

Land Reuse and Redevelopment Toolkit

An Environmental or Health
Professional's Guide to Creating
Healthfields



Image of a Brownfield . Source: Lloyd DeGrane, 2014.



U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

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Image of a Brownfield . Source: Lloyd DeGrane, 2014.

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 - [HHS Web standards](#)

This Toolkit's Purpose

The *Land Reuse & Redevelopment Toolkit* provides Environmental or Health Professionals with the information, procedures, and resources needed to identify, cleanup, and redevelop Land Reuse Sites to positively impact a community's overall health. Let's start with the basics.

The Basics

Land Reuse Sites are sites that are slated for redevelopment but may have chemical contamination. Land Reuse Sites include **Brownfield**, as well as other types of hazardous or potentially hazardous sites, such as landfills or Superfund sites. In essence, they are potentially contaminated sites that may be abandoned or underused industrial, commercial, or residential properties. A variety of Land Reuse Sites exist in the United States, including Brownfield.¹

Brownfield are defined by the United States Congress through a 2002 amendment to CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) as real property — the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. There are some exclusions to the definition of "Brownfield site," including facilities that are listed or may be placed on the National Priorities List, or are subject to corrective action under the Solid Waste Disposal Act.

The Environmental Protection Agency (EPA) estimates that there are **more than 450,000 Brownfield sites in the United States making them the most common** type of Land Reuse Site.² As foreclosures and manufacturing downturns increase, so may the number of Brownfield.

There are other types of sites that qualify as Land Reuse Sites.

Federal facilities include lands and improvements to lands, such as buildings, structures, and equipment owned by or leased to the federal government. Some of these sites may be contaminated. Federal facilities must comply with environmental regulations.³

Resource Conservation and Recovery Act (RCRA) Regulated Sites are regulated for the management of solid waste (e.g., construction debris or garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Past and present activities at RCRA sites sometimes have resulted in the release of hazardous waste and hazardous substances into soil, groundwater, surface water, sediments, and air. The RCRA requires investigation and cleanup of these hazardous releases.³

Superfund Sites are uncontrolled sites or abandoned places that contain hazardous waste and potentially affects local ecosystems or populations. These sites may be noted on the government's [National Priorities List](#).³

Underground Storage Tanks refer to any underground storage tank and underground piping connected to the tank that has at least 10% of its combined volume underground. The EPA regulates tanks that contain petroleum or any hazardous substances.³

Landfill are sites that can receive solid waste from municipalities, industrial facilities, construction activities, and medical facilities. Landfills must be designed to comply with federal regulations to protect the environment from contaminants that may be present in the waste stream.⁴

The Risks and Dangers of Land Reuse Sites

Land Reuse Sites can harm your community's health in many ways. The dangers include poor air quality, increased risk of disease, limited access to healthy foods, a lack of options for physical activity, poor housing quality, and environmental damage leading to toxic air, water, or soil. These sites can be redeveloped into healthier and safer environments, or "Healthfield." In addition to providing cleaner environments and health benefit, the redevelopment of Land Reuse Sites can stimulate the local economy by bringing in new businesses and creating jobs.

Miles Ballogg, a member of the Brownfields & Reuse Opportunity Working Network ([BROWN](#)), is one of the original supporters of the "Brownfields to Healthfield" concept. Ballogg has promoted and helped to develop Healthfields throughout his home state of Florida.⁵

Healthfield are redevelopment projects that address community needs such as access to healthcare, fresh food, community centers, and parks.



Image of a Brownfield
Source: GettyImages, 2017.

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Redevelopment Benefits

Cleaning up and investing in Land Reuse Sites:

- Protects the health of communities
- Removes development pressures off undeveloped land
- Optimizes the use/reuse of existing infrastructure
- Facilitates job growth
- Increases local tax bases
- Transforms environments into healthy and safe places

The ultimate goal is to enhance community health by reducing potentially harmful exposures to hazardous substances. If you redevelop a site with the health of your community in mind, you can help residents live a healthier overall lifestyle.

This toolkit provides all the information you need to build Healthfields or other health-focused redevelopments in your community.

Who We Are

The **Agency for Toxic Substances and Disease Registry (ATSDR)** is a federal public health agency headquartered in Atlanta, Georgia. ATSDR is responsible for evaluating and protecting community health from the effects of exposure to hazardous substances in the environment.

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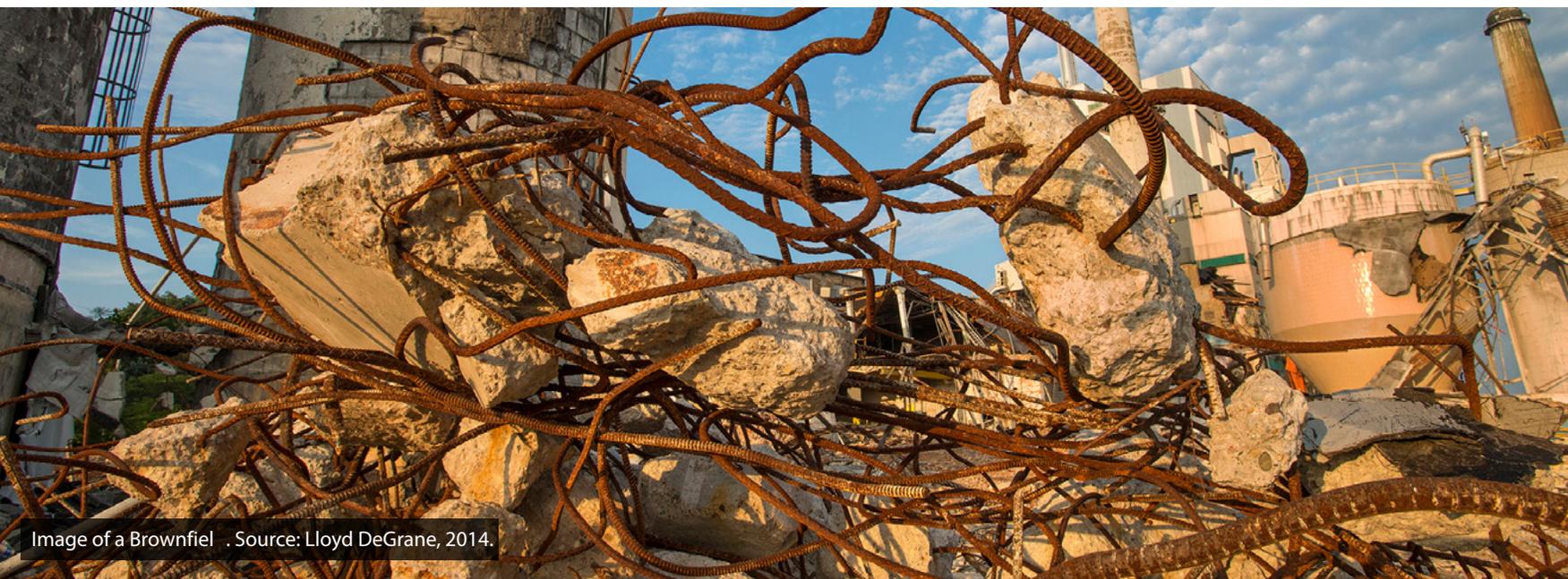


Image of a Brownfield . Source: Lloyd DeGrane, 2014.

Are You an Environmental or Health Professional?

Are you an Environmental or Health Professional?

An Environmental or Health Professional is someone who possesses sufficient specific education, training, and experience necessary to exercise professional judgment regarding conditions indicative of exposures related to hazardous substances.⁶

The following questions are a good gauge of whether this role fits your experience.

- Can you identify, evaluate, and cleanup hazardous materials?
- Can you implement, administer and advise others on hazard controls and hazard control programs?
- Can you evaluate community health using procedures and practices based on Public Health evaluation tools and techniques?
- Can you translate complex, technical findings into plain language?
- Can you conduct thorough and compliant Environmental Site Assessments?
- Can you conduct a Community Health Assessment?

If you answered “Yes” to one or many of these questions, you’re an Environmental or Health Professional and can use this toolkit throughout all phases of the project. For [additional information](#), the EPA provides descriptions of licenses, certifications and experience associated with these types of roles.

Laurel Berman

ATSDR National Brownfields Coordinator



“Land reuse and redevelopment provides opportunities to safely reuse land and improve overall community health.”

Monica Robinson

Health Program Manager, Fulton County Department of Health (GA)
Environmental Justice Program | Performance and Strategy Team



“The amendments to the Fulton County Zoning Resolution demonstrate how a zoning ordinance can contribute significantly to addressing Brownfields and healthy land reuse. Cleaning up and redeveloping also protects public health and the environment.”

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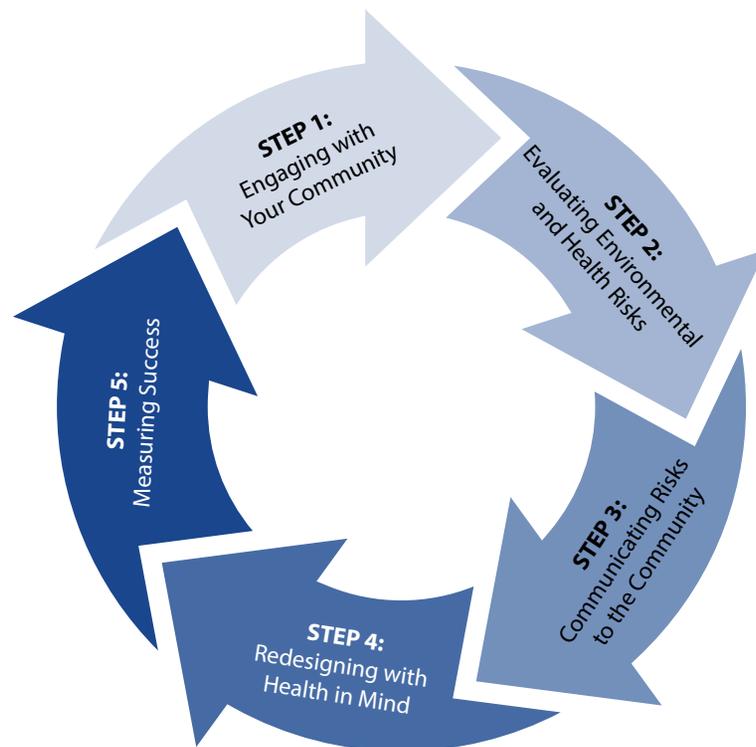
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Understanding How You'll Work within the 5-Step Land Reuse Model

The structure of this toolkit follows the comprehensive **ATSDR 5-Step Land Reuse Model** used by communities to transform sites. As an Environmental or Health Professional, you play a critical role in many of these steps.



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Step 1: Engaging with Your Community

First, get your community's support to address a Land Reuse Site. Then, come together to establish a community vision, address your community needs, and define how you will spread information throughout the project. Make sure to create a broad "Development Community" – residents, nonprofit, Environmental or Health Professionals, and anyone who shares a vision for a cleaner environment and improved health.

Step 2: Evaluating Environmental and Health Risks

An Environmental or Health Professional will conduct an Environmental Site Assessment (ESA) to determine what, if any, contaminants and liabilities are associated with the Land Reuse Site. An ESA typically has one or two phases:

- For an ESA I, the professional collects basic information — including inspecting the site, interviewing former owners, and reviewing local records.
- If there are concerns about possible contamination, an ESA II might be necessary. This means collecting and analyzing environmental samples (such as soil or water) to determine exact contaminant levels at, or from, the site. Environmental or Health Professionals can review those contaminants to determine possible harmful exposures and recommend protective actions.
- *NOTE:* ESA I and II are often referred to as Phase 1 or Phase 2 Site Assessments.

Step 3: Communicating Environmental or Health Risks

After the ESA report is finalized, you can help communicate the findings to your community. As an Environmental or Health Professional, part of your role is to translate the technical findings of the ESA report into easy-to-understand language. You may even be asked to meet with the community to explain any environmental and health impacts.

Step 4: Redesigning with Health in Mind

Once the community understands the ESA finding, you can discuss site cleanup and reassess the vision before you begin redevelopment. For example, the end result of a Healthfield redevelopment could include housing, produce markets, community gardens, health clinics, or parks.

Step 5: Measuring Success

It is important to measure and communicate any successes of the project to your community throughout redevelopment. Even small milestones show the community that the site is progressing in the right direction.

Keep reading to learn about each step of the Land Reuse Model and expected activities.

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Activating the Community

Communities living with hazardous waste sites or potentially contaminated Land Reuse Sites have likely tolerated these sites for many years, and may be unsure of the opportunity for government support to regulate or cleanup these sites. Often, it is simply because the sites are not known to government officials or regulatory agencies. **Community members can be an asset in identifying potentially contaminated Land Reuse Sites and inspiring action toward cleanup** — or, at a minimum, restricting access to the site.

As an Environmental or Health Professional, your role in engaging with the Development Community (citizens, Community Planners, stakeholders, etc.) can be pivotal in building the community's understanding of — and capacity to support — safe land reuse and redevelopment.

Understanding Who is Affected by Land Reuse Sites

It's important to begin the process with a proximity analysis. This analysis can identify individuals who live near the site in question and what, if any, negative effects they feel as a result of their proximity. **It's especially important to understand who is at increased risk from exposure to toxic agents**, often referred to as **sensitive or special populations**, people who might be more sensitive or susceptible to exposure to hazardous substances because of factors such as age, occupation, sex, or behaviors (for example, cigarette smoking). Children, pregnant women, and older people are often considered special populations.⁷ Sometimes, low income communities or communities of color are disproportionately impacted by Land Reuse Sites.

When you engage with the community and analyze the site(s), it is crucial to assess and understand all exposure pathways. Exposure pathways are the ways people can come into contact with a hazardous substance. The three basic exposure pathways include inhalation, ingestion, or direct contact. As an Environmental or Health Professional, you can assess the extent of community exposure to the Land Reuse Site by measuring the amount of contact all populations have with the hazardous substance(s) on the site.

Toxic agents are chemical or physical agents that, under certain circumstances of exposure, can harm humans, animals, or other living organisms.

Health professional engaging with Development Community. Source: Getty Images, 2017.

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Activating the Community

As an Environmental or Health Professional in the Development Community, you can set the tone for early community involvement in safe land reuse planning. Your knowledge of hazardous exposures and the environment (and if you are a Health Professional, health education) will be welcomed in the Development Community.

The practice of community involvement requires earnest, respectful, and continued attention. To successfully create a collaborative environment, establish clear expectations, communicate effectively and always put your community first. ATSDR has learned the importance of community health considerations and incorporates these needs in their land revitalization activities, which strive to:

- Encourage early community involvement in decision-making.
- Improve ways to talk about health and environmental risks.
- Promote relationships among, agencies, partners, and communities.
- Promote a well-rounded, health-focused approach to redevelopment.
- Restore and revitalize communities in a way that is fair to all community groups.
- Measure and evaluate changes in community health.

You can strengthen your role in community engagement by partnering with Community Champions. Often, the Community Champions are so busy rallying their constituents that they could use some support from an expert. As an Environmental or Health Professional, you may often become a trusted advisor and member of the Development Community; your peers may look to you for reliable and accurate information about contaminants, risks, exposures, and site redevelopment techniques.



Health professional engaging with Community Champions.
Source: Getty Images, 2017.

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Methods of Community Engagement

The [ATSDR Communication Toolkit](#) provides an array of tools and strategies for effective methods for communicating with communities and keeping them involved throughout the redevelopment process. In addition, ATSDR's [Principles of Community Engagement](#) provides a thorough overview of effective methods for communicating with communities. It is a resource you can use to keep your Development Community involved and engaged throughout the redevelopment process. A summarized version is provided below.

- 1 Be clear about the goals of the project and the populations involved.
- 2 Understand the community's culture, economic conditions, social networks, and support programs, such as local healthcare providers or park districts. Learn about how your community perceives those initiating the community engagement activities.
- 3 Build trust and establish relationships within the community, and connect with local leaders. Urge community organizations and leaders to create processes for mobilizing the community.
- 4 The power to create change lies within the community, and not necessarily with external programs and organizers.
- 5 All outside organizations may not share your interest. That's okay. They may have a different focus. Continue to reach out for assistance and partners, on local, state and national levels.
- 6 Community organizers must recognize and respect the diversity of the community. Awareness of the various cultures and values of a community must be paramount in planning, designing, and implementing approaches to engaging a community.
- 7 Community engagement can only be sustained by identifying and mobilizing community assets and strengths, and by increasing the community's ability to make decisions and take action.
- 8 Experienced professionals, organizations, and residents can work together, sharing knowledge, resources, and contacts, while staying flexible to meet the demands of change.
- 9 Community collaboration requires long-term commitment from the organization and its partners.

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Methods to Engage

There are a variety of ways to engage your community. Working with the Community Champion and other members of the Development Community, you may consider methods such as the Visioning Technique, the [ATSDR Action Model Toolkit](#), or using photographs to tell a story to drive change.

Identifying Community Needs and Creating a Unified Vision

Establishing a unified community Vision is essential to a successful redevelopment project. You can support your Development Community by leading brainstorming sessions about the vision for redevelopment, finding ways to vote on common themes and adapting the plan to suit everyone.

It's also important to consider long-term sustainability of the community vision. Because long-term sustainability typically involves discussing complex issues, it can be a challenge for any community or municipality to tackle. The following resources provide helpful approaches and questions to facilitate these conversations.

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Community receiving grant.
Source: Lloyd DeGrane, 2014.



Community Vision is the shared consensus of a population about what future its members want, as well as a group decision about what is necessary to achieve it.

The ATSDR Action Model Toolkit

The [ATSDR Action Model Toolkit](#) helps the wide range of members of the development process find ways to integrate health into the redevelopment. In addition to municipal agencies, Environmental or Health Professionals, and planners and developers, the community can also use the Action Model to identify common goals or visions and ensure they're incorporated in strategic planning.

The [Action Model](#) consists of four steps, using questions to help identify community needs and empower groups to align on unified visions and goal .

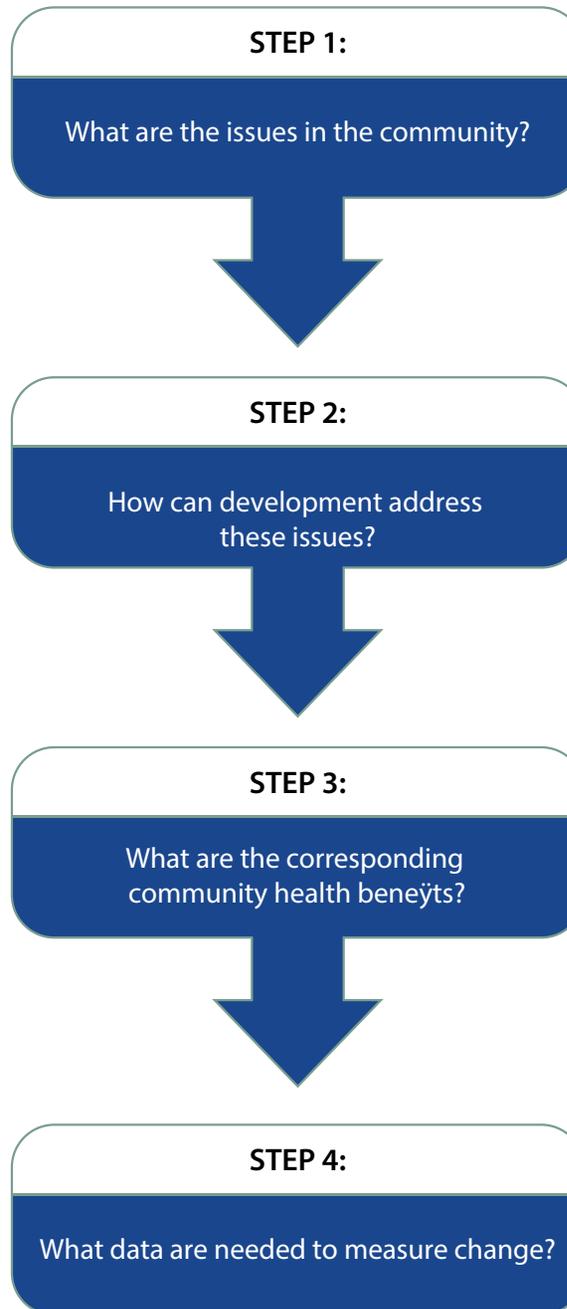
Guiding Community Conversations



Image of Ken Meter. Source: Crossroads Resource Center, N.D.

According to Ken Meter, a BROWN member from Crossroads Resource Center, these three questions serve as great thought-starters, but also provide guidance to keep the community and facilitators grounded throughout the process

1. How do we create an inclusive process?
2. How can we set a guiding vision for sustainability for our community?
3. How do we measure progress toward that vision?



The Visioning Technique

The **Visioning Technique** helps individuals arrive at a shared community vision by getting them to talk about what their ideal environment would look like.⁸

Begin by inviting citizens to a collaborative setting, where they'll visually depict their own image of what they would notice in their community if the changes they sought became true. It can be as simple as covering tables with large posters of plans or even blank sheets of white paper and providing colored markers. Ask specifically for images, because they succinctly carry a lot of information. Ask them to describe what your community might look like in the future, **using all of the bodily senses**:

- What would I see?
- What would I hear?
- What would I feel, taste, or smell?

A visioning session held in Minneapolis, Minnesota, demonstrated the value of a sustainability project. One participant expressed that, if the city were more sustainable, "I [would] be able to walk safely with my grandchild from my house to the train station, so we can visit our relatives in Chicago."

Notice the many elements contained in that one sentence: "I would feel safe; I would feel connected to my family; I would be able to walk rather than drive; I would have access to a train; I would have a sense of peace and possibility that I do not have today." These are precise, rich, relatable sentiments. Indeed, they helped inform the conclusion that the most significant step Minneapolis could take would be to create a walkable city.

A Picture is Worth a Thousand Words

Many health educators and community organizations use photographs to tell a story about conditions in their communities. They use the power of pictures and community participation to spur critical thinking and change. Some people use a technique called **Photovoice** which uses pictures to lead social change and awareness.

Your community members can take pictures of things they wish to change and provide a short caption or narrative to explain each photo. For example, a community member may take a picture of an abandoned school and write: "We have no safe place to get together, play basketball, or watch movies. I wish we could repurpose this old school into a community center."

Pictures can raise awareness, evoke emotion, and in turn, create action. Telling a community story with pictures taken by community members can unify them. It helps bring attention to the perspectives of people who live differently from those usually responsible for depicting the world during policy-making processes.

Here's an example from a community that was asked to conduct this exercise for their local park:

"We need an upgrade ... benches, tables, or garbage cans."



Image of a community park used in a Photovoice project. Source: New York State Department of Health, 2012.

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Key Roles Within the Model

Understanding Roles Throughout the Process

It's important to understand the process of redeveloping a Land Reuse Site holistically. The following chart details the primary types of personnel you can expect to work with during each stage of the project.

Roles	Who are they?	What's their role?	Who do they work with?	What key steps are they involved in?
 <p>Community Champion</p>	A person living in the community who is passionate about his or her community's health.	<ul style="list-style-type: none"> • Activate the community to make them aware of the site. • Convey all potential risks to the Community and convince them to invest time and resources into redevelopment. • Share all relevant information with the community. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agencies • Environmental or Health Professionals 	<ul style="list-style-type: none"> • Engages the Community • Communicates Risks • Measures Success
 <p>Community Planner</p>	A person who plans the logistics of a redevelopment project.	<ul style="list-style-type: none"> • Engage community members to understand their needs for redevelopment. • Create project plans to ensure site assessment, remediation, and redevelopment are on time and on budget. 	The Community Planner works with everyone in the process.	Involved at all steps
 <p>Municipal Agency</p>	A person who works for a local municipality.	<ul style="list-style-type: none"> • Bridge the capabilities of local, state, and/or federal government to the community project. • Provide network of resources, including community outreach, grant writing, staff, etc. 	The Municipal Agency works with everyone in the process.	Involved at all steps
 <p>Environmental or Health Professional</p>	A person who is qualified to provide environmental and health services for a community.	<ul style="list-style-type: none"> • Conduct site assessment. • Conduct environmental cleanup of site. • Conduct community health analysis. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agency 	<ul style="list-style-type: none"> • Evaluates the Environmental and Health Risks • Communicates the Risks
 <p>Developer</p>	A person in charge of the development aspects of the project.	<ul style="list-style-type: none"> • Provide practical redevelopment options that address community needs. • Execute the redevelopment of land into functioning real estate. 	<ul style="list-style-type: none"> • Community Planners • Municipal Agency 	Involved at all steps but their primary role is redesign

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Step	Roles	Activities
Step 1: Engaging with Your Community	 	Work with the Community Planner and Municipal Agency to gain contextual awareness of the community and their unique health needs.
Step 2: Evaluating Environmental and Health Risks		Work with the Municipal Agency to coordinate a site assessment and community health analysis.
Step 3: Communicating Environmental and Health Risks		Work with the Municipal Agency to translate the results into plain language so the community can understand the results.
	 	Work with your Community Planner and Community Champions to share the results of the site assessment with the community.
Step 4: Redesigning with Health in Mind		Work with the Municipal Agency to conduct an environmental cleanup of the site.
Step 5: Measuring Success		Work with the Municipal Agency to quantify the economic benefits from the healthy land reuse.

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Get Started Now

If the community is being engaged about the site in question, and key personnel need answers to technical questions, you can help. Contact ATSDR at:

 www.atsdr.cdc.gov/sites/brownfield

 ATSDR.LandReuse@cdc.gov



Step Two

Evaluating Environmental and Health Risks



Conducting site assessment. Source: Getty Images, 2017.

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Understanding Site and Health Assessments

Before the redevelopment of Land Reuse Sites, an ESA is conducted to understand the potential for contamination. In addition, you may need to determine the health risks associated with exposure to potential contamination to protect the health of people who live near or access the site. This could include identifying a release or threatened release of hazardous materials into structures on the property, into air, or into soil and groundwater or surface water on or near the property.

The two primary phases of the ESA process are designed to increase the level of understanding of the site condition.

1. ESA Phase I is sometimes referred to as “due diligence” or “all appropriate inquiry.” It identifies potential environmental concerns.
2. ESA Phase II identifies actual contaminants through laboratory testing of actual soil, water, and air samples.

Adhering to Environmental Site Assessment Procedures

As an Environmental or Health Professional, you may already have experience with conducting an Environmental Site Assessment (ESA).

The Environmental Protection Agency (EPA) has established standards for conducting all appropriate inquiry—the requirements for assessing the environmental conditions of a property prior to its acquisition. For properties purchased after May 31, 1997, the law requires the use of procedures developed by the American Society for Testing Materials (ASTM), as they meet the “all appropriate inquiry” requirement for site characterizations and assessments.⁹

The **American Society for Testing and Materials** (ASTM) International is a worldwide standards organization, which has strict [guidelines for both ESA I and II](#). Phase II of the ESA can be very technical, but there are plenty of environmental and health resources to assist you. Besides the aforementioned ATSDR and EPA, there are [state, tribal, and even local environmental and health agencies](#) that can also provide support.

Conducting site assessment.
Source: Getty Images, 2017.



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Assessing Potential Contamination - Public Health Assessment

If a Land Reuse Site has been evaluated for contamination, either through an ESA II or by a state or federal regulatory agency, your community members may have concerns about exposure to contamination. Through the [ATSDR Partnership to Promote Local Efforts to Reduce Environmental Exposure](#) (APPLETREE), ATSDR can fund a variety of state, county, city/township, special district, and tribal governments or organizations to conduct these activities at Land Reuse Sites. In 2017, for example, ATSDR funded 25 State Health Agencies. APPLETREE partners investigate and respond to harmful exposures in communities and educate the public on exposure protection.

During the [health assessment](#) process, either ATSDR or an APPLETREE partner may review environmental data to determine potential adverse health effects on people who may live near or access a Land Reuse Site.



ATSDR and partners have completed over 2,700 health assessments at Land Reuse Sites across the country, of which 274 were Brownfield . ATSDR discovered health hazards at 42% of these brownfields sites.¹⁰

Testing ground samples at site. Source: Getty Images, 2017.

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Conducting Site and Health Assessments

As an Environmental or Health Professional, you may already be well-versed in the evaluation of potentially hazardous sites. There are several frameworks you can use for a community health assessment. Here are three commonly used methods:

- The aforementioned ATSDR Action Model
- Health Impact Assessment
- Protocol for Assessing Community Excellence in Environmental Health

A **Health Impact Assessment** (HIA) is an evidence-based approach to inform the decision-making of proposed policies, programs or projects with the goal of maximizing the positive health impacts and minimizing the negative health impacts. This baseline research can help you decide which aspects of the community's health can be addressed through the redevelopment of toxic sites.

The HIA can help you understand how a Land Reuse Site redevelopment plan may affect your community's health, as well as what options are most effective when evaluating proposals for a new health initiative. An HIA uses scientific data, professional expertise, and stakeholder input to identify and evaluate the public health consequences of proposals **before** they are implemented. It also suggests actions that can minimize adverse health impacts and bolster beneficial health impacts.¹¹ An HIA consists of six steps:

1. **Screening** – Determines the need and value of an HIA.
2. **Scoping** – Determines which health impacts to evaluate, the methods for analysis, and the work plan for completing the assessment.
3. **Assessment** – Develops a health profile of the community, including baseline conditions for various health conditions, literature reviews, and quantitative methods to assess likely effects of the proposed project.
4. **Recommendations** – Provides strategies to manage identified adverse health impacts.
5. **Reporting** – Develops the HIA report and communicates findings and recommendations.
6. **Monitoring** – Tracks impacts of the HIA on decision-making processes and the decision, as well as impacts of the decision on health determinants.

The **Protocol for Assessing Community Excellence in Environmental Health** (PACE EH) was developed by the CDC's National Center for Environmental Health and the National Association for County and City Health Officials to provide [guidelines for local health officials](#). This methodology guides communities and local health officials in conducting community-centered environmental health assessments, by relying on community collaboration to involve stakeholders in:

- Identifying local environmental health issues
- Setting priorities for action
- Targeting populations most at risk
- Addressing identified issue

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New Definitions and Standards

In 2013, the ASTM provided new definition , updated existing definition , and introduced new standards to help Environmental or Health Professionals perform an ESA, using the requirements set out by CERCLA. Below are the new and revised terms and their respective definitions

Recognized Environmental Condition (REC): ASTM defines a Recognized Environmental Condition as “the presence or likely presence of any hazardous substances or petroleum product in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions posing a material threat of a future release to the environment.”¹²

Historical Recognized Environmental Condition (HREC): ASTM describes a HREC as a “closed release that has been cleaned up to unrestricted use criteria.” Individuals can erect residences on HRECs. ¹²

Controlled Recognized Environmental Condition (CREC): ASTM describes a CREC as a “closed release that has been cleaned up but not to unrestricted use criteria.” A CREC meets commercial and industrial standards, but individuals cannot put up residences on these properties. ¹²

De minimus Condition: ASTM defines de minimus conditions as environmental conditions that “generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.” They do not classify as RECs. ¹³

Migrate/Migration: ASTM defines “migrate” or “migration” as the “movement of hazardous substances or petroleum products in any form, including, for example, solid and liquid at the surface or subsurface, and vapor in the subsurface.” This term usually refers to the contamination from a nearby property that has moved to the subject property via groundwater or vapor. ¹³

Release: ASTM defines a release as “any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant), but excludes any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert.” ¹³



Image of a Brownfield . Source: Lloyd DeGrane, 2014.

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File Reviews

Although not required, the new 2013 ASTM standards suggest regulatory file reviews for the subject and/or neighboring properties, in order to more accurately determine the possible presence of RECs. If, in the Environmental or Health Professional's opinion, such a review is not warranted, the Environmental or Health Professional must explain within the report the justification for not conducting the regulatory file review.¹³

Implications of file reviews:

1. Increased costs
2. More thorough information
3. Known scopes of work: Regulatory file reviews may make it easier to compare delivery time and price of performing a Phase I ESA.
4. Longer turnaround time: Delivering an ESA Phase I typically takes three to four weeks, but may take an EP less time if regulatory files are not reviewed.

Vapor Migration

ASTM refers to vapor migration as vapor encroachment. The 2013 ASTM standards for vapor migration may be supplemented by ASTM Guide 2600: Standard Guide for Vapor Encroachment Screening.¹⁴

Implications of vapor migration: Previous vapor sampling efforts might not be adequate under these new measures. Increased investigation toward vapor impact may be necessary, and may incur additional costs.

Image of a Brownfield . Source: Lloyd DeGrane, 2014.

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An **Environmental Site Assessment** (ESA) is the process of evaluating a recently shut-down or acquired parcel of industrial/commercial real estate for potential environmental contaminants. A complete ESA consists of two phases, and must abide by the EPA-approved ASTM international standards.

ESA Phase I

A Certified Environmental or Health Professional might perform the following duties during a Phase I ESA, also known as All Appropriate Inquiry (AAI):

Historical and Environmental Records and Documentation Review:

Geology & Hydrogeology Review, such as photographs, building permits, Sanborn Fire Insurance Maps, and USGS topographical maps.

Historical Research:

- Historical aerial photographs
- Street directories
- Building permits
- Planning Department records
- USGS topographical maps
- Sanborn Fire Insurance maps
- Department of Oil and Gas maps
- Title information

Regulatory Records Review:

- Review federal, state, local, and tribal records regarding the subject property and/or neighboring sites

Site Visit:

- View present conditions and assess potential environmentally hazardous site history
- Inspect site along with experienced and knowledgeable inspector
- Document presence of hazardous materials or petroleum products¹⁵

Interviews:

- Past owners
- Current tenants and owners
- State and local regulators
- Site managers
- Neighbors

Reporting:

- Review any reports you are provided
- Complete professional report, which offers conclusions and recommendations regarding the property based on judgment and findings of the E

Image of a Brownfield . Source: Lloyd DeGrane, 2014.

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If the first phase of an ESA indicates possible contamination from hazardous materials, a second phase may be necessary. Phase II is not required to satisfy the AAI. However, Phase I provides an introductory framework for evaluating a site's potential environmental contaminants, while Phase II provides a more complete understanding of the contamination that may be present on the site. If a Phase II is necessary, the following requirements must be met before taking action:

- “Statement of Objectives”: In order to minimize confusion of the scope of an ESA II, the goals of the assessment must be agreed upon by both the owner of a subject property and the certified Environmental or Health Professional.¹⁶
- “Conceptual Model”: The Conceptual Model is a key component of a site assessment performed using the scientific method. It requires the certified Environmental or Health Professional to hypothesize how “target analytes (a substance whose chemical constituents are being identified and measured) would have been released and migrated to the soil or groundwater.” This process guarantees that the evaluation activities are appropriately performed. It also provides assurance that, if a substance is not detected, then it can be concluded that it is most likely not present.¹⁶
- Written Report: Since the new Phase II standards are restructured to more closely reflect the scientific method, ASTM now requires a written report to detail the findings of the assessment in relation to the Statement of Objectives.¹⁶

The new ASTM standards introduced these three actions as a way to clarify the range of activities a Phase II ESA may encompass. In particular, it takes into account the various opinions and viewpoints that may factor into the outcome of an ESA Phase II. Now that the framework has been established, here is a list of possible activities involved in a Phase II ESA:

- Subsurface soil testing
- Groundwater testing
- Service station testing
- Soil vapor testing
- Hydrogeology investigations
- Monitoring well installation tests
- Soil boring installations sampling
- Contamination evaluation
- Groundwater modeling
- Comprehensive site sampling plans
- Underground Storage Tanks (USTs) investigations
- Leach pool/underground well sampling
- Drum samples (if any were left on property)
- Dry well, floor drain, and catch basin sampling
- Testing transformers/capacitors for polychlorinated biphenyls (PCBs)

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Image of a Brownfield. Source: Lloyd DeGrane, 2014.

Understanding Tools and Resources Available

There are a variety of useful tools and resources available to inform and assist your Environmental Site Assessments including:

- ATSDR's [Toxicological Profile](#) : A portal detailing common industrial hazardous contaminants
- ATSDR's [Mercury Audit and Follow-up Checklist](#): A document to help facilitate Mercury evaluation
- ATSDR's [Brownfield and Land Reuse Site Tool](#): A site characterization, contaminant screening, and site inventory/catalog tool with a “How To” guide for conducting a site visit
- Community Mapping Tools, such as EPA's [EnviroAtlas](#): Interactive resources for exploring the benefits people receive from nature or “ecosystem goods and services” and [EJScreen](#), a tool that combines environmental and demographic indicators in maps and reports
- [Community Health Status Indicator](#): An interactive web application that produces health profiles for all 3,143 counties in the United States
- [National Health and Nutrition and Examination Survey](#): A population-based survey designed to collect information on the health and nutrition of the U.S. household population
- Additionally, a community can [petition ATSDR](#) to investigate possible exposure pathways.

Get Started Now

If the site in question is ready for an assessment, contact ATSDR to learn your first steps.



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Communicating Technical Findings in Plain Language

The analysis and reporting of environmental and health assessments can be complex and difficult for individuals to comprehend. Health educators at ATSDR and your local or state health department can help translate the risks into common language. It is crucial to use the best practices for Risk Communication so that all stakeholders can fully understand the findings of the report(s).

The EPA originally developed **Seven Cardinal Rules of Risk Communication** (1988), which have been [adapted and updated](#). Using the following rules can help you communicate the risks that your community faces.

1. Accept and involve the public as a legitimate partner. Involve the public early. Recognize that people hold you accountable.
2. Listen to the audience. Do not make assumptions about what people know, think, or want done about risks. Find out what people are thinking; use interviews, facilitated discussion groups, advisory groups, toll-free numbers, and surveys. Identify with your audience and try to put yourself in their place.
3. Be honest, frank and open. State your credentials, but do not ask or expect to be trusted by the public. If you don't know the answer to a question, say so. It is fine to get back to the questioner later with answers. Share more information, rather than less, so people don't think you are hiding anything.
4. Coordinate and collaborate with other credible sources. Coordinate your communications with partner organizations. You can issue joint communications with trustworthy sources, such as local universities, citizen advisory groups, or local officials.
5. Meet the needs of the media. Be open with and accessible to reporters. Respect their deadlines. During interviews, stay on topic. Prepare a limited number of positive key messages before an interview, and repeat these messages during the interview. Do not speculate and only say things you are willing to have repeated. Remember, everything you say in an interview is on the record.
6. Speak clearly and with compassion. Use plain language. Be sensitive to local norms, such as speech and dress. Use images to clarify messages. Try to personalize risk data through stories, examples, and anecdotes. Be prepared to acknowledge and respond (both in words and with actions) to emotions that people often express, such as anxiety, fear, anger, outrage, and helplessness.
7. Plan carefully and evaluate performance. Use clear objectives, such as providing information to the public, providing reassurance, or involving stakeholders in joint problem solving. Train staff, including technical staff, in communication skills. Recognize and reward outstanding performance. Pre-test messages. Carefully evaluate your efforts and learn from mistakes.

Dr. Vincent T. Covello

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Message Maps

The actual messages, whether written or verbal, can be structured in a way that resonates with your audience. ATSDR and health partners use **Message Maps** to assist with communication. Below is an example of message mapping, along with best practices, using a real-life example from a previous Land Reuse project.

Message Map Template

Key Message	Key Message	Key Message
Supporting information 1-1	Supporting information 2-1	Supporting information 3-1
Supporting information 1-2	Supporting information 2-2	Supporting information 3-2
Supporting information 1-3	Supporting information 2-3	Supporting information 3-3



A **Message Map** is a detailed, visual description of organized answers to anticipated questions and concerns from key community stakeholders.

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My School Daycare: Avoiding Arsenic Exposure

Background: Sinco, Inc., a former plastic safety net manufacturing facility, based in Connecticut, was redeveloped into a daycare center. The site's soil has historically contained high levels of [arsenic](#), a naturally occurring element that is used primarily in wood preservation or pesticides, as well as other contaminants.

Risk(s): Although much of the site had been cleaned up, the soil in the playground was never sampled to determine whether it contained levels of arsenic harmful to children who attended the daycare.

Outcome: In February 2008, the Connecticut State Department of Public Health worked with the daycare property owner to successfully test the soil. It was determined that while the playground surface and subsurface soil was contaminated with arsenic, a remedial plan was possible to prevent exposure.

Results: The state worked with the property owner to ensure arsenic in the soil would be covered with wood chips to prevent exposure. The state developed a fact sheet and held a public meeting to address parent and community concerns. During the meeting, the state confirmed that children had likely not been exposed prior to the cleanup and were not at risk of direct contact in the future.

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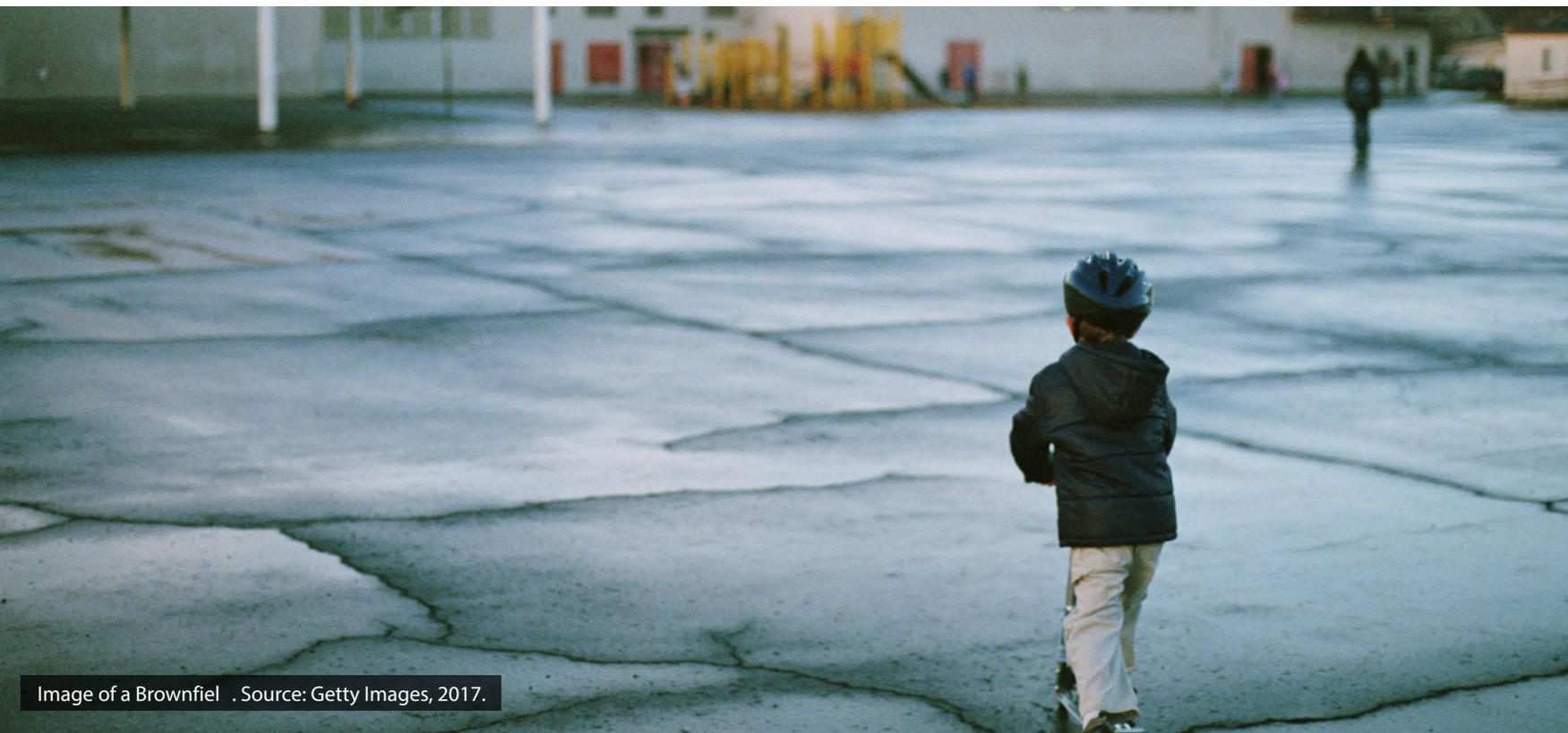


Image of a Brownfield . Source: Getty Images, 2017.

Daycare Center Message Map

<p>Key Message Connecticut Department of Public Health has worked with the owner and operator to ensure arsenic in the soil will be covered with wood chips to prevent exposures</p>	<p>Key Message Children attending the daycare will not have direct contact with the residual arsenic contamination in the soil</p>	<p>Key Message Children were not likely exposed as the daycare center has been open less than a year and children had not been using the playground in the winter</p>
<p>Supporting information 1-1 Limited soil removal will take place in areas with highest arsenic levels</p>	<p>Supporting information 2-1 The playground has a layer of woodchips covering the soil</p>	<p>Supporting information 3-1 A child would need to play directly in the soil on a daily basis, for several years, to be harmed by arsenic</p>
<p>Supporting information 1-2 Cleanup plan will likely include placing additional layers across the entire playground</p>	<p>Supporting information 2-2 Owner plans to add additional layers of covering, such as heavy landscaping fabric, crushed limestone, and woodchips</p>	<p>Supporting information 3-2</p>
<p>Supporting information 1-3 After additional layers are added, children will not be able to come into contact with the soil</p>	<p>Supporting information 2-3 One would need to play directly in the soil on a daily basis, for several years to be harmed by arsenic</p>	<p>Supporting information 3-3</p>

The EPA can provide [more information on risk communication](#) along with best practices and strategies for communicating with your audience, and ATSDR offers a [message map template](#) you can use.

Get Started Now

It can be difficult to ensure that the community understands the site assessment results, due to their technical nature. If you need help or suggestions for translating results into plain language, contact ATSDR.



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Conducting a Site Cleanup

If you have been hired to conduct an environmental cleanup, follow these steps as you plan to implement this process.

1. Identify and prioritize the key contaminants and exposure pathways to remediate.
2. Understand the future use of the site to ensure remediation does not impede new land use.
3. Establish cleanup goals that protect both workers and the environment.
4. Implement cleanup measures that are consistent with goals and future use.

Common Site Cleanup Methods

There are several ways to cleanup contaminants. The type of contaminant(s), site assessment, and exposure pathway(s) all inform the correct method to administer. The following treatment methods are defined by the EPA.¹⁷

Activated carbon treatment: A wastewater technology, in which powdered activated carbon is added to an anaerobic or aerobic treatment system. The carbon in the biological treatment process acts as a “buffer” against the effects of toxic organics in the wastewater.

Air stripping: A process to remove volatile or certain semi-volatile organic compounds from contaminated groundwater or surface water.

Bioremediation: A process that uses microorganisms to transform harmful substances into nontoxic compounds, a promising technology for treating chemical spills and hazardous waste.

Capping: A process to cover buried waste materials in order to prevent migration (movement) of the contaminants. Movement can be caused by rainwater, surface water, or wind moving through the site.

Excavation: The removal of contaminated material from a hazardous waste site using heavy construction equipment.

Immobilization: A treatment process used to prevent migration of toxic chemicals from soil slurries and waste sludge, in order to keep them from spreading to the surrounding environment.



Image of a Brownfield . Source: Lloyd DeGrane, 2014.

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Incineration: A method to destroy organic compounds in waste, particularly dioxins and polychlorinated biphenyls (PCBs).

Leachate: A liquid that has passed through buried waste and, as a result, contains dissolved or finely suspended solid matter and microbial waste product.

Pump and Treat: A method to purify contaminated aquifers, includes three steps:

1. The contaminated water is recovered from the aquifer.
2. The recovered water is treated.
3. The treated water is discharged, which removes the contaminants.

Soil Washing: Soil washing is a water-based process for scrubbing soils ex situ (away from the original site) to remove contaminants. The process removes contaminants from soils in one of two ways:

1. By dissolving or suspending them in the wash solution (which can be sustained by chemical manipulation of pH for a period of time); or
2. By concentrating them into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing (similar to those techniques used in sand and gravel operations).

Thermal Desorption: A low-temperature heat line separation process designed to remove organic contaminants from soils and sludges.



Assessing site contaminants in water sample.
Source: Getty Images, 2017.

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Focusing on Community Vision

It's essential to maintain an inclusive and communicative process when working with community stakeholders. It's equally crucial to understand the community vision for the Land Reuse Site and openly communicate with citizens to ensure that the redevelopment meets their unique needs. Translating complex environmental and health concepts into plain language may be the best way to ensure everyone is on the same contextual level. By establishing an open line of communication and displaying a level of understanding with the community, you build trust with them and help guarantee that your work will help address a pressing public health issue.

Emphasizing Health with Redevelopment

The Land Reuse Site in your city can be transformed into a site that benefits the health of our citizens. That's why it's important to establish a community vision at the start of the project in Step 1 (Engaging with Your Community). This vision may guide all the decisions for the future site. If the project lacks a vision for a healthier community, it may never happen. When developers and other groups pitch ideas to develop the land, **it's crucial to understand the community's needs and integrate those into the central design of the site.**



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Understanding Determinants of Community Health

It is important to understand the basic health profile of your community. The determinants that comprise this profile include

- Income and social status
- Social support networks
- Education
- Employment/working conditions
- Social environments
- Physical environments
- Personal health practices
- Coping skills
- Healthy child development
- Gender
- Culture

It is important to consider all of these factors when evaluating the health of your unique community and communicating with them.

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Get Started Now

Once assessments are complete, site cleanup is a major milestone. Contact ATSDR to learn about your next steps and make sure you've completed all steps thus far.



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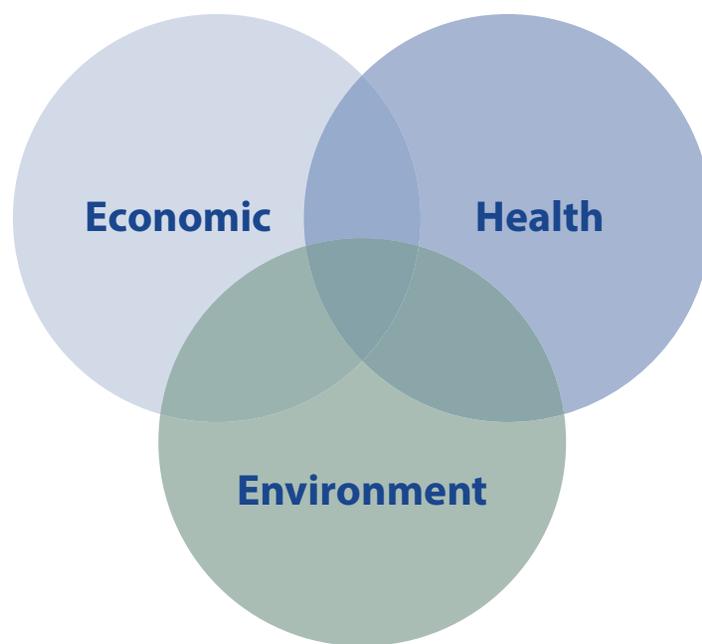
Defining Measures of Success

As an Environmental or Health Professional, it's important for you to measure the positive (or negative) community changes that occur throughout the lifecycle of the project. You can speak to the progress of a redevelopment so that all stakeholders can quantitatively understand the project's impact. This way, you can prove that the project has created a positive health impact on your community.

There are three overarching categories you can measure:

- Economic
- Health
- Environment

You can track both the physical health of the community, as well as environmental indicators. With those data sets, you can quantitatively prove that the redevelopment project is making a real impact in the lives of the community and the ecosystem.



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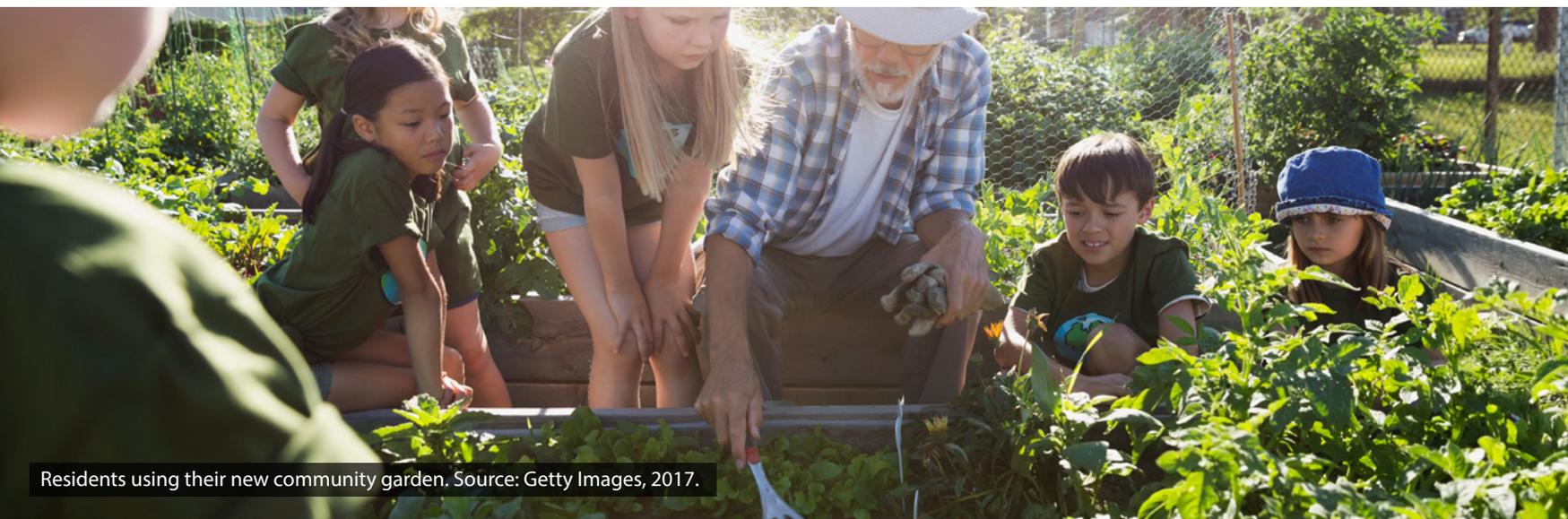
Identifying Health Impacts and Outcomes:

Because the purpose of this toolkit is to create positive health impacts in your community, the success of the project depends on tracking and evaluating the community's overall health. So, you may need to identify the most important health impacts and outcomes your community wants to achieve. For example: If you add more community gardens, the impact is "access to healthy foods." If you build a health clinic, the outcome is "access to health care." You can track these exact health impacts and outcomes of the project and communicate them to all community stakeholders.

You might track the following health indicators to show the impacts of your project:

Issue	Indicator
Lack of access to healthy food	Number of people living within two miles of natural produce, number of community gardens
Lack of access to healthcare	Number of healthcare clinics and their distance from residential areas, number of healthcare providers, Health Resources Services Administration data (such as "Medically Underserved Area" status)
Lack of affordable housing	Number of affordable housing units
High lead exposure in population	Community-wide (or children's) Blood Lead Levels (BLL)

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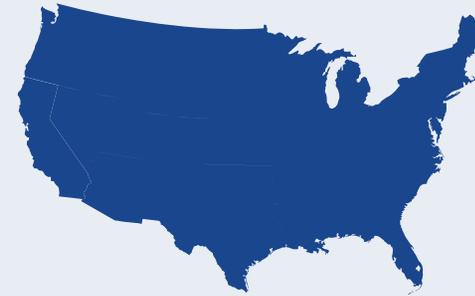


Residents using their new community garden. Source: Getty Images, 2017.



A river white with asbestos fibers. Source: ATSDR, 2006.

Because this site is still under investigation, this is a fake name to hide any identifying characteristics.



For most of the 1900s, the ABC Asbestos Mine site was an active asbestos mine. During its operation, millions of tons of [chrysotile asbestos](#) ore were excavated.

What were the contaminants and risks?

ATSDR's site investigations showed asbestos material extending to downstream wetland areas. The ore excavation process generated tons of waste rock and mine tailings and, as stormwater passed through the site, contaminated runoff affected the surface water, stream, and sediments. Despite the mine tailings, the area was a popular recreational area for skiing and hiking.

Some people, particularly workers, who breathed in asbestos fibers have developed asbestos-related diseases, including asbestosis, pleural disease, lung cancer, and mesothelioma. Some of these diseases can be serious or even fatal. No amount of asbestos exposure is considered safe; inhaling even small amounts of the microscopic asbestos fiber, which may remain in the lungs for a lifetime, can cause lung illnesses or cancer.

What did ATSDR and partners do?

ATSDR was asked to assess potential asbestos exposures to people visiting the ABC Asbestos Mine site. In this situation, an organized Development Community was not working on

redevelopment but was formed through ATSDR's attention to the mine site.

In 2006, ATSDR visited the site and estimated 160 people per year recreated at the former ABC Asbestos Mine site, many of whom were frequent visitors. ATSDR evaluated the estimated excess cancer risk for people who hiked at the site; results estimated that there would be approximately seven additional cancer cases among the 100,000 people who were similarly exposed.

ATSDR created several messages to communicate the risks of asbestos exposure to people who accessed the ABC Asbestos Mine site. They emphasized that being exposed to asbestos did not necessarily guarantee health problems and that many factors can contribute to asbestos-related health problems. ATSDR then provided a final recommendation that environmental and health agencies:

- Restrict access to the ABC Asbestos Mine property. This included prohibiting and discouraging recreational use of the site to minimize visitors' exposure.
- Prevent the reuse of tailings and all other material from the site for use beyond the ABC property.
- Prevent the use of the downstream wetland, which included a brook that should not be used for camping or other activities.

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STEP	KEY DATE	ACTIVITY	ACCOMPLISHMENT
Step 1: Engaging with the Community	January 2008	Communicated findings and concerns to state and federal agency partners	Partners launched an education and awareness campaign about risks of exposure to asbestos at the ABC mine site
Step 2: Evaluating Environmental and Health Risks	2006 to 2008	Conducted a health risk assessment	Calculated seven excess cancer deaths per 100,000 people similarly exposed
Step 3: Communicating Environmental and Health Risks	2009	State and federal partners encouraged residents to minimize exposure to asbestos by staying off the mine property Created and used a message map for education and outreach	Informed community of all potential risks of exposure to asbestos and addressed their questions/concerns
Step 4: Redesigning with Health in Mind	2009	The ABC mine site was recognized as a hazardous place where recreation can be dangerous to people's health	The site was closed and access was prohibited, which prevented further exposures to asbestos
Step 5: Measuring Success	2009	The public was notified to stay off the mine and site access restricted	Prevented 160 people per year from being exposed to asbestos

OUTCOMES

Prevented exposures to environmental contaminants creating a safer, healthier community

IMPACTS

Prevented 160 recent users of the site who had potentially been exposed to asbestos from further exposure
Permanently prevented people from accessing the site

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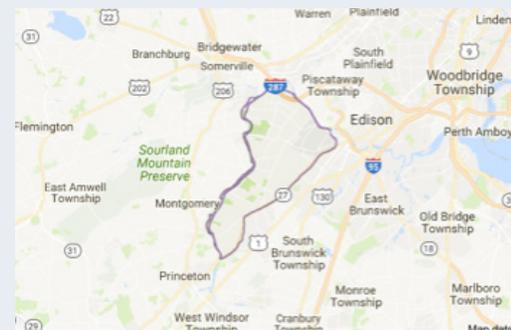
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Kiddie Kollege Day Care center in Gloucester County, NJ
Source: David Hunsinger for The New York Times



The remains of Kiddie Kollege are loaded to be taken away after demolition
Source: Tim Hawk for the South Jersey Times



Source: Google Maps

Kiddie Kollege Day Center was housed in a building that was the former location of Accutherm, Inc., a manufacturer of mercury-containing thermometers until it closed in 1994. Accutherm, Inc., had not complied with a 1995 directive from the New Jersey Department of Environmental Protection (NJDEP) to cleanup mercury contamination at the site. NJDEP referred the site to the U.S. Environmental Protection Agency (EPA). EPA performed a site inspection and issued a report on January 1996 that indicated that the site did not pose an immediate threat to human health because the mercury contamination was contained within the building and the building was unoccupied. This enabled the property to be listed as a low-priority site.

What were the contaminants and risks?

In 2001, a local realtor purchased the Accutherm, Inc. property and renovated the building. In 2004, they leased the space to the owner of Kiddie Kollege daycare center. Kiddie Kollege was granted local permits because it met all of the state daycare licensing requirements in place at that time. In 2006, during a routine inspection of low-priority sites, NJDEP realized that the former Accutherm Inc. property was being reused as a daycare center. Subsequently, NJDEP collected air and wipe samples inside the Kiddie Kollege facility. The results indicated elevated levels of mercury in the air at levels above health guidelines. This prompted immediate closure of the daycare.

What did ATSDR and partners do?

Kiddie Kollege presented an emergency situation: There was not a Development Community working on a specific redevelopment project, but it was necessary to form one quickly to address this crisis. To respond to the emergency, the New Jersey Department of Health and Senior Services (NJDHSS) relied on existing partnerships with NJDEP and the Gloucester County Health Department. NJDHSS and NJDEP inspected the Kiddie Kollege facility on July 31, 2006, and discovered liquid mercury droplets in the building basement. The partnership team then reached out to the Centers for Disease Control and Prevention (CDC) and ATSDR.

ATSDR provided mercury testing (urine samples) for 72 children and nine staff members who attended or worked at Kiddie Kollege. Over the testing period, which included follow-up testing, the CDC Environmental Health Laboratory analyzed a total of 189 urine samples for possible mercury exposure.

Nearly two-thirds of the children and adults had levels of mercury in their urine that were consistent with national expected normal ranges (reference values), but about one-third of them had slightly elevated mercury urine levels.

NJDHSS (now the New Jersey Department of Health) summarized the Kiddie Kollege Mercury Investigation on their website, available [here](#). Documents include a timeline of activities, copies of fact sheets, urinalysis results, and other information and resources.

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Step 1: Engaging with the Community	August 2 – 3, 2006	Conducted outreach to staff and parents of children. Contacted the Mt. Sinai (New York) Pediatric Environmental Health Specialty Unit (PEHSU) and area pediatricians advising them of mercury issues at Kiddie College Creation of a fact sheet	Met with staff and parents to discuss mercury exposures and next steps Distributed NJDHHS fact sheet on Kiddie College mercury exposures Scheduled urine sample collection to occur on the morning of August 7
Step 2: Evaluating Environmental and Health Risks	August 3 to January 25, 2007	CDC laboratory analyzed the urine samples and provided results to NJDHSS and ATSDR	Analyzed of 189 urine samples, one-third of which were above normal ranges
Step 3: Communicating Environmental and Health Risks	August 10 – 15, 2016	Communicated with parents, staff, and partners, and held meeting to discuss results and additional testing	Informed parents and staff of the sampling results verbally and in writing throughout the process
	September 6, 2006	NJDHSS website updated to include Kiddie College information	
	August 10 to October 6, 2006	Created and distributed five fact sheets	
	November 10, 2006	Held public meeting to discuss urine testing results and future testing plans	
Step 4: Redesigning with Health in Mind	2006 – 2007	Focused more attention on daycare licensing Raised awareness about safe childcare locations	State legislature passed legislation requiring a licensed indoor environmental consultant to conduct an Indoor Environmental Health Assessment for childcare centers located on or in specific prior-use sites Connecticut Department of Health partnered with its Child Daycare Licensing Program to create the Child Day Care Screening Assessment for Environmental Risk (SAFER) Program
Step 5: Measuring Success	July 28 to December 2016	Took urine samples and identified elevated mercury levels	Children's and adults' mercury levels dropped to normal ranges within 60 days

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OUTCOMES

IMPACTS

The end product of the redevelopment project

The quantitative result related to health or economy which resulted from the outcome

Prevented ongoing or future exposures to mercury and monitored children and adults who were exposed

Tested 189 urine samples from 72 children and nine adults

Raised awareness about childcare locations and licensing

Passed legislation requiring an environmental consultant to conduct an Indoor Environmental Health Assessment for childcare centers located on or in specific prior-use sites

Class-action lawsuits filed by attorneys from five law firms on behalf of children who attended Kiddie Kollege

Connecticut Health Department of Health SAFER program has assessed more than 35 referred daycare centers since it was launched in 2007

Accutherm, Inc. property owners found liable for cleanup costs

Paid \$1.6 million settlement to provide long-term medical monitoring program for exposed children
In 2014, a judge ordered Accutherm, Inc. property owners to pay \$6.1 million in cleanup costs and punitive damages to the State of New Jersey

Get Started Now

Once you have a good understanding of the site, potential health risks, and community vision, it's important to determine how you'll measure success of this healthy land reuse. ATSDR can help:



www.atsdr.cdc.gov/sites/brownfield



ATSDR.LandReuse@cdc.gov

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National Priorities List	Introduction	Information about EPA's Superfund program
BROWN	Introduction	Information about the Brownfields & Reuse Opportunity Working Network (BROWN)
additional information	Introduction	EPA's definition of an Environmental or Health Professional
ATSDR Communication Toolkit	Step 1	The ATSDR Communication Toolkit (ACT)
Principles of Community Engagement	Step 1	ATSDR's principles on community engagement
ATSDR Action Model Toolkit	Step 1	The ATSDR Action Model Toolkit
Action Model	Step 1	Information on the ATSDR Action Model
Photovoice	Step 1	Information about PhotoVoice
guidelines for both ESA I and II	Step 2	The American Society for Testing and Materials (ASTM) International
state, tribal, and even local environmental and health agencies	Step 2	Health and Environmental Agencies of U.S. States and Territories
ATSDR Partnership to Promote Local Efforts to Reduce Environmental Exposure	Step 2	Information on APPLETREE state cooperative program
health assessment	Step 2	Public health assessments & health consultations reports
Health Impact Assessment	Step 2	Information on health impact assessments
guidelines for local health officials	Step 2	"Protocol for Assessing Community Excellence in Environmental Health (PACE-EH) Guidebook"
Toxicological Profile	Step 2	ATSDR's Substance Index for ToxProfile
Mercury Audit and Follow up Checklist	Step 2	ATSDR's Mercury Audit and Follow-Up Checklist
Brownfield and Land Reuse Site Tool	Step 2	ATSDR's Brownfields/Land Reuse Site Tool
EnviroAtlas	Step 2	EPA's EnviroAtlas Interactive Map
EJScreen	Step 2	EPA's Environmental Justice Screening and Mapping Tool
Community Health Status Indicator	Step 2	CDC's Community Health Status Indicators (CHSI 2015)
National Health and Nutrition Examination Survey	Step 2	Information about the National Health and Nutrition Examination Survey (NHANES)
petition ATSDR	Step 2	The ATSDR Petition Process
adapted and updated	Step 3	EPA's Seven Cardinal Rules of Risk Communication

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arsenic	Step 3	Information about arsenic via ATSDR's Toxic Substance Portal
more information on risk communication	Step 3	Information about risk communication via EPA
message map template	Step 3	ATSDR's Message Mapping Template, Worksheet, and Checklist
chrysotile asbestos	Step 5	Information about asbestos' impact on your health via ATSDR
here	Step 5	Information about the Kiddie Kollege mercury investigation
SAFER	Step 5	Information about the Child Day Care SAFER Program

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