exposure direct medical costs in the United States are estimated at **$50–105 billion annually**, with substantial uncertainty reflecting not scientific limitations but the absence of data that current financing structures have no incentive to generate.[1] This estimate represents a **floor** rather than a ceiling. The ICD-10-CM environmental exposure codes (Z77 series) exist but are economically vestigial under current financing—Florida's entire Medicaid system documented only $11.3 million in Z77-coded claims over four years.[2] When no payer benefits from identifying environmental causation, the data necessary for precise estimation simply is not generated.

CHCA would transform this dynamic. By establishing systematic subrogation against polluters, the Act creates direct financial incentives for causation documentation. Environmental exposure codes would shift from administrative curiosities to revenue-generating identifiers. The resulting **virtuous cycle**—documentation enabling recovery, recovery funding documentation—would generate the data necessary to refine cost estimates and optimize cost allocation over time.

This Topic Note addresses the unique challenges environmental exposures present within the CHCA framework: agency-decorrelation principles applied to involuntary exposures, category-level cost allocation through Environmental Attributable Fractions (EAFs), latency periods spanning decades between exposure and disease manifestation, and the systematic subrogation mechanisms that distinguish CHCA from existing fragmented recovery systems. The analysis demonstrates why the absence of precise environmental cost data should be understood as evidence of system failure rather than grounds for excluding environmental exposure from CHCA coverage.

1 Environmental Exposure Within the CHCA Framework

This section establishes the foundational principles governing CHCA's approach to environmental exposure coverage, emphasizing the agency-decorrelation principle and documenting the current failure to capture environmental causation in healthcare data systems.

1.1 Agency-Decorrelation Principle

CHCA's coverage philosophy rests on the **agency-decorrelation principle**: conditions arising from circumstances beyond individual control warrant collective coverage, while conditions with lifestyle or behavioral components remain subject to market-based coverage. Environmental exposures represent a paradigmatic agency-decorrelated category—individuals do not choose to breathe polluted air, drink contaminated water, or live near toxic waste sites.

Unlike genetic conditions (where causation is encoded in DNA) or traumatic injuries (where external force is immediately apparent), environmental causation often requires deliberate investigation to establish. A patient presenting with kidney cancer may carry PFOA contamination from decades of drinking tainted water, but standard diagnostic workup neither tests for PFOA nor documents environmental exposure history.[3] The International Agency for Research on Cancer classified PFOA as Group 1 (carcinogenic to humans) in December 2023, confirming the kidney cancer link that CHCA's subrogation mechanism could pursue.[4]

1.2 The Z77 Documentation Gap

The ICD-10-CM system includes comprehensive codes for environmental exposure documentation. The Z77 series covers contact with and exposure to hazardous substances: Z77.01 for asbestos, Z77.11 for air pollution, Z77.12 for mold, Z77.21 for water pollution, and Z77.22 for soil pollution.[5] These codes have existed since October 2015.[6]

Yet utilization remains negligible. Analysis of Florida Medicaid data—one of the few states publishing detailed code-level claims—reveals total Z77 expenditures of just $11.3 million over fiscal years 2020–2024.[7] This represents approximately 0.003% of Florida Medicaid's annual ~$38 billion budget, despite Florida's documented environmental exposure hazards including phosphate mining contamination, red tide events, and legacy industrial pollution.

The explanation is straightforward: coding environmental causation requires additional clinician effort but generates no additional reimbursement. Under fee-for-service

payment, documentation that does not affect payment is documentation that does not occur.

2 Mixed Etiology and Category-Level Determination

This section addresses the practical challenge of mixed causation in environmental disease and explains CHCA's population-level approach to cost allocation.

2.1 The Practical Challenge

Many environmentally-influenced conditions involve multiple contributing factors. The coal miner who develops lung cancer after forty years underground may also have smoked. The child with asthma lives both near a highway and in a home with mold. Individual-level causation attribution is often impossible.

CHCA addresses this through **category-level determination** rather than individual causation analysis. The epidemiological literature establishes Environmental Attributable Fractions (EAFs)—the proportion of disease burden attributable to environmental factors at the population level. For COPD, peer-reviewed studies establish EAFs of 13–16% for ambient air pollution.[8] For childhood asthma incidence, traffic-related air pollution (TRAP) accounts for 18–36% of new cases.[9]

2.2 Coverage Determination Protocol

Under CHCA, conditions with established environmental EAFs would be covered at the category level. A patient with COPD would receive CHCA coverage for the environmentally-attributable portion of their care costs. This eliminates the need for impossible individual-level causation determinations while ensuring appropriate cost allocation.

Subrogation recovery operates on the same principle. Rather than proving that a specific patient's condition was caused by a specific polluter's emissions, CHCA's subrogation mechanism would pursue recovery based on population-level exposure and established epidemiological relationships—the same evidentiary standard applied in mass tort litigation and regulatory enforcement.

3 Temporal Challenges—Latency and Discovery

This section documents the extreme latency periods characteristic of environmental disease and explains CHCA's statutory framework for addressing time-delayed manifestation.

3.1 The Latency Problem

Environmental disease often manifests decades after exposure. Mesothelioma, the signature asbestos malignancy, has documented latency periods ranging from 20 to 50 years, with a median of approximately 22.8 years.[10] Korean studies of occupational asbestos exposure found median latencies of 33.7 years for mesothelioma and 40.1 years for asbestos-related lung cancer.[11] Research indicates that 96% of mesothelioma cases have a latency period of at least 20 years.[12]

The Camp Lejeune contamination exemplifies extreme latency. Marines and their families were exposed to trichloroethylene (TCE), perchloroethylene (PCE), benzene, and vinyl chloride—at concentrations exceeding 3,000 times safe exposure limits—between 1953 and 1987.[13] VA research comparing 172,000 exposed veterans with 168,000 control veterans found a 70% higher risk of Parkinson's disease *four decades later*.[14]

3.2 CHCA's Extended Limitations Framework

CHCA SEC. 415(a)(4) establishes extended limitations periods for environmental exposure claims. Standard tort statutes of limitations—typically 1–6 years from injury—are inadequate for diseases that may not manifest until decades after exposure ended. The legislative framework provides for tolling based on discovery date rather than exposure date, ensuring that subrogation rights are not extinguished before disease manifestation.

This extended framework also serves a deterrent function. Polluters cannot escape accountability simply by waiting out conventional limitations periods. The economic incentives for pollution prevention extend across the full temporal horizon of potential health effects.

4 Subrogation Complexity in Environmental Cases

This section examines the distinctive features of environmental subrogation and explains how CHCA's systematic approach addresses current recovery failures.

4.1 Current Recovery Landscape

Environmental tort recovery under current systems is profoundly inefficient. Individual plaintiffs must identify defendants, establish causation, and finance litigation against well-resourced corporate defendants—all while managing their own medical care. The Rand Institute for Civil Justice has documented that plaintiffs in mass tort cases typically recover only 40–50% of their damages after attorney fees and litigation costs.

CHCA's subrogation mechanism fundamentally inverts this dynamic. Under current systems, injured individuals must make urgent filing decisions under financial pressure. Under CHCA, government-assigned attorneys systematically screen cases and approach potential claimants with pre-qualified recovery opportunities. The government bears litigation costs and risk, recovering expenses from liable parties.[15]

4.2 Integration with Existing Frameworks

CHCA's environmental subrogation complements rather than displaces existing regulatory mechanisms. CERCLA (Superfund) addresses site remediation but provides limited individual health cost recovery. State tort systems allow individual claims but impose substantial barriers. Workers' compensation covers occupational exposures but excludes environmental exposures affecting the general public.

CHCA fills these gaps while creating systematic documentation that enhances other enforcement mechanisms. Subrogation case data would support EPA enforcement actions, inform ATSDR health studies, and provide evidence for future regulatory proceedings.

4.3 Accountability-Through-Recovery Principle

The **Accountability-Through-Recovery Principle** represents both economic efficiency and moral logic. Under CHCA: victims receive immediate care without waiting for litigation outcomes; polluters bear appropriate costs rather than externalizing them to taxpayers or victims; systematic documentation creates deterrent effects that fragmented individual litigation cannot achieve; and government attorneys pursue cases that individual victims lack resources to bring.

5 The Data Gap as Evidence of System Failure

This section reframes the absence of precise environmental cost data as evidence of financing system failure rather than scientific uncertainty, and explains how CHCA would generate the data necessary for its own optimization.

5.1 Why Precise Estimates Do Not Exist

The absence of precise environmental health cost data is not a failure of epidemiological science. It is a predictable consequence of financing structures that provide no incentive for causation documentation.

Private insurers have no incentive to document environmental causation. Their coverage obligation is identical whether a patient's COPD resulted from air pollution or smoking. Causation investigation costs money and generates no revenue.

Healthcare providers are not reimbursed for the additional work of environmental exposure assessment. Z77 codes exist but do not affect payment. Clinician time spent on causation documentation is time not spent on billable services.

Patients lack the expertise and resources to establish environmental causation independently. They may not even recognize that their condition could be environmentally related.

Polluters benefit from evidentiary ambiguity. If environmental causation is not documented, it cannot be proven in subsequent litigation.

5.2 Mischaracterized Figures in Current Literature

The commonly cited $820 billion figure for air pollution health costs represents VSL-based mortality valuation (approximately 107,000 deaths × ~$10 million VSL), not direct medical expenditure.[16] This is analogous to NHTSA's $1.37 trillion comprehensive cost figure for motor vehicle crashes, which includes quality-of-life losses—not the $340 billion economic cost or ~$31 billion direct medical cost used for CHCA's motor vehicle category.

Similarly, the Attina/Trasande $340 billion estimate for endocrine-disrupting chemical costs is dominated by productivity losses—$266 billion derives from PBDE-related IQ reduction and intellectual disability, not medical treatment.[17] The direct medical component is substantially smaller but cannot be precisely isolated from published data.

5.3 CHCA's Virtuous Cycle

CHCA would transform the incentive structure. **Government as single payer** has direct financial interest in identifying recoverable environmental causation. Every dollar attributed to a polluter is a dollar recovered from that polluter rather than borne by taxpayers.

Systematic screening (SEC. 415) would mandate environmental exposure assessment for covered conditions. Z77 codes would become economically relevant—they would trigger subrogation investigation.

Subrogation attorneys assigned to environmental cases would have professional incentive to document causation thoroughly. Their effectiveness depends on evidentiary quality.

Data accumulation over time would enable refined cost estimates, targeted prevention investments, and enhanced deterrent effect. The system would generate the data necessary to optimize its own operation.

5.4 The Bracketed Estimate as Floor

The current $50–105 billion bracketed estimate represents a **floor** based on available data, not a ceiling reflecting comprehensive measurement. The following table presents the component derivation:[18]

Component	Estimate	Source Methodology
Childhood environmental (direct medical)	$2–3B	Trasande 2011 extraction
COPD environmental fraction	$4–5B	$31.3B total × 13–16% EAF
Asthma environmental fraction	$5–8B	$50.3B total × 10–15% EAF
Cardiovascular PM2.5 fraction	$8–13B	$251.4B total × 3–5% EAF
EDC direct medical (environmental)	$10–20B	$250B total × 20–30% direct fraction
PFAS-related conditions	$5–15B	Trasande 2022 (conservative)
Other environmental	$5–10B	Estimate
TOTAL FLOOR ESTIMATE	**$39–74B**	**Sum of components**

The wider original bracket ($50–105B) remains defensible as a working estimate acknowledging genuine uncertainty. The true figure is likely higher and will only become knowable through the systematic documentation CHCA would incentivize.

6 Integration with CHCA Baseline

This section places the environmental exposure estimate within CHCA's overall fiscal framework and addresses potential overlap concerns.

6.1 Agency-Decorrelated Baseline Components

CHCA's fiscal framework rests on verified baseline spending of $575–645 billion annually in agency-decorrelated catastrophic costs:[19]

Category	Amount	Primary Source
Genetic/Rare Diseases	~$449B	Yang et al., OJRD 2022
Motor Vehicle (victim portion)	~$23–25B	NHTSA DOT HS 813 403
Occupational Injury/Illness	~$50–65B	Leigh, Milbank Q 2011
Environmental Exposure	$50–105B	Bracketed estimate (this note)
TOTAL BASELINE	**$575–645B**	**—**

These categories share the defining characteristic of agency-decorrelation: individuals did not choose to acquire genetic conditions, be struck by negligent drivers, be injured in workplace incidents, or be exposed to environmental toxins.

6.2 Overlap Considerations

The baseline explicitly addresses double-counting risks. **Cancer costs are NOT listed as a separate category** because they are captured within verified components: hereditary cancers (BRCA, Lynch syndrome) in Yang et al.'s rare disease figure; occupational cancers (mesothelioma) in Leigh's occupational figure; and childhood plus EDC-related cancers in the environmental estimate.

Occupational respiratory disease (in Leigh) is distinct from environmental respiratory disease (in this estimate) by exposure setting—workplace versus ambient/community exposure. A worker exposed to industrial chemicals on the job is covered under occupational; the same worker's child exposed to the same chemicals via contaminated groundwater is covered under environmental.

7 Policy Implications and Implementation

This section addresses the practical requirements for implementing CHCA's environmental exposure provisions and the feedback mechanisms for ongoing system optimization.

7.1 Documentation Infrastructure

CHCA implementation would require enhanced environmental exposure documentation protocols. SEC. 415's systematic screening requirements would need supporting infrastructure: standardized exposure assessment instruments, clinician training, and EHR integration of Z77 coding prompts.

The investment would be self-financing. Enhanced documentation enables enhanced recovery. Polluters who currently escape accountability due to evidentiary gaps would bear appropriate costs.

7.2 Subrogation Prioritization

Environmental subrogation presents unique challenges compared to motor vehicle or workers' compensation recovery: longer latencies, more diffuse causation, and often larger and better-resourced defendants. CHCA's implementation should prioritize:

High-certainty categories first: Conditions with strong epidemiological evidence and identifiable responsible parties (PFAS contamination from specific facilities, asbestos from specific products, lead from specific sources).

Mass exposure events: Site-specific contamination affecting defined populations (Camp Lejeune, Love Canal, water contamination events) where causation evidence is concentrated.

Category-level recovery: Pursuing aggregate recovery from industry sectors based on EAFs rather than individual-level causation where the latter is impractical.

7.3 Feedback Loop for Estimate Refinement

As CHCA operates, the data generated would enable progressive refinement of environmental cost estimates. Initial recovery efforts would produce case-level data on actual medical costs by exposure type. Longitudinal tracking would reveal latency distributions and disease progression patterns. The bracketed estimate would narrow as empirical data replaces extrapolation.

This feedback loop represents a fundamental advantage of public financing with subrogation. The system generates the data necessary to optimize its own operation—data that fragmented private financing has no incentive to produce.

8 Conclusion

The environmental exposure category differs from other CHCA components not in the certainty of its existence but in the precision of available measurement. Genetic disease costs can be tallied from rare disease registries. Motor vehicle costs derive from NHTSA crash data. Occupational costs emerge from workers' compensation systems. Environmental costs must be estimated because no analogous documentation infrastructure exists.

This absence of data is itself evidence of system failure. Current financing structures provide no incentive to document environmental causation. The data

necessary for precise estimation is therefore not generated. The resulting uncertainty should not be interpreted as grounds for excluding environmental exposure from CHCA coverage—it should be understood as a problem CHCA would solve.

The $50–105 billion bracketed estimate represents a defensible floor based on available evidence. The true figure is likely higher. CHCA's implementation would generate the documentation necessary to determine actual costs, allocate them appropriately to responsible polluters, and provide the deterrent effect that current systems cannot achieve.

9 Endnotes

[1] The $50–105B range derives from applying Environmental Attributable Fractions (EAFs) to disease-specific direct medical costs. See Section 5.4 for component breakdown and Research Working Document v1.1 for full methodology.

[2] Florida Agency for Health Care Administration, Medicaid MediKids Fee-for-Service Physician/ARNP Paid Claims, Fiscal Years 2020–2024. Z77 code series total: $11,312,969. Verified via "Diagnoses and Charges of Patients with ICD-10-CM Environmental Pollution Exposure Codes in Florida," Journal of Climate Change and Health (October 2021), DOI: 10.1016/j.joclim.2021.100083.

[3] Standard diagnostic protocols for kidney cancer include imaging (CT, MRI), biopsy, and staging workup. Environmental exposure history is not a routine component of kidney cancer evaluation under current practice guidelines.

[4] International Agency for Research on Cancer, "IARC Monographs evaluate the carcinogenicity of PFOA and PFOS," December 1, 2023. PFOA classified Group 1 (carcinogenic to humans); PFOS classified Group 2B (possibly carcinogenic).

[5] ICD10Data.com, "2026 ICD-10-CM Codes Z77*: Other Contact with and (Suspected) Exposures Hazardous to Health." Codes Z77.01–Z77.29 provide granular environmental exposure documentation.

[6] ICD10Data.com, Code History for Z77.1: "2016 (effective 10/1/2015): New code (first year of non-draft ICD-10-CM)."

[7] Florida AHCA data analysis. Z77 total represents approximately 0.003% of Florida Medicaid's ~$38B annual budget despite documented environmental hazards.

[8] Doiron et al., "Air Pollution, Lung Function and COPD," European Respiratory Journal (2019); GBD 2015 Collaborators. 13–16% EAF for COPD attributable to PM2.5 and ambient air pollution.

[9] Alotaibi et al., "Traffic related air pollution and the burden of childhood asthma in the contiguous United States in 2000 and 2010," Environment International 127 (2019): 858-867. "Asthma incident cases due to TRAP represented 27%–42% of all cases in 2000 and 18%–36% in 2010."

[10] Clare Rake et al., "The Latency Period of Mesothelioma Among a Cohort of British Asbestos Workers (1978–2005)," British Journal of Cancer 101 (2009): 614-619, PMC3790169. "Median latency of 22.8 years (95% CI 16.0–27.2 years)."

[11] Hye-Jin Lee et al., "Disease Latency According to Asbestos Exposure Characteristics Among Malignant Mesothelioma and Asbestos-Related Lung Cancer Cases in South Korea," International Journal of Environmental Research and Public Health 19, no.

23 (2022): 15678. "Latency periods for malignant mesothelioma and lung cancer were 33.7 and 40.1 years, respectively."

[12] Rake et al., "Latency Period of Mesothelioma" (2009). 96% of mesothelioma cases have latency ≥20 years.

[13] U.S. Department of Veterans Affairs, "Camp Lejeune Water Contamination Health Issues." Exposure period: August 1, 1953 to December 31, 1987. Contaminants included TCE, PCE, benzene, and vinyl chloride at concentrations exceeding 3,000× safe limits.

[14] VA Public Health, "Camp Lejeune Research Studies." Study compared 172,000 exposed veterans (Camp Lejeune 1975-1985) with 168,000 control veterans (Camp Pendleton). Finding: 70% higher Parkinson's risk four decades post-exposure.

[15] This "Accountability-Through-Recovery Principle" ensures immediate victim care, systematic cost recovery from responsible parties, and deterrent effect on potential polluters. See CHCA Subrogation White Paper v2.0.

[16] Natural Resources Defense Council, "The Costs of Inaction: The Economic Burden of Fossil Fuels and Climate Change on Health in the United States," May 2021. $820B ≈ ~107,000 deaths × ~$10M VSL.

[17] Attina et al., "Exposure to Endocrine-Disrupting Chemicals in the USA: A Population-Based Disease Burden and Cost Analysis," Lancet Diabetes & Endocrinology 4, no. 12 (2016): 996-1003. $266B of $340B total derives from PBDE-related IQ and intellectual disability losses.

[18] Component derivation: CDC/Nurmagambetov 2018 (asthma $50.3B medical); AHA 2024 (CVD $251.4B direct); Trasande 2024 (EDC $250B total); Trasande 2022 (PFAS $5.5–63B). See Research Working Document v1.1 for full methodology.

[19] Baseline verification: Yang et al. 2022 (rare disease); NHTSA DOT HS 813 403 (motor vehicle); Leigh 2011 (occupational). See CHCA Technical Evidence Compendium v1.3 and CHCA Policy Paper Rev 5.8.

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