



Public Health Handbook for Communities Under Emergency Management

A Case Study of the
Flint Water Crisis:
Legal Mapping Tools
and Lessons Learned

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A Case Study of the Flint Water Crisis: Legal Mapping Tools and Lessons Learned

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Introduction

The Flint, Michigan, water crisis—a manmade disaster that resulted in the poisoning of thousands of children and adults after lead leached into the city’s drinking water—is a terrible tragedy, and one that was far from inevitable. It is an unfortunate reminder that our communities are endangered when health is not considered in policymaking. Sadly, the harm to Flint residents cannot easily be undone.

This handbook is intended to help policymakers and practitioners incorporate the lessons learned from this preventable disaster to avert and/or mitigate future crises. Specifically, it provides guidance for implementing several key, overarching recommendations produced through extensive research and analysis aimed at answering the following key legal question with respect to the Flint water crisis: Given the emergency manager’s appointment, what legal authority could state, local, and federal public health and environmental agencies use to avert or mitigate the crisis?¹ We developed the tools set forth in this handbook to organize and understand the legal environment in Flint, and we expect that this approach may help other jurisdictions conduct similar analyses before a crisis occurs.

The handbook is designed to serve three primary goals. First, it is intended to facilitate the **communication and coordination** among multiple levels of governmental agencies needed to assure timely and effective use of checks and balances embedded in the law. Second, it is intended to facilitate **legal preparedness** among agency staff and encourage problem-solving in advance of a crisis by providing a set of tools for mapping legal authority and responsibilities and identifying gaps and overlaps. Finally, if utilized in a setting that fosters continuous learning, open communication, and respect for the community, the process of working through these tools may contribute to building an **agency culture** that is flexible and prepared to respond quickly to crisis.

In particular, the tools provided here may aid emergency managers, communities under emergency management, and relevant governmental entities to:

- Understand and assess the complex legal arrangements governing public health and the environment to:
 - Identify and implement legal changes needed to clarify or fill in gaps in the existing legal framework;
 - Anticipate and address potential implementation challenges.
 - Improve communication and coordination among agencies and individual actors before a crisis occurs.
- Understand how an emergency manager’s appointment affects the existing legal framework to:
 - Prepare entities with overlapping jurisdiction to exercise heightened vigilance during the emergency manager’s appointment;
 - Equip individual governmental actors to understand the limits of their own power and to understand how their role relates to others’.

Note that the handbook provides tools and a case study based on the Flint water crisis, but that the analysis and results will probably look different in every state. Laws and agency organization can vary tremendously by state, and even within a state at the local level. A thorough review of applicable state and local laws is therefore crucial to developing a comprehensive map of responsibilities, gaps, and overlaps.

Case Study Background

THE FLINT, MICHIGAN, WATER CRISIS

The Flint water crisis resulted from a cost-driven switch to the city's drinking water source in April of 2014, while the financially distressed community was under the control of a state-appointed emergency manager (emergency manager). The city switched from receiving finished water from the Detroit Water and Sewerage Department to treating its own water drawn from the Flint River.² Despite the corrosiveness of Flint River water, the Flint water department failed to treat the water with anti-corrosion control measures that would have cost the city approximately \$140 per day.³ As a result, lead from the aging service lines to homes leached into the drinking water.

Despite Flint residents' repeated complaints and requests for assistance, the community endured the escalating crisis for well over a year before a governmental response finally began to trickle in. The response came when it did only because the crisis was exposed by private actors—scientists, physicians, and Flint residents that worked together to examine the undeniable consequences of lead poisoning unfolding in their community.⁴ Even though Flint has returned to its previous water source, the corrosive nature of the untreated river water compromised its aging

water pipes and exposed residents to unsafe lead levels. Recent remediation efforts have improved the situation, but the lead exposure will negatively affect the community's health, especially its children, for years.

In addition to the lead exposure, the Flint community suffered from a series of Legionnaire's disease outbreaks at McLaren Hospital.⁵ Although there is some dispute about the source of the Legionella, the switch to the Flint River is the leading suspect. At least 12 people died from Legionnaire's disease in 2014-2015.⁶ Despite the alarming number of Legionnaire's disease cases occurring in Flint, the outbreak was not reported to the public until January 2016.⁷

An abbreviated timeline of key events and decisions associated with the Flint water crisis is included here for reference. This timeline includes key decisions and events affecting our legal analysis of the Flint water crisis. All entries are excerpted and/or summarized based on the Integrated Event Timeline prepared by the Flint Water Advisory Task Force.

Table 1: Timeline of Key Decisions in the Flint Water Crisis ⁸

Date	Event
12/1/2011	Gov. Snyder appoints Emergency Manager (EM) to Flint.
Mar.-Apr., 2013	State Treasurer approves EM request to contract with Karegnondi Water Authority (KWA) for water supply. Then-water supplier, Detroit Water & Sewerage Department (DWSD), sends letter terminating Flint water service effective April 17, 2014.
4/25/2014	Flint switches to Flint Water Treatment Plant (WTP) as primary water supply source until expect completion of KWA pipeline in 2016. Switch occurs despite Department of Public Works' (DPW) concern that WTP is not ready. Complaints begin immediately.
8/15/2014	Flint issues boil water advisory (<i>E. coli</i> bacteria). Boosts chlorine disinfectant use.
9/5/2014	Flint issues boil water advisory (coliform bacteria). Boosts chlorine disinfectant use.
10/17/2014	Genesee County Health Department (GCHD) concerned about Legionellosis outbreak in Flint and possible connection to water supply.
12/16/2014	MDEQ notifies Flint of quarterly violation of Safe Drinking Water Act (SDWA) Disinfection Byproducts (TTHM) requirements.
12/31/2014	Lead and copper monitoring shows 2 samples above lead action level.
2/26-27/2015	EPA tells MDEQ that lead sampling protocol (pre-flushing) may be biasing results. MDEQ informs EPA that Flint is using corrosion control.
3/5/2015	MDEQ issues second Disinfection Byproducts quarterly violation notice.
3/23/2015	Flint City Council votes to end Flint River service and return to DWSD. Vote is non-binding. EM refuses to act on City Council's vote.
4/24/2015	Contrary to prior statement, MDEQ informs EPA Flint is not using corrosion control.
4/29/2015	State Treasurer and EM sign emergency loan agreement stating Flint may not return to DWSD without state approval. Gov. Snyder returns control of Flint finances to Mayor and City Council under supervision of Receivership Transition Advisory Board.
5/29/2015	MDHHS reports 2014-15 cases of Legionellosis in Genesee County; "outbreak is over."
6/8/ 2015	MDHHS chastises GCHD for communicating with CDC re Legionellosis.
6/9/2015	MDEQ issues third Disinfection Byproducts quarterly violation notice.
7/21/2015	EPA informs MDEQ that Lead and Copper Rule (LCR) requires corrosion control in Flint.
8/17/2015	MDEQ notifies Flint of lead and copper monitoring results, "scrubbed" to exclude two high lead results. Directs Flint to install corrosion control and phosphate treatment.

continues on page 8.

Table 1 continued

Date	Event
8/31/2015	Prof. Marc Edwards (Virginia Tech) reports on corrosive lead levels in Flint water.
9/24/2015	Dr. Mona Hanna-Attisha (Hurley Medical Center) releases findings of elevated blood lead levels in Flint children.
9/25/2015	Flint, with support of GCHD, issues lead advisory.
9/29/2015	GCHD demands fresh analysis by MDHHS of state blood lead level data; issues public health advisory.
10/1/2015	Genesee County Board of Commissioners and GCHD issue "Do Not Drink" Advisory. GCHD declares public health emergency.
10/2/2015	Gov. Snyder announces Flint Action Plan to address water system.
10/16/2015	Flint is reconnected to Detroit water system.
11/10/2015	EPA announces intent to audit State of Michigan's drinking water program.
12/14/2015	Flint Mayor Weaver declares state of emergency in Flint.
12/29/2015	Gov. Snyder issues apology for Flint water crisis via press release.
1/4/2016	Genesee County Commissioners declare state of emergency.
1/5/2016	Gov. Snyder declares state of emergency for Genesee County.
1/13/2016	Gov. Snyder/MDHHS issue first public notice of 2014-15 spike in Legionellosis in Flint.
1/16/2016	Pres. Obama approves declaration of emergency and request for federal aid.
1/22/2016	Gov. Snyder returns additional executive powers to Flint's mayor.

Tools & Application

**MAPPING LEGAL AUTHORITY AND
RESPONSIBILITIES TO IDENTIFY GAPS
AND OVERLAP**

Even a cursory examination of the legal context in the Flint water crisis reveals the sheer complexity of the roles and responsibilities governmental officials were expected to meet in maintaining and monitoring the quality and safety of drinking water. In addition to involving two different but overlapping sets of state-level legal frameworks affecting enforcement of safe drinking water—Michigan’s public health code and its environmental laws—the legal context involved issues of federalism and the relationship between state and local governments as well. On top of this existing complexity, the emergency manager’s appointment altered the existing legal arrangements, requiring heightened vigilance by agencies that retained authority.

We used the mapping tools described in this handbook to understand the roles and responsibilities of various governmental agencies in Flint, and to identify legal gaps and overlaps. We expect that other jurisdictions may use this approach to conduct prospective, prevention-focused analyses in their own communities. The five phases outlined in this handbook may be used as a guide for mapping legal authority, identifying opportunities for legal change, and improving legal preparedness. Matrices resulting from our analyses of legal authority in Flint are included as examples.

Phase I: Map the existing legal environment (i.e., without an emergency manager)

The purpose of the first phase is to map authority and responsibilities at the intersection of the public health legal framework and a separate legal framework that influences health. The relevant frameworks in Flint were public health and safe drinking water, but other legal frameworks could be substituted for safe drinking water to conduct a similar gap and overlap analysis. Thus, an initial step to developing a matrix is to select the separate legal framework (Framework 2) that will be the subject of study. Subsequent steps are set forth below.

Step 1. Identify all agencies at all levels of government that play a significant role in regulating public health and in regulating Framework 2.

Step 2. Identify all laws relating to each agency's authority, potentially including laws pertaining to the entity's creation, laws granting general authority, and laws granting specific authority relative to public health or the subject of Framework 2.

Step 3. Develop a matrix template for each framework (public health and Framework 2), with all relevant agencies listed across the top of the matrix. In the far left column of the matrix, list public health functions that represent key windows of opportunity for government activity relative to the public health threat at issue. For example, we mapped authority according to: (1) prevention; (2) surveillance and detection; (3) investigation; and (4) intervention, using the following general definitions to describe the selected public health functions and categorize legal authority:

Prevention: A standard public health definition for prevention is "action so as to avoid, forestall, or circumvent a happening, conclusion, or phenomenon (e.g., disease)."⁹ We use this term to encompass activities and functions aimed at preventing exposure

to the primary agents of adverse health impacts associated with the water crisis—lead and *Legionella*.

Surveillance/Detection: The CDC describes surveillance as "the ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice."¹⁰ We use this term to include not only collection of data related to Legionnaire's disease and elevated blood lead levels, but also to capture data collection efforts pertaining to water quality, as this was a key piece of health-related data essential to public health planning. We include the term Detection to reflect the discovery of irregularities, outbreaks, or patterns that may result from routine monitoring accompanied by careful analysis and interpretation.

Investigation: Our use of the term Investigation encompasses activities designed to identify the source of a disease outbreak or threat to the public's health.¹¹ As compared to surveillance, which is routine and ongoing, we consider investigative activities to include those aimed at seeking information related to an identified problem or irregularity.

Intervention: Intervention may be defined as an "action or ministrations that produces an effect or is intended to alter the course of a pathologic process."¹² We have used this term to describe legal actions to arrest the progression or spread of a cause of illness or harm, as well as actions to correct violations of the law which pose a threat to human health.

A sample template is included here as Table 2.

Table 2: Legal Framework Template

Legal Framework										
	Federal		State			County		City		
	EPA	HHS / CDC	Gov.	State Environ. Dept.	State Health Dept.	Cnty. Bd. of Commissrs	Cnty. Health Dept.	Mayor	City Council	City Dept.
Prevention										
Surveillance/ Detection										
Investigation										
Intervention										

Step 4. Review the relevant laws gathered during Step 2 above, and categorize grants of authority for each entity according to the public health functions selected. Document public health authority within one matrix, and Framework 2 authority within a separate matrix. For both matrices, focus on authority relevant to the specific subjects of study (such as lead and Legionnaire’s disease in the context of Flint).

Step 5. Combine the two separate matrices into one combined matrix that depicts all powers and responsibilities at the intersection of the two legal frameworks. The resulting Combined Matrix will be used for subsequent stages of legal analysis.

Step 6. Summarize the separate matrices developed in Step 4 by indicating with a simple symbol whether each agency exercises responsibility with respect to a given public health function. For example, mark an “X” in the appropriate cell of the matrix if the state health department performs prevention-related functions.

Step 7. Combine the two summary matrices developed in Step 6 into one matrix, using a different color to represent the symbols for each framework. The resulting Combined Summary Matrix will be used for subsequent stages of analysis.

Phase I: Examples from the Flint Water Crisis.

The lists of agencies and laws relevant to analyzing the existing legal framework in Flint are included here as Tables 3 and 4. Examples of the Combined Matrix and Combined Summary Matrix described in Steps 5 and 7 above are

included as Tables 5 and 6, respectively. These examples document duties and responsibilities of governmental agencies relative to safe drinking water and public health in Flint.

Table 3: Phase I, Step 1 – List of relevant agencies

<p>Federal</p> <ul style="list-style-type: none"> • The federal Environmental Protection Agency (EPA) • The federal Department of Health and Human Services (DHHS) (with particular focus on its primary public health arm, the Centers for Disease Control and Prevention (CDC))
<p>State</p> <ul style="list-style-type: none"> • The Michigan Governor’s office • The Michigan Department of Environmental Quality (MDEQ) • The Michigan Department of Health and Human Services (MDHHS)
<p>County</p> <ul style="list-style-type: none"> • The Genesee County Board of Commissioners • The Genesee County Health Officer and Department of Health (GCHD) • The Genesee County Board of Health
<p>City</p> <ul style="list-style-type: none"> • The Flint city council • The Flint mayor • The Flint Department of Public Works (includes the municipal public water system)

Table 4: Phase I, Step 2 – List of relevant laws

<p>Federal</p> <ul style="list-style-type: none"> • The federal Public Health Service Act and regulations • The federal Safe Drinking Water Act and regulations
<p>State</p> <ul style="list-style-type: none"> • The Michigan public health code and regulations • The Michigan Safe Drinking Water Act and regulations • The Michigan Constitution • Michigan statutes providing for county and city organization and authority • Michigan Executive Reorganization Orders
<p>County</p> <ul style="list-style-type: none"> • County health and sanitation codes
<p>City</p> <ul style="list-style-type: none"> • City charters and ordinances

Table 5: Phase I, Step 5 – Combined Matrix / Safe Drinking Water & Public Health (Lead in water and Legionnaire’s Disease) in Flint, Michigan

	EPA	HHS/CDC	Governor	MDEQ	MDHHS	GCHD	Flint Mayor	Flint City Council	Flint Public Works
Prevention	<ul style="list-style-type: none"> • Est. national safe drinking water standards, including maximum contaminant levels, required treatment techniques, public notice requirements • Support states with capacity development • Conduct research regarding public health impacts 	<ul style="list-style-type: none"> • Limited consultation role for CDC is included in SDWA • Est. regulations/take action to prevent spread of disease across state lines • Provide technical assistance to states regarding public health 	<ul style="list-style-type: none"> • Organize Executive Branch • Oversee executive branch of state government 	<ul style="list-style-type: none"> • Est. and implement permitting process for construction/alterations of public water systems (PWS) • Adopt state regulations at least as stringent as federal rules • Determine optimal corrosion control treatment (OCCT) and follow-up actions • Est. and enforce public notification requirements • Implement program for certification of operators 		<ul style="list-style-type: none"> • Contracts with MDEQ to permit and regulate non-Type 1 public water supplies 	<ul style="list-style-type: none"> • Supervise administration of programs, services, activities of City • Propose budget/amendments to City Council 	<ul style="list-style-type: none"> • Approve budget/amendments • May delegate ownership and operational responsibility of water supply to another public entity 	<ul style="list-style-type: none"> • Direct responsibility for implementation of SDWA • Must show ability to protect the public's health during permitting process • Must employ certified operators • Implement OCCT deemed appropriate by MDEQ • May request modification of MDEQ's determination regarding OCCT • Notify public of violations of MCL, treatment technique, or monitoring requirements, or of water-borne disease outbreak

Table 5: continued

	EPA	HHS/CDC	Governor	MDEQ	MDHHS	GCHD	Flint Mayor	Flint City Council	Flint Public Works
Surveillance/ Detection	<ul style="list-style-type: none"> • Est. monitoring requirements, including sampling techniques, analytic requirements, and frequency of monitoring and reporting • Aggregate and monitor national drinking water data 	<ul style="list-style-type: none"> • Est. and operate national public health surveillance system 		<ul style="list-style-type: none"> • Prescribe and enforce monitoring and reporting requirements • Assure capacity to monitor by operating lab and lab certification program • Collect & analyze water samples / review analytical results from PWS • Conduct routine sanitary surveys to assure compliance • Monitor, evaluate, and aggregate data; report to EPA • Receives notification of waterborne disease outbreaks 	<ul style="list-style-type: none"> • Collect, analyze, utilize, disseminate health data and statistics • Receives mandatory reporting of blood lead analysis results • Develop and maintain list of reportable diseases, which includes Legionnaire's disease • Operates childhood immunization registry, which may include lead screening data 	<ul style="list-style-type: none"> • Receives mandatory disease reporting and must communicate to state within applicable timelines • May receive reports of elevated blood lead levels from state (MDHHS may provide to physician or LHD) 			<ul style="list-style-type: none"> • Collect water samples and analyze to evaluate compliance with fed/ state standards • Report results to MDEQ • Monitor pool of high-risk sampling sites in accordance with LCR; deliver notice of individual tap results to consumers • Conduct add'l tap testing upon customers' request if system exceeds lead action level • Notify DEQ of waterborne disease outbreak

Table 5: continued

	EPA	HHS/CDC	Governor	MDEQ	MDHHS	GCHD	Flint Mayor	Flint City Council	Flint Public Works
Investigation	<ul style="list-style-type: none"> • May enter property of public water systems to inspect for compliance with SDWA 	<ul style="list-style-type: none"> • May assist with investigation if requested by state • If HHS Secretary declares public health emergency, may assist with response 	<ul style="list-style-type: none"> • Supervise agencies; respond to public complaints 	<ul style="list-style-type: none"> • May enter PWS at reasonable times • Shall inspect water systems to assure capacity to protect public's health 	<ul style="list-style-type: none"> • May investigate cause of disease, environmental health hazards, etc. • May inspect to assure compliance with laws enforced by department • May investigate reportable disease notifications 	<ul style="list-style-type: none"> • May investigate cause of disease, environmental health hazards, etc. • May inspect to assure compliance with laws enforced by department • May send water samples to MDHHS for analysis if communicable disease outbreak 	<ul style="list-style-type: none"> • Supervise departments; may investigate activities of departments as necessary 	<ul style="list-style-type: none"> • May make investigations into affairs of City and conduct of any City agency 	

Table 5: continued

	EPA	HHS/CDC	Governor	MDEQ	MDHHS	GCHD	Flint Mayor	Flint City Council	Flint Public Works
Intervention	<ul style="list-style-type: none"> Regional Administrator (RA) may review state's OCCT and source water treatment determinations and annul if necessary Sec. 1414 – if PWS is non-compliant, EPA shall provide TA to state and PWS; then issue administrative order or civil action if not compliant after 30 days Sec. 1431 – if contaminant or action poses an imminent and substantial danger to the public's health, and state and local authorities have not acted, EPA may take action, including emergency orders and civil action 	<ul style="list-style-type: none"> CDC may take action if state and local measures are insufficient to prevent spread of disease across state lines If HHS Secretary declares public health emergency, may take responsive action, including providing funding, supplies, or services 	<ul style="list-style-type: none"> Supervise agencies; may direct agency action May request EPA to take enforcement action against public water supply May declare a state of disaster or emergency 	<ul style="list-style-type: none"> Order changes/ alterations to facilities or operations to protect public health Issue an emergency order if public water supply poses an imminent hazard to public health Limit water system expansion or water use until improvements are made 	<ul style="list-style-type: none"> Issue imminent danger order Order abatement of nuisance Initiate injunctive action to restrain, prevent, correct condition which adversely affects public health Intervene if local public health is unwilling or unable to take action 	<ul style="list-style-type: none"> Issue imminent danger order Order abatement of nuisance (broader definition of nuisance under local regulations includes condition which renders water supply "unwholesome") Injunctive action to restrain, prevent, correct condition which adversely affects public health 	<ul style="list-style-type: none"> Supervises Dept. of Public Works (may order appropriate action) May declare a state of emergency 	<ul style="list-style-type: none"> Approve or disapprove of major budget changes and changes to water supply May contract with or delegate responsibility for city's water supply, including if lacking internal capacity 	

Notes:

1. The Genesee County Board of Commissioners was excluded from this table because its primary role relative to the Flint water crisis may be summarized as supervising the health officer of the Genesee County Health Department. If the Board of Commissioners determined that the health officer was acting improperly or failing to take necessary action, it could have either called for appropriate action or, if necessary, replaced the local health officer.
2. The Genesee County Board of Health was excluded from this table because its role is primarily advisory. Though the Board of Health provides an important resource to the health department (and has some, limited authority as provided in county regulations), it is not included here because it held minimal direct legal authority in Genesee County.

Table 6: Phase I, Step 7 -- Combined Summary Matrix / Safe Drinking Water & Public Health (Lead in water and Legionnaire's Disease) in Flint, Michigan

	Federal		State			County		City		
	EPA	HHS / CDC	Governor	MDEQ	MDHHS	GCHD	Cnty. Bd. of Commsrs.	Mayor	City Council	DPW
Prevention	XX			XX				XX	XX	X
Surveillance/ Detection	X	X		XX	X	X				XX
Investigation	X	X	XX	XX	X	X		X	XX	
Intervention	X	X	XX	XX	X	X	X	XX	XX	

Key

X – Safe Drinking Water responsibilities

XX – Public Health responsibilities (pertaining to lead in water or Legionnaire's Disease)

Phase II. Identify gaps and overlap in the existing legal environment.

Ideally, each point of intersection in each matrix (as well as the intersection between the two matrices) would represent a clean transition of authority from one agency to another, whether through clearly written laws, formal memoranda of understanding between agencies, or simply through interagency communication and coordination. In reality, these intersections present opportunities for gaps, either in the law or in implementation, that are unfortunate aspects of operating in a complex legal and public health practice environment. The intersections may also reflect overlap, which may lead to gaps if two or more agencies defer to one another but fail to communicate.

Phase II is intended to identify gaps and overlaps in the matrix to: (1) determine needed legal changes; and (2) plan for the communication and coordination critical to responding to a public health threat. To identify these gaps and overlaps, the following steps (continued sequentially from Phase I) guide analysis of the Combined Matrix and Combined Summary Matrix produced in Phase I, Steps 5 and 7 respectively.

Step 8. Begin this step with a clean version of the Legal Framework Template developed in Phase I, Step 3. Within each public health function (i.e., within in each row) in the clean template, consider the questions below, designed to highlight gaps and overlap in legal authority and responsibility, as well as potential implementation challenges. Document responses in the appropriate cells of the Legal Framework Template to produce a Gap Analysis Matrix.

1. Which agencies are primarily responsible for performing the function?
 - a. What information and/or resources are necessary to perform this function? Does the agency have access to the required information and resources?
 - b. If coordination, communication, and resource allocation processes remain as they are today, would the agency be prepared to perform this function effectively?
2. Which agencies are responsible for overseeing performance of the function?
 - a. What information and/or resources are necessary to oversee this function? Does the agency have access to the required information and resources?
 - b. If coordination, communication, and resource allocation processes remain as they are today, would the agency be prepared to oversee this function effectively?
3. Which agencies do not have a legal responsibility related to this function, but should be consulted or involved?

Step 9. Use two additional clean versions of the Legal Framework Template for this step. The purpose of this step is to sort responses from the Gap Analysis Matrix into two categories, with a separate matrix reflecting each category. The two categories are as follows:

1. Structural Legal Failures Matrix: this category should reflect gaps, overlaps, or ambiguities which require or would benefit from structural legal changes.
2. Implementation Needs Matrix: this category should reflect gaps or overlaps which require or would benefit from implementation or practice changes.

Some gaps or overlaps may be addressed by either structural or implementation improvements, or may require a combination of strategies. In this case, both potential responses should be documented in the appropriate matrix.

Step 10. Based on the Structural Legal Failures Matrix, identify legal changes needed to close gaps in authority and to assure involvement in each public health function by all appropriate agencies. This step yields a list of Structural Recommendations.

Step 11. Based on the Implementation Needs Matrix, determine where communication and coordination are most critical to avert or mitigate a potential crisis, and identify potential implementation gaps based on current practice. Next, develop strategies for improving communication, coordination, and performance. This step yields a list of Implementation Recommendations.

Phase II: Examples from the Flint Water Crisis.

Examples of the Structural Legal Failures Matrix and Implementation Needs Matrix described in Step 9 are included below as Tables 7 and 8. Because our analysis was retrospective rather than prospective, our Implementation Needs Matrix is in fact an Implementation Failures Matrix, documenting actual legal implementation failures as they occurred in Flint. Together, these two matrices informed a range of Structural and Implementation Recommendations pertaining to safe drinking water and public health laws, summarized in Table 7.

Table 7: Phase II, Step 9 – Structural Legal Failures in Flint, Michigan

	Federal		State			County		City		
	EPA	HHS / CDC	Governor	MDEQ	MDHHS	Gen. Cnty. Bd. of Commissrs	GCHD	Mayor	City Council	DPW
Prevention	Lacks PH expertise but no PH consult required	No authority (narrow exceptions)		Lacks PH expertise but no PH consult required	No authority		No authority for Type 1 water supply			Lacks PH expertise but no PH consult required
Surveillance/ Detection				Not required to report to or support PH			Does not receive all BLL test results			Not required to report to or support PH
Investigation					Unclear w/ regard to drinking water		Unclear w/ regard to drinking water			
Intervention					Unclear w/ regard to drinking water		Unclear w/ regard to drinking water			

Table 8: Phase II, Step 9 – Implementation Failures in Flint, Michigan

	Federal		State			County		City		
	EPA	HHS / CDC	Governor	MDEQ	MDHHS	Gen. Cnty. Bd. of Commissrs	GCHD	Mayor	City Council	DPW
Prevention	Failed to identify/address MDEQ's cultural issues			Failed to assure Flint's capacity, require OCCT						Failed to complete needed upgrades, implement OCCT
Surveillance/ Detection				Guided DPW to submit inaccurate data, lied to EPA	Failed to facilitate GCHD's access to BLL data					Failed to correctly monitor lead
Investigation	Failed to fully investigate Flint residents' lead concerns	Failed to assist GCHD absent state request	Failed to assure rigorous investigation by agencies	Failed to cooperate with GCHD's LD investigation	Failed to adequately investigate BLL or LD data, support GCHD's LD investigation		Failed to use full authority to investigate			Failed to cooperate with GCHD's LD investigation
Intervention	Failed to override OCCT decision, take enforcement action, issue emergency order	Failed to declare PH emergency	Failed to take responsibility for agency errors, timely declare emergency	Failed to require Flint to correct violations		Did not urge/ require aggressive GCHD action	Failed to issue PH order, sound alarm			Failed to notify public of LD outbreak

Table 9: Phase II, Steps 10 and 11 – Structural and Implementation Recommendations for Public Health and Safe Drinking Water Laws in Flint, Michigan

SAFE DRINKING WATER	
<p>Structural Recommendations</p> <ul style="list-style-type: none"> Public health agencies should be involved in regulating type I water supplies. Structurally, this could be achieved through changes in the permitting process and in environmental regulations. State law should require public water systems to report waterborne disease outbreaks directly to LHDs and the state health department when they report to state and federal environmental agencies. The state environmental agency should develop regulations to act on reports of waterborne disease outbreaks. Responses could include increasing monitoring requirements or changing treatment requirements for the water system. The state environmental agency should develop regulations requiring coordination with state and local health departments regarding actions to be taken and when to notify the public of an environmental disease outbreak. 	<p>Implementation Recommendations</p> <ul style="list-style-type: none"> EPA should closely examine the culture of an agency before granting primacy. Perhaps a more rigorous review of state programs is appropriate. Environmental agencies should alert public health agencies to changes in environmental conditions—including water source—that may introduce new agents of disease or harm to the community. Environmental agencies should assure transparent and timely data analysis and reporting.
PUBLIC HEALTH	
<p>Structural Recommendations</p> <ul style="list-style-type: none"> Public health should have a greater role in preventing exposure to environmental health threats. This function should not be managed solely by environmental agencies. Public health should focus lead prevention efforts further upstream—rather than waiting to respond to elevated blood lead levels. 	<p>Implementation Recommendations</p> <ul style="list-style-type: none"> Public health agencies should engage in more rigorous health monitoring following environmental changes with potential public health effects. Public health agencies should rigorously employ their investigative authority to protect the public health. Public health agencies should develop criteria for when and how to notify the public of threats to their health such as the Legionella outbreak. Public health agencies should recognize and weigh the risks of delaying action when making decisions.

Phase III: Map changes to the legal environment that occur when an emergency manager (or similar intervenor) is appointed.

The next set of tools is designed to examine and prepare for how an emergency manager's appointment affects the legal environment described in Phase I. Specifically, this phase considers how the emergency manager's appointment shapes and/or limits other responsible agencies' ability to exercise their legal authority. Steps for this phase, continued sequentially from above, are included below.

Step 12. Locate your state's emergency manager law and review the law to determine how an emergency manager's appointment alters local authority. Consider the following questions in performing this analysis:

1. What are the emergency manager's or intervenor's powers and duties?
2. What relationship exists between the emergency manager and other governmental actors or entities within the same jurisdiction? For example, does the emergency manager take over all of a mayor's duties, or only certain aspects of the mayor's duties?
3. To what extent does an emergency manager assume responsibility for implementing or enforcing health and safety statutes that would otherwise have been executed by the jurisdiction?
4. How does the emergency manager's appointment affect the responsibilities of governmental actors or entities with overlapping or neighboring geographic boundaries?
5. Does the emergency manager law preempt local or state public health agencies' authority?
6. What is the role of state-level public health and environmental agencies? Do they have a defined oversight role if local entities under an emergency manager's authority are not fulfilling important functions?
7. What (if any) criteria shape the emergency manager's decision-making authority, especially in considering factors beyond fiscal savings? For example:
 - a. Is the emergency manager required to engage local government or the local community in decision-making?
 - b. Is the emergency manager required to consider health effects when making decisions, such as under a provision in the emergency manager law or through a health impact assessment?
8. How does the law provide checks on the emergency manager's power? For example:
 - a. Who appoints and dismisses the emergency manager?
 - b. Who does the emergency manager report to and how often?
 - c. Is there a public reporting requirement for the emergency manager?
 - d. Is there a legal mechanism for local residents or government officials to reject the emergency manager's decisions (e.g., by city council vote or by declaring bankruptcy)?
 - e. Who, if anyone, may be sued for the emergency manager's negligence or otherwise wrongful conduct?
 - f. Are there any protections in place specifically protecting the public's health?
9. Which units of government gain power (and concomitant responsibility) as a result of the emergency manager's appointment?

Step 13. Based on the above analysis, revise the Legal Framework Template developed in Phase I, Step 3, to reflect the emergency manager’s appointment. Use the following sub-steps to develop the Legal Framework Template with Emergency Manager:

1. Add columns to the Template to represent the emergency manager and other state entities that become relevant once an emergency manager is appointed (e.g., the agency responsible for appointing and/or overseeing the emergency manager).
2. Identify which entities listed in the Template will experience decreased (or eliminated) authority as a result of the emergency manager’s appointment. Indicate by blocking off corresponding cells or columns in the Template.

Step 14. Revise the Combined Matrix and Combined Summary Matrix developed in Phase I to reflect the changes to the Legal Framework Template with Emergency Manager indicated in Step 13 (i.e., add columns for the emergency manager and oversight entity, and block off cells or columns usurped by the emergency manager).

Step 15. In the Combined Matrix with Emergency Manager, list the specific responsibilities that an emergency manager assumes relative to public health and Framework 2. Responsibilities added to the emergency manager’s column will likely correspond to responsibilities eliminated

from governmental actors whose authority was eliminated. Next, list relevant responsibilities of the entity charged with overseeing the emergency manager.

Step 16. In the Combined Summary Matrix with Emergency Manager, mark the categories of public health responsibility that the emergency manager and oversight entity assume. These indicators should correspond with changes made in Step 15.

Phase III: Examples from the Flint Water Crisis.

Table 10 below reflects the Combined Summary Matrix with Emergency Manager developed in Step 16 above. As indicated in Steps 13 and 14, the table shows columns added to the matrix to reflect the emergency manager’s appointment, as well as showing the columns that the emergency manager’s appointment effectively removed from the framework. Under Michigan law, the emergency manager’s appointment effectively transferred all of the Flint city mayor’s and city council’s responsibilities to the emergency manager, with the Department of Treasury responsible for oversight. These changes were documented in Step 15 and symbolized in Step 16. For the sake of simplicity, only the Combined Summary Matrix with Emergency Manager (resulting from Step 16) is included here.

Table 10: Phase III, Steps 13 and 16 –Combined Summary Matrix with Emergency Manager / Safe Drinking Water & Public Health (Lead in water and Legionnaire’s Disease) in Flint, Michigan

	Federal		State			County				City		
	EPA	HHS / CDC	Governor	Treasury	EM	MDEQ	MDHHS	GCHD	County Board of Comm’r.	Mayor	City Council	DPW
Prevention	XX			XX	XX	XX				XX	XX	X
Surveillance/ Detection	X	X				XX	X	X				XX
Investigation	X	X	XX	XX	XX	XX	X	X		X	XX	
Intervention	X	X	XX	XX	XX	XX	X	X	X	XX	XX	

Key
 X – Safe Drinking Water responsibilities
 X – Public Health responsibilities (pertaining to lead in water or Legionnaire’s Disease)

Phase IV. Identify gaps and overlap in the legal environment that exists once an emergency manager is appointed.

Phase IV is designed to identify gaps and overlaps in the legal framework during an emergency manager's tenure. The goal of this phase is to: (1) determine necessary changes to the emergency manager law; and (2) identify recommendations for implementing the emergency manager law in a manner that protects the public's health. To develop these recommendations, the following steps guide analysis of the Combined Matrix with Emergency Manager and Combined Summary Matrix with Emergency Manager produced in Phase III.

Step 17. Begin this step by producing copies of the Structural Legal Failures Matrix and Implementation Needs Matrix developed in Phase II, Step 9. Adjust the matrices as indicated in Step 13 above to reflect changes resulting from an emergency manager's appointment, yielding two new matrices for Structural Legal Failures with Emergency Manager and Implementation Needs with Emergency Manager.

Step 18. In the Structural Legal Failures with Emergency Manager Matrix, add gaps, overlaps, or ambiguity resulting from an emergency manager's appointment which require or would benefit from structural legal changes. In the Implementation Needs with Emergency Manager Matrix, add gaps or overlaps resulting from an emergency manager's appointment which require or would benefit from implementation or practice changes. Where gaps or overlaps may be addressed by either strategy, or may require a combination of strategies, both potential responses should be documented in the appropriate matrices.

Step 19. Based on the Structural Legal Failures with Emergency Manager Matrix, develop a set of legal changes needed to address structural flaws of the emergency manager law. This step yields a list of Structural Recommendations specific to the emergency manager law.

Step 20. Based on the Implementation Needs with Emergency Manager Matrix, determine where the need for effective communication and coordination is increased due to an emergency manager's appointment, and identify potential implementation failures that could potentially endanger the community's health. Next, consider strategies for improving communication and coordination among all involved agencies, and for assuring that the emergency manager appropriately implements his or her responsibilities. This step yields a list of Implementation Recommendations specific to the emergency manager law.

Phase IV: Examples from the Flint Water Crisis.

Examples of the Structural Legal Failures with Emergency Manager Matrix and Implementation Needs with Emergency Manager Matrix described in Step 18 are included below as Tables 11 and 12. As noted in Phase II, because our analysis was retrospective rather than prospective, our Implementation Needs Matrix is in fact an Implementation Failures Matrix, documenting actual legal implementation errors as they occurred in Flint. Together, these two matrices informed the Structural and Implementation Recommendations pertaining to Michigan's emergency manager law included as Table 13.

Table 11: Phase IV, Step 18 – Structural Legal Failures with Emergency Manager in Flint, Michigan

	Federal		State					County		City
	EPA	HHS / CDC	Governor	Treasury	Emergency Manager	MDEQ	MDHHS	Gen. Cnty. Bd. of Comm'rs	GCHD	DPW
Prevention	Lacks PH expertise but no PH consult required	No authority (narrow exceptions)		Lack of specific requirements to consider PH	Lack of specific requirements to consider PH, no local accountability	Lacks PH expertise but no PH consult required	No authority		No authority for Type 1 water supply	Lacks PH expertise but no PH consult required
Surveillance/ Detection						Not required to report to or support PH		Does not receive all BLL test results	Not required to report to or support PH	
Investigation							Unclear w/ regard to drinking water	Unclear w/ regard to drinking water		
Intervention							Unclear w/ regard to drinking water	Unclear w/ regard to drinking water		

Table 12: Phase IV, Step 18 – Implementation Failures with Emergency Manager in Flint Michigan

	Federal		State					County		City
	EPA	HHS / CDC	Governor	Treasury	Emergency Manager	MDEQ	MDHHS	Gen. Cnty. Bd. of Comm'rs	GCHD	DPW
Prevention	Failed to identify/address MDEQ's cultural issues			Failed to provide adequate oversight	Failed to make fiscally sound decisions, consider PH	Failed to assure Flint's capacity, require OCCT				Failed to complete needed upgrades, implement OCCT
Surveillance/ Detection						Guided DPW to submit inaccurate data, lied to EPA	Failed to facilitate GCHD's access to BLL data			Failed to correctly monitor lead
Investigation	Failed to fully investigate Flint residents' lead concerns	Failed to assist GCHD absent state request	Failed to assure rigorous investigation by agencies			Failed to cooperate with GCHD's LD investigation	Failed to adequately investigate BLL or LD data, support GCHD's LD investigation		Failed to use full authority to investigate	Failed to cooperate with GCHD's LD investigation
Intervention	Failed to override OCCT decision, take enforcement action, issue emergency order	Failed to declare PH emergency	Failed to take responsibility for agency failures, timely declare emergency			Failed to require Flint to correct violations		Did not urge/ require aggressive GCHD action	Failed to issue PH order, sound alarm	Failed to notify public of LD outbreak

Table 13: Phase IV, Step 18 – Structural and Implementation Recommendations for Emergency Manager Law in Flint, Michigan

EMERGENCY MANAGER LAW	
<p>Structural Recommendations</p> <ul style="list-style-type: none"> • Laws responding to municipal fiscal distress should include an explicit requirement that emergency managers must consider the public’s health in decision-making. • Emergency manager laws must be consistent with the expected norms of democracy rather than displacing democracy entirely, such as by offering some form of democratic representation during an EM’s tenure. 	<p>Implementation Recommendations</p> <ul style="list-style-type: none"> • States should develop a rigorous process for public participation and engagement in decision-making once an emergency manager is appointed. • States should develop appropriate criteria requiring the emergency manager to take into account the public’s health and not just the cost-cutting component. • States should ensure that emergency managers recognize the limits of their expertise and consult with appropriate experts (such as the LHD) when proposing changes that implicate public health, the environment, education, etc. (issues that are not solely fiscal in nature).

Phase V. Foster legal preparedness for public health threats that cross jurisdictional lines.

The process of working through each phase of this handbook has likely made clear the complexity of the legal environment surrounding public health and overlapping legal frameworks. In addition to the structural problems and potential implementation pitfalls already identified in the previous phases, a certain degree of ambiguity is inherent in how laws are written, further complicating the legal environment. This inherent ambiguity exacerbates the challenges of adequate legal preparedness. Though some ambiguity is difficult to avoid, legal uncertainty and inadequate legal preparedness contributed to the implementation deficiencies that occurred in Flint.

There are four core elements of legal preparedness:

- Laws and legal authority (i.e., statutes, regulations, and ordinances)
- Effective use of laws
- Coordination of legal interventions across jurisdictions
- Information, resources, and dissemination.¹³

Phases I-IV of this handbook prompt users to comprehensively analyze the legal environment, identify structural changes needed to improve the laws, and develop implementation recommendations to promote effective use of the laws. These phases squarely address the first and second elements of legal preparedness. The last two elements suggest that cross-jurisdictional planning, preparedness, and communication are keys to assuring that gaps and areas of jurisdictional overlap are navigated before a public health threat emerges, rather than in the midst of an ongoing crisis. Thus, legal preparedness requires preparation by all relevant actors. To facilitate this goal, we suggest the following steps:

Step 21. Staff in governmental agencies should receive expanded legal training. The focus of the training should be to enable greater staff understanding of the statutes and regulations governing each agency and staff member's area of expertise. In particular, staff should understand their role (and the relative role of other agencies) as documented in the Combined Matrix developed in Phase I, Step 5. In the event that an emergency manager is appointed, staff within the jurisdiction and staff working in overlapping jurisdictions should understand how the emergency manager's appointment affects their role.

Step 22. As with disaster preparedness generally, effective responses depend on communication and coordination that need to be designed and tested ahead of time. For example, the federal government funded bioterrorism preparedness exercises that included all agencies likely to be first responders. States should mimic the bioterrorism table top exercises for public health threats that cross jurisdictional lines. This exercise should enable participants to identify and better understand the gaps identified in Phases II and IV above.

Step 23. States should convene a cross-agency panel to develop appropriate data sharing and communications guidelines. The panel should assure that agencies and staff build relationships with one another before a crisis occurs. By establishing expectations and requirements for sharing information among agencies, the panel should also enable a swift cross-jurisdictional response to public health threats.

Step 24. Finally, although not specifically part of our study, we observed that various agency cultures likely contributed to the Flint Water Crisis. For example, a culture of punishing openness and summarily denying bad news seemed to pervade the agencies in the Flint tragedy. In general, public health tends toward a risk-averse, procedurally-based culture.¹⁴ From everything we have learned in this project, the environmental agencies acted within similar constraints. Thus, a final step of legal preparedness is to foster a culture of continuous learning, open communication, and respect for the community. Agency leadership must allow and encourage staff to question, investigate, and communicate concerns without fear of negative repercussions.

Endnotes

- 1 The technique set forth in this handbook was used to analyze legal gaps and implementation failures in Flint. To review a full legal analysis, see our report, *Learning from the Flint Water Crisis: Protecting the Public's Health During a Financial Emergency*. Jacobson, P.D., Boufides, C.H., Bernstein, J., Chrysler, D., Citrin, T. (January 2018). Learning from the Flint Water Crisis: Protecting the Public's Health During a Financial Emergency. Retrieved from debeaumont.org/LearningFromFlint/Report.
- 2 See generally Flint Water Advisory Task Force—Final Report, Commissioned by the Office of Governor Rick Snyder, State of Michigan (March 2016), available at michigan.gov/documents/snyder/FWATF_FINAL_REPORT_21March2016_517805_7.pdf [hereinafter Task Force Report].
- 3 Jim Lynch, *DEQ: Flint water fix should have come by 2014*, Detroit News, Jan. 21, 2016, detroitnews.com/story/news/politics/2016/01/21/deq-director-flint/79145696/.
- 4 See Task Force Report, *supra* note 2.
- 5 See *id.*
- 6 MDHHS Orders McLaren Flint to comply with action to address Legionella, Press Release from the Michigan Dept. of Health & Human Servs. (Feb. 14, 2017), michigan.gov/mdhhs/0,5885,7-339-73970_71692-404886--,00.html (last visited Nov. 22, 2017).
- 7 See Task Force Report, *supra* note 2, at Appendix V: Detailed Timeline, at 26 (entry dated Jan. 13, 2016).
- 8 See Task Force Report, *supra* note 2, at Appendix V: Detailed Timeline.
- 9 *Public Health Key Terms*, Centers for Disease Control and Prevention, cdc.gov/publichealth101/documents/public-health-key-terms.pdf, last visited Nov. 22, 2017.
- 10 *Introduction to Public Health Surveillance*, Centers for Disease Control and Prevention, cdc.gov/publichealth101/surveillance.html, last visited Nov. 22, 2017.
- 11 See Centers for Disease Control and Prevention, Principles of Epidemiology in Public Health Practice 6-2-6-6 (3d ed. 2012), available at cdc.gov/ophss/csels/dsepd/ss1978/lesson6/section1.html.
- 12 *Public Health Key Terms*, *supra* note 21.
- 13 Georges C. Benjamin and Anthony D. Moulton, *Public Health Legal Preparedness: A Framework for Action*, 36 J. L. Med. & Ethics 13 (2008).
- 14 Jacobson PD, Wasserman J, Botosaneanu A, Silverstein S, and Wu HW, The Role of Law in Public Health Preparedness: Opportunities and Challenges, *Journal of Health Politics, Policy and Law* 2012; 37:297-328.

Jacobson, P.D., Boufides, C.H., Bernstein, J., Chrysler, D., Citrin, T. (January 2018). *Public Health Handbook for Communities Under Emergency Management (A Case Study of the Flint Water Crisis: Legal Mapping Tools and Lessons Learned)*. Retrieved from debeaumont.org/LearningFromFlint/Handbook.



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