

**CALIFORNIA OCCUPATIONAL HEALTH AND SAFETY SURVEILLANCE
OCCUPATIONAL HEALTH INDICATORS COMPONENT & OVERALL PROGRAM
ANNUAL REPORT: July 1, 2015 – June 30, 2016**

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The Occupational Health Branch (OHB) of the California Department of Public Health (CDPH) conducts an Expanded Program to reduce the incidence of work-related injury and illness by maintaining and enhancing our capacity for occupational health surveillance and intervention in California. The Expanded Program includes both the required **Occupational Health Indicator (OHI)** component, as well as three Priority Focus Areas (**work-related asthma, fatalities, and pesticide illness**).

- **Occupational Health Indicators and Other Data Analyses:** Collect and analyze on an annual basis surveillance data for at least 21 Occupational Health Indicators (OHIs) and an Employment Demographics Profile, and conduct additional analyses using multiple data sources to enhance our understanding of California worker populations at high risk for injury and illness.
- **Lead Poisoning Prevention:** Conduct case follow-up and intervention activities informed by case reports and analysis of surveillance data from the Occupational Blood Lead Registry.
- **Emerging Occupational Health Issues:** Identify and respond to emerging and/or under-recognized occupational health issues, while mentoring and contributing to the development of the future occupational health workforce.
- **In-state Collaborations:** Collaborate with in-state partners (including labor, occupational and environmental health advocates, employers and trade associations, other state and local public health programs and agencies, and other stakeholders) to obtain input to guide our program, gain support to further program goals, and have impact on public health and regulatory policies.
- **National Collaborations:** Collaborate with other state OH programs, the Council of State and Territorial Epidemiologists, NIOSH, and OSHA on nationwide activities that enhance the development and use of surveillance data and promote interventions to reduce work-related injury and illness.
- **Dissemination of Data, Public Health Recommendations, and Educational Resources:** Disseminate our surveillance data, investigation findings, public health recommendations, and educational resources through a variety of means to promote safer and healthier workplaces and a broader recognition of the impact of work on health.
- **Program Evaluation:** Regularly evaluate the accomplishments and impact of our occupational health program (Expanded Program) and develop recommendations for improving effectiveness

MAJOR OUTPUTS

Surveillance and Investigations

1. ***Electronic cigarette exposures.*** Concerns over the use of diacetyl and other hazardous chemicals in e-cigarette liquids and other potential workplace hazards prompted us to develop a grant proposal for a 2-year project to measure airborne chemical exposures and survey workers and employers

- regarding health and safety at vaping shops where e-cigarette products are sold and demonstrated. Our EIS Officer initiated a collaboration with the NIOSH Health Hazard Evaluation (HHE) Program and was invited to participate in an HHE at a NJ vaping shop in January 2016. Although the grant proposal was not funded, we identified one-time state funding to support and obtained IRB approval for a one-year pilot field study beginning in August 2016.
2. **Occupational coccidiomycosis** (Valley Fever, VF). Following on our investigation of 44 employees diagnosed with VF who worked on the construction of two large solar energy generation facilities, we collaborated with infectious disease colleagues on a case-control analysis using survey data from 600 employees. The analysis identified 89 additional undiagnosed cases that met a clinical syndromic case definition and important new findings related to risk factors and protective measures; a journal manuscript is in the clearance process. Continued provision of technical assistance to local health departments in VF-endemic areas with new energy development projects and outreach, including distribution of “Preventing Work-Related VF” fact sheet, development of a worker poster at the request of the CA High Speed Rail large-scale construction project, and planning of a CDPH social media campaign for August 2016, Valley Fever Awareness month.
 3. **Lead poisoning prevention in firing ranges**. We have investigated numerous instances of highly elevated blood lead levels (BLLs) in firing ranges in the current and recent years, despite limited employer BLL testing in this industry, and have begun planning an industry-wide intervention focus. Conducted two field investigations to assess educational needs of employers and workers, attitudes toward the use of lead-free ammunition, and barriers to routine blood lead testing and implementation of effective control measures.
 4. **Chemical exposures in veterinary hospitals**. Following two field investigations in the prior year to veterinary hospitals using isofluorane (anesthetic gas) and lead in the onsite preparation of radiation shielding, continued the development of an education and outreach project. Conducted an additional field visit to perform air monitoring for isofluorane. Photographed preferred and poor work practices for use in educational materials to be developed and disseminated in partnership with vet and vet tech professional associations.
 5. **Occupational health in oil and gas development (OGD)**. Robert Harrison, MD has worked closely with the NIOSH Western States Division (WSD) and the Federal OSHA Office of Occupational Medicine on the investigation of nine worker deaths from hydrocarbon exposure during flowback and other tank gauging operations in the Western States. An MMWR article about these cases was published on January 15, 2016 <http://www.cdc.gov/mmwr/volumes/65/wr/mm6501a2.htm>. OHB is currently working with the NIOSH WSD on the development of a digital worker story about the hazards of these operations, with plans to disseminate widely throughout the industry.
 6. **Digital storytelling**. Digital stories combine photographs and prevention recommendations from fatality and other investigations with re-creations of the fatal event, personal narration, and family photos. Each digital story has its own “action page,” which provides discussion questions and/or tailgate training cards, fact sheets, a link to the corresponding investigation report, and video download instructions. OHB has produced six Digital Stories (<http://www.cdph.ca.gov/programs/ohb-face/Pages/Stories.aspx#name>), the

most recent released in February 2016 (in collaboration with CPWR) about the use of safer substitutes for methylene chloride in paint stripping. As noted above, the next digital story will be focused on the hazards of tank gauging, and will be produced in collaboration with the WSD.

Data, Electronic and Web-based Communications (See www.cdph.ca.gov/programs/ohb)

1. Submitted 2013 data for 23 **OHI**s (including new OHI *Work-related Severe Traumatic Injury Hospitalizations* and new optional OHI *Occupational Heat-related Emergency Department (ED) Visits*) and Employment Demographics Profile to NIOSH/CSTE. Promoted OHI data report with 2006-2011 data through OHB e-newsletter, while initiating new report with 2008-2013 data.
2. **California Wellness Plan**. Contributed 10 indicators of workforce health status (selected CSTE OHIs and a new CA OHI for *Work-related Fatal Traumatic Injury among Latinos*) to the CA Wellness Plan, a strategy for assessing progress on the health status of the CA population and a required component of achieving/maintaining health department accreditation. Provided baseline and follow-up data for the first Wellness Plan progress report, drafted for 2016 release. Through this effort OHB connects with CDPH work on climate change health effects (worker heat illness) and health equity.
3. Created and disseminated to between 2,800 and 6,500 stakeholder recipients eleven issues of our electronic program newsletter **Occupational Health Watch** (e-OHW). Issues featured new CDPH products and programs (e.g., OHI report; drowning prevention and DCM digital stories; fact sheets on mercury, Valley Fever, electronic waste hazards; asthma-safer cleaning using microfiber products), and occasionally NIOSH resources (e.g., nanotechnology website, state-based clearinghouse).
4. Provided educational materials and offered technical assistance to ~400 employers, >1500 workers, and >160 healthcare providers, based on BLL surveillance data identifying workers with elevated BLLs.
5. Continued publicizing OHB fact sheets and resources through our website; planned more targeted outreach through CDPH Twitter account, YouTube channel, and Facebook page; the NIOSH State-based OH Surveillance Clearinghouse (826 documents submitted to date); and two items in NIOSH e-News, November 2015 and May 2016.
6. Since OHB staff identified the need for branch-wide strategic communications planning, a multidisciplinary team has continued to take steps to improve and streamline work related to OHB health promotions. This year, the team has completed a final version of a communications policies and procedures manual, including a variety of tools to assist staff with communications projects. Some tools were revised at the end of 2015 to make them more user-friendly. Our communications evaluation guide was shared with other states through a presentation at the June 2016 CSTE conference.

Partnerships

1. Partnered with the **Service Employees International Union** (SEIU) to adapt OHB green cleaning and others' materials into training on workplace health and safety for family home child care providers. OHB pilot tested the training material in August 2015; SEIU further tested the curriculum by holding 2 trainings for peer educators who then conducted 3 trainings for family home childcare workers in 2016.
2. Signed MOU with **CDPH's chronic disease division and Office of Health Equity** (OHE) detailing that OHE would provide funding to add NIOSH industry

- and occupation questions to the 2016 Behavioral Risk Factor Surveillance System survey.
3. Continued partnership with **Cal/OSHA** toward revising the lead, workplace violence, and hotel housekeeper ergonomic standards providing surveillance data, working with Cal/OSHA staff on new regulatory language, and updating 2 Appendices from the original standards. Assisted with multiple other standards development efforts (see below).
 4. Partnered with the **NIOSH Adult Blood Lead Epidemiology and Surveillance (ABLES)** program, other states, and **OSHA** on a survey and analysis of state-OSHA collaboration via agreements for referral of lead poisoned workers for enforcement action; assisted with a presentation for the annual ABLES meeting in June 2016, Anchorage, AK. Enhanced partnership with **CDPH's Childhood Lead Poisoning Prevention Branch** with a new focus on BLLs among women and youth 16-21 years.
 5. Continued and expanded partnerships under which OHB staff provide mentoring to develop the future occupational health workforce (**CDC Epidemic Intelligence Service** program, **CSTE epidemiology fellowship** program, **University of California at San Francisco** occupational and preventive medicine fellowship programs, and **Occupational Health Internship** program).
 6. Partnered with NIOSH by having staff serve on the Services and Health Care **National Occupational Research Agenda (NORA) Sector Research Councils**.

MAJOR OUTCOMES

Potential Outcomes

Nearly all items described above include dissemination of findings and prevention recommendations based on our work that, if used by others, would reduce workplace health and safety risks.

Intermediate Outcomes

1. Cal/OSHA is actively utilizing CDPH data and technical expertise in the drafting of revised lead regulations, and development of new standards on the prevention of workplace violence in healthcare, sexually transmitted infections in the adult film industry, musculoskeletal injuries among hotel housekeepers, healthcare worker exposures to hazardous drugs (antineoplastic agents).
2. We have growing evidence that our focus on establishing partnerships at the start of every single communications effort leads to the development of effective products and dissemination channels and is getting our messages to audiences that do use them to create safe and healthy workplaces. We also have many instances of programs in other states adapting our products for use in their outreach, and of OSHA and other organizations linking to our products from their websites.
3. Our partnership with SEIU on occupational health and safety training for childcare workers has contributed to further development of a union-sponsored peer educator training curriculum and proposed state legislation to include such training in licensing requirements for childcare workers.

End Outcomes

Feedback from our stakeholders suggests that work conducted by OHB assists in reduction of workplace hazards and consequent injuries and diseases. These entities also carry out various interventions aimed at the same occupational health problem. When multiple parties come together at one point in time to respond jointly to a newly identified issue with a comprehensive, concerted prevention effort, we believe there is a measurable outcome with improvement in workplace health conditions.

PRESENTATIONS AND PUBLICATIONS

1. Wilken J et al. Coccidioidomycosis among workers constructing solar power farms, California, USA, 2011-2014 (2015) *Emerging Infectious Diseases* 2(11);1197-2005.
2. Calvert G et al. Acute Occupational Pesticide-Related Illness and Injury — United States, 2007–2010. (2016) *MMWR* 62(54);5-10.
3. Fortenberry G et al. Magnitude and characteristics of acute paraquat- and diquat-related illnesses in the US: 1998–2013. (2016) *Environ Res* 2016 Apr;146:191-9.
4. Harrison R et al. Sudden deaths among oil and gas extraction workers resulting from oxygen deficiency and inhalation of hydrocarbon gases and vapors — United States, January 2010–March 2015. (2016) *MMWR* 65(1):6-9.
5. Wilken J et al. Occupational HIV Transmission Among Male Adult Film Performers — Multiple States, 2014. (2016) *MMWR* 65(5);110-114.
6. Alarcon WA et al. Elevated blood lead levels among employed adults — United States, 1994–2012. (2015) *MMWR* 62(54);52-75.
7. Presentations: “Investigations of occupational coccidioidomycosis outbreaks and prevention efforts” at 3rd California Coccidioidomycosis Collaborative, 8/27/15, Visalia, CA; “Maximizing the effectiveness of hospital respiratory protection programs: State & national resources” at Association of Occupational Health Professionals in Healthcare national conference, 9/11/15, San Francisco, CA; “Update from CDPH OHB” at CA Industrial Hygiene Council annual meeting, 12/7/15, San Francisco, CA.
8. CSTE annual meeting, June 2016, Anchorage, AK. Numerous presentations on topics including: asthma and fragrances, hazards to oil and gas workers, evaluation of communications efforts, illnesses related to pesticide drift, digital stories to prevent injury and illness, and chlorine incidents at pools.

**CALIFORNIA OCCUPATIONAL HEALTH AND SAFETY SURVEILLANCE
WORK-RELATED ASTHMA PREVENTION PROGRAM (WRAPP)
ANNUAL REPORT**

July 1, 2015 - June 30, 2016

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The overall aims of the project are to identify, characterize and prevent work-related asthma (WRA) in California by:

- expanding case ascertainment using multiple data sources
- performing case-based field investigations and developing prevention strategies
- collaborating with local and state agencies
- disseminating results generated from project activities; and
- evaluating surveillance activities on an ongoing basis

MAJOR OUTPUTS

Data

1. From January 1, 1993 through June 30, 2016, we identified over 11,900 potential work-related asthma (WRA) cases and have so far confirmed 8,132 using the NIOSH guidelines. Of the 3,455 confirmed cases that could be classified, 53% were new onset and 47% were work-aggravated. Among the 1,829 new onset cases, 68% were classified as new onset, unknown inducer; 15% were new onset, known inducer; and 17% were new onset RADS cases. An additional 4,677 cases (58%) were confirmed but lacked temporal information necessary for case classification.
2. The overall rate of WRA was 2.4 cases/100,000 workers. The 5 3-digit industries with the highest rates were transit and ground passenger transportation (16.5/100,000); hospitals (13.3/100,000); utilities (8.1/100,000); social assistance (7.1/100,000); and manufacturing of wood products (6.3/100,000). The 5 occupations with the highest rates were firefighters (30.6/100,000); miscellaneous science technicians (16.3/100,000); medical assistants/healthcare support (11.6/100,000) correctional officers (13.3/100,000); and respiratory therapists (11.1/100,000).
3. The most common exposures identified were dust, unknown chemicals, smoke, mold, indoor air pollutants, cleaning chemicals, paint, and indoor air pollutants from building renovation. The most commonly reported known asthma-inducing exposures (AOEC 2015) were bleach, chlorine, ammonia, latex, isocyanates, formaldehyde, sulfuric acid, glutaraldehyde, rat antigens, quaternary ammonia compounds, epoxies, hydrochloric acid, and California redwood.
4. 846 previously unidentified cases were extracted from the DFR, WCIS, ED, and PDD data sets for 2014 and are now being interviewed.
5. We generated 151 case reports within our database, summarizing interviewed cases that illustrate an important or unusual exposure, occupation, industry or outcome. These case reports can be filtered by any variable in the database in order to identify appropriate cases to illustrate relevant points in dissemination materials, presentations, or prevention recommendations.

6. Data from 1993 through 2012 were de-identified, reformatted and submitted to NIOSH.

Electronic and Web-based Communications, Partnerships, Collaborations

1. Participated in application design and applicant review for selecting California schools as part of the National Green Ribbon Schools Program. Collaborated to ensure use of the WRAPP How-To Guide for safer cleaning products and practices was included in the application criteria and scoring.
2. Conducted training for school maintenance staff on asthma-safer cleaning practices at the Alameda County Office of Education.
3. Continued to disseminate and promote our “Healthy Cleaning and Asthma-Safer Schools: A How-to Guide” and digital story. The Guide was awarded a Bronze medal for excellence in public health communication from the National Public Health Information Coalition (NPHIC).
4. Collaborated with NPHIC on an article in their August 2015 newsletter featuring our Cleaning for Asthma-Safe Schools (CLASS) project and our How-to Guide.
5. Supported the New York state occupational health clinics through our educational materials on WRA and fragrances.
6. Contributed two articles to the School Environmental Health and Asthma Collaborative (SEHAC) newsletter, including an article introducing our Microfiber Pilot Project, and a feature article on the CLASS project entitled “WRAPP Protects Staff and Students in Schools”
7. Collaborated with the Department of Pesticide Regulation (DPR) to distribute an announcement about our CLASS Microfiber Pilot Project through their School Integrated Pest Management listserv.
8. Contributed quotes and a case report to two Hospital Employee Health newsletter articles: “Can you kill microbes without hurting health care workers? Occ hlth teams up with infection prevention for safer cleaning” and “Rapid onset of asthma in health care workers: case reports linked to cleaning products”

MAJOR OUTCOMES

Potential Outcomes

Each of the activities listed below focuses on characterizing exposures or developing policies that can potentially reduce exposures known to induce or trigger work-related asthma.

- Based on cases of WRA due to ozone exposure, we have been investigating, along with Occupational Pesticide Illness Prevention Program staff, the use of ozone to disinfect winery tanks, barrels, and surfaces. We conducted two site visits and preliminary air sampling of ozone during disinfection tasks.
- Staff observed poultry processing practices at two plants in California to research potential for exposures to sanitizers and disinfectants.
- Assisted health and safety staff at a university-based hospital with technical guidance on air sampling strategies for disinfectants used in endoscopy suites.
- Assisted California Department of Public Health staff with site visit and air sampling strategies for investigating vaping shops to assess worker exposures to vaping and e-cigarette chemicals during mixing and to second-hand e-cigarette emissions.
- Staff participated in the first biennial Conference for the Model Aquatic Health Code (CMAHC) meeting and voted on 160 change requests to the MAHC. Many of the sections in the MAHC address issues relevant to occupational health and WRA in recreational pool and aquatic venue settings, such as ventilation, chemical safety training, chemical storage, water/air quality, etc.

- Staff provided comments to Green Seal to express concern about Green Seal's plan to confer environmentally preferable designations on the use of asthmagens like isocyanates and styrene in their proposed standard for architectural thermal insulation.

Intermediate Outcomes

1. School Asthma-Safer Cleaning Guidelines

Our Cleaning for Asthma Safe Schools (CLASS) program continues to provide technical assistance to school districts around the state. The CLASS program has initiated a Microfiber Pilot Project to encourage and assist schools throughout California to avoid the use of disinfectants in the classroom and instead transition to healthier and safer routine cleaning using microfiber cloths. The pilot program is being conducted in conjunction with the continued promotion of our document, "[Healthy Cleaning and Asthma-safer Schools: A How-To Guide](#)," which walks a school district through the steps required to transition to safer cleaning products and practices. We have also released a [digital story](#) to accompany and promote the How-To Guide. The Guide has been downloaded from our website over 2,000 times and hundreds of hard copies have been distributed to schools throughout California. The video has been accessed over 950 times on YouTube and Vimeo. The Guide has been featured by the state Department of Education as a resource for schools to improve air quality and to help them become a National and State Green Ribbon School.

2. Technical Assistance on Safer Cleaning Products

We continue to provide technical assistance to employers, workers, community-based organizations, and local, state, and federal government agencies seeking to select safer cleaning products, including recommendations about safer cleaning processes and referrals to third party certification resources.

End Outcomes

Feedback from stakeholders suggests that findings, results, and recommendations have contributed to documented reductions in work-related morbidity and mortality related to asthma in the workplace. Our CLASS program has trained custodial staff to significantly reduce exposures to hazardous ingredients in cleaning chemicals in seven school districts and one charter school. These districts have followed our guidelines and made efforts to transition to asthma-safe cleaning methods and products. This has potentially reduced exposure to hundreds of teachers, custodians and staff members and over 143,000 students working and studying in the affected schools. This number will escalate with the continued distribution, promotion, and implementation of the CLASS How-To Guide for Asthma-safer Cleaning and the Microfiber Pilot Project. In addition, our program has continued to collaborate with non-governmental advocates, local health departments, private industry, and other government agencies to develop and implement interventions and strategies for prevention targeted at the jobs, industries and exposures identified as high risk by our ongoing surveillance data. Our data and recommendations are also continually used by academia and other public health agencies to characterize the nature and extent of WRA and focus further prevention efforts in order to reduce WRA. We also continue to work toward policy changes, such as the addition of asthmagen criteria to third party certification programs, to decrease exposures, improve working conditions, and to reduce the burden of work-related asthma in California.

PRESENTATIONS AND PUBLICATIONS

1. Presented CLASS Microfiber Pilot Project at collaborative symposium on schools and asthma attended by 85 people; distributed 65 CLASS How-To guides (May 2016)
2. Collaborated with Michigan, New Jersey, Massachusetts, and NIOSH to combine our data on WRA and isocyanate exposures and co-author an article published in the American Journal of Industrial Medicine, "Isocyanates and Work-Related Asthma: Findings from California, Massachusetts, Michigan, and New Jersey, 1993-2008 (November 2015).
3. Presented WRA data and prevention recommendations to several audiences, including the San Francisco Asthma Network (60 attendees) and the California Asthma Summit in Los Angeles (50 attendees) (October 2015).
4. Contributed a chapter to California's updated "Strategic Plan to Address Asthma in California, 2015-2019." One of the six goals in the document is dedicated to preventing work-related asthma. The document is available on the website of the Department NCEH asthma program. (August 2015)
5. Contributed an article on the CLASS How-To Guide in the NIOSH Science Blog.
6. Presented data and recommendations on WRA and fragrances at the Council of State and Territorial Epidemiologists Annual meeting (June 2016)
7. Distributed an announcement introducing the CLASS Microfiber Pilot Project to nearly 4,000 recipients through our electronic monthly newsletter (e-OHW). The announcement was accompanied by a Department tweet and Facebook posting, and was picked up and re-published in multiple labor, advocacy, public health, education, and federal organization newsletters (May 2016).

**CALIFORNIA OCCUPATIONAL HEALTH AND SAFETY SURVEILLANCE
PESTICIDE-RELATED ILLNESS
ANNUAL REPORT**

July 1, 2015 - June 30, 2016

Robert Harrison, MD, MPH – Principal Investigator

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The overall aims of the project are to identify, characterize, and prevent and occupational pesticide illness in California by:

- Expanding case ascertainment using multiple data sources
- Performing case-based field investigations and developing prevention strategies
- Collaborating with local and state agencies
- Disseminating results generated from project activities
- Evaluating surveillance activities on an ongoing basis

MAJOR OUTPUTS

Data

1. We identified 5,239 case reports of occupational pesticide illness from January 1, 1998 through June 30, 2016. Of these, we have coded and analyzed 98%. We classified a total of 3,404 (65%) of these as definite, probable, or possible cases of pesticide illness.
2. The overall pesticide illness rate is 1.4/100,000 workers. The 5 industries with the highest rates are farm production and services (27/100,000 workers); food manufacturing (12); highway, street, and bridge construction (5); beverage manufacturing (5); and wholesale of nondurable goods (4). The 5 occupations with the highest rates are pest control operators (63/100,000); agricultural field workers (45); agricultural graders and sorters (26); chemical processing machine operators (18); and agricultural supervisors (16).
3. From January 1, 2007 through June 30, 2016 we also identified 1,907 case reports of illness or injury caused by exposure to disinfectants. We have analyzed and coded 94% of these reports. 1359 (76%) of completed reports were case classified as definite, probable, or possible cases.
4. We expanded our collaboration with California Department of Pesticide Regulation (CDPR) and are sharing data to aid case ascertainment and case classification.

Press, workshops, conferences, and new partnerships

1. We planned and participated in the annual SENSOR-Pesticide Program conference in March 2016. The meeting focused on data quality issues, illnesses due to exposure to paraquat, fumigants, and disinfectants.
2. Staff organized and participated in the occupational health workshop and occupational health sessions of the 2016 Council of State and Territorial Epidemiologists (CSTE) annual conference held in Anchorage, Alaska.
3. We collaborated with a Public Health Institute expert in mobile health, Planned Parenthood, and other Santa Cruz and Monterey County community-based organizations on a pilot project to evaluate whether text messaging was an effective way to emphasize pesticide illness prevention and reporting with area farmworkers. Evaluation results indicated that the novel health communications methods can raise awareness and influence behavior change. Findings were

- presented to CDPH in September 2015.
- Staff participated as a member of the Council for the Model Aquatic Health Code (CMAHC) on behalf of CSTE to provide occupational health input regarding worker exposures to swimming pool chemicals.
 - Staff met with the Integrated Pest Management in Schools staff at CDPR to collaborate on developing materials for and publicizing a new training requirement for disinfectant use in schools.

MAJOR OUTCOMES

Potential Outcomes

1. Poultry Processing

In collaboration with the Work-Related Asthma Prevention Program (WRAPP), also a part of the Occupational Health Branch, we have evaluated illness and injury data and are investigating antimicrobial and other pesticide use in the poultry processing industry in California. We are investigating processing practices and chemical use in both organic and conventional poultry processing facilities and have visited two sites to observe disinfection practices at plants that use different methods during processing of poultry carcasses.

2. Swimming Pool Chemical Illness

In collaboration with the WRAPP and CDPH's Emergency Preparedness Team we are developing educational materials and a web topic page to promote the safer use of pool chemicals. Contacts with pool operator associations and fellow members of the CMAHC will be used to help disseminate our materials as will CDPH's Twitter feed and Facebook page. Staff involvement in the CMAHC also enables CDPH to provide ongoing input regarding occupational swimming pool chemical exposures.

3. Ozone Use in Beverage Processing

Based on data showing worker illness due to ozone used as a disinfectant, in collaboration with the WRAPP, we have been investigating ozone use in wineries. We have conducted a site visit to observe ozone generator use and have conducted air monitoring for ozone levels during various disinfection tasks. Based on our findings, we plan to create outreach materials for employers and workers in this industry.

Intermediate Outcomes

1. Pesticides in public transit

We distributed an announcement to 4000 recipients about the development and release of our new fact sheet "Safer and Effective Cockroach Control for Buses and Trains," URL:

<http://www.cdph.ca.gov/programs/ohsep/Documents/CockroachControlOnTransit.pdf>, based on our investigations into pesticide illnesses attributed to the use of pesticides on buses and other public transit and our research and observation of integrated pest management (IPM) practices in municipal bus systems. The fact sheet has been posted on our web topic page (URL:

<http://www.cdph.ca.gov/programs/ohsep/Pages/IndoorPest.aspx>) that is dedicated to preventing worker illness from indoor pesticide exposures. We plan to partner with transit unions and trade organizations to disseminate educational materials and to work with municipalities to implement IPM.

2. Occupational Pesticide Illness Mapping Project

For the last few years we have investigated select incidents of occupational pesticide illness caused by agricultural drift onto adjacent non-farm workplaces. Using satellite view mapping, we noted that a number of these incidents occurred at workplaces that were completely or almost completely surrounded by

agricultural fields. In 2013 we initiated a project to geocode the non-agriculture worksite drift cases in order to identify and conduct outreach to “hot spot” areas in the state that may be at higher risk for drift onto non-farm worksites. We also conducted an in-depth investigation of a drift incident where seven workers became ill at a worksite surrounded by fields, which we finalized late in 2015. Educational materials based on our investigation findings are under development and will be evaluated with the assistance of the workplace we investigated and other stakeholders.

3. **Disinfectant use in several work settings**

Disinfectant use in food and beverage production, child care, schools, and swimming pools has been investigated and we have used our data and field expertise to provide technical review in several collaborations and to develop our own educational materials. We continue to work jointly with the WRAPP to conduct investigations and develop materials to educate employers and workers about safer disinfectant use.

4. In collaboration with the Environmental Health Investigations Branch (EHIB), we completed a project to evaluate whether text messaging is an effective way to emphasize pesticide illness prevention and reporting with area farmworkers. We trained staff from Santa Cruz and Monterey County community-based organizations (CBOs) to recruit 30 farm workers to receive 40 pesticide illness prevention texts in Spanish over a four-month period. The CBOs helped developed text messages that emphasized keeping family members safe from take home exposures. The project showed that texting of health and safety messages was an effective mechanism to reach farmworkers.

End Outcomes

Feedback from stakeholders suggests that our findings, results, and recommendations have contributed to reductions in work-related morbidity, mortality, and exposure related to pesticide use in the workplace. Our program continues to work with a variety of governmental and non-governmental stakeholders to encourage the elimination of the most toxic pesticides and the substitution of less-toxic pesticides and other non-chemical pest-control treatments. Data from our program has been used to help describe pesticide-related illness in California and has been used, alongside analogous data from other states, to demonstrate the extent of pesticide-related illnesses in certain populations (e.g. farmworkers, women, geographic locations) and associated with certain pesticide uses (e.g. swimming pool disinfection, beverage processing, public transit, poultry processing) and causative factors that should be changed in order to reduce illness. The Environmental Protection Agency (USEPA) extensively cited data from our program to justify changes to the Worker Protection Standard, and we provided additional public comments to USEPA regarding these revisions. We continue to work toward both legislative and non-legislative solutions to improve working conditions, increase worker and employer knowledge of pesticide-related health effects, and to reduce the burden of pesticide-related illnesses in California.

PRESENTATIONS AND PUBLICATIONS

1. Presented “Texting Farmworkers and Tallying Oxygen Atoms” at the SENSOR-Pesticide Program meeting held at the University of Washington, March, 2016.
2. Presented “Using Maps to Target Pesticide Illness Investigation and Outreach” at the annual CSTE meeting, June, 2016.
3. Calvert G, Beckman J, Bonnar-Prado J, Bojes H, Mulay P, Lackovic M, Waltz J, Schwartz A, Mitchell Y, Moraga-McHaley S, Leinenkugel K, Higgins S. Acute Occupational Pesticide-Related Illness and Injury — United States, 2007–2010. *MMWR* 2015; 62(54);5-10
4. Fortenberry G, Beckman J, Schwartz A, Bonnar- Prado J, Graham L, Higgins S, Lackovic M, Mulay P, Bojes H, Waltz J, Leinenkugel K, Orel M, Evans L, Calvert G. Magnitude and characteristics of acute paraquat and diquat-related illnesses in the US: 1998-2013. *Environ Res* 2016 Apr;146:191-9.

**CALIFORNIA OCCUPATIONAL HEALTH AND SAFETY SURVEILLANCE
WORK-RELATED INJURY FATALITIES
ANNUAL REPORT**

July 1, 2015 - June 30, 2016

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The overall aims of the California FACE (CA FACE) project are to identify, characterize, and prevent occupational fatalities in California by:

- Maintaining and enhancing case ascertainment using multiple data sources;
- Performing case-based field investigations and developing prevention strategies;
- Collaborating with local and state agencies, and a wide range of other partners;
- Disseminating results generated from project activities; and
- Evaluating surveillance activities on an ongoing basis.

MAJOR OUTPUTS

Data

A total of 2,454 work-related injury fatalities in Los Angeles County have been identified, coded (NAICS, SIC, 1990 COC, 2000COC, ICD-9) and analyzed since 1992 with the following results:

1. A total of 2,450 work-related injury fatalities in Los Angeles County have been identified since 1992.
2. Homicide is the leading cause of death, followed by transportation-related, falls and machine-related.
3. The overall fatality rate is 2.8 per 100,000 employed.
4. The rate of work-related fatalities among Hispanic workers (3.7/100,000) was 62% higher than non-Hispanic workers (2.3/100,000).
5. The two (two-digit NAICS code) industries with the highest rates since 2009 are transportation, warehousing & utilities (5.5/100,000), and construction (5.2/100,000).
6. The five occupations with the highest rates are fishing and hunting workers (113.6/100,000), counter & rental clerks (33.2/100,000); roofers (26.7/100,000); taxi drivers & chauffeurs (22.9/100,000); construction workers (17.3/100,000), and security guards (15.8/100,000).

Electronic and Web-based Communications, Partnerships, Collaborations

1. Partnered with CPWR to publish a digital story (short safety video), *Toxic Paint Removers: Safer Alternatives*. This video highlights the dangers of exposure to paint removers containing methylene chloride, and the safer alternatives that are available. This was based on our previous work (see 'Preventing Worker Deaths from Paint Strippers Containing Methylene Chloride'), and our collaboration with the California Department of Toxic Substances Control to finalize and publish a proposed Priority Products list (hazardous products including MeCl).
2. Published one investigation report, *Lake Maintenance Worker Drowns While Removing Weeds from a Golf Course Lake (#15CA001)*; two fact sheets, *A Golf Course Maintenance Worker Drowns When He Falls From a Boat & Un Trabajador De Mantenimiento De Un Campo De Golf Se Ahoga Al Caer De Una*

Barca; and two digital stories (short safety videos), *Preventing Worker Drownings & Cómo prevenir muertes de trabajadores por ahogamiento*. These materials highlight findings and prevention recommendations from an investigation involving a lake maintenance worker who drowned when he fell out of a boat. Both videos are available on the CDPH YouTube Channel, and were promoted via CDPH and NIOSH social media.

3. One CA FACE e-mail blast featuring the newly published investigation report was disseminated to 2,000 FACE stakeholders.
4. Staff presented a webinar for the California Lake Management Society, *Learning From One Worker's Death: Using Investigation Findings and Digital Stories to Highlight and Prevent Lake Maintenance Worker Drownings* on March 29, 2016.
5. Authored and disseminated to over 6,000 stakeholder recipients each for four issues of our electronic program newsletter **Occupational Health Watch** (e-OHW). The August 2015 issue, "*Preventing Worker Drownings*", the February 2016 issue "*Toxic Paint Removers, Safer Alternatives*", the March 2016 issue "*Sudden Deaths Among Oil and Gas Extraction Workers*" and the April 2016 issue, "*Spotlight on Latinos for Workers Memorial Day*" highlighted CA FACE program work. The newsletter content was re-published in multiple organizations' web-based and social media venues.
6. Collaborated with NIOSH to write the December 17, 2015 NIOSH Science Blog, *Preventing Wood Chipper Fatalities*, and the August 24, 2015 NIOSH Science Blog, *Palm Tree Worker Suffocated by Palm Fronds – Another Death in California*. OSHA, NIOSH, and the Tree Care Industry Association (TCIA) promoted both to additional stakeholders.
7. Authored the September 3, 2015 CSTE Features Blog, *Palm Tree Worker Suffocated by Palm Fronds - Another Death in California*.
8. Created an enhanced '*Digital Stories Topic Page*' featuring all eleven CA FACE digital stories, discussion questions, how the videos can be used in tailgate trainings, and how to download the videos.
9. Created a new '*Drowning Prevention Topic Page*' featuring the FACE videos, discussion questions, investigation report and fact sheet related to prevention.
10. As a partner in the *Campaign to Prevent Falls in Construction*, we promoted both the Campaign and the Safety Stand-Down in the CA FACE email blast and the e-OHW Workers Memorial Day newsletter. We updated our Fall Prevention Topic Page '*Preventing Worker Injuries and Deaths from Falls*, which has the Campaign highlighted as a resource; and our *Fall Prevention Tailgate Training Materials* (16 bilingual cards). Two of our CA FACE digital stories (*Preventing Falls Through Skylights*, *Preventing Falls in the Solar Industry*) continue to be highlighted on the Campaign website.
11. Ongoing collaboration with the NIOSH Western States office and the Fed OSHA Office of Occupational Medicine on investigating a series of deaths linked to volatile organic hydrocarbons among flowback operators in oil and gas production in the Western states.
12. Mentored FACE states and other organizations in developing their own digital stories.
13. Partnered with UCLA Labor Occupational Safety and Health Program to disseminate 1,000 hard-copy bilingual fact sheets to workers, employers, unions, labor centers, foreign consulates, community-based organizations, trade associations, state and local agencies and health care professionals.

14. CA FACE fact sheets, investigation reports, fatality alerts and digital stories continue to be promoted nationally using social media (bilingual messages) including CDPH and NIOSH Twitter, YouTube, and Facebook.

MAJOR OUTCOMES

Potential Outcomes

Nearly all items described above include dissemination of findings and prevention recommendations based on our work that, if used by others, would reduce workplace health and safety risks.

Intermediate Outcomes

1. Our *Toxic Paint Removers: Safer Alternatives* digital story is featured on the CPWR and NIOSH methylene chloride topic pages - both are industry and consumer information and training resources.
2. The largest national tree care industry trade association uses our wood chipper and palm tree safety digital stories, fact sheets, and investigation reports in their national tree worker training curricula.
3. The California Department of Toxic Substances Control has included methylene chloride in a list of hazardous, or priority, products based in part from findings from our CA FACE fatality investigations.
4. The Occupational Safety and Health Administration (OSHA) highlights CA FACE reports on the Tree Care Industry Safety and Health Topic Page. Our palm tree asphyxiation investigation reports and digital story led to the addition of a *new hazard category - asphyxia* (see <https://www.osha.gov/SLTC/treecare/hazards.html>)
5. Based on our investigation findings from the death of a psychiatric technician at a large forensic facility we provided technical information in regard to legislative proposals to require workplace violence prevention plans in acute care hospitals. CA FACE staff continue to participate in the Cal/OSHA Advisory Committee process to develop a new comprehensive workplace violence regulation. As part of the proposed standard, we developed a workplace violence incident log that will be included in the required record keeping by employers.
6. CA FACE continues to assist NIOSH, FACE states, and OHIP students on how to create and incorporate digital stories into their educational materials and promotional strategies.
7. National employers and municipalities are using our digital stories in trainings to decrease worker injury and death. Worker and employer evaluations of the CA FACE digital stories indicate the videos and investigation findings motivate them to work safely, increase the number of worker safety trainings, and follow safety protocols.
8. Equipment World is using FACE reports to create Safety Watches, which are used for safety training/toolbox talks (see <http://www.equipmentworld.com/safety-watch/>).

End Outcomes

Feedback from our stakeholders suggests that work by CA FACE has contributed to reduction of workplace hazards and consequent fatalities in the workplace. Our program continues to work with a variety of governmental and non-governmental stakeholders to encourage safe work practices. Data and investigation findings from our program have been used to identify high hazard industries and occupations. We continue to work towards both legislative and non-legislative solutions to improve working conditions, increase worker and employer knowledge of workplace hazards, and reduce the burden of work-related fatalities in California.

PRESENTATIONS AND PUBLICATIONS

1. One CA FACE investigation report, #15CA001: *Lake Maintenance Worker Drowns While Removing Weeds From a Golf Course Lake* was published in August 2015.
2. Two fact sheets, *A Golf Course Maintenance Worker Drowns When He Falls From a Boat* (English and Spanish) were published in August 2015.
3. Three digital stories, *Preventing Worker Drownings* (English and Spanish), and *Toxic Paint Removers: Safer Alternatives* were published in July 2015 and February 2016.
4. *Drowning of Lake Maintenance Worker Spurs New Safety Resources*. National Safety Council's Safety and Health Website, August 2015.
5. Staff authored three national blog articles: *Palm Tree Worker Suffocated by Palm Fronds – Another Death in California* (NIOSH Science Blog, August 24, 2015; CSTE Features Blog, September 3, 2015); and *Preventing Wood Chipper Fatalities* (NIOSH Science Blog, Dec. 17, 2015).
6. FACE Value: Maintenance Worker Drowns While Removing Weeds. National Safety Council's Safety and Health Magazine, December 2015.
7. Harrison RJ, Retzer K, Kosnett MJ, et al. Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors - United States, January 2010-March 2015. MMWR January 15, 2016.
8. "Occupational Health Storytelling: Methylene Chloride – From the Store Shelves to the Big Screen." Presentation by R. Harrison and L. Styles at the 2016 CSTE Annual Conference, Anchorage, Alaska (June 19, 2016).
9. "Using Digital Stories to Highlight and Prevent Fatalities Among Landscapers." Presentation by L. Styles at the 2016 CSTE Annual Conference, Anchorage, Alaska (June 21, 2016).
10. "Preventing Falls/FACE Digital Stories Tailgate Trainings. Presentation by D. Harrington at the Statewide Construction Safety Expo Conference, Sacramento, CA (March 24, 2016).