EHLR Module 4: Redesigning with Health in Mind

Laurel:
Hi, I'm Laurel. Welcome to Module 4: Redesigning with Health in Mind.

There are three main learning objectives for today.

Our first objective is to develop a basic understanding of typical site cleanup methods and describe at least three site cleanup methods.

Our second objective is to understand how to determine what the community needs and vision are. Describe why health is important to include in redevelopment plans. Define healthfields and describe at least three aspects or examples of health-focused redevelopment.

Our third objective is to demonstrate how to use the Action Model to include community input in redevelopment plans.

In this section of the training, we will cover site clean-up methods.

Your first step is to ensure that the site is cleaned up before redevelopment. You have already hired an environmental consultant to conduct an environmental cleanup. During the environmental cleanup, you plan to:

Identify and prioritize the key contaminants and exposure pathways to remediate.

Understand the future use of the site to ensure remediation does not impede new land use. Your future users of the site may include children, elderly, adults, and those living or working adjacent to the site.

Establish cleanup goals that protect both cleanup workers, the environment, and future users.

Create cleanup measures that are consistent with goals and future use.

Shereitte will describe some ways contaminants are cleaned up.

Shereitte:
Hello. I'm Shereitte. I'll describe some treatment methods used and defined by the U.S. Environmental Protection Agency, or EPA.

Activated carbon treatment is a water treatment technology. Activated carbon in the treatment process absorbs compounds to block toxic effects of organic compounds in the wastewater. Compounds include vapors (chlorinated chemicals), groundwater (fuel oil, solvents, polychlorinated biphenyls or PCBs, dioxins, perfluoroalkyl substances, radioactive materials, and metals).

Air stripping is a process to remove volatile or certain semi-volatile organic chemicals from contaminated groundwater or surface water. It is part of the pump and treat method, which I will discuss shortly.

Bioremediation uses microorganisms to transform harmful substances into non-toxic compounds. Contaminants treated using bioremediation include oil and other petroleum products, solvents, and pesticides. Time is a factor to consider when using bioremediation because it can take a few months or multiple years to complete.

Capping covers buried waste materials to prevent movement of the contaminants. Movement can be caused by rainwater, surface water, or wind moving through the site. Caps do not remove contaminants. Instead, they isolate them. They prevent people and animals from coming in contact with the contaminants. One of the issues with caps is that they must be maintained.

Excavation removes contaminated material from a hazardous waste site, such as digging it up for offsite treatment elsewhere or for disposal in a landfill. Excavation also may involve removing old drums containing chemicals and other buried debris that might be contaminated.

Soil Vapor Extraction or SVE removes vapors from the air spaces between soil particles for above ground treatment. The treatment involves using a vacuum to bring the vapors to the surface where they are captured and treated. SVE is frequently used with petroleum vapors.

Here are a few more site cleanup methods.

Solidification with stabilization keeps contaminants from spreading to the surrounding environment. For example, preventing migration of a contaminated waste sludge from a sewer, or binding a toxic substance to encapsulate it.

Incineration is the process of burning hazardous materials in soil, sludge, liquids, or gases at temperatures high enough to destroy contaminants. It is used to destroy solvents, dioxins, PCBs, and pesticides. It will not destroy metals, such as lead or chromium.

Pump and Treat is a method to purify groundwater contaminated with industrial solvents, PCBs, pesticides, and fuel oil. This method can take years to decades to remove contamination.

There are three basic steps:

The contaminated water is recovered from the groundwater.

The recovered water is treated to remove contaminants.

The now clean, treated water is discharged to the environment.

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:

By dissolving or suspending them in the wash solution (which can be sustained by chemical manipulation of pH for a period of time); or

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 is a low-temperature heat line separation process designed to remove or evaporate VOCs and some semi-VOCs from soils and sludges. Thermal desorption removes organic contaminants from soil, sludge, or sediment by heating the soil in a machine called a “thermal desorber” to evaporate the contaminants. Evaporation changes the contaminants into vapors from the soil or sludge, thus separating the contaminants.

Let’s do some knowledge checks.

Knowledge Check #1.

Select the best answer.

Which of the following is a process to cover buried waste materials to prevent migration (movement) of and contact with contaminants?

a) Incineration

b) Solidification (stabilization)

c) Capping

d) Excavation

Let’s pause for 10 seconds for you to answer.

[No audio]

The answer is c. Capping is a process to cover buried waste materials to prevent migration and contact with contaminants. Movement can be caused by rainwater, surface water, or wind moving through the site.

Incineration is an incorrect answer because it is the process of burning materials to destroy contaminants. Solidification is incorrect because it is a treatment process used to prevent migration of toxic chemicals from soils. Excavation is not correct because it is the removal of contaminated material from a hazardous waste site, such as by digging it out.

Knowledge Check #2.

Select the best answer.

Bioremediation uses what to transform harmful substances into non-toxic compounds?

a) Man-made chemicals

b) Microorganisms

c) Aeration

d) Activated carbon

Let’s pause for 10 seconds for you to answer.

[No audio]

The answer is b. Bioremediation uses microorganisms to chemically transform harmful substances into nontoxic compounds. This is a promising technology for treating chemical spills and hazardous waste.

Bioremediation does not use man-made chemicals, aeration, or activated carbon, so these answers are incorrect.

Knowledge Check #3 part 1 of 2.

Soil washing is a process for scrubbing soil ex situ (away from the original site) to remove contaminants.

a) True

b) False

Let's pause for 10 seconds for you to answer.

[No audio]

The answer is a. True. Soil washing is a process for scrubbing soils ex situ (away from the original site) to remove contaminants.

Knowledge Check #3 part 2 of 2.

Two methods of soil washing are (select two):

a) Dissolving or suspending soils in a wash solution (which can be sustained by chemical manipulation of pH for a period of time).

b) Removing contaminated soils from a hazardous waste site using heavy construction equipment.

c) Burning soils to destroy organic compounds.

d) Concentrating contaminants into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing (similar to techniques used in sand and gravel operations).

Let's pause for 10 seconds for you to answer.

[No audio]

Answer a and d are correct. The two methods for washing soil involve dissolving or suspending soils in a wash solution and concentrating contaminants into a smaller volume.

B is not correct because removing contaminated soils from a hazardous waste site using heavy construction equipment is excavation.

C is not correct because burning soils to destroy organic compounds is called incineration.

I will turn it over to Huda to discuss community needs and visions.

Huda:

Hi, I'm Huda.

It is essential to focus on the community's vision for land reuse. We use clear language and communication to ensure that the redevelopment meets the community's 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. Establishing an open line of communication and displaying a level of understanding with the community builds trust with them and helps guarantee that the work will help address a pressing public health issue.

The image shown is of a community meeting in Navajo Nation. The group is in a planning and visioning session.

The land reuse site can be transformed into a site that benefits the health of its citizens. That is why it is 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, from planning to evaluation to action. If the project lacks a vision for a healthier community, it may never happen, or the community may be disappointed in or not agree with the results.

How would you evaluate how healthy your community is? What indicators or determinants of community health could you measure?

This is an image of Social Determinants of Health or SDOH from Healthy People 2030. You can access SDOH at https://www.healthypeople.gov.

Determinants include Education Access and Quality, Economic Stability, Social and Community Context, Neighborhood and Built Environment, and Health Care Access and Quality.

It is important to understand the basic health profile for your community. Factors such as culture, community services, access to healthcare and full-service grocery stores have impacts on community health. For example, some cultures emphasize dietary practices like a vegetarian diet, that can improve health.

Once you have a basic health profile of the community, it can help you guide health-focused redevelopment, or the creation of healthfields.

Find out what the community likes about where they live. What are the assets? Do they have community centers, faith-based organizations, or good schools?

What are the community demographics, such as ethnicity, poverty, and other socioeconomic information?

It is important to know how resilient the community is. The community may have had trauma or traumatic events that had generational impacts, such as dictating where people can live or displacing them from their land. These are things that can reduce a community's resilience.

You can work with the community to access health data, such as state vital statistics. Also, you can characterize the communities socioeconomic and environmental burden using any publicly available data and compare it to other communities in the state or country.

Because each community is unique, it's important to consider all of these factors when evaluating the health of your community and when communicating with them.

Now, let's do a knowledge check.

Knowledge Check #4.

It is important to include health considerations in redevelopment plans because if a project lacks a vision for a healthier community, it may never happen, or the community may not agree with the results.

True, or False.

Let's pause 10 seconds for you to answer.

[No audio]

Answer: True. This is why we look at many social determinants of health when working with communities and involve the community in every step of the process.

Now, I'll turn it over to Laurel.

Laurel:

Hello again. Now we will learn how to redesign with health in mind.

The ATSDR Brownfields Land Reuse Action Model, or simply, the Action Model, helps the diverse members of the development community find ways to make health part of the renewal process. These partners include officials, developers, community supporters, and residents.

Communities can use the Action Model to identify common goals to incorporate in strategic planning.

This is the Action Model. It has 4 steps or questions that we'll ask ourselves today and answer together.

1. What are the issues in the community?

2. How can development address these issues?

3. What are the corresponding community health benefits?

4. What data are needed to measure change?

The first step is to build a development community to get everyone at the table ready to redesign with health in mind.

A development community is a group of people who want to help with and have input on the land reuse site. This community might include:

Concerned citizens, including neighborhood associations or members of non-profits, business owners, developers involved with construction, city or town planners and city council members, tribal leaders for development that might affect First Nations, federal, state, and local government agencies, local, state, tribal health departments, Indian Health Service, nonprofit groups, such as green energy groups or a local environmental organization.

The image shown is of a development community event where individual groups set up a booth or table and distributed their materials.

The Development Community is very important for redevelopment planning.

Some good places to start identifying development community partners include local resources and organizations like: Chamber of Commerce, community centers, organizations (like the 4-H Club or Boys and Girls Clubs), local hospitals and health clinics, City Council or Tribal Council.

As a participant in the Linnton, Oregon, Action Model once said: "I firmly believe that the success of any community action lies with the enthusiasm of its people."

Here are some examples of tribal, state, and federal resources. You can invite experts from these groups to meet with the development team.

You can get in contact with a regional ATSDR office at this website https://www.atsdr.cdc.gov/regional-offices/index.html.

Regional staff can answer questions about contamination and health risks. They can also connect you to other resources, such as a state environmental or health agency.

Other organizations could also be helpful, including the EPA Brownfields Program, which focuses on cleaning up old factories and industrial sites. The website is https://www.epa.gov/brownfields.

Other assets include Health departments in the local area or state, which focus on keeping communities healthy. State and tribal environmental protection agencies, which focus on the environment and its effect on people's health.

When you contact members of your development community, ask them a few questions, such as:

What are the problems/situations that you want to improve?

What would help solve the problems or situations? Learn about the development community's ideas for improvements of the property or redevelopment area.

Ask the development community if they know anyone else who might be interested in the project. This is key. You'll get more names of people who might want to join the development community.

The Development Community partners are the local experts. They've lived in the community for years, know the players, and know all about the obstacles the community faces.

This image shows a community meeting in Navajo Nation. The participants are part of the development community. Their visioning and planning have helped launch several

redevelopment projects. Altogether, millions of dollars in funding have been leveraged resulting in contamination being removed from some large areas.

Now, I'll turn it over to Huda to discuss the development community and healthfields examples.

Huda:

People often ask how many people should be a part of the development community?

There's no right number. Development communities can range from 10 to 30 people. How do you know you have your complete team? Whenever you talk to a new possible member, ask if they have recommendations for other potential members. Eventually, you will come full circle as they name people already involved.

The image shown is of a development community in Navajo Nation. ATSDR partners were conducting a mock phase one environmental assessment as a training exercise for local college students at Diné College. There was also a tribal official, a student intern, and members of the Brownfields & Reuse Opportunity Working Network (BROWN) who joined the assessment.

BROWN is a group of people with expertise in public health, planning, development, food systems, community advocacy, environmental restoration and sustainability, and many other disciplines. BROWN was able to be a part of the Navajo development community. BROWN provided some assistance on redevelopment plans, site assessment, and collaborated with faculty at Diné College to teach special lectures on environmental health to summer interns.

Once people sign up to work on the project, everyone should meet in person at least once. You can use the Action Model as part of visioning and discussion.

The purpose of these meetings is to build relationships and trust, and to provide an opportunity to get to know and understand each other's concerns and perspectives. These meetings can be at the library, community center, senior center, or at a local health agency. This approach will make virtual meetings in the future more successful.

You can help the community with step 3 – what is the health benefit of the redevelopment approach? You can also help them establish measurement indicators to assess environmental and health change. This is part of healthfields or health-focused redevelopment.

How do we create healthfields?

A healthfield is a former land reuse site that has been transformed from an underused, potentially contaminated property into a vibrant area that serves a number of community health needs.

As the development community is starting to plan how redevelopment could address issues in the community, think about how redevelopment could improve the health of the community.

Healthfields is the broader strategy of improving access to improved health through redevelopment. They simultaneously address health-related issues, such as: Contaminant and exposure reduction, Environmental burden, Fresh food availability, Community recreation and green space, Health care access, Employment, Crime.

I will describe some examples of healthfields.

The healthfields movement owes a tremendous debt to Ms. Willa Carson.

In 1998, Carson was a retired nurse in Clearwater, Florida. She ran a health clinic that provided basic medical assistance to friends and neighbors who lacked health insurance and the means to travel to the nearest hospital. When the City of Clearwater designated the Greenwood area of Clearwater as a Brownfields Redevelopment Site, Carson saw an opportunity. She had the pioneering vision to turn Greenwood's abandoned gas station site into a stand-alone health care facility.

Today, the Willa Carson Health and Wellness Center provides over 3,500 underserved residents with local access to preventive health and dental care, a pharmacy, and health education programs.

Carson's work serves as the basis for community-driven Highways to Healthcare initiatives that turn abandoned properties with underground storage tanks across Florida into health centers and public service facilities.

You can learn more about the Clearwater Healthfield Redevelopment at the following link: https://www.atsdr.cdc.gov/land-reuse-health-program/media/pdfs/2024/09/ATSDR_landreuse.pdf.

In Lynchburg, Virginia, a non-profit organization turned to the owners of the derelict Schenkel Farm. The farm had a six-and-a-half acre rose growing facility with nine historic greenhouses, a farmhouse, a root cellar, and other farm buildings.

Inspired by the Lynchburg Grows mission, the family provided attractive terms for the organization to acquire the property. It is now known as the H.R. Schenkel Urban Farm and Environmental Center. Once transferred, Lynchburg Grows appealed to community groups and local schools to clean the space and prepare for growing food.

By 2013, more than 5,000 volunteers contributed over 70,000 hours working with Lynchburg Grows staff. They have produced over 100,000 roses and 80,000 pounds of food, donating almost 75% to Lynchburg-area food banks and soup kitchens. As of 2024, Lynchburg Grows was thriving and had an active community supported agriculture program.

The website for Lynchburg Grows is: https://lynchburggrows.org/veggiebox.2019.

ATSDR piloted the Action Model in Baraboo, Wisconsin.

The City of Baraboo is a river community of 12,000 people with the Baraboo River bisecting the town. An active group of volunteers in Baraboo created redevelopment plans that not only improved the environment, but also the health of the community in the redevelopment area.

Several community organizations helped support the development of a 3-mile recreational trail that winds through several parks along the riverfront. As a result, the area has seen increasing numbers of residents and visitors who use the trails and parks for recreation and family events.

In addition, the development community saw the successful remediation and removal of 4 brownfields that had significant contamination. These sites are now a successful restaurant, a distillery, municipal offices, and other assets to the community. By cleaning up contamination, the community has lowered exposure to hazardous chemicals.

Let's do a couple of knowledge checks.

Knowledge Check #5.

What is a "healthfield?" (Select the best answer.)

a) Working as a nurse is one example of a healthfield.

b) A location where many healthy people gather for like-minded activities is a healthfield.

c) A former land reuse site that has been transformed from an underused, potentially contaminated property into a vibrant area that serves a number of community health needs is a healthfield.

d) None of the above describe a healthfield.

Let's pause for 10 seconds for you to answer.

[No audio]

The answer is c. A healthfield is a former land reuse site that has been re-purposed to benefit the health of the community.

Working as a nurse or being at a location where healthy people gather are not examples of healthfields.

Knowledge Check #6.

What would be considered an example of health-focused redevelopment? (Select all that apply)

a) Reusing existing underground storage tanks for a new gas station at the site of an old gas station.

b) Increasing the availability of fresh food in a community through the creation of a community garden on an abandoned lot.

c) Creating a senior center and health clinic inside an abandoned school.

d) Demolishing an abandoned warehouse and fencing the property to protect the community from the danger of the debris and lead paint chips left behind.

e) Remediating asbestos contamination inside an old mill and redeveloping the building to be a cultural center.

Let's pause for 10 seconds for you to answer.

[No audio]

The correct answers are b, c, and e.

B is correct because increasing the availability of fresh food in a community through the creation of a community garden on an abandoned lot is a healthfield project.

C is correct because creating a senior center and health clinic inside an abandoned school improves the health of the community, which is a primary goal of the healthfield program.

E is correct because remediating asbestos contamination inside an old mill and redeveloping the building to be a cultural center is a healthfield outcome.

A is not a healthfield activity because there's no health benefit associated with reusing old underground storage tanks for the same purpose.

D is not a healthfield activity because demolishing an abandoned warehouse and fencing the property to protect the community from the danger of the debris left behind does not have the redevelopment component needed for a healthfield activity.

Next, Laurel and I will demonstrate how to use the Action Model.

The Action Model helps the diverse members of the development community — officials, developers, community supporters, and residents — find ways to make health part of the renewal process.

Laurel:

We will use a mock-up of a site that is based on a real project.

On the slide are images of blighted properties that the community is concerned about. The image on the left is of fuel tanks behind a gas station in a rural community. Historically, there have been several gasoline tank leaks.

The image on the right is of an old school that needs clean up. It is contaminated with several toxic chemicals, primarily lead, mercury, petroleum, and asbestos. The development community would like to save the school for historical reasons. They envision the school serving as a shelter-in-place and a community center with local businesses. However, the school is 100 yards from the gas station. The community is worried about gasoline vapor intrusion from a plume traveling from the gas station to the school.

Huda and I will practice using the Action Model to offer suggestions for you to engage the community in plans for redevelopment of the mock site.

You are on the community development team, and you are working with a rural community. The community has many land reuse sites, no community gathering spaces that can also serve as storm shelters, a low median income, no early childhood education facilities, and no primary health care or dental providers. The town is 25 miles from the nearest hospital, healthcare providers, and full-service grocery stores. It's 5 miles from the nearest gas station. The population is aging with the median age being 48. Some residents can no longer drive, particularly the elderly, making it hard for them to get to doctor appointments.

Huda:

The development community has plans and funding for cleaning the site. The city recently received a federal grant to clean up the former school so its future use as a community center

with other activities will benefit the community. The school is contaminated with lead, mercury, PCBs, and asbestos.

The city also received two additional grants to clean up and redevelop the former gas station.

The tanks leaked gasoline into soil, which also migrated to contaminate groundwater. Over time, the contaminated groundwater migrated from the gas station to the former school. It will have to be treated to prevent petroleum vapor from entering into the school building.

How will we, the development community, redevelop the site?

Here are some of the questions you could be asking at this stage.

Who are the members of your development community? You should learn their names and their roles. Ask them if any other people, maybe from the state environmental agency or the local health agency, should be members.

Who is at the table? We, as your environmental health professionals, are at the table and so are your community members and organizations.

Next, create an Action Model by following steps 1 through 3 below. We are focusing on step 2, the redevelopment approach and step 3, the health benefit, so we will not complete step 4, developing a measurement indicator.

In step 1, you should find out what are the issues in the community by talking with members of the development community. A good way to start this conversation is to ask what people like about the community. Then you can ask them what properties they are concerned about or would like to change.

For step 2, you should understand how redevelopment can address these issues. For example, you can discuss the steps conducted in the cleanup of contamination. What are some potential cleanup methods? Will the community need additional funding? Does the state have any money for site assessment? Can the state pull any leaking gasoline tanks?

The last and one of the most important steps is to identify the health benefits to the community.

How can you redesign the redevelopment plan with health in mind? Can you create healthfields?

Here are some prompts to consider.

Laurel:

Step 1: What are the issues?

The nearest health and dental clinic and full-service grocery store are 25 miles away.

Step 2: What are the redevelopment approaches?

Include a grocery store and health and dental clinic in the old school. Connect with the local health department for additional health services.

Step 3: What are the health benefits?

Improved access to medical, dental and mental health services, and increased nutritional status.

Huda:

Step 1: What are the issues?

We know that the school is contaminated.

Step 2: What are the redevelopment approaches?

Remove lead, mercury, PCB, and asbestos contamination.

Use pump and treat to remediate groundwater contamination from the underground fuel tanks. This is expensive, but the development community will pursue local, state, and federal funding for the cleanup.

Step 3: What are the health benefits?

Decreased exposure to harmful chemicals. Decreased blood lead levels in children and adults.

Laurel:

This is an example of how to redesign a project with healthfields in mind. The redesign was done with full community input over several years.

The initial site was vacant. The state environmental agency used federal funding from EPA to conduct a Phase I environmental site assessment that indicated no contamination. The initial design was for a vendor crafts village that provided more visibility for vendors and artists, generated tourism dollars, and provided a central location for jeep tour access of a nearby canyon.

The redesign by the development community included the craft village as a key element to support local artists. The redesign also included recreational trails for local residents, a community center, an amphitheater, outdoor showers, and a basketball court. The development community incorporated natural storm water runoff in the design as a seasonal water feature. Ultimately, a formerly vacant parcel of land could be reused to improve overall community health.

The reading that supplements this training is Chapter 15 of the free course textbook, Land Reuse and Redevelopment: Creating Healthy Communities. The book is available on the training home page.

To receive continuing education credits for this course, please access the link on the training home page for this training module. You will be linked to CDC Train to take a short, open book post-test and to complete an evaluation. The test is optional but necessary to receive continuing education units.

This is the end of the presentation for Module 4. Thank you for attending.

For more training information, you may email atsdr.landreuse@cdc.gov.