Bulletin de veille risques biologiques N°132 – Juillet-octobre 2025

Objectifs (dont 4 nouvelles thématiques veillées à partir du n° 131, mars-mai 2025) : veilles spécifiques sur la thématique du risque biologique : biotechnologies (nouveaux procédés), équipements de protection individuelle (fièvre hémorragique, Ebola), protection respiratoire (ajustement), protection respiratoire des professionnels de santé (retrait, astreinte thermique, nouveaux équipements, efficacité), zoonoses (pathologies émergentes), légionellose (cas professionnels), endotoxines (effets toxiques/multi-expositions), mycotoxines (voie respiratoire, risque professionnel), recyclage textiles (technologies, risques), usages de l'eau dans l'industrie (usages de retraitement de l'eau, process, risques).

+ suivi d'organismes français et internationaux (sélection d'actualités classées par thème).

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 fournis 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 connexion à son compte).

Sommaire :

- **Protection respiratoire : ajustement**

Sawada H, Kakine M, Kubota Y, Sekine K, Hiraide A.

Evaluation of the protective efficacy of a user seal check for N95 respirators through quantitative fit testing in an ambulance crew.

Scientific reports. 2025;15(1):7.

https://www.nature.com/articles/s41598-025-17616-8.pdf

To ensure health and wellbeing of healthcare workers, prevention of infection is essential. Although N95 filtering facepiece respirators (N95 respirators) are potentially effective respiratory protective devices, scientific evaluation for healthcare workers, particularly for ambulance crews has been insufficient. We investigated if N95 respirator user seal checking ensures seal quality through quantitative fit testing among ambulance crews. A user seal check was performed according to the manufacturer's instructions and based on each participant's subjective assessment of fit. A quantitative test was then performed using a dedicated counter. In the results, although the pass rates for both the user seal check and the quantitative test exceeded 50%, the kappa coefficients between the two tests were -0.072 (95%CI: -0.38-0.23), 0.11 (95%CI: -0.11-0.33), and 0.013 (95%CI: -0.31-0.34) for three kinds of N95 respirators respectively suggesting extremely low rates of agreement similar to other reports from health providers. Therefore, we compared the patterns of distributions of the two tests. In the result, probability of agreement of the two tests was determined to be 50%, which was identical to a coin toss. It is unknown what level of protection an N95 respirator will provide when only a user seal check is performed.

- **Protection respiratoire des professionnels de santé (hors fit test, voir ci-dessus) : retrait, astreinte thermique, nouveaux équipements, efficacité (Nouvelle thématique)**

Alshahrani F, Elgujja A, Alabdan L, Alharbi JS, Rabaan AA, Alzayid I, et al.

Knowledge attitudes and practices of healthcare workers on respirator fit testing and PAPR use at a university medical center.

Scientific reports. 2025;15(1):18.

https://www.nature.com/articles/s41598-025-12507-4.pdf

Particularly during an epidemic of infectious diseases, worker safety in healthcare depends critically on respirator fit testing and the usage of powered air-purifying respirators (PAPR). Reducing hazards requires ensuring healthcare professionals' (HCW) knowledge, attitudes, and behaviors as well as their compliance with respiratory protection programs. There is little information on these factors in Saudi Arabian healthcare environments, which calls for targeted research. This study aimed to assess healthcare workers' (HCW) knowledge, attitudes, and practices (KAP) regarding respirator fit testing and powered air-purifying respirator (PAPR) use at King Saud University Medical City (KSUMC) which is

referred to as 'the medical center' throughout the paper. Specifically, it sought to identify gaps in policy understanding and training, evaluate compliance and confidence levels, and examine how demographic variables influence these outcomes. A total of 204 HCWs from different departments and hospitals around the medical center participated in cross-sectional research. Structured surveys measuring demographic variables, knowledge, attitudes, training experience, and compliance with fit testing and PAPR use gathered data. While chi-square tests and correlation analysis look at relationships between variables, descriptive statistics compile the demographic traits and survey answers. With SPSS, version 27, all the statistical tests were run with a significance threshold of alpha = 0.05. With respirator fit testing, the results revealed a high compliance rate-93.4%. Nurses had the best rates of compliance and confidence. However, demonstrating a large knowledge gap, only 6.9% (N-36) of the respondents knew about quantitative fit assessment techniques. Among the 82.2% (N-168) of HCWs who reported PAPR usage training, 48% (of N-168) received consistent instructions. While 14.8% (of N-168) of the respondents reported poor confidence, suggesting room for development, PAPR use was rather high-85.2% (N-204). Significant correlations were found between demographic variables and compliance, training, and confidence levels ($p < 0.05$). In particular, a negative connection between PAPR usage ($r = -0.287$, $p = 0.01$) and confidence in fit testing indicated possible specialized effects. This study highlights the need for thorough and consistent respiratory protection training courses for different HCW profiles. Respiratory protection measures at KSUMC may be strengthened even further by addressing knowledge gaps, increasing hands-on training, and strengthening policy communication to guarantee HCW safety and preparedness.

Cherrie MPC, Loh M, Cherrie JW.

The relative effectiveness of personal protective equipment and environmental controls in protecting healthcare workers from Covid-19.

Annals of work exposures and health. 2025;69(7):777-88.

https://doi.org/10.1093/annweh/wxaf040

Objectives Our aim was to explore the probable effectiveness of personal protective equipment (PPE) and environmental controls in protecting healthcare workers from Covid-19 infection using the Covid Exposure Model and Risk App (CEMRA), which estimates the risk of infection by various pathways.Methods We adapted a compartmental model of nine states within a hospital room to estimate virus transport and fate for contact and inhalation transmission from an infected patient, implemented using a discrete-time Markov-chain. Cough spray transmission was modeled separately, extrapolated to the expiratory volume, with a probability of the cough impacting the face in proportion to the surface area of the mucous membranes. Infectious profiles of patients observed in hospitals, constructed using information on salivary virus concentration, exhaled emissions and cough frequency, were categorized from "extremely low" to "extremely high" in seven steps. We parameterized the model using measurements made in three Scottish hospitals along with estimates from the literature. Seven interventions spanning PPE, engineering controls and administrative controls were applied to simulations of a health care worker working in a small room.Results Route of infection and to a lesser extent efficacy of controls depended on the infectiousness of the patient; inhalation was the main transmission route in scenarios from "extremely low" to "moderate" infectiousness. For these lower infectious profiles, the surgical mask, surgical mask combined with hand hygiene, and surgical mask, hand hygiene and surface disinfection showed between a 60% and 64% average reduction in risk compared with no intervention. The use of natural ventilation and an air purification device resulted in a modeled 71% to 77% reduction in risk. A healthcare worker wearing an FFP2 or FFP3 respirator, was associated with an 86% to 95% reduction in risk. Finally, a ventilated headboard or a powered respirator with hood showed between a 91% and 99% reduction in risk. For the "high" to "extremely high" infectious profiles the cough spray route predominated, although the modeled effectiveness of the

interventions was similar to the lower infectious profiles.Conclusion The use of a flexible quantitative microbial risk assessment model can assess the likely reduction of risk of Covid-19 from workplace controls under various assumptions. Respirators and local ventilation were the most effective modeled interventions.

Clavel N, Castonguay FM, Laprise C, Williams S, Ethier I, Bernier MC, et al.

Barriers and facilitators to implementing reusable personal protective equipment in hospitals, and their impacts on environment, care safety, costs, and supply chain resilience: a scoping review protocol.

Bmj Open. 2025;15(5):6.

https://doi.org/10.1136/bmjopen-2024-096504

Introduction Climate degradation poses a significant global health challenge, with healthcare systems paradoxically contributing to this issue while adhering to the principle of 'do no harm'. Notably, the healthcare sector accounts for a considerable share of greenhouse gas emissions in many industrialised countries, primarily due to the supply chain, including pharmaceuticals, disposable medical devices and personal protective equipment (PPE). The COVID-19 pandemic exacerbated this issue, with millions of tons of CO2 emissions attributed to single-use PPE. In response to the pandemic, some hospitals have begun adopting and implementing reusable PPE as a sustainable alternative to reduce emissions, enhance resilience to supply chain disruptions and achieve cost savings. This scoping review aims to synthesise the available evidence on the adoption, implementation barriers and facilitators, as well as the impacts of reusable PPE in hospital settings.Methods and analysis This protocol is based on York's five-stage framework outlined by Arksey and O'Malley. We will map evidence on the environmental and economic impacts of reusable versus disposable PPE, and the associated infection risks. Using an adapted Consolidated Framework for Implementation Research, our scoping review will identify enablers and barriers to implementation across different clinical settings. The methodology will adhere to the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Review guidelines and will include a comprehensive search of peer-reviewed articles in five databases (Medline, Embase, CINAHL, Web of Science and Global Health) and grey literature. Databases will be searched from inception to December 2024. Two reviewers will independently evaluate the eligibility of all identified titles and abstracts for inclusion in the full-text review, as well as for data extraction. Descriptive data will provide insights into the enablers and facilitators of reusable PPE adoption and implementation, along with its impacts on patient and staff safety, costs, the environment and supply chain resilience to disruptions will be reported.Ethics and dissemination We expect the results to both identify research gaps and generate novel ideas for future studies on transitioning to reusable PPE in healthcare settings. This review will offer healthcare decision-makers valuable insights into the factors influencing the shift from disposable to reusable PPE and its associated impacts. By refining PPE management strategies, the findings will enable managers to clearly understand the challenges and anticipated outcomes, thereby guiding effective decision-making and facilitating a smooth transition that minimises operational disruptions while upholding patient and staff safety. Ethics approval was not required for this review. The findings will be shared through conferences on healthcare management and sustainability, and submitted to peer-reviewed journals in healthcare management and implementation science.Trial registration details https://doi.org/10.17605/OSF.IO/DESVU.

Cordeiro L, Price A, de Oliveira NA, Ciofi-Silva CL, Girelli G, Lin Y, et al.

Implementation considerations for integrated face and respiratory protection: a qualitative study.

Journal of Hospital Infection. 2025;160:1-11.

https://www.sciencedirect.com/science/article/pii/S0195670125000659?via%3Dihub

Background: The implementation of an innovative form of personal protective equipment (PPE) as an infection and prevention control measure for respiratory transmissible diseases is complex, with several elements to be addressed. Aim: To make considerations for integrated face and respiratory protection implementation in clinical settings. Methods: This was a multi-site qualitative study with 87 health workers that compared traditional PPE or powered air-purifying (PAPR) respirators with lightweight PAPR (L-PAPR). Semi-structured interviews were performed based on the Consolidated Framework for Implementation Research (CFIR). Findings: Insights into L-PAPR implementation were found. The advantages include enhanced sense of protection, pleasant ventilation, good visibility for both health worker and patient, no fogging of the visor interior, no movement restriction, and easy disinfection process. To enhance usability some barriers should be tackled: reduction of facial pressure; better accommodation for glasses and corrective lenses; reduction of number of steps for assembling the device; infrastructure provision for storage, charging and disinfection of the device; training of health workers for assembling, donning and doffing; and the cost benefit of implementation. Conclusion: L-PAPR was overall perceived with advantages by many participants, and can be considered a potential option of PPE to be implemented to protect health workers during outbreaks of respiratory transmissible diseases. (c) 2025 Published by Elsevier Ltd on behalf of The Healthcare Infection Society.

de Souza FFP, Segundo J, Constantino JSF, Lorevice MV, Beppu MM, Mattos ALA, et al.

A graphene/silver-PCL/PVP-based nanocomposite membrane produced by electrospinning provides protection against coronavirus and pathogenic bacteria.

Polym Bull. 2025:20.

https://link.springer.com/article/10.1007/s00289-025-05920-2

The spread of infectious diseases through air and contaminated surfaces is a constant threat to public health. The development of porous materials based on nanofibers incorporated with antimicrobial compounds results in the production of multifunctional composites that may control the spread of infectious agents. This study aimed to develop and characterize nanofibers incorporated with graphene oxide and silver nanoparticles (GOAg), produced by electrospinning. The GOAg nanocomposite was synthesized and incorporated into a poly(epsilon-caprolactone) and (PCL)/polyvinylpyrrolidone (PVP) (1:1) blend solution and used to produce nanofibers. Transmission electron microscopy (TEM) and Raman spectroscopy initially confirmed that the GOAg nanocomposite exhibited silver nanoparticles (diameter, 10.4 +/- 4.0 nm) anchored onto GO sheets. The GOAg-PCL/PVP nanofibers were characterized in terms of morphological, chemical, thermal, and mechanical features and their biological activities against bacteria and MHV-3 coronavirus. The GOAg-PCL/PVP nanofiber presented a porous structure, with a diameter of 0.52 +/- 0.38 mu m, and improved thermal and mechanical properties. Furthermore, the GOAg-PCL/PVP nanofiber inactivated 99.97% coronavirus, inhibited the growth of S. aureus (98%), E. coli (62%), and P. aeruginosa (48%) bacteria, and was not cytotoxic to fibroblasts. The GOAg-PCL/PVP nanofiber exhibits significant physicochemical properties and antimicrobial properties, making it ideal for the development of a multifunctional nanocomposite for health applications. These materials are particularly suitable for advanced filters for air filtration and purification, especially for use in personal protective equipment used during viral outbreaks or pandemics.

Ezeh OV, Ternero-Hidalgo JJ, Lintag RMN, Han W, Yeung KL.

Exploring innovations in antimicrobial protective mask filters: A review.

Adv Colloid Interface Sci. 2025;345:47.

https://www.sciencedirect.com/science/article/pii/S0001868625002465?via%3Dihub

Mask filters are necessary for personal protection. The COVID-19 pandemic exemplified this need. Nonetheless, they can pose risk of transmission as captured microbes or respiratory droplets can remain viable on filters and propagate under ideal environmental conditions. It became evident during the COVID-19 pandemic that conventional masks alone are insufficient for ensuring adequate safety and disrupting the route of spread. Equipping protective masks with antimicrobial property is fundamental to overcoming the survivability of microbes on the surface of filter media and ensuring personal safety. Consequently, this has become a significant research focus, with a sharp upsurge in publications in the COVID-19 era. In this work, we present a comprehensive review of crucial advancements in antimicrobial mask filters, emphasizing the relevance of this topic within the contemporary framework of the COVID-19 pandemic, in addition to the anticipated performance standards associated with the expanding market of antimicrobial protective mask filters.

Freire K, Green E, Kernaghan L, Castelletto K, Schubert JA.

Impact of Heat and Mitigation Strategies on Healthcare Professionals: A Scoping Review.

Public Health Nurs. 2025;42(3):1408-20.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/phn.13534?download=true

BACKGROUND: Rising global temperatures and increased use of personal protective equipment has led to increased risk of heat stress amongst healthcare professionals. This review synthesizes recent research on the impact of heat and heat mitigation strategies on healthcare professionals across disciplines and settings. METHOD: Databases were systematically searched using keywords and data from included studies were extracted for content analysis. RESULTS: Among 15 eligible studies, 13 investigated the impact of heat stress on healthcare professionals. Six investigated mitigation strategies. Most studies utilized survey methodology and were related to the use of personal protective equipment during the recent pandemic. Large proportions of healthcare professionals reported high levels of thermal discomfort and preferred a cooler temperature in the workplace. The most commonly reported heat strain symptoms included sweating, fatigue, thirst, and poor or reduced concentration. Investigation of mitigation strategies has thus far focused on individual strategies with little insights gained into organizational support or heat policy. CONCLUSIONS: Supporting healthcare professionals to manage the impact of heat stress has received little attention in the literature. Mitigation strategies have thus far focused predominantly upon individual strategies. Future studies should adopt a more comprehensive approach to investigating healthcare professional's experiences, investigating all levels of controls.

He FJ, Zhang JY, Zhai SJ, Liu CC, Zhao H.

Fluorinated Graphene-Coated N95 Respirators for Enhanced Protection against Viral Accumulation and Transmission.

Adv Eng Mater. 2025;27(13):9.

https://advanced.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/adem.202402919?download=true

Highly contagious respiratory infection diseases such as COVID-19 can be transmitted by inhaling virus laden liquid droplets and short-range aerosols, released by an infected person. Particularly, in hospitals, spraying of the respiratory droplets containing pathogens from the conjunctiva or mucus of a

susceptible person plays a key role in transferring the infectious diseases. N95 filtering respirators are a critical personal protective equipment. However, due to concerns over the virus accumulation on the N95 respirators, there is an urgent need to make the N95 respirators less contaminated. To address this critical issue, a one-step spray coating approach is developed to coat the fluorinated graphene (FG) nanosheet onto the N95 respirators. The synergistic effect of the FG nanosheet with a low surface energy and the increased surface roughness by FG on the respirator's surface makes it superhydrophobic. For respiratory droplets like saliva and mucus, the FG-coated respirators also show excellent superhydrophobicity. Furthermore, the ability against virus accumulation on the FG-coated respirators is tested by using the mucus droplets laden with SARS-CoV-2. The results show that FG-coated respirators largely increase the virus repel efficiency even under multiple contacts and effectively reduce the virus accumulation.

Ibarra B, Schwerin M, Hasani A, Snodderly K, D'Souza G, Guha S, et al.

Leak verification method for additively manufactured medical devices.

Scientific reports. 2025;15(1):8.

https://link.springer.com/article/10.1007/s00170-025-16362-5

During the COVID-19 pandemic, supply shortages drove innovation in additively manufactured (AM) personal protective equipment, such as face masks that create barriers against infectious body fluids like blood, mucus, and respiratory droplets. However, printing defects including pores and flaws may occur during AM fabrication, potentially compromising effectiveness. This study advances AM quality assurance by providing a novel leak verification approach specifically targeting defects that may arise from AM processes. This article presents a verification method for manufacturers to assess defect impacts on device performance. A vessel mimicking an AM face mask with artificial defects underwent pressure decay testing to characterize air leakage. Fluid infiltration susceptibility was studied using synthetic blood, while aerosol leakage effects were investigated with sodium chloride testing. Combining these results established allowable pressure decay limits, enabling estimation of critical pressure decay responses where manufacturing defects can hinder the mask's performance. For the designed face mask pressure vessel, we found that an equivalent flaw size less than 70,686 mu m2 would likely ensure no blood infiltration of the mask frame at a heavy breathing pressure differential. This translated to a pressure decay test criteria requiring no more than a 1.3 psi air pressure drop over 2 s when the vessel is charged to 5 psi. The approach can be adapted for other AM components, providing a framework for developing verification methods ensuring AM part quality and reliability across various industries.

Lee B, Ahmed B, Koizumi N, Galvão CG, Sikka N, Ranniger C.

Feasibility of a virtual safety officer in detecting PPE donning and doffing violations.

Journal of occupational and environmental hygiene. 2025;22(6):437-42.

https://www.tandfonline.com/doi/pdf/10.1080/15459624.2025.2471394

A safety officer (SO) can assist healthcare workers in minimizing respiratory transmission of communicable diseases through verification of compliance with safety protocols, such as appropriately donning and doffing personal protective equipment (PPE). This project sought to determine if observation of PPE donning and doffing for detection of protocol violations by a virtual safety officer (VSO) was a feasible option to improve the safety of the workplace. Five healthcare workers with experience serving as safety officers were enrolled in a feasibility study in which they observed actors donning and doffing PPE in-person and noted errors using a curated checklist for documentation. One

month later, the same participants viewed recordings of the in-person sessions and again recorded errors for seven trials. Five hundred and twenty-three responses recorded from the SOs across the in-person and virtual trials aligned 88.7% of the time. SOs were more accurate in the virtual setting than in the in-person setting (87.6% vs. 82.4%, respectively). However, Cohen's kappa showed lower inter-rater reliability when observing virtually than in-person, especially in the doffing steps of the protocol. A VSO may be a feasible option when assessing whether participants can correctly follow PPE donning and doffing protocols. Future work includes incorporating real-time observation, 360-degree cameras, virtual reality (VR), and augmented reality (AR) to increase visualization, thereby increasing inter-rater reliability.

Mao YD, Zhu YC, Feng XW, Fang ZS.

Development of heat stress index for healthcare workers with personal protective equipment.

ENERGY AND BUILDINGS. 2025;346.

https://doi.org/10.1016/j.enbuild.2025.116150

The convergence of the COVID-19 pandemic with intensifying heatwaves has posed unprecedented occupational heat stress risks for healthcare workers (HCWs) wearing Personal Protective Equipment (PPE). The applicability of standard thermal indices is often limited in accurately assessing this risk across different climatic regions and specific contexts, highlighting the need for calibrated, localized thresholds. This study developed a comprehensive heat risk evaluation framework for PPE-clad individuals in a hot and humid climate. Through a field experiment with 96 volunteers performing simulated tasks across three seasons, a Bayesian Linear Mixed-effects Model (LMM) was employed to systematically calibrate the Physiological Equivalent Temperature (PET) and Wet-Bulb Globe Temperature (WBGT). This robust statistical approach accounts for inter-individual variability and establishes a scientifically defensible link between environmental indices, subjective thermal sensation, and objective physiological strain. The results confirmed significant seasonal differences in thermal responses, with wearers suffering the greatest physiological and psychological stress during summer. The LMM-based calibration subsequently quantified this impact, revealing a significant downward shift in thermal neutrality for PPE wearers. The neutral PET range was identified as 16.4 similar to 20.6 degrees C (WBGT < 17.5 degrees C), corresponding to neutral mean skin and auditory canal temperatures of 30.4 similar to 33.2 degrees C and 35.7 similar to 36.4 degrees C, respectively. Critical thresholds for moderate physiological strain and strong heat stress were established at PET > 29.1 degrees C and WBGT > 26.8 degrees C. By integrating statistical modeling with empirical data, this research provides more than a simple numerical adjustment; it develops the evaluation of thermal index. The developed thresholds constitute a practical tool to inform occupational safety protocols, enhance local heat warning systems, and mitigate heat-related risks for this vulnerable population.

Matić Z, Oh Y, Grindle A, DuBose JR, Lim L.

Keeping Healthcare Workers Safe During a Pandemic: Evaluating Doffing Area Design for Safer Removal of Personal Protective Equipment.

Herd. 2025;18(2):235-54.

https://journals.sagepub.com/doi/10.1177/19375867241311273

ObjectiveThis study proposes a user-centered methodology to quantify the design affordances of doffing spaces, focusing on the safety and efficiency of healthcare workers (HCWs).BackgroundDoffing personal protective equipment (PPE) poses a significant challenge for healthcare workers (HCWs) due to the high risk of self-contamination. The physical design of the doffing area plays an important role

in ensuring safety during this process. However, there currently are no established spatial metrics for assessing the design of doffing spaces.MethodsFour doffing areas in two Biocontainment Units (BCUs) were evaluated using Functional Scenario (FS) analysis method. FSs, representing the spatial needs of key users (HCW and Trained Observer-TO) were developed based on observations, literature, and discussions with staff. For each FS, we defined quantifiable metrics for visualizing the user's needs and evaluating doffing area design performance.ResultsWe defined 11 FSs (seven for HCWs and four for TOs) and 19 associated spatial metrics. FSs for the HCW focused on the prevention of self- and cross-contamination, as well as facilitating visibility, efficiency, and situational and process awareness. The FSs for the TO center on preventing self-contamination, promoting visibility and process awareness, and safe waste management.ConclusionsThe FS approach allowed for the quantification of doffing area affordances and evaluation of how they impact HCW performance, emphasizing design aspects that enhance safety and efficiency. The presented metrics and study findings are expected to inform the future design of spaces where doffing occurs and provide new guidance for improved doffing safety.

Nabwami PE, Nyaberi JM, Monyangi NN, Nantima N, Kayiwa J, Mokaya AG.

Preparedness of healthcare workers for the Ebola outbreak in Mubende and Kassanda districts, Uganda.

J Public Health Africa. 2025;16(4):6.

https://publichealthinafrica.org/index.php/jphia/article/download/1347/2273

Background: Effective preparedness is essential to safeguard healthcare workers (HCWs) and strengthen outbreak response. The 2022-2023 Ebola virus disease (EVD) outbreak in Uganda exposed critical gaps in healthcare preparedness, with HCWs accounting for 13.4% cases and 12.7% deaths. Aim: The study assessed preparedness of HCWs in public health facilities in Mubende and Kassanda districts, Uganda for EVD containment. Setting: The study was conducted in 16 public health facilities in districts severely affected by the 2022-2023 EVD outbreak. Methods: A cross-sectional study was conducted in May 2024 and June 2024 among 376 HCWs. Preparedness was assessed based on knowledge, infection prevention and control practices (IPC) practices and attitudes towards EVD containment. Data were collected using self-reported structured questionnaires. Preparedness was determined using median split. Logistic regression analysis was performed in STATA, and 95% confidence intervals (CIs) were calculated to assess statistical significance. Results: One hundred and fifteen (30.6%) HCWs met preparedness criteria. A total of 295 HCWs (78.5%) could not correctly don personal protective equipment (PPE), while 258 (68.6%) could not correctly doff PPE. The HCWs with degree or higher had higher odds of being prepared (adjusted odds ratio [aOR]: 4.55, 95% CI: 1.26-16.45) compared to those with lower qualifications. Similarly, HCWs with 11-15 years of experience had higher odds of being prepared compared to those with fewer years (aOR: 3.47, 95% CI: 1.12-10.07). Conclusion: Overall preparedness among HCWs was low. This highlights the need for continuous professional development and routine practical training on PPE use including donning and doffing procedures. Contribution: Findings provide evidence to guide targeted interventions for improving HCW preparedness for future EVD outbreaks.

Ng I, Kave B, Paynter C, Bodas C, Roberts M, Hung S, et al.

Speech intelligibility and hearing acuity assessments of N95/P2 respirator with under-mask elastic band beard cover.

Infect Control Hosp Epidemiol. 2025:7.

https://www.cambridge.org/core/services/aop-cambridge-core/content/view/5799C14E44C7797E3B9A79FE3B781802/S0899823X25102973a.pdf/div-class-

title-speech-intelligibility-and-hearing-acuity-assessments-of-n95-p2-respirator-with-under-mask-elastic-band-beard-cover-div.pdf

Objective: Using the Modified Rhyme Test in accordance with the National Institute for Occupational Safety and Health (NIOSH) protocol, we assessed the communication performance for both speech intelligibility and hearing acuity in bearded healthcare workers (HCWs) wearing a N95/P2 respirator with an under-mask elastic band beard cover.Design and setting: A prospective simulation study conducted at the respiratory fit test center of the Royal Melbourne Hospital.Participants: Bearded HCWs who required respiratory protection and could not shave for medical, cultural, or religious reasons.Results: The overall performance rating score was 91.3% and 99.8% for speech intelligibility and hearing acuity respectively. There was a reduction in the percentage of correct words perceived by a panel of trained listeners when bearded HCWs were speaking while wearing the N95/P2 respirator/elastic band combination compared to the uncovered beard condition (84.5% vs. 92.9%, p = 0.011). However, no significant difference was found in the perception of medical phrases between these two conditions. In the hearing assessment, there were no differences found in hearing correct single words or medical phrases between the two conditions.Conclusions: This study demonstrates that when bearded HCWs wore the N95/P2 respirator/elastic band combination, their speech intelligibility and hearing acuity greatly exceeded the NIOSH standard of 70% in the Modified Rhyme Test. This finding is crucial for ensuring effective communication among bearded HCWs, thereby supporting both respiratory protection and operational efficiency in healthcare settings.

Ohishi T, Shinomiya S, Tsuda Y, Kurosu H, Yoshikawa T.

Personal protective equipment stewardship across 112 medical facilities: a preliminary survey in Japan.

https://doi.org/10.1016/j.jhin.2025.03.016

Background: The stewardship of personal protective equipment (PPE) is crucial in preventing healthcare-associated infections by safeguarding healthcare workers. Aim: To comprehensively elucidate the selection process and current status of PPE stewardship in Japanese medical facilities and gather evidence that will contribute to the qualitative enhancement of PPE stewardship in the country. Methods: A survey on PPE stewardship was conducted at 200 Japanese medical facilities between February and March 2024. Findings: The response rate was 56.0% (112/200). While 99.1% of the responding facilities had documented protocols for PPE use and provided comprehensive training (including practical skills), only 3.8% extended this training to outsourced staff. Multiple sizes of surgical mask were available in 58.0% of the facilities, and 58.9% were equipped to conduct fit testing for N95 respirators. Moreover, 58.9% of the facilities monitored and evaluated PPE stewardship in conjunction with environmental rounds and hand hygiene assessments. Conclusion: Despite the limited sample size, this study is the first large-scale survey of PPE use in Japan. Our findings provide a basis for future surveys and evidence for establishing optimal PPE-related protocols. They may also contribute to the advancement of healthcare-associated infection control. (c) 2025 The Author(s). Published by Elsevier Ltd on behalf of The Healthcare Infection Society. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Orji I, Beam EL, Kopocis KR, Stentz TL, Lowe JJ.

A pilot study on the impact of wearing powered air-purifying respirators on speech intelligibility.

Journal of occupational and environmental hygiene. 2025:7.

https://www.tandfonline.com/doi/pdf/10.1080/15459624.2025.2549011

Powered air-purifying respirators (PAPR) have become an increasingly utilized form of respiratory protection against highly infectious aerosols. In the United States, PAPRs have been used in high-level clinical isolation settings to care for patients infected with viral hemorrhagic fevers and, more recently, during the COVID-19 pandemic. PAPRs have long been used for biocontainment care and experienced increased use during the pandemic because they provide full-face visibility and eye and respiratory protection. Despite their extended use, limited studies have explored the operational usability and limitations of these devices, especially during patient care and communication. For this pilot study, the speech intelligibility of two commonly used PAPR brands was examined in a clinical setting using some requirements from the National Institute for Occupational Safety and Health (NIOSH) standard testing procedure (NIOSH TEB-CBRN-APR-STP-0313 Determination of Communication Performance Test For Speech) for determining communication performance for speech conveyance in PAPRs. A total of 19 study participants were split into 17 speakers and two listeners. Speakers were assigned to test groups. Each speaker was provided with a word list, while listeners were provided with a response list. A modified rhyme test (MRT) was conducted to determine the communication performance rating of each PAPR brand. The 3M PAPR had a higher performance rating than MAXAIR across all test groups, despite having a 5 dBA higher internal noise. The difference in the mean performance rating of 3M (75) was significantly higher than that of MAXAIR (59) (95% CI: -23.66-9.09). Overall, the 3M PAPR was strongly preferred among study participants in terms of comfort, fit, and noise level. Interventions such as incorporating communication devices are of interest for future study, and an assessment of additional limitations is needed to optimize PAPR use in clinical care activities.

Preda V, Ong Z, Wijeweera C, Carney T, Clay-Williams R, Kankanamge D, et al.

Artificial intelligence (AI) use for personal protective equipment training, remediation, and education in health care.

American Journal of Infection Control. 2025;53(6):678-84.

https://doi.org/10.1016/j.ajic.2025.03.020

Background: Personal protective equipment (PPE) is a first-line transmission-based precaution for reducing the spread of nosocomial infections between health care workers (HCWs), patients, and staff. The COVID-19 pandemic highlighted a problematic skill gap in effective PPE donning/doffing. Methods: We performed a single-center, mixed-methods, prospective cohort study of 293 HCWs in Sydney, Australia. Participants were assessed using SXR AI-PPE, an artificial intelligence (AI) system that autonomously evaluates donning/doffing of PPE while providing real-time feedback on user technique. Results: Longitudinal results showed improved accuracy rates for correct donning/doffing after each guided session conducted at 3-monthly intervals, with a 100% accuracy rate for correct use of PPE after 2 guided sessions. These improvements were maintained with 3-monthly training sessions. Conclusions: The SXR AI-PPE platform is a comprehensive tool capable of training PPE donning/doffing by HCWs in real time with implications for reducing PPE contamination and risk of nosocomial infections. (c) 2025 The Author(s). Published by Elsevier Inc. on behalf of Association for Professionals in Infection Control and Epidemiology, Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

Schwartz A, Mikati S, Knipper F, Vogel AR, Stiegel MA.

Innovation in Personal Protective Equipment Decontamination During the COVID-19 Pandemic: The Powered-Air Purifying Respirator Hood Optimal Decontaminant Distribution System.

Appl Biosaf-J Am Biol Saf Assoc. 2025:8.

https://www.liebertpub.com/doi/10.1089/apb.2025.0006

Background: The COVID-19 pandemic highlighted critical shortages in personal protective equipment (PPE), particularly respirators, which limited healthcare workers' safety worldwide. Decontamination and reuse of PPE, including powered-air purifying respirators (PAPR) hoods, became essential to mitigate shortages. Conventional methods were inadequate for complete decontamination, prompting innovative solutions.Objective: To design and evaluate a novel device, the PAPR Hood Optimal Decontaminant Distribution System (PHODDS), for efficient decontamination of PAPR hoods using hydrogen peroxide vapor, ensuring safety, sustainability, and scalability.Methods: PHODDS was constructed using polyvinyl chloride tubing to facilitate hydrogen peroxide vapor circulation throughout PAPR hoods. Three PAPR models were tested in incremental batches of one, six, 10, and 20 hoods. Biological and chemical indicators (BIs and CIs) were placed in challenging areas to verify decontamination efficacy. Off-gassing of the decontaminant was assessed over 7 days post-decontamination.Results: Conventional decontamination methods failed to achieve full decontamination, as indicated by positive biological indicator growth and lack of chemical indicator color change. In contrast, PHODDS demonstrated consistent 6-log reduction efficacy across hoods and batch sizes, with BIs and CIs yielding negative results. The retention of H2O2 was minimal, except in some comfort strips.Conclusion: PHODDS successfully achieved effective decontamination of PAPR hoods, offering a scalable, cost-effective solution for PPE shortages during a pandemic response. It enables safe PPE reuse, potentially supporting pandemic resilience and environmental sustainability.

Tsang CC, Hoalroyd-Leduc JM, Ewa V, Conly JM, Leslie MM, Leal JR.

Barriers and facilitators to the use of personal protective equipment in long-term care: a qualitative study.

Journal of Hospital Infection. 2025;162:212-22.

https://doi.org/10.1016/j.jamda.2022.11.012

Background: Long-term care (LTC) residents are vulnerable to invasive infection. Appropriate use and training on personal protective equipment (PPE) is important for protecting residents and healthcare workers (HCWs). Studies on the barriers and facilitators to PPE use are limited in LTC settings. Aim: To characterize HCWs' perceptions of barriers and facilitators to the uptake and appropriate use of PPE in LTC facilities in Calgary, Alberta. Methods: Semi-structured interviews were conducted with HCWs from April to October 2022. Interview transcripts were analysed deductively to identify themes from the Theoretical Domains Framework. Findings: Seven HCWs were interviewed. Barriers and facilitators fell within six overarching themes including: availability and quality of PPE; knowing how to use PPE; familial obligations; convenience and comfort; sense of professional duty; and social influences and identity. Additional factors such as understaffing and the need for more training sessions were highlighted. Strategies to improve PPE use were identified by HCWs, including the use of PPE champions, regular audits, and constructive feedback. Conclusion: Identification of unique barriers and facilitators regarding PPE use by HCWs in LTC will facilitate targeted interventions to improve PPE use in this setting. on behalf of The Healthcare Infection Society. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Wibowo R, Satow M, Quartucci C, Weinmann T, Koller D, Daanen HAM, et al.

Impact of heat stress and protective clothing on healthcare workers: health, performance, and well-being in hospital settings.

Annals of work exposures and health. 2025;69(6):665-75.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12262050/

INTRODUCTION: Heat stress poses a recognized threat to human health. Despite growing evidence, its impact on healthcare workers (HCWs) remains underexplored. This study evaluates occupational heat stress in HCWs, assessing physiological responses and subjective well-being. METHODS: Twelve HCWs from a German university hospital were monitored in non-air-conditioned intensive care units (ICU) and non-ICU settings during the summer of 2022 (mean indoor temperature of 26.5 °C) and again in the autumn of the same year or in March 2023 (mean indoor temperature of 23.6 °C). Physiological data (core body temperature, heart rate, and skin temperature) and subjective perceptions were measured using wearable sensors and questionnaires. RESULTS: In summer, mean core body and skin temperatures were higher by 0.4 °C and 0.3 °C, respectively. ICU workers exhibited higher heart rates and reported greater mental demands, frustration, and discomfort, particularly when using personal protective equipment (PPE). Common symptoms included sweating, fatigue, and headaches. CONCLUSION: We observed some evidence suggesting that elevated indoor temperatures and reported PPE usage contribute to increased HCWs' heat strain, which could potentially affect health, safety, and performance. Given the observed trends, we recommend considering cooling vests and revising workplace standards to mitigate heat stress.

• Zoonoses : pathologies émergentes

Atherstone C, Galloway R, Schafer I, Artus A, Rodriguez MM, Ryff K, et al.

Epidemiological, temporal, and geographic trends of leptospirosis in the United States, 2014-2020.

PLoS neglected tropical diseases. 2025;19(8):18.

https://journals.plos.org/plosntds/article/file?id=10.1371/journal.pntd.0013427&type=printable

Background Leptospirosis, caused by pathogenic Leptospira spp., is one of the most widespread zoonotic diseases globally. In 2014, leptospirosis was reinstated as a nationally notifiable condition due to evidence of increasing incidence and public health importance. We describe the epidemiological, temporal, and geographic trends of leptospirosis in the United States since reinstatement.Methodology Analysis included confirmed and probable leptospirosis cases from jurisdictions reporting >= 1 case between 2014-2020. Analyzed data included reportable case surveillance and voluntarily submitted supplemental data.Principal findings Between 2014-2020, CDC received 1,053 case reports from 34 jurisdictions. The national incidence rate was 0.48 cases per 100,000 population. Since 2014, leptospirosis cases have been increasing, with an average annual gain of 13 cases (R2 = 0.69). Cases increased in summer, peaking in early fall, corresponding with warmer weather and hurricane season. Among cases with outcome data, 85% (n = 606/709) were hospitalized and 10% (n = 74) died. Seventy-seven percent of cases (n = 623) reported contact with animals or their bodily fluids while 71% (n = 578) of cases reported contact with freshwater or mud. More cases reported avocational activities (n = 413, [52%]) as the source of their animal or environmental exposure(s) than recreational or occupational activities (n = 203, [25%] vs n = 163, [20%], respectively). Only 13% of cases reported any international travel in the 30 days prior to symptom onset.Conclusions An increasing number of leptospirosis cases in the U.S. are being reported, mostly from domestic sources of infection. Changing epidemiological trends away from occupational exposures to avocational or recreational activities highlights the need for interventions mitigating these exposure risks. A high percentage of cases were hospitalized and died emphasizing the need to educate healthcare providers, public health professionals, and the public about early identification and treatment for leptospirosis to improve patient outcomes.

Baguma JN, Namusisi S, Ninsiima LR, Musiitwa R, Tamale BN, Amperiize M, et al.

Bat-human interactions and associated factors among communities in Bundibugyo District, Uganda: A cross-sectional study.

PLOS Glob Public Health. 2025;5(8):18.

https://journals.plos.org/globalpublichealth/article/file?id=10.1371/journal.pgph.0004249&type=printable

More than 70% of new, emerging, and reemerging infectious diseases are from animal origin. Human interaction with bats has been associated as a driver for various fetal zoonoses, including numerous viral diseases of bat-origin. A lot of serological evidence has been gathered around human-bat interaction, yet very little is known regarding the underlying risk factors at community level. This study was aimed at understanding the human-bat interactions and associated factors among communities in Bundibugyo District in Uganda. A cross-sectional study was conducted using both qualitative and quantitative data collection methods in Harugale, Burondo and Ntandi Subcounties in Bundibugyo District between November 2022 and March 2023. A total of 344 participants were interviewed using a structured questionnaire. Key Informant Interviews (KIIs) were also conducted among purposively selected individuals who have vast knowledge on human-bat interaction. Proportional piling and FGDs were conducted among groups of men, women, and youths to get their insights into human-bat interaction. The study revealed that 54.1% of the respondents were males, 42.1% were aged above 40 years. Households headed by males (APR = 1.31, 95% CI:1.07-1.62, Batwa communities (APR = 3.03, 95% CI:1.87-3.94), residing in urban areas (APR = 1.72, 95 CI%:1.35-2.20), trading of food and animal products (APR = 0.6, 95 CI%:0.36-0.99), no occupation (APR = 0.27, 95 CI%:0.12-0.57) and residing in incomplete houses (APR = 1.57, 95 CI%:1.25-1.98) were significantly associated with exposure of humans to bats. There was high exposure of humans to bats in Ntandi compared to Burondo and Harugale. Women groups highlighted use of bat repellants and killing of bats using sticks as the measures to reduce human bat interaction during the focus group discussions (FGDs). Generally, there is high exposure to bats among human communities in Bundibugyo district which increases the risk of zoonotic disease transmission at human-bat interface. Findings from this study aim to enable the one health interventions to reduce bat-human interaction potential risks in both urban and rural areas and support design of feasible interventions for Bundibugyo district and Uganda at large.

Bakpatina-Batako MhVDP, Li K, Lacouture S, Cipolla L, Gianecini A, Prieto M, et al.

Human Streptococcus suis Infections, South America, 1995–2024.

Emerging Infectious Disease journal. 2025;31(7):1277.

https://wwwnc.cdc.gov/eid/article/31/7/24-1835_article

https://wwwnc.cdc.gov/eid/article/31/7/pdfs/24-1835.pdf

Streptococcus suis, a swine pathogen that causes zoonotic infections in Europe and Asia, has increasingly been observed in South America. We reviewed all available reports from the continent and identified S. suis cases in Argentina, Brazil, Chile, French Guiana, and Uruguay. We also identified 8 novel infections from Argentina, bringing the total documented human cases in South America to 47. We reclassified 1 previously reported infection as S. parasuis. Among the 47 S. suis cases, 40 (85%) patients had meningitis, 2 (4%) had toxic shock–like illness, 2 (4%) had nonshock sepsis, 1 (2%) had arthritis, and 1 (2%) had endocarditis. The case-fatality rate was 4% (2/47). Infections were primarily linked to pig or pork exposure, although some occurred after consuming undercooked meat. Case distribution varied by country, and Argentina reported a disproportionately high number of cases

despite a smaller swine industry. Our findings highlight the need for more consistent regional S. suis surveillance.

Berger A, Dangel A, Melnikov V, Bengs K, Rupp T, Mappes H-J, et al.

Human Infections by Novel Zoonotic Species *Corynebacterium silvaticum*, Germany.

Emerging Infectious Disease journal. 2025;31(7):1450.

https://wwwnc.cdc.gov/eid/article/31/7/25-0086_article

https://wwwnc.cdc.gov/eid/article/31/7/pdfs/25-0086.pdf

We report 2 human Corynebacterium silvaticum infections in Germany with axillary lymphadenitis and abscess formation; in 1 case the infection likely originated from a slaughtered wild boar. This recently described member of the diphtheria toxin gene–bearing C. diphtheriae species complex might be a new zoonotic pathogen.

Brüssow H.

Increasing Occurrence of Marburg Virus Outbreaks in Africa: Risk Assessment for Public Health.

Microbial biotechnology. 2025;18(9):15.

https://doi.org/10.1111/1751-7915.70225

In this millennium, Marburgvirus (MARV) outbreaks with very high mortality but still small case numbers (< 400) were observed with increasing frequency in Africa. Ecologists identified Egyptian Rousettus bats (ERB) as viral reservoir species causing occasional zoonotic spillover events, mostly in humans intruding into their cave habitats as miners or tourists. So far only short human-to-human transmission chains have been documented. ERB can be experimentally infected with MARV but show no clinical signs. MARV transmission is inefficient among adult bats and occurs mostly between older juvenile ERB. WHO has modified infection control measures, requiring a high level of personal protective equipment when treating Marburgvirus disease (MVD) patients or burying the dead. If patients are quickly identified and isolated after symptom onset and contacts traced and also isolated, epidemics can be controlled. Researchers explored a number of antivirals against MARV in non-human primate (NHP) MVD models. Compounds included galidesivir, an adenosine nucleoside analogue; favipiravir, a synthetic guanine base analog; remdesivir, an injectable; and obeldesivir, an oral prodrug which are intracellularly metabolised to an adenosine triphosphate nucleotide analog; small interfering RNA drugs that target short segments of the MARV nucleoprotein NP mRNA; and a human neutralising monoclonal antibody directed against MARV glycoprotein. All compounds mediated various levels of survival in challenged NHPs depending on dose and time of application. Various vaccine approaches (alphavirus replicons, adenovirus and vesicular stomatitis virus vectors, virus-like particles, recombinant proteins, DNA vaccines) were explored in NHPs and conferred various degrees of protection against lethal MARV challenge. DNA vaccines were well tolerated in humans but showed only low immunogenicity. The African CDC has attributed an upper tier risk attribution to MVD when comparing 18 pathogens. For the moment, the short human MARV infection chains make large international outbreaks unlikely, but viral genome analysis in future outbreaks for transmission mutants is warranted.

Cassens J, Larson S, Keller K, Alexander BH, Bender JB, Oliver JD.

Estimating Infected Blacklegged Tick Encounters Among Outdoor Workers in Minnesota.

EcoHealth. 2025:16.

https://link.springer.com/content/pdf/10.1007/s10393-025-01753-7.pdf

Outdoor workers are at increased risk of tick-borne diseases, yet we poorly understand the interaction between occupational risk factors and worker behavior. This study integrates active tick surveillance with worker-reported survey data to assess how occupational behaviors, demographic characteristics, and tick-prevention knowledge influence exposure to infected ticks. We collected blacklegged ticks (Ixodes scapularis) from three Minnesota counties to determine the infection prevalence and density of infected ticks for Borrelia burgdorferi and Anaplasma phagocytophilum. Molecular surveillance was coupled with outdoor worker surveys that ascertained exposure characteristics to model individual-specific probabilities of encountering infected ticks during their job responsibilities. From May to July 2023-2024, 872 ticks were collected, where 45.6% (n = 398) were infected with B. burgdorferi and 7.2% (n = 78) were infected with A. phagocytophilum. Across both years, maximum infected tick densities peaked in Carlos Avery Wildlife Management Area at 0.80 (0.22 [IQR 0.16, 0.48]) per 100 m(2), were intermediate in Lake Elmo Park Reserve at 0.35 (0.12 [IQR 0.05, 0.18]) per 100 m(2), and lowest in Whitewater Wildlife Management Area at 0.25 (0.04 [IQR 0.02, 0.13]) per 100 m(2). Forty-two survey responses revealed individual probabilities of encountering infected ticks ranged from similar to 5 to 65% for B. burgdorferi and similar to 0-25% for A. phagocytophilum. Our results suggest that outdoor workers have a high probability of encountering infected ticks through occupational exposure, which was marginally associated with demographic factors (e.g., age) and preventive behaviors (e.g., tick checks, repellent use). This study reports elevated B. burgdorferi infection prevalence from adult (62.1%) and nymphal (36.5%) blacklegged ticks within Minnesota.

de França DA.

Unveiling Q fever in Latin America: beyond occupational risks to vulnerable populations and environmental transmission.

Frontiers in public health. 2025;13:4.

https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2025.1571557/full

Di Guardo G.

Highly Pathogenic Avian Influenza A(H5N1) Virus: How Far Are We from a New Pandemic?

Vet Sci. 2025;12(6):5.

https://doi.org/10.3390/vetsci12060566

The focus of this commentary is represented by the pandemic risk associated with the highly pathogenic avian influenza (HPAI) A(H5N1) virus, clade 2.3.4.4b. More in detail, the herein dealt pandemic alarm appears to be primarily justified by the huge and progressively growing number of virus-susceptible domestic and wild birds and mammals, including threatened marine mammal species like South American sea lions and elephant seals as well as harbour porpoises, bottlenose dolphins and polar bears. Of major concern is the susceptibility of dairy cattle to HPAI A(H5N1) virus, particularly the documented and unprecedented colonization of host's mammary gland tissue, resulting in viral shedding through the milk alongside a large series of cases of infection in dairy farm workers in several USA locations. Despite well-documented zoonotic capability, no evidences of a sustained and efficient HPAI A(H5N1) viral transmission between people have been hitherto reported. If this were to happen sooner or later, a new pandemic might consequently arise. Therefore, keeping all this in mind and based upon the lessons taught by the COVID-19 pandemic, a "One Health, One Earth, One Ocean"-centered

approach would be absolutely needed in order to deal in the most appropriate way with the HPAI A(H5N1) virus-associated zoonotic and pandemic risk.

Fincato A, Lucchese L, Bellinati L, Mazzotta E, Ragolia S, Asa'Ad S, et al.

Q Fever: Who Is at Risk? A Serological Survey in the General Population and Occupationally Exposed Individuals in Northern Italy.

Pathogens. 2025;14(9):13.

https://doi.org/10.3390/pathogens14090869

Background: Q fever is a zoonotic disease caused by the intracellular bacterium Coxiella (C.) burnetii. In ruminants, it mainly leads to reproductive disorders. In humans, transmission typically occurs through direct contact with infected animals or inhalation of contaminated aerosols. Although it is a notifiable disease in the European Union for both humans and certain animal species, the actual incidence is likely underestimated due to the non-specific nature of clinical symptoms. Domestic ruminants are considered the main reservoirs of C. burnetii, placing farmers and veterinarians at increased occupational risk of infection. Objectives: This study aimed to assess the risk of Q fever infection in northern Italy by comparing the seroprevalence rates between professionally exposed individuals and not professionally exposed people. Methods: A total of 209 serum samples were analysed: 117 from exposed professionals (veterinarians, biologists, agronomists, laboratory technicians) and 92 from professionally unexposed people (control group). Serum samples were tested with a commercial enzyme-linked immunosorbent assay to detect the presence of IgG against C. burnetii. Positive and doubtful samples were further investigated with a commercial immunofluorescence assay for detection of IgM and IgG. Epidemiological data were also collected to explore potential risk factors. Results: In total, 10 of the 117 exposed individuals tested positive, yielding a seroprevalence of 8.6%, while only 1 of the 92 control subjects tested positive (1.1%). These findings indicate a significantly higher occupational risk of C. burnetii infection among exposed professionals compared to the general population. Conclusions: The results highlight the need for preventive measures and surveillance in at-risk occupational groups.

Gao HB, Sun WY, Lu PY, Dong ZP, Wu JJ, Li YG, et al.

Efficient airborne transmission of influenza D virus in ferret models and serological evidence of human exposure in Northeast China.

Emerging Microbes & Infections. 2025;14(1):15.

https://www.tandfonline.com/doi/pdf/10.1080/22221751.2025.2564308

Newly emerging influenza D virus (IDV), first identified in swine in 2011, has demonstrated broad mammalian tropism with notable prevalence in bovine populations and occupational exposure-associated seroprevalence among cattle workers. This zoonotic expansion raises concerns that IDV could acquire capability for human-to-human transmission via sustained evolving in mammal hosts. Here, we evaluated the infectivity and transmissibility of a currently circulating IDV strain, D/bovine/Jilin/HY11/2023 (abbreviated as D/HY11), isolated from cattle in Northeast China in 2023. D/HY11 was able to replicate efficiently in human primary respiratory epithelial cells and exhibits respiratory tract tropism in mammals. More importantly, we found that D/HY11 could efficiently transmit through the air between ferret models (5/6). Serological surveillance (2020-2024) revealed alarming exposure rates, with no significant difference in positivity between rural and urban populations: 73.37% (449/612) in the general population and an even higher rate of 96.67% (58/60) among individuals with respiratory symptoms. The extraordinary high IDV seropositivity among people

in Northeast China highlights the possibility of silent spread in mammals with mild symptoms. Among generic anti-influenza drugs tested in vitro, only polymerase inhibitors demonstrated effective suppression of IDV replication. And the D/HY11 strain exhibited enhanced polymerase activity compared to the classical IDV strain, with preliminary evidence implicating the P3 gene as a potential contributing factor to this functional enhancement. Our pathogenetic and serological findings indicate that IDV may have acquired the capacity for human-to-human transmission during its ongoing evolution, and currently circulating IDV strains already pose a potential panzootic threat.

Gompo TR, Pandit S, Subedi D, Sapkota RC, Pandey A, Nepal R, et al.

Seroprevalence and risk factors associated with Leptospira Hardjo among commercial dairy cattle farms of Rupandehi district, Nepal.

BMC Vet Res. 2025;21(1):12.

https://link.springer.com/content/pdf/10.1186/s12917-025-04882-x.pdf

Background Nepal relies on an agrarian-based economy, with the livestock sector contributing significantly to the national GDP. However, diseases like leptospirosis negatively impact cattle production and pose significant zoonotic risks. This study represents the first attempt to evaluate the risk factors of leptospirosis in cattle in Nepal. A cross-sectional study was conducted from March 2019 to April 2020 in 14 administrative units of the Rupandehi district. A total of 367 blood samples were collected from 206 cattle farms using a proportionate sampling procedure. An indirect ELISA was used to detect specific antibodies in serum samples against Leptospira interrogans serovar Hardjo. Farm management practices and knowledge of zoonotic diseases were assessed through interviews with animal owners from the 206 cattle farms. Regression analyses were conducted to analyze the herd and farm level risk factors. Results The overall farm-level seroprevalence of leptospirosis was 4.85% (95% CI: 2.35-8.75), while the animal-level seroprevalence was 3.81% (95% CI: 2.10-6.30). Using multivariable logistic regression analysis, we found that farms with purchased cattle (farms that regularly introduce cattle from other farms) had a borderline significant increase in odds of leptospirosis (OR: 7.25, 95% CI: 0.88-59.46, p = 0.065) compared to farms that only keep home-bred cattle. Additionally, larger farms (> 10 animals) were significantly associated with increased odds of leptospirosis (OR: 13.34, 95% CI: 1.64-108.42, p = 0.015) compared to smaller farms (<= 10 animals). At the animal level, no statistically significant difference was observed in the multivariable mixed-effects logistic regression model, which included farm as a random effect. Conclusion The detection of farms with positive serum samples highlights the persistent threat of leptospirosis to cattle production and its occupational hazards within Nepal's dairy sector. Farm-level risk factors, such farms with purchased cattle and larger farm sizes, emphasize the need for targeted control measures. Given the zoonotic nature of the disease and its ecological complexity involving multiple hosts, a One Health approach is essential. Collaborative efforts among stakeholders are needed to develop evidence-based policies, strengthen health system preparedness, and implement practical interventions that reduce transmission risks and the overall disease burden in both human and animal populations across the country.

Gould CV, Staples JE, Guagliardo SAJ, Martin SW, Lyons S, Hills SL, et al.

West Nile Virus: A Review.

Jama-Journal of the American Medical Association. 2025;334(7):618-28.

https://jamanetwork.com/journals/jama/article-abstract/2836058

Importance West Nile virus (WNV), a neurotropic flavivirus spread by Culex species mosquitoes, is the leading cause of mosquito-borne disease in the contiguous US. From 2014 to 2023, a mean of 1298 WNV neuroinvasive disease cases and 129 deaths were reported annually in the US. Observations Almost all WNV infection occurs via mosquito bites, but transmission can rarely occur via blood transfusion, organ transplantation, and transplacental, perinatal, breastmilk, percutaneous, and conjunctival exposure. Since 2018, large WNV outbreaks have been reported in Europe, Tunisia, Israel, and the US. In 2021, the largest county-level US outbreak occurred in Arizona, with 1487 disease cases and 101 deaths reported. Based on seroprevalence surveys, approximately 80% of human WNV infections are asymptomatic, 20% cause a febrile illness (West Nile fever), and less than 1% cause neuroinvasive disease (eg, meningitis, encephalitis, acute flaccid myelitis). Mortality of patients with neuroinvasive disease is approximately 10% overall but is 20% in individuals 70 years or older and 30% to 40% in patients with hematologic malignancies, solid organ transplants, and those receiving B-cell-depleting monoclonal antibodies. Among patients hospitalized for WNV disease, 30% to 40% are discharged to long-term care facilities, and more than 50% have long-term sequelae such as fatigue, weakness, myalgia, memory loss, and depression. WNV transmission during solid organ transplantation was identified in 14 clusters in the US and Italy from 2002 to 2023. Since WNV screening of the US blood supply began in 2003, 14 cases of WNV transmission through blood transfusion have been reported. For patients with fever or neurologic symptoms during summer and fall months, WNV should be considered; IgM testing of serum and/or cerebrospinal fluid is recommended, followed by confirmatory neutralizing antibody testing in cases of possible exposure to cross-reacting flaviviruses, atypical presentation or death, or suspected unusual transmission modes such as organ transplantation. Reverse transcription-polymerase chain reaction testing is often more sensitive than IgM testing in patients with severe immunocompromise. There are no evidence-based therapies or human vaccines for WNV disease. Preventive methods include personal protective behaviors, such as using Environmental Protection Agency-registered mosquito repellents, wearing protective clothing, and limiting outdoor exposure from dusk to dawn, and community mosquito control measures. Conclusions and Relevance WNV causes more than 1200 neuroinvasive disease cases and 120 deaths annually in the US. People who are older or immunocompromised are at higher risk of severe disease and death. Since there are no therapies or human vaccines, prevention relies on personal protective measures, WNV surveillance, and mosquito control interventions.

Grosbois A, Risco-Castillo V, Davoust B, Laidoudi Y, Crozet G, Watier-Grillot S.

Dirofilaria immitis and Dirofilaria repens infections in French working military dogs: Prevalence and factors associated with vector exposure.

Parasitol Int. 2025;109:10.

https://www.sciencedirect.com/science/article/pii/S1383576925000789?via%3Dihub

Dirofilaria (D.) immitis and D. repens are mosquito-borne nematodes that can cause heartworm disease and skin nodules, respectively in infected dogs. These parasites may also be responsible for minor zoonoses. Infections caused by these agents are widely distributed throughout the world and have already been reported in mainland France, especially in the south. Both parasites are associated with animal and public health concerns in France. Military working dogs are often exposed to them during their missions throughout the world, and prophylactic measures are therefore well established. To gain a better understanding of the situation among these dogs, a prevalence survey was carried out on a representative sample of 250 military working dogs. Blood samples were analyzed using a rapid test for the detection of D. immitis adult antigens, and modified Knott's test for microfilariae identification. Data on dog exposure to vectors and on their living behaviors were also collected with a survey questionnaire. For one dog (0.4 %), a positive result for D. immitis was obtained with the rapid diagnostic test, and another dog (0.4 %) was found to be positive for D. repens with the modified Knott's

test. However, only D. repens infection was confirmed by polymerase chain reaction. These dogs were living in outdoor kennels, which could increase their exposure to mosquito vectors in enzootic areas, and thus to the parasites, further reinforced by their predominantly outdoor operational activities. Nevertheless, the low observed prevalences may reflect the effectiveness of stringent prevention measures in this specific population, or a generally low level of transmission in the general canine population in France-albeit insufficiently documented due to limited surveillance data-or again, limitations related to the imperfect diagnostic methods employed in this study.

Guinat C, Fourtune L, Lambert S, Martin E, Gerbier G, Pellicer AJ, et al.

Promising Effects of Duck Vaccination against Highly Pathogenic Avian Influenza, France, 2023–2024.

Emerging Infectious Disease journal. 2025;31(7):1468.

https://wwwnc.cdc.gov/eid/article/31/7/24-1445_article

https://wwwnc.cdc.gov/eid/article/31/7/pdfs/24-1445.pdf

Highly pathogenic avian influenza causes substantial poultry losses and zoonotic concerns globally. Duck vaccination against highly pathogenic avian influenza began in France in October 2023. Our assessment predicted that 314–756 outbreaks were averted in 2023–2024, representing a 96%–99% reduction in epizootic size, likely attributable to vaccination.

Hashemian SMM, Madani SA, Peighambari SM.

Molecular Survey of Chlamydial Infections in Three Public Bird Collections in Tehran, Iran.

Vet Med Sci. 2025;11(5):8.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/vms3.70537?download=true

BackgroundAvian Chlamydia spp. are capable of infecting different avian species and potentially cause the loss of valuable birds in rehabilitation facilities and zoos. They also pose a potential zoonotic risk to visitors and workers at such centres.ObjectivesThis study aimed to assess the occurrence of chlamydia in two different public aviaries and a rehabilitation centre.MethodOne hundred and eight samples from 48 different avian species belonging to 11 different orders were collected. These samples were tested for chlamydia infection by detecting the Chlamydia 16s rRNA gene using polymerase chain reaction.ResultsThirty-seven samples were positive for Chlamydia DNA. High infection rates were detected in Psittaciformes (60%) and Columbiformes (77.8%). These findings indicate the relatively high frequency of chlamydial infections in birds of these orders. The occurrence of this infection in Falconiformes was 33.3%. Galliformes species investigated in this study had a lower occurrence (16.7%) of chlamydial infection. The only sample taken from the Charadriiformes order belonging to the yellow-footed gull was tested positive. A relatively high rate of infection with chlamydial agents was demonstrated in this study.ConclusionRegarding the close contact of infected animals with both workers and visitors, these findings are alarming. The affected aviary centres must implement a strategy to monitor, detect and control the infection, as it poses a considerable public health risk. On the other hand, the infection of rehabilitating captive birds in rescue centres is particularly relevant because the infection might be reintroduced to endangered wild populations, posing a conservation and environmental hazard.

Iqbal N, Sawatzki K, Ahmed K, Tisoncik-Go J, Smith E, Voss K, et al.

Identification of Co-Circulating Dengue and South America–Origin Zika Viruses, Pakistan, 2021–2022.

Emerging Infectious Disease journal. 2025;31(8):1648.

https://wwwnc.cdc.gov/eid/article/31/8/25-0342_article

https://wwwnc.cdc.gov/eid/article/31/8/pdfs/25-0342.pdf

We collected samples from febrile patients in Karachi, Pakistan, in 2021–2022. Sequencing, molecular, and serologic screens revealed dengue serotype 2 and Zika virus. The Zika lineage was inferred to be from Brazil in 2016, indicating unobserved circulation. We conclude that Zika virus contributes to perceived dengue outbreak burden in Pakistan.

Janssens H, Delameillieure L, Jonckheere S, Van Houtte F, Meuleman P, Geens T.

Higher Hepatitis E Seroprevalence in Workers in the Pig Sector in Flanders, Belgium: Results From a Seroprevalence Case-Control Study.

Zoonoses and public health. 2025;72(5):442-52.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/zph.13223?download=true

Introduction: Autochthonous hepatitis E virus (HEV) infection in industrialised countries is a zoonosis. Pigs are recognised as the principal reservoir. Consequently, workers in the pig sector may be a high-risk occupational group for HEV infection. The current study aims to investigate whether workers exposed to pigs or pork have a higher seroprevalence of HEV IgG in comparison to a control group. Methods: A cross-sectional study was conducted involving 92 individuals occupationally exposed to pigs or pork and 217 control subjects outside the pig sector. Socio-demographic variables, information about occupation, and a number of relevant confounding variables (such as eating habits, and history of blood transfusions) were gathered by a questionnaire. Serum samples were tested for anti-HEV IgG antibodies using an enzyme-linked immunosorbent assay (ELISA). Results: Our study revealed a significantly higher seroprevalence of HEV antibodies in pig workers (32.6%) compared to the control group (9.2%) ($p < 0.001$). The relation between occupational exposure and HEV seropositivity remained significant in the multiple logistic regression analysis, in which the odds were adjusted for age, gender, and eating habits. Conclusions: The results from this first HEV IgG serology study in the pig sector in Belgium demonstrate that workers in this sector have a higher risk for HEV infection compared to a population not occupationally exposed to pigs and pork. These findings underscore the need for targeted occupational health interventions, including improved hygiene practices and informing employees with risk profiles, to mitigate the risk of HEV infection among pig workers.

Jephcott FL, Bonney JHK, Arhin-Sam KO, Nyarko-Ameyaw S, Wood J, Cunningham AA, et al.

Practical norms in emerging infectious disease control: lessons for transnational collaboration from a suspected newly emerging zoonosis outbreak in Ghana.

BMJ Glob Health. 2025;10(7):15.

https://doi.org/10.1136/bmjgh-2024-017717

Concern around the emergence of zoonoses with pandemic potential has fuelled significant foreign engagement with domestic infectious disease surveillance and response systems across Africa. These international efforts at augmentation have likely been hampered, however, by an inattention to how such systems actually manifest on the ground and the critical activities and undertakings that take

place outside of official structures and protocols. Such deviations from official protocols have previously been treated as inherently detrimental to public service delivery. A growing body of anthropological scholarship arising out of west and east Africa, however, has revealed that such deviations are often crucial to realising some core function or facet of it. Further, these apparent acts of discretion can represent broadly standardised sets of practices and structures that can be elucidated through interviews and observation. In this paper, we present an ethnographic account of the investigations into a suspected outbreak of a newly emerging zoonosis in the Brong Ahafo Region of Ghana between 2010 and 2016. By following the unfolding of the responses to the Brong Ahafo Region outbreak and drawing on observations from contemporaneous zoonotic outbreaks in West Africa, we elucidate the kinds of unofficial professional practices and shared visions of public service delivery which shape, and frequently augment, national responses to suspected newly emerging infectious diseases. The paper advances recent anthropological work on practical norms by applying them to emerging infectious disease control systems and considering the role of professional ethos in coordinating their use. The paper also clarifies the nature and utility of such unofficial activities for foreign would-be reformers of domestic surveillance and response systems in Africa, potentially enabling more effective transnational engagement with, and strengthening of, these critical systems for emerging infectious disease control.Abstract Concern around the emergence of zoonoses with pandemic potential has fuelled significant foreign engagement with domestic infectious disease surveillance and response systems across Africa. These international efforts at augmentation have likely been hampered, however, by an inattention to how such systems actually manifest on the ground and the critical activities and undertakings that take place outside of official structures and protocols. Such deviations from official protocols have previously been treated as inherently detrimental to public service delivery. A growing body of anthropological scholarship arising out of west and east Africa, however, has revealed that such deviations are often crucial to realising some core function or facet of it. Further, these apparent acts of discretion can represent broadly standardised sets of practices and structures that can be elucidated through interviews and observation. In this paper, we present an ethnographic account of the investigations into a suspected outbreak of a newly emerging zoonosis in the Brong Ahafo Region of Ghana between 2010 and 2016. By following the unfolding of the responses to the Brong Ahafo Region outbreak and drawing on observations from contemporaneous zoonotic outbreaks in West Africa, we elucidate the kinds of unofficial professional practices and shared visions of public service delivery which shape, and frequently augment, national responses to suspected newly emerging infectious diseases.The paper advances recent anthropological work on practical norms by applying them to emerging infectious disease control systems and considering the role of professional ethos in coordinating their use. The paper also clarifies the nature and utility of such unofficial activities for foreign would-be reformers of domestic surveillance and response systems in Africa, potentially enabling more effective transnational engagement with, and strengthening of, these critical systems for emerging infectious disease control.

Lee JY, Pyo SW, Kim J, Park YJ.

First report of human Mycobacterium bovis infection in a veterinary laboratory worker in the Republic of Korea.

Osong Public Health Res Perspect. 2025;16(3):132.

https://doi.org/10.24171/j.phrp.2024.0343

Objectives: In the Republic of Korea, the previous surveillance system for zoonotic tuberculosis (TB) involved the X-ray testing of humans in contact with Mycobacterium bovis-infected livestock. In contrast, the updated surveillance system incorporates the genotyping of cultured Mycobacterium isolates for high-risk occupational groups. This study aimed to systematically document the detection, diagnosis, assessment, and response in the epidemic investigation of zoonotic TB in a laboratory worker

in the Republic of Korea. Methods: M. bovis was confirmed using spoligotyping and whole genome sequencing. Clinical characteristics were reviewed through epidemiological investigation and interviews with the affected individual. Transmission routes and secondary spread were assessed via field epidemiological investigations and contact evaluations using chest X-ray and interferon gamma release assay for latent TB infection. Results: A 56-year-old laboratory worker presented with chest X-ray findings compatible with TB and subsequently tested positive for M. bovis. She had no clinical or family history of TB and remained asymptomatic. She completed a 6 month treatment regimen of isoniazid, rifampin, ethambutol, and pyrazinamide without hospitalization. Although no direct transmission pathways for zoonotic TB were identified, her work in a laboratory, processing specimens for zoonotic TB, indicated potential laboratory related exposure. Conclusion: This case underscores the importance of stringent use of personal protective equipment among high-risk occupational groups and the implementation of an enhanced surveillance system to report zoonotic TB. These findings highlight the need for a One Health approach and proactive surveillance, emphasizing the necessity of refining and strengthening surveillance systems for precise monitoring and an effective response.

Li HM, Ren RQ, Bai WQ, Li ZH, Zhang JY, Liu Y, et al.

A Review of Avian Influenza Virus Exposure Patterns and Risks Among Occupational Populations.

Vet Sci. 2025;12(8):15.

https://doi.org/10.3390/vetsci12080704

Avian influenza viruses (AIVs) pose significant risks to occupational populations engaged in poultry farming, livestock handling, and live poultry market operations due to frequent exposure to infected animals and contaminated environments. This review synthesizes evidence on AIV exposure patterns and risk factors through a comprehensive analysis of viral characteristics, host dynamics, environmental influences, and human behaviors. The main routes of transmission include direct animal contact, respiratory contact during slaughter/milking, and environmental contamination (aerosols, raw milk, shared equipment). Risks increase as the virus adapts between species, survives longer in cold/wet conditions, and spreads through wild bird migration (long-distance transmission) and live bird trade (local transmission). Recommended control measures include integrated animal-human-environment surveillance, stringent biosecurity measures, vaccination, and education. These findings underscore the urgent need for global 'One Health' collaboration to assess risk and implement preventive measures against potentially pandemic strains of influenza A viruses, especially in light of undetected mild/asymptomatic cases and incomplete knowledge of viral evolution.

Morea A, Schino V, Bartolomeo N, Ravallese R, Sacino G, Ravallese R, et al.

Seroprevalence of tick-borne diseases in Europe in occupational settings: A systematic review and metanalysis.

Public Health. 2025;248:9.

https://doi.org/10.1016/j.puhe.2025.105923

Objectives: Tick-borne diseases (TBDs) pose a growing occupational risk due to the expanding geographical range of tick species and their associated pathogens. This study aims to assess TBD seroprevalence among different occupational groups in Europe, identifying high-risk professions and guiding targeted prevention efforts. Study design: A systematic review and meta-analysis were conducted following PRISMA guidelines to evaluate TBD seroprevalence in occupational settings across Europe from January 2013 to June 2024. Methods: A comprehensive search of PubMed, Web of Science, and Scopus identified 36 relevant studies. Heterogeneity among studies was assessed using Cochran's Q test and the inconsistency index (I2), with sensitivity and outlier analyses applied to evaluate their impact. Publication bias was examined through funnel plot analysis, Egger's test, and Duval & Tweedie's trim-and-fill method. Results: Seroprevalence varied significantly across occupations. The highest rates were found for Coxiella burnetii among livestock and dairy producers (up to 73.7 % in Italy) and Borrelia burgdorferi among forestry workers, particularly in Poland. A meta-analysis of 33 studies revealed seroprevalence rates of 8.2 % in military workers (no publication bias), 26.0 % in forestry workers, 8.0 % in veterinarians, and 18.0 % in farmers, with high overall heterogeneity. Conclusions: TBD risk is influenced by occupational exposure, environmental factors, and regional differences. Given the substantial variation across worker categories, targeted preventive measures, increased awareness, and enhanced surveillance efforts are necessary to mitigate risks in high-exposure professions.

Moreira G, Ribeiro M, Martins M, Cardoso JM, Esteves F, Anastácio S, et al.

Assessing Q Fever Exposure in Veterinary Professionals: A Study on Seroprevalence and Awareness in Portugal, 2024.

Vet Sci. 2025;12(6):13.

https://doi.org/10.3390/vetsci12060512

Due to their frequent contact with animals, veterinarians may be at preferential risk of Coxiella burnetii exposure due to occupational contact with livestock. This study assesses the seroprevalence and risk factors associated with C. burnetii seropositivity in Portuguese veterinarians. A cross-sectional study compared IgG anti-C. burnetii in veterinarians' sera to a demographically matched control group. Univariate and multivariate logistic regression analyses evaluated associations between the demographic, occupational, and biosecurity factors and seropositivity. Seroprevalence among veterinarians was 33.7%, significantly higher (p = 0.0023) than in the controls (17.39%). Univariate analysis identified higher seropositivity in the northern region (p = 0.03), though this association was not significant after adjustment (p = 0.07). Protective measures, including isolating aborting animals from the rest of the herd (adjusted OR [aOR]: 0.35, p = 0.03) and wearing gloves during sample collection (OR: 0.28, p = 0.009), were significantly associated with lower infection risk. Veterinarians face increased C. burnetii exposure, but specific biosecurity practices reduce risk. Strengthening preventive measures, including personal protective equipment (PPE) use and biosecurity training, is essential to mitigate occupational and public health risks. Further research should explore vaccination strategies and molecular epidemiology to improve risk reduction efforts.

Muthappan S, Abdulkader RS, Mohd G, Lydia JB, Priya J, Salvankar A, et al.

Risk of Swine Influenza Virus Spillover at the Human-Swine Interface - a Scoping Review.

Int J Public Health. 2025;70:9.

https://doi.org/10.3389/ijph.2025.1608380

Objectives We conducted this scoping review to describe the factors that influence the risk of spillover of Swine Influenza Virus (SIV) at various human-swine interfaces.Methods We used the PubMed and EMBASE databases to identify relevant articles published until February 2024. We included cross-sectional, case-control, cohort, randomized controlled trials (RCTs), and ecological studies. Two authors screened the titles, abstracts, and full texts. The extracted details were presented in tables and figures.Results Among the 55 studies, the majority were conducted in the United States (n = 27) and published after 2015 (n = 30). Occupational risk factors were the most commonly reported (n = 14), followed by lack of biosecurity measures (n = 10). We classified the identified risk factors into two broad categories: (1) risk factors that influence the transmission of SIV among swine and from swine to human, and (2) risk factors associated with the type of human-swine interfaces.Conclusion Vaccination, biosecurity measures, and surveillance systems at human-swine interfaces effectively reduce swine influenza transmission. These strategies can be tailored to specific risk factors in common interaction settings.

Nguyen HT, Lee HS, Bett B, Ling JX, Nguyen-Tien T, Dang-Xuan S, et al.

Seroprevalence and risk factors of hantavirus and hepatitis E virus exposure among wildlife farmers in Vietnam.

PloS one. 2025;20(8):21.

https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0329570&type=printable

Background Wildlife farming is a growing industry, but it poses substantial risks for zoonotic disease transmission, including infections caused by hantaviruses and hepatitis E virus (HEV). This study aimed to determine seroprevalences of these viruses among wildlife farmers and identify associated risk factors.Methods A cross-sectional study was conducted among 210 wildlife farmers in Lao Cai and Dong Nai provinces in Vietnam who raised bats, bamboo rats, civets, and wild boars. Of these, 207 provided serum samples for serological testing for hantavirus and HEV antibodies. Apparent (AP) and true (TP) prevalences were estimated, and multivariable logistic regression was performed to identify risk factors.Results The AP of hantavirus IgG was 8.7%, 95% confidence interval (CI): 5.4-13.6 (TP: 4.7%, 95% credible interval (CrI): 0.2-11.1). HEV IgG AP was 26.7%, 95%CI: 20.8-33.2 (TP: 27.1%, 95%CrI: 21.3-33.4). Hantavirus IgM testing was also performed due to higher IgG seroprevalence compared to earlier studies, detecting IgM antibodies in 1.9% of samples (95%CI: 0.6-5.2) (TP: 1.7%, 95%CrI: 0.1-4.7). Hantavirus seropositivity was significantly associated with engaging only in wildlife farming, and not participating in other activities such as hunting, trading, slaughtering, processing, guano collection, or consumption (OR = 2.7, 95% CI: 1.1-6.9). HEV seropositivity was significantly associated with men gender (OR = 3.1, 95%CI: 1.4-7.3), older age (OR = 1.03, 95%CI: 1.0-1.1), raw meat consumption (OR = 6.8, 95%CI: 1.6-31.8), residing at higher altitudes (OR = 31.6, 95%CI: 5.5-204.4), and reporting use of protective clothing (OR = 4.0, 95%CI: 1.4-11.2), although their proper use was not assessed.Conclusions This study highlights behavioural and environmental risk factors associated with wildlife farming and zoonotic pathogens exposure. Public health interventions should focus on biosecurity, proper hygiene practices, and risk communication to reduce the transmission in wildlife farming settings.</p>

Nisa S, Ortolani E, Vallée E, Marshall J, Collins-Emerson J, Yeung PLY, et al.

Case-control study of leptospirosis in Aotearoa New Zealand reveals behavioural, occupational, and environmental risk factors.

Epidemiology & Infection. 2025;153:13.

https://www.cambridge.org/core/services/aop-cambridge-core/content/view/A07E41B2B4D862647B0DACA7D903105F/S0950268825100071a.pdf/div-class-title-case-control-study-of-leptospirosis-in-aotearoa-new-zealand-reveals-behavioural-occupational-and-environmental-risk-factors-div.pdf

Leptospirosis in NZ has historically been associated with male workers in livestock industries; however, the disease epidemiology is changing. This study identified risk factors amid these shifts. Participants (95 cases:300 controls) were recruited nationwide between 22 July 2019 and 31 January 2022, and controls were frequency-matched by sex (90% male) and rurality (65% rural). Multivariable logistic regression models, adjusted for sex, rurality, age, and season-with one model additionally including occupational sector-identified risk factors including contact with dairy cattle (aOR 2.5; CI: 1.0-6.0), activities with beef cattle (aOR 3.0; 95% CI: 1.1-8.2), cleaning urine/faeces from yard surfaces (aOR 3.9; 95% CI: 1.5-10.3), uncovered cuts/scratches (aOR 4.6; 95% CI: 1.9-11.7), evidence of rodents (aOR 2.2; 95% CI: 1.0-5.0), and work water supply from multiple sources-especially creeks/streams (aOR 7.8; 95% CI: 1.5-45.1) or roof-collected rainwater (aOR 6.6; 95% CI: 1.4-33.7). When adjusted for occupational sector, risk factors remained significant except for contact with dairy cattle, and slaughter without gloves emerged as a risk (aOR 3.3; 95% CI: 0.9-12.9). This study highlights novel behavioural factors, such as uncovered cuts and inconsistent glove use, alongside environmental risks from rodents and natural water sources.

Nõupuu K, Mõtsküla M, Pulges R, Pauklin M, Saarma U.

Characterization of Emerging Human *Dirofilaria repens* Infections, Estonia, 2023.

Emerging Infectious Disease journal. 2025;31(9):1854.

https://wwwnc.cdc.gov/eid/article/31/9/24-1890_article

https://wwwnc.cdc.gov/eid/article/31/9/pdfs/24-1890.pdf

Mosquitoborne diseases are a growing threat to public health worldwide. Human dirofilariasis, caused by the nematode Dirofilaria repens and transmitted by mosquitoes from various genera, has recently expanded into new areas of Europe. In this article, we report molecularly confirmed autochthonous human D. repens infections in Estonia.

Padda H, Jacobs D, Gould C, Sutter R, Lehman J, Staples JE, et al.

West Nile Virus and Other Nationally Notifiable Arboviral Diseases - United States, 2023.

Mmwr-Morbidity and Mortality Weekly Report. 2025;74(21):358-64.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12161518/

In the United States, arthropodborne viruses (arboviruses) are primarily transmitted by infected mosquitoes or ticks. Most infections are asymptomatic; symptomatic infections range from mild febrile

illness to severe neuroinvasive disease. This report summarizes 2023 data for nationally notifiable domestic arboviral diseases. Forty-eight states and the District of Columbia reported 2,770 human arboviral disease cases, including 2,022 (73%) hospitalizations and 208 (8%) deaths. As in previous years, West Nile virus (WNV) was the most commonly reported domestic arboviral disease in 2023, accounting for 2,628 (95%) of all reported cases. A majority (91%) of case onsets occurred during July-September. Three WNV disease cases among patients infected though organ transplantation from two donors were reported in 2023. Powassan virus disease case reports were the second most common (n = 49), having increased from the previous record high in 2022, with onsets evenly distributed during April-December. La Crosse virus was the most common cause of arboviral disease among children, with most cases classified as neuroinvasive. Variations in annual arboviral disease incidence, distribution, and seasonal temporality highlight the importance of high-quality and timely surveillance. Clinicians should consider arboviral testing in patients with acute febrile or neurologic illness when mosquitoes and ticks are active and report positive test results to their health department. Reducing arboviral disease morbidity and mortality relies on population use of personal protective measures (e.g., insect repellent and protective clothing), implementing vector control efforts, and screening blood and organ donors for WNV.

Pan TS, Roy P, Biswas P, Laskar A, Patra S.

A rare case of anthrax zoonosis from an infected cow to butchers and meat handlers.

J Infect Chemother. 2025;31(10):3.

https://doi.org/10.1016/j.jiac.2025.102814

Background: Anthrax is a fatal disease of domestic and wild herbivores, caused by Bacillus anthracis, a Gram positive spore forming bacterium. Humans pick up infection from affected animals or their products but occupational exposures are rare. Human anthrax is often fatal except cutaneous form, but some untreated cases progress to fatal septicaemia and occasionally death. Case: A rare cutaneous anthrax outbreak in Murshidabad was traced back to exposure of sick cow or its meats. Anthrax infection both in the cow and humans were confirmed by laboratory tests. Susceptible livestock were vaccinated and the affected people were treated orally with Doxycycline and topically with Neosporin for 7 days. Cutaneous lesions healed completely in 7 days time. Conclusion: Prompt diagnosis of anthrax and successful treatment with Doxycycline and Neosporin, was highlighted to cure cutaneous anthrax. Vaccination was advocated to prevent the disease in livestock. Farmers were advised to avoid sick animal consumption and commerce.

Pedí VD, Porto DL, de Jesus Martins W, de França GVA.

Epidemiology of Chikungunya Hospitalizations, Brazil, 2014–2024.

Emerging Infectious Disease journal. 2025;31(9):1718.

https://wwwnc.cdc.gov/eid/article/31/9/25-0554_article

https://wwwnc.cdc.gov/eid/article/31/9/pdfs/25-0554.pdf

We describe 7,421 chikungunya hospitalizations in Brazil covered by the country's unified health system during 2014–2024. Most (43.2%) hospitalizations occurred in 2016 and 2017, reaching 0.72 (95% CI 0.69–0.76) hospitalizations/100,000 population in 2016. Hospitalizations were more frequent among persons who were female (55.8%), identifying as brown or black (63.5%), and 1–19 years of age (31.4%). Intensive care unit admissions occurred in 1.4% of cases, predominantly among children <5 and adults >85 years of age. The overall in-hospital case-fatality rate was 1.1%, which increased

substantially with age, reaching 11.5% among patients >90 years of age and 14.1% among men 85–89 years of age. Patients admitted to the intensive care unit had a case-fatality rate of 21.1%. The total cost of chikungunya hospitalizations was US $560,746 (US $76.26 per patient). Our findings provide insights for surveillance of the most severe chikungunya cases.

Pintado JL, Aboytes J, Uribe C.

A Flea-Borne Mystery: Unraveling Murine Typhus in a Patient with Unexplained Encephalopathy.

J Invest Med High Impact Case Rep. 2025;13:5.

https://journals.sagepub.com/doi/10.1177/23247096251345086

Murine typhus is a flea-borne rickettsial infection caused by Rickettsia typhi, commonly seen in endemic regions like Southern California and Texas. While it typically presents with fever, rash, and headache, neurological symptoms such as altered mental status are rare. We present a case of a 66-year-old male in southern Texas with alcohol use disorder who developed progressive confusion, decreased appetite, and subjective fevers. He was found to have severe hyponatremia, acute kidney injury, and atrial fibrillation with rapid ventricular response. Despite supportive care and empiric antibiotics for a urinary tract infection, his encephalopathy persisted. Further history revealed exposure to flea-infested cats, prompting rickettsial testing and empiric doxycycline. Typhus immunoglobulin M antibodies later confirmed the diagnosis, and the patient showed marked improvement with doxycycline therapy. Murine typhus with altered mental status is a rare presentation, often leading to diagnostic delays. This case occurred in an endemic region, with exposure to flea-infested cats as a significant risk factor. The patient's persistent encephalopathy prompted a broad workup, including rickettsial testing, which was confirmed on serology testing. Early doxycycline initiation led to symptom resolution. This case highlights a rare neurological presentation of murine typhus and emphasizes the importance of considering it in patients with unexplained encephalopathy in endemic areas.

Rao AK, Minhaj FS, Carter RJ, Duffy J, Satheshkumar PS, Delaney KP, et al.

Use of JYNNEOS (Smallpox and Mpox Vaccine, Live, Nonreplicating) for Persons Aged ≥18 Years at Risk for Mpox During an Mpox Outbreak: Recommendations of the Advisory Committee on Immunization Practices - United States, 2023.

Mmwr-Morbidity and Mortality Weekly Report. 2025;74(22):385-92.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12176103/

Since the worldwide eradication of smallpox in 1980, orthopoxvirus vaccines had been used nearly exclusively by persons at risk for occupational exposure to orthopoxviruses, including Monkeypox virus, the virus that causes mpox. However, during recent years, the epidemiology of mpox has been changing in countries where the animal reservoirs are believed to live and where endemic transmission has been known to occur for decades. CDC issues outbreak-specific vaccination recommendations based on the epidemiology at the time specific cases or clusters are identified; however, because of the increased risk for U.S. mpox outbreaks, the Advisory Committee on Immunization Practices (ACIP) reviewed results from a previously performed modified Grading of Recommendations Assessment, Development, and Evaluation of the 2-dose JYNNEOS (smallpox and mpox vaccine, live, nonreplicating) vaccination series and an Evidence to Recommendations (EtR) framework addressing multiple domains (e.g., benefits, harms, and target population values and preferences). Based on this assessment, ACIP recommended the use of JYNNEOS (alive, replication-deficient vaccinia virus vaccine) for persons aged >= 18 years at risk for mpox during an mpox outbreak (irrespective of clade). Because the cause of future mpox outbreaks and the populations affected by these outbreaks remain uncertain, public health

authorities will continue to issue outbreak-specific vaccination guidance when outbreaks occur. A clade IIb mpox outbreak that began in 2022 continued to cause substantial morbidity and mortality >1 year later. Although CDC had issued outbreak-specific vaccination guidance, it was anticipated that the outbreak would be protracted. For this reason, ACIP reviewed a second EtR framework about outbreaks and in 2023 recommended JYNNEOS for persons aged >= 18 years at risk for acquiring mpox during the multinational clade IIb outbreak. As of 2025, cases continue to occur; however, the future need for the recommendation will be reassessed as the outbreak evolves. Mpox vaccination is not routinely recommended for health care personnel during mpox outbreaks, including during the ongoing clade IIb outbreak.

Reddy SG, Handa A, Arumugam A, Ange B, MacArthur R.

Seal finger: a literature review.

Int J Circumpolar Health. 2025;84(1):12.

https://www.tandfonline.com/doi/pdf/10.1080/22423982.2025.2530267

Seal finger is a rare zoonotic bacterial infection typically caused by Mycoplasma species, transmitted from seals (Pinnipedia suborder) to humans. First documented in 1907, this disease remains under-researched despite growing relevance as humans increasingly encroach on Arctic regions. We conducted a review of multiple databases to evaluate its history, prevalence, at-risk populations, and treatment options. The infection primarily affects individuals who have close contact with marine mammals, including fishers, hunters, sealers, and marine biologists. Seal finger usually presents similarly to panaritium, with localized swelling, erythema, and pain. Due to its rarity and limited awareness among healthcare providers, the infection is often unrecognized, leading to wounds going untreated or being managed with inappropriate antibiotics. This mismanagement allows the infection to progress, potentially involving joints or spreading further, which could have been effectively prevented with a course of tetracycline. Further research is essential to better understand the epidemiology of seal finger and improve timely diagnosis. To reduce complications, more education is needed for physicians working in coastal, Arctic, and aquarium settings about recognizing the disease and administering proper treatment. Enhanced awareness and research can improve patient outcomes and increase the safety of human interactions with seals.

Rolfes MA, Kniss K, Kirby MK, Garg S, Reinhart K, Davis CT, et al.

Human infections with highly pathogenic avian influenza A(H5N1) viruses in the United States from March 2024 to May 2025.

Nat Med. 2025:26.

https://www.nature.com/articles/s41591-025-03905-2

Between March 2024 and October 2024, 46 human cases of highly pathogenic avian influenza (HPAI) A(H5N1) had been detected in the United States. The persistent panzootic spread of HPAI A(H5N1) viruses and continued detection of human cases presents an ongoing threat to public health. In this study, between November 2024 and May 2025, an additional 24 cases have been reported for a total of 70 human cases of HPAI A(H5N1): 41 were exposed to dairy cows, 24 to commercial poultry, two to backyard poultry and three had an unidentified source of exposure. All sequenced viruses were clade 2.3.4.4b. Overall, 62 cases (89%) reported eye redness, 32 (46%) fever and 29 (41%) respiratory symptoms; 54 of 67 cases (81%) reported receiving antiviral treatment. Most illnesses were mild;

however, four patients were hospitalized. Of the hospitalized patients, three had pneumonia and one died. No human-to-human transmission was detected. Occupational exposure to infected animals was a risk factor for HPAI A(H5N1) virus infection and the risk to the general population remains low; however, the two cases exposed to infected backyard poultry and three cases with unidentified exposures highlight that ongoing vigilance is warranted.

Roy Á, Gómez-Barroso D, Cruz-Ferro E, Fernández A, Martínez-Pino I, del Henar Marcos M, et al.

Spatiotemporal Distribution and Clinical Characteristics of Zoonotic Tuberculosis, Spain, 2018–2022.

Emerging Infectious Disease journal. 2025;31(7):1344.

https://wwwnc.cdc.gov/eid/article/31/7/25-0031_article

https://wwwnc.cdc.gov/eid/article/31/7/pdfs/25-0031.pdf

Zoonotic tuberculosis (zTB) is a communicable disease that has major effects on both human and animal health. Spain reports the highest number of zTB cases in humans annually in the European Union. We describe the epidemiology of human cases of zTB caused by Mycobacterium bovis and M. caprae in Spain during 2018–2022. The incidence of M. bovis infection compared with M. tuberculosis infection was higher in patients who were native-born (adjusted odds ratio [aOR) 2.32, 95% CI 1.44–3.82), HIV-negative (aOR 3.39, 95% CI 1.24–14.0), or had extrapulmonary forms of TB (aOR 2.20, 95% CI 1.46–3.28). The spatial pattern differed by M. tuberculosis complex species; we identified 3 significant clusters of M. bovis and 1 of M. caprae in bovine TB–free regions. Our results show the importance of including animal and human data on circulating zoonotic pathogens under the One Health umbrella.

Roy S, Hassan MM, Mohd G, Rizwan AS, Sendhilkumar M, Lydia JB, et al.

Implications for influenza A virus surveillance in Southeast Asian Region countries: a scoping review of approaches for the surveillance of swine influenza viruses at human-swine interfaces.

BMJ Public Health. 2025;3(1):11.

https://doi.org/10.1136/bmjph-2024-002330

Background and objectives The Southeast Asian Region (SEAR) faces a heightened risk of reassortment of circulating influenza viruses in swine populations due to the dense cohabitation of humans, poultry and swine. However, there is currently no specific guidance on conducting influenza surveillance at the human-swine-poultry interfaces within SEAR. This study conducted a scoping review to characterise the objectives and frameworks of influenza A Virus (IAV) surveillance systems established at human-swine exposure sites globally.Design A literature search was performed for studies published until June 2024 that reported on IAV survey and surveillance activities at swine farms, slaughterhouses, agricultural fairs, animal markets, backyard farms and among swine workers.Data sources and extraction Data were extracted from relevant articles using PubMed, Scopus and Web of Science, following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for scoping reviews. Extracted data were organised in MS Excel, with analyses stratified by IAV surveillance objectives.Results Of 42 studies meeting inclusion criteria, most were short-term and project-based. Half of the studies (50%; 21/42) were conducted in Asia, strongly focusing on virological monitoring as the main surveillance objective (69%; 29/42). Swine farms were the primary setting for surveillance (61.90%; 26/42), with active surveillance employed in most cases (90.48%; 38/42). Sampling techniques included nasal, tracheal and faecal swabs, along with serum and lung tissue, with most sampling targeting swine

(73.81%). Other targets included swine and humans (11.90%); swine, humans and environmental samples (7.14%); humans only (4.76%); and swine and poultry (2.38%). Testing relied heavily on PCR and whole-genome sequencing, used by half of the studies (50%; 21/42) alongside RT-PCR and ELISA for detecting IAVs.Conclusion This study reveals considerable variability in IAV survey and surveillance across human-swine-poultry interfaces. Establishing standardised, objective-based protocols for such surveillance is crucial to strengthening IAV's global preparedness and response capabilities and benchmarking progress towards zoonotic risk reduction.

Sadooghi N, Panahi Y, Delshad A, Maurin M, Dadar M.

Epidemiological analysis of human brucellosis in North Khorasan province, Iran (2018-2023): a six-year multicenter retrospective study.

Bmc Infectious Diseases. 2025;25(1):13.

<Go to ISI>://WOS:001561822800005

https://link.springer.com/content/pdf/10.1186/s12879-025-11516-y.pdf

Brucellosis remains a significant zoonotic issue in Iran, especially in areas with substantial livestock agriculture. This study explores the epidemiological profile of human brucellosis in North Khorasan Province, northern Iran, over six years from 2018 to 2023. A retrospective analysis was performed on 24,104 suspected cases of human brucellosis reported to healthcare facilities in both urban and rural regions of North Khorasan. Cases were detected through clinical symptoms and validated via serological assays, including the standard tube agglutination test (SAT), the 2-mercaptoethanol (2ME) test, and the Combs Wright. Demographic characteristics, regional distribution, occupational exposure, animal contact, and the intake of unpasteurized dairy products were evaluated utilizing SPSS version 22. Chi-square testing identified relationships between variables, with significance established at $p < 0.05$. Of the total suspected cases, 1877 (7.7%) were confirmed positive for brucellosis. Incidence rates escalated over time, reaching a zenith in 2023. The most significant incidence of positive cases was observed in Shirvan (21.7%), followed by Faruj, Maneh, Samalqan, and Bojnurd. A majority of positive cases (81.1%) originated from rural areas, demonstrating a substantial correlation between infection and rural residency ($p < 0.001$). Livestock farming constituted the predominant occupation among infected persons (56.6%), with a higher prevalence in males than females (55.9% vs. 44.1%). The age cohort of 31 to 50 years exhibited the most significant infection rate at 39.1%. A substantial percentage of patients reported consuming unpasteurized dairy products (93.1%) and having direct interaction with animals (87.5%). Infection among family members was also significant (19.6%). Our results confirmed a considerable public health concern in North Khorasan, particularly affecting rural communities, livestock producers, and those who use unpasteurized dairy products. These findings highlight the necessity for focused control tactics, public awareness initiatives, and improved surveillance, especially in areas with high incidence rates.

Satheshkumar P, Gigante C, Mbala-Kingebeni P, Nakazawa Y, Anderson M, Balinandi S, et al.

Emergence of Clade Ib Monkeypox Virus—Current State of Evidence.

Emerging Infectious Disease journal. 2025;31(8):1516.

https://wwwnc.cdc.gov/eid/article/31/8/24-1551_article

https://wwwnc.cdc.gov/eid/article/31/8/pdfs/24-1551.pdf

Mpox was first identified against the backdrop of the smallpox eradication campaign. Monkeypox virus (MPXV), the causative agent of mpox, has been maintained in animal reservoirs in the forested regions of West and Central Africa as 2 distinct clades; clade I has historically caused more severe infection in Central Africa than clade II, historically found in West Africa. However, rapid reemergence and spread of both MPXV clades through novel routes of transmission have challenged the known characteristics of mpox. We summarize mpox demographic distribution, clinical severity, and case-fatality rates attributed to genetically distinct MPXV subclades and focus on MPXV clade Ib, the more recently identified subclade. Broad worldwide assistance will be necessary to halt the spread of both MPXV clades within mpox endemic and nonendemic regions to prevent future outbreaks.

Shanta RN, Akther M, Prodhan MA, Akter SH, Annandale H, Sarker S, et al.

Adaptation and Outbreak of Highly Pathogenic Avian Influenza in Dairy Cattle: An Emerging Threat to Humans, Pets, and Peridomestic Animals.

Pathogens. 2025;14(9):20.

https://doi.org/10.3390/pathogens14090846

Over the decades, cattle have not been considered primary hosts for influenza A viruses (IAV), and their role in influenza epidemiology has been largely unrecognized. While bovines are known reservoirs for influenza D virus, the recent emergence of highly pathogenic avian influenza (HPAI) H5N1 clade 2.3.4.4b in U.S. dairy cattle marks an alarming shift in influenza ecology. Since March 2024, this virus has affected thousands of dairy cows, causing clinical signs such as fever, reduced feed intake, drastic declines in milk production, and abnormal milk appearance. Evidence suggests that the virus may be replicated within mammary tissue, raising urgent concerns about milk safety, foodborne transmission, and occupational exposure. This review highlights the unprecedented expansion of viruses into bovine populations, exploring the potential for host adaptation, and interconnected roles of pets, peridomestic animals, and human exposure within shared environments. The potential impacts on dairy production, food safety, and zoonotic spillover highlight the urgent need for integrated One Health surveillance to stay ahead of this evolving threat.

Stamelou E, Papageorgiou K, Stoikou A, Chatzopoulos D, Papadopoulos D, Giantsis IA, et al.

Herd-Level Prevalence of Hepatitis E Virus in Greek Pig Farms.

Microbiol Res. 2025;16(9):9.

https://doi.org/10.3390/microbiolres16090208

Hepatitis E virus (HEV) is an emerging zoonotic pathogen, with swine identified as a major reservoir. Despite the global significance of HEV, epidemiological data regarding its presence in Greek pig farms remain limited. This study investigated the presence of HEV RNA in swine populations across Greece. In 2019, a total of 280 fecal samples from finishing pigs were collected from 28 pig farms in diverse geographic regions. Pooled samples were analyzed by real-time RT-PCR targeting the conserved ORF3 region of the HEV genome (without genotyping). HEV RNA was detected in 42.9% (12/28) of farms, with positive farms identified in five of the six surveyed regions, suggesting widespread viral circulation. These findings confirm, for the first time, the presence of HEV in the Greek swine population, while the observed prevalence aligns with intermediate to high levels reported in other European countries. Considering the zoonotic potential of HEV, especially via occupational exposure or consumption of contaminated pork products, these results highlight the need for continued surveillance and further investigation into potential public health implications.

Stufano A, Schino V, Plantone D, Lucchese G.

Occupational zoonoses, neurological diseases, and public health: A one health approach.

Infect Med. 2025;4(2):11.

https://doi.org/10.1016/j.imj.2025.100184

Zoonotic diseases, which constitute 60% of all human infectious diseases, present substantial risks to public health, economies, and livelihoods. These diseases emerge at the human-animal-environment interface, with occupational exposure representing a critical yet underexamined dimension of zoonotic risk. Workers in high-risk sectors such as agriculture, wildlife management, and laboratory research face elevated exposure to zoonotic pathogens, often under conditions of inadequate preventive measures and resource constraints. Neurological disorders resulting from zoonotic infections, including Guillain-Barr & eacute; syndrome, encephalitis, and meningitis, illustrate the severe health consequences for occupational groups. Cases linked to swine hepatitis E virus, West Nile virus, Streptococcus suis, and Baylisascaris procyonis underscore the urgent need for robust surveillance and targeted interventions. The Ecohealth approach, integrated with the One Health framework, provides a transformative model for managing zoonotic risks by addressing the upstream drivers of disease emergence. By emphasizing environmental stewardship, ecological balance, and socio-economic equity, Ecohealth fosters sustainable preventive strategies. Occupational medicine is crucial in linking workplace safety with public health through tailored risk management, enhanced surveillance, and targeted education. Despite these frameworks, significant barriers persist, including data gaps, underreporting of occupational diseases, and insufficient coordination among health sectors. Addressing these challenges requires implementing standardized occupational health surveillance systems, enhancing reporting mechanisms through digital tools, and promoting cross-sectoral data-sharing initiatives. Successful models, such as sentinel surveillance programs in agricultural sectors and integrated biosurveillance networks, demonstrate the feasibility of these strategies. Leveraging these approaches can facilitate early detection, improve reporting accuracy, and support evidence-based interventions.

Tague C, Isiko I, Langat AK, Maqbool S, Khalid M, Mufungizi I, et al.

Kenya's national burden of monkeypox: a public health emergency, a review.

Ann Med Surg. 2025;87(10):6612-7.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12577850/

Infection with Orthopoxvirus Mpox is steadily becoming a public health menace in Kenya. This review seeks to provide insight into the disease's epidemiology, clinical-attendance, preventive mechanisms, surveillance efforts, and the associated challenges within the health system in the country. Initial outbreaks were recorded in July 2024 among long-haul drivers in Taita Taveta County; the occupational risks and border-crossing activities posed significant threats. Of particular note is the fact that approximately 77% of the 13 confirmed cases (n = 10) occurred within the subset of international transporters, which accounts for a seemingly astounding 10% prevalence among this population. As of October 2024, Mpox cases have been reported in five counties, with a total of 47 confirmed cases and 3 deaths. Age distribution shows that 62% of cases occurred in individuals aged 25-45 years, with a male predominance of 81%. There is a great need for preventive hygiene education, as well as vaccination; however, the public's access to vaccines and knowledge about them remains scarce. The surveillance system as well as case management has insufficient funding, inadequate diagnostic, and trained health personnel resources strangle these systems. More robust healthcare infrastructure, such

as isolation facilities and laboratory capacity, as well as fostering regional collaborations with WHO, requires advocacy along with adopting a One Health strategy encompassing human, animal, and environmental health.

Yoshida K, Fukushima K, Nishikawa Y, Jung S, Tanaka M, Kobayashi T, et al.

A case of leptospirosis contracted through occupational exposure in the Tokyo metropolitan area.

J Infect Chemother. 2025;31(10):4.

https://doi.org/10.1016/j.jiac.2025.102799

Leptospirosis is a zoonotic disease caused by direct or indirect contact with rodent reservoirs. Although it is widely known to be endemic in tropical countries, several cases have been reported even in metropolitan areas of non-tropical countries. Herein, we report a case of leptospirosis caused by occupational exposure in the Tokyo metropolitan area. A 24-year-old man presented with fever, headache, and systemic arthralgia. Laboratory tests revealed thrombocytopenia, abnormal liver function, and impaired renal function. Although he denied any direct contact with rats, his workplace was contaminated with them, which was key to the diagnosis. Leptospira interrogans serogroup Icterohaemorrhagiae ST17 was identified as the causative agent based on multilocus sequence typing of the urine sample and the microscopic agglutination test of the paired serum samples. Subsequent epidemiological investigation revealed that L. interrogans serogroup Icterohaemorrhagiae ST17 was isolated from rats captured in the vicinity of the patient's workplace. To the best of our knowledge, this is the first case of leptospirosis in Japan in which the same Leptospira genotype was identified in both the patients and the rats trapped around the patient's workplace. Although there is a widespread misconception that leptospirosis is a tropical disease, several cases are reported annually even in non-tropical industrialized cities, such as Tokyo, where rodents play a significant role in human infection. Diagnosis of leptospirosis is sometimes challenging for clinicians, but the first step in diagnosis is to recognize that there is always a risk of infection with Leptospira spp. in any environment potentially contaminated by rats.

Zhang YF, Li SZ, Wang SW, Mu D, Chen X, Zhou S, et al.

Zoonotic diseases in China: epidemiological trends, incidence forecasting, and comparative analysis between real-world surveillance data and Global Burden of Disease 2021 estimates.

Infectious diseases of poverty. 2025;14(1):21.

https://link.springer.com/content/pdf/10.1186/s40249-025-01335-3.pdf

BackgroundZoonotic diseases remain a significant public health challenge in China. This study examines the temporal trends, disease burden, and demographic patterns of major zoonoses from 2010 to 2023.MethodsThis study analyzed data from China's National Notifiable Infectious Disease Reporting System (NNIDRS, 2010-2023) on nine major zoonoses, including echinococcosis, brucellosis, leptospirosis, anthrax, leishmaniasis, encephalitis (Japanese encephalitis), hemorrhagic fever, rabies, and schistosomiasis. Joinpoint regression was applied to assess annual trends in incidence rates, while autoregressive integrated moving average (ARIMA) and exponential smoothing models were used to forecast incidence trends from 2024 to 2035. To assess the performance of the Global Burden of Disease (GBD) 2021 model in China, disease-specific multipliers-defined as the ratio of GBD estimates to national surveillance data-along with their corresponding 95% confidence intervals (CIs) were calculated to quantify discrepancies and evaluate the consistency between modeled estimates and empirical observations.ResultsFrom 2010 to 2023, the incidence rates of leptospirosis [average annual percent change (AAPC) = - 5.527%, 95% CI: - 11.054, - 0.485], encephalitis (AAPC = - 16.934%, 95% CI: -

23.690, - 11.245), hemorrhagic fever (AAPC = - 5.384%, 95% CI: - 7.754, - 2.924), rabies (AAPC = - 20.428%, 95% CI: - 21.076, - 19.841), and schistosomiasis (AAPC = - 28.378%, 95% CI: - 40.688, - 15.656) showed a declining trend in China. In contrast, brucellosis exhibited a modest but statistically significant increase (AAPC = 0.151%, 95% CI: 0.031, 0.272). For most diseases, incidence rates were consistently higher in males than females. Children aged 0-5 years accounted for a substantial proportion of encephalitis and leishmaniasis cases, while adults aged 14-65 years represented the primary affected group across the majority of diseases. Occupationally, farmers and herders were the most affected populations. Compared to national surveillance data, the GBD 2021 model substantially overestimated the burden of zoonotic diseases in China, particularly for echinococcosis (by 3.611-7.409 times) and leishmaniasis (by 3.054-10.500 times).ConclusionThe study revealed significant decline in several major zoonoses in China, while brucellosis showed a continued upward trend. These findings highlight the urgent need for a One Health-based prevention and control system to interrupt cross-species transmission and reduce long-term public health risks.

- ## Légionellose

Tanne JH.

Legionnaires' outbreak kills five and infects over 100 in New York.

BMJ (Clinical research ed). 2025;390:r1785.

https://www.bmj.com/content/390/bmj.r1785.abstract

The New York City Health Department has reported five deaths and 108 confirmed cases of legionnaires' disease, a type of pneumonia, since the outbreak in Harlem was identified on 25 July. It seems to have been spread by mist from 12 cooling towers on top of 10 buildings.1The health department told The BMJ that as of 20 August 14 people remained in hospital but that no new cases or deaths had been reported. The department has sampled and …

- ## Endotoxines

Clarysse M, Bertier P, Verpaele S, Madsen AM, Vlaminck L.

Analysis of dental dust and aerosol emissions during odontoplasty: assessing potential respiratory health risks.

Annals of work exposures and health. 2025;69(7):752-64.

https://doi.org/10.1093/annweh/wxaf033

Equine dental disorders, such as sharp enamel points and focal overgrowths, are common in horses and are often treated with motorized dental grinding tools. These tools, while effective, produce dust and aerosols that may pose health risks to veterinarians and nearby individuals. This study aimed to assess the health risks associated with dental dust and aerosols generated during equine odontoplasty. Using a realistic setup, air concentrations of inhalable and respirable dust, crystalline silica, and airborne microorganisms and endotoxins were measured in 12 groups of horses undergoing odontoplasty with and without water-cooling. Results indicated that dust emission significantly increases during odontoplasty, but the concentrations of inhalable and respirable dust remained below occupational exposure limits. However, airborne microorganisms, including potential pathogenic fungal species and bacteria such as the methicillin-resistant bacterium Staphylococcus aureus, were detected as well as

elevated endotoxin levels, suggesting an occupational health risk. Therefore, protective measures, such as wearing FFP3 masks, gloves, and glasses, are recommended during equine odontoplasty.

Gosling RJ, Simpson AT, Bailey C, Baldwin PEJ, Lord S.

Worker exposure to persistent organic pollutants, as polybrominated diphenyl ethers, and biological hazards during the processing of waste upholstered domestic seating in Great Britain.

Annals of work exposures and health. 2025.

https://doi.org/10.1093/annweh/wxaf066

Pressure to increase rates of recycling in Great Britain is expected to increase to meet circular economy and net zero drivers. There are concerns about worker exposure to persistent organic pollutants (POPs) during the processing and recycling of waste upholstered domestic seating (WUDS). The aim of this study was to understand worker exposures to POPs, specifically the flame retardants polybrominated diphenyl ethers (PBDEs), and other airborne substances hazardous to health, when WUDS go through the recycling process. Five WUDS processing sites were visited by a health and safety executive occupational hygienist, who collected worker and static air samples, bulk dust and bulk material samples, and assessed control measures in use. All exposures to inhalable dust and PBDEs were significantly below occupational exposure limits, while exposures to airborne bacteria and fungi were elevated at most sites. Exposures to endotoxins were above the recommended health-based nonbinding occupational exposure limits at 4 sites. Across all sites, recommended control measures were only partially met, indicating that exposures to airborne dust and biological agents could be reduced that these sites.

Loison P, Alonso L, Simon X.

Optimization of the measurement method for airborne endotoxins in workplace atmospheres: experiments using laboratory-generated bioaerosols.

Annals of work exposures and health. 2025;69(8):883-95.

https://doi.org/10.1093/annweh/wxaf057

Endotoxins are components of the outer membrane of bacteria that can become airborne during aerosol-generating work activities and cause adverse effects on workers' health. Filtration is the sampling method recommended by the EN 14031 standard for endotoxin measurements in workplace atmospheres. However, there are still differences in terms of practice regarding certain parameters of the measurement method. Thus, the storage of samples, the method of endotoxin extraction from the filter, and the type of filter are some parameters that still need to be studied to improve endotoxin recovery. For this purpose, laboratory experiments were performed based on 19 independent generations of an endotoxin aerosol coming from a suspension of 3 cultivable Gram-negative bacteria. Using a fix sampling time of 1 h, this experimental bioaerosol allow covering endotoxin concentrations from ~ 10 to ~ 104 EU/m3. Using the kinetic chromogenic LAL (Limulus Amebocyte Lysate) assay, our results show that a better recovery of endotoxins is achieved using 5 mL of pyrogen-free water compared to 10 mL, especially for glass fiber filters, with no change when the agitation time is reduced from 60 to 20 min. Except for polyvinylchloride, the type of filter (polycarbonate, Teflon, or glass fiber) does not have a great influence on the concentrations measured. However, PVC filters systematically gave a lower endotoxin concentration than the others. Finally, compared to the immediate processing of the cassette, storage of the samples at room temperature is possible for up to 8 d after sampling without altering the amount of endotoxin measured. These improvements make the results of the endotoxin concentration more robust and will help to make this measurement method more readily

usable, especially with the simplification of the protocol steps and storage, providing a greater flexibility for analysts.

Madsen AM, Árnadóttir HB, Bertier P, Tunney MM, Hannerz H, Verpaele S, et al.

Species-resolved exposure to fungi and bacteria, dust, and endotoxin during recycling of diverse waste types and systemic inflammatory response in workers.

Ecotoxicol Environ Saf. 2025;304:119097.

https://doi.org/10.1016/j.ecoenv.2025.119097

The waste recycling workforce is growing across Europe. This study investigates the airborne exposure of workers recycling plastic, paper/cardboard, and electronic (e) waste, and examines whether serum levels of inflammatory markers correlate with exposure. Exposure was measured repeatedly and analysed for inhalable and respirable dust, inhalable endotoxin, fungi, and bacteria. Microorganisms were identified using MALDI-TOF MS on cultured microorganisms and bacteria by 16S rRNA marker-gene sequencing. Blood samples collected at the end of each workday were analysed for three markers of inflammation. Waste types/tasks had an impact on exposure levels for all exposures and temperature on exposure to anaerobic bacteria. Exposure levels to dust, endotoxin, and anaerobic bacteria differed between workers. Exposures were highest for those handling paper/cardboard and plastic waste. The alpha diversity indices for most exposures did not differ between types of waste handled, but eWaste was associated with a lower species richness. Beta diversity did not differ between indoor temperatures or waste types except for mesophilic bacteria and bacteria (NGS-data). The species Aspergillus niger, Penicillium brevicompactum, Bacillus cereus, and Staphylococcus equorum were frequently detected. Serum levels of inflammatory markers increased with increasing exposure to dust, fungi or Penicillium spp, and anaerobic bacteria, but did not correlate with bacterial biodiversity indices. The study suggests further investigations of the impact of daily inhalation of bacteria able to grow anaerobically and fungi. Based on the high exposure levels, and the association between exposure and biomarkers of inflammation, it is advisable to explore risk management strategies aimed at minimizing worker exposure.

Madsen AM, Frederiksen MW, Árnadóttir HB.

Exposure to fungi, bacteria, and endotoxin in a museum, with staff reporting work-related symptoms.

Journal of occupational and environmental hygiene. 2025;22(9):713-25.

https://www.tandfonline.com/doi/pdf/10.1080/15459624.2025.2499599

Occupational exposure to airborne fungi in indoor environments may pose respiratory health risks. This study aimed to characterize exposure to fungi, bacteria, and endotoxin in a historical museum where the staff reported airway symptoms. Air samples were collected during three separate workdays using personal and stationary samplers. Fungi and bacteria were quantified and identified using MALDI-TOF MS, and the total inflammatory potential was measured through Reactive Oxygen Species (ROS) production in a human cell line. The geometric mean of staff exposure was 5.9 × 10(3) CFU/m(3) fungi, 1.8 × 10(3) CFU/m(3) bacteria, and 7.93 EU/m(3) endotoxin. Staff reported symptoms of the airways, with immediate symptoms upon entering two departments, which exhibited elevated fungal concentrations compared to other departments. The most prevalent fungal species were Aspergillus conicus, A. domesticus, A. pseudoglaucus, A. pseudogracilis, and Cladosporium spp. Concentrations of bacteria were highest when staff were present and without dominance by any particular species. Staff

exposure and stationary samples induced ROS production in a cell line, which correlated with concentrations of fungi, bacteria, and endotoxin. Fungi were detected on the museum artifacts, and concentrations of fungi and bacteria increased during handling of the artifacts. In conclusion, staff in the two departments where airway symptoms were reported were exposed to 2 × 10(4) to 7 × 10(4) CFU/m(3) of fungi, primarily Aspergillus spp. and Cladosporium. spp. This exposure constituted both xerophilic species and species commonly found in water-damaged buildings, and they seemed to have developed on artifacts. These findings underscore the importance of developing preventive strategies to protect the health of museum staff. Moreover, it highlights the challenge of managing fungi adapted to varying humidity conditions.

Straumfors A, Haugen F, Skare Ø, Eduard W, Henneberger PK, Douwes J, et al.

Immune modulating effects of continuous bioaerosol and terpene exposure over three years among sawmill workers in Norway.

Scand J Work Environ Health. 2025;51(5):433-43.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12415592/

OBJECTIVES: Exposure to wood dust, resin acids, microbial and volatile components among sawmill workers may impair respiratory health, with inflammation indicated as a key mechanism. Previous, mostly cross-sectional studies have shown mixed results, and a conclusive association between wood dust exposure and chronic respiratory inflammation has therefore not yet been established. This study assessed associations between exposure to bioaerosols and volatile terpenes and serum inflammatory marker levels over three years. METHODS: Serum biomarkers and blood cell counts were analyzed based on 702 observations from 450 exposed sawmill workers and 102 observations from 65 unexposed sawmill workers in Norway at baseline and after three years. Job-exposure-matrices, based on measurements among the same cohort, were used to assess exposures for wood dust, endotoxins, resin acid, monoterpenes, fungal spores, and fungal fragments. Changes in exposures, biomarkers and cell counts over the study period, as well as group differences and potential cause-and-effect associations were assessed using linear mixed regression. RESULTS: Exposures were relatively low and below occupational limits, although variances were relatively high (GSD(tot) 2.1-8.3), largely driven by differences between workers (GSD(bw) 1.9-7.8). Serum CC-16 and mCRP were slightly higher after three years, whereas IL-1β, TNF-α and IL-10 levels were significantly lower among exposed compared with unexposed workers. Exposures positively associated with increases in biomarker levels included endotoxin with mCRP, monoterpenes with IL-10, and fungal spores with TNF-α and IL-8. Exposed workers had higher counts of total leucocytes, neutrophils, lymphocytes and basophils after three years. Several of the increased leucocyte counts were associated with concurrent increase in mCRP and IL-6 concentrations, predominantly in the exposed group. Conversely, increased CC-16 levels were associated with lower leucocyte and neutrophil counts, mainly in the unexposed group. CONCLUSION: Continuous exposure to wood dust and related components for three years appears to induce a chronic low-grade inflammatory response among sawmill workers with a shift in cytokine profiles towards a less regulated, potentially more muted immune state.

Straumfors A, Pedersen I, Brinchmann EZ, Ervik TK, Afanou A, Anmarkrud KH, et al.

Impact of air recirculation and humidification systems on wood dust exposure during woodworking.

Annals of work exposures and health. 2025;69(6):652-64.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12262046/

Employees in the woodworking industry, including carpentry workshops, wood product factories, and the wooden house industry, are exposed to wood dust at work. In Norway, this industry is exempt from regulations banning air recirculation, intended to prevent harmful substance buildup in working environments. While wood dust exposure is linked to increased risks of cancer and respiratory diseases, eliminating the exemption could have significant economic consequences for companies reliant on heated air recirculation during winter. A detailed characterization of the exposure is needed to evaluate the health risks associated with recirculated air. Wood dust contains components like resin acids, endotoxins, fungi, bacteria, monoterpenes, and aldehydes, which can irritate the skin, eyes, and respiratory system. Understanding these exposures is crucial for evaluating whether existing occupational exposure limits (OELs) adequately protect workers' health. This study aimed to assess wood dust and associated exposures in companies with and without air recirculation or humidification. Between 2019 and 2023, full-shift personal aerosol sampling was conducted in 23 companies during winter. Samples were analyzed for wood dust mass, endotoxin, bacteria and fungi, resin acid, monoterpenes, and aldehydes. Log-transformed exposure data were analyzed by mixed models using company types and work-related conditions as fixed effects. Results showed average exposure below OELs but with significant variability. About 25% of measurements exceeded the OEL for inhalable wood dust of 1 mg/m3. Air recirculation had mixed effects; it lowered the monoterpene exposure by 95% (from GM 597 µg/m3 to GM 27 µg/m3) but increased the GM microbial exposure 2 to 5 times across companies. The impact of air recirculation varied across company types. For building element production, it nearly doubled the wood dust exposure from soft woods (from GM 0.15 mg/m3 to GM 0.27 mg/m3), while for door/window manufacturers, exposure was nearly halved compared to those not using air recirculation (from GM 0.44 mg/m3 to GM 0.25 mg/m3). Air humidification lowered the inhalable dust exposure by 59% across the company (from GM 1.36 mg/m3 to 0.56 mg/m3) but led to increases in monoterpene by 90 % (from GM 86 µg/m3 to GM 792 µg/m3) and microbial exposure by up to 64%. Companies manufacturing interior products without a humidification system had resin acid exposure levels that were 10 times higher (GM 3323 ng/m3) compared to those with a humidification system (GM 344 ng/m3). The variability in exposures was mostly influenced by company-specific practices. Evaluation of preventive measures should therefore be tailored to the individual company.

Thomassen MR, Hollund BE, Özgümüs T, Madsen AM, Nordhammer ABO, Smedbold HT, et al.

Occupational exposure to bioaerosols in the Norwegian salmon processing industry.

Annals of work exposures and health. 2025;69(7):708-21.

https://doi.org/10.1093/annweh/wxaf038

Objectives Workers in salmon processing plants are at risk of respiratory diseases. The aim of this study was to describe the Norwegian salmon processing industry in respect to production-related factors that may influence the generation of bioaerosols in the work atmosphere, and to assess salmon processing workers' personal exposure to protein and endotoxin.Methods The study comprised 222 workers from 9 plants. Fullshift personal exposure measurements of total protein (inhalable aerosol fraction, n = 380) and endotoxin (total aerosol sampler, n = 178) were collected on 4 consecutive workdays. Technical and process-related information was collected through plant visits and meetings with technical and production staff. Linear mixed-effect model was used, treating individuals as random effect and work area and work task within areas as fixed effects.Results Plants differed in size, setup, processing procedures, and use of labor along the processing lines. Salmon processing overall geometric mean (GM) exposure to inhalable protein across the plants was highest in filleting area with 4.83 mu g/m3 (geometric standard deviation [GSD] 3.16), followed by 3.91 mu g/m3 (GSD 2.42) in slaughtering area, and 1.68 mu g/m3 (GSD 2.40) in other areas. Endotoxin levels were generally low with the highest levels in slaughtering (GM 0.24 EU/m3; GSD 3.48), followed by other area (GM 0.19 EU/m3; GSD 4.05) and filleting (GM 0.10 EU/m3; GSD 2.51). The overall correlation between inhalable protein and endotoxin

(total aerosol sampler) was poor (r = 0.13, P = 0.12).Conclusions Salmon processing workers are exposed to airborne inhalable protein bioaerosols at levels similar to those measured over a decade ago, indicating that a systematic approach to reduce exposure levels is still needed. Given the known health risk, the industry and regulatory bodies need to intensify efforts to reduce exposure and protect workers' health. The variance in exposure levels to inhalable protein across plants, areas, and tasks might form the basis for better exposure-reducing strategies.

Zegeye FD, Straumfors A, Lei P, Graff P, Samulin Erdem J, Afanou AK.

Microbial exposure and diversity in Norwegian shrimp processing plants.

Journal of occupational and environmental hygiene. 2025;22(9):756-69.

https://www.tandfonline.com/doi/pdf/10.1080/15459624.2025.2491488

Seafood processing workers have a high prevalence of respiratory symptoms and occupational asthma, primarily attributed to allergenic protein exposure. However, exposure to airborne microorganisms from raw materials can also contribute to allergic sensitization and other respiratory ailments. This study aimed to assess microbial exposure in shrimp processing plants and identify susceptible work tasks. Full-shift personal air samples were collected from two Norwegian shrimp processing plants across five distinct work processes: thawing, truck driving, cooking-peeling (technician), packing, and flour production. The samples were analyzed for the presence of endotoxin, Toll-Like Receptor (TLR) activation, bacterial and fungal DNA copies, and microbial composition. Endotoxin levels were generally low, with only one sample (98 EU/m(3)) exceeding the recommended occupational exposure limit (OEL). A significant TLR2 activation was observed among thawers, indicating the presence of microbial ligands capable of triggering an immune response. The median bacterial (75 × 10(3) DNA copies/m(3)) and fungal (3,301 × 10(3) DNA copies/m(3)) exposure were highest among the flour production workers, while the lowest bacterial and fungal exposure was among packers (1.5 × 10(3) DNA copies/m(3)) and technicians (337 DNA copies/m(3)), respectively. Several bacterial and fungal species were identified, including ten allergenic and sixteen pathogenic species. Sporobolomyces roseus and Saccharomyces cerevisiae were the two most frequently identified allergenic fungal species. Among the pathogenic bacterial species, Prevotella nigrescens and Roseomonas gilardii were the two most detected species. While the pathogenic species were identified mainly in the packing, truck driving, and flour production work processes, most of the allergenic species were found in all work processes. Altogether, work processes before the cooking of shrimp (thawing and truck driving) had higher endotoxin, bacterial load, and species richness than after cooking, suggesting that these work tasks are susceptible to bacterial exposure and that the cooking process significantly reduces bacterial exposure. By shedding light on microbial exposure and identifying high-exposure work tasks, this study enables the development of targeted interventions and implementation of measures for the prevention of occupational diseases.

- ## Mycotoxines : exposition professionnelle (Nouvelle thématique)

Balasubrahmaniam N, Nastasi N, Hegarty B, Horack JM, Meyer ME, Haines SR, et al.

Exposure to elevated relative humidity in laboratory chambers alters fungal gene expression in dust from the International Space Station (ISS).

Scientific reports. 2025;15(1):12.

https://www.nature.com/articles/s41598-025-09534-6.pdf

Microorganisms are present in all occupied indoor environments, including homes on Earth and within specialized systems like the International Space Station (ISS). Microbes when exposed to excess moisture, such as from an unexpected ventilation system failure, can undergo growth that is associated with material degradation and negative health effects. However, we do not yet understand how exposure of these microbes to excess moisture alters their function. A de novo metatranscriptomic study was performed using dust collected from the US air filtration system of the ISS and incubated in laboratory chambers on Earth at different equilibrium relative humidity (ERH) levels. Changes in fungal function (gene expression) were significantly associated with moisture (adonis2 p = 0.0001). Secondary metabolism and fungal growth genes were upregulated (FDR-adjusted p <= 0.001, log2FC >= 2) at elevated ERH compared to 50% ERH. Elevated moisture conditions showed upregulation of aflatoxin and fungal allergen genes such as Asp f 4 (log2FC = 26.4, upregulated at 85% ERH compared to 50%) and Alt a 7 (log2FC = 2.98, upregulated at 100% ERH compared to 50%). Our results demonstrate that understanding microbial functional changes in response to elevated moisture will help develop more robust microbial monitoring standards for spacecraft environments to protect astronaut health and spacecraft integrity in low-Earth orbit and beyond.

Dias M, Gomes B, Pena P, Cervantes R, Rodriguez M, Riesenberger B, et al.

Boosting knowledge on occupational exposure to microbial contamination in Portuguese carpentries.

Frontiers in public health. 2025;13.

https://doi.org/10.3389/fpubh.2025.1574881

Introduction Wood industry workers face health risks due to exposure to microorganisms and their metabolites. This study aimed to characterize seasonal microbial contamination, antifungal resistance, mycotoxins, cytotoxicity, and particulate matter in Portuguese carpentries, to reduce exposure and promote safe working conditions.Methods Conducted in six carpentries in Lisbon, Portugal, the sampling strategy encompassed active and passive sampling methods to assess microbial contamination. A Handheld Particle Counter HH3016-IAQ was used to monitor particulate matter size, temperature, and humidity.Results The highest fungal load was in the cold season, with Aspergillus sp. being the predominant species, and the highest bacterial load in the warm season. Reduced susceptibility to azoles was observed in both seasons, with greater species diversity in the cold season. In the warm season, Nidulantes and Fumigati sections of Aspergillus were detected by RT-PCR, with Fumigati being the most prevalent; in the cold season, only Nidulantes was detected. Mycotoxins, mainly fumonisins, were more prevalent in the warm season; in the cold season, griseofulvin was the most prevalent mycotoxin. Cytotoxicity was more prevalent in A549 cells than in SK cells. Settled dust caused greater cytotoxicity in SK cells, and filters from the vacuumed dust in A549 cells. Higher particulate matter concentrations in the indoor sampled areas suggest a significant contribution of indoor activities to workers' exposure.Discussion The study highlights concern about seasonal variations in microbial contamination, emphasizing the potential for respiratory diseases, invasive infections by azole-resistant fungi, mycotoxin exposure, and cytotoxicity in lung cells due to co-exposure to fungi, particulate matter, and mycotoxins influenced by environmental conditions.

Usages et retraitement de l'eau dans l'industrie (Nouvelle thématique)

Abdykadyrov A, Abdullayev S, Kuttybayeva A, Marxuly S, Izbairova A, Altayeva Z, et al.

Wastewater treatment technologies using electrical discharge after processing of mineral raw materials.

Min Miner Deposits. 2025;19(2):121-31.

http://mining.in.ua/articles/volume19_2/13.pdf

Purpose. The research aims to study wastewater treatment technology using electrical discharge at the Aktogay field in Kazakhstan to assess its effectiveness in reducing heavy metal concentrations and improving water quality. Methods. Laboratory tests were conducted on a specially designed experimental setup operating in the voltage range from 15 to 100 kV and frequencies from 50 Hz to 10 kHz. Physical-chemical parameters of water (pH, electrical conductivity, temperature), concentrations of heavy metals (copper, zinc, cadmium) before and after treatment were measured. Mathematical models were used to describe the precipitation processes and to assess the purification efficiency. Findings. Electrical discharge technology has been found to achieve a purification rate of up to 97.5% for copper, 97.3% for zinc and 96% for cadmium. At optimal parameters (15 kV, 10 kHz), heavy metal concentrations are reduced to levels that comply with World Health Organization standards. Improvement of physical characteristics of water (colour, odour, electrical conductivity) confirms the high efficiency of the method. Originality. For the first time, an innovative wastewater treatment methodology based on electrical discharge technology, implemented using a specially designed device, has been developed and tested. Mathematical models of heavy metal removal processes that describe the kinetics and dynamics of pollutant precipitation have been proposed and experimentally confirmed. Practical implications. The obtained results demonstrate a high potential for the industrial application of electrical discharge technology for treatment of wastewater generated during the processing of mineral raw materials at the Aktogay mine. Implementation of this technology will improve the environmental safety of production, while reducing operating costs and ensuring the possibility of water reuse.

Berkinbayeva A, Kenzhaliyev B, Smailov K, Aimagambetov A, Kamenov B, Saulebekkyzy S, et al.

An overview of biological cyanide elimination from tailing wastewater as a promising tool for sustainable utilization.

Water Res X. 2025;29:14.

https://www.sciencedirect.com/science/article/pii/S2589914725000994?via%3Dihub

Cyanide compounds, both organic and inorganic, are widely present in natural and industrial environments, especially in effluents from mining and metallurgical processes. Their high toxicity, particularly in the form of free cyanides and hydrogen cyanide, poses severe risks to ecosystems and public health by disrupting cellular respiration via inhibition of cytochrome c oxidase. Conventional chemical treatments such as alkaline chlorination are effective but can be costly, energy-intensive, and generate secondary pollutants. In contrast, microbial bioremediation has emerged as a potentially more sustainable and cost-effective alternative, particularly for onsite treatment of cyanide-laden wastewater from massive tailings dams. Microorganisms including cyanotrophs utilize cyanide as a nitrogen or carbon sources, transforming it into less toxic compounds such as ammonia and carbon dioxide through enzymatic systems like cyanide hydratase, nitrilase, and rhodanese. While bioremediation may operate more slowly than chemical methods, its advantages lie in lower energy consumption, reduced material input, simpler maintenance, and minimized toxic by-products. This

review synthesizes current understanding of cyanide's chemical nature, toxicity, and environmental impact, and explores microbial cyanide degradation mechanisms. It further highlights how advances in metagenomics and synthetic biology ("cyanomics") are enabling the design of more robust biocatalytic systems. Integrating these biological approaches into environmental management frameworks could reduce long-term operational costs and improve sustainability across cyanide-intensive industries.

Chaudhary A, Usman M, Masek O, Haderlein S, Hanna K.

Simultaneous removal of PFAS and cadmium from different water matrices using regenerable carbonaceous adsorbents.

J Water Process Eng. 2025;74:9.

https://www.sciencedirect.com/science/article/pii/S221471442500947X?via%3Dihub

Per- and polyfluoroalkyl substances (PFAS) frequently coexist with metal ions in industrial effluents and contaminated aquatic environments, yet their simultaneous removal remains poorly understood. This study examines the co-adsorption of three PFAS compounds (PFOA, PFOS, and GenX) and cadmium (Cd(II)) in concentrated water matrices using activated carbon (AC) and three biochars: hardwood-derived (BC-W) and sewage sludge-derived at 550 degrees C and 700 degrees C. Both AC and BC-W demonstrated superior adsorption due to enhanced surface properties. Adsorption followed the order PFOS > PFOA > GenX, influenced by hydrophobicity and functional groups. Cd(II) enhanced PFOS and PFOA adsorption through synergistic interactions but inhibited GenX adsorption due to competition. Cd(II) adsorption improved with increasing PFAS concentrations. A novel step-wise methanol-acid regeneration train selectively desorbed PFAS and Cd(II) in separate steps, achieving over 90% pollutant recovery and enabling adsorbent reuse for at least three cycles without performance loss. PFAS removal in groundwater remained effective, matching or exceeding performance in Milli-Q water. In wastewater, adsorption declined due to organic matter competition, particularly for PFOA, yet both adsorbents maintained strong performance across diverse matrices. This study highlights the potential of wood-derived biochar as a cost-effective alternative to activated carbon for PFAS and Cd(II) co-removal in contaminated effluents.

Chen SQ, Gao Y, Sun WQ, Zhou J, Sun YJ.

Catalytic Ozonation for Reverse Osmosis Concentrated Water Treatment: Recent Advances in Different Industries.

Catalysts. 2025;15(7):17.

https://doi.org/10.3390/catal15070692

Reverse osmosis (RO) concentrated water can be effectively treated with catalytic ozone oxidation technology, an effective advanced oxidation process. In order to provide a thorough reference for the safe treatment and reuse of RO concentrated water, this paper examines the properties of RO concentrated water, such as its high salt content, high levels of organic pollutants, and low biochemistry. It also examines the mechanism of its role in treating RO concentrated water and combs through its applications in municipal, petrochemical, coal chemical, industrial parks, and other industries. The study demonstrates that ozone oxidation technology can efficiently eliminate the organic matter that is difficult to break down in RO concentrated water and lower treatment energy consumption; however, issues with free radical inhibitor interference, catalyst recovery, and stability still affect its use. Future research into multi-technology synergistic processes, the development of stable and effective non-homogeneous catalysts, and the promotion of their use at the "zero discharge" scale for industrial wastewater are all imperative.

Cicekalan B, Shitreh S, Cavdar B, Salimi-Khaligh S, Yuksekdag A, Cataltas A, et al.

Sustainable treatment of dairy industry wastewater using an integrated anaerobic membrane bioreactor-reverse osmosis system for industrial water reuse.

Chemical Engineering Journal. 2025;521:10.

https://www.sciencedirect.com/science/article/pii/S1385894725071839?via%3Dihub

The increasing demand for water in industrial processes has prompted the exploration of sustainable water management technologies. This study investigated the integration of an anaerobic membrane bioreactor (AnMBR) with reverse osmosis (RO) for energy recovery and water reuse in the dairy industry. The AnMBR system, fed with dairy industry wastewater, was operated under mesophilic conditions, and its treatment and filtration performances were evaluated. The permeate from the AnMBR system was subsequently treated by the RO system, and the quality of reclaimed water was assessed for potential industrial reuse. The methane yield from anaerobic digestion of dairy industry wastewater was 0.214 +/- 0.008 mL CH4/g CODfed. The RO permeate quality met EPA standards, and the combined AnMBR + RO system operated at a cost of 0.46 <euro>/m3. The findings of this study demonstrated that the AnMBR + RO system could produce treated water suitable for use as makeup water in cooling towers, offering a sustainable alternative for industrial water reuse and reducing the overall water footprint.

Dabare S, Rajapaksha S, Munaweera I.

Sustainable innovation in nanotechnology-based water treatment: aligning climate change adaptation with industrial ecology and CSR goals.

Environ Sci-Wat Res. 2025;11(9):2100-24.

https://pubs.rsc.org/en/content/articlelanding/2025/ew/d5ew00557d

Climate change has intensified the global water crisis by making the hydrological cycle more erratic, resulting in severe droughts and floods. Against this backdrop, nanotechnology-enabled water treatment (NWT) has emerged as a transformative solution for bolstering water security. By employing nanoscale materials, such as advanced membranes, adsorbents, and photocatalysts, NWT achieves higher removal efficiencies, selectivities, and operational flexibility than many conventional methods. These technologies can target a broad array of pollutants, including heavy metals, organic contaminants, and pathogens, and enable innovations such as solar-driven photocatalysis and decentralized treatment. This review is novel in linking the NWT to climate adaptation, industrial ecology, and corporate social responsibility (CSR) frameworks. We examine how NWT can support closed-loop water reuse and circular resource flows in industrial systems, contributing to sustainable water management, while also aligning with CSR initiatives and Sustainable Development Goal 6 (clean water and sanitation). Global case studies, from nanofiltration-based industrial wastewater reuse in China to solar-nanotech disinfection in rural communities, illustrate NWT's role in creating resilient, circular water systems. Finally, we identify key knowledge gaps, such as life-cycle impact, techno-economic trade-offs, and regulatory needs, and outline future research directions. This interdisciplinary synthesis clarifies NWT's advantages over conventional treatment and maps a path for integrating nanoscale innovation with sustainability and CSR goals.

Dabrowski W, Baginska-Kretowicz S, Malinowski P.

Preliminary studies on the possibility of recovering water from wastewater using constructed wetlands.

J Ecol Eng. 2025;26(8):57-66.

https://doi.org/10.12911/22998993/203662

Due to climate change, among other factors, many countries are experiencing problems with water resources consumed by population, industry and agriculture. In addition to the implementation of water conservation, it may be necessary to use the process of water recovery from treated wastewater discharged to receivers. One of the factors facilitating the reuse of treated wastewater is the use of increasingly efficient municipal and industrial wastewater treatment systems. The authors' used constructed wetland (CW) beds for wastewater treatment, as a simple, inexpensive and effective way to carry out the project of water recovery. The scientific objective of the study was to determine the treatment efficiency of organic matter, nutrients and microbial during CW treatment of sewage discharged from municipal and dairy WWTPs. The analysis concerned the basic parameters of wastewater after treatment in municipal and dairy wastewater treatment plants (WWTPs), namely the content of organic matter and biogenic compounds. Microbiological tests included determination of the total coliform (TC) and Escherichia Coli (EC) index. The treatment efficiency in relation to the unit area of the CW beds was determined. Dairy sewage used in the study was characterized by significantly lower microbial contamination in comparison with municipal sewage, which predisposes them to be used in the process of water recovery. The conducted research indicates a high potential of CW for water recovery from wastewater, providing an alternative to conventional technologies.

Deogaonkar-Baride S, Koli M, Ghuge SP.

Recycling textile dyeing effluent through ozonation: An environmentally sustainable approach for reducing freshwater and chemical consumption and lowering operational costs.

Journal of Cleaner Production. 2025;510:13.

https://www.sciencedirect.com/science/article/pii/S0959652625009916?via%3Dihub

Dyeing operations in textile industries require large quantities of freshwater, which creates handling challenges and generates wastewater with high organic load that is difficult to treat and incurs high treatment costs. Minimizing freshwater consumption is essential for adopting sustainable practices. A limited number of studies are available in the literature exploring the possibility of recycling dyeing effluent through ozonation as an ecofriendly approach. Therefore, in the present work, the recycling of effluents obtained after dyeing with Reactive Red 198 (RR198) and Reactive Blue 21 (RB21) dyes through ozonation treatment has been studied. Nearly complete decolourization with COD removal efficiency of 32 % was obtained for both dye effluents after 15 min of ozonation. The qualities of recycled dyed fabrics were compared to fresh water-dyed fabrics through spectrophotometric analysis and colour fastness tests. These qualities for both dyed fabrics with recycled effluent were found to be either in excellent or good category after each recycle. Comparative analysis of freshwater and chemical requirements, along with cost savings, was conducted over four dyeing attempts. The study revealed significant savings with recycled effluent dyeing including 60 % reduction in fresh water usage and 75 % in salt consumption compared to conventional freshwater dyeing. Thus, recycling textile dyeing effluent through ozonation treatment was found to be a resource efficient approach. This approach not only significantly reduces wastewater volumes but also freshwater demand without compromising the colour-related qualities of dyed fabrics. Additionally, it minimizes operational expenses, thereby, supporting textile industry's shift toward sustainable practices.

Elkashef O, Mbrouk O, Elbatanony N, Hafez H.

Performance and Environmental Assessment of a Designed Water Recycling Pretreatment Unit for MLD in the Acid Liquefaction Industry.

Water Air and Soil Pollution. 2025;236(11):18.

https://link.springer.com/content/pdf/10.1007/s11270-025-08310-6.pdf

With growing water scarcity worldwide, water recycling is now a vital component to save water and ensure sustainable water management. Boilers are extensively used in various industries to generate steam for industrial processes and heating. Boiler operation results in polluted wastewater, which has to be specially treated before it can be released into the environment. Effective treatment of boiler wastewater is indispensable to ensure environmental protection as well as regulatory compliance. In this study, a specially designed pre-treatment facility was used for treating boiler wastewater from a hydrochloric acid factory. The wastewater was mixed with reverse osmosis (RO) unit effluents that supplied the production line, followed by reusing the treated water in Hydraulic acid liquefaction process. As an inexpensive pretreatment technique, effective removal of inorganic contaminants, 20%-30% diminution in the level of sulfate, and the levels of phosphate also diminished, whereas metals (zinc and iron) were reduced to the extent of approximately 70%-80%. The Water Quality Index (WQI) indicates fair quality and demonstrates that the system was effective in improving water quality. Life Cycle Assessment (LCA) further revealed that integrating economic and environmental strategies is essential for sustainability. Consequently, 80% of the plant's wastewater was successfully recovered and reused in a neighboring sulfuric acid production line, achieving a Minimal Liquid Discharge (MLD) outcome.

Hornák D, Procházková M, Miklas V, Vondra M, Tous M, Kollmann M, et al.

Minimal Liquid Discharge system for sustainable dairy wastewater management.

Sep Purif Technol. 2025;373:18.

https://doi.org/10.1016/j.seppur.2025.133556

The dairy industry is a significant producer of wastewater, contributing to the deterioration of both the quality and quantity of freshwater resources. Moreover, the high daily and seasonal variability in the composition and volume of dairy wastewater poses challenges for efficient recycling. Minimal Liquid Discharge (MLD) systems, capable of achieving water recovery rates of up to 95%, have attracted increasing attention from both scientific and industrial sectors. However, their technological complexity, high energy requirements, and the challenge of managing produced concentrate remain significant barriers to broader industrial adoption. In this study, an MLD system comprising microfiltration, reverse osmosis, and an agitated vacuum evaporator was designed and experimentally evaluated. Additionally, the biogas yield potential of the produced sludge was assessed to explore sustainable concentrate management strategies. At a water recovery rate of 89.8%, the treated effluent exhibited COD, BOD, and TDS values of 66 mg/L, 55 mg/L, and 134 mg/L, respectively, indicating strong potential for reuse as rinsing and cleaning water for non-food surfaces or as cooling water. A biogas yield of 32.3 Nm3/tFM demonstrates that the sludge could be a viable co-substrate for anaerobic digestion in biogas plants. Furthermore, the techno-economic assessment revealed that, for optimized water recovery rates, the payback period can be as short as 2.8 years, underscoring the economic viability of this approach. Future development will focus on system optimization, long-term operation tests to better understand the system behavior, and economic sensitivity analysis to investigate the impact of various factors.

Karkou E, Papadaki A, Angelis-Dimakis A, Arnaldos AN, Arampatzis G.

Water efficiency solutions for the oil refinery industry.

Journal of environmental management. 2025;391:14.

https://doi.org/10.1016/j.jenvman.2025.126343

The water-intensive oil refinery industry generates a high amount of wastewater that has the potential to be treated and reused for industrial and/or other purposes, with the aim of closing the water loop. A four-phase methodology was developed to identify fit-for-purpose technologies for treating wastewater derived from an oil refinery industry. The scope of this study is to simulate and assess the overall performance of five scenarios for the oil refinery wastewater (ORW) treatment in a real industrial oil refinery plant by utilising the existing industrial-scale conventional Ballast Water Treatment Plant (titled plate separator, mixing, coagulation/flocculation, dissolved air flotation) and implementing an advanced pilot-scale unit (aerobic granular sludge, ultrafiltration, reverse osmosis). To this end, process modelling, simulation and life cycle assessment tools were performed. Six performance indicators (Waste Reduction, Water-Eco, Water Sustainability, Improved Water Quality, Digitalisation and Environmental Protection) were defined to compare the performance of all scenarios compared to the existing status (scenario 1). According to the results, scenario 5 (only pilot-scale ORW treatment) proved to be the most efficient and sustainable approach to close the water loop in the oil refinery plant, enabling the reuse of reclaimed water as cooling water, firefighting water, or fed into a biological unit for further treatment.

Korzin A, Sturm MT, Myers E, Schober D, Ronsse P, Schuhen K.

Upstream Microplastic Removal in Industrial Wastewater: A Pilot Study on Agglomeration-Fixation-Reaction Based Treatment for Water Reuse and Waste Recovery.

Clean Technol. 2025;7(3):20.

https://doi.org/10.3390/cleantechnol7030067

This pilot study investigated an automated pilot plant for removing microplastics (MPs) from industrial wastewater that are generated during packaging production. MP removal is based on organosilane-induced agglomeration-fixation (clump & skim technology) followed by separation. The wastewater had high MP loads (1725 +/- 377 mg/L; 673 +/- 183 million particles/L) and an average COD of 7570 +/- 1339 mg/L. Over 25 continuous test runs, the system achieved consistent performance, removing an average of 97.4% of MPs by mass and 99.1% by particle count, while reducing the COD by 78.8%. Projected over a year, this equates to preventing 1.7 tons of MPs and 6 tons of COD from entering the sewage system. Turbidity and photometric TSS measurements proved useful for process control. The approach supports water reuse-with water savings up to 80%-and allows recovery of agglomerates for recycling and reuse. Targeting pollutant removal upstream at the source provides multiple financial and environmental benefits, including lower overall energy demands, higher removal efficiencies, and process water reuse. This provides financial and environmental incentives for industries to implement sustainable solutions for pollutants and microplastic removal.

Lin ZY, Li MJ, Yan PH, Zhang J, Xie HJ, Wu HM.

Constructed wetlands for wastewater treatment and reuse: Two decades of experience from China.

Environmental Research. 2025;279:13.

https://doi.org/10.1016/j.envres.2025.121781

Constructed wetlands (CWs) can be used for water purification and ecological restoration through the synergistic effects of substrates, aquatic plants, and microorganisms. This study explored a bibliometric approach to quantitatively evaluate the recent research progress and applications of CWs in China by synthetically analyzing publication output characteristics, research hotspots and quantified China's unique contributions to global CW applications. The results indicated that the number of papers published in the field of CWs has shown an overall upward trend in the past two decades, and the research hotspots mainly focus on the nitrogen and phosphorus removal, microbial community. China has actively supported the investigation and application of CWs for wastewater treatment and reuse. More than 40 species of plants and over 30 types of substrates have been employed in CWs for treating different types of wastewater, such as domestic sewage, industrial effluents, river water, and drinking water. Several successful case studies of full-scale CWs have been selected and summarized to highlight the extensive application of CWs in China and provided a CW localized design framework.

Ling AL, Stegner T, Thompson M, Viswanathan S, Pinkard BR, Wolohan KM, et al.

Spent Media Management Pathways for PFAS Treatment Applications.

Water Environment Research. 2025;97(7):16.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/wer.70130?download=true

Removing PFAS from water is increasingly needed to comply with evolving regulations in multiple industries, including drinking water production, municipal and industrial wastewater treatment, and contaminated site remediation. This change is driving increased use of adsorptive media to remove PFAS from drinking water. Granular activated carbon (GAC) and anion exchange resin (AER) are the two predominantly applied media used to separate PFAS from water. Both technologies produce PFAS-laden spent media that requires downstream management, with significant operating costs and regulatory uncertainty. Once GAC or AER media is spent, it can be physically changed out from treatment vessels or regenerated in place. Spent media can be managed through existing offerings like incineration or GAC reactivation or through emerging offerings like supercritical water oxidation (SCWO). Spent regenerant can be recovered and reused, with concentrated PFAS-laden liquid managed through offsite incineration or emerging PFAS destruction methods. Both offsite GAC reactivation and onsite regeneration of either AER or GAC have the potential to reduce operating costs and energy use relative to single-use media procurement and disposal.

Margaritis M, Gkazeli E, Atzemi M.

Removal of heavy metals from industrial wastewater using natural and organically modified minerals.

Sustain Futures. 2025;9:5.

https://doi.org/10.1016/j.sftr.2025.100644

The reuse of industrial or municipal wastewater for irrigation is increasingly common due to its availability and the pressing need for effective disposal methods. However, this practice elevates heavy metal concentrations in water and soil. This study investigates the removal of heavy metals from industrial wastewater from the petroleum industry through an adsorption process using natural and organically modified minerals. Petroleum wastewater samples were charged with Cr(III), Cr(VI), Cu(II), Mn(II), Ni(II), Cd(II), Pb(II), and Zn(II) ions at 10 mg/L concentration levels. The efficiency of adsorption by natural and modified zeolite and vermiculite was evaluated using adsorbent concentrations of 10 g/L with a pH of 4. Overall, the experimental results showed that vermiculite was more effective in removing pollutants from the wastewater. Lead and chromium removals using vermiculite were shown

to be greater than 99 % according to Atomic Absorption Spectrometry (AAS) and Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Statistical evaluations have shown that the efficiency at which vermiculite removes pollutants is influenced by the mineral content, adsorption capacity, and percentage of removal. Similarly, zeolite's effectiveness depends on its adsorption capacity and rate of removal. The results indicate that both natural and organically modified minerals are effective in purifying industrial wastewater containing heavy metals, achieving removal rates that meet environmental standards. Thus, this study highlights the potential of using vermiculite and zeolite as cost-effective and efficient solutions for treating heavy metal-laden industrial wastewater, offering a promising approach to mitigating the environmental and public health risks associated with heavy metal contamination.

Nawi NSM, Lau WJ, Woo WX, Seah MQ, Goh PS, Ismail AF, et al.

Tailoring TFC NF membranes for saline water recovery via vacuum filtration interfacial polymerization technique.

J Environ Chem Eng. 2025;13(6):12.

https://doi.org/10.1016/j.jece.2025.119212

The expansion of various industrial sectors such as textile and petrochemical creates opportunity for saline water recovery that can potentially be reused in its industrial operations. Nanofiltration (NF) process using thin film composite (TFC) membrane is a promising technology for water reclamation, but the conventional polyamide (PA) TFC membranes made of interfacial polymerization technique are ineffective for saline water recovery owing to its relatively high rejection to dissolved ions. This study aims to develop loose TFC NF membranes synthesized using glucose and a piperazine (PIP)/glucose mixed monomer, and to compare their properties with conventional membranes made solely from PIP. These membranes were fabricated via a vacuum filtration interfacial polymerization technique, investigating two monomer concentrations of 1 wt% and 2 wt%. The results demonstrated that the best-performing membrane was the 1 wt% PIP/glucose membrane, which exhibited the highest pure water permeance (19.9 L/m2 & sdot;h & sdot;bar) and low NaCl rejection (9 %), attributed to its thinner and looser selective layer. When tested with simulated textile wastewater and produced water, this membrane effectively achieved over 98 % rejection of dyes and oil while recovering at least 75 % of saline water. The exceptional solute rejection combined with high salt recovery highlights the potential of TFC NF membranes for industrial saline wastewater treatment, supporting circular economy initiatives through salt recovery and reuse.

Ouaissa YA, Madi NE, Chabani M, Bouafia-Chergui S.

Solar Advanced Oxidation Processes for Refinery Wastewater Treatment: Comparative Efficiencies, Modeling, and Feasibility for Cooling Tower Reuse.

Water Air and Soil Pollution. 2025;236(10):16.

https://link.springer.com/article/10.1007/s11270-025-08298-z

This study explores the application of Advanced Oxidation Processes (AOPs) for treating effluent from the Algiers refinery to meet wastewater discharge standards and assess the feasibility of reusing the treated water in cooling towers. Five processes were evaluated: sunlight, sunlight/H2O2, sunlight/persulfate (PS), sunlight/H2O2/PS and the solar photo-Fenton process. In batch reactor tests, the solar photo-Fenton process performed exceptionally well, reducing Chemical Oxygen Demand (COD) by 94% under optimal conditions: pH 3.5, [Fe2(+)] = 0.329 mM and [H2O2] = 14.685 mM. Additionally, it effectively reduced water hardness, along with the concentrations of chlorides,

suspended solids and total dissolved solids. Kinetic analysis revealed that COD removal followed a pseudo-first-order reaction. The predictive capability of an Artificial Neural Network (ANN) model was also evaluated, achieving a higher correlation coefficient of 97.9% for COD removal efficiency. Pilot-scale experiments using a solar concentrating parabolic trough reactor (CPC) further validated the process, achieving a 50% reduction in COD and significantly improving water hardness. With the added potential for treated effluent reuse in cooling towers, our results show that the solar photo-Fenton process is a practical and scalable solution for industrial applications, supporting sustainable water management in the refinery industry.

Pandey AK.

Sustainable water management through integrated technologies and circular resource recovery.

Environ Sci-Wat Res. 2025;11(8):1822-46.

https://pubs.rsc.org/en/content/articlelanding/2025/ew/d5ew00103j

Sustainable water management increasingly necessitates integrating advanced treatment technologies with circular economy principles to achieve zero-discharge targets. Conventional physical, chemical, and biological treatment processes have evolved with a focus on process efficiency and disinfection. However, to meet the broader goals of the UN Sustainable Development Goals (SDGs), which include resource recovery, waste minimization, and environmental protection, there is a pressing need to move beyond standalone system-based water treatment technologies. This requires drivers such as regulations, strict enforcement of compliance and institutional support for a holistic integration of technologies that reinforce the water-energy-sanitation (WES) nexus. Emerging hybrid systems are mostly membrane-based separation, advanced oxidation, and bio-electrochemical processes, not only for contaminant removal but also for energy generation and valuable resource recovery, such as fresh water, nutrients and metals/materials. The use of low-grade industrial waste heat and renewable energy sources, coupled with energy storage technologies, enhances the sustainability and resilience of these systems. Radiation-based sterilization, real-time monitoring using sensors, and closed-loop water reuse systems further support zero-discharge operations and regulatory compliance. Desalination brine and sludge management, end-of-life membrane recycling, and nutrient recovery are critical components requiring integrated solutions. When designed effectively, these systems reduce carbon footprints and environmental burden, recover valuable water and resources, and support decentralized treatment models. This perspective explores how multi-separation, energy-integrated, and resource recovery technologies can be synergistically combined to create closed-loop water treatment systems. The zero-discharge infrastructure and strengthening interconnections across water, energy, and sanitation domains would achieve the objectives of 11 of 17 SDGs directly or indirectly.

Qin JW, Tang S, Shi JL, Zhang TF, Yang L, Wang F, et al.

Bipolar membrane electrodialysis for producing acid and alkali from concentrated seawater: Industrial application in Bohai Sea, China.

J Water Process Eng. 2025;76:12.

https://doi.org/10.1016/j.jwpe.2025.108266

In order to avoid environmental pollution caused by concentrated seawater being discharged directly into the sea from multi-effect seawater distillation (MED) equipment, membrane separation, hardness removal, and ion exchange resin systems were combined as pre-treatments, and bipolar membrane electrodialysis (BMED) system was applied to convert the pretreated concentrated seawater into

hydrochloric acid (HCl) and sodium hydroxide (NaOH), which can be further used in resin cleaning, pH correction, etc. The results showed that the maximum concentrations of the prepared acid and alkali were 3.4 mol center dot L- 1 and 3.3 mol center dot L- 1, respectively, with maximum purities of 99.2 % and 96.3 %. The products quality met the requirements for reuse. The current efficiency of the BMED unit ranged from 73.7 % to 76 %, and the energy consumption per ton of acid and alkali was about 1878.9 kWh and 1617.2 kWh respectively under optimal conditions. Additionally, the investment payback period of this engineering project was about 5.3 years, which had profound significance for promotion.

Romanovski V, Gruzinova V.

Aggregate from Spent Ion-Exchange Resins for Petroleum Products Removal from Wastewater.

Waste and Biomass Valorization. 2025:9.

https://link.springer.com/content/pdf/10.1007/s12649-025-03158-7.pdf

In this paper, the application of a sorption aggregate obtained from spent ion-exchange resins for the purification of locomotive depot wastewater from oil products is investigated. The aggregate was formed from dispersed anion exchange resin AV-17-8 and cation exchange resin KU-2-8 (fraction less than 150 mu m) in a ratio of 1:1. The purification efficiency was studied at different reagent doses (0.5-3.0 g/L) and settling times (10-60 min). The optimal parameters were: dose 2.0 g/L and settling for 10 min, which ensures the removal of oil products by more than 89%. It is shown that introducing a dry aggregate contributes to better binding of oil products compared to their suspension. Economic analysis showed that using the aggregate at one locomotive depot allows for the cleaning of 12,500 m3/year of wastewater, reduces the volume of waste by 25,000 kg/year, and the payback period of the technology was 1.98 years. The developed technology can be used as an alternative to traditional methods of coagulation with aluminum hydroxychloride. It is proposed to use the sediment in the production of building ceramics for its final utilization, which allows for the improvement of the mechanical properties of bricks and reduces energy costs for their firing. This study is consistent with two Sustainable Development Goals (SDG): Goal 6: Clean Water and Sanitation, as it is aimed at effective wastewater treatment from oil products, and Goal 12: Responsible Consumption and Production, as it offers an innovative approach to the disposal of spent ion-exchange resins, contributing to the minimization of industrial waste and their reuse.

Safarpour H, Tariq M, Katz LE, Faust KM, Spearing LA.

Barriers and drivers to implement alternative water use in the chemical industry: A stakeholder perspective.

Journal of Cleaner Production. 2025;517:10.

https://www.sciencedirect.com/science/article/pii/S0959652625009321

Due to increasing water scarcity, industries are turning to alternative water sources of lower quality, necessitating the development and implementation of innovative water technologies (e.g., membrane processes, advanced oxidation). However, successful adoption of these technologies can fail due to organizational and regulatory barriers, factors that are often overlooked in the literature. To address this gap, we conducted and qualitatively analyzed semi-structured interviews with stakeholders from two chemical plants-one in Europe and one in the United States (US)-to explore the drivers and barriers influencing the implementation of alternative water sources using new systems or technologies. Our findings reveal that organizational aspects, such as labor capacity, risk aversion, and hierarchical structures, are critical barriers and that a company's willingness to be an early adopter can serve as a

key driver. Further, regulatory differences contributed to contrasting stakeholder perspectives, with stakeholders at the European site emphasizing stringent water quality regulations more often than those from the US site. Results underscore the importance of a holistic, stakeholder-driven approach in designing and implementing sustainable water technologies for alternative water use. Our study offers practical guidance for decision-makers by highlighting the need to integrate organizational and regulatory considerations into technology assessments, ultimately enhancing the likelihood of successful adoption. For example, companies could pair new water systems with workforce training to address skill gaps and ensure smooth adoption. Additionally, our findings provide a foundation for quantitative analyses, such as system dynamics modeling, to further explore the complex interactions influencing water technology adoption in the industrial sector.

Sharma N, Lemar P, Nimbalkar S.

Opportunities for iron and steel industrial wastewater treatment and reuse in the United States.

Water Resour Ind. 2025;34:20.

https://doi.org/10.1016/j.wri.2025.100298

Concerns around water security in the United States have heightened the interest in industrial water treatment and reuse to improve water efficiency and operational reliability. Alongside nationwide efforts to expand industrial capacity, primary manufacturing sectors are adopting more resource-efficient technologies. This transition is expected to shift industrial water consumption patterns, driving the need for improved treatment and reuse practices. This study investigates opportunities for water use, treatment, and reuse in the iron and steel sector through a review of academic and industry literature and interviews with industry representatives. It identifies key challenges in water and wastewater management and outlines the conditions under which innovative treatment technologies could be deployed. Based on these insights, the study presents a practical water management action plan. Furthermore, it assesses water quality targets across different process operations, evaluates existing treatment technologies, and highlights challenges and opportunities for improvement relative to future performance expectations. Although water is often perceived as a low-cost commodity, industry feedback suggests that improvements in water use and treatment efficiency are typically prioritized only when they also reduce energy use, carbon emissions, or costs. This study advocates for a direct two-way partnership between industry and research audiences to bring their attention toward sustainable industrial water use, treatment, and reuse.

Silva JA.

Advanced Oxidation Process in the Sustainable Treatment of Refractory Wastewater: A Systematic Literature Review.

Sustainability. 2025;17(8):38.

https://doi.org/10.3390/su17083439

More than 4 billion people yearly suffer from global water scarcity amid climate change, rapid population growth, and growing industrial activity. Due to the high concentrations of recalcitrant organic compounds, refractory wastewater is highly resistant to conventional biological treatment and represents a critical obstacle for water reuse and sustainable water management. A systematic literature review of 35 peer-reviewed articles published from 2010 to 2025 is provided to evaluate the utilization and sustainability potential of advanced oxidation processes (AOPs) for treating recalcitrant wastewater. Using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, the review assesses numerous AOPs, such as ozonation, UV/H2O2, Fenton reactions, and

photocatalysis, while also evaluating their performance, efficiency, and integration ability. The results show that AOPs demonstrate pollutant removal rates often greater than 96%, reduce sludge formation, and improve effluent biodegradability. They can be applied at different treatment stages, combined with any renewable energy systems, and therefore can scale and be sustained, thereby aligning with UN Sustainable Development Goal 6. AOPs provide a technically feasible and eco-friendly solution for higher quality wastewater treatment. In the face of increasing pressure on global water resources, and the urgent need for sustainable water resource management, this study offers valuable insights for policymakers and practitioners aiming to adopt resilient and circular strategies for water.

Recyclage textile (nouvelle thématique)

Al-Qahtani SD, Al-Senani GM, Alqahtani AS.

Plasma-Assisted and REDOX-Driven Synthesis of Polyaniline and Silver Nanoparticles Toward Multifunctional Nonwoven Cellulose Fabric Recycled From Textile Waste.

J Appl Polym Sci. 2025;142(40):12.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/app.57564?download=true

Cotton fibers have been a main source for numerous textiles and nontextile industrial applications. However, there has been a growing demand to discover more sources for cellulose fibers at low cost and high quality. Herein, multifunctional nonwoven cotton fabric was developed from a recycled waste of a woven cotton textile by the pad-dry-cure method from a combination of aniline and silver nitrate into plasma-treated cotton textiles. As a result of the oxidation-driven polymerization of aniline to PANi, silver ions (Ag+) were reduced into silver nanoparticles (Ag0) with diameters of 5-9 nm. The mechanical needle punching technology was applied on a pre-shredded cotton waste to fabricate a nonwoven fabric with fiber diameters of 7-18 mu m. PANi functioned as an electroconductive agent on the fabric surface, whereas AgNPs suppressed microbial growth. A weak peak was detected at 576 nm for plasma-unexposed fabrics to indicate a pink color, whereas a stronger absorption band was noted at 609 nm for plasma-exposed fabrics to signify a purple color. The Ag0/PANi/HDTMS hybrid was applied to the plasma-assisted textile, demonstrating an electrical conductivity of 0.7514 S/cm, contact angles of up to 157.1 degrees, high ultraviolet protection, and superior biological activity against Staphylococcus aureus and Escherichia coli.

Catarino ML, Sampaio F, Pacheco L, Gonçalves AL.

The Shift to Bio-Based Auxiliaries in Textile Wet Processing: Recent Advances and Industrial Potential.

Molecules (Basel, Switzerland). 2025;30(19):31.

https://doi.org/10.3390/molecules30194016

The textile industry is among the most resource-intensive sectors, heavily dependent on water, energy, and synthetic chemicals, particularly in wet processing stages such as desizing, scouring, bleaching, dyeing, printing, and finishing. Conventional practices generate vast amounts of contaminated wastewater, posing severe risks to ecosystems and human health. In recent years, growing environmental concerns and stricter regulations have accelerated the search for sustainable alternatives. Biotechnology offers promising solutions, including enzymes, biopolymers, plant- and agrowaste-derived materials, and microbial metabolites, which can replace conventional auxiliaries and reduce the ecological footprint of textile processing. This review provides a structured overview of recent advances in bio-based compounds applied across different stages of textile wet processing. Applications are critically assessed in terms of performance, efficiency, environmental benefits, and potential for industrial adoption. Current limitations, future outlooks, and examples of commercially available products are also discussed. By highlighting the most recent progress, this review underscores the potential of bio-based innovations to support the transition toward more sustainable and resource-efficient textile manufacturing.

Mohtaram F, Fojan P.

From Waste to Value: Advances in Recycling Textile-Based PET Fabrics.

Textiles. 2025;5(3):24.

https://doi.org/10.3390/textiles5030024

The environmental burden of textile waste has become a critical challenge for sustainable development. This review explores recent developments in the recycling of textiles, especially polyethylene tereph-2 thalate (PET)-based fabrics, with a focus on fiber-to-fiber regeneration as a pathway toward circular textile production. Recent developments in PET recycling, such as mechanical and chemical recycling methods, are critically examined, highlighting the potential of chemical depolymerization for recovering high-purity monomers suitable for textile-grade PET synthesis. Special attention is given to electrospinning as an emerging technology for converting recycled PET into high-value nanofibers, offering functional properties suitable for advanced applications in filtration, medical textiles, and smart fabrics. The integration of these innovations, alongside improved sorting technologies and circular design strategies, is essential for overcoming current limitations and enabling scalable, high-quality recycling systems. This review aims to support the development of a more resource efficient textile industry by outlining key challenges, technologies, and future directions in PET recycling.

Zaki MEA, Al-Hussain SA, Al-Mutairi AA, Abdelaziz MA, Jame R, Gomha SM.

Development of Beta vulgaris L. extract-finished plasma-cured recycled linen fabrics as a chromogenic sensor for sweat sensing.

Int J Biol Macromol. 2025;327:10.

https://doi.org/10.1016/j.ijbiomac.2025.147328

A novel smart textile swab was developed as an analytical tool for the onsite evaluation of biochemical changes in sweat toward potential applications in healthcare monitoring and drug testing. Betalain (BTA) was extracted from beetroot (Beta vulgaris L.) using a simple procedure. Recycled woven textile waste was recycled to linen fibers for the production of nonwoven textile by the needle punching technology. The betalain probe was applied to the recycled nonwoven linen cloth in the presence of a mordant to fasten BTA to cellulose fibers. The sweat monitoring was performed by generating halochromic mordant (Al)/betalain (BTA/Al) nanoparticles (15-35 nm) on the plasma-treated fabric surface. Increasing the pH of a sweat mimic solution results in a blueshift (hypsochromism) in the absorption spectra of the cellulose sensor, switching the wavelength from 583 nm to 440 nm, demonstrating an isosbestic point of 503 nm. The biochromic efficiency of the BTA-dyed cellulose diagnostic tool mostly depends on the halochromic character of the betalain probe, which exhibited a color switch from red to yellow owing to a pH-driven intramolecular charge delocalization in the BTA chromophore. The fastness properties of the dyed nonwoven fabrics demonstrated satisfactory results. No substantial defects were identified in the air permeability and stiffness of the BTA-finished nonwoven textiles.

Biotechnologies

- **Nouveaux procédés**

Abbas S, Saeed A, Bibi M, Perveen S, Masood N.

CRISPR-Cas: From bacterial immunity to precision genome engineering.

Gene Rep. 2025;40:16.

https://www.sciencedirect.com/science/article/pii/S2452014425001694?via%3Dihub

The CRISPR-Cas system is an adaptive immune strategy in bacteria that has rapidly transformed into a cornerstone of modern genome engineering with broad applications in medicine, agriculture, and biotechnology. This review explores its molecular foundations and highlights its expanding functional scope, including roles in immunity, DNA repair, and transcriptional regulation. CRISPR technology has emerged as a powerful tool in addressing major global health challenges, enabling precise genome modifications in drug-resistant parasites such as Plasmodium and Trypanosoma cruzi, as well as offering promising strategies against persistent viral infections like HIV and hepatitis B. However, challenges remain, particularly the risk of off-target effects, which underscores the need for refined precision tools and innovative delivery methods. Recent advances are addressing these limitations through next-generation approaches such as engineered virus-like particles, DNA nanostructures, and synthetic exosomes are improving delivery efficiency and targeting specificity, while bioresponsive hydrogels offer controlled, site-specific release of editing components. At the same time, newer tools like prime editing systems and Cas12 variants are achieving highly accurate, double-strand break-free modifications with expanded targeting capacity. These advances point toward a safer, more adaptable future for genome editing. CRISPR's transformative impact will depend on improving delivery strategies, enhancing precision, and establishing robust ethical and regulatory frameworks. As applications expand, particularly in germline editing, ethical concerns surrounding intergenerational consent, human enhancement, and potential eugenic misuse become increasingly pressing. The possibility of non-therapeutic genetic modification further elevates the need for equitable access and strong global oversight to avoid deepening health disparities. The future of CRISPR lies in harmonizing scientific innovation with societal responsibility-ensuring that progress is both impactful and ethically grounded.

Ahmad U, Hanaffi WNW, Islam A, Salman A, Khan MM, Shakeel F, et al.

Cutting edge strategies for diabetic wound care: Nanotechnology, bioengineering, and beyond.

BMEMat. 2025:40.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/bmm2.70033?download=true

Diabetic wounds affect millions of people globally, posing significant clinical and socioeconomic challenges due to their prolonged healing times and risk of complications. This review provides a comprehensive examination of the pathophysiology underlying delayed wound healing in patients with diabetes, focusing on key mechanisms such as hyperglycemia, oxidative stress, vascular insufficiency, and chronic inflammation. Impairments in angiogenesis, growth factor signaling, and tissue regeneration create a complex therapeutic landscape that demands multifaceted approaches. Accordingly, this review critically examines current clinical interventions such as topical growth factors, antioxidant therapies, and hyperbaric oxygen. Furthermore, it explores innovative solutions, such as advanced wound dressings, bioengineered materials, and stem cell therapy, which offer enhanced wound healing outcomes. We provided a comprehensive analysis of innovative platforms, such as nanoparticle-loaded hydrogels and 3D printing, shedding light on their transformative potential to revolutionize wound care through personalized multifunctional therapies. This review concludes by identifying critical gaps and proposing a roadmap for future research and clinical innovations to enhance diabetic wound management and improve patient outcomes.

Ahranjani PJ, Sadatfaraji H, Dehghan K, Edlabadkar VA, Khadka P, Nwobodo I, et al.

Recent Advances in the Development and Industrial Applications of Wax Inhibitors: A Comprehensive Review of Nano, Green, and Classic Materials Approaches.

J Compos Sci. 2025;9(8):16.

https://doi.org/10.3390/jcs9080395

Wax deposition, driven by the crystallization of long-chain n-alkanes, poses severe challenges across industries such as petroleum, oil and natural gas, food processing, and chemical manufacturing. This phenomenon compromises flow efficiency, increases energy demands, and necessitates costly maintenance interventions. Wax inhibitors, designed to mitigate these issues, operate by altering wax crystallization, aggregation, and adhesion over the pipelines. Classic wax inhibitors, comprising synthetic polymers and natural compounds, have been widely utilized due to their established efficiency and scalability. However, synthetic inhibitors face environmental concerns, while natural inhibitors exhibit reduced performance under extreme conditions. The advent of nano-based wax inhibitors has revolutionized wax management strategies. These advanced materials, including nanoparticles, nanoemulsions, and nanocomposites, leverage their high surface area and tunable interfacial properties to enhance efficiency, particularly in harsh environments. While offering superior performance, nano-based inhibitors are constrained by high production costs, scalability challenges, and potential environmental risks. In parallel, the development of "green" wax inhibitors derived from renewable resources such as vegetable oils addresses sustainability demands. These eco-friendly formulations introduce functionalities that reinforce inhibitory interactions with wax crystals, enabling effective deposition control while reducing reliance on synthetic components. This review provides a comprehensive analysis of the mechanisms, applications, and comparative performance of classic and nano-based wax inhibitors. It highlights the growing integration of sustainable and hybrid approaches that combine the reliability of classic inhibitors with the advanced capabilities of nano-based systems. Future directions emphasize the need for cost-effective, eco-friendly solutions through innovations in material science, computational modeling, and biotechnology.

Aljabri M.

Recent advances in pesticide bioremediation: integrating microbial, phytoremediation, and biotechnological strategies - a comprehensive review.

Env Pollut Bioavail. 2025;37(1):49.

https://www.tandfonline.com/doi/pdf/10.1080/26395940.2025.2554173

Rapid industrialization and excessive agrochemical use have caused severe environmental contamination, threatening human, animal, and ecosystem health. Fertilizers and pesticides, though boosting yields, degrade soil, disrupt microbial communities, and pollute air and water. Long-term exposure leads to cancer, neurological disorders, hormonal imbalance, and biodiversity loss. Addressing pesticide contamination is urgent, especially under climate change. Bioremediation offers a cost-effective, eco-friendly solution, employing microbes, plants, and advanced biotechnologies. Bacteria (Pseudomonas, Bacillus, Burkholderia, Sphingobium, Agrobacterium), fungi (Trichoderma, Aspergillus, Penicillium, white rot fungi), and algae (Chlorella, Scenedesmus, Spirulina) metabolize pesticides into less toxic compounds. Phytoremediation and modern tools like metabolomics, transcriptomics, proteomics, synthetic biology, bioelectrochemical systems, and machine learning enhance degradation strategies. However, challenges include slow rates, environmental variability, GMO risks, and limited field validation. Future research must emphasize large-scale studies, integration of biotechnology and

nanotechnology, and global collaboration to improve efficiency and field applicability of bioremediation.

Alsaiari AKA, Alonazi MS, Alotaibi NM, Alqahtani H, Alotaibi WM, Al Yhyha ASS, et al.

Bioengineering Innovations in Global Dental Infection Control: Applications and Adaptations in Clinical Settings.

Int Dent J. 2025;75(3):2222-38.

https://pmc.ncbi.nlm.nih.gov/articles/PMC12142762/

Introduction and Aims: Dental practices pose a high risk of microbial contamination due to frequent exposure to bodily fluids like saliva and blood. Bioengineering innovations have emerged as vital tools to enhance infection control in dental settings. This review aims to assess the global applications and effectiveness of these innovations, particularly focusing on antimicrobial biomaterials, sterilization techniques, and personal protective equipment (PPE). Methods: A systematic review was conducted across major databases to identify studies from 2000 to 2024 that examined bioengineering technologies used in dental infection control. Inclusion criteria included studies focusing on antimicrobial materials, PPE, or novel sterilization technologies. Data extraction followed PRISMA guidelines, focusing on study design, dental settings, and clinical outcomes related to infection control. Results: Nine studies met the inclusion criteria, covering diverse geographical regions, including Italy, Saudi Arabia, Brazil, and India. Antimicrobial agents like silver and zinc oxide nanoparticles, UV-C sterilization, and low-temperature plasma were found to significantly reduce microbial contamination. The pooled effect size across studies was 1.62 (95% CI: 1.41-1.82) with low heterogeneity (I2 = 6.4%). However, barriers such as high costs and limited resource availability were highlighted, particularly in lower-income regions. Conclusion: Bioengineering innovations show significant potential for enhancing infection control in dental settings worldwide. While the technologies offer improved safety and hygiene, challenges related to cost and accessibility persist. Further research is needed to explore cost-effective and scalable solutions, particularly in resource-limited settings. Clinical Relevance: The integration of bioengineering technologies in dental practices can significantly improve infection control measures, reducing microbial contamination and enhancing safety for both patients and healthcare workers. These innovations hold promise for global adaptation, particularly in response to emerging public health challenges. (c) 2024 The Authors. Published by Elsevier Inc. on behalf of FDI World Dental Federation. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/)

Amiri M, Afshary H, Bezaatpour A, Hatamikia S, Wei JM, Boukherroub R, et al.

A critical review on neurodegenerative biomarker diagnostics: where is the field heading to?

Analytical and bioanalytical chemistry. 2025;417(24):5435-48.

https://link.springer.com/article/10.1007/s00216-025-06061-1

Neurodegenerative diseases (NDD), a collection of disorders with different underlying causes and clinical presentations, are recognized as a major area of concern of our society today. The most common NDD are Parkinson's disease (PD), Alzheimer's disease (AD), amyotrophic lateral sclerosis (ALS), and Huntington's disease, each one of them being characterized by the progressive degradation of nerve cells and accumulation of misfolded and aggregated proteins in the affected brain region. Diagnosing NDD is challenging, due to the heterogeneity of the disease and the overlap of symptoms. Yet, early detection and accurate diagnosis are crucial for effective NDD management. With the

emergence of disease-modifying therapies for AD, monitoring disease progression and treatment success is becoming essential. The future of NND diagnostics is focusing on developing less invasive, cost-effective strategies that enable early NDD identification and detection with improved patient outcomes. The integration of biotechnology and nanotechnology is seen as crucial for advancing the analytical science aspect of NDD. The creation of these innovative tools and methodologies is on the verge of enabling new possibilities for clinical diagnostics, but is also faced with several hurdles that will be critically evaluated.

Chen HX, Dong HY, Lu RX, Wang XY, Li ZJ.

Advances in the biosynthesis of heparosan, a key precursor of heparin.

Biochem Eng J. 2025;224:11.

https://www.sciencedirect.com/science/article/pii/S1369703X25002773?via%3Dihub

Heparin, a vital anticoagulant widely used in clinical practice, has traditionally been sourced through extraction from animal tissues. However, this production method faces significant challenges, including limited source availability, batch-to-batch variability, and potential safety risks associated with animal-derived products. These inherent limitations have prompted an urgent need for developing more efficient and consistent heparin production strategies. Recent advances in biotechnology have identified heparosan, a bacterial capsular polysaccharide, as a promising precursor for heparin production through targeted sulfation modifications. The application of metabolic engineering techniques has significantly enhanced the microbial synthesis of heparosan, paving the way for an innovative and environmentally friendly approach to heparin production. This emerging biotechnological method offers substantial advantages, including reduced production costs, increased yield consistency, and decreased dependence on animal-derived resources, while simultaneously addressing safety concerns associated with traditional methods. This comprehensive review systematically examines recent advancements in microbial heparosan synthesis, evaluates current challenges, and explores future directions in this rapidly evolving field.

Ezzati M, Izadpanah M, Hawkins SM, Yalameha B.

Advancements in Ovarian Tissue Engineering: Strategies for Fertility Preservation and Restoration.

Regen Eng Transl Med. 2025:20.

https://link.springer.com/article/10.1007/s40883-025-00477-y

Purpose Ovarian failure and dysfunction represent significant opportunities for ovarian replacement via ovarian tissue engineering (OTE). This review explores advancements in OTE as a promising strategy to restore ovarian function, emphasizing the potential role of OTE in overall health, longevity, and fertility. By analyzing these advancements, this review underscores the importance of OTE related to ovarian dysfunction and advancing women's health.MethodsA narrative review of OTE was conducted. Topics investigated include: (1) the recent technological developments in fertility preservation, including the use of ovarian tissue cryopreservation; (2) advancements in scaffold-based technologies and biomaterials, including alginate and fibrin that support follicle growth and viability; and (3) the concept of an artificial ovary, encapsulating ovarian follicles and stromal cells within biomaterials to replicate ovarian functions.ResultsThe preservation of ovarian tissue has become vital in reproductive medicine. Advances in OTE offer promising opportunities to recreate normal ovarian tissue and improve fertility preservation. This review examines the use of various natural and synthetic polymers in bioengineered ovaries. Emerging technologies, such as three-dimensional (3D) printing and microfluidics, are also discussed for creating complex structures and manipulating fluids at small scales

to replicate systemic ovarian function.Conclusion This review highlights the significant engineering aspects of OTE, advocating research that prioritizes biomaterial refinement, cell sourcing, and ethical considerations in stem cell therapy. Advancements in 3D printing and microfluidics are crucial for developing bioengineered ovarian functions. Recognizing the ovary's diverse biological functions beyond fertility will broaden the innovation of research in this field.Lay SummaryOvarian dysfunction poses significant fertility and health challenges. OTE offers innovative solutions to restore ovarian function. This review discusses advancements in OTE, including biomaterials and technologies that support ovarian follicle growth and viability, aiming to improve fertility preservation and ovarian functions.Future ViewFuture research in OTE should concentrate on refining 3D culture systems with advanced polymers to enhance follicle survival. Additionally, integrating angiogenic factors will be crucial for developing vascular networks, while utilizing stem cell-derived granulosa-like cells may offer innovative strategies for restoring fertility in at-risk patients.

Gago G, Comeau MO, Ness R, Gomes F, Gibbon FD, Champagne PO.

Bioengineered Materials for Skull Base Reconstruction-Current Clinical Applications: Systematic Review and Meta-analysis.

Journal of Neurol Surg Part B. 2025:15.

https://www.thieme-connect.de/products/ejournals/abstract/10.1055/a-2693-1905

Introduction Skull base reconstruction (SBR) is a crucial aspect of open and endoscopic skull base surgery. Currently, multilayer reconstruction with vascularized tissues is the standard technique. Despite advancements, complications such as postoperative cerebrospinal fluid leaks (PO-CSF-L) and infections persist. Bioengineered materials (BEM) have emerged for SBR, showing promising results. Methods A systematic review was conducted using Embase, PubMed, Scopus, and Cochrane databases. We performed a proportional meta-analysis of studies utilizing BEM for SBR and a comparative analysis with control groups that underwent SBR without biomaterials. The odds ratio assessed treatment effects for binary outcomes. Results From 1,075 potential articles, 14 met the inclusion criteria. Five BEM were identified: hydroxyapatite (HXA), leukocyte-platelet-rich fibrin (L-PFR), collagen matrix (CM), polyglycolic acid (PGA), and porous polyethylene (PP). The analysis included 1,960 patients, with 1,570 in experimental groups using BEM. Pooled data indicated a PO-CSF-L proportion of 0.02% (95% CI: 0.01-0.03%), postoperative CSF diversion (PO-CSF-d) at 0.01% (95% CI: 0.00-0.04), and PO infection at 0.02% (95% CI: 0.00-0.05%). Common effect models showed that CM had a lower total PO infection rate (0.01; 95% CI: 0.00-0.01, p = 0.0006) compared with HXA (0.08; 95% CI: 0.05-0.11, p = 0.0007). Comparative analysis demonstrated lower odds of PO-CSF-L (OR 0.37; 95% CI: 0.15-0.89, p = 0.026) and infections (OR 0.47; 95% CI: 0.13-1.47, p = 0.264) in patients with BEM. Conclusion Our results indicate that bioengineered materials are viable for skull base reconstruction, associated with low rates of postoperative CSF leaks, diversions, and infections.

Fu S, Hou LC, Huang XL, Zhao W, Wang FM, Wang YN.

Unilateral biportal endoscopy for minimally invasive spinal fusion: Advancements in biomaterials and clinical outcome optimization.

World J Orthop. 2025;16(9):8.

https://doi.org/10.5312/wjo.v16.i9.108931

Lumbar interbody fusion is essential for treating degenerative lumbar diseases. The disadvantages of open surgery have led to the evolution of minimally invasive spine surgery, including endoscopic techniques such as unilateral biportal endoscopy (UBE). Leveraging arthroscopic principles, UBE offers

superior visualization and flexibility and expands from decompression to fusion (UBE fusion). However, achieving robust UBE fusion presents challenges, such as suboptimal arthrodesis rates and implant-related complications, requiring more than surgical skill alone. Optimizing UBE fusion critically depends on the effective integration of advanced biomaterials with the surgical technique. This minireview assessed recent advances in UBE, focusing on the development of novel biomaterials, such as functionalized porous, expandable, or double-cage designs, to improve bone regeneration outcomes. These advancements address challenges, like washout of bone graft material and biologics, and utilize growth factors, such as recombinant human bone morphogenetic proteins, while exploring pathway modulation to improve outcomes. We also evaluated clinical optimization strategies involving technical refinements, fluid and hemostasis control, key complication mitigation especially concerning dural tears and hematomas, and technologies such as navigation and robotics. While UBE shows promise particularly for early recovery, its long-term success hinges on these biotechnological advancements. High-quality evidence, especially from randomized controlled trials and long-term studies, is needed to validate integrated strategies and define the optimal role of UBE fusion.

Gisselsson D, Pirnay JP, Wiederoder M, Hart C, Rinaldi A, Gorgé O, et al.

Why the military should be interested in biomedical technology: four domains of innovation that could change fighting power.

Biotechnology advances. 2025;84:14.

https://www.sciencedirect.com/science/article/pii/S0734975025001818?via%3Dihub

Biotechnology is a rapidly progressive field, currently transforming agriculture, healthcare, and life sciences. This rapid development comes with serious legal and ethical challenges as well as risks for human security and health. NATO has prioritized biotechnology and human enhancement technologies for defense, focusing on legitimate, defensive applications. This paper highlights four clusters of biomedical technologies with the potential to enhance warfighter performance: 1. Small-scale sensors with response capability: These sensors, already used in civilian healthcare for glucose monitoring and insulin dosing, could be adapted for military use to administer antidotes or antibiotics in response to chemical or biological threats. 2. Microbial engineering: Tailor-made probiotics could prepare soldiers' gut microbiomes to prevent travel-related illnesses, while bacteriophages, can be used to combat infections resistant to antibiotics. 3. Human-machine interaction: Neurocybernetics is transforming military robotics by enabling seamless communication between humans and machines. 4. Omics and informatics: Precision medicine combined with machine intelligence can be used for medical screening and monitoring of soldiers, as well as for biomedical intelligence gathering. These technologies, progressing in civilian sectors, have significant potential to enhance military capabilities in the near future (5-10 years). Oversight and prioritization of human rights are essential to ensure responsible application, maintaining human dignity, bodily integrity, and personal autonomy even in wartime. As military innovation systems worldwide are advancing in strategic biotechnologies, it is critical for NATO countries to maintain synergistic intra-alliance collaboration in this intense field.

Ibarra-Muñoz LA, Resendiz-Acosta GG, Muñoz-Garcia R, Alvarado-Mata LY, Sosa-Martinez JD, Morales-Oyervides L, et al.

Artificial intelligence in the food and bioprocess industries: Addressing food security challenges.

Food Humanit. 2025;5:13.

https://doi.org/10.1016/j.foohum.2025.100818

Exponential population growth and increasing global food demand present significant challenges to food security, including risk of food shortages, declining quality and adverse environmental consequences associated with food production. Thus, emerging technologies are being applied to enhance and address challenges within production and safety of food. In this review, the potential of Artificial Intelligence (AI) is being explored as an emerging tool towards food industry and bioprocess concerns such as fermentation parameters, quality control contamination detection, food safety management and bioprocess optimization. By leveraging advanced AI techniques, such as Machine Learning (ML), Deep Learning (DL), Artificial Neural Networks (ANN), and Generative Adversarial Networks (GAN). However ethical implications, such as transparency, liability, AI autonomy and corporation's awareness, remain critical. Despite its transformative potential, challenges like scalability, data availability, and public perception must be addressed for AI full integration into the food industry. Future perspectives highlight AI's expanding role in preproduction, processing, and distribution, additionally AI is supported by advancements in synthetic biology and predictive modeling.

Ji XY, An ZK, Liu Y, Zhang R, Zhao YF.

Research progress and prospects of animal bioreactors.

Chin Sci Bull-Chin. 2025;70(25):4223-31.

https://www.sciengine.com/parse/pdf/0023-074X/B591EE67CD3243FC854C9E65BD06BFE6.pdf

Animal bioreactors have emerged as a transformative platform in biopharmaceutical manufacturing, providing a costeffective and scalable approach for producing functional proteins through transgenic expression in specific animal tissues or organs. Over the past four decades, advancements in transgenic animal technologies and precision gene-editing tools- particularly CRISPR-Cas9-have significantly accelerated progress in this field. Among various bioreactor systems, the mammary gland remains predominant due to its high biosynthetic capacity and broad applicability, achieving gram-per-liter yields of complex biologics, including recombinant human lactoferrin, monoclonal antibodies, and therapeutic enzymes. The College of Biological Sciences at China Agricultural University has made pioneering contributions, such as generating transgenic cattle with unprecedented levels of human lactoferrin expression and developing optimized expression systems for human lysozyme and anti-CD20 monoclonal antibodies in murine and caprine models. Egg-based bioreactors have also gained attention due to rapid production cycles and minimal physiological impacts on hosts. Transgenic hens expressing recombinant human lysozyme and neutrophil defensin 4 in egg whites demonstrate substantial industrial potential. Commercial milestones, such as ATryn from goat milk and Kanuma from transgenic hens, along with over 30 therapeutic proteins currently in clinical trials, underscore the translational success of animal bioreactor technologies. Precision genome-editing technologies have become pivotal catalysts for innovation in this domain. Platforms such as CRISPR-Cas9 have substantially improved the specificity and efficiency of targeted gene insertion. By facilitating the site-specific integration of transgenes under the control of mammary gland-specific regulatory elements (e.g., milk protein promoters), these technologies mitigate the risks of ectopic expression and transgene silencing commonly associated with random integration events. Despite these advances, several challenges persist. Species-specific glycosylation patterns can affect the immunogenicity and efficacy of recombinant proteins, and high-level expression of exogenous proteins imposes metabolic burdens that may compromise animal health and welfare. Public perception remains a significant barrier, particularly in China, where only 34.7% of respondents accept transgenic biopharmaceuticals, highlighting the need for improved science communication and stakeholder engagement. Regulatory landscapes are gradually evolving; China's 14th Five-Year Plan for the Bioeconomy has expedited approval processes for innovative biologics, exemplified by the 2023 clinical trial authorization of a domestically developed C1 esterase inhibitor. Future advancements will require further refinement of gene-editing technologies and, integration of synthetic biology. Emerging applications include rare

disease therapeutics, sustainable agriculture via hypoallergenic dairy products, and insect bioreactors producing plant-derived compounds. Market forecasts predict the animal bioreactor sector will surpass $1.1 billion by 2030, driven by rising demand and strategic investments in CRISPR-based platforms. Aligning technological innovation with societal acceptance positions animal bioreactors to revolutionize biopharmaceutical production, offering scalable and ethically viable solutions to global health challenges.

Jing R, Si S, Zhu SY, Tang XY, Jiang ZQ.

Current advancements in the investigation of mitochondria-targeting organic sensitizers in cancer immunotherapy.

Biomater Sci. 2025;13(20):5582-604.

https://pubs.rsc.org/en/content/articlelanding/2025/bm/d5bm01193k

Cancer immunotherapy has transformed oncological treatment paradigms, yet tumor resistance and immune evasion continue to limit therapeutic efficacy. Mitochondria-targeting organic sensitizers (MTOSs) represent an emerging class of therapeutic agents that exploit mitochondrial dysfunction as a convergent node for tumor elimination and immune activation. As central regulators of cellular metabolism, apoptotic signaling, and immune cell function, mitochondria serve as critical determinants of tumor progression and the immunological landscape within the tumor microenvironment (TME). This comprehensive review synthesizes the latest advances (2023-2025) in MTOS-mediated cancer immunotherapy, systematically examining the capacity of MTOSs to induce diverse forms of regulated cell death and orchestrate antitumor immune responses. MTOSs demonstrate remarkable versatility in triggering mitochondria-dependent apoptosis, immunogenic cell death (ICD), necroptosis, pyroptosis, ferroptosis, and autophagic cell death through strategic disruption of mitochondrial homeostasis. These sensitizers modulate key mitochondrial functions including membrane potential dynamics, reactive oxygen species (ROS) generation, electron transport chain integrity, and calcium homeostasis, thereby releasing damage-associated molecular patterns (DAMPs) that potently activate both innate and adaptive immunity. Current MTOS platforms encompass small-molecule sensitizers, polymeric nanocarriers, metal-organic complexes, and biomimetic systems, each offering distinct advantages in mitochondrial targeting and therapeutic efficacy. Clinical translation faces significant challenges including variable mitochondrial targeting efficiency due to transmembrane transport limitations and TME pH fluctuations, systemic toxicity risks from nonspecific metal ion release in metal-organic complexes, insufficient long-term biocompatibility evaluation, and the predominant reliance on simplified tumor models that inadequately reflect clinical heterogeneity and complex spatiotemporal dynamics of mitochondrial damage-immune remodeling interactions. Future research directions emphasize the multidisciplinary integration of synthetic biology, nanotechnology, and computational approaches to engineer next-generation intelligent sensitizer platforms with enhanced TME-adaptive capabilities, enabling precise mitochondrial intervention and immune modulation for improved cancer immunotherapy outcomes.

Jo BK, Lee SY, Eom HJ, Kim J, Cha HY.

Organ-Specific Dedifferentiation and Epigenetic Remodeling in In Vivo Reprogramming.

Aging Cell. 2025:22.

https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/acel.70268?download=true

The advent of in vivo reprogramming through transient expression of the Yamanaka factors (OCT4, SOX2, KLF4, and c-MYC) holds strong promise for regenerative medicine, despite ongoing concerns about safety and clinical applicability. This review synthesizes recent advances in in vivo reprogramming, focusing on its potential to restore regenerative competence and promote rejuvenation across diverse tissues, including the retina, skeletal muscle, heart, liver, brain, and intestine. We highlight mechanistic parallels and distinctions between injury-induced dedifferentiation and OSKM-mediated reprogramming, emphasizing the roles of dedifferentiation, transient regenerative progenitors, and epigenetic remodeling. Critical safety considerations-such as teratoma formation, organ failure, and loss of cell identity-are discussed alongside strategies designed to mitigate these risks, like cyclic induction and targeted delivery. Finally, we briefly note the growing translational interest in this field, alongside directing readers to recent reviews for detailed coverage of biotech initiatives. Collectively, this work underscores the transformative potential of in vivo reprogramming for both tissue regeneration and rejuvenation, while stressing the importance of precise spatiotemporal control for its safe clinical application.

Khurram MF, Tahira M, Rauf A, Khalid B, Ikram M.

Target Mining in Insect Genomes: Omics-Guided Innovations for Smart Pesticides.

J Crop Health. 2025;77(5):14.

https://link.springer.com/article/10.1007/s10343-025-01219-4

The pervasive and escalating contamination of agricultural ecosystems by insecticides presents a formidable challenge to environmental sustainability, food security, and public health. Conventional chemical pesticides, while effective, have engendered widespread ecological disruption, resistance development, and non-target toxicity. This review systematically elucidates emerging molecular and biochemical targets for next-generation pesticide development, including receptor-mediated signaling pathways such as G-protein coupled receptors (GPCRs) and nicotinic acetylcholine receptors and critical enzymatic cascades governing chitin biosynthesis, lipid metabolism, and detoxification. Recent advances in RNA interference (RNAi) technologies and regulatory small RNAs (sRNAs) have demonstrated remarkable precision in silencing pest-essential genes, offering environmentally benign alternatives to synthetic insecticides. Additionally, microbial degradation strategies and multi-omics approaches have accelerated the discovery of novel metabolic pathways and biosensors for real-time detection and remediation of pesticide residues. By integrating structural biology, nanotechnology-enabled delivery systems, and computational modeling, this review delineates a comprehensive framework for the rational design and deployment of target-specific pesticides. The synthesis of mechanistic insights with sustainable biotechnological innovations underscores the potential to transcend current limitations, mitigate ecological risks, and inform robust policy frameworks to guide the phased reduction of highly toxic compounds.

Klyagin S, Maklakova I, Tomic N, Shestakova A, Pieckova E, Osmolovskiy A.

Proteolytic Profiles of Aspergillus caespitosus, A. jensenii and A. neotritici, and a Novel Peptidase with Plasmin-like Activity for Biomedicine and Pharmacology.

Curr Pharm Biotechnol. 2025:10.

https://www.eurekaselect.com/article/149863

Introduction Cardiovascular diseases (CVDs) are the leading cause of death globally, often complicated by thromboembolic events. Plasmin, a key enzyme in fibrinolysis, is crucial for managing these

conditions. Elevated or reduced plasmin levels can indicate thrombotic risks, making it a valuable diagnostic marker. Recent biotechnological advances have developed diagnostic kits to measure plasmin activity, aiding early detection and intervention. Fungal proteases, particularly from micromycetes, are emerging as promising agents in anticoagulant therapy. This study investigates three Aspergillus species - A. caespitosus, A. jensenii and A. neotritici for their potential to produce novel biomedical components.Methods The fungi were cultured, and their proteolytic profiles were analyzed. Key findings include the identification of specific proteases with plasmin-like and protein C-activating activities. These enzymes were purified using isoelectric focusing and characterized through SDS-PAGE and zymography.Results The study confirmed that A. jensenii, and A. neotritici produce proteases with plasmin-like activity, with A. neotritici showing a single 35 kDa non-specific protease, and A. jensenii exhibiting two proteases (33 kDa and 100 kDa) in the acidic zone and one (110 kDa) in the neutral zone, the latter exhibiting specific chymotrypsin and plasmin-like activity.Discussion Among the studied strains, A. neotritici exhibited the fastest secretion of proteases with plasmin-like activity, making it a promising source of enzymes with potential clinical applications. In contrast, A. caespitosus and A. jensenii displayed more complex protease compositions, featuring multiple active enzymes. Notably, one of the A. jensenii proteases showed pronounced specificity toward chymotrypsin and fibrinolytic substrates, indicating its suitability for the development of targeted therapeutic agents.Conclusion These findings suggest the potential of these fungal proteases for developing novel anticoagulant therapies and diagnostic tools.

Mohamed HI, Ullah I, Toor MD, Tanveer NA, Din MMU, Basit A, et al.

Heavy metals toxicity in plants: understanding mechanisms and developing coping strategies for remediation: a review.

Bioresour Bioprocess. 2025;12(1):44.

https://link.springer.com/content/pdf/10.1186/s40643-025-00930-4.pdf

Heavy metal (HM) contamination is an increasing environmental and agricultural concern due to the persistence, toxicity, and bioaccumulative nature of metals such as cadmium (Cd), lead (Pb), mercury (Hg), and arsenic (As). These pollutants are primarily introduced through industrial effluents, mining, and agrochemicals, negatively impacting soil health, crop productivity, and food safety, ultimately posing serious risks to both ecosystems and human health. Conventional remediation methods can be costly, labor-intensive, and environmentally disruptive. Heavy metals like Cd, Pb, Hg, and As disrupt cellular homeostasis, inhibit photosynthesis, generate oxidative stress, and interfere with nutrient uptake, leading to significant yield losses in plants. In response to these stresses, plants utilize complex molecular mechanisms for tolerance, including the activation of antioxidant enzymes, upregulation of metal transporters, production of metal-chelating molecules, and modulation of stress-responsive genes and transcription factors. In contrast, bioremediation offers a sustainable and eco-friendly alternative by leveraging the detoxification capabilities of plants, microbes, and their symbiotic interactions. Techniques such as phytoremediation, microbial-assisted remediation, and integrated strategies involving biochar and organic amendments have demonstrated promising results in restoring heavy metal-contaminated soils. Recent advancements in molecular biology and synthetic biology have further improved the efficiency of bioremediation through the genetic engineering of hyperaccumulator plant species and metal-resistant microbes. This review examines the toxic effects of heavy metals on plants and highlights innovative, nature-based remediation strategies, emphasizing their potential for scalable and sustainable environmental cleanup.

Negi S, Kumar P, Kumar A, Kumar V, Irfan M.

Environmental Variables Affecting Apple Fruit Development and Bioactive Compounds: Biochemical Insights and Biotechnological Advances.

J Plant Growth Regul. 2025:20.

https://link.springer.com/article/10.1007/s00344-025-11862-w

Apples are a widely consumed fruit valued for their rich content of health-promoting phytochemicals, including carotenoids, flavonoids, isoflavonoids, and phenolic acids. Consumption of apples has been linked to reduced risks of several chronic diseases, such as cancer, cardiovascular conditions, and asthma. The chemical composition and quality of apple fruit are strongly influenced by the dynamic interactions between environmental factors and secondary metabolic pathways throughout development from flowering to ripening. This review summarizes the latest research on how temperature, light, soil composition, and biotic stressors affect key developmental stages, with an emphasis on the biosynthesis of secondary metabolites such as phenolic compounds, flavonoids, carotenoids, terpenoids, and anthocyanins. These compounds are regulated through complex networks involving phytohormones, transcription factors, and epigenetic modifications. It also highlights recent biotechnological advances, including CRISPR/Cas9 and RNA-directed DNA methylation, to improve fruit quality and stress resilience. By integrating genetic, epigenetic, and environmental perspectives, this review offers strategic insights to mitigate the impacts of climate change on apple production. Its novelty lies in providing a comprehensive framework to guide breeders, growers, and researchers in optimizing fruit quality and functionality across all stages of development.

Olawade DB, Oladipo P, Ajisafe O, Egbon E, Fapohunda O, Kade A.

Genetically engineered microorganisms: A promising frontier for PFAS bioremediation.

Process Saf Environ Protect. 2025;202:13.

https://doi.org/10.1016/j.psep.2025.107699

Per- and polyfluoroalkyl substances (PFAS) are persistent environmental pollutants widely used in industrial applications due to their exceptional chemical stability. However, their presence in wastewater poses significant environmental and health risks, necessitating innovative remediation strategies. Traditional treatment methods are inadequate for breaking strong carbon-fluorine bonds and present substantial process safety risks including high-temperature operations (800-1200 degrees C), explosive potential, and toxic gas emissions. This has led to increased interest in genetically engineered microorganisms (GEMs), which offer inherently safer operating conditions with ambient temperatures , atmospheric pressure, and reduced explosion risks. This review explores GEMs' potential for PFAS degradation, focusing on genetic engineering technologies such as CRISPR, synthetic biology, and metabolic pathway engineering. The review highlights target enzyme optimization, including dehalogenases and oxygenases, showing promise for cleaving PFAS bonds. Process safety advantages include elimination of high-pressure vessels, reduced fire hazards, and containment of byproducts within controlled biological systems. Strategies for enhancing microbial efficiency, including metabolic flux analysis and cometabolism, are discussed alongside scaling challenges from laboratory to pilot applications. Key considerations include environmental concerns, microbial containment, reactor safety design, and accident prevention protocols to balance technological benefits with ecological safety. Comparative analysis demonstrates GEMs' superior safety profile versus conventional treatments. Future directions emphasize integrating GEMs into existing wastewater treatment systems and advancing bioreactor designs. Research gaps, including long-term ecological impacts and economic scalability, are critical areas requiring study. With responsible deployment, GEMs provide sustainable solution for mitigating PFAS environmental impact.

Paiva NML, Ribeiro SC, Borba AES, Silva CCG.

Current Status and Future Challenges in the Use of Bacteriocins to Modulate Ruminant Gut Microbiota.

Probiotics Antimicrob Proteins. 2025:25.

https://link.springer.com/article/10.1007/s12602-025-10792-z

The overuse of antibiotics is leading to an ever-increasing risk of bacterial resistance in animals and humans. In response, new alternatives are emerging to combat these threats, including the use of bacteriocins. Bacteriocins are small peptides secreted by bacteria and have a remarkable antimicrobial effect, usually with a narrow spectrum of inhibition. These antimicrobial peptides raise new hopes in the fight against multidrug-resistant pathogenic bacteria and have led to several studies in various fields of scientific research. In agriculture, more specifically in cattle production, bacteriocins are an excellent and promising tool for the treatment of mastitis in dairy cows to avoid the overuse of antibiotics. Bacteriocins can also be used to modulate the rumen microbiota to increase feed performance and milk/meat yield. In addition, modulation of rumen microbiota by bacteriocins may reduce methane production and thus the emission of this greenhouse gas by ruminants. This review examines the potential of bacteriocins and bacteriocin-producing bacteria to modulate the rumen microbiota and the resulting effects on ruminant health, productivity, and the reduction of methane emissions.

Pirkharati Z, Pirsa S, Mohebinia R.

Microorganism-based techniques for extracting food pigments: Insights and applications.

Food Humanit. 2025;5:8.

https://doi.org/10.1016/j.foohum.2025.100820

The extraction of food pigments using microorganisms involves the utilization of fungi, bacteria, and microalgae for the production of natural pigments. In recent years, this process has garnered significant attention due to the increasing consumer demand for natural alternatives to synthetic dyes, as concerns regarding the health risks and environmental impacts associated with artificial additives continue to rise. Microbial pigments not only have widespread applications across various industries but also possess diverse bioactive properties. Microorganisms serve as rich sources of various pigments, including carotenoids, anthocyanins, and phycobiliproteins. Several microorganisms, such as the fungus Monascus purpureus, the bacterium Chromobacterium violaceum, and the microalga Dunaliella salina, are well known for their pigment-producing capabilities. Despite their potential, certain pigment-producing strains generate toxic secondary metabolites, posing safety challenges for commercial applications. Furthermore, optimizing growth conditions and developing efficient extraction methods present additional challenges. Among the extraction techniques employed, ultrasound-assisted extraction (UAE), microwave-assisted extraction (MAE), and supercritical fluid extraction (SFE) are notable, each with distinct advantages, limitations, efficiencies, and environmental impacts. Recent advancements in biotechnology and microbial systems engineering have facilitated increased pigment production using agricultural and food waste as growth substrates. This approach not only enhances the sustainability of pigment production through circular economy principles but also improves the cost-effectiveness of extraction processes.

Sahil S, Bhatia S, Nanda S.

Advances in biohythane: Integrating biohydrogen and biomethane for sustainable fuel solutions.

Int J Hydrog Energy. 2025;179:14.

https://doi.org/10.1016/j.ijhydene.2025.151712

Hydrogen is regarded as the fuel of the future due to its high energy density and zero carbon emissions. However, hydrogen's high flammability and risk of metal embrittlement complicate its bulk storage, transportation, and distribution. Nonetheless, hythane is generated upon blending hydrogen (10-30 %) with methane (70-90 %). As a hybrid biofuel, hythane offers key benefits including high energy density and combustion efficiency, reduced emissions, and ease of storage and distribution. This article reviews the optimization, intensification, and application of synthetic biology in photo/dark fermentation and anaerobic digestion for producing biohydrogen and biomethane, respectively, from biowaste, as well as considerations for strategic integration of these bioprocesses to generate biohythane. Depending on the blending ratios of hydrogen and methane, hythane demonstrates superior fuel properties, including high energy density, burning velocity, flame temperature, ignition temperature, flammability range, and low diffusivity.

Sahith VN, Kumar JA, Sruthi VS, Sathish S, Venkatesan D, Prabu D, et al.

Microbial and enzymatic biodegradation of microplastics and nanoplastics: Advances, challenges, and sustainable solutions for Environmental Remediation.

Desalination and Water Treatment. 2025;324:13.

https://doi.org/10.1016/j.dwt.2025.101450

The exponential rise in plastic production has intensified global concerns over plastic pollution, particularly the environmental and health impacts of microplastics (<5 mm) and nanoplastics (<1 mu m). These persistent pollutants accumulate in ecosystems, disrupt biological processes, and pose significant risks to human health. Conventional remediation methods such as mechanical recycling, chemical degradation, and incineration are energy-intensive, inefficient, and often result in secondary contamination, emphasizing the need for sustainable alternatives. This review explores microbial and enzymatic biodegradation as a promising eco-friendly strategy for plastic waste management. Key enzymes,including PETase, MHETase, cutinase, laccase, and oxidoreductases, play pivotal roles in depolymerizing widely used polymers such as polyethylene terephthalate (PET), polypropylene (PP), and low-density polyethylene (LDPE). Bacterial species such as Ideonella sakaiensis, Alcanivorax borkumensis, and Rhodococcus spp. demonstrate robust degradative capacities and provide valuable insights into bio-based recycling. Despite these advances , enzymatic biodegradation encounters considerable obstacles, such as restricted substrate specificity, reduced activity under fluctuating environmental conditions, poor reaction velocities, and inadequate study on nanoplastics. Moreover, insufficient degradation may lead to the accumulation of potentially detrimental intermediates. Future research directions encompass protein engineering and synthetic biology to augment enzyme stability, efficiency, and substrate diversity; the creation of microbial consortia for synergistic plastic degradation; the incorporation of pre-treatment strategies to enhance polymer accessibility the investigation of halotolerant species for marine ecosystems and the application of nanotechnology for enzyme immobilization to enhance stability and scalability. These interdisciplinary discoveries provide sustainable, scalable solutions to alleviate global plastic pollution.

Tahir MF, Ishtiaq S, Anas M, Irfan A, Jaremko M, Fahad S, et al.

Integrating biotechnology into diagnostic labs: Innovations in PCR and molecular procedures.

Curr Res Biotechnol. 2025;10:15.

https://doi.org/10.1016/j.crbiot.2025.100325

The field of biotechnology has significantly contributed to progress in diagnostic laboratories, especially in the early identification of genetic disorders. Timely detection plays a vital role in the treatment and management of such conditions, and numerous molecular approaches have been established to identify disease markers with high accuracy and sensitivity. The polymerase chain reaction (PCR), a cornerstone technique in molecular biology, has seen various advancements, establishing it as an essential method in diagnostic settings for recognizing genetic abnormalities. PCR-based approaches have transformed the diagnostic process by amplifying trace amounts of DNA, allowing for the identification of mutations linked to a wide range of inherited conditions. This review explores the role of biotechnology in diagnostic labs, emphasizing genetic disease detection through molecular procedures. Special attention is given to innovations in PCR, highlighting new PCR-based techniques such as digital PCR, multiplex PCR, and reverse-transcription PCR, which have improved sensitivity and versatility. Additionally, various PCR methodologies, their diagnostic applications, and inherent limitations are discussed. The role of molecular tools in identifying diseases such as cancer, hereditary disorders, and infectious infections is also explored. The review further outlines the evolution of PCR technologies, their integration into molecular diagnostics, and their potential to improve diagnostic accuracy and enable early disease detection. Ongoing advancements in PCR technologies are transforming diagnostic practices by enabling more accurate, faster, and widely accessible molecular testing. These innovations promise enhanced disease management and better clinical outcomes, heralding a new era in healthcare.

Tripathy P, Kulkarni H, Kalla S.

Exploration of multifaceted domain of advanced membrane separation processes for wastewater treatment and desalination - A review.

Desalination. 2025;614:33.

https://doi.org/10.1016/j.desal.2025.119133

Wastewater treatment is a crucial component of water resource management, essential for ensuring water availability for reuse and protecting both environmental health and human well-being. The rise in the volume of modern-day wastewater, often containing critical pollutants, and lack of advancements in treatment processes leads to the discharge of untreated or poorly treated wastewater into freshwater sources. While conventional treatment methods offer some effectiveness, they fall short in producing high-quality treated water and addressing key challenges associated with it for domestic and industrial applications. This has intensified the demand for advanced separation techniques to handle current wastewater management issues. Among these, membrane technology has garnered significant attention for its ability to remove organic contaminants, toxic substances, and other low-concentration nutrients. So, this review aims to emphasize the importance of advanced wastewater separation techniques, particularly their role in enhancing treatment efficiency and resource recovery. It mainly evaluates the performance of integrated and hybrid separation technologies for wastewater treatment with respect to membrane technology. The idea of this paper is to summarize the evolution in conventional membrane technology by discussing the integration of different membrane techniques with one another or with various advanced oxidation processes (AOPs) for membrane performance enhancement, including their fouling and wetting mitigation strategies. Additionally, the review explores the application of novel nanocomposites in membrane technology, assessing their effectiveness and potential for addressing major drawbacks associated with membrane separation process during wastewater treatment. The paper concludes with a discussion on future research directions in this evolving field.

Wang JJ, Meng XC, Fu L, Ding JX, Li JX, Wang L, et al.

Implantable and wearable triboelectric nanogenerators as a novel platform for biomedical antibacterial applications.

Mater Today. 2025;87:378-402.

https://doi.org/10.1016/j.mattod.2025.05.005

Bacterial infections and antibiotic resistance pose escalating threats to global public health. Consequently, there is a critical need for novel antibacterial strategies and materials that circumvent bacterial resistance. Among emerging solutions, triboelectric nanogenerators (TENGs) have attracted significant attention as a promising physical antibacterial technology due to their efficient self-powered capability, flexible design, and broad applicability. Despite significant progress in applying TENG-based electrical stimulation (ES) in antibacterial applications, challenges persist in fully understanding its antibacterial mechanisms and enhancing its efficiency. This review comprehensively presents the latest advancements in implantable and wearable TENGs for biomedical antibacterial applications. It examines the antibacterial mechanisms of TENG-based ES, summarizes current strategies for enhancing the antibacterial performance of TENGs through integration with other technologies, and explores their applications in wound healing, deep tissue and implant-associated infections, wearable electronic devices, and personal protective equipment. Finally, the review highlights the key challenges in biomedical antibacterial applications and discusses potential solutions, offering valuable insights for future development and innovation.

Wang ZK, Qiu QH, Ding XB.

Long-term antimicrobial polyionene-modified PAN nanofibrous membranes via one-pot electrospinning and self-crosslinking for bioprotective applications.

Process Saf Environ Protect. 2025;201:15.

https://doi.org/10.1016/j.psep.2025.107542

Microbial infections pose a significant challenge to public health. Traditional personal protective equipment (PPE) often lacks effective antimicrobial activity, potentially leading to secondary transmission and environmental contamination through discarded materials. Herein, we developed durable antimicrobial nanofibrous membranes by one-pot electrospinning of silane-functionalized polyionene-modified polyacrylonitrile (PAN), with in situ self-crosslinking during fiber formation. The polyionenes, synthesized through copolymerization of silane-containing monomers, exhibited antimicrobial efficacy against both bacteria and fungi (minimum inhibitory concentrations of 0.5-128 mu g/mL) while exhibiting excellent mammalian cell selectivity. The resulting membranes demonstrated contact-killing antimicrobial effects without leaching, ensuring long-term durability and biological safety. When incorporated as an intermediate filter layer in protective masks, they demonstrated 97.88 % filtration efficiency and obvious antimicrobial activity, highlighting their potential as personal protective applications.

Xu P, Zhao CX, Li SX, Li SX, Li AF, Zhao J, et al.

Gene editing tools promote the development of chloroplast gene engineering.

Curr Plant Biol. 2025;44:13.

https://doi.org/10.1016/j.cpb.2025.100540

Plant genetic engineering serves as a crucial technology in enhancing crop quality, promoting pharmaceutical product biosynthesis, and changing agricultural practices. While conventional nuclear transgenic systems demonstrate generally stable and efficient transgene expression profiles, infrequent but persistent technical challenges-including gene silencing as well as low or unstable expression-continue to hinder precise genetic manipulation of nuclear genomes. Since the characteristics of maternal inheritance of plastid genome, chloroplast transformation circumvents this limitation and the risk of transgenic ecological pollution is greatly reduced. Although chloroplast gene engineering (CGE) has some unique advantages, it also has its own disadvantages, including low-efficiency transformation, a limited ability to target organelles, and a low number of species that can transform chloroplast genomes. Over the past few years, the establishment of several novel gene editing technologies has offered beneficial tools to solve these issues. This review explores advanced CGE tools (transcription activator-like effector nucleases, clustered regularly interspaced short palindromic repeats/CRISPRassociated systems, base editors, and prime editors) for sustainable agriculture, focusing on crop yield improvement, accelerated breeding of resistant varieties, enhanced stress tolerance, and optimized growth traits. Additionally, we thoroughly discuss the current challenges in CGE as well as its potential and future development. Moreover, new technologies and tools, such as nanotechnology, designer pentatricopeptide repeat proteins, and aptamers, are also considered with the aim of improving gene targeting and expression levels in CGE, which could potentially promote advances in CGE and extend its utility for different applications. Challenges in implementation and regulatory considerations are also discussed.

Zhang HY, Wu YZ, Liu D, Feng SR, Xuan XX, Dong GH, et al.

Insights into microalgal biotechnology: Current applications, key challenges, and future prospects.

Journal of environmental management. 2025;394:15.

https://doi.org/10.1016/j.jenvman.2025.127263

Microalgae have emerged as multifunctional biofactories capable of simultaneously supporting carbon capture, renewable energy production, environmental remediation, and the synthesis of high value bioproducts. Despite this promise, large-scale deployment remains limited by techno-economic barriers, particularly the high costs of biomass harvesting and dewatering. Recent advances including bioflocculation, magnetic separation, and solarassisted drying are helping to reduce energy inputs and enhance feasibility. In parallel, breakthroughs in synthetic biology, such as CRISPR/Cas genome editing, are enabling the development of engineered strains with enhanced lipid, carbohydrate, and hydrogen productivity. Innovations in photobioreactor design have further improved light-use efficiency, reduced contamination risks, and supported high-density cultivation. Life cycle assessments indicate that integrating microalgal systems with flue gas utilization and wastewater treatment can substantially lower freshwater use and greenhouse gas emissions. To unlock the full potential of this technology, future efforts should prioritize modular biorefinery systems, intelligent process control, and supportive policy frameworks that incentivise negative-emission technologies. These integrated strategies can help position microalgae as a key enabler of a sustainable, circular bioeconomy.

Zhang R, Tan SF, Wang Y, Wu JX, Zhang C.

Hydrogels incorporating active compounds from traditional Chinese medicine for diabetic wound healing: mechanistic pathways and bioengineering progress.

Front Cell Dev Biol. 2025;13:20.

<Go to ISI>://WOS:001576195600001

Diabetic wounds, especially foot ulcers, pose significant clinical challenges due to persistent inflammation, oxidative stress, impaired angiogenesis, and a high risk of infection. Advanced therapeutic strategies are needed to actively modulate the wound microenvironment. Hydrogels incorporating bioactive compounds derived from Traditional Chinese Medicine (TCM), such as curcumin, baicalein, glycyrrhetinic acid, Astragalus polysaccharides, and Ganoderma lucidum polysaccharides, offer a promising integrative approach. These hydrogels combine the biological activities of TCM compounds with the advantages of a moist, biocompatible wound dressing. This review highlights recent advancement (2020-2025) in TCM-based hydrogels for diabetic wound healing focusing on the design of these materials (e.g., curcumin, baicalein, glycyrrhetinic acid, Astragalus and Ganoderma polysaccharides) and the development of stimuli-responsive delivery systems (e.g., pH, enzymes, temperature, glucose and possibly magnetic/electric fields). TCM-derived compounds can not only form or reinforce hydrogel networks but also impart therapeutic functions by modulating key cellular pathways involved in anti-inflammatory (NF-kappa B) and antioxidant responses (Nrf2/HO-1), angiogenesis (VEGF, PI3K/Akt), and tissue regeneration (TGF-beta/Smad). Challenges in translating TCM-based hydrogles into clinical use, such as pharmacokinetic variability and stability of the active compounds, are also discussed. Furthermore, representative studies are critically compared to elucidate how different TCM-hydrogel systems enchance wound healing outcomes by improving tissue regeneration, accelerating wound closure, and combating infection through responsive release and localized delivery mechanism. TCM-based hydrogels offer a novel, multi-functional platforms to diabetic wounds. They represent a novel paradigm in chronic wound management. Continued interdisciplinary research and clinical translation of these integrative biomaterials could significantly advance precision regenerative therapy for diabetic patients.

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The treatment of type 1 diabetes is entering a transformative era. Teplizumab, the first immunotherapy treatment to delay the onset of clinical type 1 diabetes, has been approved by the US Food and Drug Administration. Other immunebased therapies show promise in preserving f3-cell function. Public health screening using islet autoantibodies is expanding, enabling earlier diagnosis, reducing diabetic ketoacidosis, and allowing timely introduction of diseasemodifying treatments before the need for insulin therapy. f3-cell replacement is shifting from traditional transplantation of organ donor islets and the pancreas to stem cell-derived f3 cells. Bioengineering methods, such as encapsulation, and gene editing to create hypoimmune cells could reduce the need for immunosuppression that has hampered f3-cell replacement, and patient-derived stem cells open doors to personalised therapies. Although these innovations have been made available to a small number of patients, scaling them to widespread use remains a challenge. Meanwhile, glucose regulation is improving through the use of automated insulin delivery systems that combine glucose monitoring with insulin pumps. New-generation insulins (those that are ultrarapid, ultralong, and glucose-responsive) improve outcomes by minimising blood sugar fluctuations. Together, these breakthroughs offer renewed hope for improving long-term management and quality of life for people living with type 1 diabetes.

Organismes français et internationaux - Actualités

Suivi d'organismes français et internationaux. Sélection d'actualités classées par thème.

- **Candidozyma auris (ex Candida auris)**

ECDC, Drug-resistant fungus Candidozyma auris confirmed to spread rapidly in European hospitals: ECDC calls for urgent action, 11/09/2025.

- **DASRI**

BO Ministère des affaires sociales, Note d'information n° DGOS/RI2/DGS/EA1/2025/58 du 2 juillet 2025 visant à informer les établissements de santé de la publication du guide sur l'élimination des déchets d'activités de soins, « Tome 1 : Les déchets d'activités de soins à risques infectieux », 07/2025.

- **Fit-test**

HSE (UK), Face fit testing : clarification on the use of extended ports, 21/10/2025.

- **Généralités**

OIT, Convention sur la prévention et la protection contre les dangers biologiques dans les milieux de travail, 06/2025.

- **Laboratoire**

HSE (UK), Risk of exposure of laboratory staff to biological agents due to missing clinical information. Safety notice, 07/11/2025.

- **Maladies infectieuses (hors zoonoses)**

INSERM, Traquer les virus émergents, 23/10/2025.

Santé Publique France,

Port du masque, lavage des mains et aération des pièces : cet hiver, retrouvons le réflexe des gestes barrières, campagne de prévention, 27/10/2025.

Coqueluche : une année 2024 marquée par une recrudescence des cas très importante, 13/10/2025.

ECDC,

ECDC recommends vaccinating without delay due to early flu circulation, 20/11/2025.

Detection of wild poliovirus in wastewater in Germany: risk and recommendations, 13/11/2025.

Chan J, Levine C, Herstein J, Cloutier N, Sauer L, Mehta A, et al.

Preparedness and Response Considerations for High-Consequence Infectious Disease.

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- ## Piqures d'hyménoptères

ANSES, Piqûres de guêpes, frelons et abeilles : quel bilan depuis 2014 ?, 17/07/2025.

- ## Toxoplasmose

INSERM, Toxoplasmose : un tandem de biomarqueurs pour diagnostiquer les infections chroniques, 11/09/2025.

- ## Zoonoses

ANSES,

Influenza aviaire : les risques pour la santé humaine et les mesures de prévention, 27/11/2025.

Dengue, chikungunya, Zika : quelle efficacité des lâchers de moustiques pour prévenir les épidémies ?, 18/09/2025.

Zoonoses : des projets du programme Prezode se penchent sur les transmissions par les moustiques et les rongeurs, 05/09/2025.

Encéphalite à tiques : renforcer la surveillance pour améliorer la prévention de la maladie, 08/07/2025.

Santé Publique France,

Encéphalites à tiques en France, amélioration de la situation par la surveillance obligatoire, 08/2025.

Épidémie du virus Oropouche : quels risques pour les Antilles françaises et la Guyane ?, 23/06/2025.

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Widespread avian influenza in birds increases risk of human exposure, 25/11/2025.

Mpox worldwide overview, 30/10/2025.

New ECDC weekly reports and guidance to tackle mosquito-borne diseases across Europe, 01/07/2025.

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