

Human contact plays big role in spread of some hospital infections, but not others

30 May 2019



Multidrug-resistant *Klebsiella pneumoniae* bacteria (red) interacting with a neutrophil (blue). Credit: David Dorward; Ph.D.; National Institute of Allergy and Infectious Diseases.

An observational study conducted in a French hospital showed that human contact was responsible for 90 percent of the spread of one species of antibiotic-resistant bacteria to new patients, but less than 60 percent of the spread of a different species. Audrey Duval of the Versailles Saint Quentin University and Institut Pasteur in Paris, France, and colleagues present these findings in *PLOS Computational Biology*.

People treated in hospitals and other health care settings are increasingly at risk of infection with [multidrug-resistant bacteria](#). Many of these microbes produce enzymes called extended-spectrum β -lactamases (ESBLs), which make them

resistant to antibiotics. Understanding how ESBL [bacteria](#) spread from person to person is key to developing effective prevention strategies.

In the new study, Duval and colleagues distributed [wearable sensors](#) to hundreds of patients and [health care workers](#) in a French hospital. Equipped with RFID tags, the sensors allowed the researchers to track patterns of human contact between patients over an eight-week period. Meanwhile, they systematically screened patients for ESBL-producing *Escherichia coli* and *Klebsiella pneumoniae*.

The scientists found that 90 percent of the spread of ESBL *K. pneumoniae* to new patients could be explained by direct or indirect contact with patients who had the same bacteria within the previous eight weeks; this figure was less than 60 percent for ESBL *E. Coli*. The findings suggest that contact-prevention strategies—primarily hand hygiene—can be very efficient in limiting transmission of ESBL *K. pneumoniae*. However, additional measures, such as environmental decontamination or using antibiotics more appropriately, may be necessary to prevent spread of ESBL *E. Coli*.

The researchers suggest that the same kind of wearable-sensor analysis could be extended to other multidrug-resistant species. Investigation of more detailed genomic data could further illuminate how ESBL-producing bacteria spread.

"By combining digital epidemiology and rapid microbiological diagnostic tools, we may be entering a new era to understand and control the risk of hospital-acquired infection with multidrug-resistant bacteria," Duval says.

More information: Audrey Duval et al, Close proximity interactions support transmission of ESBL-*K. pneumoniae* but not ESBL-*E. coli* in healthcare settings, *PLOS Computational Biology* (2019). [DOI: 10.1371/journal.pcbi.1006496](https://doi.org/10.1371/journal.pcbi.1006496)

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APA citation: Human contact plays big role in spread of some hospital infections, but not others (2019, May 30) retrieved 19 November 2019 from <https://medicalxpress.com/news/2019-05-human-contact-big-role-hospital.html>

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