

Texas Occupational Health and Safety Surveillance (U60)

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List of Terms and Abbreviations

ABLES	Adult Blood Lead Exposure Surveillance Program
AHEC	Capital Area Health Education Center
ASHCA	Agricultural Safety and Health Council of America
ASSE	American Society of Safety Engineers
BLS	Bureau of Labor Statistics
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CFOI	Census of Fatal Occupational Injuries
COSS	Consortium of Occupational State-based Surveillance
CSTE	Council of State and Territorial Epidemiologists
CTS	Carpal Tunnel Syndrome
DSHS	Texas Department of State Health Services
EIET	Environmental and Injury Epidemiology and Toxicology
EMS	Emergency Medical Services
ERC	Education and Research Center
ETR	Texas EMS/Trauma Registry
FIFRA	Federal, Insecticide, Fungicide, and Rodenticide Act
FQHC	Federally Qualified Health Centers
FTE	Full Time Equivalent
HDD	Hospital Discharge Data
IT	Information Technology
MAFO	Midwest Association of Farmworker Organizations
MCSE	Microsoft Certified Systems Engineer
MSD	Musculoskeletal Disorder
NAICS	North American Industry Classification System
NEMSIS	National Emergency Medical Services Information System
NHMA	National Hispanic Medical Association
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
OH	Occupational Health
OHI	Occupational Health Indicator
OHSS	Occupational Health & Safety Surveillance
OR	Odds Ratio
OSHA	Occupational Safety and Health Administration
RSS feed	Really Simple Syndication feed
SAC	Scientific Advisory Committee
SENSOR	Sentinel Event Notification System for Occupational Risks
SOII	Survey of Occupational Injuries and Illnesses
SPIDER	SENSOR Pesticide Incident Data Entry and Reporting
SWCOEH	Southwest Center for Occupational and Environmental Health
TDA	Texas Department of Agriculture
TDI	Texas Department of Insurance
THA	Texas Hospital Association
TMA	Texas Medical Association
TPCN	Texas Poison Control Network

TPHA	Texas Public Health Association
TRHA	Texas Rural Health Association
TRHF	Texas Rural Health Forum
URL	Uniform Resource Locator
UTHSCSA	University of Texas Health Science Center San Antonio
UTHSCT	University of Texas Health Science Center Tyler
µg/dL	Micrograms per deciliter

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Abstract:

Over the period from July 1, 2010 through June 30, 2015, the Texas Department of State Health Services (DSHS) has been steadily working to make Texas occupational health surveillance data more readily accessible for compilation, analysis, and reporting purposes. Access database techniques are now being utilized for analysis of Texas hospital discharge data (HDD) (~2.9 million discharges per year), Texas Poison Control Network (TPCN) calls (~300,000 calls per year), Texas vital statistics data (~170,000 deaths per year), and Texas pesticide-related illness and injury (~300 cases per year). Since Texas is not a workers compensation state, DSHS developed methods using additional fields in the HDD dataset to identify work-related hospitalizations, improving case-finding by about 19-26% compared with using only the primary payment source field coded as worker compensation.

The Council of State and Territorial Epidemiologists (CSTE) recommends collection of a core set of occupational health indicators (OHIs) to assist in the development of programs to prevent or reduce workplace injuries and illnesses. In 2010, DSHS collected 15 out of the recommended 19 OHIs and has steadily progressed up to compiling and reporting all 22 OHIs in 2015. For OHI data obtained from HDD, DSHS now routinely analyzes data by age group, race, ethnicity, sex, and a number of other parameters. DSHS has aggregated all available Texas OHIs (from 2003–2012) to allow easy analysis of trends over time.

Texas Department of Transportation crash data has been linked up with data from the DSHS EMS/Trauma Registry, and OHSS has begun looking at collisions involving commercial motor vehicles along with EMS runs and hospital outcomes associated with those crashes. OHSS and other DSHS staff were instrumental in showing the importance of including occupation and industry information on the BRFSS questionnaire for 2012 as recommended by NIOSH.

DSHS staff attended over 60 meetings, workshops, and training events attended by hundreds of workers, students, employers, and public health professionals and gave presentations and/or distributed brochures on various occupational health topics, including adult lead exposure, childhood lead exposure resulting from parental occupational lead exposure, silicosis, asbestosis, work-related pesticide illness and injury, and workplace falls.

DSHS assisted NIOSH staff with a Health Hazard Evaluation of the first reported case of silicosis in a worker resulting from dust exposure during fabrication of engineered stone countertops. DSHS also created and distributed a Hazard Alert targeting employers and employees involved in stone countertop fabrication. The alert included information about silicosis risk factors and engineering controls for preventing silica exposure.

DSHS also conducted a workplace mercury vapor exposure investigation in hospital rooms occupied by 3 siblings admitted for mercury toxicity resulting from a liquid mercury spill in their home. Clothing and other belongings had been brought from home for use during their hospital stay, and nursing staff were concerned about possible workplace mercury vapor exposures. Measurements were obtained from the children's rooms and from bagged belongings from home using a Jerome J505 Mercury Vapor Analyzer. Results, interpretations, and conclusions were provided back to the hospital administration and medical and nursing staff.

SECTION 1

Significant (Key) Findings

These activities were funded by the National Institute of Occupational Safety and Health under the state-based Occupational Health and Safety Surveillance project (U60) from July 2010 through June 2015. Summarized below are some of the significant accomplishments made by DSHS to reduce occupational injuries and illness in Texas:

- The initial Specific Aim 1 for the Texas DSHS program was to compile and report data for 13 of the specified OHIs to CSTE/NOISH. At the end of year 1 we reported 15 out of 19 defined OHIs. Over the next 4 years, the number of defined OHIs increased, and we systematically increased our capacity until we were reporting 22 out of 22 defined OHIs by the end of the grant period.
- Access database techniques have been developed and are being utilized for analysis of Texas hospital discharge data (HDD) (~2.9 million discharges per year), Texas Poison Control Network (TPCN) calls (~300,000 calls per year), Texas vital statistics data (~170,000 deaths per year), and Texas pesticide-related illness and injury (~300 cases per year). While these data are not from totally new sources, having them available in an easily accessible database makes it possible to explore numerous datasets in a variety of new ways looking for work-related morbidity and/or mortality.
- For OHI data obtained from our annual HDD database, DSHS routinely analyzes hospitalizations by age group, race, ethnicity, sex, and a number of other parameters. This has allowed demographic analysis of work-related hospitalizations for burns, pneumoconioses, lower back disorders, severe traumatic injuries, and total work-related hospitalizations. OHI data from 2003–2012 have been aggregated to allow easy analysis of trends over time.
- The Texas EMS/Trauma Registry (ETR) currently has over 2.5 million records for EMS runs and, in 2013, received over 130,000 reports of hospitalizations for trauma. To comply with National Emergency Medical Services Information System (NEMSIS) standards, EMS and hospital reports to ETR will be required to indicate if a case was work-related, and to complete industry and occupation fields, by the end of 2016.
- DSHS education and outreach activities include 12–16 events per year sponsored by organizations such as the Texas Office of Border Health, Texas Department of Agriculture, Texas Department of Insurance, Institute of Industrial Engineers, American Society of Safety Engineers, the Austin Ergonomics Roundtable, the Association of Occupational Health Nurses, Texas Ergonomics Roundtable, the Texas Rural Health Association, National Farmworkers Association, Migrant Clinicians Network, Texas Border Health, Midwest Association of Farmworker Organizations, and many others. At these meetings (often with 20 to 100 attendees) DSHS staff have given presentations, talked with meeting attendees, and distributed informational handouts (in both English and Spanish) on various occupational health topics and reporting requirements.
- DSHS investigated a case of silicosis associated with fabrication of engineered stone countertops. We assisted NIOSH in conducting a Health Hazard Evaluation of the case's work place and published an article in CDC's Morbidity and Mortality Weekly Report.

- DSHS conducted a mercury vapor workplace exposure investigation in a limited number of rooms at a central Texas hospital.

Translation of Findings

- During the grant period, DSHS has clearly demonstrated our program’s ability to access and compile data from various sources in order to generate output for reporting the 22 OHIs to CSTE/NIOSH.
- Beyond these fundamental tasks, we have constructed numerous databases that have made data sources that were once nearly inaccessible readily available through simple queries to the appropriate Access database.
- Our EMS/Trauma Registry is now requiring reporting of information on work-relatedness, industry, and occupation for data submitted on EMS runs and trauma hospitalizations. With these advances in data reporting, we look forward to being able to search the ETR database for additional work-related injuries and illnesses.
- Texas DSHS education and outreach activities reach thousands of Texas workers through presentations, brochures, and hand-outs distributed at meetings and health fairs, and visits to the DSHS website on occupational health issues. Printed materials and web-based materials are available in both English and Spanish to reach the largest Texas audiences.
- When unusual occupational illnesses or exposures are encountered (such as the silicosis case investigation and the hospital mercury vapor exposure investigation mentioned above), DSHS staff have conducted or participated in field investigations to evaluate workplace conditions and make recommendations for improvements.

Outcomes/Impact

- As a potential outcome from the silicosis case, we created and distributed a hazard alert targeting employers and employees involved in stone countertop fabrication. The Hazard Alert included information about silicosis risk factors and focused on engineering controls as the most effective method for preventing silica exposure.
- As an intermediate outcome, one of the other states reporting OHI data to CSTE/NIOSH heard about how Texas DSHS has been using Condition code and Occurrence code fields to improve case-finding for work-related hospitalizations. They contacted our program and we shared with them how we have been using the fields and what our experience had been in improved case-finding.
- Another intermediate outcome is that OHSS and other DSHS staff have been long-term supporters of the collection and use industry and occupation information for the EMS/Trauma Registry and other registries tracking data that could contain useful information about occupational injuries and illnesses. We believe that this support has helped to get the rule changes necessary to get this information reported and tracked for epidemiological and public health purposes.
- Education and outreach activities, including 12–16 events per year (often with 20 to 100 attendees) have reached thousands of workers over the years, and DSHS occupational health website visits have reached thousands more.

SECTION 2

Scientific Report

Background for the Project

Occupational injuries and illnesses affect millions of employees in the U.S. each year, and result in significant costs to our nation, both in terms of quality of life of employees and economic losses experienced by affected employees, employers, and society in general. In 2013, the U.S. Bureau of Labor Statistics (BLS) reported an estimated total of just over 3 million non-fatal workplace injury and illness cases within the private sector workforce. The total cost of workplace injuries and illnesses (both direct and indirect costs) in the U.S. is estimated to be \$250 billion annually. In Texas alone, employers paid over \$1.7 billion dollars in workers' compensation benefits in 2012. Given that Texas law does not require private employers to provide workers' compensation insurance, this figure likely underestimates the true economic impact of occupational illness and injury.

Texas is the second-largest state in the U.S., both in terms of size and population. In 2013, it was estimated that more than 8% (12,752,000) of the total U.S. labor force resided in Texas. Over two million of these workers are estimated to be employed within Census Bureau industries that are at high risk for occupational mortality (unpublished data, Texas occupational health indicators 2012). Compared with most other states, a slightly larger percentage of individuals in Texas (6.9%; over 830,000 persons) were employed within the construction and extraction occupational group in 2013, a group with one of the highest rates of fatal injuries in the U.S. Texas is demographically diverse, and an estimated 20% of the state's total population of over 25 million is foreign born. Immigrants are more likely to be employed in more dangerous jobs or in jobs with poorer working conditions than U.S.-born workers. Given the size and diverse demographic characteristics of the state's workforce, in-depth analysis of Texas surveillance data provides much-needed occupational health information for state priority setting and intervention activities. It also provides valuable support for National Occupational Research Agenda Sector Programs and other states' surveillance programs.

The DSHS Environmental and Injury Epidemiology and Toxicology (EIET) Unit has a history of conducting surveillance both on occupational and non-occupational illnesses and injuries, including more than 25 years of surveillance of occupational pesticide exposure, adult and childhood blood lead levels, asbestosis, and silicosis. Additionally, the EIET Unit has conducted surveillance on hazardous substances emergency events, EMS runs, hospitalizations for severe traumatic injuries, submersion injuries, traumatic brain injuries, and spinal cord injuries. These state-based efforts are multi-dimensional projects involving data collection, analysis, interpretation, and dissemination, with linkages to (and evaluation of) prevention and intervention activities. However they have existed under separate mandates and have not worked together in a comprehensive occupational health capacity as envisioned by the Council for State and Territorial Epidemiologists (CSTE). Over the past 5 years, the EIET Unit has been working to create a more seamless program that addresses gaps in occupational health surveillance in Texas.

States play a vital role in the surveillance of occupational injuries, illnesses, and hazards. State occupational health surveillance activities serve as a foundation for several federal surveillance systems. State-based occupational health surveillance provides information necessary to identify and characterize work-related injury, illness, and fatality cases within the state. Furthermore, because state agencies are more likely to have access to local data than agencies at the national level, and because it is the mission of state health departments to improve the health and well-being of their citizens, it is important for states to develop the capacity to conduct and implement more in-depth surveillance and analytical methods to identify high-risk groups, create targeted preventive interventions for selected conditions, and ultimately, reduce worker morbidity and mortality.

Specific Aims

DSHS identified the following six specific aims for implementing a Fundamental Program in Texas under the PAR-09-184 grant:

1. Compile and report data for 13 specified occupational health indicators.
2. Conduct detailed analysis to identify patterns and trends for these occupational health indicators.
3. Pilot other data sources for their capacity to identify cases of occupational illness and injury.
4. Provide training and education to enhance awareness and increase prevention.
5. Continue to review and evaluate the Texas occupational safety and health surveillance system process.
6. Assess the public health outcomes of the surveillance system.

Methodology

Each year CSTE distributes a new “How-To Guide” with updated instructions providing guidance to states regarding the minimal level of occupational health surveillance activity regarding the collection of occupational health indicator (OHI) data for a “fundamental” program. As stated in the “How-to-Guide,” the indicators are a subset of the larger number of conditions that were recommended for surveillance in 2001 and represent a core set of data that, if calculated at the state level, can assist in the development of programs to prevent workplace injuries and illnesses.

DSHS routinely uses the latest CSTE “How-To Guide” methodology each year for generating data for the OHIs to be reported to CSTE/NIOSH. While most of the defined OHIs are relatively straight-forward with little room for improvement, for the OHIs that utilize hospital discharge data (i.e., indicators #2, #6, #20, and #22), the “How-To Guide” suggests using only the “Primary Payer = Workers’ Compensation” for identifying work-related hospitalizations. However, since Texas is not a workers’ compensation state, use of this payment source field alone was expected to significantly under-estimate work-related hospitalizations in Texas. Consequently, when DSHS began constructing an Access database of hospital discharge data (HDD) each year as a source for these indicators, we searched for and found that there are additional fields in the Texas dataset that can help to identify previously unrecognized work-related hospitalizations.

Texas has a “Secondary Payment Source” field that also may be coded as “WC” (Workers Compensation Health Claim) even if the primary payer is coded as something else. DSHS also identified an additional set of 8 “Condition Code” fields that, when coded as “02” (Condition is Employment Related), could be used to identify work-related hospitalizations. Additionally, Texas HDD has 12 “Occurrence Code” fields that, when coded as “04” (Accident/ Employment Related), can also identify work-relatedness. Searching these 21 supplemental fields for the additional codes indicating a work-related hospitalization, improved our case-finding, over the period from 2005–2012, by about 19-26% when compared to looking only for “WC” codes in the “Primary Payment Source” field.

Results and Discussion

Specific Aim 1: In order to expand program capacity, Texas DSHS augmented the original goals of Aim 1 as follows: **Compile and report Occupational Health Indicator (OHI) data for 13 specified OHIs adding 2 indicators per year over the next 3 years to include the full set of 19 OHIs.**

To help ensure accuracy, DSHS routinely double checks OHI data before they are submitted to CSTE/NIOSH. DSHS staff compiled, analyzed, and submitted data for inclusion in the CSTE Occupational Health Indicators Report for the data years 2007 through 2012 (reporting years 2010 through 2015). For the year 2007, Texas DSHS compiled data for 15 of the 19 OHIs (Indicator #s 1-13, 15, and 16). For 2008, the program added 2 indicators and compiled data for 17 of the 19 OHIs (Indicator #s 1-13, 14, 15, 16, and 18) and submitted the verified data to CSTE/NIOSH in June 2011. For the 2009 data year, DSHS added another 2 indicators for a total of 19 out of 20 defined OHIs; these data were reported to CSTE/NIOSH in June 2012. In June 2013 DSHS initially submitted 2010 data for 19 out of 20 indicators but later (December 2013) submitted an update that included OHI #20. Our June 2014 submission included data for 20 out of 21 OHIs (Texas data for OHI 17 was not available for the 2011 data year). Due to a minor error in one of the employment demographic fields, an updated report was submitted in October 2014. For the 2012 data year, DSHS reported data for 22 out of 22 defined OHIs in June 2015.

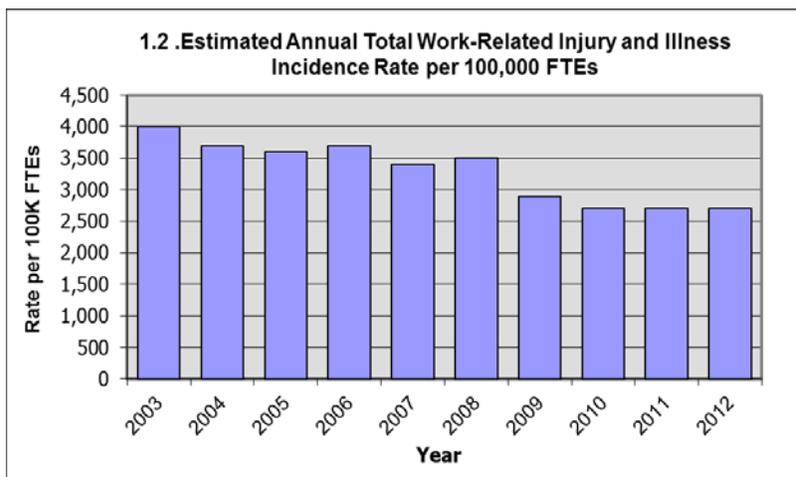
Specific Aim 2: **Conduct detailed analysis to identify patterns and trends for the occupational health indicators.**

For OHI data obtained from our annual HDD Access database, DSHS now routinely analyzes data by age group, race, ethnicity, sex, and a number of other parameters. This has allowed demographic analysis of work-related hospitalizations for burns, pneumoconioses, lower back disorders, severe traumatic injuries, and total work-related hospitalizations. However, obtaining easy access to age group, race, ethnicity, and sex information for the remainder of the OHIs is a difficulty not yet overcome. Trends of the various OHIs over time are shown in sections **OHI 1** through **OHI 22** below. A report of OHI data in Texas documenting these time trends and demographic characteristics for the various OHIs was envisioned and a rough format has been developed. Also, Texas OHI data from 2003–2012 have now been aggregated to allow easy analysis of trends over time. However, due to lack of full demographic data on most of the OHIs, the report is not yet ready to be completed and released.

OHI 1. Non-Fatal Work-Related Injuries and Illnesses

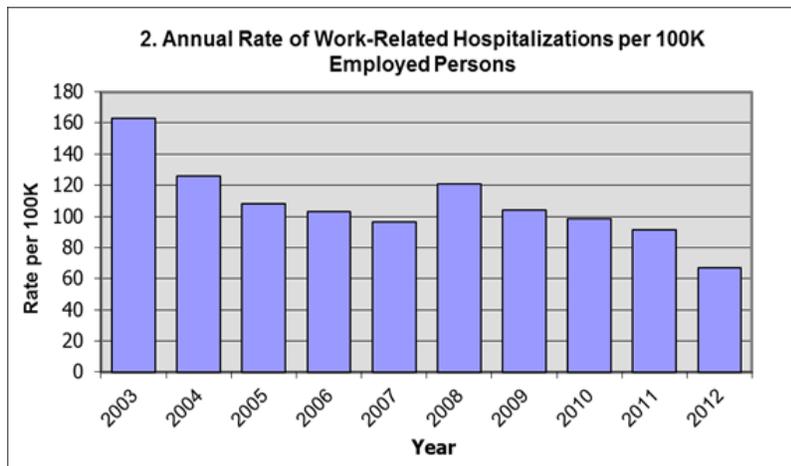
In 2012, the U.S. Bureau of Labor and Statistics (BLS) reported an estimated total of nearly 3.0 million non-fatal workplace injury and illness cases within the private sector workforce, an estimated incidence rate of 3.4 cases per 100 FTE workers. Approximately 94.8% of these cases involved workplace injuries and the remaining 5.2% resulted from workplace illnesses.ⁱ In 2012, a UC Davis Health System researcher estimated considerably higher numbers for total U.S. non-fatal work-related illnesses and injuries (8.56 million) and costs of approximately \$192 billion.ⁱⁱ With continually rising medical care costs, the financial burden of work-related illnesses and injuries can only get worse, not only for direct costs, but also for lost productivity resulting from days away from work.

DSHS has tracked this OHI using the method specified in CSTE’s “How-to-Guide” since 2003 and has observed an annual average of 230,110 work-related illnesses and injuries in Texas. Total work-related injuries and illnesses were relatively level through 2007. However, from 2008–2012, annual numbers appear to be on a decreasing trend of approximately 22%.



OHI 2. Work-Related Hospitalizations

Work-related injuries and illnesses that result in hospitalizations are some of the most serious and costly work-related adverse health outcomes. Using the Texas hospital discharge database, DSHS performed a basic cost analysis of work-related hospitalizations in Texas for 2007–2012. Over that period, work-related hospitalization cost various insurance payers, taxpayers, and/or Texas residents an average of approximately \$592 million per year.



Since Texas is not a workers’-compensation state, use of this payment source alone may significantly under-estimate work-related hospitalizations. Consequently, DSHS has identified and is using additional fields within the Texas hospital discharge dataset to identify previously unrecognized work-related hospitalizations. Use of these

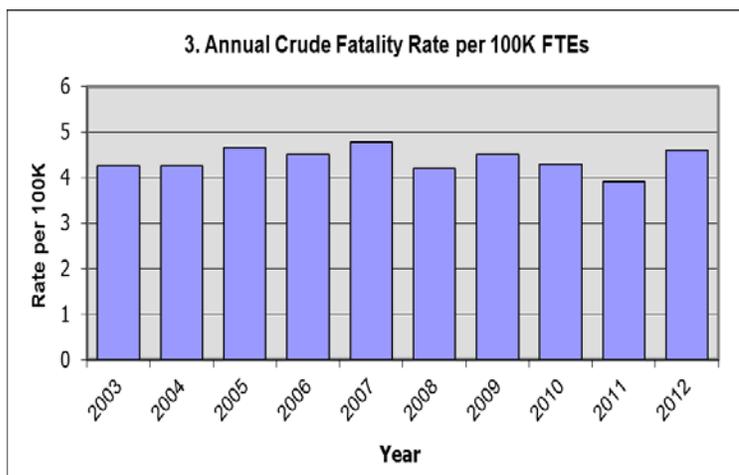
additional data sources has increased annual case-finding of work-related hospitalizations by an estimated 20–30% since data year 2008.

Since 2003, DSHS has observed an average of 12,144 work-related hospitalizations per year out of approximately 2.9 million annual hospital discharge records for an average rate of 107.8 work-related hospitalizations per 100,000 employed persons. Over the first four years, the numbers dropped by approximately 36% but have leveled off since then.

OHI 3. Fatal Work-Related Injuries

According to the BLS’s Revised and Final 2012 data for Fatal Injuries in the U.S., the rates for fatal work injuries from 2006 through 2012 have gradually decreased from 4.2 to 3.4 cases per 100,000 FTEs.ⁱⁱⁱ Over the period 2007–2012, the most frequent causes of work-related fatal events in the U.S. were transportation incidents (40.7%), violence by person/animal (16.8%), falls/slips/trips (14.3%), and struck by object/equipment (16.2%).^{iv}

In Texas, from 2003–2012, the numbers of work-related fatalities have remained relatively stable over time, with an average of 478 deaths per year, producing rates that have varied from 3.92 to 4.78 cases per 100,000 FTEs.

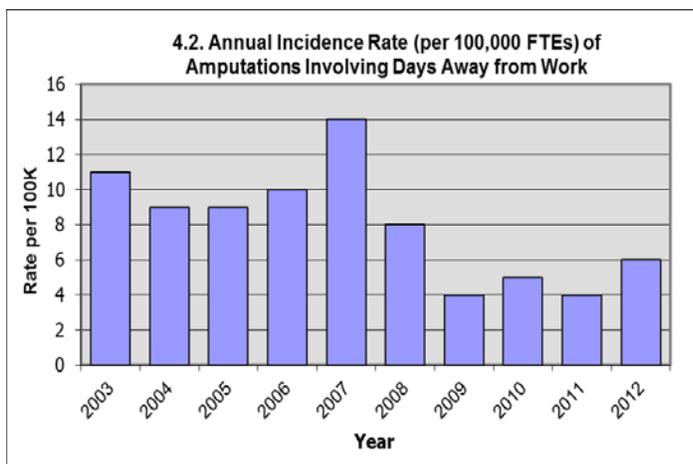


Over the period 2007–2012, the most frequent causes of work-related fatal events in Texas were transportation incidents (41%), violence by person/ animal (16%), falls/slips (14%), and struck by object/equipment (14%).^v Clearly, loss of life to a potentially preventable occupational fatal injury is the most devastating adverse health outcome and more needs to be done to insure that work-related fatalities continue to decrease. In addition to tracking this indicator, DSHS has conducted outreach and educational activities to help increase worker awareness of safety issues and reduce fatal work-related injuries. For example, since 2013 DSHS has been participating in the NIOSH/OSHA Fall Prevention Campaign to reduce morbidity and mortality from workplace falls.

OHI 4. Work-related Amputations with Days away from Work Reported by Employers

In the U.S. in 2012, the BLS received reports of 7,530 amputation injuries involving days away from work (median 21 days).^{vi} About 90% of work-related amputations involve the fingers. Although workplace amputations represent less than 1% of all work-related injury and illness cases, the severity of these injuries often impacts workers and employers much more profoundly than many other injuries. Amputation injuries are the most costly worker

claims by nature of injury, and median number of days away from work for cases involving nonfatal amputations is 18-25 days compared with only 6 days for all injuries and illnesses combined.^{vii}



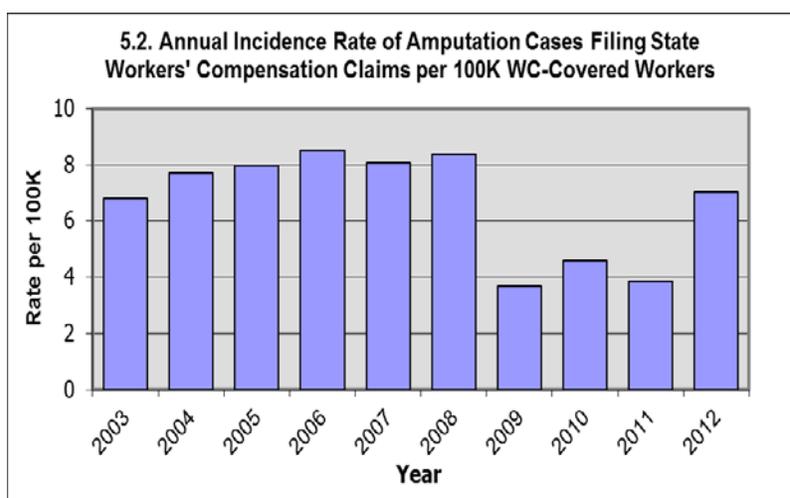
Over the period 2003-2012, the estimated average number of amputation cases in Texas with days away from work was 589, and the average incidence rate was 8.0 per 100,000 FTEs. The numbers from 2003–2008 were relatively consistent in the 580–770 range (except for 2007 with 1,030 cases). From 2009–2011 the numbers dropped to the 290–470 range. These apparent swings in the numbers are suggestive of a possible BLS coding or

classification issue or a change in the reporting requirements. DSHS will evaluate these results to determine if there were coding discrepancies and continue to track this indicator.

OHI 5. State Workers' Compensation Claims for Amputations with Lost Work-Time

Texas employers are not required by state law to provide workers' compensation coverage for their employees; therefore, the number of amputations filed with the Texas Department of Insurance (TDI) likely underestimates the true number of work-related amputations. North Carolina studied work-related amputations presenting to emergency departments and found 32% more cases than reported to BLS Survey of Occupational Injuries and Illnesses (SOII).^{viii}

From 2003-2012, the average number of amputation injuries reported through workers' compensation claims in Texas was 508 compared with 589 cases estimated by the BLS. While the high peak seen in amputation cases reported by employers (see above) was not present in the workers' compensation claims, starting in 2009, the same sudden drop in cases to one half the former numbers was observed. DSHS



plans to compare BLS data with TDI's workers' compensation data and to determine the various industries and occupations most commonly affected by this injury in Texas.

OHI 6. Hospitalizations for Work-related Burns

NIOSH estimates there are 150,000 work-related burns treated in the emergency rooms each year in the U.S. and that an estimated 30-40% of burns are work-related.^{ix} Burns are some of the most devastating injuries affecting workers; they are painful, disabling, expensive to treat, and may result in significant disfigurement. Due to persistent pain, neurologic problems, and psychiatric problems (including anxiety, post-traumatic stress disorder, and depression), up to 44% of workers having burns affecting an average of 16% of total body surface area may remain unemployed up to one year after their burn.^x High-risk occupations include vehicle and equipment cleaners, food service personnel, and millwrights. Occupational burn hazard prevention efforts should focus on restaurant establishments, and preventative measures should target young employees and late-shift workers.^{xi} Texas does not require its employers to provide workers’ compensation coverage. Consequently, identifying work-related burn hospitalizations by counting cases where the primary payer was listed as “Workers’ Compensation” very likely underestimates the true number of cases.

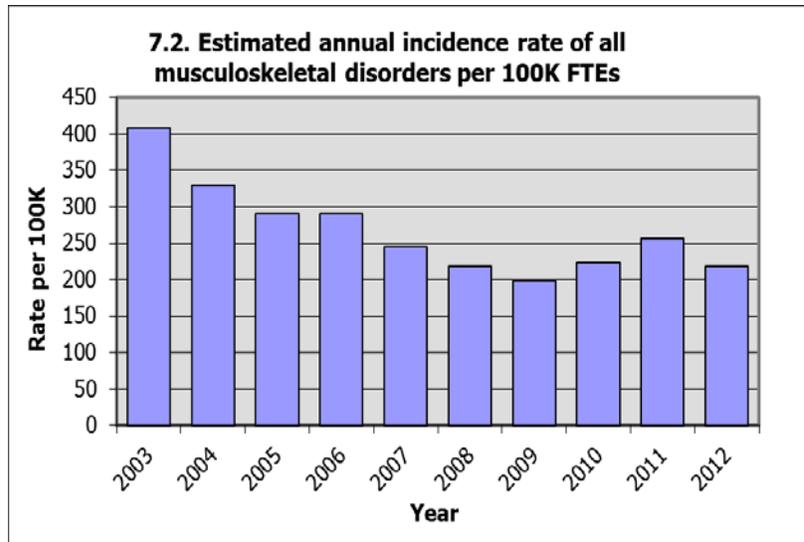


From 2003–2012, DSHS has identified an annual average of 209 cases of work-related burn hospitalizations, with an average incidence rate of 1.91 cases per 100,000 workers. While the rates of work-related burn hospitalizations have varied considerably from year to year in Texas, there does not appear to be any significant trend to the rates.

OHI 7. Work-related Musculoskeletal Disorders with Days away from Work Reported by Employers

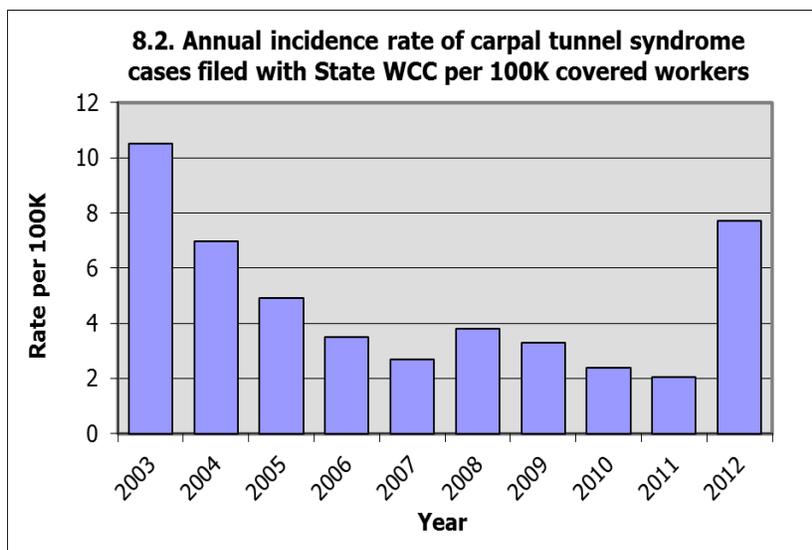
Musculoskeletal disorders (MSDs) generally involve an injury to muscles, nerves, tendons, joints, cartilage, and/or spinal discs; with pain, swelling, and/or numbness; that is caused by overexertion, repetitive motion, and/or jarring vibrations. In 2012, the incidence rate per 100,000 FTEs in the U.S. for MSDs with days away from work was the highest in the transportation and material moving occupation (968), followed by installation maintenance and repair (716), production (522), and construction and extraction (493). The largest number of MSD cases (73,300) occurred in the service occupations out of a total 314,470 cases.^{xii}

Over the period from 2003–2012, annual numbers of MSD cases in Texas workers averaged 18,966, producing an average annual incidence rate of 268 cases per 100,000 FTEs. DSHS will continue to track this indicator and further evaluate these results in order to identify specific high-risk occupations. Based on these results, DSHS will collaborate with safety and ergonomics engineers to improve public health and reduce costs to business.



OHI 8. Carpal Tunnel Syndrome Cases Filed with State Workers’ Compensation Commission

Texas does not require employers to provide workers’ compensation; thus, these data may underestimate the occurrence of this injury in the Texas workforce. Carpal Tunnel Syndrome (CTS) is a compression neuropathy that occurs when the median nerve is squeezed where it crosses the wrist. This results in the symptoms of numbness, tingling, and weakness. In a recent meta-analysis of the relationship between CTS and occupation, risk factors for CTS in exposed workers included vibration (OR 5.40, 95% CI 3.14–9.31), hand force (OR 4.23 95% CI 1.53–11.68), and repetition (OR 2.26, 95% CI 1.73–2.94).^{xiii} These risk factors can be mitigated to a large extent, and therefore CTS should be considered a preventable occupational injury.

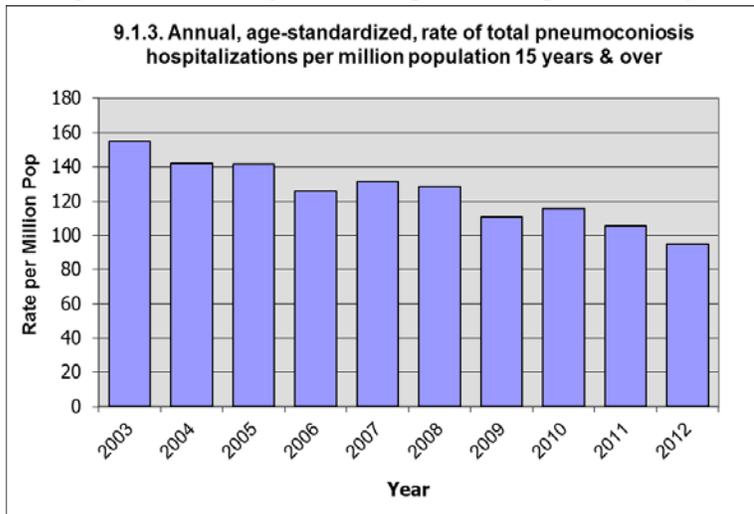


In Texas, over the period 2003–2012, there was an annual average of 362 cases with an apparently downward-sloping trend until 2012 when the count spiked up to 650 cases, producing an overall average incidence of 4.78 cases per 100,000 FTEs. The OHSS group will be working closely with TDI to further analyze the apparent downward trend and sudden spike upward. The need for

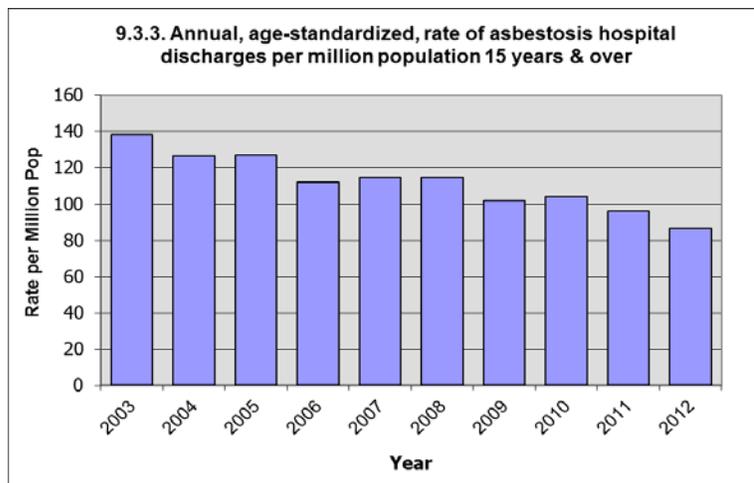
long-term data makes it essential to document occupational history in future cases.

OHI 9. Hospitalizations from or with Pneumoconiosis

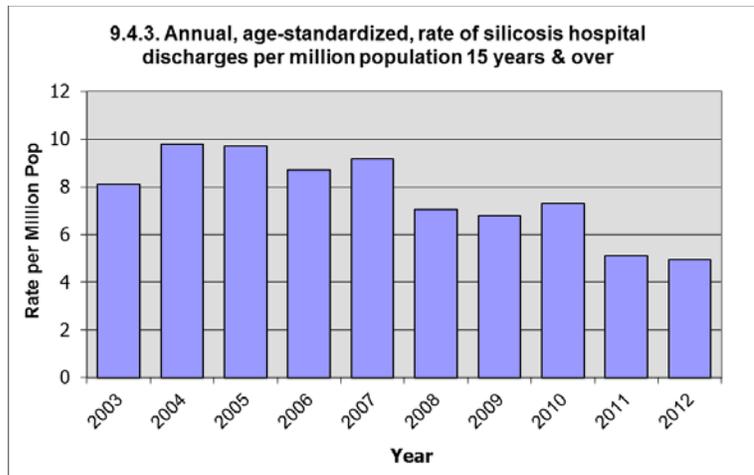
The pulmonary pneumoconioses are a family of chronic lung diseases caused by the chronic inhalation of various forms of organic and inorganic dust particles, particularly in industrial workplaces. All the pneumoconioses are largely attributable to occupational exposures, and the frequency of each varies considerably in different parts of the country depending on local industrial activities. The three major types of pneumoconioses include asbestosis, silicosis, and coal-workers’ pneumoconiosis; a number of other lesser types are listed under three additional categories, but are generally lumped together for analysis of this OHI.



Over the period from 2003–2012, DSHS has identified an average of 1,942 hospitalizations per year of all pneumoconioses combined. Most of these cases are asbestosis (average 1,730 cases), followed by silicosis (average 127 cases), coal-workers’ pneumoconiosis (average 64.1 cases), and other and unspecified pneumoconioses (average 39.4 cases). Asbestosis and silicosis cases seem to be decreasing over the 10-year

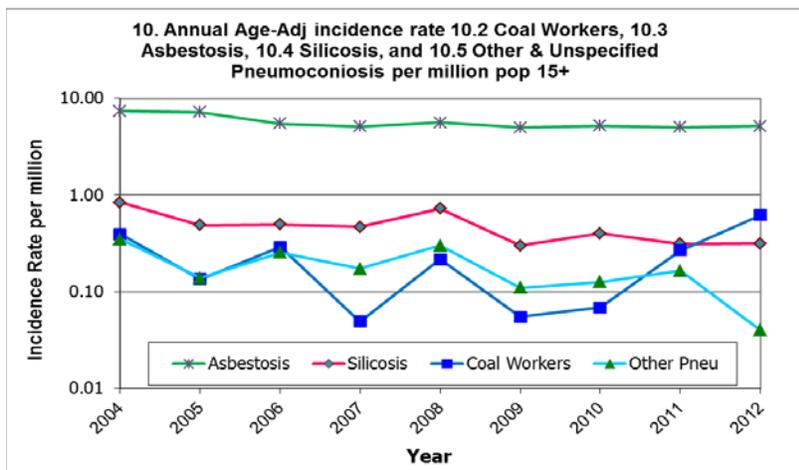


period, but the trends for the other pneumoconioses are not as clear. Prevention of these illnesses requires education regarding the need for eliminating exposure to principal hazardous dust(s) that contribute to the individual diseases. For example, DSHS recently received a report of the first U.S. case of occupational silicosis, acquired from the fabrication of man-made granite composite countertops. DSHS is currently working with NIOSH to conduct follow-up inspections of the facility. DSHS



plans to notify the community of the hazards of breathing dust generated from the fabrication of man-made granite composite countertops by sending fact sheets and/or health alerts to health care providers (B-readers and pulmonologists) in Texas and posting the information on DSHS web page.

OHI 10. Mortality from or with Pneumoconiosis



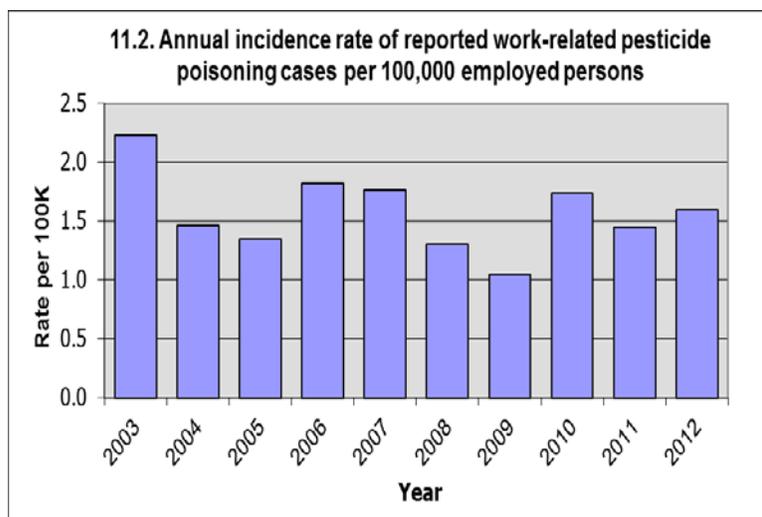
Over the period 2004–2012, the number of deaths in Texas, with pneumoconiosis as a contributing or underlying cause, ranged from 102 to 185 deaths, producing an average of 127.2 deaths per year. There has been a gradual decline in the number of pneumoconiosis related deaths from 2004 to 2012. Similarly, the age-standardized mortality rates

in Texas with pneumoconiosis as a contributing or underlying cause ranged from 6.4 to 10.6 deaths per million population, producing an average of 7.86 deaths per million population. The average age-standardized mortality rates for asbestosis, silicosis, coal-workers’ pneumoconiosis, and other & unspecified pneumoconioses were 6.96, 0.484, 0.233, and 0.184, respectively.

OHI 11. Acute Work-related Pesticide-Associated Illness and Injury

In the U.S. more than one billion pounds of pesticide active ingredients are used annually, and the EPA estimates that 20,000-40,000 work-related poisonings occur per year. The literature suggests that adolescents may also be at substantially higher risk for pesticide exposure in agricultural and service industries.^{xiv}

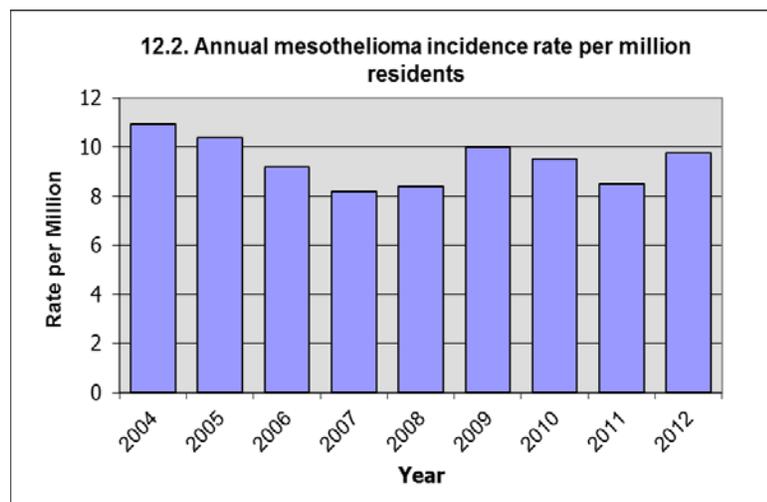
Over the period from 2003–2012, Texas identified an average of 172 cases of occupational pesticide exposure for an average annual incidence rate of 1.58 cases per 100,000 employed persons. In Texas, the majority of pesticide poisoning case reports come from the Texas Poison Control Network (TPCN). The TPCN makes daily updates to an Access database accessible by the OHSS program; possible



cases are contacted, surveillance data are obtained and entered into SPIDER (the database software provided by NIOSH for tracking pesticide exposures) and results are reported annually to NIOSH. Reliance on TPCN data no doubt leads to some under-ascertainment because calls to poison control centers are voluntary and exposed workers may go straight to an emergency department, health clinic, or private physician for evaluation. Also, some workers may just go home sick and return to work when they feel better. DSHS continues to educate medical providers about the need for proper diagnosis, management, and reporting of acute occupational pesticide exposure and will work with our collaborators to overcome the challenges to these efforts.

OHI 12. Incidence of Malignant Mesothelioma

Malignant mesothelioma is a cancer involving the cells that line the abdominal and/or pleural cavities. With a latency period of 20–40 years after exposure begins; this cancer is primarily attributed to occupational exposure to asbestos.^{xv} At 5–7%, 5-year survival rates for mesothelioma are poor. In the U.S., asbestos use peaked in 1973 at 803,000 metric tons and gradually declined to approximately 1,700 metric tons in 2007.^{xvi} The annual number of mesothelioma cases in the U.S. significantly increased from the 1970s through the 1990s. Projections suggest that the number of mesothelioma cases in the U.S. peaked in 2000–2004 with more than 2,500 cases annually and should be declining over the next two decades.



Texas identifies an average of 176 cases of malignant mesothelioma cases per year (over the period 2004–2012) for an average annual age-standardized incidence rate of 10.8 cases per million population. Despite the sharp decline in use of asbestos, the potential for exposure continues. New cases may result from exposure to asbestos during inappropriate remediation and/or demolition of buildings

with existing asbestos. This underscores the need to document occupational history.^{xvii} DSHS plans to continue to track this indicator, and to work with our collaborators to better educate the public of this potential hazard.

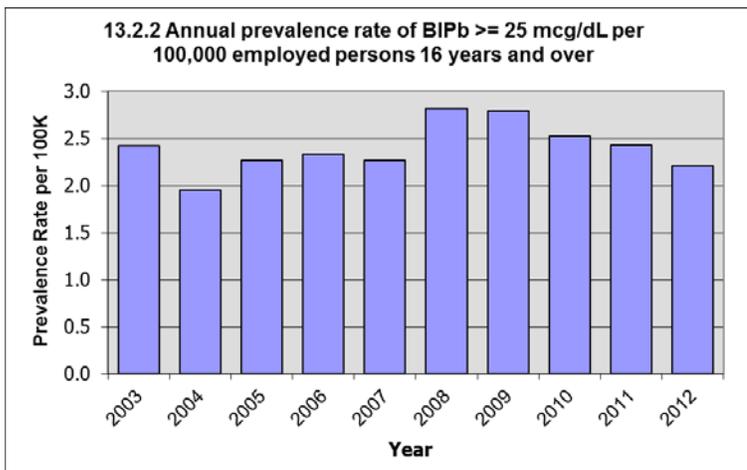
OHI 13. Elevated Blood Lead Levels among Adults

Lead is a toxic metal that accumulates in the body and can affect multiple body systems, including the neurologic, hematologic, gastrointestinal, cardiovascular, and renal systems. Workers exposed to lead may contaminate their homes and expose their children through take-home exposure. In pregnant women, lead can pass through the placenta and harm the fetus. Studies have shown that adults with blood lead levels between 25–60 micrograms per deciliter (µg/dL) can exhibit non-specific symptoms such as depression, fatigue,

headache, irritability, reduced libido, and sleep disturbance.^{xviii} In addition, recent research has caused increased concerns about the toxicity of lead at even lower doses.^{xix} The U.S. prevalence rates of adults aged 16 years and older with elevated blood lead levels over 25 µg/dL has gradually decreased from 15.0 cases per 100,000 employed adults in 1996 to 7.4 per 100,000 in 2005, but toxic exposures continue to occur in higher risk industries such as manufacturing, battery recycling, and construction.^{xx}

DSHS has a long history of effective occupational blood lead surveillance in Texas. In 1986, the Texas Legislature enacted the Health and Safety Code Chapter 84, “Reporting of Occupational Conditions” and required the reporting of adult blood lead levels to the state health department. Initially, the reporting level for blood leads was 40 µg/dL, but following revised definitions of the term “elevated” over the years, CDC NIOSH now recommends (and DSHS uses) a blood lead level of 10 µg/dL as the starting point for follow-up. In 2002, an amendment to the Texas Administrative Code (Title 25, Part 1, Chapter 99, Rule §99.1) required the reporting of all blood lead levels to DSHS. The Adult Blood Lead Epidemiology and Surveillance (ABLES) program at DSHS uses a tiered approach for follow-up of elevated blood lead levels, with progressively more aggressive actions to find and stop the exposure with progressively higher blood lead levels greater than or equal to 10 µg/dL. Actions may include letters to the patient, employer, or provider; or mail or phone interviews with the patient and/or the provider depending on the level. Childhood blood lead levels are also reportable under separate legislation.

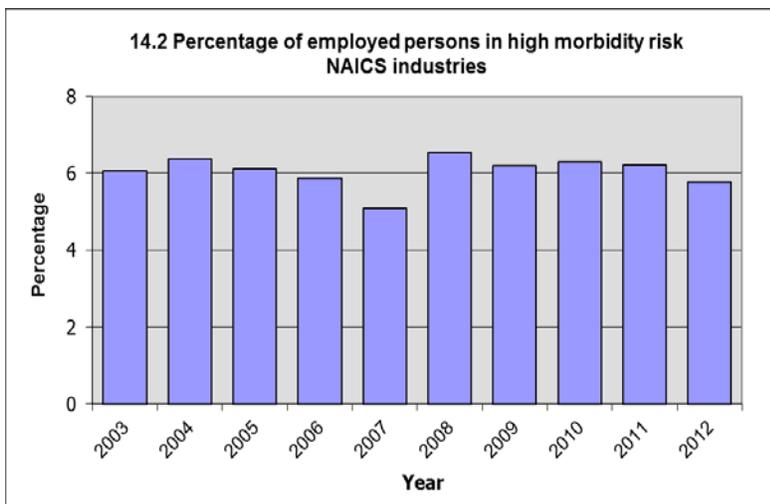
Over the period from 2003–2012, ABLES received an average of nearly 32,400 adult blood lead reports per year. Of these, an average of 677 had levels greater than 25 µg/dL and over 103 had levels greater than 40 µg/dL. Occupational exposures accounted for 608 of the levels greater than 25 µg/dL and 71 of the levels greater than 40 µg/dL. After elimination of duplicate tests per person, ABLES sees an average of 264 persons per year with levels greater than 25 µg/dL and 49.7 with levels greater than 40 µg/dL, producing the annual prevalence rates seen in Figure 13.2.2. Data reported to the ABLES program suggest that the majority of elevated blood lead levels among adults are a result of occupational exposures. DSHS will continue to track this indicator and work with our ABLES program to improve our educational outreach and inspection activities.



OHI 14. Numbers and Percentage of Workers in High Morbidity Risk Industries

In 2008, the BLS reported an estimated total of 3.7 million injury and illness cases within the private sector workforce, and an estimated incidence rate of 3.9 cases per 100 FTE workers. Fifty-five industries had occupational injury and illness rates of more than double the national rate, or 7.8 cases per 100 FTE workers or higher. For this OHI, these

industries, are classified as “high risk industries” and they accounted for 7.96 million workers in the U.S. (6.6% of the private sector employment), and 16% of the OSHA reportable injuries and illnesses.^{xxi}



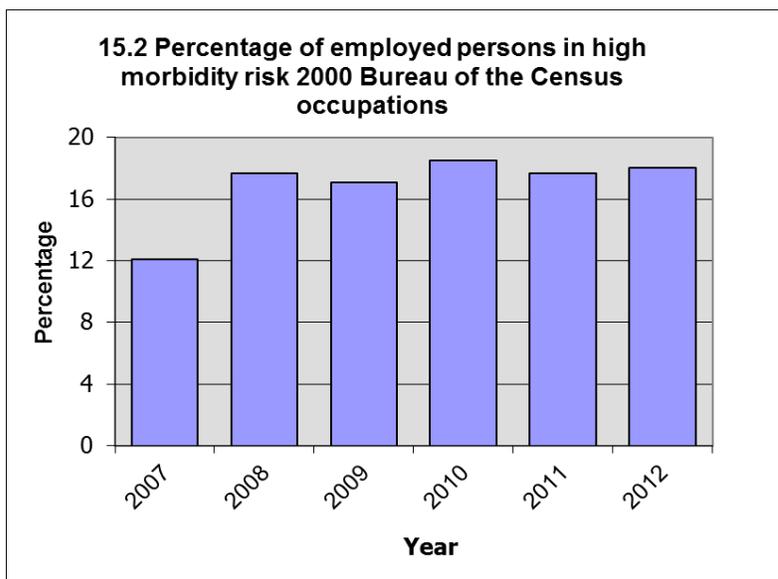
Over the period 2003–2012, Texas identified an average of 530,819 persons per year employed in the North American Industry Classification System (NAICS) industries, having the top 55 highest BLS incidence rates for total reportable occupational morbidity. These “high morbidity risk industries” account for an average of 6.08% of employed persons in Texas. With continued tracking, DSHS will be able to determine trends

and develop targeted education and outreach activities to reduce worker morbidity in these industries.

OHI 15. Numbers and Percentage of Workers in High Morbidity Risk Occupations

In 2008, the BLS reported an estimated 1.1 million injuries and illnesses that resulted in “days away from work”, and a rate of 113 “days away from work” cases per 100,000 FTE workers. The risk of these injuries and illnesses are significantly higher in certain occupations. Sixty-one occupational categories had “days away from work” injury and illness rates higher than 226 cases per 10,000 FTE workers. These occupations accounted for approximately 18.4 million private sector workers in the U.S. (16.1% of the private sector employment, excluding self-employed and unpaid workers), but 44.1% of OSHA “days away from work” cases.^{xxii}

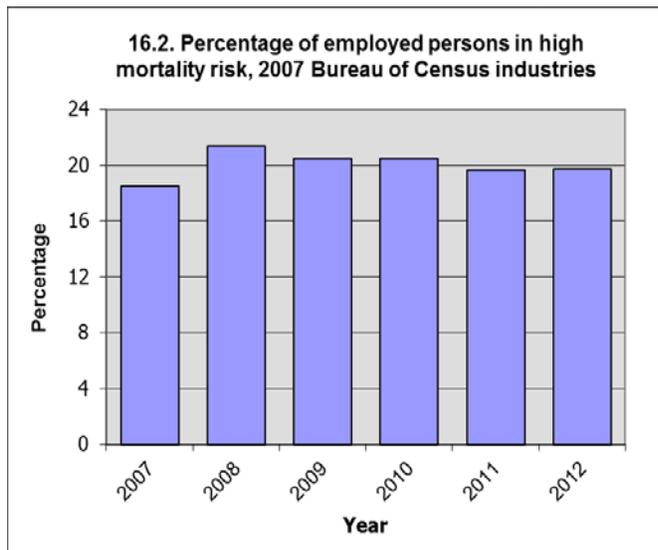
Since 2007, Texas has identified an average of over 1.49 million persons per year employed in 2000 Bureau of Census occupations, classified as having a high risk for morbidity; this amounts to an average of 16.8% of employed persons. With continued tracking, DSHS will be able to determine trends and develop targeted education and outreach activities to reduce morbidity in these occupational groups.



OHI 16. Percentage of Workers in Industries & Occupations with High Mortality Risk

Each year, over 4,500 cases of work-related fatalities are reported to BLS under the Census of Fatal Occupational Injuries (CFOI) program. On an average day, 13 workers die as a result of injuries sustained at work. The risks for these occupational fatalities are significantly higher in certain industries and occupations. In 2008, 40 industries had fatality rates of 7.5 deaths per 100,000 workers or higher, and employed approximately 20.6 million workers (16.6% of the private sector employment), but accounted for 64% of the occupational fatalities. There were 62 occupations that had fatality rates of 7.5 deaths per 100,000 workers or higher. These occupations accounted for approximately 16.1 million workers in the U.S. (13% of the private sector employment), but 66% of the

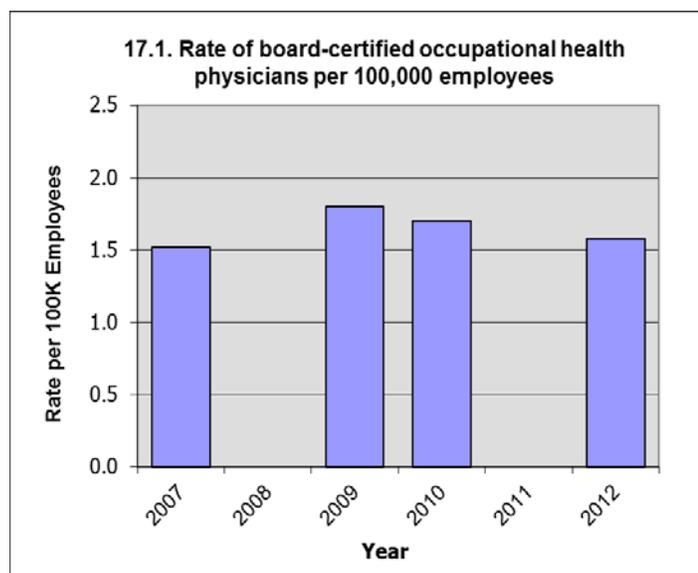
occupational fatalities in 2008.^{xxiii}



Since 2007, Texas has identified an average of nearly 1.99 million persons per year employed in 2007 Bureau of Census occupations classified as having a high risk for mortality; this amounts to an average of 20.0% of employed persons in Texas. With continued tracking and a list of high-risk industries, DSHS will be able to determine trends and develop targeted list of occupations for education and outreach activities to reduce mortality in these occupations and industries.

OHI 17. Occupational Safety and Health Professionals

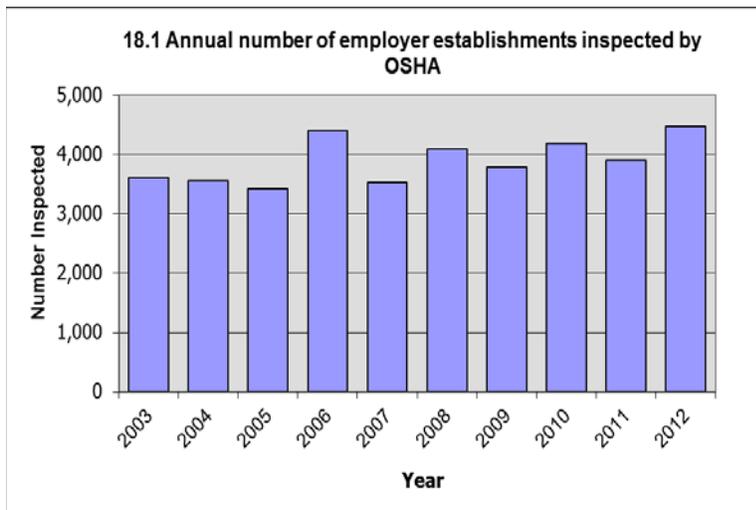
Physicians with training and/or special interest in occupational medicine provide primary, secondary, and tertiary occupational health preventive services. In 1989, the American Medical Association recommended that there be one physician per 1,000 employees. Currently, occupational health nurses provide a great deal of the onsite occupational health care. Industrial hygienists and safety professionals are typically the primary individuals responsible for evaluating workplaces and making recommendations to prevent occupational injuries and



illnesses. In Texas, these data are available only sporadically (4 out of the last 10 years) and are reported when available.

OHI 18. OSHA Enforcement Activities

Under the OSHA law, employers are responsible for providing a safe and healthful workplace for their workers. To this end, OSHA targets with inspections workplaces in high-hazard industries and employers with the highest injury and illness rates. Inspections can also be triggered by a fatality, hospitalization of three or more workers, worker complaint or referral (including outside health/safety agency or media).

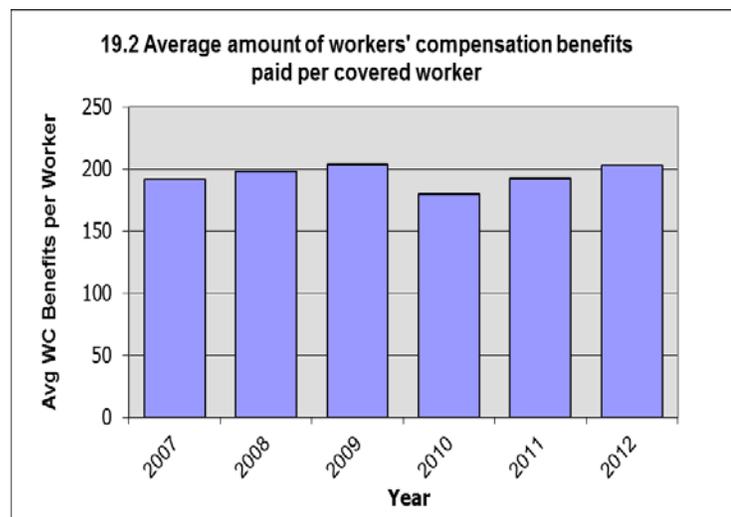


In Texas from 2003–2012, an average of 3,893 employer establishments per year were inspected by OSHA out of an average of 528,930 covered establishments that were eligible for OSHA inspection. Over the same period, an average of 131,295 workers out of 8.33 million covered employees had their work areas inspected by OSHA (1.65%). With continued tracking, DSHS will determine trends.

OHI 19. Workers' Compensation Awards

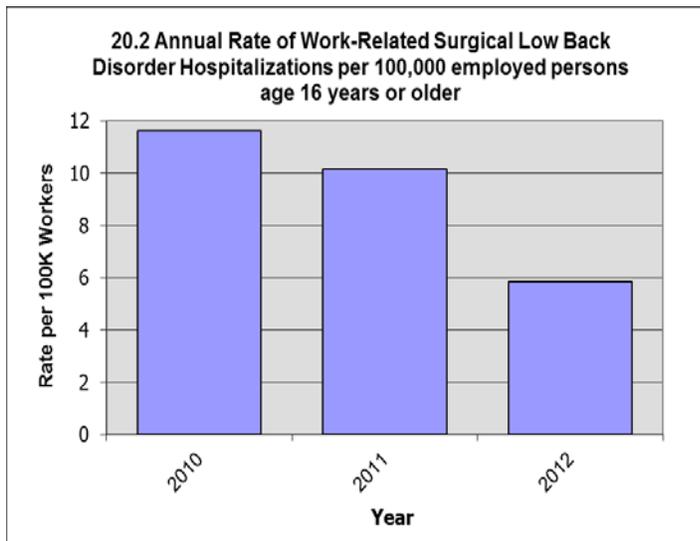
In 2011, \$60.2 billion in workers' compensation benefits were paid to workers with occupational injuries or illnesses. Employer costs of workers' compensation claims increased by 7.1% to \$77.1 billion, medical payments to providers increased by 4.5 percent, to \$29.9 billion, and cash benefits to injured workers increased by 2.6 percent, to \$30.3 billion.^{xxiv}

From 2007–2012, Texas employers paid an annual average of \$1.57 billion to an average of 7.94 million workers, averaging approximately \$195 in payments per worker. Since Texas employers are not required by state law to provide workers' compensation coverage for their employees, these figures may not be a particularly good indicator for costs of work-related illnesses/injuries in Texas.



OHI 20. Work-Related Low Back Disorder Hospitalizations

Each year 15-20% of Americans report back pain, resulting in over 100 million workdays lost and more than 10 million physician visits. National Health Interview survey data estimates that two-thirds of all low back pain cases are attributable to occupational activities. The cost of back pain is also disproportionate, as it represents about 20% of workers’ compensation claims, but nearly 40% of the costs. In 2003, 3.2% of the total U.S. workforce experienced a loss in productive time due to back pain. The total cost of this productive time lost to back pain is estimated to be in excess of \$19.8 billion dollars.^{xxv} Hospitalizations for work-related back disorders have serious and costly effects including: high direct medical costs, significant functional impairment and disability, high absenteeism, reduced work performance, and lost work productivity.

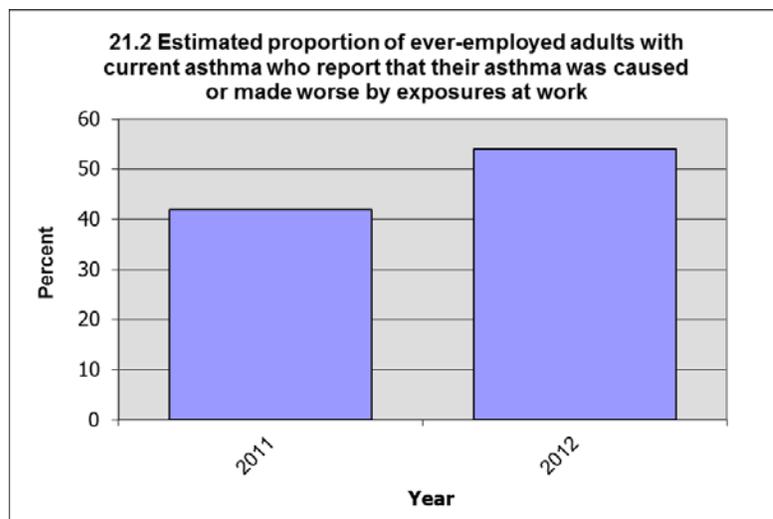


Texas identified an average of 1,051 workers hospitalized in 2010–2012 with surgical low-back disorders and 1,282 workers hospitalized with surgical and/or non-surgical low back disorders and an average annual rate of 9.21 low back disorder hospitalizations per 100,000 employed persons. OHSS will continue to track this indicator and attempt to identify those occupations that could benefit most from education and outreach activities. Targeted education and prevention efforts can then be implemented for

high risk job activities, thereby reducing the burden of work-related low back disorders. These educational materials will also be posted on our website.

OHI 21. Asthma in Adults Caused or Made Worse by Work

Asthma is a chronic inflammatory disease of the airways that affects more than 18 million adults in the U.S.^{xxvi} Work-related asthma is a term used to describe asthma that has a temporal association between asthma symptoms and the work environment. It has been estimated that approximately 36-58% of adult asthma is caused or made worse by workplace exposures; this translates to approximately 9.7



million adults in the U.S. However, work-related asthma continues to be underdiagnosed. If the condition is diagnosed early and the causal agent(s) are identified, exposures can be reduced or eliminated, and work-related asthma may be partially or completely reversible.^{xxvii}

In 2011 in Texas, an estimated 513,994 ever-employed adults were identified whose asthma was caused or made worse by exposures at work (41.9%). With continued tracking, OHSS will be able to determine trends and attempt to identify high-risk occupations in Texas.

OHI 22. Work-Related Severe Traumatic Injury Hospitalizations

Acute work-related trauma is a leading cause of death and disability for U.S. workers. In 2010, more than 4,500 U.S. workers died from occupational injuries [NIOSH, 2012]. Severe traumatic injury can lead to long-term pain and disability and is very costly for workers' compensation systems and society as a whole. The total national medical and productivity cost for occupational injuries was recently estimated at \$192 billion annually [Leigh, 2011]. Accurate characterization of injury trends is critical to understanding how we are doing as a nation with regard to occupational injury prevention.

In 2012 (the first year in which this indicator has been defined), Texas OHSS observed a total of 1,344 work-related severe traumatic injury hospitalizations, producing an annual rate of 11.4 per 100,000 workers.

Specific Aim 3: Pilot other data sources for potential to identify cases of occupational illness and injury.

- Access database techniques have been developed and are being utilized for analysis of Texas hospital discharge data (HDD) (~2.9 million discharges per year), Texas Poison Control Network (TPCN) calls (~300,000 calls per year), Texas vital statistics data (~170,000 deaths per year), and Texas pesticide-related illness and injury (~300 cases per year). Also, the program coordinated with NIOSH and the DSHS Vital Statistics Unit to facilitate the coding of narrative from Texas death certificates into the NIOSH NOMS (National Occupational Mortality Surveillance) database. While these data sources are not new sources, having them available in an easily accessible database makes it now possible to explore numerous datasets in a variety of new ways looking for work-related morbidity and/or mortality.
- Early in the grant period we tried using the TPCN data to identify work-related cases of carbon monoxide poisoning but found that occupation was not reliably collected and information on many of the cases suggested they clearly were not occupational. With the new readily accessible TPCN Access database, it will be possible to begin exploring the data coming from ~300,000 poison center calls per year for work-related toxic exposures of all types.
- DSHS has recently transferred the EMS/Trauma Registry (ETR) database (housed within the EIET unit) to an entirely new system. ETR collects data on EMS runs, reportable injuries (traumatic brain injuries, spinal cord injuries, and submersions),

and other traumas from EMS providers, justices of the peace, medical examiners, physicians, and hospitals. ETR currently has over 2.5 million records for EMS runs. In 2013, ETR received over 130,000 reports of hospitalizations for trauma. In July 2015, ETR became certified by the National Emergency Medical Services Information System (NEMSIS), allowing the registry to contribute field data collected by EMS personnel across the state into NEMSIS, as well as access best practices from other states. To comply with NEMSIS standards, EMS and hospital reports to ETR will be required to indicate if a case was work-related, and to also complete industry and occupation fields, by the end of 2016. When these elements are available, we will utilize these data to assess work-related trauma.

- Additionally, ETR recently began receiving traffic collision data from TxDOT and has linked these data with trauma registry data for 2012 to 2014. This is the first time that this data linkage has been conducted in Texas, giving us opportunities to conduct innovative analyses, such as an evaluation of health outcomes associated with work-related collisions. We have begun to pilot these data for several research topics, including an evaluation of health outcomes among construction workers involved in collisions at highway construction zones. The oil and gas industry, which involves large amounts of motor-vehicle traffic, is widespread in Texas. Therefore, we also plan to use these data to conduct a time-trend analysis of collision-related injuries involving commercial vehicle drivers in areas with a high prevalence of oil and gas production.
- For the first time, our group has gained access to identifying variables for Texas hospital discharge data, which will allow us to conduct more detailed analyses of hospitalizations associated with occupational illnesses. For example, we will attempt to examine readmissions among asbestosis and silicosis cases. We will also conduct a pilot comparison of de-duplicated hospital discharge data with other existing surveillance data sources (such as death certificate data and case reports) to assess completeness and accuracy of registry data.
- DSHS routinely reviews the TPCN database for interesting poison control center calls, and these reviews have identified a number of workplace exposure scenarios (either related or similar but unrelated) that have warranted publications in peer-reviewed journals (see Publications section).
- DSHS carried out follow-up activities (consisting of interviews and/or medical record reviews) on 1,162 potential occupational pesticide exposure cases, resulting in the following classification: 114 Definite Cases, 91 Probable Cases, 454 Possible Cases, 24 Suspicious Cases, 22 Unlikely Cases, 379 Insufficient Information, 73 Exposed/Asymptomatic, and 5 Unrelated.

Specific Aim 4: Provide training and education to enhance awareness and increase prevention.

- DSHS conducts follow-up investigations of occupational illness or injury cases, reported through our surveillance systems, and uses the findings of our investigations to implement interventions and create targeted outreach and education materials. For example, in May 2014, DSHS was notified of the first case of silicosis reported in the U.S. associated with silica dust exposure during fabrication of engineered stone countertops.

Subsequent to being notified of this case via our surveillance system, we collected additional information about the case and collaborated with NIOSH as they conducted a Health Hazard Evaluation at the case's work place. We also created and distributed a hazard alert targeting employers and employees involved in stone countertop fabrication. The Hazard Alert included information about silicosis risk factors and focused on engineering controls as the most effective method for preventing silica exposure. The results of this investigation were published in CDC's Morbidity and Mortality Weekly Report. The NIOSH Health Hazard Evaluation report is currently pending.

- The Texas Department of State Health Services recently conducted a mercury vapor exposure investigation in a limited number of rooms at a central Texas hospital. Pediatric nursing staff had been caring for three children admitted for mercury toxicity resulting from a liquid mercury spill in their home. Clothing and other belongings had been brought from home for use during their hospital stay, and nursing staff were concerned about possible workplace exposures resulting from residual mercury contamination on belongings from home. Measurements were obtained from the children's rooms and from bagged belongings using a Jerome J505 Mercury Vapor Analyzer, and results, interpretations, and conclusions were provided back to the hospital administration and medical and nursing staff.
- Plans progressed to redesign DSHS occupational health indicators website to make it more easily navigable by the general public, researchers, and other interested parties. Focus group feedback from students of Lehman High School in Kyle, TX and Jack Hays High School in Buda, TX on webpage design and overall appeal was obtained and will be incorporated to improve the usefulness of the DSHS OHI website. Concurrently, staff educated the student focus group on the importance of the program's strategic role in the collection of occupational health data in supporting the OHI's and their ultimate goal to prevent and minimize illnesses and injuries in the workplace.
- Staff gave presentations and/or provided information about the Texas' OHIs to: 70 Midwest Stream Farmworker Health Forum attendees in November 2010; other public health professionals (Health and Human Services Commission Toastmasters in July 2010; Texas Poison Center Specialists in Poison Information in April 2011), 80 academics in December 2010, and others (80 employees of Texas Department of Transportation at July 2010 workshop; 95 attendees at the City of Austin Health Fair, Sep 2010 and July 2011; 120 attendees of the Socorro Independent School District - Lower Valley Nurse's Association health fair in April 2011; 10 attendees from the Lubbock City Health Department, May 2011; 10 attendees of the Midwest Association of Farmworker Organizations (MAFO), March 2011; and the Texas Department of Insurance Safety Summit, May 2011. (See Appendix A for a more complete listing of DSHS education and outreach activities over the 5-year grant period).
- Staff hosted approximately 80 attendees at the November 2010 Consortium of Occupational State-based Surveillance (COSS) meeting in Austin, TX. A major discussion topic was the need to forge better ties with the U.S. Department of Labor; the U.S. Occupational Safety and Health Administration; and the Texas Department of Insurance, Division of Workers' Compensation.

- Information on occupational pesticide exposure, heat exposure, transportation mortality and mesothelioma was dispersed to stakeholders through an informal scientific advisory committee consisting of representatives of the Association of Occupational Health Nurses, Texas Ergonomics Roundtable, Environmental Protection Agency, Texas Department of Agriculture, Texas Department of Insurance, the Texas Rural Health Association, National Farmworkers Association, Migrant Clinicians Network, Texas Border Health, the Department of Labor, Occupational Safety and Health Administration (OSHA), and the deans of the University of Texas Southwest Center for Occupational Health in Houston, San Antonio, and Tyler, TX.
- Staff worked with the NIOSH and DSHS webmasters to implement a Really Simple Syndication (RSS) feed of Texas occupational health resource materials and reports to NIOSH. DSHS added new English / Spanish postings on the NIOSH state-based occupational health RSS clearinghouse for the Asbestosis and Silicosis occupational health programs.
- Staff met with the Capital Area Health Education Center (AHEC) and the Mexican Consulate in Austin to provide the Latino community with information and educational support on occupational health and safety at the workplace. Additionally, this partnership aims to increase awareness and the reporting of occupational exposures to pesticides. Through the outreach program “Ventanilla de Salud”, the Mexican Consulate in Austin and Capital AHEC provide relevant health education and screenings to an important segment of the Latino population; with the use of targeted materials and short narratives, “promotoras” working at the “Ventanilla de Salud” increase awareness and encourage prevention of occupational injuries. Expanding OH education and awareness to the 11 Mexican Consulates in Texas through AHEC and “Ventanilla de Salud” are the next step.
- Staff met with and/or corresponded several times with the DSHS BRFSS coordinator and Asthma Control Program staff to inform them of the importance of considering occupational health and to help support NIOSH’s attempt to add two questions on occupation and industry to the BRFSS questionnaire for 2012.
- Staff contacted a sampling of the more than 300 Federally Qualified Health Centers (FQHCs) in Texas discussing the importance of taking an occupational history and guiding them toward documents that would help them with that task.
- The OHI program worked with Texas Agrilife in 2012 to produce a training module for healthcare and service industry professionals who work with transient populations including agricultural migrant workers.

Specific Aim 5: Review and evaluate the Texas occupational safety and health surveillance system process.

- OHSS staff have established a relationship with the Southwest Center for Occupational and Environmental Health (SWCOEH) at the University of Texas Health Science Center School of Public Health in Houston. The SWCOEH has also expressed interest in assisting with detailed statistical analysis. The SWCOEH has experienced senior faculty in epidemiology and biostatistics, as well as state-of-the-art statistical software, who

will assist in the design and conduct of detailed statistical analyses of these datasets. Graduate students from SWCOEH and Texas A&M Health Science Center, School of Rural Public Health have already assisted with research projects and dissertations, and both universities have pledged to continue providing students to conduct research under appropriate faculty supervision. Additionally, we have had initial discussions with the University of Texas School of Public Health San Antonio Regional campus to provide internships for graduate students in environmental and occupational health.

- A detailed review and evaluation of the Texas occupational safety and health surveillance system process was completed in 2009. A predominant theme was that collaboration with partners was essential for progress to be made in the evaluation and dissemination of occupational health data. The program has since partnered with the Regional Dean of the University of Texas School of Public Health San Antonio and Texas A&M to generate graduate level class topics that focus on analysis of the CSTE occupational health indicators. This will give students experience working with occupational health data and contribute to dissemination of occupational health data via DSHS publications. Letters of support have been drafted to maintain consistency in the partnerships.
- Staff attended a national meeting of states with Federal OSHA representatives and NIOSH in Washington, D.C. in March 2011 to discuss partnerships and how better to share data and information between agencies. Immediately received feedback on how each group could better serve the other and within a week of the meeting received information on a few cases of occupational pesticide exposure that had remained open due to insufficient information. A new Memorandum of Agreement is being constructed to solidify this strengthened relationship.
- DSHS staff reviewed the 2011 CSTE “How to Guide” for OHI collection and provided some suggested edits/updates for the next version. DSHS also piloted and critiqued a demo version of an Access database tool for calculating and reporting occupational health indicators.
- Staff addressed one of the 2009 surveillance evaluation findings by partnering with University of Texas and Texas A&M to identify research topics on occupational safety and health and to work with graduate students to provide data for more in-depth analyses.
- DSHS simplified the process of generating the Profile of Employment Demographics by automating the calculations of the required profile elements using a new Excel data entry sheet. Required data values are entered into designated cells, and all the required profile elements are calculated automatically according to the methods outlined in the How-to-Guide. The new data entry spreadsheet can be used as a template for each successive year of data.

Specific Aim 6: Assess the public health outcomes of the surveillance system.

- Feedback obtained from a focus group of web-design students is being incorporated to improve the usefulness of the DSHS OHI website. After learning about the importance of occupational health surveillance and the role of the program’s webpage and how it

impacts their awareness and the general public's regarding prevention and safety, the student focus group provided suggestions on how to make it more effective and informative.

- Texas data, along with data from other states, has been used to develop policies that protect worker health. For instance, the EPA used results from SENSOR-Pesticide studies, including Texas data to support Agricultural Worker Protection Standard (WPS) changes that strengthened occupational protections for workers and pesticide handlers who work at agricultural establishments. Additionally, EPA is currently using SENSOR-Pesticide data to justify strengthening of the "Certification of Pesticide Applicators" rule 40 CFR 171. Through our collaborative-enhancing activities, we will increase our ability to contribute data to support such policy and rule-making activities. Furthermore, by monitoring data for emerging pesticide problems, we will be able to identify potential areas for intervention activities.

Conclusions

Over the period from July 1, 2010 through June 30, 2015, the Texas DSHS program has made significant progress in expanding our capabilities for conducting occupational health surveillance in the state, as illustrated by the following examples:

- Significant data management improvements have made Texas occupational health surveillance data more readily accessible for compilation, analysis, and reporting purposes.
- Access database techniques have been developed and are being utilized for analysis of Texas hospital discharge data (HDD) (~2.9 million discharges per year), Texas Poison Control Network (TPCN) calls (~300,000 calls per year), Texas vital statistics data (~170,000 deaths per year), and Texas pesticide-related illness and injury (~300 cases per year).
- Since Texas is not a workers compensation state, OHSS began using additional fields in the HDD dataset to identify work-related hospitalizations, improving case-finding by about 19-26% compared with using only the primary payment source field coded as worker compensation.
- In 2010, DSHS collected 15 out of the recommended 19 OHIs and has steadily progressed up to compiling and reporting all 22 OHIs in 2015.
- For OHI data obtained from HDD stored in an Access database, DSHS now routinely analyzes data by age group, race, ethnicity, sex, and a number of other parameters.
- All available Texas OHIs summary results (from 2003–2012) have now been aggregated onto a single Excel spreadsheet to allow easy graphic analysis of time-trends.
- The Texas EMS/Trauma Registry (ETR) collects data on EMS runs and trauma-related hospitalizations. ETR currently has over 2.5 million records for EMS runs. In 2013, ETR received over 130,000 reports of hospitalizations for trauma. EMS and hospital reports to ETR will be required to indicate if a case was work-related, and to complete industry and occupation fields, by the end of 2016.

- Texas Department of Transportation crash data has been linked up with data from the EMS/Trauma Registry, and OHSS has begun looking at collisions involving commercial motor vehicles and crashes that occur in work zones, along with EMS runs and hospital outcomes associated with those crashes.
- DSHS conducts follow-up investigations of unusual occupational illness or injury cases, reported through our surveillance systems, and uses the findings of our investigations to implement interventions and create targeted outreach and education materials.
- DSHS continues to conduct education and outreach activities with presentations and distribution of educational materials at 12–15 events per year, reaching 20–100 individuals per event.
- While most of the OHIs in Texas do not exhibit any obvious trends, exceptions include the decreasing annual rate of work-related hospitalizations per 100,000 employed persons (see Figure 2) and the annual age-adjusted hospitalization rates for silicosis and asbestosis per 100,000 population 15 years and over (See Figures 9.3.3 & 9.4.3). While these decreasing trends over time appear to be real, it is not possible to determine what the driving factor(s) may be. We would like to believe that greater awareness of the hazards of silica and asbestos dust exposure through some of our education and outreach activities may have played a role in the latter decreases.

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APPENDIX A

Education/Outreach Activities

2010 - 2011

- Presentation and educational exhibit, Tarrant county / Fort Worth Texas Department of Transportation Safety Fair, attendance ~ 250, July 27, 2010,
- Presentation and educational exhibit, City of Austin Safety Health Fair, attendance ~ 200, September 8, 2010,
- Educational occupational health exhibit, farmworker advocates Midwest Stream Farmworker Health Forum at Austin, attendance ~ 250, November 18, 2010,
- Occupational health indicators presentation, Lehman High School, attendance ~ 30, Hays county ISD, December 14, 2010,
- Dissemination of Educational material at Pearsall elementary, ~ attendance 200, Frio county EMS Health fair, March 9, 2011,
- Presentation on pesticide exposure reporting, farmworker advocates at Midwest Association of Farmworker Organizations (MAFO) conference, attendance ~ 25, March 22, 2011,
- Educational exhibit on occupational health indicators and pesticide exposure, Lower Valley Nurses Association health fair, attendance ~ 350, April 2011,
- Educational exhibit occupational health, Safety and Health professionals Texas Department of Insurance I safety summit, attendance ~ 300, May 11, 2011,
- Presentation on occupational health indicators, Lehman High School - Hays County ISD, attendance ~ 30, Kyle, May 16, 2011
- Mail out - educational publications on pesticide exposure prevention, Lubbock county health fair, attendance ~ 200, Health Department, May 18, 2011,
- Presentation on occupational health indicators, Jack C. Hays High School - Hays County ISD, attendance ~ 30, Buda, May 23, 2011,
- Buda Pesticide exposure Survey on webpage design, Jack C. Hays High School - Hays County ISD, attendance ~ 30, Buda, May 23, 2011.

2011 - 2012

- RSS occupational health postings, NIOSH RSS state-based occupational health clearinghouse, August 11, 2011,
- Educational exhibit on occupational health indicators and pesticide exposure prevention Saint John's United Methodist church health fair, attendance ~ 230, Austin, October 9, 2011,
- Posted Texas county pesticide exposure data, program's webpage and NIOSH RSS state-based occupational health clearinghouse, October 11, 2011,
- Presentation on occupational health indicators, Midwest Association of Farmworker Organizations (MAFO) planning committee, attendance ~ 23, San Antonio, November 3, 2011,
- Presentation on pesticide exposure prevention, public health professionals, attendance ~ 18, Austin, December 2011,
- Presentation on occupational health indicators, public health professionals Toastmasters Club, attendance ~ 17, Austin, December 20, 2011,

- Presentation in Spanish on occupational health indicators and pesticide exposure prevention, Colonias program social workers, attendance ~ 21, Laredo, January 12, 2012,
- Presentation on Texas pesticide exposure surveillance, SENSOR program state representatives, attendance ~ 23, Austin, January 26, 2012,
- Publication on South Texas counties pesticide exposure, University of Texas South Texas Health Status Review 2006-2010, February 21, 2012,
- Presentation on occupational health indicators, Colonias program social workers, attendance ~ 26, El Paso, February 24, 2012,
- Presentation on occupational health indicators, Colonias program social workers, attendance ~ 24, Harlingen, March 5, 2012,
- Exhibit on occupational health indicators, safety and public health professionals at Department of Insurance Safety Summit, attendance ~ 280, Austin, April 10, 2012,
- Exhibit on occupational health indicators, City of Austin workforce, attendance ~ 300, Austin, May 31, 2012,

2012 – 2013

- Implemented pesticide exposure webpage in Spanish translating English content to Spanish, internet audience, July 05, 2012,
- Created pesticide exposure charts reflecting data analyses for program's pesticide exposure 2000 – 2010 for use in outreach presentations, internet and general public, July 30, 2012,
- Exhibit on pesticide exposure prevention and the occupational health indicators, public health professionals at DSHS Healthy Texas Babies conference, attendance ~ 350, San Marcos, August 6, 2012,
- New content postings for occupational health indicators, pesticide exposure, asbestosis, and silicosis webpages, internet general public, August 13, 2012,
- Texas county pesticide exposure maps for 2000 – 2010, presentations and internet, September 16, 2012,
- Presentation introducing pesticide program as integral part of Texas A&M University Rural School of Public Health student practicum, Cory Handy, Austin, October 31, 2012,
- Presentation on occupational health indicators, public health professionals, attendance ~ 17, Austin, November 06, 2012,
- Data analysis on programs pesticide data, Texas A&M University Rural School of Public Health student practicum, Cory Handy, Austin, November 15, 2012,
- Posted new RSS content, Texas Occupational Health Surveillance Program webpage and NIOSH national RSS OHI RSS Clearinghouse, internet, December 18, 2012,
- Presentation on pesticide data analysis for 2005 – 2010 for University of Texas Health Science Center at San Antonio South Texas Health Status Review, epidemiologists and other public health professionals, attendance ~ 14, internet and publication, January 8, 2013,
- Streamlined Environmental and Injury Epidemiology and Toxicology Unit (EPITOX) webpage reportable conditions forms unto one access point, internet, February 4, 2013,

- Mailed out pesticide exposure prevention and occupational health indicator educational material, workforce and general public at Lower Valley Nurses Association Health Fair, attendance ~ 350, El Paso, March 6, 2013,
- Translated occupational health indicators webpage to Spanish, Spanish-speaking internet audience, March 8, 2013,
- Updated, coordinated printing and website upload of programs injury prevention and educational material, internet and publication, April 9, 2013,
- Presentation on occupational health indicators and pesticide exposure prevention, Environmental Epidemiology and Disease Registries Section (EEDRS) Birth Defects public health professionals, attendance ~ 12, Austin, April 23, 2013,
- Exhibit on pesticide exposure prevention and the occupational health indicators, public health professionals Texas Department of Insurance Safety Summit, attendance ~ 350, Austin, May 06, 2013,
- Mailed out pesticide exposure prevention educational material, general public at Laredo Community Health Clinic, attendance ~ 500, Laredo, May 28, 2013,
- Educational exhibit on occupational health indicators and pesticide exposure prevention, City of Austin workforce at City of Austin Safety Conference, attendance ~ 375, Austin, June 05, 2013,

2013 – 2014

- Presentation on occupational health indicators, public health professionals Toastmasters Club, Austin, attendance ~ 18, July 9, 2013,
- Program subscribed to OSHA/NIOSH Fall Prevention Campaign, internet and general public construction workers, July 22, 2013,
- Mailed out pesticide exposure prevention educational material, general public at city health fair, attendance ~ 350, City of Baytown, Oct 8, 2013,
- Presentation on Fall Prevention Campaign, public health professionals Toastmasters Club, attendance ~ 16, Austin, October 8, 2013,
- Presentation on farmworkers underreporting to interagency toxicologists at Toxic Substances Coordinating Committee, attendance ~ 17, Austin, October 22, 2013,
- Presentation of pesticide exposure data and farmworker exposure underreporting, public health professionals and farmworker advocates, 23rd Annual Midwest Stream Farmworker Health Forum – National Center for Farmworker Health (NCFH), attendance ~ 22, South Padre Island, November 15, 2013,
- E-news article submission – NIOSH state-based e-news occupational health forum, January 21, 2014,
- Presentation / e-news article on farmworker pesticide exposure underreporting, program pesticide webpage, February 6, 2014,
- Educational exhibit on occupational health indicators and pesticide exposure prevention, farmworker advocates at Midwest Association of Farmworker Organizations (MAFO), attendance ~ 300, McAllen, March 2014,
- Presentation and educational exhibit on Fall Prevention Campaign, workers and general public at Lower Valley Nurses Association Health Fair, attendance ~ 375, El Paso, April 12, 2014,

- Educational exhibit – Fall Prevention Campaign, OHIs, health and safety professionals at Texas Department of Insurance Safety Summit, attendance ~ 275, Austin, May 6, 2014,
- Educational exhibit on Fall Prevention Campaign and occupational health indicators, City of Austin workforce at City of Austin Safety Conference, attendance ~ 300, Austin, June 19, 2014,

2014 – 2015

- Presentation on OSHA/NIOSH Fall Prevention Campaign in residential construction, public health professionals from various agencies, attendance ~ 18, Austin, July 8, 2014,
- Presentation on asbestosis awareness and prevention, public health professionals from various agencies, attendance ~ 16, Austin, August 12, 2014,
- Presentation on silicosis awareness and prevention, public health professionals from various agencies, attendance ~ 15, Austin, September 23, 2014,
- Presentation on Texas farmworker pesticide exposure underreporting, public health professionals from various agencies, count: 16, Austin, November 4, 2014,
- Presentation on silicosis awareness and prevention, public health professionals from various agencies, attendance ~ 17, Austin, November 14, 2014,
- Presentation on asbestosis awareness and prevention, public health professionals from various agencies, attendance ~ 17, Austin, January 11, 2015,
- Presentation on silicosis awareness and prevention, Workers from various industries at Ventanilla de Salud social services program, attendance ~ 40, Austin, January 20, 2015,
- Presentation on silicosis awareness and prevention, Workers from various industries at Ventanilla de Salud social services program, attendance ~ 45, Austin, February 18, 2015,
- Presentation on asbestosis awareness and prevention, Workers from various industries at Ventanilla de Salud social services program, attendance ~ 50, Austin, March 16, 2015,
- Presentation on asbestosis awareness and prevention, Workers from various industries at Ventanilla de Salud social services program, attendance ~ 40, Austin, April 20, 2015,
- As part of the NIOSH HHE, we spoke with workers to assess knowledge about silicosis causes and prevention, 58 employees (English/Spanish speaking) of Stone Systems of Houston, Houston, April 2015,
- Gave Asbestos and Silicosis Reporting Update to physicians, Texas College of Occupational and Environmental Medicine, Austin, May 2015.

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