GET THE LEAD OUT ACT OF 2016

MPA-ESP Fall 2016 Workshop

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School of International and Public Affairs

GET THE LEAD OUT ACT OF 2016

Faculty Advisor
Professor Dr. Steven Cohen

Manager
Fatma Zişan Tokaç

Deputy Manager
Xinjia Emily Yan

Team Members
Zhuo Hao Kevin Cheng
Tiara Cunningham
Jingjing Du
Kaiyu Qiu
Marissa Sterling
Na Su
Isaac Wilkins

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Contents

Executive Summary

For thousands of children across the country, the water they drink every day is slowing eroding their ability to perform well in school and achieve the opportunities of their peers. Widespread lead contamination, a leftover residue from the industrial age when lead paint and lead infrastructure were thought to be prime materials, renders America vulnerable to a future generation of children with intellectual and health impairments. Immediate action is critical to address and reverse the potentially devastating effects of lead contamination.

The Get the Lead Out Act of 2016 seeks to directly address lead contamination by reducing lead in drinking water through corrosion control, education, and service line pipe replacement. In offering a yearly $60 million grant between 2017-2021, the bill aims to empower communities to tackle lead contamination in their communities, particularly among children, low-income and vulnerable populations.

Unfortunately, a careful review of the extent of lead contamination in the United States demonstrates a full remediation program will amount into the billions of dollars. This report introduces proposed action to effectively maximize the grant money proposed by the Get the Lead Out Act. In particular, the report reviews the potential consequences and benefits of corrosion control, education, and pipe replacement as delineated in the bill.

In an effort to eliminate the risk of severe lead contamination for as many people as people in the most equitable and politically-strategic manner, this report details a program design to maximize the grant monies funded through the Get the Lead Out Act. The program allocates $1 million planning grants to 250 cities with the goal that funding will act as seed money to help cities initiate water infrastructure planning in order to garner future political and financial support. Additionally the program will allocate $20 million for a nationwide education campaign aiming to increase lead awareness and prevent lead exposure.

The key to this program is that the planning grants will demonstrate actionable solutions and will thereby amass greater political will to support future steps and lead awareness campaign addressing a wider public will act as a supportive mechanism. In allocating the Get the Lead Out Act of 2016 toward planning grants can we begin to set America on track to achieve its best.

GET THE LEAD OUT ACT OF 2016

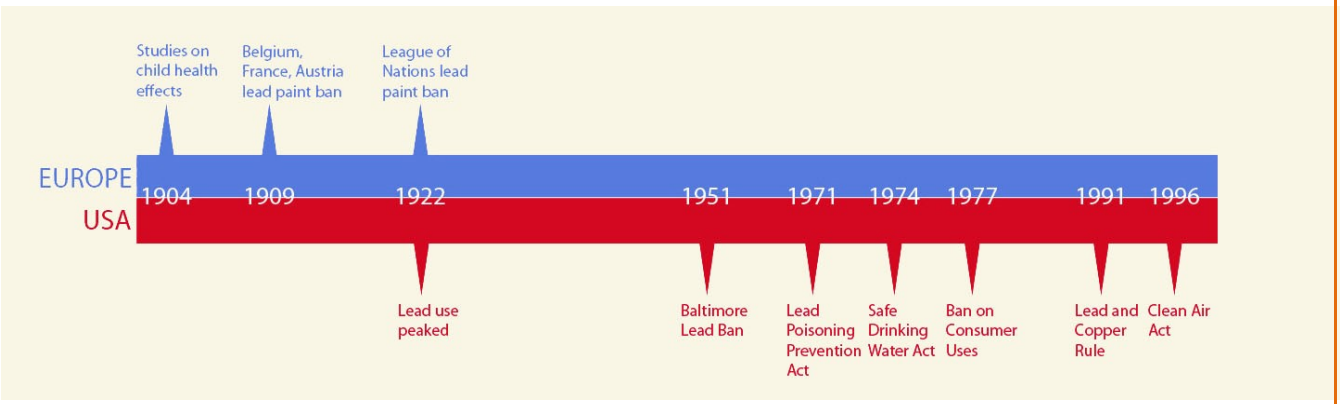
1. Introduction

Lead is an extremely toxic metal that can lead to irreversible and detrimental health effects. Despite increased knowledge on the detrimental health effects of lead since the 19th century, particularly on the brain, lead has been marketed as a durable chemical in the U.S. and used in a wide variety of products.

Prior to 1974, there was no federal level regulation responsible for public drinking water supplies. Moreover, state programs lacked the funding and staff to maintain a long-term functional monitor system, as well as an emergency response team. The deficit resulted in serious water quality problems. The 1969 Community Water Supply Survey and additional evaluations in the early 1970s disclosed that one-third of tap water samples have high chemical contaminant concentration (especially lead), which was much higher than the Public Health Service's voluntary limits (McCabe et. al 1970). Infrastructure, especially water pipes, despite being the backbone of the U.S. economy, were found to be old and deteriorating.

Under the circumstances, in 1974, Safe Drinking Water Act (SDWA) was established and EPA was required to create standards for drinking water quality with tight regulation to ensure all states and water suppliers implement these standards. SDWA was the first federal law that states the quality standards for every public drinking-water system in the United States. A series of acts and rules regulating lead followed SDWA (Figure 1). However, the infrastructure built before 1974 persisted containing lead (Bascom et. al 1996).

Figure 1. Lead Regulations in Europe and in the U.S.



Despite all of the regulatory efforts to prevent lead poisoning, lead has resurfaced in the United States through the Flint water crisis since 2014. High hospitalization rates drew intense media coverage and led to the confirmation of a national crisis. Following media coverage of Flint water crisis, the situation caused an outcry throughout Flint and the country. The Flint crisis brought to the surface that 5300 water systems across the country (Figure 2) were in violation of the lead rule (Ganim 2016), signaling a widespread public health crisis (Kennedy et al. 2016).

Figure 2. Lead Violations Across the U.S. (NRDC)

2. Health Impacts

Lead is a highly hazardous chemical. According to the Environmental Protection Agency (EPA), there is no safe level of lead. Even at small quantities lead can be extremely hazardous. Lead can enter drinking water when service pipes and fixtures, containing lead, begin to corrode. Lead can dissolve in water depending on several factors, including the acidity of the entering water, the amount of lead in the pipes, the residence time of water, and the presence or non-presence of protective coatings.

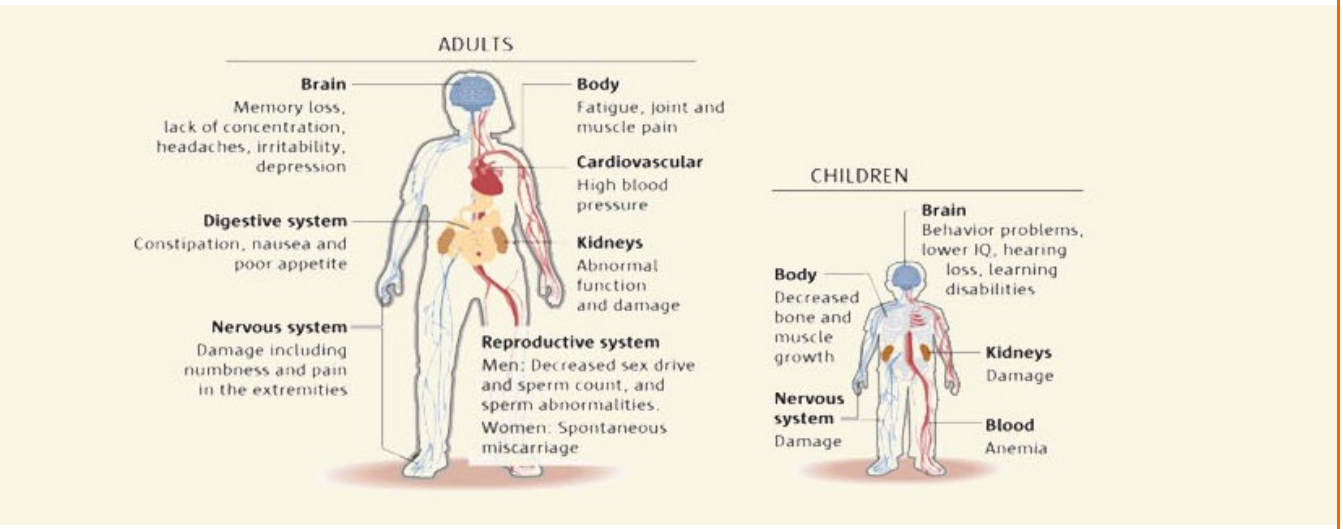
Lead enters the body orally, (drinking lead contaminated water, eating paint chips which contain lead, etc), dermally (skin) and through inhalation with no apparent symptoms. Consequently, it often goes unrecognized. Individuals that ingest lead through lead contaminated drinking water are unaware of their consumption because they cannot see, taste, or smell lead dissolved in water.

Once absorbed by human beings, lead circulates to the brain, liver, kidney, and bones, impacting the development of the brain and nervous system in children. Lead absorbed during the early developmental stage inflicts their bone structure, replacing vital calcium. Lead can, thus, seep back into the blood stream at any point during their life and effect neurological development, resulting in reduced IQ levels. Lead poisoning can be treated, however the damages caused by lead exposure may not be reversed.

High lead levels can negatively affect central nervous system, hematopoietic system and renal system. Blood lead levels greater than 40ug/dL can result in reduced sperm counts and sperm abnormalities. Maternal blood lead levels greater than 10 ug/dL can adversely affect both mothers

and children, such as through decreased fertility, hypertension and impaired infant neurodevelopment. Compared to adults, children are more severely affected by lead exposure. Lead can break down both peripheral and central nervous system with a possibility of causing severe nervous damage (Exposure 2010) such as "behavioral and cognitive deficits, e.g. impairment of activity, attention, adaptability, learning ability, and memory, as well as increased distractibility" (Guidelines 1996).

Figure 3. Lead Caused Adult and Child Health Problems (Crosby 2016)



3. Socioeconomic Impacts

Many low-income families are housed in affordable, rent- subsidized housing. The lead exposure risk increases within low-income houses because many of the houses are substandard. Low income neighborhoods are more likely to have elevated blood lead levels (Knorr 2016) because they are more likely to live in older homes with corroded pipe lines, where lead contaminated paint has yet to be removed.

Homes built before 1970s are more likely to contain lead pipes, solders and fixtures. Furthermore, low-income households lack the additional funds to fix or remove the sources of lead exposure, such as replacing lead corroded pipelines or removing the lead contaminated paint from their homes. Lead-caused health problems are more serious for minority, urban and low-income families (Brody 1994). Without additional funds to mitigate the sources of lead exposure, low-income families continue to consume lead-contaminated drinking water.

> "Significantly, the biggest changes in predicted BLL since 2013 were also found in these impoverished neighborhoods; more stable neighborhoods in the far north and south of the city may have experienced improved predicted BLLs because of prevention efforts taken by the more-often middle-class residents in response to the water source change."
>
> (Hanna-Attisha et al. 2016)

4. Overview of the Bill

Proposed after Flint crisis, the *Get the Lead Out Act of 2016* (S.2588) intends to address the current unsafe drinking water issues due to aging water infrastructure, in low-income communities around the nation. The *Get the Lead Out Act of 2016* focuses on providing grants of $60,000,000 for each year from 2017-2021 to reduce lead in community drinking water supplies and delivery systems through the replacement of lead-pipe service lines.

The bill, proposed by Senator Benjamin Cardin, senior member of the Senate Environment and Public Works Committee, acts as an amendment to the 1974 Safe Drinking Water Act (SDWA). The bill was sponsored by US Representative Tammy Duckworth and introduced by Congressman Mike Quigley in the House of Representatives on March 17, 2016. H.R 4797 was assigned to the United States House Committee on Energy and Commerce and the subcommittee on Environment and the Economy on March 18, 2016.

4.1. Objectives of the Bill

The *Get the Lead Out Act* intends to address the current unsafe drinking water issues due to aging water infrastructure in low-income communities around the nation. The *Act* aims to reduce the lead level in water for human consumptions through education, corrosion control, and lead service line replacement. The bill stipulates that lead service line replacement projects should prioritize public projects that would impact children, low-income and vulnerable communities. The act prioritizes low-income households that are disproportionately affected by lead exposure. The definition of low-income under this bill is in the possession of municipality, state, interstate or inter-municipal agency. In general, an eligible entity can use the grant to provide assistance to low-income homeowners to carry out lead reduction projects. The amount of the grant to low-income homeowners shall not exceed the total cost of replacement of the service line. In accordance with the bill, the Administrator shall give priority to an eligible entity based on the following: the community has exceeded the lead action level established by the Administrator, lead contamination occurs at schools, daycares or other facilities that primarily serves children or other "vulnerable human subpopulation", i.e. elders, and other criteria will be established by the Administrator with ultimate goal of reducing lead levels.

4.2. Options in the Bill

1) Pipe Replacement

In accordance with the bill, only publicly owned pipelines are eligible for lead service pipe replacements. Additionally, economic assistance is allocated for privately owned parts of the service water lines for eligible low-income homeowners. Due to the previously observed risks, such as elevated lead levels originating from partial lead service line replacements (Clair et al. 2015). The grant offered in this bill does not cover partial lead service line replacements. If drinking water is coming through another lead pipe to a household, it is not eligible for replacement grants.

Special Considerations for Lead Service Line Pipe Replacement:

a) Notify customers of the planned replacement of public portion of the service line.

b) Offer the following: Replace the privately owned portion of the lead service line at the cost of the replacement, if the homeowners are not considered low income. Replace the privately owned portion of the lead service line at a cost that is equal to the difference between (a) the cost of replacement; and (b) the amount of low-income assistance available to the homeowners based upon the Low Income Assistance allocation.

c) In order for line service replacement to go forward, the Administrator will need the consent of the homeowners.

d) Include an evaluation of options for corrosion control, and demonstrate that the eligible entity has considered other options for reducing lead in drinking water.

2) Testing & Planning

The administrator is responsible for determining the testing, planning , or other relevant activities to identify and address conditions that contribute to increased lead levels in water for human consumption. Testing helps identifying problems specific to the community. Planning grants kick-starts lead service line replacement projects, a long-term and final solution, while addressing the lead problem through education in the interim.

3) Corrosion Control

The Administrator's responsibilities under the act include corrosion control. Corrosion control grants aim to prevent lead contamination.

4) Education

According to the act, a lead reduction project includes education of consumers regarding measures to reduce exposure to lead from drinking water or other sources.

5. Feasibility

There are several limitations when it comes to implementing the act. They stem from the lack of significant and sufficient funding provided by the act to address the problem and a lack of time to fully understand the problem. The act recognizes that a lead reduction project falls into one of four categories: replacement of publicly owned service lines and providing assistance to privately owned service line replacement, testing and planning, corrosion control, and educational programs.

Under the Act, the EPA is responsible for establishing a plan to implement the lead reduction process. Accordingly, the Act states that the administrator, in this case the EPA, must prioritize public lead reduction projects and initiatives that would impact children or vulnerable communities. The EPA is given the freedom to establish criteria consistent with the objective of reducing lead in drinking water and to prioritize projects that ultimately aim at reducing lead in the overall water service line.

Under the act, action plans must reflect the EPA's commitment to community need. Given the financial limitations, the project must maximize the reduction of lead in drinking water with minimum funds. In line with this principle, feasibility of four main actions that EPA can implement are discussed below.

1) Pipe Replacement

First option is total pipe replacement of a single municipality or a small group of municipalities. Elimination of lead in water requires complete lead service line replacement with copper, PVC, or PEX pipes. Complete service line replacement would eliminate the source of lead and ensure that no further lead management or corrosion control would be needed. The project would have high upfront costs for the service line replacement program, but outcomes would be permanent.

Comparisons of the efficiencies in reducing lead between the three types of pipe, copper, PVC, and PEX, indicate that PVC pipes are many more times as efficient as others (See Appendix A). Also they are the cheapest option, therefore, PVC pipes should be given preference. Yet, with only $60 million in funding, only 117 miles of pipes could be replaced. To put that into perspective, it would be barely enough to replace all pipes in a small city like Flint. Hence, total pipe replacement using PVC pipes would be limited to a small group of entities.

The bill specifically emphasizes funding for lead service line replacement as the best option to address the lead problem in its entirety without requiring long-term maintenance. Funding toward pipe replacement will ensure long-term elimination of the source of lead.

Unfortunately, the proposed grant amount will not be enough to support the necessary large-scale pipe replacement required. The bill only offers only $60 million for a project that is likely to total in the billions. Typically, service line replacement projects entail replacement of large swaths of both the public and private infrastructure at one time. In larger communities, costs can reach into the billions of dollars. For example, the start-up cost for pipe replacement in Flint is estimated to be nearly $55 million. Under a $60 million budget, funding for such projects would not be feasible.

2) Testing & Planning

Testing and planning grants kick-starts lead service line replacement projects. These grants will act as seed money in the hopes of inspiring and putting pressure for further funding and action on the matter. Beyond that, the planning grants also allow the communities to begin to strategize a comprehensive plan to address the lead contamination in drinking water.

With $1 million planning grant per city, 55 cities across the country can be reached in a year. Funding toward pipe replacement will ensure a long-term elimination of a major source of lead and gain support of contractors.

The proposed amount for the grant will not be enough to support the type of large-scale replacement. Typically, service line replacement projects entail replacement of large swaths of both the public and private infrastructure at one time. With $1 million planning grants maximum 250 cities can be reached in 5 years. Addressing only 250 cities is not enough to tackle the lead problem in the U.S., however it is a good start. 250 cities widely distributed across the nation may create a political influence and inspire other cities to act.

3) Corrosion control

Lead contamination is a result of corrosion. As a result of corrosion, lead containing inner pipe surface breaks down and releases lead into water. Properly chosen phosphate technology can help control corrosion in lead pipes, which lead to lead contamination of the drinking water. Using corrosion control methods have shown a wide range of success when it comes to reduce lead in drinking water. Corrosion control has become the standard method to control lead contamination in drinking water over the past few decades because of its cost-effectiveness, success in preventing lead exposure up to 99% and the convenient implementation process.

Adding phosphates to water is the most traditional corrosion control method. Phosphates may range in cost from $0.30/lb for generic orthophosphates to more than $4.00/lb for specialty phosphate blends. At a dosage rate of 1-5 mg/L, the chemical cost may range from less than 1 cent to more than 10 cents per thousand gallons of water treated, depending on the treatment criteria and water quality. The savings easily offsets the cost of a water treatment program. For example, following provincial

regulations set by the 2007 Safe Drinking Water Act, a $4.95 million corrosion control plan was initialized in Hamilton City to add phosphoric acid to deal with lead from commercial and residential pipes in 2015. The annual cost for the chemical plan is estimated to be about $310,000, which includes monitoring, purchasing the chemicals, and storage. From the environmental perspective, the corrosion control plan can avoid disposal problems caused by pipe replacement.

However, a main concern of corrosion control is the potential huge run-off problems of phosphate into water sources, river and streams and may even end up in oceans, becoming toxic to marine life. When there is excess amount of phosphate in water, it will cause eutrophication, reducing dissolved oxygen in water due to increasing growth of algae and other microbes. Public opposition stems from the health concern of the phosphate products.

Additionally, lead corrosions have been correlated with many factors including pH, alkalinity, dissolved oxygen, chlorine residual and total dissolved solids. Proper phosphate technology varies for each community. Inappropriate use of corrosion control agents may cause further problems as in Flint. More researches need to be done before the plan could be implemented. Furthermore, corrosion control provides only temporary solutions and requires continuous maintenance.

4) Education

Education is targeted at consumers and includes multiple types of awareness projects about lead exposure. Education will include measures to reduce exposure to lead from drinking water or other sources. To address a wider range of the population in a shorter time frame, education can be used in conjunction with another action (pipe replacement, testing and planning or corrosion control). Education programs will ensure that those who do not have access to lead service line replacement can prevent lead exposure. Education can help enhance people's awareness of the lead problem, teach people how to prevent lead exposure and enable people to identify symptoms of lead exposure in time. The majority of lead education programs focus on housekeeping interventions, such as flushing tap water before drinking and planting bushes or grasses in soil areas near lead exposure (CDC 2016).

Depending on previous work, $3-5 million per year is necessary to support lead education programs. Using education as a tool will allow a greater breadth of the population from all ages and areas to access a means of preventing lead exposure at a much more affordable cost. The outcomes of education is not 100% reliable and is dependent on individual behavior. However, to address a wider range of the population in a shorter time frame, education can be used in conjunction with planning grants for service line replacement.

6. Program Design

Given the advantages and disadvantages of four main actions covered in the act, most feasible and effective option is a combination of planning grants and education. Planning grants are most effective because they are the first crucial step to expose the severity and extent of the lead problem in the U.S. $50 million will be allocated for initial stage planning grants each year. The EPA will allocate the funds as $1 million for 50 cities across the country. These smaller grants will act as seed money that could inspire and put pressure for further funding. The key to this option is that the planning grants will demonstrate actionable solutions and will thereby amass greater political will to support future steps. At the end of 5 years, 250 cities widely distributed across the nation will set examples as successful lead reduction projects and create a nationwide political influence.

Alongside the planning grants, EPA will allocate $4 million for education each year. Currently EPA spends $11 million for Environmental Education Program (EEP) and $14.6 million for Environmental Justice (EJ). Our program plans to focus on most vulnerable communities. It will allocate $2 million to EJ program to focus on vulnerable communities and $2 million to EEP to increase the outcomes of the National Environmental Education Act.

The proposed allocation of funds kick-starts lead service line replacement projects, a long-term and final solution, while addressing the lead problem through education in the interim. The goal is to temporarily reduce lead exposure through education, while supporting the beginning stages of lead service line replacement projects. This initial funding will put pressure on legislative branches to increase funding for further development of such projects. The one drawback is that politicians will have to argue for an initial investment without guaranteed future funding. However, given the political process future funding would be realistic. Under this scenario, the Get the Lead Out Act will seed short-term and long-term lead reduction programs and will carve an opportunity for future funding.

The grant program will be opened to applications and application will be reviewed based on the priorities of the act. In soliciting applications, the program will ascertain local interest and political will to carry out future large scale lead pipe replacement programs (See Appendix C). The program will also establish a monitoring system (See Appendix D) to measure the success in each step: Applications, review, issuing grant money, and education. The results will be used as a feedback mechanism to further improve the program.

6.1. Goals of the program design

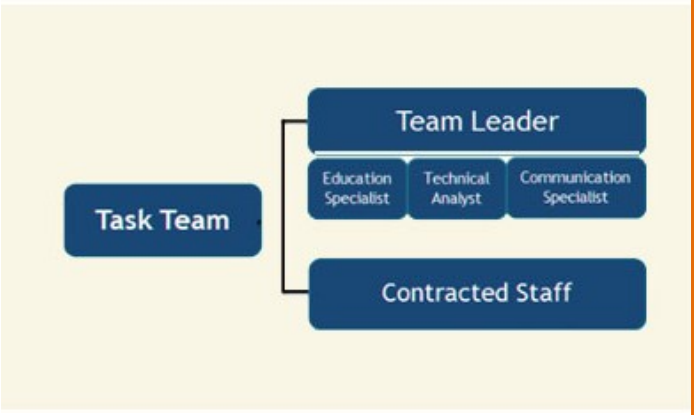
(1) Facilitate local lead reduction efforts
(2) Target children/low-income communities
(3) Seed future large-scale projects
(4) Create political influence
(5) Increase public awareness

7. Organizational Plan

Based on the principle of maximizing output while minimizing cost, administrative costs are minimized in this program. Therefore, "Lead Free" project team is established to consist of four personnel and mainly depend on contractors. This project team operates under the Environmental Protection Agency's Office of Water, specifically in the Office of Ground Water and Drinking Water. The "Lead Free" project team seeks to mitigate lead issues in America by overseeing implementation and allocation of federal grants awarded under the Get the Lead Out Act of 2016.

The general structure of the project team includes one project team leader and three government specialists, with an option to hire contractors for support on internal and external level matters (See Appendix B). All core members of the project team will be offered a permanent position, pending his or her performance after the first year of the program.

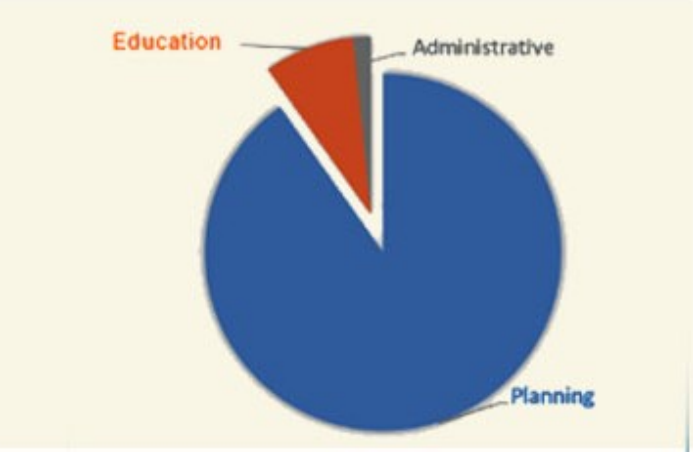
Figure 4. "Lead Free" Project Team



8. Budget Plan

Program budget consists of three main components: Planning grants, education and administrative costs. Each year, $50 million will be allocated for planning grants, $4 million for education and $1 million for administrative costs. Considering the possibility of not receiving total $60 million, administrative costs are limited to $1 million. Administrative costs include personnel wage, benefits, travel expenses, office expenses, meetings and occasions, web services and contractor budget (See Appendix E).

Figure 5. Budget Allocation



9. Accomplishments

The first year objectives can be divided into two parts: lead reduction and education. The program will facilitate local planning of lead reduction projects, outreach to low-income communities and establish a monitoring system. In addition, the program will establish effective community-based education programs and raise public awareness of lead issues.

Our first-year tasks include soliciting applications, reviewing applications, issuing grant money, monitoring implementation processes, and facilitating education programs. Before implementing the program, a comprehensive evaluation of the extent of the lead problem among communities in the US is required. This includes a well-established mechanism to assess the application and monitor the implementation.

The Office of Water will manage the entirety of the program and contracted consultants will aid in grant application, evaluation, and the monitoring process. EPA officials will be held responsible for establishing the program's management structure and securing contractors by March 1, 2017. Contractors will also aid in application review and the grant selection process. Progress reports will be issued regularly and the will be accessible by related authorities and the public.

The staff hiring process will be completed by January 2017. The temporary EPA contractors for the "Lead Free" project team will be completed by the end of March 2017. After securing the contractors, program promotion will begin, followed by soliciting and evaluating applications, and then issuing the grant money by September 2017. Educational programs will begin in June 2017 and will be carried out through the remainder of the year (See Appendix F).

In soliciting applications, the program design hopes to achieve active participation of diverse stakeholders and extensive community-based investigation of the lead problem. Reviewing applications will ensure the future support after the duration of the grant program, revealing the extent and severity of the lead problem in the United States, the total cost of addressing it, and the willingness from local communities to do so. In granting money, the program strives for fair and effective grant distribution.

Monitoring program and progress will ensure the effective maximization of grant funds. The education program will raise awareness among the public, deliver enough knowledge on lead issues and achieve Behavior Modeling and Sustained Motivation on public self-protection from lead issue.

10. Conclusion

In 2014, the lead crisis afflicting Flint, Michigan's drinking water has been the cause of outrage and concern about the risk of aging drinking water infrastructure in the United States. A review of the national lead contamination problem reveal that lead exposure is widespread across the country and is not uniformly distributed across groups of people. Age and poverty status place some groups at a disproportionately high risk for lead poisoning in drinking water. Yet, effective solutions to these challenges exist and can be implemented.

The 2016 Get the Lead Out Act sheds light onto cost-effective solutions to protect the most vulnerable population from lead, as well as enhance public awareness about this issue. Several options such as pipe replacement, planning grants, corrosion control and education program have been considered in the bill to address the urgent needs of low-income communities for improved water infrastructure projects. The unique program design - planning grants in combination with community-based education - is most effective and sustainable from social, ethical and environmental perspectives.

This bill proposes solutions to lead elimination and provide equal access to clean water at multiple levels. In communities, where lack adequate implementation of the Lead and Copper Rules, local - or household-level solutions can be more effective. Informing households of the health effects of lead, the different sources, and affordable household water treatment methods can make a significant difference in improving health. The community level is essential as localities are primarily responsible for providing water infrastructure services and engage active participation from corporations, NGOs, and public sectors in water quality improvement. In distributing $1 million grants to 50 municipalities, this programs aims to help cities initiate the planning stages necessary to cultivate further financial and political support.

However, both state and local governments have reached the consensus that elimination lead in water, as a multi-billion-dollar problem, requiring massive capital investments in water infrastructure. Hence this bill alone is insufficient to meet all needs. Recommendations for moving forward to solve the nationwide water quality challenges encompass legal, financial and technology are detailed as follows:

Legal

In the coming decade, water resources will be under increasing stress from aging infrastructure and climate change. "Social and institutional innovation is a key aspect of an efficient adaptation framework. This may imply revising governing arrangements,

decision-making mechanisms, budgetary processes, etc." (United Nations, 2009).
A new comprehensive national strategy is crucial and should build on principles of civil society, economic equality and sustainable development. The federal government should set more enforceable water quality standards, locate key sites for remediation, create city-based planning units that integrate information, identify lead sources, and drive appropriate interventions at local level. Enforceable standards are only the first step.

A monitoring system of lead concentrations in water should be up-scaled and embedded into a national water quality monitoring system to have efficient enforcement procedures and take punitive actions. Key water quality indicators must be implemented to track the effectiveness of lead remediation and improve data sharing and transparency.

Finance

Given the widespread geographic nature of potential lead hazards in old cities like Flint, one of the major challenges is the lack of capital investment to support an integrated water management system. The most common sources of funding now are federal funding grants from the U.S. Department of Housing and Urban Development (HUD), the U.S. Environmental Protection Agency (U.S. EPA), and the CDC (UUP, 2008). Nevertheless, eliminating lead poisoning in children in low-income communities needs creative ways to provide dedicated funding for local projects.
One possible initiative is establishment of a targeted fund for lead pollution remediation, such as New Jersey's Lead Hazard Control Assistance Fund, which provides loans to households in lead-based hazards. State governments can also give business tax credits for lead reduction work, bringing strong incentives in capital investment, as well as technological development on cost-minimized lead remediation projects.

Research and Development

In addition to funding, technical and logistical support should be provided by state government to help communities implement technology and infrastructure projects to remove water. Additional research on the evaluation of cost and benefits of different lead reduction methods should be conducted to identify best practices and attract further funding.

Future research should focus on:

- Affordable and environmentally-friendly materials for pipe replacement, which, despite being effective in many cases, has been too costly to be implemented on a large scale.
- Low-cost and reliable testing technology needs to be developed to prevent serious latent impact of lead in human body.

- Better and cheaper ways of quickly and accurately detecting lead contamination in public water supply systems.
- Effective education to trigger behavior change in water treatment to reduce the risk of lead poisoning in households

Ultimately, improvements in knowledge, technology, and water management will create new ways of dealing with lead in water, building paints, and soils.

A combination of state and local efforts is essential to prevent another Flint. Technology development will bring new strategies to lead removal, water quality monitoring and toxin detection. Yet, immediate action is necessary to prevent a generation children suffering from intellectual disabilities and low-income households deprived of basic rights to water.

To achieve a more sustainable and equitable future, we must integrate diverse financial tools, public pressure on policy, and environmental education to actively enforce water quality regulations. This bill is a crucial step towards this positive future.

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Appendices

Appendix A – Pros and Cons of Pipe Replacement, Planning, Corrosion Control and Education

Pipe Replacement	PROS	CONS
COPPER	• Suitable for outdoor constructions • Resist the growth of bacterial • Higher melting point	• Expensive • Environmental problems related to copping mining
CPVC	• Cheapest • Easy to implement • Efficient	• Lower melting point • Not suitable for outdoor constructions
PEX	• Flexible • Easy to implement • Better resistance than CPVC • Efficient	• Not suitable for outdoor constructions • Cannot be recycled

Planning	PROS	CONS
ECONOMIC	• Seed money	• Not 100% reliable

Corrosion Control	PROS	CONS
ENVIRONMENT	• **No disposal problem** • **Phosphate is safe**	• **Inhibitors may cause runoff** • **Polluting watercourses in other regions**
SOCIAL	• **Timely solution** • **Effective**	• **Health concerns** • **Limited funds**
ECONOMIC	• **Cheaper than pipe replacement** • **Easy to implement**	• **Needs further monitoring** • **High long-term investment costs**

Education	PROS	CONS
ENVIRONMENT	• Assures all sources of lead	• Only temporarily solutions
SOCIAL	• Addresses a wider range of population in a shorter time frame • Increase public awareness	• Depends on individual behavior
ECONOMIC	• Cheapest • Easy to implement	• Less efficient

Appendix B – "Lead Free" Project Team

1. Task Team Leader

Hiring Organization: Environmental Protection Agency
Position: Task Team Leader
Series/Grade: GS-0340-15
Job type: Part-time
Responsibilities:

- Directing and planning the review, development, and development of the overall program
- In communication with the Director of Office of Water, selecting well-qualified staff for the "Lead free" project team
- Developing an annual budget and operating plan in accordance with the overall goal
- Approving allocation and utilization of resources
- Establishing a performance management plan for the program

2. Lead Technical Specialist

Hiring Organization: Environmental Protection Agency
Position: Lead Technical Specialist
Series/Grade: GS-0340-14
Job Type: Part-time
Responsibilities:

- Establishing the criteria of eligibility for receiving the grant from a technical perspective on lead contamination condition
- Liaising with other specialists to ensure the effective and efficient program delivery
- Accomplishing and/or directing the actions involved in completing assigned projects, redirecting work, establishing priorities, and changing program emphasis
- Report findings to the leader quarterly and recommend changes to enhance the program
- Ensuring that all the coordinators receive appropriate training

3. Educational Specialist

Hiring Organization: Environmental Protection Agency
Position: Educational Specialist
Series/Grade: GS-0340-14
Job Type: Part-time
Responsibilities:

- Providing technical assistance to improve the effectiveness of education
- Directing design of the education contents, distribution channels, and feedback systems
- Ensuring that education programs operate within limited budgets

4. **Communication Specialist**

Hiring Organization:	Environmental Protection Agency
Position:	Communication Specialist
Series/Grade:	GS-0340-14
Job Type:	Part-time

Responsibilities:

- Communicating with recipient municipalities
- Communicating with contractors
- Coordinating the staff work within the team
- Communicating with other stakeholders to gain community support for the improvement and scaling up of the program
- Providing information for quarterly reports

There also exists money which will be allocated to contractors at the internal and external level of the project. Contractors will be selected on a need to need basis and serve as support for the implementation of the grant program. An example of a potential contractor and its responsibilities are listed below:

5. **Contractors**

Responsibilities:

- Announcing grant program
- Evaluating planning grant proposals
- Evaluating grant proposals of public education on lead poisoning, and water treatment
- Monitoring and reporting the overall implementation process
- Monitoring all expenditures of the program
- Providing information and data back to the project team
- Providing technologies and solutions for each programs based on their individual situations
- Assisting with other necessary tasks

Appendix C - Program Tasks

Task 1: Solicit Applications: The task team should clearly announce types of entities eligible to receive grants, types of applications, types of funding opportunities, legal implications of applications, format of application, and application receipt information and deadlines. The lead technical analyst will give all applicants a comprehensive guidance for research, investigation, and submission. The communication specialist will help facilitate the solicitation process by motivating diverse entities to apply and answering any questions that the local municipalities have. This task will be considered successful if it achieves active participation of diverse stakeholders, extensive community-based investigation of the lead problem, and a targeted number of qualified applications.

Task 2: Application Review: After applications are received, the management team, along with hired contracted consultants will review applications to determine entities in most need and for whom a planning grant would maximize the benefit of limited financial resources in future lead reduction projects. A ranking system will then be applied to each application based on the grant requirements and applicants' initial socio-economic status. Applicants with the highest scores will be given grants. The quality of applications can not only reflect the effectiveness of the team's guidance communication with municipalities during the application process, but also predict the future cost-effectiveness of the planning grants. The efficiency and transparency of review process plays an important role in making sure that the Program will be finished on time and increasing public trust.

Task 3: Issue Grant Money: After selecting particular entities, moneys will be disbursed through a third part contractor to the entities. Funds will be disbursed on a quarterly basis and entities will be required to report on progress each quarter. The contracted team will build a database to record and audit the financial transactions using an accrual-based method during the Program year. During the payment period, the task team will review all related processes to verify grant funds were allocated in compliance with federal regulations. This task will be considered success only if all grant receipts get the exact amount of planning grants within 10 business days after the review process.

Task 4: Monitor Programs and Progress: The monitoring program encompasses the monitoring of grant process and voluntary reporting of use of grants. The goal is not only to measure and evaluate the effectiveness of the grant, but also shed light onto further adjustment of the strategies of the years to follow. The task team will define measurable and traceable indicators to measure the impact of local lead reduction efforts and assign contractors to start gathering information and establish a framework for local entities to conduct voluntary report. The task team will direct the monitoring system based on communities' voluntary reports, financial statements, water sample collection, household visits, and social surveys.

Task 5: Facilitate Education Program: The education specialist will lead the evaluation national education program. The team will implement an impact-based evaluation, collaborating with local entities and contractors. This task is expected to create wide behavior change and targets at all age groups with different level of education contents.

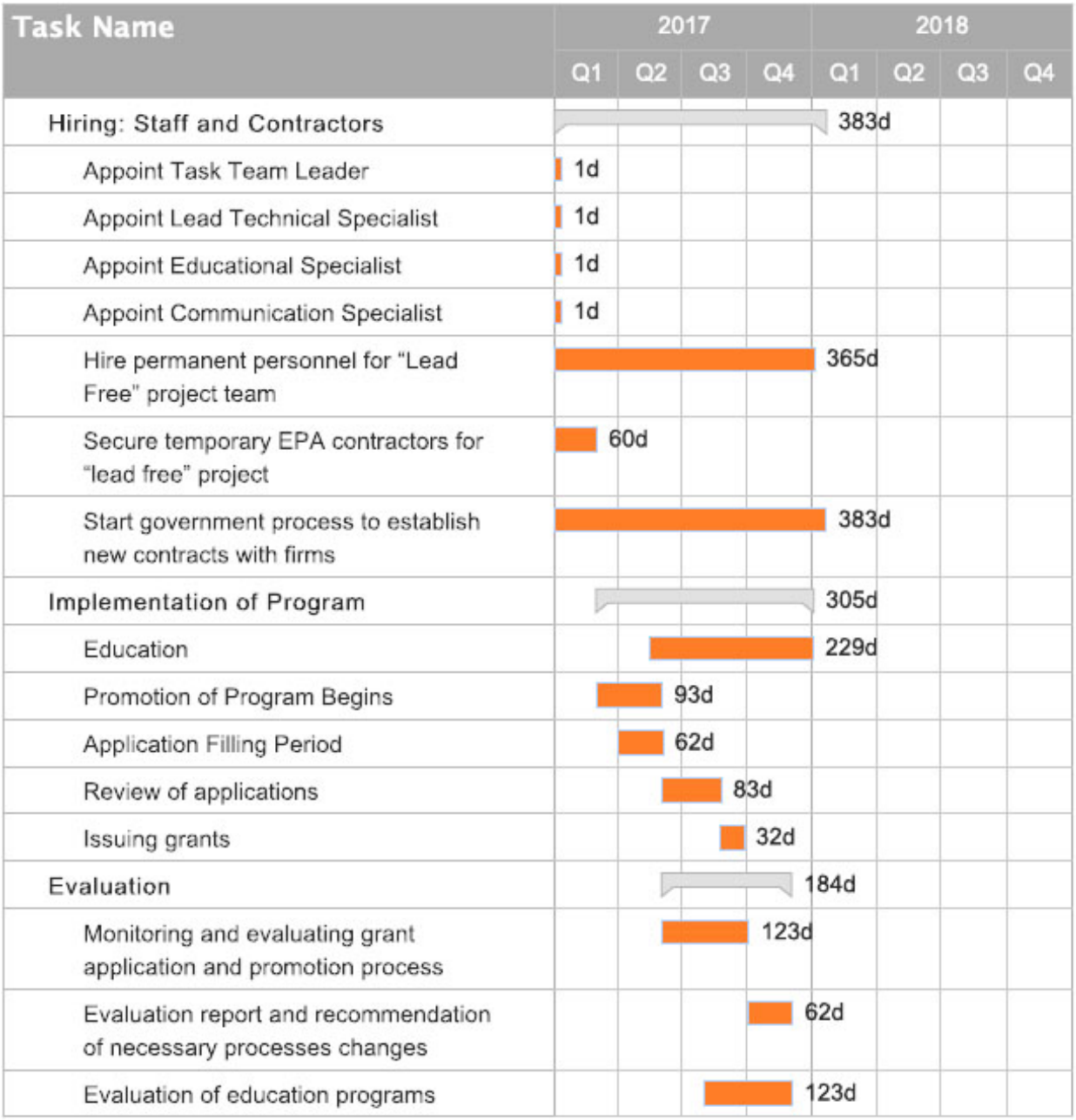
Appendix D – Monitoring and Feedback System

Tasks	Indicators
Solicit Applications (15%)	1a: Number of applications (5%) 1b: Distribution of applications based on home state (5%) 1c: Distribution of applications based on household income(5%)
Application review (15%)	2a: Number of applications meeting the minimum qualifications (5%) 2b: Number of feasible proposed projects (5%) 2c: Average time from receiving applications to making grant decision (5%)
Issue grant money (30%)	3a. Average time for each entity to get the money (days) (10%) 3b: Distribution of applications based on home state (10%) 3c: Distribution of applications based on household income(10%)
Monitoring Process (20%)	4a. Average score of local municipalities' lead reduction effort (10%) 4b. Completeness of project report by municipality (10%)
Facilitate Education Program(20%)	5a. Participation rate of education program (10%) 5c. Average score of community surveys (10%)

Appendix E – Program Budget

Planning Grants	**$50,000,000.00**		
Education Programs	**$4,000,000.00**		
Staffing Budget	**$1,000,000.00**		
Personnel Computation	**Wage**	**Benefits**	**Benefits**
Task Group Leader GS-15	51,323.00	20%	10,264.60
Lead Technical Specialist GS-14	43,631.50	20%	8,726.30
Educational Specialist GS-14	43,631.50	20%	8,726.30
Communication Specialist GS-14	43,631.50	20%	8,726.30
Total Personnel Expense	**218,661.00**		
Contractor Budget	**726,339.00**		
Other than Personal Service			
Travel Expense	25,000.00		
Meetings and Occasions	8,000.00		
Office Expense	2,000.00		
Web Services	5,000.00		
Total OTPS	**40,000.00**		
Total Available Budget	**$55,000,000.00**		

Appendix F – Program Timeline



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