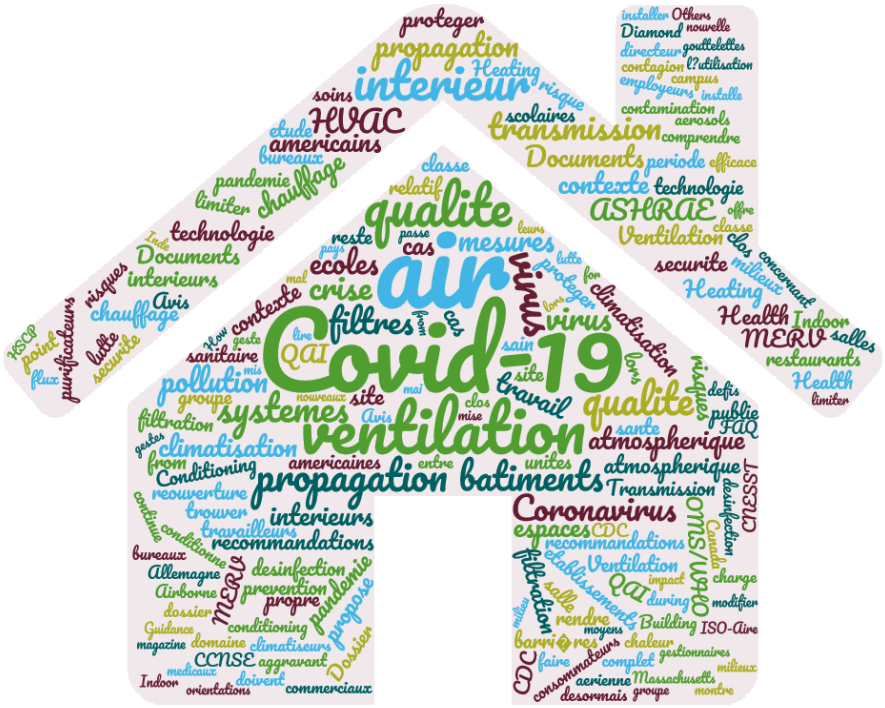

Bulletin de veille AéroCovid
N°118 – 18/06/2025

Objectif : *Air intérieur, ventilation, climatisation et propagation du Covid-19*

La validation des informations fournies (exactitude, fiabilité, pertinence par rapport aux principes de prévention, etc.) est du ressort des auteurs des articles signalés dans la veille. Les informations ne sont pas le reflet de la position de l'INRS. Les éléments issus de cette veille sont founis sans garantie d'exhaustivité.

Les liens mentionnés dans le bulletin donnent accès aux documents sous réserve d'un abonnement à la ressource.

Les bulletins de veille sont disponibles sur le portail documentaire de l'INRS. L'abonnement permet de recevoir une alerte mail lors de la publication d'un nouveau bulletin (bouton « M'abonner » disponible après connection à son compte).

Wang, J., John, S., Tiina, R., Sergey, G., Michael, Y., And Bunte, J.

Aerosol emission, transmission, and mitigation from performing singing and wind instruments.

Journal of Occupational and Environmental Hygiene, (2025), 1-10 p.

During the COVID-19 pandemic, concerns about potential airborne virus transmission and exposure during musical performances were raised. Past studies suggest that aerosols are emitted from exhaling and talking with varying magnitudes. Meanwhile, little was known about aerosol emissions from singing and playing wind instruments. The objective of this study was to examine the spatial and temporal build-up of aerosol concentration in a typical studio room where singing, talking, and playing wind instruments are involved, to represent musical practicing and teaching scenarios at the University of Cincinnati College-Conservatory of Music (CCM). Four condensation particle counters were strategically placed throughout a room at various distances from the performer. Besides singing, musical professionals played seven instruments (clarinet, flute, French horn, saxophone, trombone, trumpet, and tuba). Two types of tests were conducted for each instrument: 10 min of playing and 10 min of combined playing and talking to mimic the teaching session. The results show that singing increased aerosol concentration to $3.9 \times 10^3\ cm^{-3}$ at the performing point, more than double the background ($1.2 \times 10^3\ cm^{-3}$). Most wind instruments had minimal but detectable emission of aerosols over time, suggesting instruments could provide wall deposition for aerosols compared to singing. Particle concentrations decreased further from the performing point; however, they were still detectable over the background level at 10 feet away. Use of a portable high-efficiency particulate air (HEPA) filtration reduced aerosol concentrations developed during musical performances to below background level. These findings suggest that there are risks associated with aerosolized transmission of infectious agents such as SARS-CoV-2 from musical performance if the performer is infected. Distancing beyond the 6 ft distancing recommendation and proper room and local ventilation combined with disinfecting procedures are needed to minimize the risk of exposure to infectious aerosols.

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Guo Shu-Xian, Liu Jin-Zhong, Su Li-Qin, Li Feng, Liu Hang, Ge Tan-Xi, Han Xu, Zhang Wei-Yi, Yu Lian-Zheng, Chen Yong-Biao, Hong Hua-Rong, Shao Ran-Qi, Luo Jiao, Wang Xian-Liang, Yao Xiao-Yuan.

Analysis of indoor air microbial contamination in four swimming pools across two cities in China, 2023.

Journal of Environmental Hygiene, Vol. **15** n°(6), (2025), 544-550 p.

Objective To investigate the status and distribution of indoor air microbial contamination in swimming pools in northern and southern Chinese cities.Methods Two large swimming pools were selected in Shenyang (north) and two in Xiamen (south). The indoor air samples were collected at different times over five days within one week to measure total bacterial and fungal counts. Bacterial species were identified using fully automated microbial mass spectrometry. Indoor air temperature, humidity, CO2concentration, wind velocity, and visitor flow were also measured. The Kruskal-Wallis test was used to compare the differences between groups, and Spearman's rank correlation was used to analyze the influencing factors on airborne microbes.Results The qualified rates for total bacterial count in the swimming pool air were 100.0% in Shenyang and 96.7% in Xiamen. The median total bacterial and fungal counts in the swimming pool air were 367.50 and 685.50 CFU/m3, respectively, in Shenyang, and 160.00 and 248.50 CFU/m3, respectively, in Xiamen. The values were significantly higher in Shenyang than in Xiamen. The concentration of microbes in the air was correlated with temperature, humidity, CO2 concentration, and

visitor flow. The distribution of bacterial species in the swimming pools varied in the two cities and across different times. Specifically, 166 bacterial strains (78 species) were identified in Shenyang, including 8 strains (3 species) of pathogens. The dominant bacteria in the air were Streptomyces olivaceus (5.6%) and Bacillus horikoshii (4.4%), with the highest composition ratios occurring in the morning. In contrast, 262 bacterial strains (77 species) were identified in Xiamen, including 39 strains (8 species) of pathogens. The dominant bacteria were Micrococcus luteus (17.9%) and Moraxella osloensis (8.8%), with the highest composition ratios occurring at noon for the former and in the morning for the latter.Conclusion Indoor air microbial composition can differ in swimming pools by region and time of the day, and the concentration of indoor air bacteria is correlated with temperature, humidity, CO2 concentration, and visitor flow. Targeted increases in the intensity and frequency of ventilation in the swimming pools should be warranted.

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Oude Hengel, K. M., Peters, S., Stokholm, Z. A., Burdorf, A., Pronk, A., Kolstad, H. A.*, et al.*

Capturing occupational risk of airborne disease: An international job-exposure matrix based on five exposure factors.

Scand J Work Environ Health, Vol. **50** n°(5), (2024)

Objective This study aimed to construct a job-exposure matrix (JEM) for the risk of being infected by infectious agents through airborne or droplet transmission in an occupational setting, which might lead to a respiratory disease.

Methods An established COVID-19-JEM formed the basis for the development of the general airborne infectious agents JEM. Nine researchers in occupational epidemiology from three European countries (Denmark, The Netherlands and the United Kingdom) discussed and agreed on which factors from the COVID-19-JEM were relevant and whether new factors or adjustments of risk levels were needed. Adjustments to the COVID-19 JEM were made in a structured iterative. based on an expert assessment, a JEM on solar ultraviolet radiation (UVR) exposure including information on hours per day working inside, and national data on hours per week on site. Finally, a risk score was assigned to all factors for each job title within the International Standard Classification of Occupations system 2008 (ISCO-08).

Results This airborne infectious agents JEM contains five factors: (i) hours spent per week on site, (ii) hours spent per day working inside, (iii) number and (iv) nature of contacts, and (v) being in close physical contact to others. Per occupation, a risk score ranging from 1 (low risk) to 3 (high risk) was provided for all five factors separately.

Conclusion This newly developed infectious agents JEM assesses the risk at population level using five factors. Following validation, this JEM could serve as a valuable tool in future studies investigating the role of work in the occurrence of a respiratory disease.

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Pantoja, C., Acosta, F. M., Granatir, S., Anderson, M., Wyr, M., Tailor, J.*, et al.*

Electromagnetic waves destabilize the SARS-CoV-2 Spike protein and reduce SARS-CoV-2 Virus-Like particle (SC2-VLP) infectivity.

Scientific Reports, Vol. **15** n°(1), (2025)

Infection and transmission of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) continues to pose a global public health concern. Using electromagnetic waves represents an alternative strategy to inactivate pathogenic viruses such as SARS-CoV-2. However, whether electromagnetic waves reduce SARS-CoV-2 infectivity is unclear. Here, we adapted a coplanar waveguide (CPW) to identify frequencies that could potentially neutralize SARS-CoV-2 virus-like particles (SC2-VLPs). Treatment of SC2-VLPs at frequencies between 2.5 and 3.5 GHz and an electric field of 413 V/m reduced infectivity. Exposure of SC2-VLPs to a frequency of 3.1 GHz –and to a lesser extent, 5.9 GHz– reduced their binding to antibodies targeting the SARS-CoV-2 Spike S1 receptor-binding domain (RBD) but did not alter the total levels of

Spike, Nucleocapsid, Envelope, or Membrane proteins in virus particles. These results suggest that electromagnetic waves alter the conformation of Spike, thereby reducing viral attachment and entry. Overall, this data provides proof-of-concept in using electromagnetic waves for sanitation and prevention efforts to curb the transmission of SARS-CoV-2 and potentially other pathogenic enveloped viruses.

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Kendoush, A.

The Elimination of the Return line from the HVAC systems due to COVID-19.

Archives of Microbiology and Immunology, Vol. **9**, (2025), 163-164 p.

Due to the spread of the deadly COVID-19 virus in the US and around the world, the authors propose the elimination of the return line from the HVAC (Heating, Ventilation, and Air conditioning) systems [1], simply by closing the return air damper (RAD) shown Figure 1 that represents a single zone HVAC system. The idea of closing the RAD may be applied to other Design systems such as variable air volume, terminal air reheat, dual duct flow, . . .etc.

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Chenari, B., Saadatian, S., Gameiro Da Silva, M.

Experimental Assessment of Demand-Controlled Ventilation Strategies for Energy Efficiency and Indoor Air Quality in Office Spaces.

Air, Vol. **3** n°(2), (2025)

This study investigates the performance of different demand-controlled ventilation strategies for improving indoor air quality while optimizing energy efficiency. The experimental research was conducted at the Indoor Live Lab at the University of Coimbra using a smart window equipped with mechanical ventilation boxes, occupancy sensors, and a real-time CO2 monitoring system. Several occupancy-based and CO2-based ventilation control strategies were implemented and tested to dynamically adjust ventilation rates according to real-time indoor conditions, including (1) occupancy period-based control, (2) occupancy level-based control, (3) ON-OFF CO_2-based control, (4) multi-level CO_2-based control, and (5) modulating CO_2-based control. The results indicate that intelligent control strategies can significantly reduce energy consumption while maintaining indoor air quality within acceptable limits. Among the CO_2-based controls, strategy 5 achieved optimal performance, reducing energy consumption by 60% compared to the simple ON-OFF strategy, while maintaining satisfactory indoor air quality. Regarding occupancy-based strategies, strategy 2 showed 58% energy savings compared to the simple occupancy period-based control, but with greater CO_2 concentration fluctuation. The results demonstrate that intelligent DCV systems can simultaneously reduce ventilation energy use by 60% and maintain compliant indoor air quality levels, with modulating CO_2-based control proving most effective. The findings highlight the potential of integrating sensor-based ventilation controls in office spaces to achieve energy savings, enhance occupant comfort, and contribute to the development of smarter, more sustainable buildings. Future research should explore the integration of predictive analytics and multi-pollutant sensing to further optimize demand-controlled ventilation performance.

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Blondeau, P., Andrès, Y., Nicolle, J., Geffre, E., Chartier, E., Litaud, J.*, et al.*

Improving indoor air quality by using air ionizers. Epuration de l'air intérieur par ionisation

The EVOLUTION research project : Assessment and optimization of ionizer air cleaners to improve indoor air quality. EVOLUTION : Évaluation et optimisation de l'utilisation de l'ionisation pour l'amélioration de la qualité de l'air intérieur.

La Rochelle Université, France 2025

Le projet EVOLUTION avait pour objectif d'évaluer le potentiel d'amélioration de la qualité de l'air intérieur par des épurateurs autonomes de type ioniseur, en abordant les aspects relatifs à l'efficacité, à l'innocuité et à la consommation énergétique des systèmes. Dans le contexte de la crise sanitaire de la Covid-19 où les environnements confinés ont clairement été identifiés comme les principaux lieux de contamination, ce projet a également visé à déterminer dans quelles conditions et dans quelles proportions l'utilisation d'ioniseurs d'air peut contribuer à réduire les risques microbiologiques dans les bâtiments, par voie aérienne et par contact. La méthodologie de recherche a associé plusieurs approches : des mesures dans six bâtiments d'usages différents (logements, salles de classe, bureaux), des mesures en environnement semi-contrôlé d'échelle 1 (maison expérimentale EUREKA), des mesures en chambre d'essai, et le développement d'un outil de simulation des concentrations intérieures en particules et en ozone dans une pièce où fonctionne un ioniseur. Les résultats obtenus montrent qu'en situation d'usage réel, les trois ioniseurs sélectionnés pour l'étude impactent uniquement les concentrations des particules en suspension dans l'air intérieur, avec des abattements de 10 % à 40 % pour les particules fines (PM2.5) et potentiellement de 50 % à 60 % pour les nanoparticules (PM0.1). Dans ces conditions, les trois ioniseurs s'avèrent moins efficaces que des épurateurs autonomes à filtres mécaniques ou à électrofiltre. Les spores fongiques de Penicillium spinulosum et le bactériophage MS2 (pris comme modèle de virus SARS-Cov-2) se comportent comme des particules inertes quand les ioniseurs fonctionnent. Aucun effet sporicide ou virucide n'a été observé pour des concentrations en ions et des temps d'exposition représentatifs des conditions rencontrées dans les bâtiments. Concernant les aspects liés à l'innocuité, aucune production secondaire de composés organiques volatils (COV) n'a été mise en évidence dans les essais. Les émissions d'ozone et d'oxydes d'azote sont nulles ou faibles suivant les modèles d'ioniseurs. L'ionisation ne semble par ailleurs pas modifier le potentiel oxydant des particules respirables (PM10).

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Sørensen, S. B., Kristensen, K.

Indoor Surface Emissions of Volatile Organic Compounds Induced by Germicidal UV (222 and 254 nm) Illumination.

ACS ES&T Air, Vol. **2** n°(5), (2025), 911-916 p.

The application of germicidal ultraviolet (GUV) lamps has recently attracted increased attention as a measure to mitigate indoor disease transmission. Among the most commonly employed are traditional mercury lamps and krypton–chloride excimer lamps, which emit UV-C light with peak wavelengths of 254 nm (GUV254) and 222 nm (GUV222), respectively. This study investigates volatile organic compound (VOC) surface emissions induced by GUV254 and GUV222 lamps across various surface materials. Near-surface proton-transfer-reaction time-of-flight mass spectrometry (PTR-TOF-MS) measurements revealed significantly increased surface emissions during GUV illumination. In addition to compounds intrinsic to the illuminated surface, GUV light also increased surface off-gassing of externally applied compounds, including limonene and 4-oxopentanal (4-OPA). The magnitude of the enhanced surface emissions was found to decrease with increasing GUV path length resembling the expected decrease of the irradiance. Overall, greater surface emissions were induced by the GUV222 lamp compared with the GUV254 lamp. Conclusively, this study identifies UV-induced surface emissions as a potential source of indoor VOCs during the GUV lamp application.

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Ahmad Jamali, N. S., Isa, Z. M., Liang, R.

Indoor Transmission of COVID-19 Using Advection Diffusion Equation.

International Seminar on Mathematics in Industry 2024

This study develops a mathematical model using the one-dimensional advection diffusion equation (ADE) to simulate the spread of SARS-CoV-2 particles in an indoor environment. The model assumes the presence of one infected individual and focuses on the effects of ventilation and aerosol-generating activities, such as talking and breathing. This study advances previous work by employing boundary

conditions and incorporating the source location and time of particle release that allow for more realistic simulation. The one-dimensional ADE is solved analytically using the Laplace transform method which then provides predictions of the distribution of the virus. One of the key findings indicates that pandemic-updated ventilation shows the lowest overall concentrations of particles across all conditions compared to poor ventilation, thereby lowering the risk of transmission. Well-ventilated spaces quickly reach stable conditions with low particle concentrations, while poorly ventilated areas maintain higher concentrations for longer periods, increasing exposure risk. Additionally, the use of masks is shown to further mitigate transmission risks by reducing the number of particles released into the air. However, breathing without a mask is better than talking with a mask. These findings can guide public health policies on ventilation standards to improve air quality and reduce viral transmission.

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Singh, T.

Integrating Robotics and AI into Workplace Biorisk Management.

In: Cases on AI Innovations in Occupational Health and Safety. IGI Global Scientific Publishing; 2025. 181-226 p.

Work-related illnesses and injuries affect over 2.3 million people annually. Biological hazards are often underreported and poorly managed. Biorisk Management (BRM) aims to assess and reduce these risks. Emerging technologies like AI and robotics offer new tools for predictive analytics, real-time monitoring, and hazard detection. This chapter explores how AI can enhance BRM, particularly in under-resourced settings, to improve workplace health and safety. This chapter explores how AI can support effective, adaptive, and ethical BRM systems, especially in under-resourced settings.

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Giron, A., Marinho, K., Drummond, L., Rocha, S., Galeno, L., Gonçalves, R. F.*, et al.*

IoT Software System for Biosafety Monitoring of Facilities.

Companion Proceedings of the 25th Brazilian Symposium on Computing Applied to Health

This article presents the SAFE IoT system, a low-cost solution for easily monitoring biosafety indicators in different installation profiles, such as the number of people, CO2 levels, humidity, and temperature. The collected information is displayed on a dashboard, facilitating analysis and decision-making. The system has been evaluated, and the appropriate data transmission frequency is expected to contribute to effective indoor air quality monitoring.

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Pattaro, B., Dolcini, M., Brambilla, A., Capolongo, S.

Mitigating Risks in Hospital Facilities—An Analysis of the Relationship Between Healthcare Risks and the Built Environment: A Literature Review and Survey in the Italian Scenario.

In: Hygiene. 2025.

Background: This study examines the role of the built environment in mitigating risk in healthcare facilities, with a particular focus on how the design of hospital infrastructures can influence and improve the safety of patients, staff, and visitors. Methods: A two-phase mixed-methods approach was adopted. First, a scoping literature review was conducted to identify design-based strategies targeting five categories of risk: healthcare-associated infections (HAIs), indoor air quality (IAQ), safety, falls, and emergency resilience. Based on this review, a structured questionnaire was developed and administered to a sample of hospital facilities in Northern Italy to assess the implementation of the strategies emerged. Results: The literature review identifies recurring specific design solutions and strategies that have proven effective in mitigating risks in healthcare infrastructures in the following dimensions: infection mitigation, indoor air quality, falls reduction, safety, emergency preparedness. At the same time, survey data from (n = 9) hospitals indicate a

significant implementation gap. Key shortcomings included a lack of spatial flexibility, limited environmental monitoring (especially for IAQ and acoustic conditions), and underutilization of antibacterial surfaces. Antibacterial flooring and wall finishes were absent in (n = 4/9) and (n = 6/9) of the facilities, respectively. IAQ monitoring was mostly confined to surgical areas, with (n = 0/9) facility reporting comprehensive building-wide monitoring. Only two (n = 2) facilities reported adaptable spaces suitable for emergency conversion and accessible green areas. Conclusions: This study provides a comprehensive overview of risk mitigation strategies in hospital design. The results reveal critical gaps in implementation, particularly in spatial flexibility, environmental monitoring, and antimicrobial surfaces. Future research should focus on developing adaptable design models that are context-sensitive, scalable, and capable of enhancing healthcare resilience in response to emerging global health threats.

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Colaco Martins, L.

The Next Public Health Frontier with Indoor Air Quality Regulation.

Tulsa Law Review, Vol. **60**, (2025)

The United States has neither one federal law nor one federal agency tasked with governing indoor air quality. Rather, it has a constellation of laws and agencies that selectively and tangentially address parts of indoor air making it woefully inefficient and ineffective. Prior initiatives at harmonizing the indoor air quality regulatory framework have centered much effort on contaminants such as vapor intrusion (radon), noxious by-products of gas-burning stoves, environmental secondhand smoke, and chemicals emitted from building construction materials. Yet, indoor environments are also ripe for spread of respiratory pathogens that are transmitted through and hover in the air - such as measles, tuberculosis, influenza, respiratory syncytial virus (RSV) and SARS-CoV2(Covid-19).

Indeed, discourse on indoor air quality has waned since the 1990s, when a wave of regulatory shifts attempted to address such ailments as sick-building syndrome, largely motivated through fear of litigation. However, the recent confluence of wildfires and the Covid-19 pandemic have reinvigorated societal interest in indoor air quality, a reckoning with airborne transmission of respiratory pathogens and the urgency in addressing it. Solutions proffered have traditionally relied on an expansion of existing federal law, which seems improbable in this current political climate. Despite the despair heightened in the past three years, steeped in death and sickness, there are reasons to be optimistic about the momentum generated by communities (e.g. aerosol scientists, engineers, and other advocates) and should serve to fuel any public health efforts. It is with this optimism that I proceed on this exploration of the regulatory framework for indoor air quality.

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Kang, L., Zhang, X., Zhang, C., Chen, G., Jia, X., Cao, B.*, et al.*

Risk assessment of cough droplets in the indoor environment under different ventilation modes with coupled ceiling fan.

Journal of Building Engineering, Vol. **110**, (2025)

The operation of ceiling fans can disperse the local droplet concentration by mixing the air, and the ventilation mode influences the indoor spread of droplets. The potential of ceiling fans to reduce the risk of virus transmission in the indoor environment under different supply and exhaust air modes remains to be explored. This study employed CFD methods to investigate the effects of various parameters on the transient transmission of cough droplet, including the operating status of ceiling fans (on or off), the forms of supply and exhaust air, and the relative position of the infected individual. The local quantum concentration was used to calculate the infection risk of the exposed individual, and the Particle Escape Index (PEI) was proposed to comprehensively evaluate the ventilation performance under different cases. The results demonstrated that the operation of the ceiling fan could significantly reduce the infection risk of the exposed individual, shorten the exposure time by 16 s, and decrease the infection probability approximately 50 times. In addition, the forms of supply and exhaust air significantly influenced the control

effect of the ceiling fan on droplets, while the relative position of the infected individual mainly affected droplet discharge efficiency. This study contributes to a deeper understanding of the role of ceiling fans in reducing the risk of respiratory infectious diseases. Furthermore, the results provide a reference for the design or renovation of indoor ventilation modes combined with the ceiling fans.

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Djadi, A., Lachebi, S., Agouillal, F., Berabou, W., Cherifi, N., Ladji, R.

Study and characterization of airborne microbial communities in indoor air of an urban polyclinic: Bioaerosols in indoor air of polyclinic.

Indian Journal of Experimental Biology (IJEB), Vol. **63** n°(05), (2025), 435-442 p.

Bioaerosols in the medical environment have been identified as suspected agents for the transmission of nosocomial infections, and the COVID-19 pandemic serves as a concrete example. This study aims to provide a qualitative and quantitative estimation of bioaerosols within a polyclinic located in the northern part of Algiers, Algeria. It also involves analyzing the influence of the sampling duration and period on the variability of bioaerosols within different rooms of the polyclinic. The passive sampling technique carried out the measurement of airborne bacteria in five rooms of the polyclinic. Two sampling times were chosen, 30 and 60 min with three sampling periods of two days each. The bacterial bioaerosols were characterized by MALDI TOF-MS.The bacterial bioaerosol concentration was notable in the five rooms of the polyclinic, reaching a medium-risk level. There was no significant difference (P =0.847-1.116) observed in the sampling duration, and similarly results for the sampling period (P=0.093 -0.798). Staphylococcus, Bacillus and Raoultella were the most dominant defined bacteria. These bacteria can have a harmful effect on the health of patients and workers of the polyclinic.

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Zhang, J., Liu, J., Liu, J., Xu, L., Wen, S., Liu, S.

The targeted removal effect and mechanism analysis of two-way active chilled beam induced purification on virus in wards.

Building Simulation, (2025)

During the COVID-19 pandemic, hospital wards served as crucial medical infrastructure for patient treatment. The existing ventilation systems in hospital wards are often criticized for their high energy consumption and poor pollutant removal. This study introduces an improved active chilled beam (ACB) system for wards. This system integrates an ionization module with the ACB, utilizing the ACB's supply air jet and exhaust air convergence to create a directed airflow within the ward, effectively purifying aerosols. First, a validated CFD model is employed to simulate airflow generated by the ACB and the movement of aerosols exhaled by patients. Particle image velocimetry (PIV) is then used to visualize the indoor directed airflow created by the ACB. The targeted aerosol removal performance of the ACB system is quantitatively described using the TARGETING index. To address the cumbersome calculation of the TARGETING index, a qualitative rapid identification method for targeted ventilation is proposed. Finally, the purification effect of the ACB system in multipatient wards was optimized through theoretical analysis. Compared with existing systems, the improved ACB system enhances the targeted aerosol removal performance by 41.9%–62.5%, and achieves energy savings of 33.3%. In multipatient wards, the ACB system can reduce the cross-infection risk by 80.5%–91.0%.

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Regad, M., Forin, J., Baudet, A., Lizon, J., Florentin, A.

Ventilation, architecture et risque infectieux : enjeux dans la réhabilitation et la construction des services de soins.

L'Aide-Soignante, Vol. **39** n°(264), (2025), 14-17 p.

L’épidémie de Covid-19 a mis l’accent sur différents facteurs de risque de transmissions croisées nosocomiales. Le service territorial de prévention du risque infectieux du centre hospitalier régional universitaire de Nancy a constaté d’autres vecteurs possibles de contamination. Dans un contexte de forte épidémie, les chambres doubles compliquent la gestion du risque infectieux par la difficulté d’application des mesures de précautions “standard” et complémentaires (gouttelettes et contact). Par ailleurs, même lorsque les mesures d’hygiène des mains et le port du masque sont correctement appliqués, la qualité de l’air intérieur peut devenir un facteur critique. Ces observations soulignent la nécessité de mesures correctives et ouvrent des perspectives pour améliorer la conception ou la rénovation des infrastructures hospitalières.

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Veselji, L., Lindgren, M.

Yttre faktorer och dess påverkan på ventilation och luftkvalitet i operationssalen: En systematisk litteraturstudie. (Facteurs externes et leur impact sur la ventilation et la qualité de l'air au bloc opératoire : revue systématique de la littérature).

Université De Lund. Thèse 2025

Contexte : Les blocs opératoires utilisent différents systèmes de ventilation aux caractéristiques variables,mais avec un objectif commun : réduire la quantité de bactéries et de particules dans l'air. Objectif : L'objectif était de compiler la littérature décrivant les facteurs externes qui affectent la ventilation et la qualité de l'air au bloc opératoire. Méthode : Une revue systématique de la littérature a été menée par le biais de recherches dans PubMed, CINAHL et EMBASE. Le processus de sélection a commencé par la lecture des titres et des résumés de tous les articles. Les articles restants ont été lus en texte intégral, suivi d'une évaluation de la qualité à l'aide du guide d'évaluation de la qualité CASP. Résultats : Deux catégories principales ont été identifiées parmi les 12 articles : Facteurs influençant le flux d'air et Facteurs environnementaux et comportementaux au bloc pératoire. Les facteurs qui ont affecté la ventilation et/ou la qualité de l'air comprenaient les différents systèmes de ventilation, la présence de l'équipe chirurgicale, l'emplacement de l'équipement, les types d'interventions chirurgicales, la quantité d'équipement chirurgical, les ouvertures des portes et/ou des armoires, les vêtements et l'activité à l'intérieur du bloc opératoire. Conclusion : Les recherches actuelles montrent que plusieurs facteurs à l'intérieur du bloc opératoire peuvent affecter la ventilation et/ou la qualité de l'air . En améliorant les connaissances sur les facteurs qui peuvent contribuer à des niveaux élevés de concentration de particules dans la salle d’opération, les infirmières de salle d’opération et les autres membres du personnel chirurgical peuvent travailler de manière préventive pour réduire les infections.

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