

# Infectious Diseases in the Workplace

[Announcer] This program is presented by the Centers for Disease Control and Prevention.

[Sarah Gregory] Hi, this is Sarah Gregory, and today I'm talking to Dr. Marie de Perio. She's in Cincinnati with NIOSH, the National Institute for Occupational Safety and Health. We'll be discussing her article about how infectious diseases can spread in the workplace. Welcome, Dr. de Perio.

[Marie de Perio] Thanks, Sarah. I'm glad to be here. Thanks for this opportunity.

[Sarah Gregory] Let's just jump right in. What's your study about and how was it conducted?

[Marie de Perio] We wanted to better understand the range of infectious disease cases in workplaces, the risk factors for workers, and the ways to prevent infectious disease transmission on the job. To do that, we performed a literature review of infectious disease investigations in workplaces across the United States for a period of time. So, using key words, we searched two databases and we found 67 articles and seven health hazard evaluation reports on 66 investigations. We then abstracted information from each paper and then we used that information to describe occupational factors to consider in investigations and also systematic approach to control and prevent infectious disease in the workplace.

[Sarah Gregory] Well, what's unique about infectious diseases in the workplace?

[Marie de Perio] There are a lot of factors in the workplace that may combine to increase the risk of infection among workers. So, first, there's factors about the disease itself and their different modes of transmission. So, as an example, the bacteria that causes tuberculosis is transmitted through the airborne route, where small particles containing the bacteria are suspended in the air and they can be breathed in. This makes it easier to spread within workplaces, where workers have a higher likelihood of being in close contact with persons who have undiagnosed illness.

So, another factor is factors about the workplace and the work activities themselves that can facilitate transmission. As an example of this, construction workers in central California who dig up or move soil, can be exposed to *Coccidioides*, which is a fungus that causes coccidioidomycosis, or Valley fever. Finally, there are factors about the workers themselves that can contribute to their risk of getting a disease. So, things like impaired immunity or even socioeconomic and language factors.

[Sarah Gregory] How are infectious diseases in the workplace identified?

[Marie de Perio] In order to identify that infectious disease in the workplace, there needs to be, one, a diagnosis of the disease and, two, recognition by the clinician that it could be related to the person's work. Sometimes, clusters can be identified if more than one case is associated with the same workplace close in time. Workplace clusters can be more readily identifiable if occupational information is collected on individual case report forms in notifiable disease databases.

[Sarah Gregory] And what did you find? Who is most likely to get a disease at work?

[Marie de Perio] The cases we reviewed allowed us to identify a range of infectious diseases, specific settings and activities that are at increased risk for certain infectious diseases. We found

the cases we reviewed appear to be concentrated in specific industries and occupations, especially the healthcare industry and among like people like laboratory workers, public service workers, and workers who handle or care for animals.

[Sarah Gregory] What's the most important aspect of this study and why is this study important?

[Marie de Perio] I think our literature review really highlights the importance of considering the workplace as a factor when looking at infectious disease. Consideration of occupational risk factors in the control of occupational exposures is really important and will help protect workers' health and prevent infectious disease transmission, not only in workplaces, but also in the community.

[Sarah Gregory] What other kinds of studies on this subject should be done or would you like to see be done?

[Marie de Perio] I think once notifiable disease systems routinely collect occupational information, it'd be really interesting to analyze those data to identify additional patterns, and also, additional industries and occupations that could be at risk. For example, our group has analyzed occupational information for infectious diseases like coccidioidomycosis and *Campylobacter* infections. For *Campylobacter* infections, which causes a bacterial gastroenteritis, we found that persons working in not only agriculture and food production, but also in healthcare and personal care occupations were at increased risk.

[Sarah Gregory] How long did this study take? It seems like it was quite extensive. What were your first steps?

[Marie de Perio] It's funny, because some of the coauthors and I'd actually talked about doing this type of literature review for a few years. It wasn't until Dr. Chia-ping Su, who's an infectious disease physician from Taiwan CDC, started his fellowship as an Epidemic Intelligence Service officer at the United States CDC. He really dug into the scientific literature and that's how the study took off. The literature search and drafting of the manuscript, once we got started, took about a year to complete and really are the results of contributions by all six of the coauthors.

[Sarah Gregory] Did you have an initial hypothesis or expectation when you began?

[Marie de Perio] I would say, you know, prior to beginning the literature review, we knew that infectious disease cases and outbreaks had been reported in multiple industries and occupations. However, you know, we learned that infectious diseases can affect workers in many occupations, even those beyond things like...industries like health care, laboratory, and animal care work. So, as an example, we found infectious diseases also affects workers in industries like construction, manufacturing, transportation, and education.

[Sarah Gregory] What's been the most challenging aspect of doing this study? Do you have any anecdotes you'd like to share?

[Marie de Perio] Well, I would say, you know, it's pretty clear from our literature review that many groups of workers are at risk for infectious diseases. However, we know that surveillance of work-related infectious diseases is not done systematically, so we're probably missing occurrences of infectious diseases in the workplace. We're also probably missing industries, occupations, and exposures not historically identified as at-risk. So, CDC surveillance programs,

including the program here at NIOSH, are working on strategies to change this, based in part on findings from this review.

[Sarah Gregory] Can you give us some practical outbreak controls?

[Marie de Perio] Yeah. So, at NIOSH, we use the occupational health and safety Hierarchy of Controls as a framework to approach prevention and control measures. The first rung is elimination of hazards, which is the most preferred measure, but it's really not always possible for infectious agents. So, the next best thing in this hierarchy are isolating workers from the hazards through engineering controls, changing the way people work through administrative controls, and then also using personal protective equipment, or PPE.

[Sarah Gregory] Okay, so is there anything else you'd like to tell us that I haven't asked about this study?

[Marie de Perio] Yeah, I think it's important that the listeners understand that an effective program to prevent transmission of infectious diseases in the workplace should involve input from not only management, but also employees and unions, as applicable. So, employees should be informed of and trained on their potential risk of infectious diseases, and also trained on how to prevent or minimize those exposures.

[Sarah Gregory] And why were you personally interested in participating in this study?

[Marie de Perio] At the time of when we were discussing potentially doing this study... so the first author, Dr. Chia-ping Su, and I were actually the only board certified infectious disease physicians at NIOSH. So, we shared this special interest in describing infectious diseases that occur in the workplace. And we talked about, you know, the need for this type of review that just focuses on workers and workplaces. Since I've come to CDC, I've had personal experience in addressing workplace transmission of things like, you know, pandemic influenza A (H1N1) at a long-term care facility. I also was deployed and assisted with the Ebola virus disease cases in Dallas, Texas, specifically after the first nurse was diagnosed. I've also looked at tuberculosis in many healthcare settings, and also did an interesting investigation looking at *Campylobacter* infections among poultry processing workers. These investigations have really highlighted for me the importance of focusing on workplaces, not only to identify at-risk populations, but also understand how diseases spread and how they can be prevented.

[Sarah Gregory] If you could fix just one science- or health-related problem, what would you pick?

[Marie de Perio] Since I work at NIOSH, which focuses on worker health, I'd have to say that I would like to ensure safe and healthy working conditions for every worker in this country. You know, it's really important that we minimize the number of workers who become injured or ill on the job.

[Sarah Gregory] And sort of along those same lines, what's the one best thing people can do to protect themselves in this world of global diseases?

[Marie de Perio] So, I don't know if I can pick one thing, but I can say, you know, since infectious diseases have no borders, it's important that people follow basic, established infection prevention measures. So, these include things like, you know, being up-to-date on immunizations, practicing good hand hygiene, and having access to safe water.

[Sarah Gregory] And, again, further along those same lines, there are a lot of terrible diseases out there now and, as you said, there are no borders. Are you optimistic about the future?

[Marie de Perio] I am. So, I am optimistic because I think science has really advanced our public health knowledge significantly. However, you know, we're always going to have emerging and reemerging infectious diseases that are going to continue to threaten workers' health. So, I think it's really important for us as a scientific community to understand the importance of work as a determinant of health. Specifically, understanding how work and workplaces contribute to the transmission of infectious diseases among workers and potentially the larger community, is really critical, I think, to preventing future outbreaks.

[Sarah Gregory] And on a completely personal note, tell us about your job now. Where do you work and, specifically, and what do you do? Also, what interests you about infectious diseases?

[Marie de Perio] Thanks, Sarah. I'm a medical officer in the U.S. Public Health Service, and I'm also a physician, board certified in internal medicine and infectious diseases. So, I'm currently assigned to NIOSH's Health Hazard Evaluation Program, where we do worksite investigations of health hazards in response to requests from employers, unions, and employees. We've been able to investigate a variety of different health hazards in the workplace. And my specialty happens to be infectious diseases. I've participated or led a lot of...well, not a lot, but a few of the investigations that we highlight in this paper. I really enjoy going into the workplace and trying to figure out what factors, occupational or nonoccupational, contribute to infectious diseases.

[Sarah Gregory] And, for your final question—what do you do for fun?

[Marie de Perio] That's funny that you ask because I am a mom with two kids. My kids are 11 and 9 and they are very busy. When I'm not at work, I'm usually driving them around and cheering for them at baseball, soccer, hockey games. So, I am really a soccer and hockey mom when I'm not working.

[Sarah Gregory] Well, that's actually pretty impressive that you are a mom of two children and you do all this deployment and these papers and everything. Very nice!

So, thank you so much for taking the time to talk with me today.

[Marie de Perio] Yeah, thanks, Sarah. I really appreciate this opportunity to highlight our work.

[Sarah Gregory] And thanks for joining me out there. You can read the March 2019 article, Case Investigations of Infectious Diseases Occurring in Workplaces, United States, 2006–2015, online at [cdc.gov/eid](https://www.cdc.gov/eid).

I'm Sarah Gregory for *Emerging Infectious Diseases*.

[Announcer] For the most accurate health information, visit [cdc.gov](https://www.cdc.gov) or call 1-800-CDC-INFO.