

CHAPTER 2:

Environmental Health



INTRODUCTION

Hippocrates sagely said, “If you want to learn about the health of a population, look at the air they breathe, the water they drink, and the places where they live.” Even in the 5th century B.C., it was understood that our environments, the places where we live, learn, work, and play, influence our health. Healthy environments can increase one’s quality of life; conversely, exposure to poor environmental quality can lead to disease and premature death.¹

Certain communities have greater access to healthy environments than others. The term “Environmental Justice” refers to fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.² CT DPH Environmental Health staff works continuously toward Environmental Justice in our state to ensure that all of our citizens enjoy the same degree of protection from environmental and health hazards, and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

Our Environment at Home

Our Environment at Home, both our individual living spaces and our larger communities, may be the single greatest social determinant of health impacting health equity in our state and across the nation. Our homes are a haven for our loved ones and ourselves. However, our homes can also contain hazards that put us at risk, causing or making worse illnesses and injuries, and sometimes resulting in preventable or premature death.

Dust, mold, environmental tobacco smoke (ETS), and pests trigger asthma; radon and ETS cause lung cancer; household lead-based paint hazards are the major source of lead poisoning in children; carbon monoxide and chemicals in household products can lead to poisonings; and lack of safety railings or window guards can result in preventable falls. These home conditions can lead to health outcomes that increase health care costs.

Our Environment at School

As with our homes, it is also essential to ensure that Our Environment at School has healthy indoor air quality to protect the health and wellbeing of the youngest members of our communities. We know high radon concentrations are present in many buildings throughout Connecticut towns and cities, and schools are no exception. Radon is a known carcinogen that poses a lung cancer risk in the indoor environment. Students and staff spend an average of seven hours per weekday inside schools and, just like in a home, the only way to know if radon is a problem in a school is to test for it.^{3,4} In addition, due to their advanced age many schools in our state still have asbestos present. Asbestos management in schools is an ongoing public health concern and is strictly regulated on the state and federal level. As with asbestos in the home, prolonged exposure to asbestos in schools can lead to health risks for children and school staff, including asbestosis, mesothelioma, and other cancers.

Our Environment at Work

Having steady employment and the income it provides is generally seen as beneficial to overall health outcomes. However Our Environment at Work can potentially impact our health in negative ways as well. Currently, almost two million Connecticut residents are employed.⁵ As such, it is essential to ensure that workplace conditions are health-promoting. Potential health impacts from the indoor air contaminants previously mentioned, such as lead, radon, and asbestos apply to workplaces as well. However, many other hazards are present in workplaces that can adversely affect worker health in the form of acute injuries or chronic illnesses. Some more common hazards include slip, trip, and fall hazards, chemical exposures, ergonomic and repetitive motion hazards, dangerous machinery, and workplace violence.

Our Environment Outdoors

Our Environment Outdoors, that is the cleanliness of the air we breathe, the water we drink, our beaches and recreational waters, and other public spaces, all impact our health and well-being every day. While federal and local regulations and scientific innovation have decreased pollution overall, much work remains to be done in the area of Environmental Justice. Low-income communities, communities of color, and more densely populated, urban areas can be disproportionately affected by poor air quality. Rural communities can be disproportionately impacted by unregulated water from private wells. Healthy environments can enable us to spend time outdoors and utilize public recreational spaces. Doing so can promote physical activity, build connections with neighbors, and foster a sense of community vitality and pride. Conversely, unhealthy environments can lead to the disuse of amenities, greater social isolation, and the exposure of residents to harmful toxins. There are many potential environmental factors that can impact our public recreational spaces and have negative effects on health. Common examples are secondhand smoke exposure in public spaces, the quality of our freshwater and saltwater recreational areas (i.e., the water quality at our lakes, rivers and beaches), and climate impacts that can change the form, function, utility, and safety of outdoor recreational spaces over time.

In the following chapter, we will utilize data collected as part of the Connecticut State Health Assessment (SHA) to explore important questions about the overall environmental health of our state, the impacts of indoor and outdoor environments on the health of our citizens, the communities that bear the greatest burden of environmental hazards, and the different strategies being employed to improve the health of our environment and advance health equity and Environmental Justice in Connecticut. We will present these data in the context of individual and community environmental health hazards by looking specifically at the health impacts of our homes, our schools, our workplaces, and our outdoor surroundings.



PROGRAM SPOTLIGHT: *HEALTHY HOMES* INITIATIVE

The Connecticut Department of Public Health's *Healthy Homes* initiative envisions that “*Every Connecticut resident lives in a healthy and safe home environment.*”

Accomplishments include the development of:

- A unified *Healthy Homes* checklist for home visits and local health complaint responses to promote the standardization of *Healthy Homes* assessment across Connecticut.
- A web-based surveillance system that code enforcement officials and partners can use to track assessment where the unified *Healthy Homes* checklist was used.
- A *Healthy Homes* Strategic Plan in 2017 to address: 1) public awareness; 2) workforce development, and 3) policies, guidelines, and practices.
- A *Healthy Homes* Surveillance Report in 2017 using data gathered by partner agencies and local health departments.

Our Environment at Home

Since we spend approximately 90% of our time indoors and at least half of every day inside our homes, it is essential to ensure that the places where we live are healthy and safe to promote the health and well-being of our residents.^{6;7}

To understand the health of where we live, we embrace a *Healthy Homes* approach, a holistic methodology to performing inspections on a home. In addition, we explore factors that compromise the health and safety of our homes, including housing code violations and the presence of asbestos, radon, and lead. A healthy home is a dwelling that is sited, designed, built, renovated, and maintained to support health. A *Healthy Homes* approach is a coordinated and comprehensive approach to preventing diseases and injuries that result from housing-related hazards and deficiencies.⁸ To promote the health of our homes, a *Healthy Homes* inspection holistically takes health, safety, and building-related issues into consideration instead of taking a categorical approach (i.e. focusing on one issue at a time) during an inspection. *Healthy Homes* inspections support more equitable population health outcomes by systematically identifying the prevalence of severe housing code violations, and addressing the shared, underlying causes of multiple home hazards through education and physical interventions.

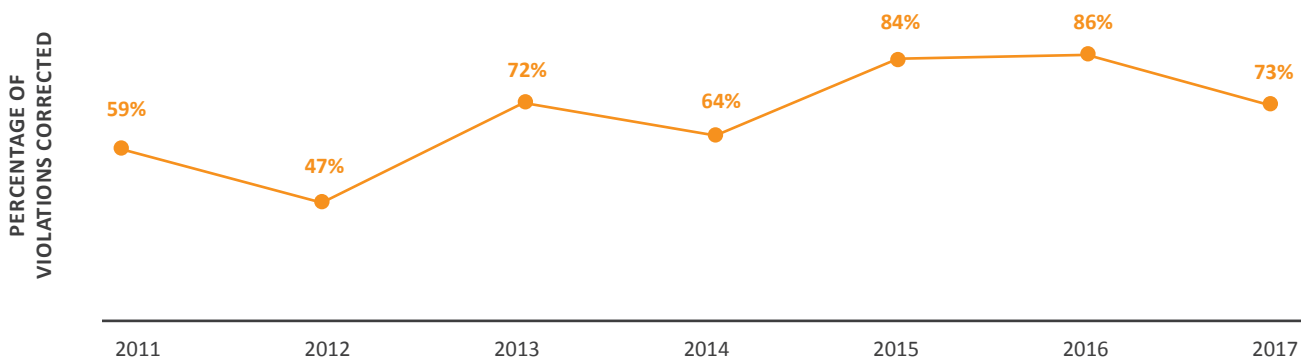
Since poor housing conditions and code violations affect highly urban areas and individuals with lower incomes disproportionately, these efforts better ensure that all individuals, regardless of race/

ethnicity, socioeconomic status, household composition, or zip code, benefit from developments in modern building science, fair maintenance practices, and creative housing strategies to promote health and social connectedness. *Healthy Homes* policies and practices lead to more dependable and timely maintenance responses, smoke-free environments, amenities that promote active living, and a greater sense of safety, while also ensuring that hazards such as lead-based paint, asbestos, mold, and pest infestations are permanently remediated.

Severe Housing Code Violations

Severe housing code violations are issues that are imminently hazardous to a person's life (e.g., unvented combustion appliances, broken stairs and railings, excessive clutter making it difficult to exit a home, inadequate lighting, and the absence of smoke and carbon monoxide alarms). Since 2011, approximately half to over 85% of severe housing code violations were corrected upon reassessment (**Figure 2.1**). Ultimately, the goal is to correct 100% of severe housing code violations upon reassessment. However, this goal is difficult to attain as many of these hazards fall outside

FIGURE 2.1: Percentage of severe housing code violations that were corrected upon reassessment, CT, 2011–2017



Source: CT DPH Lead, Radon, and Healthy Homes Program; Healthy Homes Surveillance System. Data analyzed November 28, 2018.

the jurisdiction of the person performing the *Healthy Homes* assessment/reassessment, and a referral to the agency/program with the authority to mandate the correction must be made. At times, the referral may not be followed up on, or the person making the referral does not see the outcome by the time of reassessment.⁹

Lead Poisoning

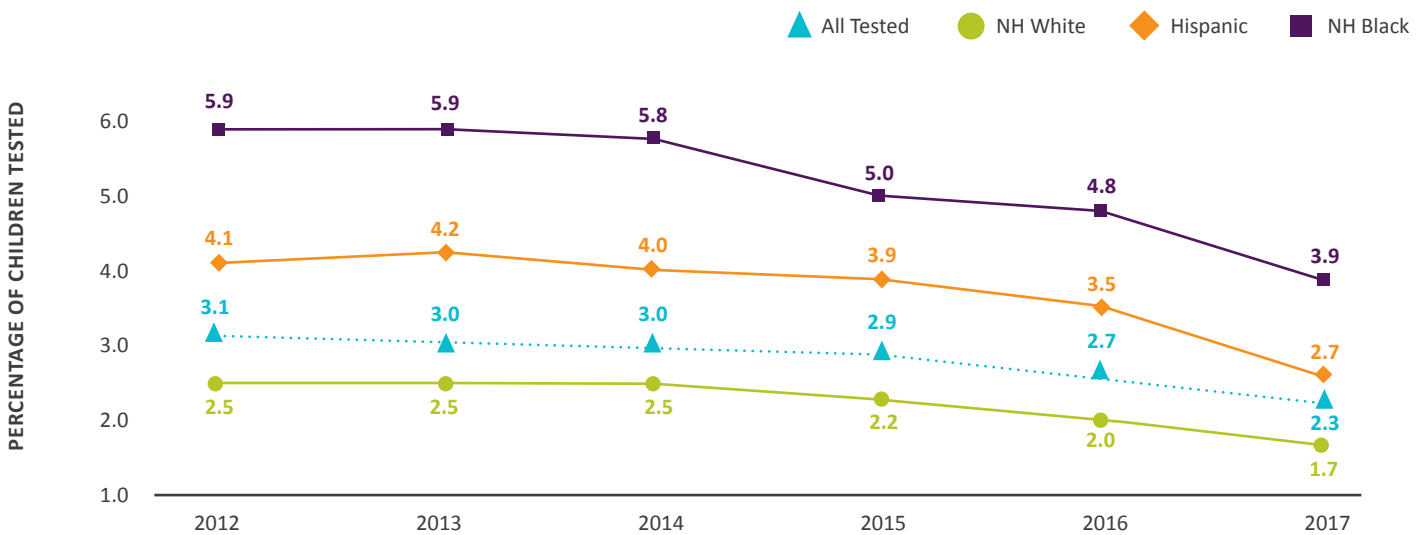
Childhood lead poisoning is the most common pediatric public health problem that causes irreversible impairment but is entirely preventable. While lead paint and lead dust in homes built before 1978 continues to be the most common source of lead exposure, other sources of lead such as contaminated soil, plumbing fixtures, and antique or imported toys can also poison a child or an adult. No amount of lead is safe for the body. Lead harms children’s nervous systems and is associated with reduced academic achievement, behavioral problems, and learning disabilities, among other health outcomes. Early childhood lead exposure is shown to be negatively associated with academic achievement in elementary and junior high school.

In 2017, 2.3% of all children under 6 years of age were tested with a blood lead level of $\geq 5\mu\text{g}/\text{dL}$, the current case definition for lead poisoning in our state (Figure 2.2). Black and Hispanic children are disproportionately affected by childhood lead exposure, with the risk of lead poisoning being more than double for Black

children when compared to White children in 2017. This disparity may account for part of the historical achievement gap among Connecticut school children.^{10;11} The good news is that over time, there has been a steady decline overall, and by race/ethnicity, in the prevalence of lead poisoned children (Figure 2.2). From 2016 to 2017, our state saw the largest decrease in a single year, slightly more than double the decrease from 2015 to 2016.

Connecticut’s housing stock is considerably older than the national average, as indicated by the prevalence of housing built prior to 1978 in various communities across our state. Lead-based paint was banned in the United States in 1978 for use on homes, however it is estimated that 71% of the housing stock in Connecticut was built before 1980 and that 45% of homes built prior to 1960 and 87% of homes built prior to 1940 contain some lead paint. As might be expected, cities and towns with a higher percentage of older housing stock also had a higher percentage of lead poisoning cases among children under the age of 6 years. In addition, localities with a higher number of households below the poverty level had a higher count of lead poisoning cases. Bridgeport, Hartford, New Haven, and Waterbury have the highest number of households with incomes below poverty level, as well as the highest rates of childhood lead poisoning. Lead poisoning cases were identified in almost 70% of Connecticut cities and towns, with over half in urban cities (i.e., New Haven, Bridgeport, Waterbury, Hartford, and Meriden) (Figure 2.3).

FIGURE 2.2: Percentage of lead poisoned children under 6 years of age by race/ethnicity, CT, 2012–2017



Source: CT DPH Lead, Radon, and Healthy Homes Program; Lead Poisoning Surveillance System. Data analyzed October 15, 2018.

PROGRAM SPOTLIGHT: LEAD POISONING PREVENTION

The mission of the Lead Poisoning Prevention and Control Program is to prevent lead poisoning and promote wellness through education and a wide range of program activities that relate to lead poisoning prevention, specifically childhood lead poisoning prevention:

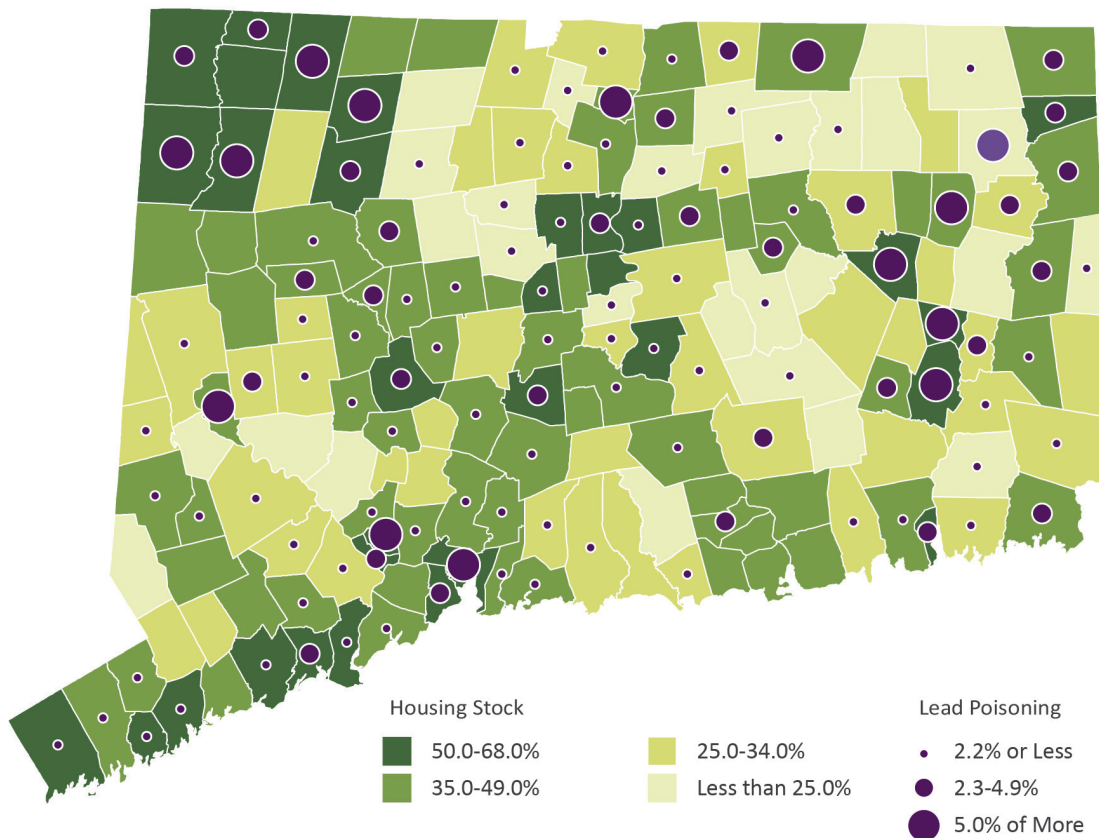
- Requiring universal testing of all children twice before the age of 3 years.
- Statutes outlining the local health department response to childhood lead poisoning:
 - + Providing educational materials;
 - + Performing epidemiological investigations, including a comprehensive lead inspections;
 - + Ordering the abatement of lead hazards.
- Regulations outlining the requirements of lead abatement.
- Media campaigns to reach targeted populations at greater risk for lead poisoning (e.g., cities with older housing stock, Black and Latino families, and low socioeconomic status families).

BEST & PROMISING PRACTICES: LEAD POISONING PREVENTION

To prevent lead poisoning:

- Improve the quality of rental housing by
 - + Eliminating chipping and peeling paint to reduce the hazard of children eating lead contaminated dust and paint chips.
 - + Replacing old windows to eliminate a large source of chipping, peeling paint.
- Adopt and enforce a statewide housing maintenance code that would provide property owners with a standard for the maintenance of their rental properties and code enforcement officials a tool to enforce minimum housing standards.
 - Develop and promote media campaigns to reach targeted cities for lead poisoning prevention.
 - Partner with health care professionals and Medicaid to establish and enhance case management activities.
 - Provide focused outreach and supports to populations at greater risk for lead poisoning (e.g., cities with older housing stock, Black and Latino families, and low socioeconomic status families).

FIGURE 2.3: Percentage of pre-1960 housing and lead poisoned children under 6 years old by town, CT, 2013–2017*



* Lead poisoning rates are single-year rates for 2017

Sources: US Census Bureau American Community Survey. "B25034: Year Structure Built." 2013–2017 American Community Survey. Data analyzed November 2, 2018. Retrieved from <https://factfinder.census.gov/>; and CT DPH Lead, Radon, and Healthy Homes Program; Lead Poisoning Surveillance System. Data analyzed May 16, 2019.

Radon

Radon is a naturally occurring radioactive gas that has been identified as the second leading cause of lung cancer. Each year, up to 24,000 Americans die of lung cancer even though they never smoked.¹² More than 21,000 of those deaths are believed to be a result of radon exposure in the home.¹³ The actual risk of lung cancer depends on the radon concentration a person is exposed to, the length of exposure time, and behavioral risk factors such as smoking tobacco. The combined health effects of radon and tobacco exposure are synergistic, so reducing either of the exposures substantially reduces lung cancer risk. Radon cannot be detected with the human senses and causes no symptoms. The only way to know if it is a problem is to test for it. The US Environmental Protection Agency (EPA) recommends

taking action at radon levels of 4.0 pCi/L of air; however, since there is no safe level of radon, the radon level goal should be under 2.0 pCi/L in areas that are occupied daily. High radon concentrations have been found in indoor spaces in all Connecticut towns and cities.

On average, one in five Connecticut homes that tested for radon had levels above the EPA action level of 4.0 pCi/L (**Figure 2.4**). This average is based on limited radon results reported to CT DPH from specific analytical laboratories, as reporting is not required. Due to seasonal variations in radon levels, inconsistent testing locations, and other factors, trends are difficult to establish. It is anticipated that elevated radon levels will continue to be detected in homes across Connecticut, and that statewide prevalence rates will vary based on available data.



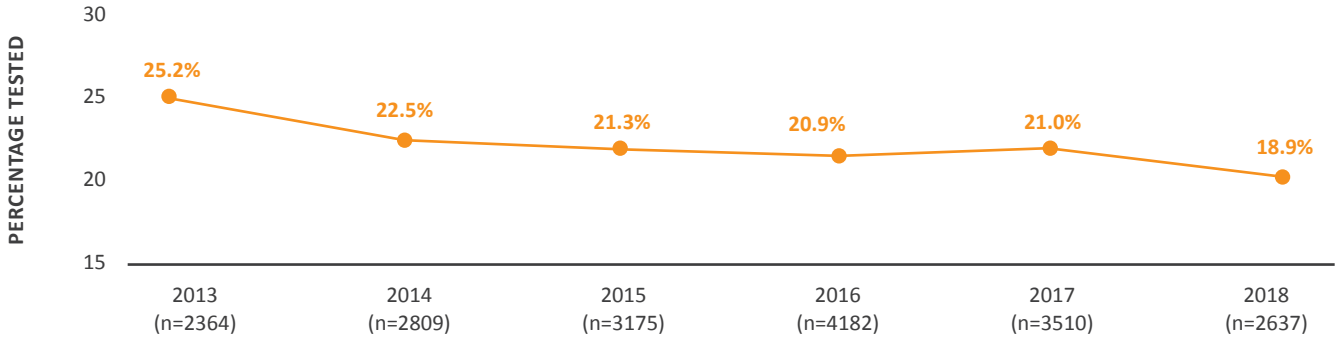
PROGRAM SPOTLIGHT: RADON PROGRAM

The Radon Program at the CT Department of Public Health aims to promote radon awareness, testing, mitigation, and radon-resistant new construction throughout the state in order to reduce the number of radon-induced lung cancer deaths in Connecticut.

Accomplishments include the following:

- Development and implementation of a statewide radon measurement in schools policy to achieve compliance under CGS Sec 10-220 (d), An Act Concerning Indoor Air Quality in Schools, resulting in nearly every public school in CT having been tested for radon and re-evaluated every five years;
- Inclusion of Appendix F Passive Radon Controls in One & Two Family homes and townhouses in the CT State Building Code;
- Creation and management of the data surveillance system to house all reported radon data with developed workflows to assist in focused program efforts;
- Execution of a successful annual campaign for National Radon Action Month in January with
 - + local health/district partnerships (35 partners in the 2018/2019 year);
 - + a statewide media campaign with measurable metrics (Network TV spots, Connected TV & Streaming device spots, social media — Facebook & Twitter, search retargeting, billboards, movie theater advertisements, CT Radio and streaming music spots);
 - + a well-attended half-day radon conference; and
 - + a statewide Radon Poster Contest in schools.

FIGURE 2.4: Percentage of homes tested with radon levels ≥ 4.0 pCi/L, CT, 2013–2018



Source: CT DPH Lead, Radon, and Healthy Homes Program; Radon Surveillance System. Data analyzed April 10, 2019.

BEST & PROMISING PRACTICES: RADON EXPOSURE PREVENTION

To prevent radon exposure:

- Improve the quality of radon testing and mitigation with the use of qualified nationally certified professionals.
- Provide free or low cost radon tests and education of available funding opportunities for radon mitigation for eligible, low-income residents.
- Use *Radon Resistant New Construction* techniques in the design of all new Connecticut homes.
- Promote radon testing and mitigation when needed in all Connecticut homes.
- Disclose elevated radon levels during real estate transactions and provide radon awareness education.
- Require radon testing in Connecticut homes and rental properties.
- Require landlords to mitigate rental properties with elevated radon levels.
- Promote and expand CT Department of Public Health's Radon Program Partnerships with local health departments/ and districts for radon education/ and outreach and distribution of free radon test kits (<https://portal.ct.gov/DPH/Environmental-Health/Radon/Radon-Program>).
- Increase radon data reported by national analytical laboratories to expand the surveillance system for more focused outreach projects.

Asbestos

Asbestos refers to several naturally occurring fibrous minerals used in a wide range of manufactured goods, including thermal system insulation on mechanical systems, roofing shingles, ceiling and floor tiles, paper and cement products, textiles, and coatings. The substance was banned in most products in 1989, but legacy building materials remain in housing, institutions, commercial properties, public buildings and schools. Asbestos has been found in over 3,000 building materials and products.

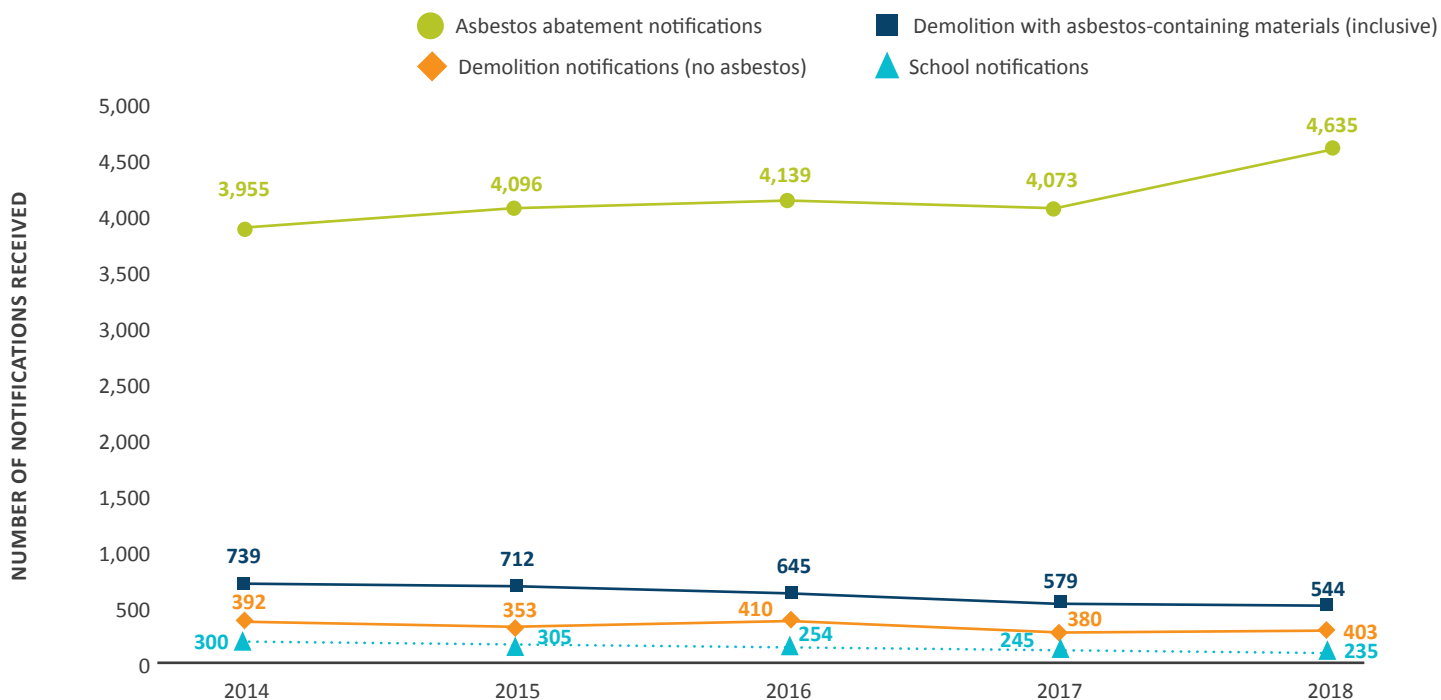
Exposure to airborne, friable asbestos can increase the chance of developing:

- Cancer, most commonly lung cancer, but also throat, gastrointestinal tract, and kidney cancers.
- Mesothelioma, a rare, often fatal cancer, usually occurring in the chest cavity.
- Asbestosis, a chronic and fatal condition in which the lungs become increasingly scarred with fibrous tissue making breathing increasingly difficult.

On average, our state receives approximately 4,000 asbestos abatement notifications and 400 demolition notifications each year (**Figure 2.5**). Increasing numbers of notifications received in 2018 reflect the program's outreach to local health departments and building officials. By providing electronic copies of the notifications to 18 of the state's 66 local health districts, a greater awareness of notification requirements is shared with the communities served by these health districts. A comparison of notifications by CT DPH determined that the majority of notifications are from towns integrated with our electronic notification program.

While not related to home environments, school building and renovation projects account for an average of 276 notifications per year. Abatement and renovation activity in public schools is indirectly related to a priority list created by the Connecticut Department of Administrative Services (CT DAS). CT DAS approves partial funding for public school projects in compliance with CT General Statute, Section 10-283(a). This statute requires notification to the Governor each December with a "priority list" of renovations/alterations in schools for the coming school year. The generated list helps raise awareness for the asbestos regulations.

FIGURE 2.5: Number of asbestos abatement and demolition notifications received, CT, 2014–2018



Source: CT DPH Asbestos Program, Asbestos Abatement Notification Form. Data analyzed March 18, 2019.



PROGRAM SPOTLIGHT: ASBESTOS PROGRAM

The Asbestos Program at the CT Department of Public Health (CT DPH) works to reduce the chance of exposure by the public to airborne asbestos. Contractors are required to notify the Asbestos Program in advance for demolition or renovation projects that will impact more than 10 linear feet or more than 25 square feet of asbestos-containing material.

Asbestos Abatement Notifications allow Asbestos Program staff:

- To inspect projects to determine if work is being conducted according to the regulations.
 - To ensure projects are tracked electronically.
- Maintaining demolition and renovation notification data allows the Asbestos Program at CT DPH to track compliance with the state Standards for Asbestos Abatement and Licensure and Training Requirements. The Asbestos Program can locate where these activities are taking place in the state and evaluate data regarding the asbestos industry. Doing so helps ensure asbestos abatement is being performed safely thereby protecting residents and construction workers from a known human carcinogen.

OUR ENVIRONMENT AT SCHOOL

Radon in Schools

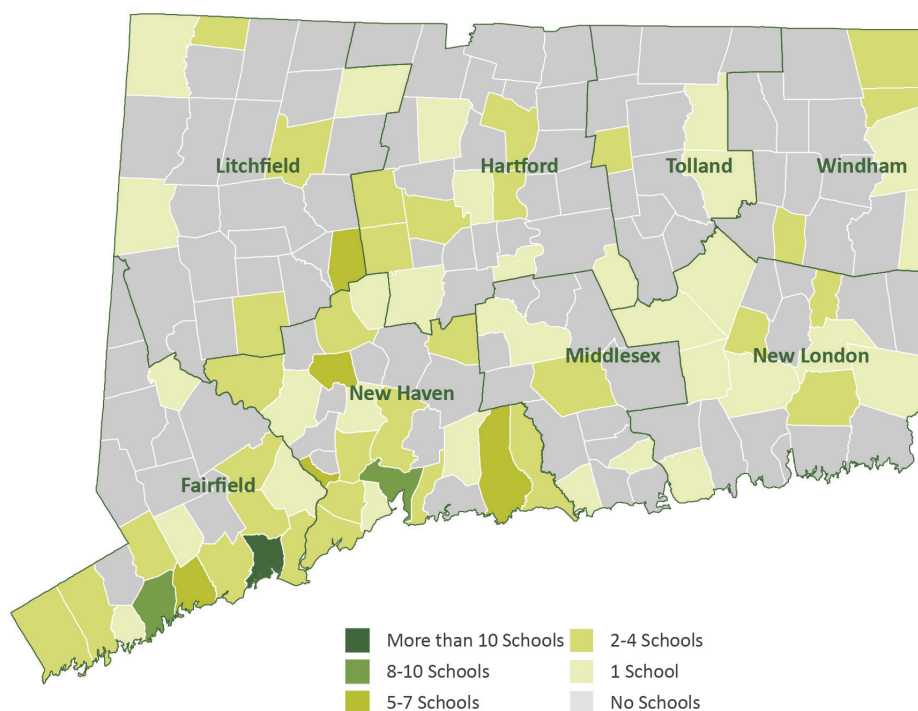
All public schools in Connecticut test for radon every five years as part of a CT State Department of Education indoor air quality inspection requirement and summary data is reported to CT DPH. Approximately 90% of Connecticut public schools have been tested for radon, exceeding the national average of 20% in school buildings.¹⁴

Elevated radon levels are most often detected during the initial round of radon testing at a school. From 2013–2018 the majority of radon testing conducted in schools was reevaluation testing, as part of the CT State Department of Education’s indoor air quality inspection requirement. To provide an accurate picture of radon in Connecticut schools, data from 2000–2018 was used in the analysis to include the majority of initial testing events. The number of schools with elevated levels of radon varied by county, with New Haven and Fairfield Counties having the most schools with elevated radon levels statewide (**Figure 2.6**).

Continued radon testing and mitigation reporting is essential to continue managing radon in schools. To continue preventing radon exposure to students and staff in schools, our state should consider the following:

- Continued routine radon testing in schools every five years by qualified radon measurement professionals;
- Use of qualified nationally certified mitigation contractors to install radon mitigation systems in schools where elevated radon levels have been detected;
- Review of required *Radon Resistant New Construction* (RRNC) techniques in the design of all new Connecticut schools prior to approval;
- Inspection of passive and active RRNC systems in new schools;

FIGURE 2.6: Number of schools with radon levels ≥ 4.0 pCi/L by town and county, CT, 2000–2018



Source: CT DPH Lead, Radon, and Healthy Homes Program; Radon Surveillance System. Data analyzed April 11, 2019.

- Completion of the Connecticut school regulation (CT General Statutes Section 19a-37(b)) concerning radon testing and mitigation in public schools; and
- Revision to the CT General Statutes that requires radon testing in public schools to include private schools.

Asbestos in Schools

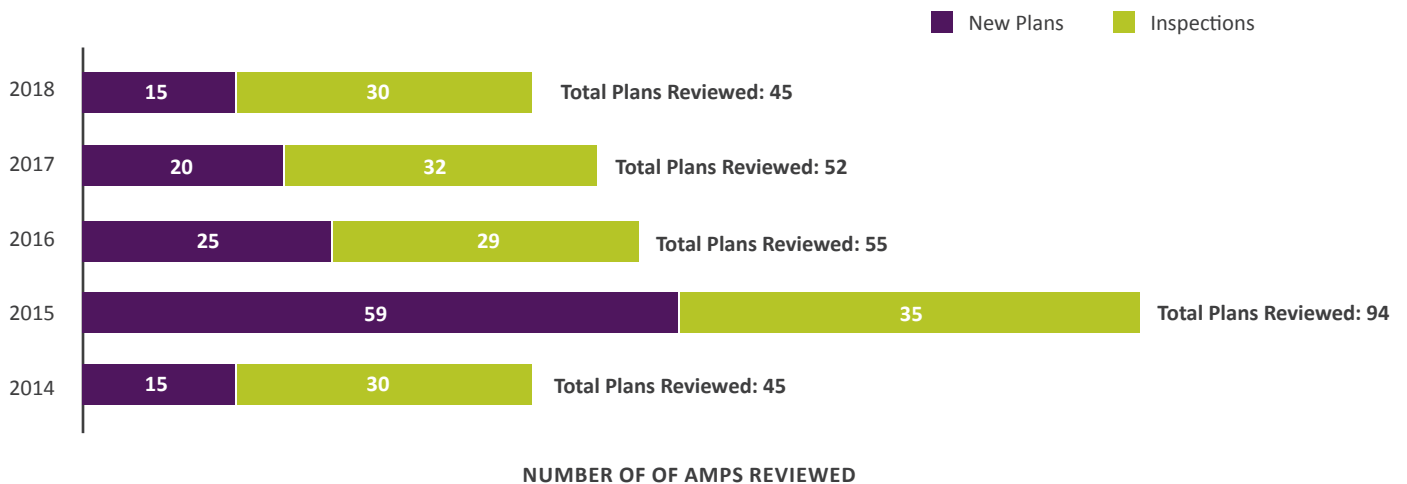
Asbestos Management Plans (AMPs), and a person designated to ensure regulatory compliance, are required for each public and private, not-for-profit K-12 local education agency (LEA), including each school and each school building (maintenance, offices, etc.). Currently, over 1,400 AMPs have been approved by CT DPH. Review of these plans allows the agency to document asbestos abatement that has already occurred and future abatement plans for each school district. If damaged asbestos containing materials are present in a school, the LEA must respond to sufficiently protect human health and the environment.

Between 2014 and 2018, 137 LEAs submitted management plans for newly constructed buildings and building additions (Figure 2.7). In addition, 156 CT DPH inspections were conducted, indicating

that the LEAs engaged in new building or renovation activities without submitting an initial plan. When added together, we can estimate that 290 new schools and new building additions were added to the education directory during that period. In general, the rate of compliance with the requirement to submit an asbestos management plan continues to improve.

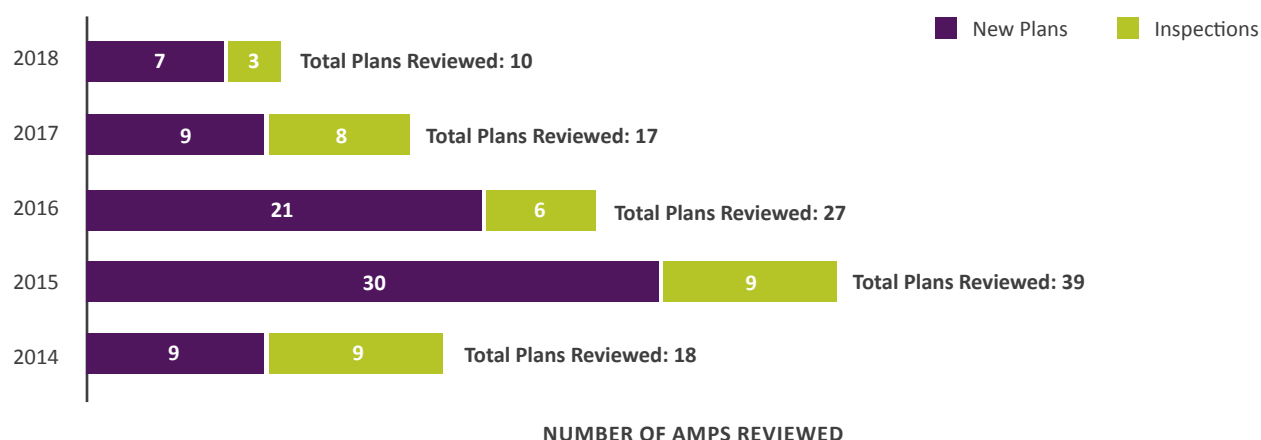
In addition, CT DPH prioritizes inspections of economically distressed communities (known as Environmental Justice communities), especially since many of these communities do not have the means to budget for asbestos abatement.¹⁵ Between 2014 and 2018, 76 LEAs from these communities submitted management plans for newly constructed buildings and building additions (Figure 2.8). In addition, 35 inspections were conducted in these communities, indicating that these LEAs engaged in new building or renovation activities without submitting an initial plan. When added together, we can estimate that 111 new schools and new building additions were added to the education directory in Environmental Justice communities during that time period.

FIGURE 2.7: Number of asbestos management plans in schools reviewed, CT, 2014–2018



Source: CT DPH Asbestos Program, LEADbase. Data analyzed March 25, 2019.

FIGURE 2.8: Number of asbestos management plans in schools reviewed in Environmental Justice Communities, CT, 2014–2018



Source: CT DPH Asbestos Program, LEADbase. Data analyzed March 25, 2018.

REGULATION SPOTLIGHT: ASBESTOS-CONTAINING MATERIALS IN SCHOOLS

The regulation requires Local Education Agencies (LEAs) to:

- Inspect for the presence of asbestos-containing building materials and to document the condition of the materials.
- Develop an asbestos management plan (AMP).
- Submit the plan to Connecticut Department of Public Health.
- Designate and train a point person for each school who is responsible for making sure that the Asbestos Management Plan is followed.
- Ensure all maintenance and custodial personnel that work in a school that has asbestos containing building materials (ACBM) participate in a two-hour asbestos awareness training.
- Inspect the ACBM every six months to document any change in the condition of asbestos containing building material.

- Conduct a full re-inspection of the school every three years.
- Notify parents, teachers, and employee organizations annually regarding the availability of the AMP and any asbestos activities conducted, including inspections, response actions and post response actions. A copy of the plan must be available for review upon request.

Newly submitted plans generally contain a statement by the architect or project engineer responsible for construction, declaring that 1) no asbestos-containing building materials were specified or 2) to the best of his or her knowledge, no asbestos-containing materials were used in the building construction. A representative number of our state's schools are inspected in economically distressed communities (i.e., Environmental Justice communities), and in communities with higher median incomes.

OUR ENVIRONMENT AT WORK

Occupational Illnesses and Injuries

Work-related injuries are generally defined as injuries that result from single events such as falls, being struck or crushed by objects, electric shocks, or assaults. Work-related illnesses, such as asthma, silicosis and carpal tunnel syndrome, typically occur as the result of longer-term exposure to hazardous chemicals, physical hazards (e.g., radiation, noise), or repeated stress or strain at work. Infectious diseases also can be caused by workplace exposures. It is more difficult to track work-related illnesses than injuries because many of the conditions also can be caused by non-occupational factors. Also, many work-related illnesses take a long time to develop and may not appear until many years after the individuals have left employment. The financial cost of workplace injuries and illnesses to the state is substantial; with over \$900 million paid out in workers' compensation benefits in 2015, which equates to \$552.00 per covered worker.¹⁶

NON-FATAL INJURIES

Non-fatal work-related injuries are a common occurrence in workplaces in our state, but can vary widely across different industries, occupations, and demographic categories. In 2017, the average incidence rate for non-fatal work-related injuries for Connecticut workers across all age groups was 136.5 per 10,000 full-time equivalent (FTE) workers (**Figure 2.9**), with workers 35 to 44 years of age experiencing the highest incidence rate. When separated by gender, the incidence rate of non-fatal work-related injuries for men and women decreased between 2011 and 2017, with the rate of work-related injuries among men consistently exceeding that rate among women (**Figure 2.10**).

FATAL INJURIES

On average, Fatal Work-Related Injuries claim the lives of 13 workers in the US each day. These fatalities result from non-intentional injuries such as falls, electrocutions, acute poisonings, and motor vehicle crashes occurring during travel for work. Intentional injuries (i.e., homicides and suicides) that occur at work are also counted in these statistics. In Connecticut, work-related fatal injuries cost our state an estimated \$88 million per year.¹⁷ Fatal work-related injuries also carry a tremendous social and economic burden for families in Connecticut, disrupting family units and social networks.

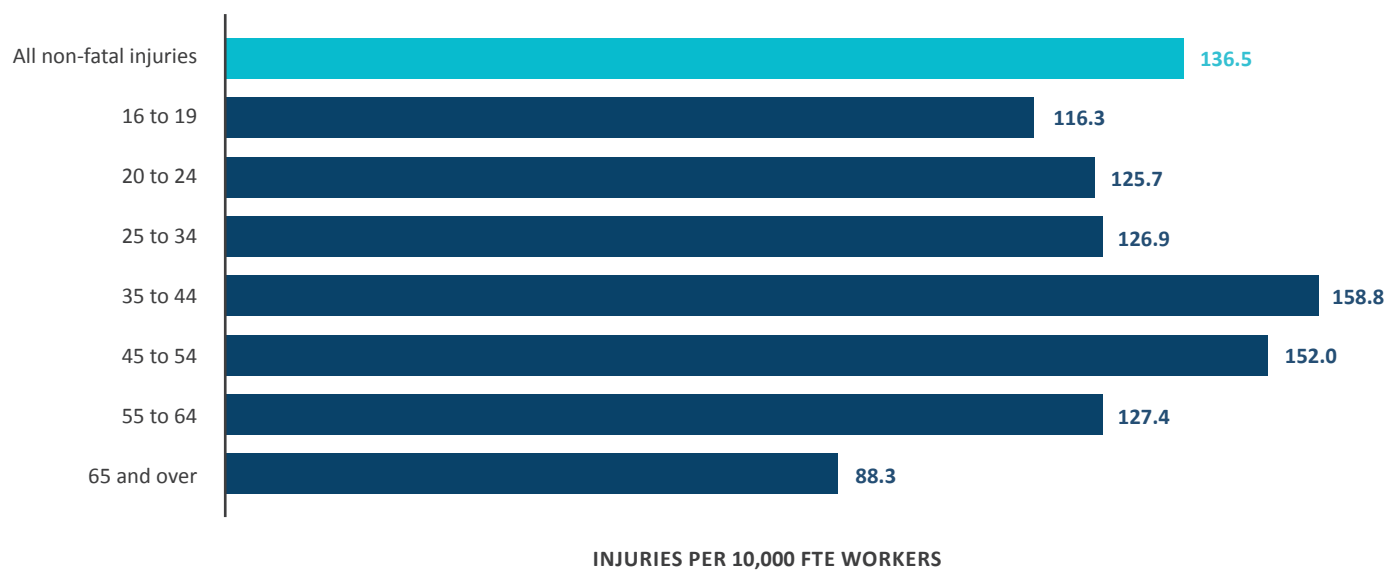
From 2013 to 2017 (**Figure 2.11**), the three most common events resulting in work-related fatalities in our state were:

- Transportation incidents (60 fatalities),
- Violence and other injuries by persons or animals (38 fatalities), and
- Falls, slips, trips (31 fatalities).

Nationally, worker fatalities have decreased by approximately 18% from a decade earlier.¹⁸ From 2013–2017, working adults (ages 25–54) bore the greatest number of work-related fatalities, followed by older workers (55+) (**Figure 2.12**). Men were overwhelmingly more likely to experience a work-related fatality when compared to women, experiencing 18-times the number of deaths over a five-year period (**Figure 2.13**).

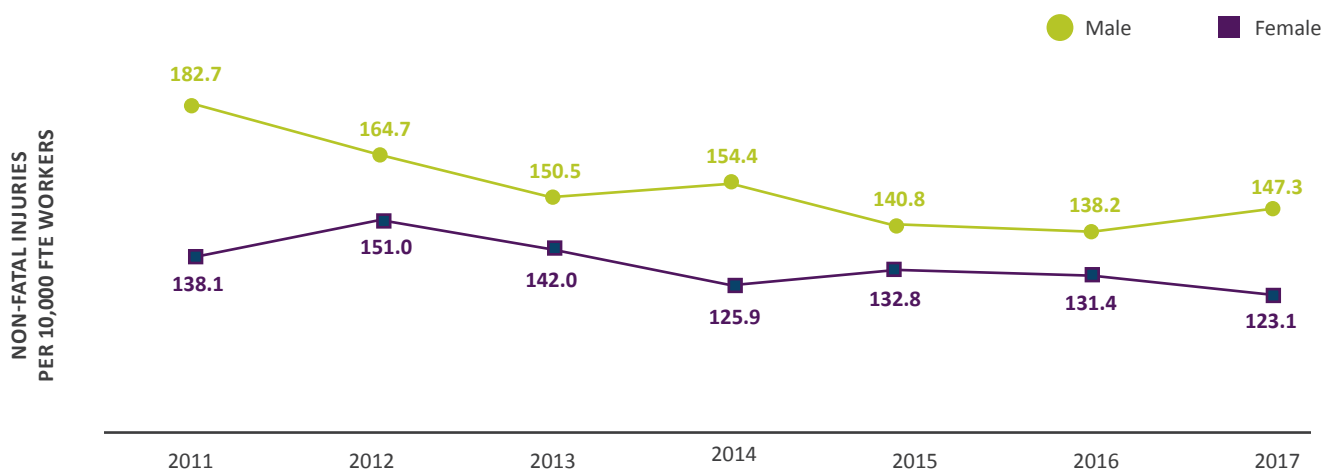
Both fatal and non-fatal injuries disproportionately affect Hispanic and non-Hispanic Black workers in Connecticut. From 2011–2017, the rate of non-fatal work-related injuries was consistently two-times greater in non-Hispanic Black workers and 2.5-times greater in Hispanic workers than the rate in non-Hispanic White workers in Connecticut (**Figure 2.14**). Similarly, the rate of fatal work-related injuries for the time period 2013–2017 was higher in Hispanic and non-Hispanic Black workers than the rate for non-Hispanic White workers in our state (**Figure 2.15**).

FIGURE 2.9: Incidence rate of non-fatal work-related injuries by age group, CT, 2017

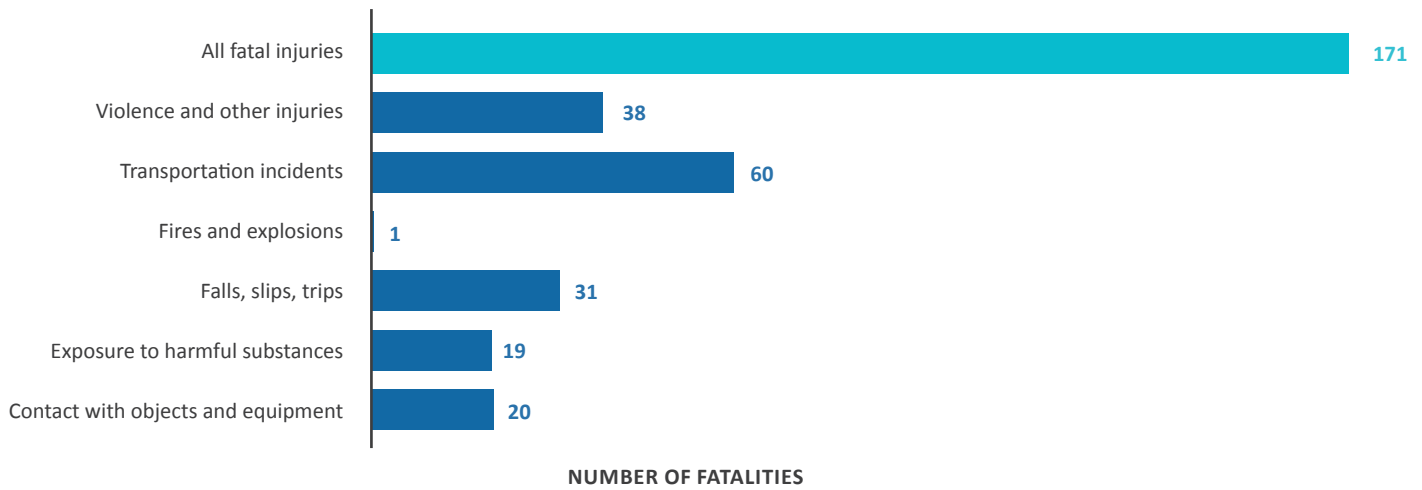


Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed January 17, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

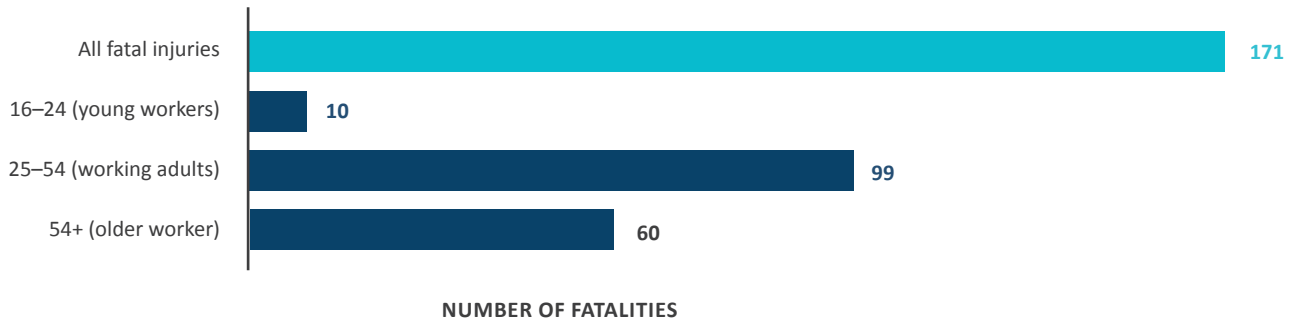
FIGURE 2.10: Incidence rate of non-fatal work-related injuries by sex, CT, 2011–2017



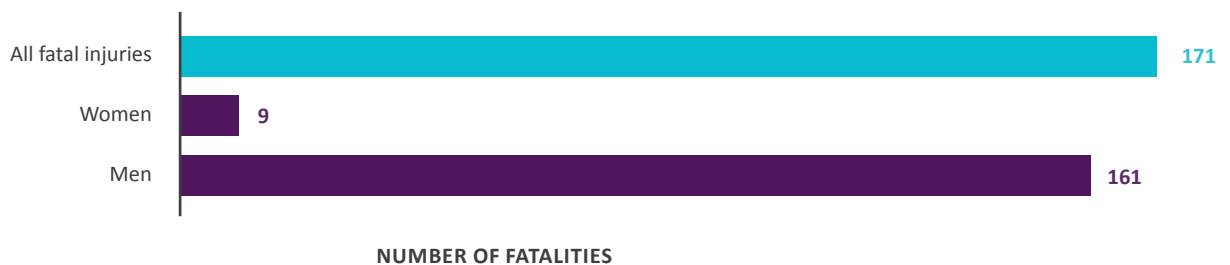
Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed January 14, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

FIGURE 2.11: Number of work-related fatalities by type of event or exposure, CT, 2013–2017

Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed January 21, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

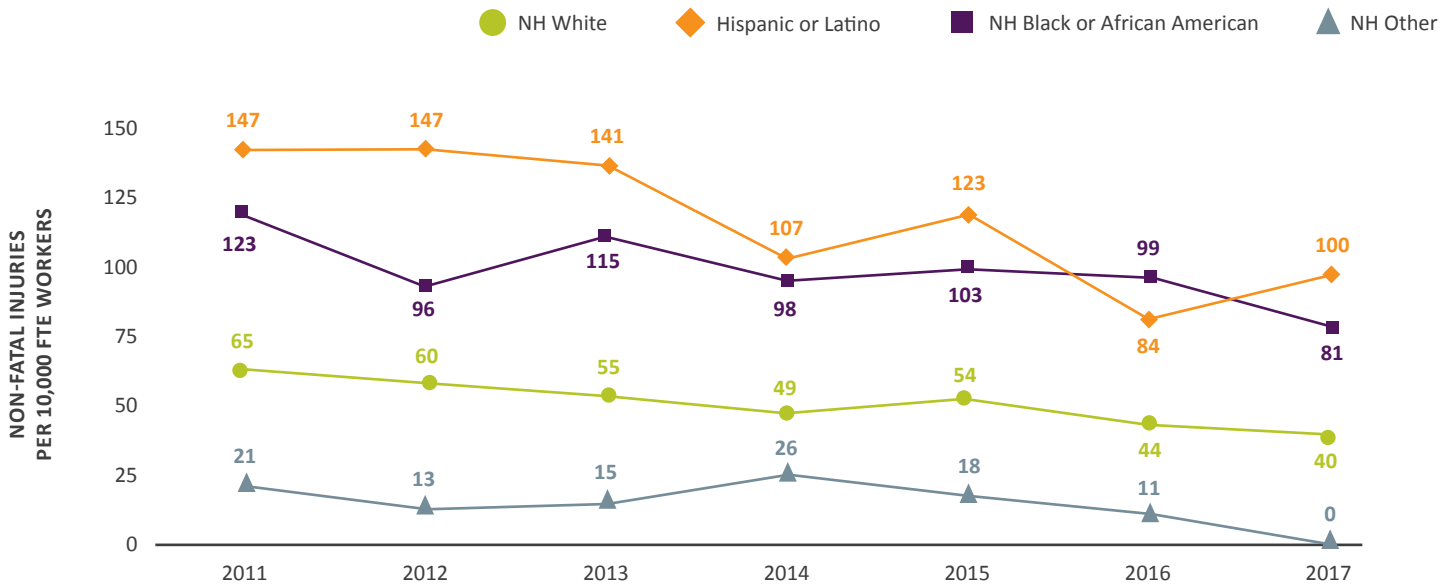
FIGURE 2.12: Number of work-related fatalities by age category, CT, 2013–2017

Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed January 21, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

FIGURE 2.13: Number of work-related fatalities by sex, CT, 2013–2017

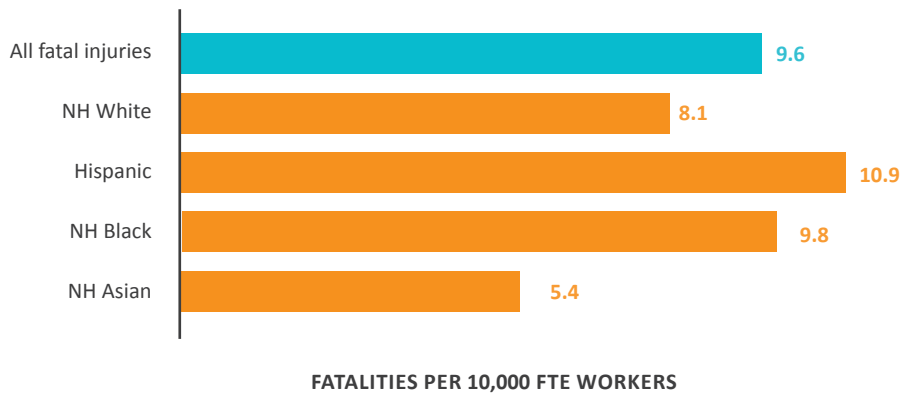
Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed January 21, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

FIGURE 2.14: Incidence rate for non-fatal work-related injuries by race/ethnicity, CT, 2011–2017



Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed October 15, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

FIGURE 2.15: Incidence rate for fatal work-related injuries by race/ethnicity, CT, 2013–2017



Source: US Department of Labor Bureau of Labor Statistics; State Occupational Injuries, Illnesses, and Fatalities. Data analyzed October 15, 2019. Retrieved from www.bls.gov/iif/state_archive.htm#CT.

PROGRAM SPOTLIGHT: EDUCATING EMPLOYERS ABOUT OPIOIDS

Workers struggling with addiction are more likely to get injured on the job, to have high absenteeism, and to experience other job performance issues. The Connecticut Department of Public Health's Occupational Health Program has partnered with stakeholders to develop a set of key principles for employers to include in Human Resource policies to shift from the traditional punitive approach to employee substance abuse to the development of a more supportive and healing environment to aid in their recovery.

Source: *The Opioid Crisis and Connecticut's Workforce*. 2018. [https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/occupationalhealth/Opioid-conference-writeup_FINAL-FINAL_11_28_18-\(2\).pdf?la=en](https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/environmental_health/occupationalhealth/Opioid-conference-writeup_FINAL-FINAL_11_28_18-(2).pdf?la=en)

CONNECTICUT SUPPORTS PRIORITY POPULATIONS TO PREVENT OCCUPATIONAL HAZARDS

When the State Department of Public Health's Occupational Health Program identifies populations at-risk for occupational injury, illness, or death they do the following:

- Develop multi-lingual educational materials;
- Provide training to young workers; and
- Provide free consultative services to worksites to create safer workspaces.

Priority populations that experience a disproportionate burden of occupational illness and injury include:

- **Non-English speaking workers experiencing occupational injuries.** Historically, non-English speaking workers are

disproportionately injured on the job. As such, educational documents and outreach materials are translated into Spanish (the predominant non-English language spoken in our state) to ensure a majority of these workers are reached.

- **Workers in industries with higher rates of injury and chemical and noise exposure, including manufacturing, service, and construction.** Workers in these industries tend to be non-English speaking, non-White, young, and low wage workers. As such, resources and trainings should be customized for these populations and workplaces employing these populations to mitigate risk and promote healthy worksites.

OUR ENVIRONMENT OUTDOORS

Outdoor Air Pollution

Outdoor Air Pollution can have adverse effects across the life course. When thinking about the health of the air we breathe, ozone and fine particulate matter (PM_{2.5}) are two pollutants that can trigger health issues when they exceed ambient air quality standards. Specifically:

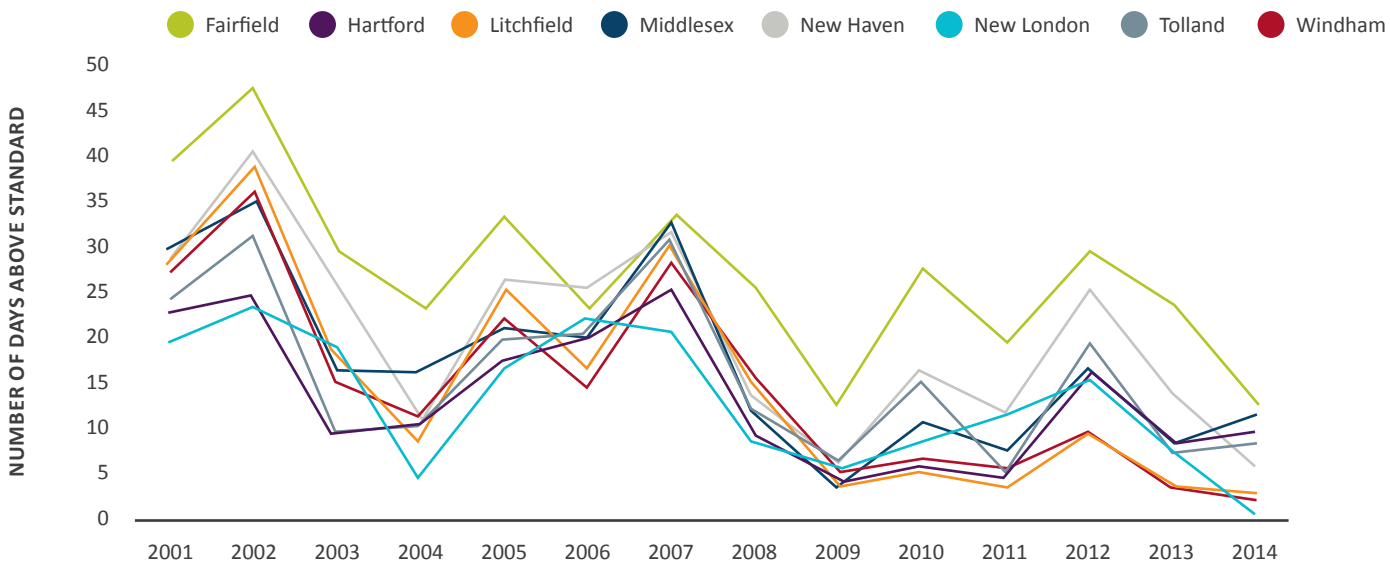
- Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and airway inflammation. It can reduce lung function and cause damage to lung tissues. Ozone can worsen bronchitis, emphysema, and asthma, requiring medical care.
- Exposure to fine particles such as PM_{2.5} can affect both the lungs and the heart, and is linked to a variety of problems, including premature death in people with heart or lung disease, non-fatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

Children, adults over 65 years of age, and people with pre-existing respiratory, heart, or circulatory system diseases are particularly at risk for the health consequences resulting from poor air quality.

The number of days where the ozone levels exceeded the regulatory standard of 70 parts per billion has generally decreased since 2002 (**Figure 2.16**). However, there is great variability in the data, likely due to the impacts of weather on levels of ozone. Fairfield and New Haven counties have somewhat higher levels, likely due to their proximity to the New York metropolitan area, where many ozone precursors originate.

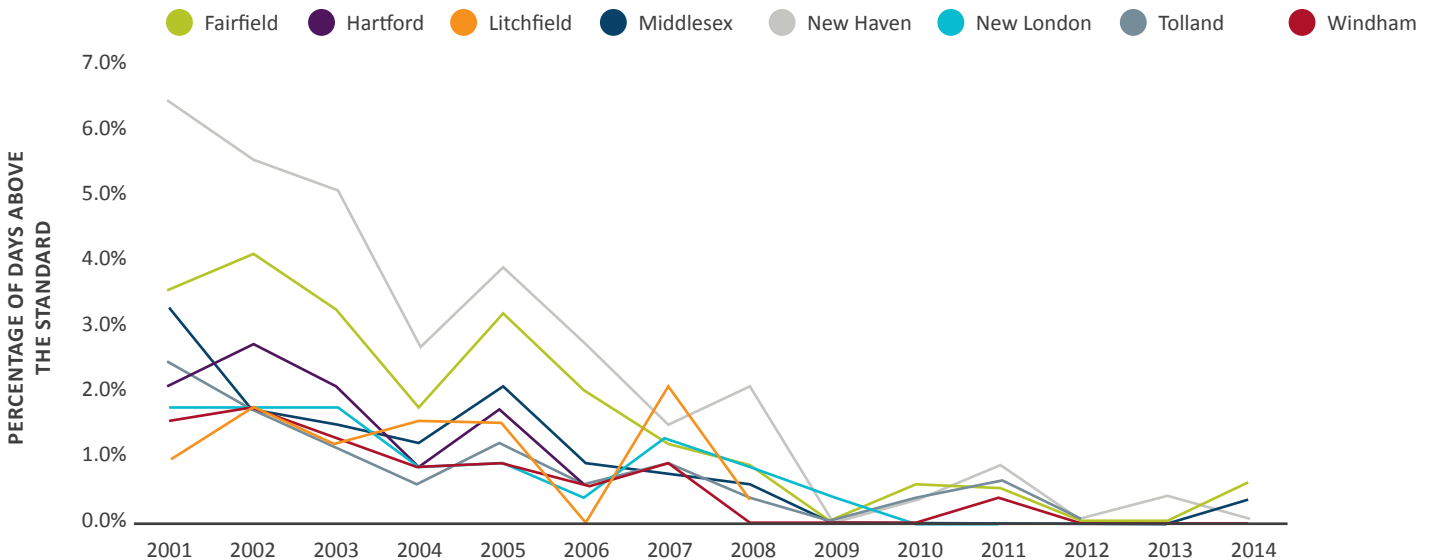
The levels of PM_{2.5} measured annually in Connecticut have been dropping for over a decade, and are now consistently below the EPA standards of 12 micrograms per cubic meter. The number of days where the 24-hour standard for PM_{2.5} was exceeded has decreased for all counties since 2002 (**Figure 2.17**).

FIGURE 2.16: Number of days with maximum 8-hour average ozone concentration over regulatory standard by county, CT, 2001–2014



Source: Centers for Disease Control and Prevention, Environmental Public Health Tracking Network. Data analyzed December 4, 2018. Retrieved from <https://ephtracking.cdc.gov/>.

FIGURE 2.17: Percentage of days with fine particulate matter levels over the National Ambient Air Quality Standards by county, CT, 2001–2014



Source: Centers for Disease Control and Prevention, Environmental Public Health Tracking Network. Data analyzed December 4, 2018. Retrieved from <https://ephtracking.cdc.gov/>.

To improve air quality, it is important for our state to identify opportunities to reduce emissions. Strategies include:

- Implementing clean transportation policies;
- Reducing the use of wood burning stoves;
- Targeting renewable energy and increasing energy efficiency;
- Developing walking- and cycling-friendly communities; and
- Encouraging communities to plant trees that can absorb air pollution.

Recreational Waters

Beach closures occur when local health officials suspect that water quality is adversely impacted by storm-water runoff. Closure prevents the public from contacting disease-causing organisms transmitted through the water. Beach closure decisions are based on 24-hour local rainfall data or *enterococci* bacteria results from beach water testing. When a beach is closed, it indicates that the beach water might be contaminated with human pathogens that can cause gastrointestinal illness.

When looking at beach closures from 2003–2017, no long-term trends in beach closure frequency can be discerned. However, predictors for beach closure are well-known, as severe storms and heavy precipitation are the most likely predictor of closure frequency (**Figure 2.18**).

Continued monitoring by local health department staff, the CT DPH Laboratory, and the CT Department of Energy and Environmental Protection will continue to ensure the safety of the recreating public. In addition, efforts to control storm water runoff and decrease the impact and number of waterfowl should help to prevent future beach closures.

FIGURE 2.18: Number of marine swimming beach closures by closure days and events, CT, 2003–2017



Source: CT DPH Recreation Program, Annual Beach Grant Report. Data analyzed March 14, 2019.

PROGRAM SPOTLIGHT: AIR QUALITY INDEX AND AIRNOW FLAG PROGRAM

Air Quality Index (AQI)

- Posted daily by the Connecticut Department of Energy and Environmental Protection (CT DEEP).
- Intends to help the public know when bad air pollution days are predicted and gives recommendations to the public on steps they can take to alter their activities and behaviors to reduce their risk for adverse health effects.
- Website: <https://ct.gov/deep/cwp/view.asp?q=320646>

AirNow Flag Program — Stratford

- Air Quality awareness program associated with the EPA.
- Aims to increase awareness of air quality issues and inform individuals of protective measures.
- Uses color-coded flags raised in visible places throughout the community.
- A School Flag Program helps schools highlight the importance of good air quality and educate the school community about the Air Quality Index and how it affects student activities each day.
- Website: www.airnow.gov/index.cfm?action=flag_program.index
- School Flag Program: www.easternct.edu/sustainenergy/school-flag-program/

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