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SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF ORANGE COUNTY

LEIGH HOERNER, individually and on behalf of
other similarly situated individuals,

Plaintiff,

vs.

HOAG MEMORIAL HOSPITAL
PRESBYTERIAN; PROVIDENCE HEALTH &
SERVICES; and DOES 1-50 inclusive,

Defendants.

Case No.: 30-2021-01178333-CU-OE-CXC

Assigned for all purposes to: Judge Glenda Sanders
Dept: CX101

CLASS ACTION COMPLAINT

1. Private Attorneys General Act Civil Penalties (Lab. Code § 2699(f))
2. Violation of the California Labor Code §3602(b)(2) (Fraudulent Concealment of Injury)
3. Violation of the California Labor Code §6409.1 (Reporting Requirements)
4. Violation of the California Code of Regulations, Title 8, § 3380, 3383, 5141 & 5144 Violation of Unfair Competition Law – Unlawful Conduct (Bus. & Prof. Code §§ 17200 *et seq.*)
5. Violation of the Unfair Competition Law – Fraudulent Conduct (Bus. & Prof. Code §§ 17200 *et seq.*)

DEMAND FOR JURY TRIAL

1 Plaintiff Leigh Hoerner (“Plaintiff”), on behalf of her herself and others similarly situated (“the
2 Class”) bring this action against Defendants Hoag Memorial Hospital Presbyterian and Providence
3 Health & Services (hereinafter “Hoag Defendants” or “Hoag”) to enjoin conduct in violation of
4 California’s Unfair Competition Law and for penalties recoverable under the Labor Code, and for other
5 recovery specified herein, and allege upon information and belief, except as to her own actions, the
6 investigation of counsel, and the facts that are a matter of public record, as follows:
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I

INTRODUCTION

1. Chemical exposure in the modern workplace is ever-present, despite the adverse effects on the health and lives of workers when exposed to harmful chemicals.

2. A number of studies performed since 2000 have shown that exposure to chemicals in cleaning products is associated with work-related asthma in agriculture, construction, manufacturing, transportation, wholesale, retail trade, services, and government industries.

3. In the healthcare industry, chemical exposure from cleaning products is particularly acute. According to a Bureau of Labor Statistics information, hospital workers in California suffered almost 20,000 recordable injuries or illnesses in 2018. Hospital workers acquired work-related illnesses generally, and respiratory illnesses specifically, at a rate more than three times higher than that of the average worker in the U.S.

4. Data reported in the American Journal of Industrial Medicine has shown hospital housekeeping staff, defined as those who clean patient areas in hospitals, are more than 50 percent more likely to show symptoms related to chemical-related illness than custodians in other settings.

5. Since early 2013, when Ecolab first distributed its OxyCide cleaning products to over 500 hospitals nationwide, hospital workers have reported serious physical injuries associated with the use of Ecolab's OxyCide Cleaning Products. These included burning eyes, nose, throat, nasal problems, cough, headache, dizziness, nausea, nose bleeds, asthma-like symptoms, respiratory irritation, skin burns, rashes and other reactions affecting their pulmonary and respiratory functions (e.g. fatigue, shortness of breath, congestion, coughing, and asthma) in addition to other health concerns.

6. Recent testing of certain chemical compounds in OxyCide cleaning products reveal the presence of dangerous chemicals and compounds that are known to cause adverse health effects. Specifically, these tests revealed the presence of peracetic acid (also known as peroxyacetic acid, referred to hereinafter as "PAA"), a known asthmagen (asthma causing substance) and respiratory sensitizer (causing immune responses and adverse respiratory effects, even at low levels of exposure).

7. Defendant Providence Health and Services ("Providence") employs 120,000 caregivers and is comprised of 51 hospitals and 1,085 clinics in the following markets: Alaska, California,

1 Montana, New Mexico, Oregon, Texas, and Washington.¹ Defendant Providence is contracted with
2 Defendant Hoag Memorial Hospital Presbyterian (“Hoag”) to provide and arrange medical services for
3 Hoag Hospital members in California.

4 8. Defendant Hoag operates two acute-care hospitals, 13 urgent care centers, nine health
5 centers, and a network of more than 1,700 physicians, 100 allied health members, 6,500 employees and
6 2,000 volunteers.²

7 9. Since at least January 1, 2014, doctors, nurses, and housekeepers at Hoag hospitals in
8 California have made consistent and repeated complaints of serious physician harm and injuries
9 associated with the use of a chemical cleaning product called OxyCide, which is manufactured by
10 Ecolab, Inc. Hoag requires its housekeepers to use it when cleaning patient areas. The employee
11 complaints have included burning eyes and throat, nasal congestion and irritation, chronic cough,
12 headache, dizziness, nausea, loss of consciousness, nosebleeds, hay fever or asthma-like symptoms,
13 respiratory irritation, skin burns, rashes and other reactions affecting their pulmonary and respiratory
14 functions.

15 10. Hoag has been aware of OxyCide’s adverse effects for years and refuses to analyze its
16 effects, mitigate the harm it causes to employees exposed to it, or remove it from its hospitals. Instead,
17 Hoag has increased its use of OxyCide in recent years, thereby increasing the number of reported Oxy-
18 Cide-related illnesses and injuries.

19 11. Hoag’s continued and increase use of OxyCide in its hospitals in the face of evidence that
20 it makes its workers ill is driven by its bottom line. The product is marketed as an effective tool in
21 preventing healthcare-associated infections, which are an economic burden for hospitals like Hoag,
22 costing the industry billions of dollars annually. OxyCide offers Hoag a cheaper alternative than the
23 additional staffing hours required to safely clean patient areas and prevent patient healthcare-associated
24 infections. Hoag’s decision to continue using OxyCide is driven by financial considerations without
25 regard for the wellness of its workforce.

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28 ¹ Providence, <https://www.providence.org/about> (last visited June 8, 2020.)

² Hoag, <https://www.hoag.org/about-hoag/> (last visited June 8, 2020.)

12. Moreover, Hoag has acted to conceal the hazards of OxyCide from its workers and misled workers who have become ill from exposure to the product. Hoag has received numerous complaints and Workers' Compensation claims from workers at all levels of its hospitals, from physicians to environmental service workers ("EVS") but has withheld these complaints from being known to the workers. When workers have suffered illnesses directly linked to OxyCide, Hoag has failed to report such illnesses to state agencies and denied workers' compensation claims related to OxyCide in an effort to defend its cost-saving tool.

13. Plaintiff Leigh Hoerner is yet another victim of exposure to the toxic and hazardous OxyCide cleaning products. Ms. Hoerner was a nurse working at Hoag Orthopedic Institute (“HOI”) in Orange County, California when Defendants permanently and seriously damaged her health with continuous exposure to hazardous OxyCide Cleaning Products. Immediately after Ms. Hoerner was exposed to OxyCide, she began suffering from asthma-like symptoms, burning sensations, skin irritation, headaches, runny nose, light-headedness, respiratory problems and coughing from the toxic chemical and/or combination of chemical agents. Ms. Hoerner wishes to prevent others from suffering the devastating health consequences caused by the exposure to this product.

II

THE PARTIES

14. Plaintiff Leigh Hoerner is an individual who, at all times material hereto, was a resident and citizen of California at the time of the incident. She recently relocated to Texas. At the time of the incident, Plaintiff Leigh Hoerner was a nurse working at Hoag Orthopedic Institute (“HOI”) in Orange County, California.

15. Defendant Providence Health and Services (“Providence”) is a healthcare organization engaged in an industry affecting interstate commerce with its headquarters and principle place of business in Renton, Washington. Providence operates hospitals and clinics in numerous states, including California.

16. Defendant Hoag Memorial Hospital Presbyterian (“Hoag”) is a regional health care delivery network with its headquarters and principle place of business in Orange County, California.

17. Defendants DOES 1-50 are companies, entities, individuals which otherwise were negligent or wrongful in their conduct toward Plaintiff Leigh Hoerner, and which were thereby also substantial factors in causing her serious and other consequential injuries.

18. The true names and capacities of Defendants DOES 1 through 50 are unknown to Plaintiff, who therefore sue said Defendants by such fictitious names. Plaintiff will amend this complaint to state the true names and capacities of said fictitious Defendants when they have been ascertained. Plaintiff is informed and believe and thereon alleges that Defendants DOES 1 through 50 are in some manner responsible for the occurrences herein alleged, and that Plaintiff's damages as herein alleged were proximately caused by their conduct.

19. Plaintiff is informed and believes and based thereon allege that, at all times material hereto, each of the Defendants, including the fictitiously named Defendants, were acting in an individual, corporate, partnership, associate, parent-subsidiary, successor-predecessor, conspiratorial or other capacity or as the agent, employee, co-conspirator, and/or alter ego of their co-Defendants, and in doing the acts herein alleged, were acting within the course and scope of their authority as such parent, successor, partner, associate, agent, employee, co-conspirator, or alter ego, and with the permission, consent, knowledge, authorization, ratification and direction of their co-Defendants, including all fictitiously named Defendants.

III

JURISDICTION AND VENUE

20. The California Superior Court has jurisdiction over this action pursuant to California Constitution Article VI, Section 10, which grants the Superior Court “original jurisdiction in all causes except those given by statute to other trial courts.” The statutes under which this action is brought do not specify any other basis for jurisdiction.

21. The California Superior Court has jurisdiction over the Defendants because, based on information and belief, each is a corporation and/or entity organized under the laws of the State of California, a foreign corporation or association authorized to do business in California and registered with the California Secretary of State or has sufficient minimum contacts in California, or otherwise

intentionally avails itself of the California market so as to render the exercise of jurisdiction over it by the California courts consistent with traditional notions of fair play and substantial justice.

22. This Court has personal jurisdiction over Hoag Defendants because their principal place of business is in Orange County, California, they conduct substantial business in California, and because a substantial part of the acts and omissions complained of occurred in California.

23. This Court has personal jurisdiction over Providence Defendant because they engage in an industry that affects interstate commerce, they conduct substantial business in California, and because a substantial part of the acts and omissions complained of occurred in California.

24. Venue is proper in this Court as the acts, transactions, and/or occurrences giving rise to the causes of action occurred in substantial part in the County of Orange, State of California, and the Court has personal jurisdiction over each of the parties as alleged throughout this Complaint.

IV

FACTUAL BACKGROUND

A. OxyCide™ Daily Disinfectant and OxyCide Dilution Management System

25. In or around 2013, OxyCide™ Daily Disinfectant Cleaner was manufactured and marketed as an EPA-registered non-bleach sporicide and virucide. The main component in OxyCide Cleaner is PAA, a colorless liquid formed by the reaction of hydrogen peroxide and acetic acid. PAA is known to be one of the strongest oxidizing agents. OxyCide Cleaner's active ingredients when sold are PAA, hydrogen peroxide ("HP"), and acetic acid ("AA"). At dilution, the active ingredients are PAA and hydrogen peroxide.

26. OxyCide Cleaner is advertised as a one-step disinfectant cleaner, virucide and deodorizer with sporicidal activity for hard and flexible non-porous inanimate surfaces.³ OxyCide Daily Disinfectant Cleaner is effective in five (5) minutes against *Clostridium difficile* (hereinafter "C. Diff.") spores."⁴ OxyCide Cleaner is used in over 500 hospitals nationwide.

27. C. Diff. infections cost the healthcare industry \$1.5 billion in annual expenditures, according to the American Medical Association estimate in 2016. Studies show the average cost to

³ OxyCide Daily Disinfectant Cleaner, ECOLAB, <http://www.ecolab.com/offerings/concentrated-disinfectants/oxycide-daily-disinfectant-cleaner> (last visited Dec. 12, 2019).

⁴ *Id.*

1 hospitals of treating a hospital-acquired C.Diff. infection is 50 percent higher than the cost of treating
2 the same infection when acquired outside the hospital.

3 28. Ecolab also manufactures the OxyCide™ Dilution Management System, an automated
4 dispenser designed to dilute the concentrated OxyCide Cleaner with water to its at-use pH level of three
5 (3). The OxyCide Dilution System provides a safety feature where a locked compartment holds the
6 OxyCide Cleaner concentrate and is attached to a suction line for quick and automated dilution. The
7 dilution system functions by introducing two liquid lines together in a controlled fashion to meet a
8 specified diluted concentration. A line supplies concentrated OxyCide Cleaner and another supplies
9 water. With a single push of a button, diluted OxyCide Cleaner disinfectant is dispensed for use in a
10 bucket filled with rags and OxyCide. The OxyCide-saturated rags are used to wipe down surfaces in the
11 hospital. The product safety information states that OxyCide Cleaner does not require personal
12 protective equipment when automatically diluted.

13 29. The OxyCide Cleaning Products are catered toward industrial use and are not sold as
14 household cleaning solutions due to their hazardous health effects from direct exposure, including severe
15 burns, allergies, respiratory problems, and dangerous effects to the skin and eyes.

16 30. In California, PAA is classified by the California Department of Industrial Relations as
17 an “acutely hazardous chemical,” putting it in the same category as sarin and hydrogen cyanide. Even at
18 low levels of exposure, peracetic acid is corrosive to the eyes, skin, and the respiratory tract, and causes
19 coughing, labored breathing, shortness of breath, nosebleeds, skin redness, pain, blistering and severe
20 deep burns in the eyes, and other serious health effects. The International Chemical Safety Card for
21 stabilized PAA warns of short-term exposure effects, noting that “the substance is corrosive to the eyes,
22 the skin and the respiratory tract.” In Europe, PAA is classified as a flammable liquid, organic peroxide,
23 corrosive to skin, toxic to aquatic environment, and harmful by ingestion, inhalation and skin contact.

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B. Plaintiff Leigh Hoerner's Exposure to OxyCide Cleaning Products

31. In October 2010, Plaintiff began working as a nurse at Hoag Memorial Hospital in Newport Beach, California.

32. Upon information and belief, in or around 2011 or 2012, OxyCide was implemented in the Main Operating Room and Pavilion Operating Room at Hoag Memorial Hospital.

33. Plaintiff and multiple staff members reported difficulty breathing as a result of the new chemical product. Approximately two weeks later, the product was discontinued in the hospital.

34. In 2013, Plaintiff was transferred to the Hoag's Orthopedic Institute ("HOI") in Irvine, California.

35. In March 2014, Hoag posted an online article available to the general public stating the mandatory usage of OxyCide in their facilities.⁵

36. In October 2017, HOI started using OxyCide. Immediately upon Plaintiff's first exposure to OxyCide, she started experiencing headaches, nausea, lightheadedness, and coughing. Several employees complained to the OR management, but management indicated that they had no intentions of getting rid of the product because it will help with the increased infection rates of the hospital.

⁵ Hoag, <https://medstaff.hoag.org/in-the-know?Edition=March+2014> (last visited July 8, 2020).

1 37. After a few months of being exposed to the chemical product, Plaintiff's symptoms
2 became more severe. She had several visits to her primary care physician and was told that her
3 respiratory and mucosal membrane irritation is likely due to inflammation in the lungs from the
4 continuous chemical exposure in the hospital.

5 38. Between November 2017 and January 2018, Plaintiff was constantly sick and missed
6 more days from work than she ever had before OxyCide was introduced at Hoag.

7 39. In or around January 2018, Plaintiff conducted online research and collected data about
8 OxyCide from websites such as OSHA, CDC, and Ecolab to present to her employer.

9 40. In January 2018, Plaintiff expressed her concerns about the product in a staff meeting.
10 She told the OR Management, specifically Terry Roth and Beth Dickinson, that the entire staff is
11 requesting that they get rid of the OxyCide product. Plaintiff provided management with all the research
12 she found on the internet regarding OxyCide's side effects. She also expressed her concerns with the
13 lack of ventilation systems in the hospital. Several other employees also spoke at the staff meeting
14 explaining their own personal health issues with the product. Terry Roth told staff members that the
15 hospital will bring a company to test the exposure levels of the chemical amongst the staff members and
16 determine if it is at a safe range.

17 41. In March 2018, Beth Dickinson, the OR Manager, showed Plaintiff the results of the
18 OxyCide exposure test that was conducted at Hoag. The results showed that OxyCide was a safe
19 exposure range for Hydrogen Peroxide and Acetic Acid. Ms. Dickinson asked Plaintiff to sign a form
20 acknowledging that she saw the results of the test, however, Plaintiff only agreed to sign the form if Ms.
21 Dickinson would tell the staff that Peracetic Acid concentration levels were never actually tested.

22 42. In September 2018, Ms. Hoerner was diagnosed with occupational/allergy induced
23 asthma. Plaintiff had no pre-existing issues related to asthma prior to Hoag's adoption of OxyCide.

24 43. On September 25th, 2018, Plaintiff was exposed to OxyCide and immediately started
25 having difficulty breathing. Plaintiff's director, Terry Roth, gave Plaintiff permission to get an Albuterol
26 Inhaler from the medical room for personal use. This incident was reported to the RN at Employee
27 Health.
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1 44. On October 8th, 2018, Plaintiff provided Beth Dickinson with a doctor's note requiring
2 Plaintiff to limit her exposure to the OxyCide product.

3 45. At the end of 2018, Plaintiff's position changed to a "Charge Nurse" in the OR.
4 Plaintiff's exposure to OxyCide actually increased with her new position. Her symptoms exacerbated
5 and she was forced to take numerous days off from work. This resulted in a significant decrease in her
6 wages and caused financial hardships for Plaintiff.

7 46. In 2019, Hoag employees were assigned a PowerPoint to read with the title "OxyCide –
8 The New Smell of Clean." The PowerPoint provided exposure assessments of two EVS employees that
9 were required to clean with the OxyCide product in March 2014. The results showed that the chemicals
10 in OxyCide were at a permissible exposure limit and that no further measures were needed to protect
11 workers. Hoag required employees to sign an acknowledgement form that they read the PowerPoint, but
12 Plaintiff refused to sign it.

13 47. From April 2019 to June 2019, Plaintiff was continuously pressured by her manager to
14 work in rooms that are still wet from the OxyCide chemicals.

15 48. In 2019, Plaintiff overheard her manager speaking to the new Nurse Educator, Nicole
16 Szopinski, regarding OxyCide. Plaintiff's manager told Nicole that if a staff member complains about
17 their reaction to OxyCide, she should remind them of the February 2018 OxyCide exposure level test
18 results. Plaintiff interrupted the conversation to explain that certain chemicals were not included in the
19 tests. Beth continued to tell Plaintiff that she was incorrect, and that testing Hydrogen Peroxide and
20 Acetic acid as individual chemicals was just as good as testing for Peracetic Acid.

21 49. On June 11, 2020, Plaintiff got an X-ray of her cervical spine from Dr. Deckey. Results
22 showed that she had bone spurs, which Plaintiff was told could be caused by inflammation of the body.

23 50. On June 12, 2020, Plaintiff sent an email to the Employee Health RN regarding her
24 symptoms relating to OxyCide. In the email, Plaintiff listed all her reactions to the chemical and all the
25 reasons why she must reduce her exposure to the product. She never received a response.

26 51. On June 21, 2019, Plaintiff had an episode with OxyCide that caused her throat to swell
27 up. She ended up in the emergency room where she was provided with breathing treatments. Plaintiff
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expressed her need to be transferred to a position in the hospital with minimal OxyCide exposure but was told that every facility and department at Hoag had adopted OxyCide.

52. On July 1, 2019, Plaintiff sent an e-mail to Lisa Mattick, the head staff of the HR department, expressing her concerns about OxyCide side effects. Plaintiff was told to speak about these matters to Lisa Mattick in person. Plaintiff spoke with Lisa Mattick in person but received very vague feedback with no real solution to her problems.

53. On July 13, 2020, Plaintiff visited a new doctor for her breathing problems because her primary care physician was unavailable. She was told that her symptoms are related to a chemical reaction. Plaintiff had to take off several days from work so that she was able to recover.

54. Over the years at HOI, Plaintiff has suffered great physical and financial loss as a result of the OxyCide product. Plaintiff suffered economic injury due to medical treatment, doctor visits, prescription medication, over the counter medication purchases, medical leave off work, and much more. Plaintiff was even written up at work due to excessive absences.

55. Plaintiff continues to suffer from the hazardous exposure to OxyCide Cleaning Products today.

C. Prior to Plaintiff's Exposure to OxyCide Cleaning Products

56. Prior to Plaintiff Leigh Hoerner's exposure to OxyCide Cleaning Products, Plaintiff was relatively healthy with no major health concerns. Ms. Hoerner did not have health issues associated with chemicals products until her exposure to OxyCide.

57. On information and belief, other Hoag employees have experienced similar complaints as Plaintiff Leigh Hoerner. Other employees at Hoag's facilities throughout California, including Plaintiff, complained about the caustic smell, irritations, and respiratory side effects from the cleaning agents used and notified management at Hoag.

D. Plaintiff Leigh Hoerner's Experiences Demonstrates a Dangerous Trend Among Persons Exposed to OxyCide Cleaning Products

58. Since OxyCide's introduction at Hoag hospitals throughout California, there have been numerous reports of employees developing serious health related issues concerning OxyCide, including

1 difficulty breathing, shortness of breath, nausea, vomiting, burning eyes, burning throat, bronchospasms,
2 vocal cord stridor, and asthma.

3 59. Prior to Ms. Hoerner's resignation in 2020, Ms. Hoerner reported to her supervisors that
4 OxyCide Cleaning Products were making her sick and that she was experiencing worsening health
5 conditions after exposure to OxyCide.

6 60. Despite repeated complaints and injuries from using OxyCide Cleaning Products, Hoag
7 Defendants continued to use the hazardous products and took no action.

8 61. Despite all of the complaints from Hoag employees of feeling ill after being exposed to
9 the products, Hoag Defendants repeatedly told Ms. Hoerner that OxyCide Cleaning Products were safe
10 despite their knowledge to the contrary.

11 62. Plaintiff Leigh Hoerner's experience was not an isolated experience nor was it
12 unavoidable. In 2015, over 200 healthcare workers at the University of Pittsburgh Medical Center
13 ("UPMC") filed a complaint with the Division of Occupational Safety and Health Administration
14 ("OSHA") to open an investigation. The healthcare workers complained of adverse health effects,
15 including headaches, nausea, difficulty breathing, among other side effects resulting from OxyCide
16 Cleaning Products.

17 63. On information and belief, in or around February 2016, a registered nurse at the Kaiser
18 facility in Fontana, California suffered a similar, but more severe reaction to OxyCide. The nurse was
19 about ten (10) feet away from a patient room being cleaned with OxyCide when she began experiencing
20 a burning sensation in her nose and lungs, difficulty breathing, coughing, and had ultimately collapsed
21 from respiratory failure. The nurse was admitted to the hospital and kept in the intensive care unit for
22 five (5) days. The nurse was diagnosed with vocal cord dysfunction, bronchospasm, acute respiratory
23 failure, and severe chemical burns in her throat, which required several surgeries and a tracheostomy.

24 64. On information and belief, ChemDAQ, a company devoted to ensuring occupational
25 safety in diverse markets such as the healthcare industry, researched the effects of PAA and found that
26 continued exposure to PAA can result in liver and kidney problems, pulmonary edemas and circulatory
27 problems that can go undetected for months or years. ChemDAQ and other industry experts note flaws
28 in OSHA's investigation due to its methodology for measuring PAA concentrations. At the time of the

investigation, OSHA did not have a standard in place for analyzing PAA. The problem is illuminated when OSHA only examines hydrogen peroxide and acetic acid individually, which are not as harmful as when they are combined to create PAA. In May 2015, ChemDAQ released a comment urging companies to install accurate monitoring systems to detect PAA concentrations.

E. Investigations into OxyCide Cleaning Products

65. Multiple studies have been undertaken regarding Ecolab's OxyCide Cleaner and PAA-based disinfectants, particularly the long-term health effects from exposure to the product.⁶

66. In spring of 2014, the American Conference of Governmental Industrial Hygienist ("ACGIH") set a Short-Term Exposure Limit (STEL) on PAA at 0.4 parts-per million ("ppm"), confirming its dangers in the workplace.⁷

67. In 2015, the Association of Occupational and Environmental Clinics ("AOEC") listed PAA and hydrogen peroxide as strong oxidants and their mixture is listed as an asthmagen and respiratory sensitizer. According to NIOSH, astmagens are substances that can cause asthma, and respiratory sensitizers are substances that can cause an immune response and adverse respiratory effects, even at low levels of exposure¹.

68. The AOEC clarified that an

[I]ndividual may develop asthma due to exposure to a sensitizing agent at very low levels of exposure, and this condition may become permanent and require treatment even after exposure has stopped. The longer an individual is exposed to an asthmagen, the greater the risk of developing asthma. The person must be exposed to the chemical/substance that caused the initial reaction. This is not a list of substances that aggravate an individual's asthma, but a list of substances that cause asthma.⁸

69. In 2015, the National Institute for Occupational Safety and Health (NIOSH) conducted a health hazard investigation after healthcare workers at Magee-Women's Hospital in Pittsburgh contacted the agency and expressed concerns about the reaction to the new sporicidal disinfectant product called

⁶ Emmanuelle Cristofari-Marquand et al., *Asthma Caused by Peracetic Acid-Hydrogen Peroxide Mixture*, 49 J. OCCUP. HEALTH 155 (2007), http://joh.sanei.or.jp/pdf/E49/E49_2_11.pdf.

⁷ Adrea Tritschler, *Disinfectant Designed for Patient Health Could be Making Health Workers Sick*, RIVER CURRENTS (Feb. 2016), <http://riverwestcurrents.org/2016/02/disinfectant-designed-for-patient-health-could-be-making-health-workers-sick.html>.

⁸ Gary Evans, *Healthcare Dilemma: Kill the Bugs But Spare the Workers*, AHC MEDIA (Aug. 1, 2016) <https://www.ahcmedia.com/articles/138245-protect-patients-harm-workers-cleaning-agent-raises-concerns>.

OxyCide used at its facility.⁹ Employees complained of symptoms that included burning eyes, nose, and throat; runny nose; cough; headache, dizziness; nausea; nose bleeds; asthma exacerbation; skin burns; and rashes. NIOSH found that OxyCide users reported higher prevalence of work-related health outcomes including cough, shortness of breath, asthma-like symptoms, asthma attack, use of asthma medicine, asthma symptoms, use of allergy medicine, nasal problems, and skin problems, with wheeze and watery eyes being significantly higher in OxyCide users than non-users. EVS Staff Workers using OxyCide had reported acute eye and airway symptoms, as well as chronic airway symptoms at low levels of measured exposures. NIOSH reported that shortness of breath was significantly associated with increased exposure to PAA, hydrogen peroxide, and acetic acid. All the active ingredients in concentrated and diluted solutions of OxyCide Cleaner show that increased exposure to PAA, hydrogen peroxide, and acetic acid significantly correlated with increases in work-shift acute nasal and eye irritation and shortness of breath.

70. On April 12, 2016, NIOSH released an interim report concluding that the “findings support the conclusion that exposure to OxyCide is associated with adverse health effects and indicate the need to minimize employee exposures.”¹⁰

71. In its 2017 quarterly meetings, the members of the state of California’s Health Effects Advisory Committee, formed by the Department of Industrial Relations, reviewed OxyCide and other uses of peracetic acid, noting that in the health care setting they had received a number of employee complaints of irritation. The Committee showed concern, noting “we have a material that is increasing in usage and we knew it is an irritant.”

72. In or around 2017, NIOSH conducted an investigation of OxyCide at the Kaiser Permanente Fontana Medical Center after a serious work-related injury occurred relating to OxyCide and a nursing staff. During its investigation, NIOSH conducted interviews with eleven (11) EVS staff, ten (10) nursing staff, and six (6) ancillary staff. Of the eleven (11) EVS staff interviewed five (5)

⁹ Brie Hawley et al., *Evaluation of Exposure to a New Cleaning and Disinfection Product and Symptoms in Hospital Employees*, NIOSH (Jan 2017), <https://www.cdc.gov/niosh/hhe/reports/pdfs/2015-0053-3269.pdf>; Gary Evans, *Healthcare Dilemma: Kill the Bugs But Spare the Workers*, AHC MEDIA (Aug. 1, 2016) <https://www.ahcmmedia.com/articles/138245-protect-patients-harm-workers-cleaning-agent-raises-concerns>.

¹⁰ Brie Hawley et al., *Evaluation of Exposure to a New Cleaning and Disinfection Product and Symptoms in Hospital Employees*, NIOSH (Jan 2017), <https://www.cdc.gov/niosh/hhe/reports/pdfs/2015-0053-3269.pdf>.

1 reported burning eyes, and six (6) reported nasal irrigation, coughing, sneezing, headache, and burning
2 throat. Two (2) EVS staff reported previous chemical splashes or skin burns. Six (6) of ten (10) nursing
3 staff reported headache, eyes burning, throat irritation, coughing, nausea, or shortness of breath.
4 NIOSH also took measurements of the pH levels of diluted OxyCide and found that the pH varied
5 significantly from 3.1 to 7.5 pH.

6 73. In June 2018, members of the National Union of Healthcare Workers and employees of
7 area hospitals protested the use of OxyCide at St. Joseph Hospital in Eureka, California. The Unions
8 press release stated:

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10 For the last two years, housekeepers at both hospitals have been required to
11 use OxyCide, a relatively new one-step cleaner, disinfectant, and deodorizer
12 product, which they say has caused them respiratory problems, burning
13 noses, burning eyes, rashes and severe headaches.

14 74. In the interest of its bottom line, Hoag exposes EVS staff and other workers to a
15 chemical it knows to be harmful, and in some instances, knows is actually causing workers
16 specific harm and aggravating specific injuries or illnesses.

17 75. Hoag has received numerous complaints from employees regarding eye irritation,
18 burns to the skin and eyes from direct contact, nasal and respiratory irritation, nausea, and loss of
19 consciousness related to OxyCide since 2014.

20 76. In March 2014, Hoag posted an online article available to the general public
21 stating that “OxyCide has a vinegar-like smell that we now consider the new smell of clean.”¹¹
22 The article guarantees readers that “By using the highest standards of cleaning excellence, we
23 help ensure that Hoag lives up to its reputation for exceptional patient care.”¹²

24 77. Numerous staff members have requested they be permitted not to work with or
25 around OxyCide when it is not necessary. In response, Hoag posted an article stating “although
26 OxyCide does have a distinct odor, it is safe for staff and patients when used as directed.”¹³
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28 ¹¹ Hoag, <https://medstaff.hoag.org/in-the-know?Edition=March+2014> (last visited July 8, 2020).

¹² *Id.*

¹³ *Id.*

1 78. Hoag has failed to inform the California Department of Industrial Relations of any
2 of its employees' reports of illness related to OxyCide, as required under the Labor Code.

3 79. Though Hoag stated that they hired an external certified company to test the
4 product in an industrial hygiene lab, the Defendant neglected to test the PAA concentration
5 levels in the toxic chemical. Moreover, Defendant knew the PAA levels were not tested and
6 continued to conclude that the product is safe to use and that "no further measures are needed to
7 protect workers."¹⁴

8 80. Hoag has actual knowledge of the hazards posed by OxyCide, the exposure of its
9 employees to the hazards posed by OxyCide, and the injuries and illnesses OxyCide has caused
10 EVS staff members and other employees. It has been informed of these facts by Hoag
11 employees themselves, treating physicians and medical examiners who have evaluated injured
12 employees. Since Hoag is the healthcare provider for its employees, Hoag is aware of the
13 specific injuries and illnesses the employees suffer and the treatments they receive. Based on
14 information and belief, those with independent decision-making authority within Hoag also have
15 been made aware of the publicly available reports of OxyCide's hazards from NIOSH, referred
16 to herein and in further detail, *infra*.

17 81. Despite knowing the hazardous effects OxyCide is having on its EVS staff and
18 other employees, Hoag continues to require the use of OxyCide in all patient areas and conceals
19 its knowledge of these hazardous effects, telling its staff that the product is safe.

20 82. Hoag's policy to continue to use OxyCide and maintain to staff that it is safe for
21 them to use is made by Hoag employees/directors overseeing infection control policies at all
22 Hoag hospitals and facilities. Similarly, Hoag's policy to fight causation of work-related illness
23 or injury due to OxyCide is made by Hoag employees overseeing worker injury and illness risk
24 management and workers' compensation programs. These decisionmakers have substantial
25 authority over policy at all Hoag hospitals and facilities.

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28

¹⁴ *Id.*

1 83. Under California Labor Code and the California Occupational Safety and Health
2 Act, Hoag is legally obligated to provide and maintain a safe and healthful workplace for its
3 employees, including Plaintiff and the Class.

4 84. Through its acts and omissions, Hoag has failed and continues to fail to ensure
5 that its employees can clean patient areas in a manner that avoids harmful exposure to OxyCide.
6 Hoag is required to implement administrative and engineering controls or provide personal
7 protective equipment to minimize or eliminate the harm caused by OxyCide. It has failed to take
8 any such measures, but instead Hoag has made the administrative decision to continue using
9 OxyCide. It has failed to improve its air filtration or ventilation in patient areas. And, other than
10 safety goggles worn at the dispensing station and gloves while cleaning rooms, Hoag has failed
11 to mandate, require or provide PPE when working with OxyCide.

12 **F. Defendants Failure to Evaluate and Disclose the Health Risks Associated with**
13 **OxyCide**

14 85. Ecolab's Safety Data Sheet for PAA exposure only provides ACGIH's Short Term
15 Exposure Limit or STEL at 0.4 ppm, which is only calculated as a 15-minute time weighted average.
16 Hoag failed to investigate, determine, and disclose the health risks associated with short and long-term
17 PAA exposure, particularly in occupational and industrial setting.

18 86. Hoag Defendants knew, or should have known, the health concerns surrounding OxyCide
19 Cleaner from various public health reports, hospital-staff employee complaints, and internal complaints.
20 Yet, Defendants willfully or negligently declined to investigate and disclose the serious health risk to
21 healthcare professionals and the general public, disregarded well-founded complaints, and chose to
22 continue to risk the health of their employees despite the availability of less-harmful cleaning agents.
23 This knowledge was exclusively in the hands of Defendants.

24 87. To date, no occupational exposure limits have been established for PAA. There is limited
25 data on PAA's exposure limits and occupational hazards for exposure to the mixture of PAA, hydrogen
26 peroxide, and acetic acid. Most exposure limit values are created for exposure to a single chemical
27 substance. At present, there are no OSHA Permissible Exposure Limits ("PEL") or NIOSH
28 Recommended Exposure Limits ("REL") studies for occupational exposure to PAA.

1 88. Further, PAA is a very potent irritant at considerably lower concentrations compared to
2 hydrogen peroxide and acetic acid. The methodology of testing occupational exposure utilized by
3 OSHA only takes into account hydrogen peroxide and acetic acid individually, but not when combined
4 to create PAA, which is significantly more hazardous.

5 89. On information and belief, current analytical methodologies are not adequately
6 quantifying the PAA levels and/or the recommended occupation exposure limits are not protective
7 enough to ensure consumer/employee safety.

8 90. NIOSH has reported that “[f]ew assessments of worker exposure to hydrogen peroxide,
9 acetic acid, and peroxyacetic acid in healthcare settings have been conducted, despite the use of this
10 product in more than 500 hospitals nationally.”¹⁵

11 91. In NIOSH’s evaluation, EVS Staff Members reported work-related symptoms despite
12 measured air sampling exposures that were below the established full-shift limits for hydrogen peroxide
13 and acetic acid. However, because both hydrogen peroxide and PAA are strong oxidants, it is possible
14 that the mixture of hydrogen peroxide and PAA contributed to the symptoms reported by workers.

15 92. In 2010, the National Research Council issued a report stating “Peracetic acid is
16 extremely irritating to mucous membranes of the eyes and nasal passages at low concentrations.”¹⁶

17 93. Hoag Defendants knew, or should have known, about the increased concerns regarding
18 the OxyCide Cleaning Products. Defendants willfully and/or negligently ignored persistent warnings
19 and failed to undertake investigations to determine the health risk associated with OxyCide. Defendants
20 failed to perform necessary evaluations to ensure that the OxyCide Cleaning Products are safe for use in
21 the hospital setting.

22 ///

23 ///

24 ///

26 ¹⁵ Brie Hawley, PhD et al., *Notes from the Field: Respiratory Symptoms and Skin Irritations Among Hospital Workers Using*
27 *a New Disinfection Product – Pennsylvania* 2015, MORBIDITY & MORTALITY WKLY. REP., Apr. 22, 2016,
<https://www.cdc.gov/mmwr/volumes/65/wr/mm6515a3.htm>.

28 ¹⁶ NATIONAL RESEARCH COUNCIL, ACUTE EXPOSURE GUIDELINE LEVELS FOR SELECTED AIRBORNE CHEMICALS: VOLUME 8,
NATIONAL ACADEMIES PRESS 333 (2010), <https://www.nap.edu/catalog/12770/acute-exposure-guideline-levels-for-selected-airborne-chemicals-volume-8>.

1 **G. NIOSH Recently Recommended Elimination or Substitution of OxyCide as a**
2 **Primary Approach to Minimize Exposure Risk**

3 94. Recently, in September 2019, the U.S. Department of Health and Human Services
4 Centers for Disease Control and Prevention (“CDC”) – National Institute for Occupational Safety and
5 Health (“NIOSH”) issued Report No. 2017-011403357 entitled “Evaluation of exposure to hydrogen
6 peroxide, peracetic acid, and acetic acid containing cleaning and disinfection product and symptoms in
7 hospital employee” pursuant to its Health Hazard Evaluation Program (“HHE”).¹⁷ The HHE was a
8 response to a confidential employee request for NIOSH to conduct the HHE at a Kaiser Hospital,
9 located in Fontana, California, which is encompassed in Kaiser’s Southern California Region.

10 95. The request for the HHE cited “concerns about exposure of hospital employees to
11 OxyCide, and described symptoms experienced by employees, including respiratory distress, skin
12 problems, headaches, chest tightness, burning eyes, sore throat, and nausea.”¹⁸ NIOSH visited the
13 Kaiser hospital in August 2017 to observe EVS staff while they conducted cleaning tasks throughout the
14 hospital. NIOSH collected 14 bulk samples of the diluted OxyCide Product in August 2017 to measure
15 pH levels and returned again one year later in multiple visits to perform air sampling and health
16 questionnaire surveys.¹⁹ NIOSH linked the symptoms experienced by the employees with exposure to
17 the mixture of vapors found in OxyCide Products. It is undisputed that irritant and allergic effects can
18 occur with disinfectant chemical air concentrations at levels below OSHA or NIOSH exposure limits.²⁰

19 96. In its report, NIOSH cited studies that found occupational upper respiratory disease such
20 as allergic rhinitis and sinusitis is often more prevalent than occupational asthma and several studies
21 suggest that rhinosinusitis might precede or occur with lower respiratory symptoms and asthma.²¹
22 Additionally and importantly, upper respiratory involvement can result in suboptimal control of
23 asthma.²² Although the HP and PAA levels measured in the HHE were below the established
24 occupational exposure limits, NIOSH still observed health effects among employees because both HP

25 ¹⁷ HHE Report 2017-0114-3357 is available at <http://www.cdc.gov/niosh/hhe/reports/pdfs/2017-0114-3357.pdf> (last visited
26 December 12, 2019.)

27 ¹⁸ *Id.* at p. i.

28 ¹⁹ *Ibid.*

²⁰ *Id.* at p. 24.

²¹ *Id.* at p. 23.

²² *Ibid.*

and PAA are strong oxidants, the mixture of which potentially contributed to the eye and airway symptoms reported by staff at the relatively low levels of measured exposure.²³

97. NIOSH’s findings are consistent with Plaintiffs’ symptoms: they found that some employees using OxyCide reported “eye, upper respiratory, lower respiratory and skin symptoms that began during their shift.”²⁴ NIOSH found that “increased exposure to hydrogen peroxide, peracetic acid, or acetic acid vapors [OxyCide’s chemical compounds] was associated with increases in acute, cross-shift work related nasal irritation, eye irritation, shortness of breath, and wheeze symptoms reported by hospital staff” after adjusting for age, gender, smoking status, allergic status, other sensitizer or irritant containing cleaning products used during their shift, and stress.²⁵

98. These results, according to NIOSH, indicates a need to: (1) monitor eye, respiratory, and skin symptoms among hospital cleaning staff using any cleaning products containing OxyCide’s mixture, and (2) use a combination of engineering, administrative and personal protective equipment (“PPE”) controls to reduce employee exposure.²⁶

99. NIOSH’s primary approach to minimizing exposure risk to these harmful chemicals is to “eliminate hazardous materials or processes”, however the choice to use sporicidal disinfectants like OxyCide in specific areas of the hospital should “be prudent and reflect the level of risk of healthcare-acquired infection.”²⁷ In the absence of elimination, NIOSH recommends engineering controls to reduce employees’ exposures by lowering air concentrations with increased ventilation or by placing a barrier between the hazard and the employee, and such controls *should not* task the employee with primary responsibility for implementation.²⁸

100. In addition to engineering controls, NIOSH recommends that the employers implement a comprehensive system for reporting and tracking workplace injuries and illnesses that includes reports of near misses, minor injuries and illnesses, and employee safety concerns.²⁹ NIOSH believes such

²³ *Ibid.*

²⁴ *Id.* at p. ii.

²⁵ *Id.* at pp. ii-iii.

²⁶ *Id.* at p. 25.

²⁷ *Ibid.*

²⁸ *Ibid.*

²⁹ *Id.* at p. iii.

information should be reviewed by the Safety Officer on a regular basis to identify hazards, implement risk-reduction strategies, and prevent significant injuries and illnesses.³⁰

101. What NIOSH strongly recommends is NOT placing the burden of safety precautions on the employee when using OxyCide. NIOSH warns that “personal protective equipment is the least effective means for controlling hazardous exposures.”³¹ Rather, personal protective equipment should not be used until effective engineering and administrative controls are in place.³² In fact, NIOSH observed some EVS staff using surgical masks or the N95 respirator mask for the purpose of respiratory protection while dispensing or working with the Products.³³ However, NIOSH warns “these types of masks do not provide adequate, validated respiratory protection while working with products that release gases or chemical vapors.”³⁴ Specifically, the N95’s effectiveness at mitigating worker exposure to the organic vapors contained in OxyCide has not been validated and therefore should not be relied upon as a means of airway/respiratory protection.³⁵

H. Plaintiff Leigh Hoerner’s Tragic Experience Illustrates a Preventable Risk Caused by Defendants’ Failure to Implement Safeguards

102. On information and belief, Hoag Defendants, and each of them, were on notice of serious health risks and defects in their OxyCide Cleaning Product line shortly after its introduction. Had Defendants implemented readily available engineering and administrative safeguards and adequate warnings, Plaintiff Leigh Hoerner would not have endured serious and permanent injuries.

103. Defendants, and each of them, misrepresented the safety and soundness of the OxyCide Cleaning Product for use in institutions, such as healthcare settings.

104. Defendants, and each of them, failed to provide adequate engineering and administrative controls and/or adequately warn healthcare professionals and the general public within the vicinity of the OxyCide Cleaning Product’s use to wear necessary protective garments and masks, or to clean with the Product only in a well-ventilated area.

³⁰ *Ibid.*

³¹ *Id.* at p. 27

³² *Ibid.*

³³ *Id.* at p. 24.

³⁴ *Ibid.*

³⁵ *Ibid.*

1 105. The New Jersey Department of Health and Senior Services reported that PAA
2 (Peroxyacetic Acid), the active ingredient in OxyCide Cleaning Products, “is a HIGHLY CORROSIVE
3 CHEMICAL and contact can severely irritate and burn the skin and eyes leading to eye damage.
4 Breathing Peroxyacetic Acid can irritate the nose and throat. Breathing Peroxyacetic Acid can irritate
5 the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in
6 the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.”³⁶

7 106. Ecolab’s OxyCide Safety Data Sheet states that when the product is as sold, inhalation is
8 “[t]oxic if inhaled. May cause nose, throat, and lung irritation.”

9 107. Had Defendants, and each of them, provided adequate engineering and administrative
10 safeguards and warnings, Plaintiff Leigh Hoerner would have undertaken necessary precautions when
11 around OxyCide Cleaning Products to protect herself from its hazardous chemicals.

12 108. Defendants also failed to reasonably analyze the occupational exposure limits for PAA
13 despite knowing or reasonably knowing hospital workers nationwide were experiencing serious
14 respiratory, asthma, eye and skin complications as a result of the OxyCide Cleaning Products. Instead,
15 Defendants were content with stating that no special protective equipment is required to protect users
16 from diluted OxyCide Cleaner, as long as their products were being sold on the market and met OSHA
17 or NIOSH exposure limits.

18 109. Ecolab’s Safety Data Sheet only states the short-term exposure limit for PAA is at 0.4
19 parts per million. Defendants failed to investigate safety concerns regarding their OxyCide Cleaning
20 Products and possible long-term exposure complications even after complaints of harmful effects
21 suffered by employees from the use of the OxyCide Cleaning Products.

22 110. Further, PAA monitoring systems are readily available on the market and provide
23 immediate indication of PAA concentrations in the work area, so that workers can protect themselves
24 from acute and chronic exposure to PAA. Continuous monitoring of PAA can help protect employees
25 from the acute and chronic health affects by reporting the toxic concentrations in real time and providing
26 alarms for proactive protection.

27
28 ³⁶ HAZARDOUS SUBSTANCE FACT SHEET, PEROXYACETIC ACID, NEW JERSEY DEPARTMENT OF HEALTH & SENIOR SERVICES
(Mar. 1998, Rev. Oct. 2004), <http://nj.gov/health/eoh/rtkweb/documents/fs/1482.pdf>.

1 111. A continuous monitoring system, adequate ventilation, along with a comprehensive
2 education and reporting program and safe work practices are quick methods to assure worker safety and
3 maximize productivity.

4 112. Defendants failed to recommend and/or require accurate PAA monitoring systems to
5 ensure consumer and user safety to prevent acute or chronic exposure to hazardous chemicals from their
6 defective OxyCide Cleaning Products. Had Defendants acted reasonably to safeguard their employees,
7 and/or the general public's health and offer a solution to ensure safe PAA levels, Plaintiff Leigh Horner
8 would not have endured serious and permanent injuries. A PAA monitor would have necessarily
9 provided accurate and advanced warnings of any defective OxyCide Cleaning Products. Had
10 Defendants provided adequate product warnings or required PAA monitoring systems and disclosed the
11 need for engineering and administrative safeguards, Plaintiff Leigh Hoerner would have had limited
12 hazardous OxyCide exposure and advanced warning to leave the hazardous area in the absence of such
13 safeguards.

14 **I. Defendants' Misrepresentations Aggravated Plaintiff Leigh Hoerner's Injuries**
15 **Causing Serious and Permanent Damage**

16 113. Defendants made material misrepresentations, fraudulently concealed information, and
17 intentionally omitted material information to healthcare professionals, Plaintiff Leigh Hoerner,
18 government officials, and/or the general public, aggravating Plaintiff Leigh Hoerner's injuries causing
19 serious and permanent damage.

20 114. On multiple occasions, Plaintiff Leigh Hoerner complained to Hoag Defendants,
21 including complaining to their supervisors about their health and respiratory issues, but Hoag
22 Defendants took no action and continued to use the OxyCide Cleaning Products.

23 115. In fact, Hoag Defendants had repeatedly told Ms. Hoerner and other employees that
24 OxyCide Cleaning Products were safe despite knowledge to the contrary.

25 116. Plaintiff Leigh Hoerner would not have suffered such serious injuries had Defendants
26 revealed necessary information regarding the hazardous OxyCide Cleaning Products, taken necessary
27 precautions, and ceased use of OxyCide Cleaning Products following serious health related complaints.
28

V

CLASS ACTION ALLEGATIONS

117. Plaintiff brings this action to seek equitable non-monetary relief as a class action pursuant to Code of Civil Procedure section 382, on behalf of herself and the following Class:

All persons who were employed at Hoag hospitals in the state of California as EVS workers and/or nursing staff whose job duties included working with OxyCide from January 1, 2014 to the present.

118. Plaintiff also brings a claim for fraudulent concealment of injury and fraudulent business practices on behalf of herself and the following Subclass:

All Class Members who filed internal complaints or made reports of illness or injury relating to the use of OxyCide from January 1, 2014 to the present.

119. Plaintiff, and those similarly situated as described in the preceding paragraphs, may be collectively referred to herein as the "Class." Excluded from the Class are Defendants, its affiliates, officers and directors, and the Judge(s) assigned to this case. Plaintiff reserves the right to modify, change, or expand the Class definitions based on discovery and further investigation.

120. **Numerosity:** Upon information and belief, the Class is so numerous that joinder of all members is impracticable. While the exact number and identities of individual members of the Class are unknown at this time, such information being in the sole possession of Defendants and obtainable by Plaintiff only through the discovery process, Plaintiff believes, and on that basis allege, that thousands of Class members have been exposed to OxyCide Cleaning Products throughout the State of California. Because the class members may be identified through business records regularly maintained by Defendants and its agents, the number and identities of class members can be ascertained. Members of the class can be notified of the pendency of this action by mail and supplemented by published notice, if necessary;

121. **Existence and Predominance of Common Questions of Fact and Law:** Common questions of law and fact exist as to all members of the Class. These questions predominate over the

questions affecting individual class members. These common legal and factual questions include, but are not limited to, whether:

122. Whether Defendants exposed its workers to a harmful chemical by requiring that they use OxyCide to clean patient areas and nurses' stations;

123. Whether Defendants failed to provide and maintain a safe and healthful workplace for its workers by exposing them to OxyCide;

124. Whether Defendant failed to provide its workers with proper personal protective equipment, environmental and administrative controls based on the hazards associated with OxyCide;

125. Whether Hoag policies required its workers to continue to use OxyCide, even after Hoag became aware of the hazards and harm this product was causing;

126. Whether Defendants concealed the hazardous nature of OxyCide from its workers;

127. Whether Defendants concealed the fact that OxyCide had caused actual injuries or illnesses to its workers and exacerbated those injuries or illnesses by telling them OxyCide was safe for use;

128. Whether Defendants' conduct violates title 8 of the California Code of Regulations and the Labor Code;

129. Whether Defendants' conduct violations section 17200 of the Business and Professions Code;

130. Whether Defendants' conduct otherwise violates California law;

131. Whether, as a result of Defendants' misconduct, Plaintiff is entitled to equitable relief, penalties, or other damages and relief, and, if so, the amount and nature of such relief.

132. **Typicality:** All of Plaintiff's claims are typical of the claims of the Class. Plaintiff has no interest antagonistic to those of the Class and are not subject to any unique defenses.

133. **Adequacy:** Plaintiff is an adequate representative because she will fairly and adequately represent and protect the interest of the Class and her interests do not conflict with the interests of the Class that she seeks to represent. She has retained counsel competent and highly experienced in complex class action litigation, and they intend to prosecute this action vigorously. There are no

1 material conflicts between the claims of the representative Plaintiff and the class members that would
2 make class certification inappropriate.

3 134. **Predominance and Superiority**: This suit may be maintained as a class action because
4 questions of law and fact common to the class predominate over the questions affecting only individual
5 members of the class and a class action is superior to other available means for the fair and efficient
6 adjudication of this dispute. Further, it would be virtually impossible for class members to individually
7 redress effectively the wrongs done to them. Even if class members themselves could afford such
8 individual litigation, the court system could not. In addition, individualized litigation increases the delay
9 and expense to all parties and to the court system resulting from complex legal and factual issues of the
10 case. Individualized litigation also presents a potential for inconsistent or contradictory judgments. By
11 contrast, the class action device presents far fewer management difficulties; allows the hearing of claims
12 which might otherwise go unaddressed because of the relative expense of bringing individual lawsuits;
13 and provides the benefits of single adjudication, economies of scale, and comprehensive supervision by
14 a single court. Upon information and belief, members of the Class can be readily identified and notified
15 based on, *inter alia*, Defendants business records, employee records, and database of complaints.

16 135. Defendants has acted, and refused to act, on grounds generally applicable to the Class,
17 thereby making appropriate final equitable relief with respect to the Class as a whole.

18 VI

19 CAUSES OF ACTION (on behalf of Plaintiff and the Class)

20 FIRST CAUSE OF ACTION

21 Private Attorneys General Act Civil Penalties

22 (Labor Code § 2699(f))

23 136. Plaintiff incorporates by reference each preceding and succeeding paragraph as though
24 fully set forth at length herein.

25 137. Plaintiff brings this cause of action on behalf of herself and the Class.

26 138. By the conduct described herein, Plaintiff alleges violations of provisions of Division 5 of
27 the Labor Code, including Labor Code sections 6302(b)(2) and 6409.1. Plaintiff further alleges
28 violations of the California Code of Regulations and title 8, sections 3362, 3382, 5141, and 5144.

1 139. Plaintiff has complied the requirements of Labor Code section 2699.3(b) and attach
2 herewith as Exhibit 1 and true and correct copy of their letter of November 12, 2020, providing the
3 Department of Industrial Relations and Defendants with written notice via certified mail of all violations
4 of the Labor Code Plaintiff alleges. The Department of Industrial Relations' Division of Occupational
5 Safety and Health has decline to inspect or investigate the claims alleged herein.

6 140. Pursuant to Labor Code section 2699, all civil penalties otherwise recoverable for
7 violations of the Labor Code which could be assessed and collected by the Labor and Workforce
8 Development Agency, or any of its departments, divisions, commissions, boards, agencies, or
9 employees, for a violation of the Labor Code, may be recovered through a civil action by an aggrieved
10 employee in an action brought on his or her own behalf or on behalf of others similarly situated.

11 141. As a result of Defendants' violations, Plaintiff and the Class are entitled to all civil
12 penalties available to the Labor Code, as well as attorneys' fees and costs as authorized by Labor Code
13 section 2699(g), and to such other and further relief as this Court may deem just and proper.

14 **SECOND CAUSE OF ACTION (on behalf of Plaintiff and the Subclass)**

15 **Fraudulent Concealment of Injury**

16 **(Labor Code § 3602(b)(2))**

17 142. Plaintiff incorporates by reference each preceding and succeeding paragraph as though
18 fully set forth at length herein.

19 143. Plaintiff brings this cause of action on behalf of herself and the Subclass only.

20 144. Defendants' staff members were injured or made ill by the use of OxyCide in the course
21 and scope of their employment with Hoag.

22 145. Hoag knew that staff members had suffered injuries or work-related illness by the use of
23 OxyCide in the course and scope of their employment.

24 146. Hoag concealed its knowledge of the fact that staff members, including one nurse who
25 had a near-fatal injury, had suffered injuries or work-related illness by the use of OxyCide in the course
26 and scope of their employment by informing them that OxyCide was safe to use and their injuries or
27 illness were non-industrial.
28

1 147. As a result of Defendants’ concealment, staff members’ injuries or illnesses were
2 exacerbated, causing further injury or illness.

3 148. As a consequence of the conduct alleged herein, Plaintiff and the Subclass are not limited
4 to the exclusive remedy of workers’ compensation.

5 149. As a direct and proximate result of Defendants’ violations, Plaintiff and the Subclass are
6 entitled to all damages according to proof, to punitive damages pursuant to Civil Code section
7 3294(c)(3), and to equitable and declaratory relief all in an amount and nature to be proven at trial.

8 **THIRD CAUSE OF ACTION (on behalf of Plaintiff and the Class)**

9 **Unlawful Business Practices**

10 **(Bus. & Prof. Code §§ 17200, *et seq.*)**

11 150. Plaintiff incorporates by reference each preceding and succeeding paragraph as though
12 fully set forth at length herein.

13 151. Plaintiff brings this cause of action on behalf of herself and the Class.

14 152. By engaging in the above-described unlawful business acts and practices, Hoag
15 committed one or more acts of unlawful conduct within the meaning of California’s Unfair Competition
16 Law, section 17200 of the Business & Professions Code (“UCL”). These acts and practices constitute a
17 continuing and ongoing unlawful business activity defined by the UCL, and justify the issuance of an
18 injunction, restitution, and other equitable relief pursuant to the UCL.

19 153. Hoag has unlawfully exposed staff members to a harmful chemical without instituting
20 proper controls of providing proper PPE and concealed its knowledge of injuries or illnesses caused by
21 this exposure in violation of, inter alia, the following code sections and regulations:

- 22 a. Labor Code section 6302(b)(2);
- 23 b. Labor Code section 6409.1;
- 24 c. California Code of Regulations, title 8, section 3362;
- 25 d. California Code of Regulations, title 8, section 3380;
- 26 e. California Code of Regulations, title 8, section 3382;
- 27 f. California Code of Regulations, title 8, section 5141; and
- 28 g. California Code of Regulations, title 8, section 5144.

1 154. Hoag’s conduct has required staff members to pay out of pocket and through insurance
2 for independent, non-Hoag medical treatment, despite the fact that Hoag, under California’s workers’
3 compensation laws, is required to provide treatment for industrial injuries and illnesses.

4 155. By and through its unlawful business practices and acts described herein, Hoag has
5 obtained valuable labor from staff members and have deprived them of valuable rights and benefits
6 guaranteed by law, all to their detriment.

7 156. Plaintiff seeks an order of this Court awarding restitution and injunctive relief and all
8 other relief allowed under the UCL, including interest and attorneys’ fees pursuant to, inter alia, Code of
9 Civil Procedure section 1021.5, and to such other further relief as this Court may deem just and proper.

10 **FOURTH CAUSE OF ACTION (on behalf of Plaintiffs and the Class)**

11 **Unlawful Business Practices**

12 **(Bus. & Prof. Code §§ 17200, *et seq.*)**

13 157. Plaintiff incorporates by reference each preceding and succeeding paragraph as though
14 fully set forth at length herein.

15 158. Plaintiff brings this cause of action on behalf of herself and the Class.

16 159. By engaging in the above-described unlawful business acts and practices, Hoag
17 committed one or more acts of unfair competition within the meaning of California’s Unfair
18 Competition Law, section 17200 of the Business & Professions Code (“UCL”). These acts and practices
19 constitute a continuing and ongoing unfair business activity defined by the UCL, and justify the issuance
20 of an injunction, restitution, and other equitable relief pursuant to the UCL.

21 160. Hoag’s conduct has required staff workers to pay out of pocket and through insurance for
22 independent, non-Hoag medical treatment, despite the fact that Hoag, under California’s workers’
23 compensation laws, is required to provide treatment for industrial injuries and illnesses.

24 161. The conduct of Hoag is contrary to the public welfare since it transgresses civil statutes
25 of the State of California designed to protect workers from exploitation and harm.

26 162. Hoag’s conduct described above was unfair within the meaning of the UCL because it
27 was against established public policy and has been pursued to attain an unjustified monetary advantage
28

1 for Hoag by creating personal disadvantage and hardship to their employees. As such, Hoag's business
2 practices and acts have been immoral, unethical, oppressive, and unscrupulous.

3 163. The injury to staff workers as a result of Hoag's conduct is far greater than any alleged
4 countervailing benefit.

5 164. Plaintiff seeks an order of this Court awarding restitution and injunctive relief and all
6 other relief allowed under the UCL, including interest and attorneys' fees pursuant to, inter alia, Code of
7 Civil Procedure section 1021.5, and to such other further relief as this Court may deem just and proper.

8 **FIFTH CAUSE OF ACTION (on behalf of Plaintiffs and the Subclass)**

9 **Fraudulent Business Practices**

10 **(Bus. & Prof. Code §§ 17200, *et seq.*)**

11 165. Plaintiff incorporates by reference each preceding and succeeding paragraphs as though
12 fully set forth at length herein.

13 166. Plaintiff brings this cause of action on behalf of herself and the Subclass only.

14 167. Hoag made the representations set forth above, including specific representations to EVS
15 and nursing staff that OxyCide was safe for use to clean the hospital surfaces; that OxyCide use and
16 exposure was not likely to cause staff members irritation, injury, or illness; and that OxyCide was not
17 the cause of EVS and nursing staff employees' irritation, injuries, or illnesses. These representations
18 were made on an ongoing basis from at least 2014 to the present time.

19 168. The representation by Hoag as set forth above were, in fact, false. Hoag, at the time it
20 made the representations set forth above, knew them to be false and intended to, and did, induce
21 Plaintiff's reliance upon these false representations.

22 169. Plaintiff reasonably relied upon the aforementioned statements and representations and
23 continued to use OxyCide in spite of the fact that it caused them harm. Plaintiff's reliance was a
24 substantial factor in causing EVS and nursing staff members' harm.

25 170. As a direct, proximate and foreseeable result of Hoag's misrepresentations and conduct,
26 Plaintiff has suffered, and will continue to suffer, economic injuries.

171. Plaintiff seeks an order of this Court awarding restitution and injunctive relief and all other relief allowed under the UCL, including interest and attorneys' fees pursuant to, inter alia, Code of Civil Procedure section 1021.5, and to such other further relief as this Court may deem just and proper.

VII

PRAYER FOR RELIEF

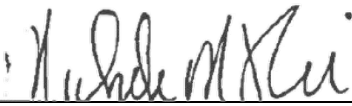
WHEREFORE, Plaintiff Leigh Hoerner, on behalf of herself and the Class, respectfully requests that this Court:

- A. Certify the proposed Class and Subclass pursuant to Code of Civil Procedure section 382;
- B. Order appointing Plaintiff Leigh Hoerner and her counsel to represent the Class and Subclass;
- C. For an order enjoining Hoag, its affiliates, successors, transferees, assignees, and the officers, directors, partners, agents, and employees thereof, and all other persons action or claiming to act on behalf or in concert with them, from requiring EVS and nursing staff to use OxyCide when cleaning patient and hospital areas unless they also provide adequate administrative controls, engineering controls, or personal protective equipment, including but not limited to reducing or eliminating the product's use; requiring sealing lids for all of the product's containers; providing extended cuff nitrile gloves or rubber gloves to all users of the product; providing goggles or a face shield to all users of the product; ensuring that all heating, ventilation, and air-conditioning systems in areas where the product is dispenses or applied meet ventilation and airflow levels sufficient to reduce the concentration to non-hazardous levels; providing workplace accommodations to employees who develop work-related symptoms after exposure to the product; providing all EVS and nursing staff members data regarding all reports of irritation, injuries, and illnesses relating to OxyCide by other Hoag EVS and nursing staff members, while maintaining the anonymity of those reporting; and relocating EVS and nursing staff members who develop work-related symptoms to areas of the hospital where the product is not used or is used less frequently;

- 1 D. For actual and compensatory damages according to proof pursuant of the Labor Code and
2 all other applicable laws and regulations;
3 E. For restitution to the extent permitted by applicable law;
4 F. For civil and statutory penalties available under applicable law, including Labor Code
5 section 2699(f);
6 G. For punitive damages pursuant to Civil Code section 3294(c)(3);
7 H. For pre-judgment and post-judgment interest;
8 I. For an award of attorneys' fees, costs, and expenses as authorized by applicable law; and
9 J. For such other and further relief as this Court may deem just and proper.

10
11 DATED: January 11, 2021

MCCUNE ▪ WRIGHT ▪ AREVALO, LLP

12
13
14 By: 

Michele M. Vercoski
Tuan Q. Nguyen
Attorneys for Plaintiff

1 **JURY DEMAND**

2 Plaintiff Leigh Hoerner, on behalf of herself and the Class, demands a trial by jury on all issues
3 so triable.

4 DATED: January 11, 2021

MCCUNE ▪ WRIGHT ▪ AREVALO, LLP

5
6 By: 
7 Michele M. Vercoski
8 Tuan Q. Nguyen
9 Attorneys for Plaintiff
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EXHIBIT “1”



November 12, 2020

Via Certified Class Mail

Department of Industrial Relations
Accounting Unit
455 Golden Gate Avenue, 10th Floor
San Francisco, CA 94102

HOAG MEMORIAL HOSPITAL PRESBYTARIAN
One Hoag Drive
Newport Beach, CA 92663

HOAG ORTHOPEDIC INSTITUTE
16250 Sand Canyon Ave
Irvine, CA 92618

PROVIDENCE HEALTH & SERVICES
c/o Business Filings Inc.
711 Capital Way S Suite 204
Olympia, WA 98501

Re: Notice of Labor Code Private Attorneys General Act

To Whom It May Concern:

This notice is submitted pursuant to the Private Attorneys General Act (“PAGA”) of 2004 regarding allegations of past and ongoing violations of the California Labor Code. This letter identifies the specific provisions that have been and continue to be violated and the facts and theories that support these allegations.

A nurse staff member, Leigh Hoerner, alleges violations taking place at Hoag Memorial Hospital Presbyterian (“Hoag”) for Labor Code provisions § 6302(b)(2) and § 6409.1. She further alleges violations of the California Code of Regulations, Title 8, Sections 3380, 3383, 5141, 5144.

The above-named individual is employed by Hoag at the Hoag Orthopedic Institute (“HOI”) facility located in Irvine, California. All of these allegations relate to Hoag’s use of the OxyCide Daily Disinfectant Cleaner (“OxyCide”). Recent testing of certain chemical compounds in OxyCide revealed the presence of peracetic acid (also known as peroxyacetic acid or “PAA”), a known asthmagin (asthma causing substance) and respiratory sensitizer (causing immune responses and adverse respiratory effects). Yet, in April 2014, Hoag posted an article on its website stating that “Although OxyCide does have a distinct odor, it is safe for staff and patients

when used as directed.” Hoag was on notice of the serious health risks and defects in OxyCide but misrepresented the safety and soundness of the product. Many Hoag employees, including Ms. Hoerner, have suffered, and continue to suffer, health and respiratory issues as a result of Hoag’s continuous use of OxyCide.

In addition, in March 2016, the Occupational Safety and Health Administration (“OSHA”) conducted an investigation at a different Southern California medical hospital that also used OxyCide as a disinfectant and interviewed several hospital employees regarding OxyCide exposure. Numerous employees reported severe symptoms associated with OxyCide, including respiratory problems and irritations. (See enclosure.) In 2017, The National Institute of Occupational Safety and Health (“NIOSH”) conducted an investigation into OxyCide use at a California medical hospital and issued a report with recommendations to protect hospital employees and patients. (See enclosure.)

Hoag failed to heed these recommendations, including engineering controls, administrative controls, and personal protective equipment and continued to use OxyCide products throughout its facilities. As a result, numerous Hoag employees continue to suffer serious and adverse reactions to OxyCide.

Further, Hoag knowingly and willfully required Ms. Horner and other aggrieved employees to perform their work in an unsafe manner and under hazardous conditions.

Labor Code § 6302(b)(2):

Employees at Hoag were injured and/or made ill in the scope of their employment by the use of OxyCide at the hospital facility. Hoag informed employees that OxyCide was safe to use, however, the injuries or illnesses exacerbated upon further exposure to the chemical product.

Labor Code § 6409.1:

Labor Code § 6409.1, requires employers to file with the Department of Industrial Relations complete reports of any employee’s report of abnormal condition caused by inhalation or direct contact with chemicals. Hoag hospital has received numerous complaints from employees regarding their negative health experiences with OxyCide, however, Hoag failed to report these complaints to the Department of Industrial Relations.

In addition to the above-referenced Labor Code Sections, Hoag violated the following statutes and regulations:

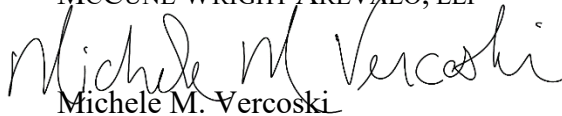
- California Code of Regulations, Title 8, § 3380: requires personal protective equipment if hazards are present or likely to be present in the workplace. Hoag has not provided the proper personal protective equipment to reduce or eliminate the harm from OxyCide.

- California Code of Regulations, Title 8, § 3382: requires suitable safeguards if there is a risk of eye injuries from a hazardous substance. Hoag employees have suffered numerous eye injuries as a result of Hoag's lack of suitable safeguards.
- California Code of Regulations, Title 8, § 5141: requires the prevention of exposure to harmful exposure through engineering controls, administrative controls, or the use of personal protective equipment. Hoag has failed to provide reasonable engineering controls, administrative controls, or personal protective equipment to reduce or eliminate the harm caused to employees by OxyCide.
- California Code of Regulations, Title 8, § 5144: requires the prevention of exposure to atmospheric contamination through engineering control measures or personal protective equipment. Hoag lacks the proper ventilation system and personal protective equipment to reduce or eliminate the harm OxyCide causes.

Plaintiff intends to seek all applicable civil penalties related to the foregoing violations. Thank you for your attention to this matter.

Respectfully submitted,

MCCUNE WRIGHT AREVALO, LLP



Michele M. Vercoski

Enclosures:
April 2014 Hoag Article re: OxyCide
March 2016 OSHA Report
September 2019 NIOSH Report

Important Changes to C-diff Policy

Clostridium difficile (C-diff) infections are at historically high levels in our country and in our community. Protecting our patients and preventing the spread of C-diff in the hospital setting requires specific environmental interventions.

In order to improve environmental outcomes for better patient care in our facilities, Hoag has implemented the mandatory usage of OxyCide Daily Disinfectant Cleaner, an EPA approved cleaner that is proven to reduce the spread of C-diff.

The use of OxyCide at Hoag has been reviewed and approved by the multidisciplinary Infection Prevention Committee. OxyCide, which has a vinegar-like smell, is currently being implemented in both hospitals. It delivers broad spectrum disinfection efficacy in five minutes and daily use of it improves environmental outcomes. OxyCide has replaced four other products used by EVS, reducing the different chemicals used in environmental disinfection at Hoag.

Although OxyCide does have a distinct odor, it is safe for staff and patients when used as directed. Hoag employees using OxyCide were monitored by an external certified company and analysis of the testing completed in an industrial hygiene lab. The lab concluded that exposure to the two major ingredients in OxyCide (hydrogen peroxide and acetic acid) were well below both Federal OSHA and CalOSHA permissible exposure limits and that no further measures are needed to protect workers.

Hoag is committed to providing our patients, visitors and staff with the cleanest environment possible. By using the highest standards of cleaning excellence, we help ensure that Hoag lives up to its reputation for exceptional patient care.

If you have any questions about the use of this new product, please contact Rose Provost, Manager, Environmental Services and Support Services at ext. 46257.

[Back to Top](#)

Accident Report

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH☐ Fatality

Date of Death

MOD	Date 2-22-2016	1. Reporting ID R D 9506 3 3	2. Previous Activity? If Yes, Enter Type: Number: ☐ Yes ☐ No	3. Event Number (Identifies this Report) 1067634
4. a ☐ Change?	b. Establishment Name KAISER PERMANENTE			5. Employer ID (State's option)
6. a ☐ Change?	b. Site Location (Street, City, State, Zip) 9961 SIERRA AVE FONTANA, CA. 92335			7. City Code 1305
9. Mailing Address (If different) (Street, City, State, Zip)				8. County Code 071
10. Type of Business HOSPITAL				11. Primary SIC
13. Ownership (Mark "x" in one box) a. ☒ Private Sector b. ☐ Local Government c. ☐ State Government d. ☐ Federal Government				12. No of Employees 4000
Receipt Information	14. Reported By CHRISTOPHER TRICE			15. Date 2-22-16
17. Job Title EH&S DIRECTOR			16. Time 9:14 ☒ AM ☐ PM	18. Telephone Number 909-645-9128
Employer Representative	19. Group Name(s) UNAT			
Site Contact	20. Name and Location MICHELLE OCON			22. Telephone Number 909-302-9083
21. Job Title CLINICAL DIRECTOR				
Classification	23. (Mark "X" in one box)	a. ☐ Fatality	b. ☐ Catastrophe	c. ☐ Non-Fatality/Catastrophe Reported by Professional or Media
d. ☒ Non-Fatality/Catastrophe Reported by Employer or Other Party				
Event Description	24. Event Date 2-15-16	25. Event Time 1:30 ☐ AM ☒ PM	26. Number of Fatalities	27. Number of Hospitalized Injuries 1
28. Number of Non-hospitalized Injuries				
29. Number Unaccounted for				
30. Type of Event (e.g. Fall from scaffold) INHALATION OF BLEACH OR OXIDE				
Received by:	Name/Address of Injured JENNIFER SALMER		Age UNKNOWN	Occupation NURSE
	Injury INHALATION			
CSHO ID Y 3063	Accident Description (Specify Mechanism/Condition/Hazardous Substance): THE INJURED WAS DOWN THE HALL FROM A ROOM BEING CLEANED WITH BLEACH OR OXIDE FELT TIGHTNESS IN HER CHEST AND WAS ADMITTED WENT TO ICU ON 2-16-16 - 2-18-16 AND WAS DISCHARGED FROM THE HOSPITAL ON 2-19-2016			
Location Where Injured Employee was Moved to: KAISER PERMANENTE				
Other Law Enforcement Agencies Present at Site:				
Workers' Compensation Insurance Carrier (Name & Address): (For Fatalities Only)				
Action	32. Inspection Planned? ☒ Yes ☐ No	If No Reason:	33. Supervisor(s) Assigned a. b.	34. CSE/IH Assigned a. T6035 b.
35. Optional Information				
Type	ID	Value	Type	ID
Value				
Comments: NAICS# 621493				36. Total Entries
37. District Manager: [Signature]				
San Bernardino District Office			Date: 3/1/16	Telephone Number ()

STATE OF CALIFORNIA DIVISION OF OCCUPATIONAL SAFETY AND HEALTH																																					
1. CSE/IH T6035		2. Rpt No. 019		3. FY 16		4. Insp. No.		5. Region 3 District 3																													
6. Employer Legal Entity Name																																					
dba:						E-mail address:																															
7. Management Officials Contacted ("P" Denotes Phone Contact Only)																																					
Name		Title		Opening		Present During Inspection		Closing																													
CHRISTOPHER TRICE		EH&S Director		☒		☐		☐																													
Michelle Ocan		Chemical Director		☒		☐		☐																													
8. Union Representatives Contacted																																					
Name		Title		Labor Union/Phone		Opening		Present During Inspection Closing																													
						☐		☐																													
						☐		☐																													
9. Dates: Open 3/15/16 Subsequent Visits: _____ Close: _____																																					
10. Small Employer Relief ☐ Yes ☐ No Ex-MOD: _____ Documentation ☐ Yes ☐ No Insurer: SELF																																					
11. <u>Opening Conference</u>			15. <u>IIPP Program Review</u>			19. <u>Evaluation of Safety & Health Program</u>																															
☒ Show ID ☒ Explain Purpose ☒ Cal/OSHA Program ☒ Employee Rights ☒ Inspection Procedure ☒ Cal/OSHA Poster ☒ Workers' Comp. Insurance ☒ Log of Injuries/Illnesses ☒ Permit/Variance ☒ PPE ☒ Consent to Inspect			☐ Written ☐ Effective ☐ Previously reviewed Date: _____ ☐ Model Program Used a. (Required) Program Elements ☐ Responsible Person ☐ Sanctions/Enforcement ☐ Communication ☐ Inspections ☐ Investigation Procedures ☐ Correction Procedures ☐ Training b. Recordkeeping ☐ Inspection Records ☐ Training Records			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Effective</th> <th>Average</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Safety Responsibility</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Employee Participation</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Training</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>PPE</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Housekeeping</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Fist Aid</td> <td>☐</td> <td>☐</td> <td>☐</td> </tr> </tbody> </table>					Effective	Average	Poor	Safety Responsibility	☐	☐	☐	Employee Participation	☐	☐	☐	Training	☐	☐	☐	PPE	☐	☐	☐	Housekeeping	☐	☐	☐	Fist Aid	☐	☐	☐
	Effective	Average	Poor																																		
Safety Responsibility	☐	☐	☐																																		
Employee Participation	☐	☐	☐																																		
Training	☐	☐	☐																																		
PPE	☐	☐	☐																																		
Housekeeping	☐	☐	☐																																		
Fist Aid	☐	☐	☐																																		
12. <u>Exit Conference</u>			16. <u>Hazard Communication Program</u>			20. <u>Adjustment Factors In %</u>																															
Date: _____ ☐ Discuss Violations Observed ☐ Closing Date Anticipated ☐ Corrective Action			☐ Written Program ☐ Training ☐ Labeling ☐ Storage ☐ MSDS Available			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Good Faith *</th> <th>Size</th> <th>History *</th> </tr> </thead> <tbody> <tr> <td>☐ 30 Good</td> <td>☐ 40 1-10</td> <td>☐ 10 Good</td> </tr> <tr> <td>☐ 15 Average</td> <td>☐ 30 11-25</td> <td>☐ 5 Fair</td> </tr> <tr> <td>☐ 0 Poor</td> <td>☐ 20 26-60</td> <td>☐ 0 Poor</td> </tr> <tr> <td></td> <td>☐ 10 61-100</td> <td></td> </tr> <tr> <td></td> <td>☐ 0 Over 100</td> <td></td> </tr> </tbody> </table> *Does not apply to penalties for accident related serious, willful, repeat, or serious violations with lack of an operative Injury & Illness Prevention Program.				Good Faith *	Size	History *	☐ 30 Good	☐ 40 1-10	☐ 10 Good	☐ 15 Average	☐ 30 11-25	☐ 5 Fair	☐ 0 Poor	☐ 20 26-60	☐ 0 Poor		☐ 10 61-100			☐ 0 Over 100											
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	☐ 10 61-100																																				
	☐ 0 Over 100																																				
13. <u>Closing Conference</u>			17. <u>Other Requirements</u>			21. <u>Entity Information:</u>																															
☐ Employer ☐ Employees ☐ Violations ☐ Citations ☐ Abatement/Consultation ☐ Penalties ☐ Posting ☐ Informal Conference ☐ Appeal ☐ Follow-up ☐ Variance ☐ Discrimination			☐ Cal/OSHA Poster Posted ☐ Code of Safe Practices ☐ Tailgate Meetings ☐ First Aid Kit ☐ Trained Fist Aid Provider ☐ Log 300 Posted in February ☐ Emergency Action Plan ☐ Fire Prevention Plan ☐ Respiratory Protection Program ☐ Energy Control Procedure ☐ Confined Space Program ☐ Hearing Conservation Program ☐ Exposure Control Plan ☐ Heat Illness Prevention Program			Corporation Partnership Sole Owner LLC (Circle one) Send Mail To: _____ Business Address: _____ Bus. Phone No. _____ Bus. Fax No. _____ Main Office Address: _____ Main Phone No. _____ Main Fax No. _____ Owner or Officer of Corporation: _____ Location of Records: Business License # _____ Exp. Date _____ CSLB License # _____ Exp. Date _____ Garment Registration: _____ Exp. Date _____ FEIN or State ER Tax ID #: _____ FLC License #: _____ Exp. Date _____ Other Lic/Cert Name _____ Other Lic/Cert # _____ Exp. Date _____ Other Lic/Cert Name _____ Other Lic/Cert # _____ Exp. Date _____																															
14. <u>Recommend Follow-up Inspection</u> ☐			18. <u>Cross Jurisdictional Referral</u>			NOTES:																															
REASON: _____ _____ _____ _____ _____			Y N ☐ ☐ Proof of Worker Comp. Insurance ☐ ☐ Industrial Welfare Comm. Poster Posted																																		

22. Employees/Persons Interviewed During Inspection (Enter name, title, home address, and phone number below.)

a. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____	b. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____
c. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____	d. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____
e. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____	f. Name/Title: _____ Address: _____ Phone (home): _____ Phone (cell): _____

23. Multi-Employer Worksites ☐ Yes ☐ No If yes, obtain the following information on each employer involved:

a. Employer: _____ Address: _____ Phone (bus.): _____ Phone (cell): _____ Activities: _____ ☐ Contract Governing Employer's Work at the Site ☐ Awareness of Violation ☐ Violation Foreseeable to Employer ☐ Steps Taken by Employer to Protect Employees If yes, list specific steps: _____ Employer Category (Check all that apply) ☐ Exposing ☐ Creating ☐ Controlling ☐ Correcting	b. Employer: _____ Address: _____ Phone (bus.): _____ Phone (cell): _____ Activities: _____ ☐ Contract Governing Employer's Work at the Site ☐ Awareness of Violation ☐ Violation Foreseeable to Employer ☐ Steps Taken by Employer to Protect Employees If yes, list specific steps: _____ Employer Category (Check all that apply) ☐ Exposing ☐ Creating ☐ Controlling ☐ Correcting
c. Employer: _____ Address: _____ Phone (bus.): _____ Phone (cell): _____ Activities: _____ ☐ Contract Governing Employer's Work at the Site ☐ Awareness of Violation ☐ Violation Foreseeable to Employer ☐ Steps Taken by Employer to Protect Employees If yes, list specific steps: _____ Employer Category (Check all that apply) ☐ Exposing ☐ Creating ☐ Controlling ☐ Correcting	d. Employer: _____ Address: _____ Phone (bus.): _____ Phone (cell): _____ Activities: _____ ☐ Contract Governing Employer's Work at the Site ☐ Awareness of Violation ☐ Violation Foreseeable to Employer ☐ Steps Taken by Employer to Protect Employees If yes, list specific steps: _____ Employer Category (Check all that apply) ☐ Exposing ☐ Creating ☐ Controlling ☐ Correcting

24. Opening and Closing Conference Summary and Additional Comments:☐ Comprehensive☐ Partial

MIKE PERRY, INTERIM DIR OF ENV. SVCS. DEAN RICHARDSON, ASST DIR OF ENV. SVCS. MARY ANN FONSECA, ASST CLINICAL DIR, EP MICHELLE O'CONNOR, CLINICAL DIRECTOR NANCY McCLELLAND RN, DIR ACCREDITATION + LICENSING CHRISTOPHER PRICE, DIR OF EH + J GABRIEL ALAMPARI RN, REGULATORY MAN, ACCREDITATION + LICENSING KRISTIN KERN, ASST CLINICAL DIR, EP (5 total, 2 day, 2 mid, 1 night)	CHRISTINE PETROVICH - WORKPLACE SAFETY MGR
---	--

25. Previous Citation History: ☐ Yes ☐ No If yes, attach citation history.**26. Publications Provided:**

☐ Guide to Cal/OSHA ☐ Cal/OSHA Poster ☐ Heat Illness Prevention ☐ Other: 1. _____
 2. _____ 3. _____ 4. _____ 5. _____

27. If additional sheets are necessary, check this box: ☐

Inspection Report

Mon Mar 14, 2016 23:10:36 PM

RID	CSHO ID	Supervisor ID	Inspection Number	Optional Report Number	Case Closed Date
0950633	T6035	B3728	1132148	019-16	

Establishment Name		Kaiser Foundation Hospitals		Doing Business As (DBA)		Kaiser Permanente	
Establishment Owner Name	Private Sector		Type of Business	Corporation	Primary NAICS		621493
Site Address	9961 Sierra Ave FONTANA, CA, 92335		Site Phone	(909)-427-7292	Extn	Site FAX	
Business Address	1 Kaiser Plaza OAKLAND, CA, 94612		Business Phone	(909)-427-7292		Business FAX	
Mailing Address	9961 Sierra Ave FONTANA, CA, 92335		E-mail			Mobile Phone	
Site Activity	Hospital		NAICS Inspected	621493		Days on Site	2
Federal EIN			DUNS		Temporary or Fixed Site?		Fixed Site
State Estab Id			DUNS plus4		CAGE Code		

Entry	10-MAR-2016		First Closing Conference		
Opening Conference	10-MAR-2016		Second Closing Conference		
Walkaround	10-MAR-2016		Exit		

Inspection Initiating Type	Accident			Secondary Type	
Other Initiating Type				Inspection Category	Health
Scope of Inspection	Partial			Reason No Inspection	
Sampling Performed?	N	SVEP	N	Expln. for No Insp.	
Federal Strategic Initiatives					
National Emphasis					
State Emphasis					
Local Emphasis					
Primary Emphasis					

Employed in Establishment	6000	Walkaround?	Y	Advance Notice?	N
Covered By Inspection	175	Interviewed?	Y	Flag for Follow-up	N
Controlled By Employer	150000	Union?	N	Reason for Follow-up	
Is this Company a current federal contractor?		N	Attempt made to capture Exec Order Info?		Y

Parent Company Legal Name		Parent Comp Trade Name/DBA	
Parent Company Address		Phone Number	Extn
TIN / EIN	DUNS		
CAGE Code	DUNS plus4		

Related Activity			
Activity Number	Activity Type	Satisfied	Establishment Name
1067634	FAT/CAT	Both Safety & Health	Kaiser Foundation Hospitals
1067839	Complaint	Both Safety & Health	Kaiser Permanente Medical Center

Related Inspections		
Inspection Number	Establishment Name	Related Inspection Type

Additional Codes			
Type	ID	Value	Description
S	14	Self	

Fatality/Catastrophe Report

Tue Mar 01, 2016 10:51:27 AM

RID	Office Name	Activity Number	Activity Type	Receipt Date	Receipt Time	Receipt Type	Received By
0950633	San Bernardino District Office	1067634	FAT/CAT	22-FEB-2016	09:14 AM	Phone	X3063

Establishment Name	Kaiser Permanente		Doing Business As (DBA)			
NAICS Inspected	621493		Primary NAICS		621493	
Site Address	9961 Sierra Avenue FONTANA, CA, 92335	Site Phone	(909)-427-7292		Site FAX	
Business Address	9961 Sierra Avenue FONTANA, CA, 92335	Business Phone	(909)-427-7292		Business FAX	
Mailing Address	9961 Sierra Avenue FONTANA, CA, 92335	Mgmt. Official	Christopher Trice	Mgmt. Official Phn.	(909)-645-9128	
Type of Business	Hospital	Type of Site Activity				
Number of Employees		Ownership	Private Sector			

Event Date	15-FEB-2016	Event Time	01:30 PM	Do Insp?	Y	Reason No Insp	
No. Hospitalized	1	No. Unaccounted	0	No. Fatalities	0	No. Non-Hospitalized	0
Classification	Accident	Employer Report Date	22-FEB-2016	Employer Report Time	09:14 AM		

Source Type	Source Name	Phone
Employer/Employer Representative	Christopher Trice	(909)-645-9128
Employer/Employer Representative	Michelle Ocon	(909)-302-9083

Incident Type	Inhalation of oxicide
Preliminary Description (Hazard Description and Location)	The injured was down the hall from a room being cleaned with oxicide felt tightness in her chest and was admitted went to ICU on 02/16/16 to 02/18/16, and was discharged from the hospital on 02/19/16.
National Emphasis	
Local Emphasis	
Federal Strategic Initiatives	

Additional Codes			
Type	ID	Value	Description

DEPARTMENT OF INDUSTRIAL RELATIONS

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

464 W. Fourth St., Suite 332, San Bernardino, CA 92401-1429

Tel: (909) 383-4321 Fax: (909) 383-6789

**DOCUMENT REQUEST SHEET**

EMPLOYER: KAISER FOUNDATION EMPLOYER CONTACT: NANCY McCLELLAND
 DATE: 3/10/2016 Postmark by DATE: 3/15/2016 RECEIVED BY: N. McClelland

As discussed during the inspection on 3/10/2016 it has been determined that copies of the following documents are required for review. Please provide the Cal/OSHA inspector with the required copies by the "postmarked date" noted above. If the copies are not provided by that date, it will be interpreted as an admission that the documents do not exist and possible Citations and Monetary Penalties could result.

Received On:

- ☐ Licenses & Permits: ☐ Business License ☐ State ER Tax ID No. ☐ CSLB ☐ Garment Reg. ☐ Farm Labor Contractor
- ☐ Facility Layout (i.e., floorplan, equipment map, etc.)
- ☒ Log of Work-Related Injuries and Illnesses (Cal/OSHA 300) for current and the previous 2 years.
- ☒ Injury and Illness Incident Report (Cal/OSHA 301) E1
- ☒ Employer's First Report of Injury (Form 5020) "
- ☒ Doctor's First Report of Injury (Form 5021) "
- ☒ Injury and Illness Prevention Program
- ☐ Code of Safe Practices
- ☐ Disciplinary Action Records (Safety & Health)
- ☒ Safety Inspection Records ED, part 3 prior to inspections
- ☒ Employer's Accident Investigation Report (including photos, witness statement, etc.) E1
- ☒ Employee Training Records E1, W1, W2
- ☐ Operator Certification Records
- ☐ Safety Meeting/Tailgate Meeting Records
- ☐ Heat Illness Prevention Plan
- ☐ First-Aid Kit Approval (Medical)
- ☐ Emergency Action Plan
- ☐ Fire Prevention Plan
- ☒ Hazard Communication Plan
- ☒ Material Safety Data Sheets (MSDS) Oxycide
- ☐ Respiratory Protection Program
- ☐ Hearing Conservation Program (Noise)
- ☐ Exposure Control Plan (Bloodborne Pathogens)
- ☐ Workplace Exposure Records/Monitoring Results
- ☐ Permits/Variations
- ☐ Maintenance Records of Equipment
- ☐ Equipment Manuals (operation, user, maintenance, etc.)
- ☐ Hazardous Energy Control Procedure (Lock-Out/Tag-Out)
- ☐ Hazardous Energy Control Procedure Inspection Records
- ☐ Contract Agreement
- ☒ Contact Information (name, title, address, phone #, etc.) E1
- ☒ Oxycide Label
- ☐
- ☐

3/15/16
3/15/16
3/15/16
3/15/16

3/10/2016

3/10/2016

If you require an extension of time in order to satisfy this request, please contact the Cal/OSHA inspector identified with your inspection at the phone number above before the deadline.

INSPECTION NO. _____ SE/IH ID. T6035 OPTIONAL REPORT NO. 019-16

DEPARTMENT OF INDUSTRIAL RELATIONS

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH

464 W. Fourth St., Suite 332, San Bernardino, CA 92401-1429

Tel: (909) 383-4321

Fax: (909) 383-6789



DOSH - San Bernardino District office

DOCUMENT REQUEST SHEETEMPLOYER: Kaiser FoundationEMPLOYER CONTACT: NANCY McCLELLANDDATE: 3/10/2016Postmark by DATE: 3/15/2016RECEIVED BY: N. McClelland

As discussed during the inspection on 3/10/2016 it has been determined that copies of the following documents are required for review. Please provide the Cal/OSHA inspector with the required copies by the "postmarked date" noted above. If the copies are not provided by that date, it will be interpreted as an admission that the documents do not exist and possible Citations and Monetary Penalties could result.

Received On:

- ☐ Licenses & Permits: ☐ Business License ☐ State ER Tax ID No. ☐ CSLB ☐ Garment Reg. ☐ Farm Labor Contractor
- ☐ Facility Layout (i.e., floorplan, equipment map, etc.)
- ☒ Log of Work-Related Injuries and Illnesses (Cal/OSHA 300) for current and the previous 2 years.
- ☒ Injury and Illness Incident Report (Cal/OSHA 301) E1
- ☒ Employer's First Report of Injury (Form 5020) #
- ☒ Doctor's First Report of Injury (Form 5021) #
- ☒ Injury and Illness Prevention Program Policy
- ☐ Code of Safe Practices
- ☐ Disciplinary Action Records (Safety & Health)
- ☒ Safety Inspection Records ED, part 3 prior to inspection
- ☒ Employer's Accident Investigation Report (including photos, witness statement, etc.) E1
- ☒ Employee Training Records E1, W1, W2
- ☐ Operator Certification Records
- ☐ Safety Meeting/Tailgate Meeting Records
- ☐ Heat Illness Prevention Plan
- ☐ First-Aid Kit Approval (Medical)
- ☐ Emergency Action Plan
- ☐ Fire Prevention Plan
- ☒ Hazard Communication Plan
- ☒ Material Safety Data Sheets (MSDS) OxyCide
- ☐ Respiratory Protection Program
- ☐ Hearing Conservation Program (Noise)
- ☐ Exposure Control Plan (Bloodborne Pathogens)
- ☐ Workplace Exposure Records/Monitoring Results
- ☐ Permits/Variations
- ☐ Maintenance Records of Equipment
- ☐ Equipment Manuals (operation, user, maintenance, etc.)
- ☐ Hazardous Energy Control Procedure (Lock-Out/Tag-Out)
- ☐ Hazardous Energy Control Procedure Inspection Records
- ☐ Contract Agreement
- ☒ Contact Information (name, title, address, phone #, etc.) E1
- ☒ OxyCide Label
- ☐
- ☐

RECEIVED

MAR 15 2016

DOSH - San Bernardino District office

3/10/20163/10/2016

If you require an extension of time in order to satisfy this request, please contact the Cal/OSHA inspector identified with your inspection at the phone number above before the deadline.

INSPECTION NO. _____ SE/IH ID. T6035 OPTIONAL REPORT NO. 019-16

FIELD DOCUMENTATION WORKSHEET

Establishment Name:

Page

of

EVS Shifts

7Am, 3Pm, 5Pm, 11Pm

Cath Lab 9Am

Previously used Vorex - disinfectant
Crew - bathroom cleaner
~~State~~
Glance - glass cleaner
(Bleach wipes) Dispatch - disinfectant for C diff rooms
inf'd by Diverox (toilet, sink, shower)

Contact +

Walls are also cleaned.

1 bottle for every 6 rags. Green & Blue rags
wipes Patient rooms

Dwell time = 5 mins Apply until saturated and not wiped off.

Sanicloth.

Oxygene prep - 6 rags (micro fiber cloths) / bottle
place rags in bucket, pour oxygene on top.
almost instantly absorbed.

Signature:

Date:

Region
3

District
3

Ident. No.
T6035

Opt. Rept. No.

Insp. No.

FIELD DOCUMENTATION WORKSHEET

Establishment Name:

Page

of

EVS has cleaning schedule
also clean - deep by soiled
- Isolation room
- nursing staff backed up - rare

Sanicloth - grey tops
- purple tops (in the past) } different formulas

Oxyide cloths patient room - maintenance (daily clean) 1 room 4 PR / day
- d/c 4-5 room & PR

Signature:

Date:

Region

3

District

3

Ident. No.

T6035

Opt. Rept. No.

Insp. No.

FIELD DOCUMENTATION WORKSHEET

Establishment Name:

Page

of

Bleach wipes on cart
used by nurses per EVS.

for Glucometers (Accu-Check machine)

Signature:

Date:

Region

3

District

3

Ident. No.

T6035

Opt. Rept. No.

Insp. No.

WITNESS LIST

Establishment Name: KAISER FOUNDATION HOSPITAL Inspection No.: 1132148

OSHAB Docket No.: _____ CSHO ID: T6035

Pursuant to California Code of Regulations, Title 8, § 372, the DOSH San Bernardino District Office knows of the following witnesses, including, but not limited to, those intended to be called to testify at any citation appeal hearing:

ID	Witness Name	Witness Address	Phone No.
E1	JENNIFER SLAMER		
W3	JIM BLEE		
W1	FRANCISCA CERRITOS		
W2	BERNITA LIMBON		
W4	JOSE JAVIER		
W5	ANA ZABALA		

Dana J. Jaramila
Signature

8/22/2016
Date

WORKPLACE ACCIDENT INTERVIEW QUESTIONNAIRE

Injured Employee ID: E1

Interview Language: ENGLISH Translator ID: N/A

1. What is the name of your employer?

Kaiser Permanente.

2. How long have you worked for the company?

6.5 years.

3. What is your job title with the company? How long have you worked in that position?

RN (Registered Nurse) in Emergency Dept. 3 yrs
RN in Home Health. 3 years.

4. What are your duties in this position?

Triage patients, patient care, stock supplies, transport pt, chart
give medications.

5. What is your previous experience related to the job you currently hold?

2003-2006 in Kaiser ER (Fontana)
RN since 2001.

6. What was the location of the accident? What was the physical condition of the area where the accident occurred?

ER, pod A. ELS worker was cleaning ~~room~~ 9.

7. Were you at the worksite alone? Who else was there and what were they doing at the time of the accident?

No. 6 other EEs in Pod A (4 other RNs). ~30 EEs overall of ER.

8. What were you doing at the time of the accident?

2/15/16 - 1:30-2:30pm RN Station by Room 9. Smelled cleaning solution. Chest felt tight + started to cough. I continued to work until started feeling dizzy. Other Nurses took me to Room 11. Standard treatment for patient w/ Respiratory distress. On biPap, seemed to get better. Original Dr thought it might be a food allergy. Took to floor + admitted ~ 5:30pm

at 11:30pm → moved to ICU

2/16/16 - intubated after 7h attack (stridor). Found to have vocal chords closing on me, preventing air movement.

2/18/16 - extubated.

2/19/16 - Discharged, in pm.

3/15/16 - Admitted for 4 days, DC'd on 3/18/16 (Step Down)

4/1/16 - Admitted for 7 days, DC'd on 4/8/16 (ICU)

4/26/16 - Admitted for 8 days, DC'd on 5/3/16 (ICU)

9. What was the extent of your injury?

Vocal Chord Dysfunction 2° chemical exposure to Oxycide.
Oxycide is used to clean the ER rooms to kill C.diff.

10. What do you think caused the accident? Was it due to a hazard previously recognized, but which was not yet corrected?

Exposure to Oxycide. Yes. Everybody was getting sick, having difficulty breathing. One ELS worker (W2) was vomiting shortly after chemical introduction (Sept 2015).

11. In your opinion, what could have prevented the accident?

Not using Oxyride.

12. Who was your immediate supervisor for that job? Where was he/she when the accident happened?

Linda. Change Desk in pod B.

13. Who assigned you to do the job you were doing at the time of the accident?

Linda.

14. Did your supervisor conduct a pre-inspection of the work area to ensure that it was safe before allowing/sending in employees to work?

There are supposedly safety checks from outside the Dept, but I have not seen them.

15. Did you receive training for the job you were doing, and the hazards of that job? Who trained you?

Yes. Clinical Educator.

No training on Oxyride. No flyer or handout.

We use bleach for surface (Sani-Cloths), we were only told to keep surface wet for 3 minutes.

16. Was there a written procedure for that job? Did you follow it?

N/A. I'm sure there was a written procedure for EVS.

17. What kind of equipment/tools were you using? Personal protective equipment?

Charting on computer.

Nothing at the time, with p/t's Nitrile gloves, mask if needed (N95), surgical mask w/ eye protection, disposable gown.

18. Is the process/operation/job you were working on new to the worksite?

Process, no. Oxyride was used for 6 months.

19. Are you familiar with your employer's safety program? Has anyone ever been disciplined for not following the safety rules?

I have not seen it. No.

20. Do you think that you violated the company's safety rules when you got injured?

No.

Write additional questions/statements below:

Have never used Oxycide.

Have never used cloth with Oxycide.

Other nurses clean rooms requiring terminal clean w/o waiting EVS.

Certain nurses only use bleach wipes. Still get them to this day.

Seen on EVD carts recently. Blue top, white container, says Clorox.

ICU nurses wrote letter to mgmt about Oxycide

I HAVE GIVEN THIS STATEMENT FREELY AND WITHOUT COERCION; IT REPRESENTS THE FACTS
PERTAINING TO THE ABOVE REFERRED ACCIDENT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNED, THIS ____ DAY OF _____, 20____

SIGNATURE

WITNESSED BY

TITLE

EMPLOYEE WITNESS STATEMENT

My name is W1

My home address and phone number are _____

I am employed by Kaiser as a EVS Attendant

I have been employed here for a period of approximately 15 years and _____ months.

I offer the following statement recorded in the presence of _____,
Division of Occupational Safety and Health, Department of Industrial Relations, State of California.

3 years in ED (patient room prior)

Site GP 28-50; C-28-40, D241-51

Didn't know about coughing episode until later

Restroom, sink, nurse station, trash bin + discharge rooms.

Bleeding

MRSA isolation rooms, C diff, airborne.

Nurses help out cleaning sometimes, use disinfectant or ask us for Oxydisinfectant.
6 towels w/ 3202 bottles in oxydisinfectant bucket.

Naturalizer for bleach

before Vivox, Washroom (Crew) Clean brite, bleach wipes.

the

In the bag

Dry throat, coughing, sneezing, red eyes, headaches, no respiratory

Informed supervisor. We don't feel good. "We have to use it."

Goggles + mask (goggles new since Oxydisinfectant)

We're given masks w/ valve on it, only once.

New green 95 two straps. 3m 1870

Something feels stronger than other days. Also, clean more feel done.

Use Additional Page(s) if Necessary

I HAVE GIVEN THIS STATEMENT FREELY AND WITHOUT COERCION; IT REPRESENTS THE FACTS
PERTAINING TO THE ABOVE REFERRED ACCIDENT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNED, this _____ day of _____, 20 _____

(Signature)

Witnessed by _____

Title _____

Nurses have Janicloths. When they need to use something

most EHD workers feel this, but have not heard of nurses having
issues.

EMPLOYEE WITNESS STATEMENT

3/17/16

My name is W2

My home address and phone number are _____

I am employed by Kaiser as a EVS - Attendant

I have been employed here for a period of approximately 18 years and _____ months.

I offer the following statement recorded in the presence of DAVID SHANNON, Natasha Narayan MD,
Division of Occupational Safety and Health, Department of Industrial Relations, State of California.

8 years in ED. 7AM - 3:30pm

I cleaned Room 8 (7, 6, 8)

I saw E1 in bed, was told she was exposed to chemical we were to clean. Next day she was upstairs & intubated.

27 rooms, 1-27 bathroom, public Rm, nurses str, medication room.
Triage, lobby, hallway, utility room.

Site A = Rm 1-15, Site B = Rm 16-27, Triage 4 more rooms.
Sink - gowns, cables, instruments,

TB, Hepatitis, respiratory, bleeding, C diff.

Orange cleaner for floor.

Blue & Green cloths not specific to room.

Sometimes nurse ask for cleaning cloth if I am cleaning another room. I will give them a cloth to clean their room with blue or green rag. (Cleaner for stainless steel Spring after Oxycide.) They bring back to me.
12 rags & 2 bottles Oxycide 3-4 rags / room

Code Blue Room - 5 ppl, 1.5 hours.

Neutralize on floor

Use Additional Page(s) if Necessary

I HAVE GIVEN THIS STATEMENT FREELY AND WITHOUT COERCION; IT REPRESENTS THE FACTS PERTAINING TO THE ABOVE REFERRED ACCIDENT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNED, this _____ day of _____, 20 _____

(Signature)

Witnessed by _____

Title _____

Blood spill, vomit, diarrhea on floor - called to clean living pt in

dry mg for testing then oxyide

headache

burning eyes

coughing

eyes water

shortness of breath

sneezing

} Symptoms from oxyide upon initial use.

headache

cough

dry throat

5, 6, 7 - discharge smaller room, tightness immediately.

EMPLOYEE WITNESS STATEMENT

3/17/16

My name is W3

My home address and phone number are _____

I am employed by KAISER as a RN, ER.

I have been employed here for a period of approximately 15 years and _____ months.

I offer the following statement recorded in the presence of DAVID HANSTON, Natasha Nguyen MD,
Division of Occupational Safety and Health, Department of Industrial Relations, State of California.

7A-7P

Patient care 3:1

10-11Am on 2/15/16 I just d/c patient
had C-diff patient. Bed 9 (had 9, 10, 11)

Computers across from room.

Elmer observed coughing a lot. Asked if she was having a reaction.

Bed 9 was being cleaned, sliding door was open (typical).

They put El in Bed 11.

Last I heard they were recommending her to be seen by Physician.

Post patient cleaning - use Sanicloth

break down bed (liner)

Wipe bed with rails & cushion, monitor leads, board, phone,

Computer with Sanicloth

3 min dwell

New liner, gown, blanket, pillowcase.

If we know we have C-diff, droplet/respiratory

Use bleach on C-diff patients w/ diarrhea.

Bleach at nurses station.

Did not use bleach that day.

2x diarrhea in 24h = C diff.

Use Additional Page(s) if Necessary

I HAVE GIVEN THIS STATEMENT FREELY AND WITHOUT COERCION; IT REPRESENTS THE FACTS
PERTAINING TO THE ABOVE REFERRED ACCIDENT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNED, this _____ day of _____, 20____

(Signature)

Witnessed by _____

Title _____

EMPLOYEE WITNESS STATEMENT

My name is WS

My home address and phone number are _____

I am employed by Kaiser as a RN - ED Charge Nurse.

I have been employed here for a period of approximately 15 years and _____ months.

I offer the following statement recorded in the presence of _____,
Division of Occupational Safety and Health, Department of Industrial Relations, State of California.

Charge Nurse 2:30 pm - 11 pm

ED - 60 beds 30-32 nurses, techs, clerks.

Pods A, B, C, D

Nurses assigned 3 beds

7a-7p / 7p-7a 3 on, 3 off 60%
Stagger shifts

Huddle 7am, 11am, 3pm, 7pm, 11pm, 3am

EI 7a-7p

Huddle notes (ACDs provide them)

Changes 2/days, 3/wings, 2/nights (only 1 on duty for any 1 shift)

Day shift charge nurse report the EI was not floating well
right after huddle (10 min) I assigned another nurse to that room.

Coughing, red, tearing, later on biopap
Admitted to Intensive Medicine.

Use Additional Page(s) if Necessary

I HAVE GIVEN THIS STATEMENT FREELY AND WITHOUT COERCION; IT REPRESENTS THE FACTS
PERTAINING TO THE ABOVE REFERRED ACCIDENT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNED, this _____ day of _____, 20 _____

(Signature)

Witnessed by _____

Title _____

Cleaning products

Nurses use swimpex (grey lid)

Call EMS to clean isolation rooms.

They use oxy-something.

They smell like Megar

Nurses have complained about smell/odor when initially used it to this day.

One EMS attendant mentioned some strong odor + watery eyes.

He mentioned something about talking to supervisor.

Nobody

Nurses can call Central Supply as needed to order products.

15 mins turnaround.

Beds 16, 17, 18 designated Code Rooms (to not always)

~~That~~ El was 6, 7, 8 that day.

Evaluation of exposure to a hydrogen peroxide, peracetic acid, and acetic acid containing cleaning and disinfection product and symptoms in hospital employees

Brie H. Blackley, MS, PhD
M. Abbas Virji, ScD
R. Reid Harvey, DVM, MPH
Jean Cox-Ganser, PhD
Randall J. Nett, MD, MPH



Report No. 2017-0114-3357
September 2019



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



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The employer is required to post a copy of this report for 30 days at or near the workplace(s) of affected employees. The employer must take steps to ensure that the posted report is not altered, defaced, or covered by other material.

The cover photo is a close-up image of sorbent tubes, which are used by the HHE Program to measure airborne exposures. This photo is an artistic representation that may not be related to this Health Hazard Evaluation.

Highlights of this Evaluation

The Health Hazard Evaluation Program received a confidential employee request for the National Institute for Occupational Safety and Health to conduct a health hazard evaluation at a hospital. The request cited concerns about exposure of hospital employees to OxyCide®, a disinfectant cleaner that is one of a group of sporicidal products marketed under various trade names that contain hydrogen peroxide, peracetic acid, and acetic acid, and described symptoms experienced by employees. Employee symptoms noted in the health hazard evaluation request included respiratory distress, skin problems, headaches, chest tightness, burning eyes, sore throat, and nausea.

What We Did

- We visited the hospital in August 2017 to observe environmental services staff while they conducted cleaning tasks throughout the hospital and informally speak with hospital staff (environmental services, nursing, and ancillary staff) about their use of cleaning products and any related health concerns.
- We collected 14 bulk samples of the diluted sporicidal product in August 2017 to measure pH.
- In September 2017, we provided a report with our interim findings and recommendations.
- We returned in July–August 2018 to perform an air sampling survey and a health questionnaire survey. We collected full-shift time-weighted average air samples on environmental services employees and analyzed the samples for the three chemicals found in the sporicidal product: hydrogen peroxide, peracetic acid, and acetic acid. We also collected full-shift area time-weighted average air samples in multiple areas of the hospital and analyzed the samples for hydrogen peroxide, peracetic acid, and acetic acid content.
- We administered a post-shift survey with health and work questions to 55 environmental

We evaluated employee health concerns and exposures to the three main chemicals, hydrogen peroxide, peracetic acid, and acetic acid, found in a sporicidal product used by hospital cleaning staff. Hydrogen peroxide and peracetic acid were detected in all personal full-shift air samples. Some employees exposed to vapors from the sporicidal product reported work-related upper airway, eye, lower airway, and skin symptoms. We recommend management tailor use of sporicidal products containing hydrogen peroxide, peracetic acid, and acetic acid to areas of high risk for healthcare-acquired infections and minimize the use of sporicidal products on noncritical surfaces and in non-patient areas. We also recommend management provide workplace accommodations for employees who develop symptoms related to the use of products containing hydrogen peroxide, peracetic acid, and acetic acid. Additionally, we recommend several ways to reduce employee exposure to the hydrogen peroxide, peracetic acid, and acetic acid vapors and liquids from the sporicidal product.

services staff and 22 patient care and ancillary staff who worked in areas of the hospital where air samples were collected, for a total of 77 hospital employees.

- We also collected 28 bulk samples of the diluted sporicidal product from containers of diluted product located on EVS employee carts during July–August 2018 to measure peracetic acid and hydrogen peroxide concentrations.
- In September 2018, we provided a report with our interim findings and recommendations.

What We Found

- We found the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid is used predominantly by environmental services staff and that patient-care and ancillary staff predominantly use quaternary ammonium (PDI®) or bleach wipes for routine point-of-care cleaning activities.
- We observed environmental services employees using the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid on surfaces throughout the hospital, including patient rooms, patient bathrooms, and public bathrooms. Environmental services staff were observed using, or reported occasionally using, other products containing substances capable of causing or worsening eye and respiratory symptoms, including products containing ethanolamines, bleach, phosphoric acid, sodium xylenesulfonate, or quaternary ammonium compounds.
- We observed pH measurements of the diluted sporicidal product that ranged from 3.1–7.5. The product’s safety data sheet indicates the product should be diluted to a pH of 2.7–4.0. The highest pH (7.5) was measured in a sample collected from a dispenser that indicated the concentrated product was low and needed replacement. The low level of remaining concentrated product in the dispenser could have contributed to the near-neutral pH observed.
- Concentrations of peracetic acid and hydrogen peroxide measured in samples of the diluted product varied among cart samples and ranged from 900 parts per million (ppm) to 2100 ppm for peracetic acid and 3600 ppm to 7000 ppm for hydrogen peroxide.
- For the three carts that NIOSH staff collected multiple samples from throughout the shift, peracetic acid concentrations were consistent throughout the shift and varied from 1500 ppm to 1800 ppm (3 North cart); 1200 ppm to 1500 ppm (black cart); and 1500 ppm to 2100 ppm (3 South cart). Hydrogen peroxide concentrations were also consistent throughout the shift and ranged from 4800 ppm to 6000 ppm (3 North cart); 3600 ppm to 4800 ppm (black cart); and 6000 ppm to 7000 ppm (3 South cart).
- We found that some employees using the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid reported eye, upper respiratory, lower respiratory, and skin symptoms that began during their shift.
- We detected hydrogen peroxide and peracetic acid in all personal full-shift air samples collected on environmental services staff.

-
- We found that increased exposure to hydrogen peroxide, peracetic acid, or acetic acid vapors was associated with increases in acute, cross-shift work-related nasal irritation, eye irritation, shortness of breath, and wheeze symptoms reported by hospital staff, after adjusting for age, gender, smoking status, allergic status, other sensitizer or irritant containing cleaning products used during their shift, and stress.
 - We also determined that increased departmental average exposure to hydrogen peroxide, peracetic acid, or acetic acid vapors was associated with increases in work-related symptoms in the previous four weeks including nasal irritation, sneeze, and eye irritation, after adjusting for age, gender, smoking status, allergic status, frequency of use of other sensitizer or irritant containing cleaning products in the previous 4 weeks, and stress.

What the Employer Can Do

- Minimize the use of sporicidal products containing hydrogen peroxide, acetic acid, and peracetic acid in non-patient care areas.
- Ensure employees understand potential hazards in the workplace and how to protect themselves. Specifically, employees should be educated on the documented health risks from exposure to hydrogen peroxide, peracetic acid, and acetic acid and chemicals found in other cleaning products at the hospital.
- Ensure the sporicidal product dispensers are calibrated to effectively dilute the product to a pH of 2.7–4.0. If the sporicidal product is not effectively diluted, a pH of less than 2.7 can increase skin, eye, and respiratory symptoms in exposed employees.
- Continue to ensure employees use only rags and wipes to apply the sporicidal product to surfaces and the sporicidal product is not used as a spray.
- Require employees to wear extended cuff nitrile gloves or rubber gloves when using the sporicidal product and goggles or a face shield while dispensing and pouring the sporicidal product into or out of the bucket on their cleaning cart.
- Consider implementing a comprehensive system for reporting and tracking workplace injuries and illnesses that includes reports of near-misses, minor injuries and illnesses, and employee safety concerns. This information should be reviewed by the Safety Officer on a regular basis to identify hazards, implement risk-reduction strategies, and prevent significant injuries and illnesses.
- Provide workplace accommodations to employees who develop work-related symptoms after exposure to sporicidal products containing hydrogen peroxide, peracetic acid, and acetic acid. Consider relocating employees who develop work-related symptoms to areas of the hospital where sporicidal products containing hydrogen peroxide, peracetic acid, and acetic acid are used less frequently.

What Employees Can Do

- Wear extended cuff nitrile gloves or rubber gloves when using the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid. Wear goggles or a face shield when dispensing and pouring the sporicidal product into or out of the bucket on your cleaning cart.
- Keep the lid on the sporicidal product bucket closed whenever possible to minimize the generation of hydrogen peroxide, peracetic acid, and acetic acid vapors that can be inhaled.
- Report new, persistent, or worsening symptoms to your personal healthcare provider and, as instructed by your employer, to a designated individual at your workplace.

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Abbreviations

AA	Acetic acid
ACGIH®	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
COPD	Chronic obstructive pulmonary disease
CI	Confidence interval
EPA	U.S. Environmental Protection Agency
EVS	Environmental Services
°F	Degrees Fahrenheit
GM	Geometric mean
GSD	Geometric standard deviation
HICPAC	Healthcare Infection Control Practices Advisory Committee
HP	Hydrogen peroxide
HVAC	Heating, ventilation, and air-conditioning
ICU	Intensive care unit
LOD	Limit of detection
mL/min	Milliliters per minute
MVUE	Minimum-variance unbiased estimator
NIOSH	National Institute for Occupational Safety and Health
OM	Oxidant exposure mixture
OR	Odds Ratio
OSHA	Occupational Safety and Health Administration
PAA	Peracetic acid
PEL	Permissible exposure limit
PPE	Personal protective equipment
ppm	Parts per million
ppb	Parts per billion
REL	Recommended exposure limit
SD	Standard deviation
SDU	Step-down unit
STEL	Short-term exposure limit
TM	Total exposure mixture
TWA	Time-weighted average
TLV®	Threshold limit value

Summary

The National Institute for Occupational Safety and Health received a confidential employee request to conduct a health hazard evaluation at a hospital. The request cited concerns about exposure of hospital employees to a sporicidal cleaning and disinfection product containing hydrogen peroxide, peracetic acid, and acetic acid, and listed symptoms experienced by employees, including respiratory distress, skin problems, headaches, chest tightness, burning eyes, sore throat, and nausea. We performed a walk-through assessment of cleaning products used at the hospital on August 15, 2017, and informally interviewed hospital employees about cleaning products they used and any related health concerns. We observed the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid was the main cleaning product used by environmental services staff for surface cleaning tasks.

We returned on July 31 and August 1, 2018, to perform air-sampling and administer a post-shift health questionnaire. We collected 56 full-shift air samples for hydrogen peroxide, peracetic acid, and acetic acid on or near environmental services staff performing cleaning activities. We also collected full-shift area samples in locations throughout the hospital. We observed environmental services staff while they performed their regular cleaning duties and noted task duration, cleaning product use and duration, and use of any personal protective equipment. Environmental services staff were observed occasionally using, or reported occasionally using, other sensitizer or irritant containing products including products containing quaternary ammonium compounds, bleach, phosphoric acid, sodium xylenesulfonate, or ethanolamines when cleaning general surfaces or bathroom surfaces. We also administered a voluntary post-shift health and work history questionnaire to patient-care and ancillary staff recruited from the same areas and departments of the hospital where area air samples were collected.

All full-shift time-weighted average air samples for hydrogen peroxide and acetic acid were below established U.S. occupational exposure limits. Nasal, throat, and eye irritation, as well as shortness of breath were the most frequently reported work-related symptoms in the post-shift survey of acute, cross-shift work-related symptoms. Similarly, nasal, throat, and eye irritation, as well as sneeze were the most frequently reported work-related symptoms in the post-shift survey of symptoms occurring in the previous four weeks.

We observed statistically significant positive associations between work-related acute, cross-shift eye, upper airway, and lower airway symptoms in relation to exposure to hydrogen peroxide, peracetic acid, and acetic acid vapors after adjusting for age, gender, smoking status, use of other cleaning products containing sensitizers and irritants, allergic status, and stress. Work-related acute nasal and eye irritation, and shortness of breath were significantly associated with increased exposure to hydrogen peroxide, peracetic acid, and acetic acid, indicating an increase in symptoms with increasing exposure to the mixture of vapors from the sporicidal product. Work-related acute, cross-shift wheeze was significantly associated with increases in exposure to hydrogen peroxide, one of the constituents in the sporicidal product.

We also observed positive associations between work-related eye and upper airway symptoms in the previous four weeks in relation to exposure to hydrogen peroxide, peracetic acid, and acetic acid vapors after adjusting for age, gender, smoking status, frequency of use of other cleaning products containing sensitizers and irritants, allergic status, and stress. Work-related nasal and eye irritation in the previous four weeks were significantly associated with increases in departmental concentrations to hydrogen peroxide, peracetic acid, and acetic acid. Work-related sneeze in the previous four weeks was significantly associated with increases in departmental concentrations of peracetic acid.

We identify several ways to reduce employee exposure to the sporicidal product containing hydrogen peroxide, peracetic acid, and acetic acid. We recommend that management restrict the use of sporicidal products containing hydrogen peroxide, peracetic acid, and acetic acid to areas of high risk for healthcare-acquired infections and minimize the use of sporicidal products containing hydrogen peroxide, peracetic acid, and acetic acid on non-critical surfaces and in non-patient areas. We also recommend that management provide workplace accommodations for employees who develop symptoms related to the use of sporicidal and high-level disinfectants. Management should also ensure that all heating, ventilation, and air-conditioning systems are functioning well and meet all applicable American Society of Heating, Refrigeration, and Air Conditioning Engineers standards.

Introduction

The National Institute for Occupational Safety and Health (NIOSH) received a confidential employee request to conduct a health hazard evaluation at a hospital. The request cited concerns about exposure of hospital employees to a disinfectant cleaner that is one of a group of sporicidal products that contain hydrogen peroxide (HP), peracetic acid (PAA), and acetic acid (AA) and marketed under various trade names. In their health hazard evaluation request they described symptoms experienced by employees including respiratory distress, skin problems, headaches, chest tightness, burning eyes, sore throat, and nausea.

In response to the health hazard evaluation request, we performed a walkthrough assessment of cleaning product use at the hospital on August 15, 2017, and informally interviewed employees about their cleaning product use and any related health concerns. We observed the sporicidal product containing HP, PAA, and AA was the main cleaning product used for all surface cleaning duties and was used predominantly by Environmental Services (EVS) staff. We researched similar products manufactured under different trade names and observed that cleaning and disinfecting products containing a mixture of HP, PAA, and AA are currently widely used as surface cleaners and sterilants in healthcare settings. Products containing HP, PAA, and AA intended for use as surface cleaners are typically more dilute than HP, PAA, and AA products intended for use as sterilants. The sporicidal product containing HP, PAA, and AA used at the hospital and subject of this report was diluted with water before use to a pH of 2.7–4.0.

During July 31–August 2, 2018, we returned to the hospital to perform a full-shift air sampling survey and collect air samples on employees performing cleaning activities and in areas throughout the hospital. We observed EVS staff while they performed their regular cleaning duties and noted task duration, cleaning product use and duration, and use of any personal protective equipment (PPE). We also noted that EVS staff occasionally used other products containing substances capable of causing or worsening respiratory symptoms, to include products containing ethanalamines, bleach, phosphoric acid, sodium xylenesulfonate, or quaternary ammonium compounds when cleaning floors or bathroom surfaces.

We administered a voluntary post-shift survey concerning health and cleaning product use to hospital employees during July 31–August 2, 2018. We offered the post-shift survey to all EVS staff who participated in the air sampling survey. We also offered the post-shift survey to non-EVS staff working in departments where air samples were collected.

In this report, we summarize the results from our exposure assessment. We also summarize results from the health and work history questionnaire and post-shift survey of acute symptoms. Additionally, we provide recommendations to help protect the health of employees. We previously mailed letters with interim results and recommendations in September of 2017 and September of 2018.

Process Description

The hospital that is the subject of this health hazard evaluation is a multispecialty hospital offering cardiology, intensive care unit (ICU), labor and delivery, neonatal intensive care unit, pediatric ICU, pediatrics, and surgical services. Beginning in 2015, the sporicidal product containing HP, PAA and AA became the primary disinfectant used for surface cleaning duties throughout the hospital. EVS staff were the primary housekeeping staff and performed cleaning duties and tasks in areas throughout the hospital. Other healthcare personnel, such as patient care and ancillary staff, performed occasional surface cleaning tasks, such as wiping down equipment in occupied patient rooms, as part of routine point-of-care cleaning activities. The product containing HP, PAA, and AA was used predominantly by EVS staff, and patient care and ancillary staff predominantly used PDI® or bleach wipes for routine cleaning activities.

Methods

August 2017 Bulk Sample Analysis

During the walkthrough assessment in August 2017, we collected bulk samples of the diluted sporicidal product containing HP, PAA, and AA from multiple hospital departments. Bulk samples of the diluted sporicidal product were collected to assess the sporicidal product dispenser calibration. Dispenser calibration was assessed by measuring diluted product pH at a time point less than 12 hours after collection. Samples were kept capped and stored at room temperature (21°C–23°C). Measurements of sample pH were taken using a pH meter (Fisher Scientific International Inc., Hampton, NH).

July–August 2018 Bulk Sample Analysis

We collected bulk samples of the diluted sporicidal product containing HP, PAA, and AA from multiple hospital departments. We assessed product variability by collecting bulk samples from the product bucket located on EVS employee carts and measuring the peracetic acid and hydrogen peroxide concentrations in each sample. Samples were analyzed within three hours of collection using a peracetic acid test kit (LaMotte Company, Chestertown, MD) and a hydrogen peroxide test kit (CHEMetrics Inc., Midland, VA).

July–August 2018 Air Sampling Survey

During July and August 2018, we performed an air sampling survey and collected a total of 56 full-shift time-weighted average (TWA) samples on day, evening, and night shift EVS employees. Twenty-nine of the full-shift samples were collected from employees' breathing zones while they performed their regular cleaning duties. Twenty-seven of the samples collected were mobile samples. For the mobile samples, we followed employees while they performed their cleaning duties and placed the samplers near EVS staff in the rooms while they cleaned or on their carts while they were cleaning. Additionally, we observed staff while they performed their regular cleaning duties and noted task duration, cleaning product use and duration, and use of any PPE. We also collected 70 full-shift TWA area samples for AA and 28 full-shift area samples for HP and PAA from multiple locations including the

Emergency Department, 2nd floor ICU, 2nd floor ICU Pre-Op, 3rd floor Anesthesia Admin, 3rd floor Labor and Delivery, 4th floor Pediatrics, 5th floor SDU, 6th floor Medical Surgical, 7th floor Medical Surgical, Diagnostic Imaging, and Pharmacy.

All air samples were analyzed for the three chemicals found in the sporicidal product: HP, PAA, and AA. HP and PAA were collected and analyzed according to the methods specified by Hecht et al. [2004]. AA was collected and analyzed according to the Occupational Safety and Health Administration (OSHA) Method PV2119 [OSHA 2003].

Post-Shift Survey of Health and Cleaning Product Use

We administered a voluntary post-shift survey of health and cleaning product use to 77 hospital employees in July and August 2018. We offered the post-shift survey to all EVS staff who participated in the air sampling survey. We also offered the post-shift survey to non-EVS staff working in departments where air samples were collected. Questions addressed eye, respiratory, and skin symptoms; nasal allergies, skin allergies, chronic bronchitis, emphysema, chronic obstructive pulmonary disease (COPD), asthma, and other diagnoses; smoking history; cleaning product use; hospital department assignment; stress outside of work; stress at work; and demographic information. Stress outside of work and stress at work were included as questions in the survey because recent studies indicate a potential association between psychosocial stress and respiratory symptoms [Rosenberg et al. 2014; Clougherty et al. 2009]. The survey was professionally translated into Spanish and offered in English or Spanish.

For eye, respiratory, and skin symptoms, we asked if employees had experienced any of the following symptoms in the previous four weeks: (1) nasal irritation (burning, itchy, runny nose); (2) sneezing; (3) throat irritation (burning, dry, sore throat); (4) eye irritation (burning, itchy, watery eyes); (5) cough; (6) wheezing or whistling in the chest; (7) chest tightness; (8) shortness of breath; (9) difficulty breathing; and (10) skin symptoms. When employees reported symptoms that occurred in the previous four weeks, we asked if their symptoms when away from work, either on their days off or when they were on vacation, were the same, worse, or better.

We also asked if employees had experienced any of the same symptoms (listed above) during their shift. When employees reported symptoms that occurred during their work shift, we asked (1) if their symptom had worsened during their shift; (2) what they were doing when the symptom first began; and (3) if they had that symptom upon arrival at work that day. Acute, cross-shift work-related symptoms were defined as symptoms that occurred during the participants' shift that were not present upon arrival at work that day. Symptoms that improved when the employees were away from work, either on their days off or when they were on vacation, were defined as work-related.

Statistical Analyses

All statistical analyses were performed using PC-SAS version 9.4 and JMP version 13.0 (SAS Institute, Cary, NC) and all plots were prepared in SigmaPlot (Version 14.0, Systat Software Inc., San Jose, CA). Because plots of the full-shift TWA exposure data for HP, PAA, and AA indicated the distributions were not normal, all full-shift TWA exposure measurements were log-transformed for all analyses. The mean, standard deviation, geometric mean, geometric standard deviation, and 95th percentile, overall and by department and sample type, were calculated using the NLMIXED procedure in SAS, which accounts for measurements below the limit of detection (LOD). The minimum variance unbiased estimator (MVUE) was used to estimate the mean (average) exposure for all analyses by department.

Individual Level Exposure Measurements

EVS staff participating in air sampling were assigned with their individual air sampling results. EVS with no air sampling results were assigned the average personal exposure for HP, PAA, and AA of EVS employees working in their department during their shift. Non-EVS staff were assigned with the average measurements for HP, PAA, and AA collected in their department during their shift. In departments where only AA measurements were collected, relationships between AA and PAA or HP were developed using data from areas where all three exposure measurements were collected to predict exposures to HP and PAA. The PROC REG procedure in SAS was used to model these relationships with measurements for AA as the predictor variable and HP or PAA as the outcome variable. Predicted values were used to calculate the HP and PAA averages by department to assign exposure for non-EVS staff working in areas of the hospital with only AA measurements.

Associations Between Acute Health Outcomes and Exposure Metrics: Individual Level Exposure

We explored associations between employee's exposure to HP, PAA, and AA and work-related acute, cross-shift symptoms using logistic regression. We used the American Conference of Governmental Industrial Hygienists' (ACGIH®) Additive Mixture Formula to estimate mixture exposures for the total mixture (TM) of HP, PAA, and AA as well as the oxidant exposure mixture (OM) of HP and PAA [ACGIH 2016]. Measured parts per million (ppm) concentrations of HP and AA were divided by their established OSHA Permissible Exposure Limit (PEL) and NIOSH Recommended Exposure Limit (REL) of 1 ppm for HP and 10 ppm for AA (Equations 1 and 2). Measured ppm concentrations of PAA were divided by 0.2 ppm, the occupational exposure limit proposed by multiple researchers [Gagnaire et al. 2002; Pechacek et al. 2015; Pacenti et al. 2010]. TM and OM exposure was determined using Eqs. (1) and (2),

$$TM = \frac{[HP]}{1 \text{ ppm}} + \frac{[PAA]}{0.2 \text{ ppm}} + \frac{[AA]}{10 \text{ ppm}} \quad (1)$$

$$OM = \frac{[HP]}{1 \text{ ppm}} + \frac{[PAA]}{0.2 \text{ ppm}} \quad (2)$$

where [HP], [PAA], and [AA] represent the measured full-shift TWA concentrations for HP, PAA, and AA.

The LOGISTIC procedure in SAS was used to examine associations of individual level exposure to HP, PAA, AA, TM, and OM; age; gender; smoking status; use of cleaning products containing sensitizers or irritants during an employee's shift; allergic status; and total stress; with work-related eye, upper airway, lower airway, and skin symptoms reported during an employee's shift.

Other sensitizer or irritant-containing cleaning products were defined as products containing quaternary ammonium compounds, bleach, phosphoric acid, sodium xylenesulfonate, or ethanolamines. Use of quaternary ammonium compounds, bleach, phosphoric acid, sodium xylenesulfonate, or ethanolamines was obtained from reported product use in the post-shift survey. Up to six different products containing sensitizers or irritants were reported, with two different products reported containing quaternary ammonium compounds, one product containing bleach, one product containing phosphoric acid, one product containing sodium xylenesulfonate, and one product containing ethanolamines. We assessed associations between acute cross-shift work-related symptoms and use of a combination of these products throughout the workday by using a sensitizer and irritant index value. A sensitizer and irritant product use during shift index value (0–6) was determined by adding the number of products containing sensitizers and irritants that an employee reported using during their shift on the day of sampling. For example, an employee who reported using three other cleaning products during their shift that contained phosphoric acid, bleach, and ethanolamines, respectively, was assigned a sensitizer and irritant index value of 3.

Allergic status was defined as reporting a previous diagnosis of nasal or sinus allergies (including hay fever) or skin allergy (eczema or any kind of skin allergy).

Total stress was defined as the average reported stress at work and stress outside of work in the previous four weeks, on a continuous scale from 0 to 10, where a score of 0–3 indicates low stress, 4–6 moderate stress, and 7–10 high stress [Elo et al. 2003; Clark et al. 2011].

Departmental Level Exposure Measurements

We also calculated the average exposure for each of the nine hospital departments where air sampling was performed using the NLMIXED procedure in SAS. EVS staff were assigned the average personal exposure measurements by department. In departments with no personal exposure measurements collected on EVS staff, EVS staff were assigned the average mobile exposure measurements by department. Non-EVS staff were assigned with the average measurements for HP, PAA, and AA collected in their department during their shift.

Associations Between Chronic Health Outcomes and Exposure Metrics: Departmental Level Exposure

All 77 survey participants worked in a department where air sampling was performed. We assessed associations between average departmental exposure and symptoms reported by staff. The LOGISTIC procedure in SAS was used to examine associations of departmental

level exposure to HP, PAA, AA, TM, and OM; age; gender; smoking status; use of cleaning products containing sensitizers and irritants in the previous four weeks; allergic status; and total stress; with work-related eye, upper airway, lower airway, and skin symptoms in the previous four weeks.

Similar methods as described for the acute, cross-shift symptoms, were used to define a sensitizer and irritant index value. Other sensitizer and irritant product use in the previous four weeks index value (0–6) was determined by adding the number of sensitizer and irritant products and frequency of product use, that an employee reported using during the previous four weeks. Frequency of product use was incorporated by multiplying each product used ($n=1$ for each respective product) by the factors assigned to reported frequency of use. The following factors were applied to weight reported product use by frequency: frequently=1, rarely=0.1, and never=0. For example, an employee who reported using a bleach product frequently, a quaternary ammonium product frequently, an ethanolamine product rarely, and a phosphoric acid product rarely, was assigned a sensitizer and irritant index value of: $(1*1) + (1*1) + (1*0.1) + (1*0.1) = 2.2$.

A positive allergic status was defined as reporting previous nasal or sinus allergies (including hay fever) or skin allergy (eczema or any kind of skin allergy) diagnosis.

Total stress was defined as the average reported stress at work and stress outside of work in the previous four weeks, on a scale from 0 to 10, where a score of 0–3 indicates low stress, 4–6 moderate stress, and 7–10 high stress [Elo et al. 2003; Clark et al. 2011].

Results

Major findings regarding hospital staff, use of a sporicidal product containing HP, PAA, and AA, and related exposure measurements are presented below. In general, we observed the sporicidal product containing HP, PAA, and AA was the main cleaning product used for all surface cleaning duties in areas sampled during the July and August 2018 survey.

August 2017 Bulk Sample Analysis

During our visits, we observed that EVS staff used automated dispensers designed to dilute the concentrated sporicidal product to its at-use pH of 2.7–4.0. We observed pH measurements of the diluted sporicidal product that ranged from 3.1–7.5. The product's safety data sheet (SDS) indicates the product should be diluted to a pH of 2.7–4.0. The highest pH (7.5) was measured in a sample collected from a dispenser that indicated the concentrated product was low and needed replacement. We observed staff using the automated dispensers to pour the sporicidal product directly into plastic bottles. The plastic bottles were then used to pour the product into buckets that contained cloth wipes. Buckets were equipped with a lid that was opened only when EVS staff needed to access cloths for cleaning. We observed that nitrile gloves were used routinely when working with cleaning products. Staff occasionally chose to also wear safety goggles or a surgical mask or a MOLDEX 2800N95 Series Particulate Respirator (Moldex® Culver City, CA) when dispensing or working with cleaning products.

July–August 2018 Bulk Sample Analysis

We collected 28 bulk samples from EVS cleaning carts. No hydrogen peroxide measurements were collected on July 31, 2018 because of a limited supply of reagents in the hydrogen peroxide test kit. Concentrations of peracetic acid and hydrogen peroxide measured in samples of the diluted product varied among cart samples and ranged from 900 parts per million (ppm) to 2100 ppm for peracetic acid and 3600 ppm to 7000 ppm for hydrogen peroxide (Appendix, Table A1).

We collected repeat measurements on three carts to assess if peracetic acid or hydrogen peroxide concentrations in the diluted product on EVS employee's carts varied throughout the shift. For the three carts that NIOSH staff collected multiple samples from throughout the shift, peracetic acid concentrations were consistent throughout the shift and varied from 1500 ppm to 1800 ppm (3 North cart); 1200 ppm to 1500 ppm (black cart); and 1500 ppm to 2100 ppm (3 South cart). Hydrogen peroxide concentrations were also consistent throughout the shift and ranged from 4800 ppm to 6000 ppm (3 North cart); 3600 ppm to 4800 ppm (black cart); and 6000 ppm to 7000 ppm (3 South cart) (Appendix A1).

Summary of July–August 2018 Air Sampling Results

Full-shift time-weighted average exposure levels for HP, PAA, and AA ranged from <3 parts per billion (ppb)–559 ppb for HP, <0.2 ppb–28 ppb for PAA, and <5 ppb–915 ppb for AA (Figure 1). The LODs were 2 micrograms (µg) of HP per sample, 0.2 µg of PAA per sample, and 1 µg of AA per sample. The average air concentrations measured on employees in each sampled department are provided in Table 1. The average air concentrations measured in each sampled department area are provided in Table 2. The highest personal exposures to the total mixture of HP, PAA, and AA were observed on EVS staff performing cleaning duties in labor and delivery, pediatrics, the 5th floor step-down unit, and float employees performing cleaning of discharged patient rooms (Table 1).

Currently, there is no OSHA PEL or NIOSH REL for exposure to the mixture of HP, PAA, and AA. Most exposure limit values are created for exposure to a single chemical substance [ACGIH 2016]. There are occupational exposure limits for exposure to HP or AA. The OSHA PEL and NIOSH REL is 1 ppm (1000 ppb) for exposure to HP and 10 ppm (10,000 ppb) for exposure to AA. All measurements for HP and AA were below their respective OSHA PELs and NIOSH RELs [NIOSH 2010] for exposure to HP or AA alone. There is currently no OSHA PEL or NIOSH REL for occupational exposure to PAA, however, several research groups have suggested 0.2 ppm as an exposure limit [Gagnaire et al. 2002; Pechacek et al. 2015; Pacenti et al. 2010]. ACGIH® developed a mixture formula that can be used when multiple chemical exposures occur simultaneously and have similar biological effects [ACGIH 2016]. The ACGIH® mixture formula was used to create the TM and OM used for the results presented below. HP and PAA are strong oxidants, and their mixture is listed as an asthmagen by the Association of Occupational and Environmental Clinics [AOEC 2015]. Astmagens are substances that can cause asthma.

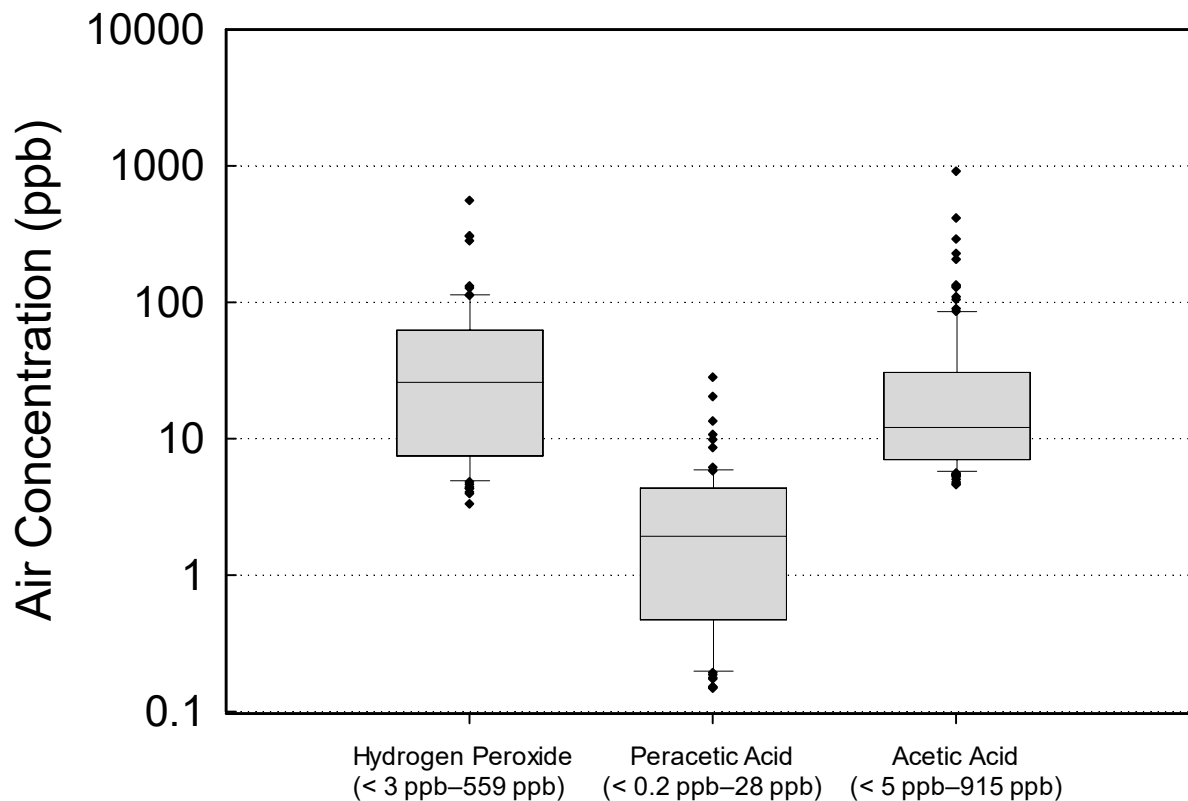


Figure 1. Box-plots of full-shift time-weighted average exposure levels of hydrogen peroxide (HP), peracetic acid (PAA), and acetic acid (AA), NIOSH survey, July and August 2018. Note: ppb=parts per billion. The box-plots illustrate each quartile with the lowest quartile shown as the line and hatch mark below the box, the second and third quartiles indicated by the shaded box, and the highest quartile indicated by the line and hatch mark above the boxes. The line within each box indicates the median air sample concentration. Outlier air samples are denoted by dots. The OSHA PEL and NIOSH REL is 1000 ppb (1 ppm) for hydrogen peroxide and 10,000 ppb (10 ppm) for acetic acid.

Table 1. Average (MVUE) and geometric mean (GM) EVS staff exposures and 95th percentile concentrations (in parts per billion) of hydrogen peroxide, peracetic acid, and acetic acid, by hospital work area, July and August 2018.

Hospital Area	Sample (N)	Hydrogen Peroxide			Peracetic Acid			Acetic Acid			OM		TM	
		MVUE (±SD)	GM (GSD)	95%ile	MVUE (±SD)	GM (GSD)	95%ile	MVUE (±SD)	GM (GSD)	95%ile	MVUE (±SD)	GM (GSD)	MVUE (±SD)	GM (GSD)
1 st Floor Emergency Dept	Personal (n=6)	29.5 (±19.2)	24.9 (1.9)	81.7	1.4 (±1.4)	1.0 (2.7)	3.6	35.2 (±36.7)	22.9 (2.9)	84.3	0.04 (±0.02)	0.03 (1.82)	0.04 (±0.02)	0.04 (1.76)
	Mobile (n=3)	68.5 (±19.6)	66.6 (1.3)	96.6	1.9 (±0.3)	1.8 (1.1)	2.2	31.04 (±23.0)	25.4 (2.2)	54.3	0.08 (±0.02)	0.08 (1.30)	0.09 (±0.04)	0.08 (1.5)
2 nd Floor ICU	Personal (n=0)	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mobile (n=6)	61.0 (±16.1)	59.2 (1.3)	89.5	2.6 (±1.4)	2.3 (1.7)	5.4	126.2 (±231.0)	36.2 (6.5)	915.1	0.08 (±0.02)	0.07 (1.34)	0.09 (±0.03)	0.08 (1.45)
3 rd Floor Labor & Delivery	Personal (n=4)	90.5 (±30.5)	86.7 (1.4)	127.7	5.3 (±1.5)	5.0 (1.5)	8.6	102.5 (±137.7)	46.9 (4.7)	134.1	0.12 (±0.03)	0.11 (1.34)	0.13 (±0.04)	0.12 (1.37)
	Mobile (n=5)	63.1 (±38.5)	54.3 (1.9)	131.9	3.9 (±1.5)	3.6 (1.5)	5.3	30.4 (±42.6)	13.7 (4.5)	50.8	0.09 (±0.04)	0.08 (1.66)	0.09 (±0.04)	0.08 (1.62)
4 th Floor Pediatrics	Personal (n=5)	89.3 (±89.3)	59.7 (2.8)	283.6	6.0 (±2.2)	5.7 (1.4)	10.7	25.2 (±48.4)	5.4 (8.9)	74.4	0.12 (±0.09)	0.09 (2.22)	0.12 (±0.09)	0.10 (2.15)
	Mobile (n=0)	–	–	–	–	–	–	–	–	–	–	–	–	–
5 th Floor Step Down Unit	Personal (n=5)	63.4 (±69.4)	39.1 (3.1)	113.4	13.0 (±14.2)	8.1 (3.1)	28.4	83.4 (±197.6)	7.0 (19.1)	207.1	0.13 (±0.14)	0.08 (3.11)	0.14 (±0.15)	0.09 (3.12)
	Mobile (n=1)	^308.0	–	–	^9.9	–	–	^416.0	–	–	^0.36	–	^0.40	–
6 th Floor Medical-surgical	Personal (n=0)	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mobile (n=3)	23.5 (±3.0)	23.4 (1.1)	26.1	1.9 (±0.4)	1.9 (1.2)	2.3	31.5 (±33.9)	19.5 (3.6)	69.1	0.03 (±0.00)	0.03 (1.15)	0.04 (±0.00)	0.04 (1.06)
7 th Floor Medical-surgical	Personal (n=0)	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mobile (n=4)	25.9 (±11.0)	24.2 (1.5)	42.6	1.5 (±0.8)	1.4 (1.8)	3.4	17.7 (±22.4)	8.9 (4.2)	37.9	0.03 (±0.01)	0.03 (1.48)	0.04 (±0.01)	0.04 (1.42)
Float: Discharges	Personal (n=6)	168.1 (±150.3)	122.0 (2.5)	558.8	3.3 (±1.7)	3.0 (1.7)	5.7	140.1 (±75.2)	124.5 (1.7)	292.2	0.19 (±0.15)	0.14 (2.26)	0.20 (±0.16)	0.16 (2.21)
	Mobile (n=2)	^6.9-13.1	–	–	^1.4-1.7	–	–	^16.7-29.9	–	–	^0.01-0.02	–	^0.03-0.06	–
Public Restrooms & Discharges	Personal (n=3)	44.0 (±26.7)	38.6 (1.9)	93.8	4.1 (±2.1)	3.8 (1.7)	5.8	67.8 (±95.7)	24.7 (7.1)	110.1	0.07 (±0.04)	0.06 (1.74)	0.07 (±0.04)	0.06 (1.79)
	Mobile (n=3)	28.5 (±12.7)	26.6 (1.6)	42.4	3.5 (±1.2)	3.4 (1.4)	4.5	8.8 (±12.0)	3.5 (6.4)	31.4	0.05 (±0.02)	0.04 (1.50)	0.05 (±0.02)	0.05 (1.42)

^– indicates employee departments where no samples or taken or insufficient numbers of samples >LOD were collected to calculate MVUE, SD, GM, GSD, or 95%tile.
^A indicates employee departments with <2 measurements. In these departments, the minimum and maximum measurements replace the average (MVUE) calculations.

^{B1}Indicates employee departments where >70% of samples were <LOD. In these departments, the minimum and maximum measurements replace the average (MVUE) calculations. MVUE indicates minimum variance unbiased estimate. SD indicates one standard deviation, $\pm$ one standard deviation shown in parentheses. GM indicates geometric mean. GSD indicates geometric standard deviation, $\pm$ one geometric standard deviation shown in parentheses. 95%ile indicates 95th percentile. OM indicates the oxidant mixture defined by Equation 2. TM indicates the total mixture defined by Equation 1. Float: discharges=employees assigned to clean discharged patient rooms in multiple departments. Public Restrooms & Discharges=employees assigned to clean public restrooms and discharged patient rooms in multiple departments. ICU=intensive care unit.

Table 2. Average (MVUE) and 95th percentile area concentrations (in parts per billion) of hydrogen peroxide, peracetic acid, acetic acid, oxidant mixture, and total mixture by hospital area, July and August 2018.

Hospital Area	N	Hydrogen Peroxide			Peracetic Acid			Acetic Acid			OM		TM	
		MVUE (± SD)	GM (GSD)	95%ile	N	MVUE (± SD)	GM (GSD)	95%ile	N	MVUE (± SD)	GM (GSD)	N	MVUE (± SD)	GM (GSD)
1 st Floor Emergency Dept	12	4.4 (± 1.3)	4.6 (1.3)	7.3	12	0.2 (± 0.2)	0.1 (2.5)	0.6	12	8.9 (± 6.1)	7.3 (1.9)	12	0.01 (± 0.0)	
2 nd Floor ICU	2	^A 4.4- 8.1	–	–	2	^A 0.2- 1.1	–	–	6	11.6 (± 7.2)	9.9 (1.9)	2	^A 0.005- 0.014	–
2 nd Floor ICU Pre-Op	0	–	–	–	0	–	–	–	4	8.0 (± 2.2)	7.7 (1.3)	0		
3 rd Floor Anesthesia Admin	0	–	–	–	0	–	–	–	4	17.0 (± 9.3)	15.2 (1.7)	0	–	–
3 rd Floor Labor & Delivery	6	6.9 (± 2.8)	6.4 (1.5)	12.0	6	0.6 (± 1.1)	0.2 (5.1)	2.4	12	11.2 (± 7.2)	9.4 (1.9)	6	0.01 (± 0.01)	0.009 (1.75)
4 th Floor Pediatrics	2	^A 6.8- 16.6	–	–	2	^A 0.2- 2.4	–	–	6	11.3 (± 7.4)	9.5 (1.9)	2	^A 0.018 -0.019	–
5 th Floor Step Down Unit	2	^A 6.7- 42.1	–	–	2	^A 0.5- 5.7	–	–	6	12.8 (± 6.8)	11.4 (1.7)	2	^A 0.011- 0.073	–
6 th Floor Medical-Surgical	2	^A 7.5- 16.8	–	–	2	^A 0.2- 0.6	–	–	6	12.2 (± 6.6)	10.8 (1.7)	2	^A 0.009 -0.02	–
7 th Floor Medical-Surgical	2	^A 7.0- 8.7	–	–	2	^A 0.3- 0.7	–	–	6	9.2 (± 1.7)	10.5 (5.8)	2	^A 0.010- 0.014	–
Diagnostic Imaging	0	–	–	–	0	–	–	–	4	^B 5.4- 9.7	–	0	–	–
Pharmacy	0	–	–	–	0	–	–	–	4	6.7 (± 3.3)	6.2 (1.6)	0	–	–

–Indicates areas where no samples or taken or insufficient numbers of samples > LOD were collected to calculate MVUE, SD, GM, GSD, or 95%tile. AIndicates areas with < 2 measurements. In these areas, the minimum and maximum measurements replace the average (MVUE) calculations. BIndicates areas where >70% of samples were < LOD. In these areas, the minimum and maximum measurements replace the average (MVUE) calculations. MVUE indicates minimum variance unbiased estimate. SD indicates one standard deviation, ± one standard deviation shown in parentheses. GM indicated geometric mean. GSD indicates geometric standard deviation, ± one geometric standard deviation shown in parentheses. 95%ile indicates 95th percentile. OM indicates the oxidant mixture defined by Equation 2. TM indicates the total mixture defined by Equation 1. ICU = intensive care unit.

Participant Demographics and Post-Shift Survey Results

A total of 77 current employees, including 55 EVS staff and 22 non-EVS staff, completed the post-shift survey. The job groups of the non-EVS participants can be seen in Table 3. Participant demographics can be seen in Table 4. The median age for both EVS and non-EVS participants were similar with a median age among EVS participants of 51 years (range: 23 years to 70 years) and a median age among non-EVS participants of 42 years (range: 28 years to 58 years) (Table 4). Most participants were Hispanic (73% EVS and 45% non-EVS). The median tenure at the hospital was 6.4 years for EVS participants and 12.0 years for non-EVS participants. Gender and smoking history were similar between the two groups. Most participants were female (75% EVS and 82% non-EVS) and never smokers (76% EVS and 82% non-EVS).

Table 3. Job groups of non-EVS post-survey participants, N=22, July and August 2018

Job Group	n (%)
Nursing staff*	13 (59%)
Other patient care staff†	4 (18%)
Administrative staff‡	3 (14%)
Pharmacists	2 (9%)

Note: EVS=environmental services staff

*Nursing Staff includes Staff Nurses and Registered Nurses.

†Other Patient Care Staff includes Case Managers, Respiratory Technicians, Radiology Technicians and Radiology Assistants.

‡Administrative Staff includes Unit Secretaries and Clerks.

Table 4. Demographic characteristics of survey participants, NIOSH survey, July and August 2018

Characteristic	All Participants (N=77)	EVS (n=55)	Non-EVS (n=22)
Age, years, median (range)	46 (23–70)	51 (23–70)	42 (28–58)
Tenure, years, median (range)	6.9 (0.1–28.8)	6.4 (0.1–28.8)	12 (0.3–21.7)
Male, n (%)	18 (23%)	14 (25%)	4 (18%)
Race, n (%)			
Hispanic	50 (65%)	40 (73%)	10 (45%)
White	14 (18%)	7 (13%)	7 (32%)
Asian	6 (8%)	4 (7%)	2 (9%)
Unknown†	5 (6%)	3 (5%)	2 (9%)
Black	2 (3%)	1 (2%)	1 (5%)
Smoking status, n (%)			
Current	5 (6%)	4 (7%)	1 (5%)
Former	12 (16%)	9 (16%)	3 (14%)
Never	60 (78%)	42 (76%)	18 (82%)

Notes: EVS=Environmental Services Staff; Non-EVS=Case Manager, Staff Nurses, Registered Nurses, Respiratory Technicians, Unit Secretaries, Clerks, Radiology Technicians, Radiology Assistants, Pharmacy

†Includes participants who refused to indicate a race

All participants' responses to questions about self-reported symptoms and diagnoses can be seen in Table 5. The most commonly reported symptoms occurring during their shift, or in the previous four weeks, were nasal irritation and eye irritation. Nasal irritation occurring during the employee's work shift was reported by 39%, and eye irritation occurring during the employee's work shift was reported by 43% of all participants (Table 5). Similarly, nasal irritation occurring in the previous four weeks was reported by 58%, and eye irritation was reported by 66% of all participants.

Some reported symptoms were work-related. Acute, cross-shift work-related mucous membrane irritation (defined as nasal and/or eye irritation) was reported by 48% (n=37/77) of total post-shift survey participants and 62% (n=34/55) of EVS staff survey participants. Work-related mucous membrane irritation in the previous four weeks was reported by 57% (n=44/77) of total post-shift survey participants and 69% (n=38/55) of EVS staff survey participants. Acute work-related lower airway symptoms such as cough, wheeze, chest tightness, shortness of breath or difficulty breathing were reported in 36% (n=28/77) of total post-shift survey participants and 45% (n=25/55) of EVS staff survey participants. Work-related lower airway symptoms such as cough, wheeze, chest tightness, shortness of breath or difficulty breathing in the previous four weeks were reported in 44% (n=34/77) of total post-shift survey participants and 55% (n=30/55) of EVS staff survey participants.

Nasal irritation, throat irritation, eye irritation, and shortness of breath were the most frequently reported work-related symptoms in the post-shift survey of acute, cross-shift symptoms. Thirty-two percent of post-shift survey participants reported work-related nasal irritation, 27% work-related throat irritation, 40% work-related eye irritation, and 21% work-related shortness of breath during their shift. Similarly, nasal irritation (43%), sneeze (36%), throat irritation (36%), and eye irritation (45%) were the most frequently reported work-related symptoms in the post-shift survey of symptoms occurring in the previous four weeks. Work-related cough, wheeze, or shortness of breath in the previous four weeks was reported by 27%, 23%, and 23% of participants, respectively.

Table 5. Symptoms, self-reported diagnoses, and total stress reported by all post-shift survey participants (N=77), July and August 2018

Health Outcome	Overall symptoms, n (%)	Work-related*, n (%)
Symptoms during shift		
Nasal irritation	30 (39%)	25 (32%)
Eye irritation	33 (43%)	31 (40%)
Sneeze	18 (23%)	14 (18%)
Throat irritation	26 (34%)	21 (27%)
Cough	15 (19%)	10 (13%)
Wheeze or whistling in the chest	10 (13%)	8 (10%)
Chest tightness	6 (8%)	4 (5%)
Shortness of breath	16 (21%)	16 (21%)
Difficulty breathing	5 (6%)	5 (6%)
Lower airway symptoms (cough, wheeze, chest tightness, shortness of breath, or difficulty breathing)	31 (40%)	28 (36%)
Skin symptoms	6 (8%)	4 (5%)
Symptoms in previous 4 weeks		
Nasal irritation	45 (58%)	33 (43%)
Eye irritation	51 (66%)	35 (45%)
Sneeze	43 (56%)	28 (36%)
Throat irritation	39 (51%)	28 (36%)
Cough	29 (38%)	21 (27%)
Wheeze or whistling in the chest	26 (34%)	18 (23%)
Chest tightness	17 (22%)	12 (16%)
Shortness of breath	24 (31%)	18 (23%)
Difficulty breathing	17 (22%)	11 (14%)
Lower airway symptoms (cough, wheeze, chest tightness, shortness of breath, or difficulty breathing)	42 (55%)	34 (44%)
Skin symptoms	19 (25%)	16 (21%)
Diagnoses		
Asthma		
Ever	9 (12%)	
Current	5 (7%)	
Nasal or sinus allergies	23 (30%)	
Eczema or any kind of skin allergy	7 (9%)	
Chronic bronchitis	7 (9%)	
Emphysema	0 (0%)	
COPD	0 (0%)	
Total Stress	5.0**	

*Work-related acute, cross-shift symptoms defined as symptoms that occurred during the participants' shift

that were not present upon arrival at work that day. Work-related symptoms in the previous four weeks were defined as symptoms that improved away from the facility, either on days off or on vacation. **Total stress is reported as the average for all participants, on a scale of 0–10. COPD=Chronic Obstructive Pulmonary Disease.

Summary of July and August 2018 Post-Shift Survey of Acute, Cross-Shift Symptoms and Associations with Exposure to HP, PAA, AA, OM, and TM

We explored associations between log-transformed exposure to single chemical vapors as well as mixtures of the chemical constituents in the sporicidal product (LnHP, LnPAA, LnAA, LnOM, and LnTM) and acute, cross-shift symptoms occurring during the work shift using logistic regression. We also explored associations between age, gender, tenure, smoking status, and use of cleaning products containing sensitizers and irritants during the employee's work shift, allergic status, total stress, and work-related acute symptoms using logistic regression (Appendix, Table A2). Work-related acute mucous membrane irritation symptoms, specifically nasal and eye irritation, as well as shortness of breath, were significantly associated with exposure to the OM of HP and PAA, and TM of HP, PAA, and AA, after adjusting for age, gender, smoking status, use of cleaning products containing known asthmagens during the employee's work shift, allergic status, and total stress (Figure 2; Table 6). Additionally, work-related acute, cross-shift wheeze was significantly associated with increases in exposure to HP, indicating an increase in symptoms with increasing exposure to HP, one of the constituents in the sporicidal product. Acute, cross-shift chest tightness and skin symptom results are not reported in Figure 2 and Table 6 below because the logistic regression model could not reliably estimate odds ratios and confidence intervals for these health endpoints because of few survey participants reporting these symptoms during their shift.

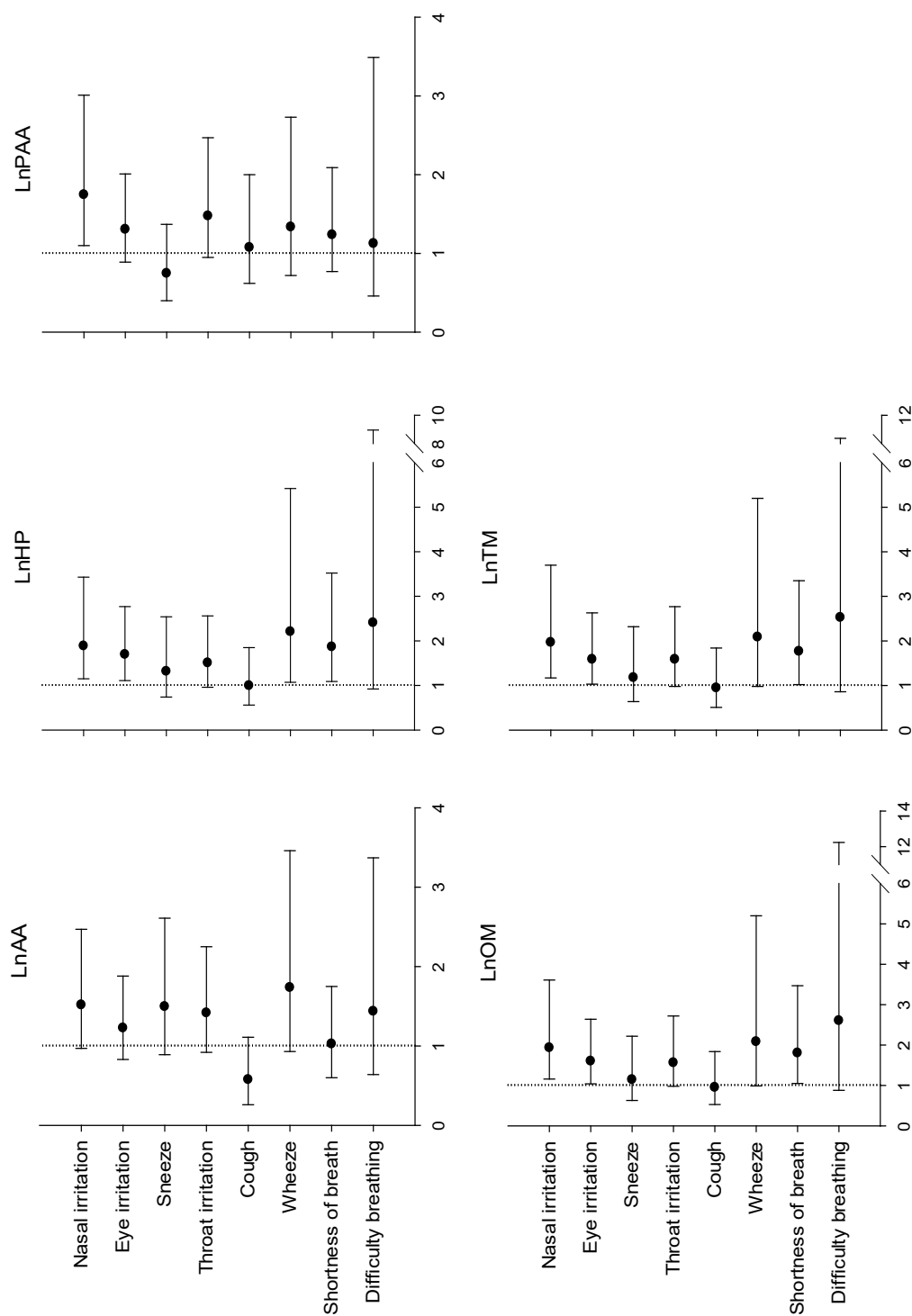


Figure 2. Adjusted odds ratios and 95% confidence intervals for eye, upper airway, and lower airway symptoms reported as occurring during employees' shift per increase in exposure to LnAA, LnHP, LnPAA, LnOM, and LnTM in July and August 2018. Ln indicates natural log-transformed measurements of AA, HP, PAA, OM, and TM respectively. OM indicates the mixture of HP and PAA using the ACGIH mixture formula. TM indicates the mixture of HP, PAA, and AA using the ACGIH mixture formula.

Table 6. Adjusted odds ratios** for acute, cross-shift symptoms and exposure to hydrogen peroxide, peracetic acid, acetic acid, oxidant mixture, and total mixture in July and August 2018.

Symptom	LnHP (95% CI)	LnPAA (95% CI)	LnAA (95% CI)	LnOM (95% CI)	LnTM (95% CI)
Nasal irritation*†	1.91 (1.15–3.43)	1.76 (1.10–3.01)	1.53 (0.97–2.47)	1.96 (1.16–3.61)	1.99 (1.17–3.70)
Sneeze	1.34 (0.74–2.54)	0.76 (0.40–1.37)	1.51 (0.89–2.61)	1.17 (0.63–2.22)	1.20 (0.64–2.32)
Eye irritation*†	1.72 (1.11–2.77)	1.32 (0.89–2.01)	1.24 (0.83–1.88)	1.63 (1.04–2.64)	1.61 (1.03–2.63)
Throat irritation	1.53 (0.96–2.56)	1.49 (0.95–2.47)	1.43 (0.92–2.25)	1.59 (0.98–2.72)	1.61 (0.98–2.77)
Cough	1.02 (0.56–1.85)	1.09 (0.62–2.00)	0.59 (0.26–1.11)	1.08 (0.61–1.94)	1.07 (0.60–1.95)
Wheeze	2.23 (1.07–5.42)	1.35 (0.72–2.73)	1.75 (0.93–3.46)	2.11 (0.99–5.20)	2.11 (0.98–5.20)
Shortness of breath*†	1.89 (1.09–3.52)	1.25 (0.77–2.09)	1.04 (0.60–1.75)	1.83 (1.05–3.47)	1.79 (1.02–3.35)
Difficulty breathing	2.43 (0.92–8.96)	1.14 (0.46–3.49)	1.45 (0.64–3.37)	2.63 (0.88–12.24)	2.55 (0.86–11.19)

Note: Ln indicates log-transformed measurements of AA, HP, PAA, OM, and TM respectively. TM=total mixture defined using the ACGIH additive mixture formula (hydrogen peroxide, peracetic acid, and acetic acid); OM=oxidant mixture defined using the ACGIH additive mixture formula (hydrogen peroxide, and peracetic acid).

Exposures that were significantly associated with work-related acute symptoms are noted in bold.

*Indicates symptoms significantly positively associated with increased exposure to the oxidant mixture.

†Indicates symptoms significantly positively associated with increased exposure to the total mixture.

**The adjusted odds ratios represent the change for every natural log parts per billion change in exposure measurements. An adjusted odds ratio greater than one indicates a significant increase in work-related symptoms for an increase in exposure, after adjusting for age, gender, tenure, smoking status, and use of cleaning products containing sensitizers and irritants during the employee's work shift, allergic status, and total stress.

Summary of July and August 2018 Post-Shift Survey of Symptoms in the Previous 4 weeks and Associations with Departmental Exposure to HP, PAA, AA, OM, and TM

We explored associations between departmental exposure to single chemical vapors as well as mixtures of the chemical constituents in the sporicidal product (LnHP, LnPAA, LnAA, LnOM, and LnTM) and symptoms occurring during the previous four weeks using logistic regression. We also explored associations between age, gender, tenure, smoking status, and frequency of use of cleaning products containing sensitizers and irritants, allergic status, total stress and work-related symptoms in the previous four weeks using logistic regression (Appendix, Table A3). Work-related mucous membrane irritation symptoms in the previous four weeks, specifically nasal and eye irritation, were significantly associated with departmental exposure to the oxidant mixture of HP and PAA, and total mixture of HP, PAA, and AA, after adjusting for age, gender, smoking status, frequency of use of cleaning products containing sensitizers and irritants, allergic status, and total stress (Figure 3; Table 7). Additionally, work-related nasal irritation, eye irritation, and sneeze in the previous four weeks were significantly associated with increases in departmental exposure to PAA, indicating an increase in symptoms with increasing exposure to PAA, one of the constituents in the sporicidal product.

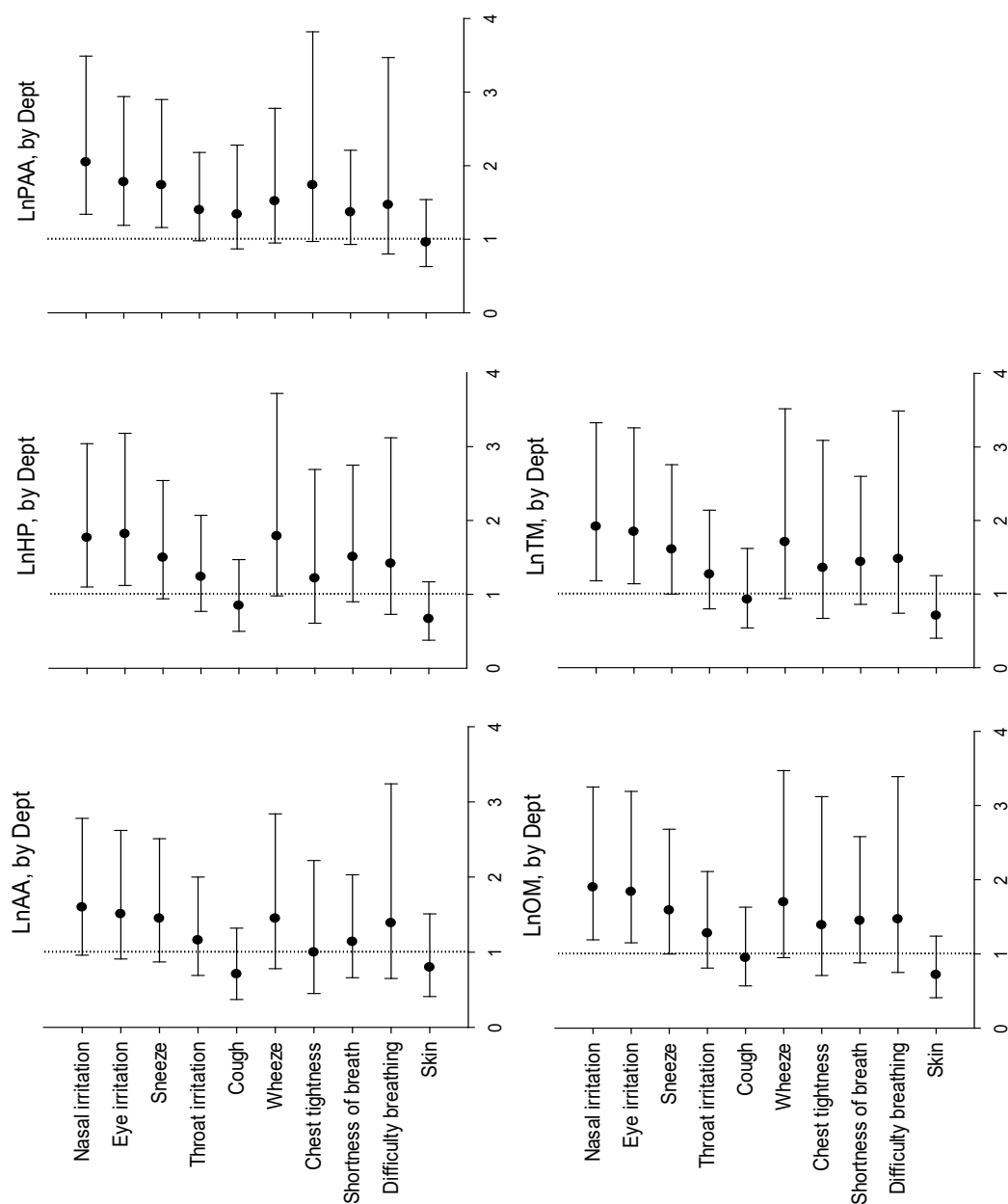


Figure 3. Adjusted odds ratios and 95% confidence intervals for work-related eye, upper airway, lower airway, and skin symptoms reported as occurring in the previous four weeks per increase in exposure to LnAA, LnHP, LnPAA, LnOM, and LnTM. Ln indicates natural log-transformed measurements of AA, HP, PAA, OM, and TM respectively. OM indicates the mixture of HP and PAA using the ACGIH mixture formula. TM indicates the mixture of HP, PAA, and AA using the ACGIH mixture formula.

Table 7. Adjusted odds ratios** for symptoms in the previous four weeks and exposure to hydrogen peroxide, peracetic acid, acetic acid, oxidant mixture, and total mixture in July and August 2018

Symptom	LnHP (95% CI)	LnPAA (95% CI)	LnAA (95% CI)	LnOM (95% CI)	LnTM (95% CI)
Nasal irritation*†	1.78 (1.10–3.04)	2.06 (1.34–3.49)	1.61 (0.96–2.78)	1.91 (1.19–3.25)	1.93 (1.18–3.33)
Sneeze	1.51 (0.94–2.54)	1.75 (1.16–2.90)	1.46 (0.87–2.51)	1.60 (1.00–2.68)	1.62 (1.00–2.76)
Eye irritation*†	1.83 (1.12–3.18)	1.79 (1.19–2.94)	1.52 (0.91–2.62)	1.85 (1.15–3.19)	1.86 (1.14–3.26)
Throat irritation	1.25 (0.77–2.07)	1.41 (0.98–2.18)	1.17 (0.69–2.00)	1.29 (0.81–2.11)	1.28 (0.80–2.14)
Cough	0.86 (0.50–1.47)	1.35 (0.87–2.28)	0.72 (0.37–1.32)	0.96 (0.57–1.63)	0.94 (0.54–1.62)
Wheeze	1.80 (0.98–3.72)	1.53 (0.95–2.78)	1.46 (0.78–2.84)	1.71 (0.95–3.47)	1.72 (0.94–3.52)
Chest tightness	1.23 (0.61–2.69)	1.75 (0.97–3.82)	1.01 (0.45–2.22)	1.40 (0.71–3.12)	1.37 (0.67–3.09)
Shortness of breath	1.52 (0.90–2.75)	1.38 (0.93–2.21)	1.15 (0.66–2.03)	1.46 (0.88–2.58)	1.45 (0.86–2.60)
Difficulty breathing	1.43 (0.73–3.12)	1.48 (0.80–3.47)	1.40 (0.65–3.24)	1.48 (0.75–3.39)	1.49 (0.74–3.49)
Skin symptoms	0.68 (0.38–1.17)	0.97 (0.63–1.54)	0.81 (0.41–1.51)	0.73 (0.41–1.24)	0.72 (0.40–1.25)

Note: Ln indicates log-transformed measurements of AA, HP, PAA, OM, and TM respectively. TM=total mixture defined using the ACGIH additive mixture formula (hydrogen peroxide, peracetic acid, and acetic acid); OM=oxidant mixture defined using the ACGIH additive mixture formula (hydrogen peroxide, and peracetic acid).

Exposures that were significantly associated with work-related acute symptoms are noted in bold.

* Indicates symptoms significantly positively associated with increased exposure to the oxidant mixture.

† Indicates symptoms significantly positively associated with increased exposure to the total mixture.

** The adjusted odds ratios represent the change for every natural log parts per billion change in exposure measurements. An adjusted odds ratio greater than one indicates a significant increase in work-related symptoms for an increase in exposure, after adjusting for age, gender, tenure, smoking status, and frequency of use of cleaning products containing sensitizers and irritants in the previous four weeks, allergic status, and total stress.

Discussion

Hospital staff using the product containing HP, PAA, and AA, or working in areas where the product containing HP, PAA, and AA was used, reported upper and lower airway symptoms occurring during their shift and in the previous four weeks. Symptoms were associated with exposure to the mixture of vapors from the sporicidal product.

Overall, nose and eye symptoms were the most commonly reported work-related symptoms among hospital staff. Occupational upper respiratory disease such as allergic rhinitis (hay fever, nasal allergies) and sinusitis is often more prevalent than occupational asthma and several studies suggest that rhinosinusitis might precede or occur with lower respiratory symptoms and asthma. asthma [Shaaban et al. 2008; EAACI Task Force on Occupational Rhinitis et al. 2008; Rondón et al. 2012, 2017; Sahay et al. 2016; Siracusa et al. 2000; Park et al. 2012]. Additionally, upper respiratory involvement (e.g., rhinitis, sinusitis) can result in suboptimal control of asthma. The common airway hypothesis suggests that occupational upper disease indicates a risk for lower airway involvement [Siracusa et al. 2000; Park et al. 2012; Walusiak 2006; Bascom et al. 2007]. Over two-thirds of (17 of 28; 68%) participants who reported work-related acute, cross-shift lower respiratory symptoms also reported acute, cross-shift nasal symptoms and almost three-quarters (25 of 34; 74%) of participants who reported work-related lower respiratory symptoms in the previous four weeks also reported work-related nasal symptoms in the previous four weeks.

Our results demonstrate that exposure to vapors from the sporicidal product containing HP, PAA, and AA contributed to work-related acute, cross-shift eye and airway symptoms as well as work-related eye and airway symptoms in the previous four weeks in hospital staff. The results of our evaluation are consistent with previous studies that have reported an increased risk for chronic bronchitis and work-related rhinitis and asthma in workers exposed to cleaning and disinfectant chemicals [Maçãira et al. 2007; Rosenman et al. 2003; Vizcaya et al. 2011; Charles, Loomis, and Demissie 2009]. We observed health effects among cleaning staff at exposure levels below established occupational exposure limits. Because both HP and PAA are strong oxidants, the mixture of HP and PAA potentially contributed to the eye and airway symptoms reported by cleaning staff at the relatively low levels of measured exposures.

The 2008 Centers for Disease Control and Prevention (CDC) Healthcare Infection Control Practices Advisory Committee (HICPAC) Guidelines recommend that each worker be informed of the possible health effect(s) of his or her exposure to chemicals [CDC 2008]. Specifically, employees should be educated on the documented health risks from exposure to HP, AA and PAA, as well as chemicals found in other cleaning products used at the hospital. This information should be consistent with SDSs, Environmental Protection Agency regulations, and OSHA requirements and identify areas and tasks where there is the potential for exposure. We note the Association of Occupational and Environmental Clinics (AOEC) in 2015 listed this sporicidal product as an asthmagen, or a substance that causes asthma [AOEC 2015].

We observed some EVS staff using surgical masks or a MOLDEX 2800N95 Series Particulate Respirator (Moldex® Culver City, CA) for the purpose of respiratory protection while dispensing or working with cleaning products. However, these types of masks do not provide adequate, validated respiratory protection while working with products that release gases or chemical vapors. Specifically, the MOLDEX 2800N95 respirators' effectiveness at mitigating worker exposure to organic vapors associated with the cleaning products in use at this hospital has not been validated.

We recommend that company management pursue the actions listed below to reduce employee exposure to sporicidal products containing HP, PAA, and AA. Because employees are most familiar with the areas and tasks involved, we recommend that management involve employees that perform the work duties in each respective area when enacting any actions described below. A committee of EVS staff, patient care staff, infection preventionists, and occupational health and safety representatives, should be convened when new cleaners and sporicidal disinfectants are chosen for the facility. Acquiring buy-in from these different groups before investment is key to implementing a new cleaning product or system. Labor-management health and safety meetings are also an opportune environment to discuss department-specific recommendations and develop an action plan. Many of our recommendations come from the CDC's HICPAC, which developed a Guideline for Disinfection and Sterilization in Healthcare Facilities in 2008 [CDC 2008]. This HICPAC Guideline acknowledges that irritant and allergic effects can occur with disinfectant chemical air concentrations at levels below OSHA or NIOSH exposure limits [CDC 2008]. HICPAC recommends that controls be used to minimize exposure to disinfectants, including elimination or substitution of the chemical, engineering or administrative controls, or the use of personal protective equipment. Additional information is provided in the Recommendations section, below.

Conclusions

In summary, acute eye symptoms and upper and lower respiratory symptoms occurring during an employee's work shift and in the previous four weeks were common among hospital staff. Hospital staff exposed to vapors from OxyCide®, a disinfectant cleaner that is one of a group of sporicidal products marketed under various trade names that contain HP, PAA, and AA, reported acute eye, airway, and skin symptoms, as well as eye, and airway symptoms in the previous four weeks at low levels of measured exposures. Increased exposure to HP, PAA, and AA was significantly associated with increases in work-related eye, and upper and lower airway symptoms after adjusting for age, gender, smoking status, use of cleaning products containing sensitizers and irritants, allergic status, and total stress. Work-related acute, cross-shift mucous membrane irritation symptoms, specifically nasal and eye irritation, as well as shortness of breath were significantly associated with increased exposure to HP, PAA, and AA, indicating an increase in symptoms with increasing exposure to the mixture of vapors from the sporicidal product. Wheeze during an employee's work shift was also significantly associated with increases in exposure to vapors from the sporicidal product, specifically with increases in exposure to HP. Work-related mucous

membrane symptoms in the previous four weeks, specifically nasal and eye irritation, in the previous four weeks were also significantly associated with increases in departmental exposure to HP, PAA, and AA, indicating an increase in symptoms with increasing exposure to vapors from the sporicidal product. Additionally, work-related nasal irritation, sneeze, and eye irritation in the previous four weeks were significantly associated with increases in departmental exposure to PAA, indicating an increase in symptoms with increasing exposure to PAA, one of the constituents in the sporicidal product. All full-shift TWA air samples for HP and AA were below established occupational exposure limits. Our results indicate a need to (1) monitor eye, respiratory, and skin symptoms among hospital cleaning staff using any cleaning products containing a mixture of HP, PAA, and AA, and (2) use a combination of engineering, administrative, and PPE controls to reduce employee exposures.

Recommendations

Our recommendations are based on an approach known as the hierarchy of controls. This approach groups actions by how effective they are at removing or reducing hazards. In most cases, the primary approach is to eliminate hazardous materials or processes, and to install engineering controls to reduce exposure or shield employees. Administrative measures and personal protective equipment might be needed until such engineering controls are in place, or if engineering controls are not effective or feasible. Hospital management has already taken some steps to minimize employee exposure to the sporicidal product containing HP, PAA, and AA, and address employee concerns. Below, we provide additional recommendations in the continued effort to improve employee health and safety.

Elimination or Substitution

A primary approach to minimizing exposure risk is to eliminate hazardous materials or processes. Sporicidal disinfectants are an important part of reducing healthcare-acquired infections. However, the choice to use sporicidal disinfectants in specific areas of the hospital should be prudent and reflect the level of risk of a healthcare-acquired infection. We observed the sporicidal product containing HP, PAA, and AA being used by cleaning staff on surfaces throughout the hospital, including surfaces in non-patient areas. HICPAC provides recommendations for when and where sterilization with sporicides versus disinfection with high- and low-level disinfectants should occur in healthcare facilities [CDC 2008]. Exposure to vapors containing HP, PAA, and AA could be reduced by substituting sporicidal products containing HP, PAA, and AA with intermediate or low-level disinfectants when cleaning noncritical items or surfaces in non-patient areas. HICPAC states that detergent and water are adequate for cleaning surfaces in non-patient care areas. We recommend sporicidal products containing HP, PAA, and AA, not be used in non-patient care areas such as in public bathrooms, pharmacy, or administrative offices.

Engineering Controls

Engineering controls can reduce employees' exposures by lowering air concentrations with increased ventilation or by placing a barrier between the hazard and the employee. Engineering controls protect employees effectively without placing primary responsibility of implementation on the employee.

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1. Ensure the dispensers for the sporicidal product containing HP, PAA, and AA are calibrated to effectively dilute the product to a pH of 2.7–4.0. If the sporicidal product is not effectively diluted, a pH of less than 2.7 might increase skin, eye, and respiratory symptoms in exposed employees.
 2. Ensure all heating, ventilation, and air-conditioning systems are functioning well and meet all applicable ASHRAE standards for ventilation of health care facilities [ASHRAE 2017].

Administrative Controls

Administrative controls refer to employer-dictated work practices and policies to reduce or prevent hazardous exposures. Their effectiveness depends on employer commitment and employee acceptance. Regular monitoring and reinforcement are necessary to ensure that policies and procedures are followed consistently.

1. Minimize use of sporicidal products containing HP, PAA, and AA, in non-patient care areas.
2. Ensure employees understand potential hazards in the workplace and how to protect themselves. OSHA's Hazard Communication Standard, also known as the "Right to Know Law" [29 CFR 1910.1200] requires that employees are informed and trained on potential work hazards and associated safe practices, procedures, and protective measures. Ensure employees have access and are informed of potential hazards and trained on the associated safe practices per the information found in the cleaning products' SDSs. The 2008 HICPAC Guideline recommends each worker be informed of the possible health effect(s) of his or her exposure to chemicals. Specifically, employees should be educated on the documented health risks from exposure to HP, AA and PAA, as well as chemicals found in other cleaners at the hospital. This information should be consistent with SDSs, Environmental Protection Agency regulations, and OSHA requirements and identify areas and tasks where there is the potential for exposure. These trainings should be offered in English and Spanish.
3. We recommend management implement a reporting system that would allow employees to report work-related symptoms, with the option to remain anonymous for employees who do not wish to be identified. As a performance indicator for disinfection and sterilization, HICPAC recommends that healthcare facilities develop a mechanism for the reporting of all adverse health events potentially resulting from exposure to sporicidal disinfectants and sterilants. These reports should be reviewed regularly, and the facility should implement controls to prevent future exposures.
4. Health and safety concerns related to cleaning and disinfecting products should be regularly evaluated. An annual post-shift survey of acute symptoms might be a useful tool for (1) alerting management to symptoms experienced by cleaning staff and (2) identifying areas of the hospital where symptoms might be more commonly reported, and exposures might be higher. Because a number of post-shift survey participants in our survey chose to have the survey administered in Spanish, the annual post-shift

survey should also be professionally translated and offered in Spanish. Such a system can allow employees with symptoms related to cleaning or disinfecting products to be offered relocation to an area or department of the hospital with lower risk of exposure to sporicidal disinfectants. This type of evaluation can also help the facility identify additional controls to reduce employee exposure.

5. Employees should report new, persistent, or worsening symptoms to their personal healthcare provider and, as instructed by their employer, to a designated individual at their workplace. An individualized management plan (such as assigning an affected employee to a different work location) is sometimes required as indicated by medical findings and recommendations of the physician. Employees with symptoms should provide their personal physicians or other healthcare providers with a copy of this report.
6. A team approach should be used when introducing a new cleaning product or system. A committee of EVS staff, patient care staff, infection preventionists, and occupational health and safety representatives should be convened when new cleaners and sporicidal disinfectants are chosen for the facility. Acquiring buy-in from these different groups before investment is key to implementing a new cleaning product or system. A trial period with a new cleaning system or product, with selected trial departments or areas of the hospital, could be used to acquire feedback from stakeholders, including EVS staff, to evaluate new cleaning systems or products. Evaluation of a new cleaning system or product should consider effectiveness, cost, and employee health and safety concerns.

Personal Protective Equipment

Personal protective equipment is the least effective means for controlling hazardous exposures. Proper use of personal protective equipment requires a comprehensive program and a high level of employee involvement and commitment. The right personal protective equipment must be chosen for each hazard. Supporting programs such as training, change-out schedules, and medical assessment might be needed. Personal protective equipment should not be the sole method for controlling hazardous exposures. Rather, personal protective equipment should be used until effective engineering and administrative controls are in place.

1. Require employees to wear extended cuff nitrile gloves or rubber gloves when using the sporicidal product containing HP, PAA, and AA, and goggles or a face shield while dispensing and pouring the product into or out of the bucket on their cleaning cart.

Appendix A: Supplemental Analyses

Associations of age, gender, smoking status, allergic status, use of cleaning products containing sensitizers and irritants, and total stress, with work-related eye, upper airway, lower airway, and skin symptoms reported during an employee's shift

We used the LOGISTIC procedure in SAS to examine associations of age, gender, smoking status, allergic status, use of cleaning products containing sensitizers and irritants during an employee's shift, and total stress, with work-related eye, upper airway, lower airway, and skin symptoms reported during an employee's shift. Results can be seen in Table A2 below.

Smoking status and allergic status were significantly associated with acute, cross-shift sneeze (Table A1). Use of products containing sensitizers and irritants during an employee's shift was significantly associated with acute, cross-shift nasal irritation, sneeze, and difficulty breathing. Total reported stress was significantly associated with acute, cross-shift nasal irritation, throat irritation, and shortness of breath. All covariates seen in Table A2 below were included in the adjusted models reported in Figure 2 and Table 6 in the main body of the report.

Associations of age, gender, smoking status, allergic status, use of cleaning products containing sensitizers and irritants, and total stress, with work-related eye, upper airway, lower airway, and skin symptoms reported during an employee's shift

We used the LOGISTIC procedure in SAS to examine associations of age, gender, smoking status, allergic status, use of cleaning products containing sensitizers and irritants in the previous four weeks, and total stress, with work-related eye, upper airway, lower airway, and skin symptoms in the previous four weeks. Results can be seen in Table A3 below.

Smoking status was significantly associated with sneeze in the previous four weeks (Table A2). Age was significantly associated with throat irritation in the previous four weeks. Use of products containing sensitizers and irritants during an employee's shift was significantly associated with difficulty breathing in the previous four weeks. Total reported stress was significantly associated with chest tightness and skin symptoms. All covariates seen in Table A3 below were included in the adjusted models reported in Figure 3 and Table 7 in the main body of the report.

Table A1. Peracetic acid and hydrogen peroxide measurements of diluted OxyCide® product, July–August 2018

Date	Dispenser Location	Cart ID	Cart Fill	Sample Collection Time	Peracetic Acid (ppm)	Hydrogen Peroxide (ppm)
7/31/18	7 South	7-Disney	12:45	14:10	900	—
7/31/18	4 North	4-North	7:30	13:39	1800	—
7/31/18	7 South	7-South	10:00	14:04	1500	—
7/31/18	7 North	7-2	9:30	14:08	1800	—
7/31/18	6 South	6-South	—	14:00	1500	—
7/31/18	5 South	5-2	7:30	13:43	1500	—
7/31/18	5 North	6470	7:30	13:47	900	—
7/31/18	6 North	D9	7:30	13:57	1500	—
7/31/18	3 North	3-3	7:30	13:29	1500	—
7/31/18	6 South	6-2	7:30	13:53	900	—
7/31/18	2 South	2-2	7:30	13:26	1200	—
7/31/18	2 North	2-Middle	7:45	13:19	1500	—
7/31/18	3 North	3-North	7:30	13:23	1800	—
7/31/18	2 North	2-North	7:30	13:12	1800	—
7/31/18	4 North	4-3	7:30	13:33	1800	—
7/31/18	5 North	5-3	7:30	13:47	1200	—
8/1/18	3 North	3 North	7:20	7:27	1800	6000
8/1/18	*	Black Cart	7:30	7:40	1500	3600
8/1/18	3 South	3 South	7:30	7:47	1800	7000
8/1/18	3 North	3 North	7:20	9:34	1800	6000
8/1/18	*	Black Cart	7:30	9:38	1200	3600
8/1/18	3 South	3 South	7:30	9:39	2100	6000
8/1/18	3 North	3 North	7:20	11:34	1500	4800
8/1/18	*	Black Cart	7:30	11:37	1200	4800
8/1/18	3 South	3 South	7:30	11:39	1500	6000
8/1/18	3 North	3 North	7:20	13:30	1500	6000
8/1/18	—	Black Cart	7:30	13:38	1200	3600
8/1/18	3 South	3 South	7:30	13:35	1500	6000

*indicates locations that were not known; — indicates samples with no hydrogen peroxide measurements because of limited supply of reagents in the hydrogen peroxide test kit; ppm = parts per million.

Table A2. Odds ratios** for acute, cross-shift symptoms and age, gender, smoking status, allergic status, sensitizer and irritant containing product use during an employee's shift, and total stress, July–August 2018.

Health Outcome	Variable	OR	95% Lower Confidence Limit	95% Upper Confidence Limit
Nasal irritation	Age	0.99	0.94	1.04
	Gender	0.94	0.23	3.96
	Smoking Status	2.03	0.53	9.29
	Allergic Status	0.40	0.12	1.26
	Sensitizer and irritant use during shift	2.00	1.02	4.22
	Total Stress	1.45	1.11	2.01
Sneeze	Age	0.99	0.94	1.05
	Gender	0.40	0.07	2.08
	Smoking Status	7.88	1.10	171.36
	Allergic Status	6.47	1.01	127.68
	Sensitizer and irritant use during shift	3.33	1.44	9.15
	Total Stress	1.15	0.82	1.68
Throat irritation	Age	1.00	0.96	1.06
	Gender	1.19	0.30	5.42
	Smoking Status	2.49	0.60	13.65
	Allergic Status	1.42	0.43	5.25
	Sensitizer and irritant use during shift	1.78	0.91	3.71
	Total Stress	1.38	1.06	1.87
Eye irritation	Age	1.04	0.99	1.09
	Gender	0.52	0.15	1.81
	Smoking Status	1.02	0.30	3.59
	Allergic Status	1.61	0.56	4.90
	Sensitizer and irritant use during shift	1.62	0.88	3.15
	Total Stress	1.22	0.96	1.60
Cough	Age	1.00	0.94	1.06
	Gender	0.40	0.07	2.32
	Smoking Status	3.54	0.53	72.28
	Allergic Status	0.89	0.19	4.76
	Sensitizer and irritant use during shift	1.63	0.69	4.11
	Total Stress	1.00	0.72	1.40
Wheeze	Age	1.04	0.96	1.14
	Gender	1.16	0.17	11.79
	Smoking Status	0.44	0.08	2.83
	Allergic Status	0.44	0.09	2.17
	Sensitizer and irritant use during shift	0.89	0.31	2.48
	Total Stress	0.97	0.64	1.43
Shortness of breath	Age	0.98	0.92	1.04
	Gender	1.84	0.40	10.71
	Smoking Status	0.60	0.14	2.83
	Allergic Status	0.43	0.12	1.53
	Sensitizer and irritant use during shift	0.97	0.44	2.14
	Total Stress	1.38	1.03	1.92
Difficulty breathing	Age	0.95	0.86	1.03
	Gender	0.89	0.07	23.43
	Smoking Status	0.23	0.02	2.38
	Allergic Status	0.31	0.03	3.01
	Sensitizer and irritant use during shift	4.25	1.06	24.38
	Total Stress	0.99	0.58	1.64

Exposures that were significantly associated with work-related acute symptoms are noted in bold.

** An odds ratio greater than one indicates a significant increase in work-related symptoms.

Table A3. Odds ratios** for symptoms in the previous four weeks and age, gender, smoking status, allergic status, frequency of sensitizer and irritant containing product use in the previous four weeks, and total stress, July–August 2018.

Health Outcome	Variable	OR	95% Lower Confidence Limit	95% Upper Confidence Limit
Nasal irritation	Age	1.00	0.96	1.05
	Gender	2.77	0.80	11.39
	Smoking Status	1.76	0.51	6.64
	Allergic Status	0.76	0.27	2.17
	Sensitizer and irritant use in the previous four weeks	1.74	0.88	3.75
	Total Stress	1.07	0.85	1.38
Sneeze	Age	1.00	0.96	1.05
	Gender	0.80	0.23	2.88
	Smoking Status	3.94	1.04	20.09
	Allergic Status	0.99	0.34	2.94
	Sensitizer and irritant use in the previous four weeks	1.65	0.83	3.52
	Total Stress	1.08	0.85	1.37
Throat irritation	Age	1.05	1.01	1.11
	Gender	1.56	0.44	6.14
	Smoking Status	1.75	0.49	6.95
	Allergic Status	1.94	0.66	6.17
	Sensitizer and irritant use in the previous four weeks	1.15	0.57	2.35
	Total Stress	1.01	0.79	1.30
Eye irritation	Age	1.05	1.00	1.10
	Gender	1.81	0.52	6.78
	Smoking Status	2.13	0.60	8.28
	Allergic Status	2.60	0.89	8.17
	Sensitizer and irritant use in the previous four weeks	1.62	0.80	3.46
	Total Stress	1.02	0.80	1.31
Cough	Age	1.01	0.96	1.06
	Gender	0.43	0.10	1.75
	Smoking Status	6.30	1.28	51.35
	Allergic Status	0.96	0.28	3.49
	Sensitizer and irritant use in the previous four weeks	1.78	0.82	4.18
	Total Stress	1.41	1.08	1.93
Wheeze	Age	1.06	1.01	1.13
	Gender	0.93	0.23	4.29
	Smoking Status	2.31	0.56	12.57
	Allergic Status	1.33	0.39	5.07
	Sensitizer and irritant use in the previous four weeks	1.63	0.75	3.74
	Total Stress	1.16	0.88	1.56
Chest tightness	Age	1.06	0.99	1.14
	Gender	1.47	0.27	11.70
	Smoking Status	5.40	0.78	112.75
	Allergic Status	1.35	0.32	6.96
	Sensitizer and irritant use in the previous four weeks	1.31	0.52	3.32
	Total Stress	1.48	1.06	2.17

Table A3 (continued). Odds ratios** for symptoms in the previous four weeks and age, gender, smoking status, allergic status, frequency of sensitizer and irritant containing product use in the previous four weeks, and total stress, July–August 2018.

Shortness of breath	Age	0.97	0.92	1.02
	Gender	1.08	0.29	4.69
	Smoking Status	1.39	0.34	7.19
	Allergic Status	1.02	0.32	3.48
	Sensitizer and irritant use in the previous four weeks	0.89	0.40	1.93
	Total Stress	1.09	0.84	1.43
Difficulty breathing	Age	0.99	0.93	1.06
	Gender	0.73	0.14	4.50
	Smoking Status	0.77	0.15	4.67
	Allergic Status	0.61	0.12	3.21
	Sensitizer and irritant use in the previous four weeks	3.12	1.10	10.87
	Total Stress	1.34	0.97	1.92
Skin symptoms	Age	0.93	0.86	0.99
	Gender	1.12	0.25	5.53
	Smoking Status	0.91	0.18	5.32
	Allergic Status	0.89	0.23	3.75
	Sensitizer and irritant use in the previous four weeks	0.94	0.35	2.47
	Total Stress	1.53	1.12	2.25

Exposures that were significantly associated with work-related acute symptoms are noted in bold.

** An odds ratio greater than one indicates a significant increase in work-related symptoms.

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Availability of Report

Copies of this report have been sent to the employer and employees at the facility. The state health department and the Occupational Safety and Health Administration Regional Office have also received a copy. This report is not copyrighted and may be freely reproduced.

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