

ECCMID 2023



Review of the 33rd European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) 2023

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This year, the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) celebrated their 40th birthday by bringing together over 15,000 experts in Copenhagen, Denmark, for their 33rd European Congress of Clinical Microbiology and Infectious Diseases (ECCMID).

At the opening ceremony, Annelies Zinkernagel, ESCMID president, looked back on how the field of microbiology and infectious diseases has changed since the start of the society. While 40 years ago, mortality from infectious diseases was decreasing thanks to sanitation, water, antibiotics, vaccinations, and the public health system, mortality started to increase again in the 1980s. Since then, the HIV epidemic has taken its toll, the antimicrobial resistance pandemic has continued to grow, and diseases such as polio, Ebola, Zika, and most recently mpox have emerged and re-emerged. Additionally, the COVID-19 pandemic has changed the world, bringing a shift in public awareness and perception of infectious threats. This has given ESCMID a great opportunity and responsibility, which is why a plan was created to tackle this. First, by leading the way in guiding the practice, education, and training of specialists in clinical microbiology and infectious diseases globally; second, by preparing for and rapidly responding to emerging infections; and, finally, by driving forward the response to antimicrobial resistance.

“To lead the fight against infections, we must think and act globally,” stated Zinkernagel. Due to globalisation, antimicrobial resistance and emerging infections can now spread around the world, and a global approach is crucial to fight them. While ESCMID is a European organisation, their mission is to be a diverse and inclusive society, to fight infections irrespective of continental borders, and to empower their experts through state-of-the-art knowledge, education, guidelines, and training.

ECCMID is based around three core strategic pillars: scientific content, education and professional development, and experience and engagement. Going forward, the society pledges to achieve these by maintaining a hybrid approach to the congress and continuing to improve it; releasing year-round content; enhancing scientific topics of interest; highlighting ESCMID strategic priorities; engaging under-represented groups and developing hands-on and immersive experiences; and personalising the ECCMID experience.

“To lead the fight against infections, we must think and act globally.”



This year's programme was dominated by topics such as viral/bacterial infection and disease, as well as new antibacterial agents, with COVID-19 taking a step back. In total, over 6,000 abstracts were submitted, with the top categories covering a range of subjects, including severe sepsis, bacteraemia, and endocarditis; hospital epidemiology, transmission, surveillance, and screening; and molecular diagnostics. With 148 sessions and 54 integrated symposia, the congress brought together 725 speakers and chairs from 67 different countries.

The opening ceremony concluded with the presentation of multiple awards. First, The ESCMID Young Investigator Award in Clinical Microbiology was awarded to Anne Wyllie, Yale School of Medicine, New Haven, Connecticut, USA, for their work on saliva as a reliable sample type for sustainable surveillance and outbreak response efforts; and Oliver Van Hecke, University of Oxford, UK, for their work entitled 'Smooth seas do not make skilful sailors: the challenges and opportunities of antimicrobial stewardship in South African primary healthcare'.

Two ESCMID Young Investigator Awards in Infectious Diseases were also awarded to Belén Gutiérrez-Gutiérrez, Universidad de Sevilla, Spain, for their research on personalised medicine in infections caused by multidrug-resistant Gram-negative bacteria; and Jacob Bodilsen, Aalborg University, Denmark, for their research titled 'Head over heels: how I fell in love with CNS infections'. Finally, the ESCMID Excellence Award in Science was presented to Gunnar Kahlmeter, European Committee on Antimicrobial Susceptibility Testing (EUCAST) Development Laboratory Växjö, Sweden.

The team was delighted to be a part of this congress and are looking forward to the next congress, which will be held 27th–30th April 2024 in Barcelona, Spain. This *EMJ Microbiology & Infectious Diseases* issue includes summaries of the most pertinent ECCMID press releases and abstracts presented at the congress, as well as an interview with ESCMID Young Investigator Award recipient Anne Wyllie. Read on for more insights from this year's congress. ●

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Virtual Ward Safe to Treat Patients with Mpox

VIRTUAL wards can be used to safely treat patients with mpox, formerly known as monkeypox, eliminating the need for admission to a hospital, according to data presented at ECCMID 2023. The viral infection that had previously circulated in animals in West and Central Africa has led to a global outbreak in 2022. While mpox was classed as a high consequence infectious disease, involving a need for admission in a specialised unit, this classification was based on case fatality data from Africa, transmissibility, and the absence of vaccines or effective treatment. As the number of cases has grown in London, UK, it has become clear that mortality rates are lower than previously reported. Furthermore, the rapidly increasing number of cases has overwhelmed specialist units.

The Hospital for Tropical Diseases and Central and North West London NHS Foundation Trust, UK, has created a virtual ward, allowing patients with mpox to be treated at home. Care involved regular assessments by phone, including a review of symptoms, mental wellbeing, and isolation circumstances, as well as monitoring of changes in rash through photographs. The patients could contact their caregivers via a dedicated advice line and prescription medication was delivered to their home.

Emily Shaw, Hospital for Tropical Diseases, University College London Hospitals NHS Foundation Trust, UK, evaluated case notes of 221 patients diagnosed with mpox between May and August 2022. In total, 191 were managed as outpatients in a virtual ward, of whom 60 received treatments for their symptoms and painkillers, and 35 received antibiotics following infections occurring as a complication of mpox. Admission was needed for 30 patients, most commonly for soft tissue infections requiring intravenous antibiotic therapy. Admissions were generally short, and most patients completed the rest of their treatment on a virtual ward. The median time spent on a virtual ward was 10 days, and telephone assessment and photographs were used to determine when patients could be discharged from the virtual ward.

It is estimated that the virtual ward saved 2,100 hospital bed days, equating to a cost saving of approximately 1.05 million GBP. Shaw concluded: "We demonstrate that a virtual ward can be rapidly established to respond to emerging health threats and the majority of individuals with mpox can be safely managed virtually." ●

"Care involved regular assessments by phone, including a review of symptoms, mental wellbeing, and isolation circumstances."

Effectiveness of Mask-Wearing Questionable Against COVID-19 Transmission

SURGICAL masks have been integral to the infection control measures implemented globally to combat coronavirus transmission. A study conducted in a London, UK, hospital during the first 10 months of Omicron activity has brought forward interesting evidence that questions how effective this was; this research was presented at ECCMID 2023 in Copenhagen, Denmark, between 15th–18th April.

Investigating the risk-benefit of mask-wearing, as the severity of infection with COVID-19 decreased with time, researchers of St George's Hospital NHS Foundation Trust, UK, collected data over a 40-week period from 4th December 2021 to 10th September 2022. This period analysed the phase where the Omicron variant was dominant and presents data from before and after the UK National Health Service (NHS) lifted the mask mandate for all staff and visitors. During the first phase, from 4th December 2021 to 1st June 2022, all staff and visitors were required to wear masks in all areas of the hospital. Then in Phase II, from 2nd June 2022 to 10th September 2022, this policy was removed (except for some high-risk intensive care wards). Hospital severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection rate was adjusted by underlying community infection rate identified by routine admission screening.

The analysis discovered that the community surge in infections in June 2022, after the removal of the mask policy, was not associated with a statistically significant change in rate of hospital-acquired SARS-CoV-2 infection in the

study group. The infection rate was no higher than the rate when masks were obligatory. There was also no delayed effect observed in Weeks 26–40 of the study period. The same was found in a control group, who continued to wear masks, experiencing no immediate or delayed change in infection rates.

The lead author, Ben Patterson, St George's University Hospitals NHS Foundation Trust, stated: "Our study found no evidence that mandatory masking of staff impacts the rate of hospital SARS-CoV-2 infection with the omicron variant." Patterson went on to add the disclaimer: "That does not mean masks are worthless against Omicron, but their real-world benefit in isolation appears to be, at best, modest in a healthcare setting." Limitations were acknowledged: the observational design of this study prevented the researchers from proving causation. Additionally, staff adherence to the mask-wearing policy was not assessed and staff infection rates were not determined.

Senior author, Aodhan Breathnach, St George's University Hospitals NHS Foundation Trust, highlighted the usefulness of these findings moving forwards: "We hope this empirical evidence can help inform a rational and proportionate mask policy in health services." These results will certainly influence hospitals and national governing bodies moving forwards, as they put together and enforce their policies for protective equipment in this new phase of the COVID-19 pandemic. ●



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Metagenomic Sequencing Betters Conventional Tests to Detect Antimicrobial Resistance

ANTIMICROBIAL resistance is a significant challenge when treating bloodstream infections. Bloodstream infections can rapidly lead to sepsis, multiple organ failure, and even death. Hence, the early and appropriate antibiotic therapy is essential for managing the infection. In clinical settings, the current method used to identify the pathogen causing the infection is time-consuming and laborious. Contrastingly, clinical metagenomics sequences all the genetic material, including infectious pathogens in a sample all at once; therefore, this would reduce time spent running tests, waiting for results, and running more tests.

At this year's ECCMID annual meeting, study lead, Kumeren Govender, John Radcliffe Hospital, University of Oxford, UK, revealed that metagenomic sequencing can generate fast and actionable antimicrobial resistance predictions to treat bloodstream infections much faster than conventional laboratory tests, highlighting the potential to save lives and better manage antibiotic usage. The researchers randomly selected 210 positive and 61 negative blood culture specimens for metagenomic sequencing from the Oxford University Hospital's (OUH) microbiology laboratory between December 2020 and October 2022, the Oxford Nanopore GridION platform was used to sequence the DNA. They used sequences to identify the species

of pathogen causing infections, and to spot common species that can contaminate blood cultures.

Sequencing identified 99% of infecting pathogens, including polymicrobial infections and contaminants, and gave negative results in 100% of culture negative samples. In some cases, sequencing identified probable causes of infection missed by routine cultures, and in some other instances detected uncultivable species where a result could not be ascertained. Sequencing could be utilised to detect antibiotic resistance in ten of the most common causes of infections. A total of 741 resistant and 4,047 sensitive combinations of antibiotics and pathogens were studied. The results of traditional culture-based testing and sequencing agreed 92% of the time, and similar performance could be obtained from raw reads after only two hours of sequencing; overall agreement was 90%.

The authors stated this is an exciting breakthrough as it can diagnose the cause of patients' infections faster and more completely than has been possible before. The researchers are attempting to overcome the remaining barriers to metagenomic sequencing being used more widely, which includes the high cost, improving accuracy, and creating improved laboratory expertise in these new technologies and simpler workflows for interpreting results. ●

"Metagenomic sequencing can generate fast and actionable antimicrobial resistance predictions."

Omicron May Be More Deadly than Seasonal Influenza

BREAKING research presented at ECCMID 2023 in Copenhagen, Denmark, suggests the Omicron variant of severe acute respiratory syndrome coronavirus 2 is associated with a higher death rate than those hospitalised with seasonal influenza. Despite previous research suggesting that Omicron is less virulent than the Delta and alpha strains, Alaa Atamna and colleagues, Rabin Medical Center, Belinison Hospital, Israel, found that adults hospitalised with influenza were 55% less likely to die within 30 days than those hospitalised with Omicron during the 2021–2022 influenza season.

In December 2021, influenza re-emerged in Israel after being undetected since March 2020. Concurrently, Omicron had been established as the predominant COVID-19 variant, substituting Delta. Therefore, the research team sought to investigate clinical outcomes in patients hospitalised with the Omicron variant and those hospitalised with influenza. Patients hospitalised with laboratory confirmed COVID-19 (167 patients; average age: 71 years; 58% male) and influenza infection (221 patients; average age: 65 years; 41% male) between December 2021 and January 2022 were included in the study.

Within 30 days, 63 patients died. Of these, 19 (9%) had been admitted with influenza while 44 (26%) had been admitted with Omicron. Furthermore, patients with Omicron tended to have higher overall comorbidity scores, were more likely to have high blood pressure and diabetes, and were more likely to require mechanical ventilation and more assistance with activities and daily tasks such as washing and dressing. However, asthma was more common in those hospitalised with influenza.

Atamna, Rabin Medical Center, Belinison Hospital, commented: "A possible reason for the higher Omicron death rate is that patients admitted with Omicron were older with additional major underlying illnesses such as diabetes and chronic kidney disease." They added that "the difference might also be due to an exaggerated immune response in COVID-19, and that vaccination against COVID-19 was far lower among patients with Omicron." Atamna summarised that there is one basic step people can take to alter the trajectory of both the influenza and COVID-19 pandemics: getting vaccinated, especially if you are older and have underlying illnesses. ●

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Dutch Study Suggests that Influenza Can Trigger Heart Attacks

INFLUENZA and heart attacks have previously been linked in a 2018 Canadian study investigating individuals hospitalised for heart attacks. However, the Canadian study did not incorporate information from death records; hence, out-of-hospital deaths from heart attacks were not included.

At ECCMID 2023 in Copenhagen, Denmark, Athenarijn de Boer, University Medical Center (UMC) Utrecht, the Netherlands, presented a study revealing that individuals who are diagnosed with influenza are six times more likely to have a heart attack in the week after they test positive for the influenza virus than they are in the year before or afterwards. De Boer and colleagues used test results from 16 laboratories across the Netherlands, covering approximately 40% of the population, along with death and hospital records, to provide a more comprehensive understanding.

The researchers revealed that, between 2008 and 2019, 26,221 cases of influenza were confirmed by the laboratories, where 401 individuals had at least one heart attack within 1 year of their influenza diagnosis. Out of the total 419 heart attacks, 25 were within the first 7 days of flu diagnosis, 217 were in the year before diagnosis, and 177 were in the year after influenza diagnosis but did not have a heart attack in the first 7 days. Within a year of being diagnosed with influenza, 139 out of the 401 individuals died of any cause.

The study population were 6.16 times more likely to have a heart attack in the 7 days following an influenza diagnosis than in the year before or after. The Canadian study had a figure of 6.05. However, when excluding data from death records, as in the Canadian study, the increase in heart attack in the first week reduced to 2.42 times, thereby demonstrating the impact that incomplete data can have on results.

"Out of the total 419 heart attacks, 25 were within the first 7 days of flu diagnosis."

The differences in testing practices between the two countries may explain the weaker association found in the Canadian study, as testing for influenza in out-of-hospital settings is less common in the Netherlands than in Canada. Nonetheless, the association is still prominent, and by utilising similar methodology to the Canadian authors, the researchers have been able to corroborate that the increased risk applies across different populations. Additionally, the findings highlight the significance of vaccination, as well as awareness of heart attack symptoms among flu patients and those treating them. ●

Finding New Approaches to Treat Amyotrophic Lateral Sclerosis

FAECAL microbiota transplantation could be used as to alter gut microbiota in patients with amyotrophic lateral sclerosis (ALS), according to research presented at the ECCMID 2023 annual meeting.

ALS is the most common motor neurone disease, where motor neurones in the spinal cord and brain degenerate, leading to paralysis, physical disability, and death. It is difficult to treat because it is inherited in 5–10% of cases but 'sporadic' in 90%, where the cause is unknown.

Gut microbiota composition could be linked to many neurological disorders through the gut–brain axis, with specific microbiota activating pro-inflammatory pathways after losing T cell numbers and suppressing function. This could have therapeutic benefits to patients with ALS.

Researchers allocated patients with ALS who had symptoms for more than 18 months into faecal microbiota transplantation (n=28) or placebo (n=14) groups in a randomised trial. Patients will be infused with gut microbes at the start of the study and Month 6. Stool, saliva, and blood samples will be collected on procedure days to investigate how the transplant affects gut microbiota, immune cells, and inflammatory status.

Researchers will also take three intestinal biopsies from both groups: at the start of the study, at 6 months, and at 12 months. The primary outcome is a significant change in T cell numbers between the groups at 6 months.

"Anyone can develop ALS, regardless of race or socioeconomic background."

The profile of gut microbiome in six patients at the start of the study showed a much higher relative abundance of *Proteobacteria*. This can activate the immune system, alerting the body to illness and triggering the release of molecules that cause inflammation.

Anyone can develop ALS, regardless of race or socioeconomic background. Author Luca Masucci, Catholic University of the Sacred Heart, Rome, Italy, stated: "With this information, we could potentially provide new approaches for treatments by altering or interfering with these inflammatory pathways. We hope to have all our data from this trial to analyse in 2024." ●





COVID-19 Vaccines Saved Over 1 Million Lives Since the End of 2020

NOVEL research presented at this year's ECCMID annual meeting shared evidence that COVID-19 vaccination directly saved at least 1,004,927 lives from December 2020 to March 2023. Of the lives saved, 95% were in adults aged 60 and older. The new estimates come from the World Health Organization (WHO) and Margaux Meslé, Epidemiologist, WHO, who underlined the huge impact of these vaccines and the need for countries with lower vaccination rates to focus on vaccinating older populations.

Following the emergence of severe acute respiratory syndrome coronavirus 2 in early 2020, countries in the WHO European Region introduced COVID-19 vaccine programmes to protect populations from the disease, especially focusing on the severe impact on vulnerable groups. Researchers analysed the weekly reported deaths alongside the reported number

of doses in 26 European countries between December 2020 and March 2023.

The results of this analysis showed that most lives saved were people aged 60 and older (up to 96%); these groups were identified during the pandemic as being most vulnerable to severe disease. The results also demonstrated that the largest number of lives were saved during the Omicron wave when at least 568,064 deaths were prevented. This equates to over half of all the deaths prevented by COVID-19 vaccination. "We see from our research, the large numbers of lives saved by COVID-19 vaccines across Europe during the pandemic," stated Richard Pebody, Head of High Threat Pathogen Team, WHO. "However, too many people in vulnerable groups across the WHO European Region remain unvaccinated or partially vaccinated. We urge people who are eligible and who have not yet taken the vaccine to do so." ●

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Study Reveals How Gut Microbiota Changes in Infants

AN ITALIAN study has revealed how gut microbiota alters in the first few months of an infant's life. Researchers at the Universities of Genoa and Florence, Italy, and the San Jacopo Hospital, Pistoia, Italy, tracked changes in the gut microbiota in the first 3 years of life. They released the primary data covering the first 0–3 months of life at the 2023 ECCMID annual meeting in Copenhagen, Denmark.

Primary research from the CI.EMME study demonstrates that from birth, the intestinal tract becomes colonised by many species of bacteria, protozoa, fungi, and viruses. Collectively, these are known as the gut microbiota. In an infant, this microbiota grows and alters in the first few months of life. If the gut microbiota is disrupted from normal growth, it is more likely that the individual will develop health conditions in future, such as Type 1 diabetes, inflammatory bowel disease, and asthma.

Researchers examined stool samples collected from 165 infants at delivery (T0); following hospital discharge (T1, within 2–3 days of birth), or at later stages in those who required intensive care (T2); and at 3 months of age (T3). These samples were stored until processing. In total, 495 samples were collected; of these, 370 were processed and analysed (T0=71; T1=136; T2=13; T3=150). Using genetic profiling, researchers

were able to detect a greater number of bacterial species in the T0 cohort than in the T1/T2 or T3 cohort. This suggests that the gut microbiome evolves rapidly in the first 3 months of life.

Marked changes over time were detected in some species of bacteria, including *Lactobacillaceae* (T0), *Staphylococcaceae* (T1), and *Bifidobacteriaceae* (T3). A higher proportion of infants born via caesarean section than vaginal delivery had *Bifidobacteriaceae* in their stool samples at Stage T0 and T3. Other factors were examined, such as breastfeeding and weight at birth, but the time of stool sample collection had the biggest link to bacterial diversity (T0, T1, and T3).

Lead study author Vincenzo Di Pilato, University of Genoa, stated the importance of this research: "Given that the development of the gut microbiota is fundamental to health later in life, it is vital to learn all we can about how this collection of microbes matures." Di Pilato went on to conclude: "A better knowledge of how the gut microbiota develops from being nearly sterile at birth towards a diverse healthy ecosystem later in life would us to identify unhealthy, or dysbiotic, microbiota. We might then be able to 'correct' the bacterial imbalance, and so increase the odds of good health later in life." ●

"From birth, the intestinal tract becomes colonised by many species of bacteria, protozoa, fungi, and viruses."

