

# VACCIREVIEW



## **The Meningitis and Encephalitis Registry of Lower Saxony, Germany (MERIN) – design and main results of circulating neurotropic pathogen surveillance, 2003 to 2023**

### **Bibliography**

Wollenweber ML, Beyrer K, Baillot A, et al. The Meningitis and Encephalitis Registry of Lower Saxony, Germany (MERIN) – design and main results of circulating neurotropic pathogen surveillance, 2003 to 2023. *Euro Surveill.* 2026;31(6):31(6):2500625.

### **Summary**

This surveillance article describes the design, operation, and 21-year results of the Meningitis and Encephalitis Registry of Lower Saxony (MERIN), a passive, voluntary surveillance system covering Lower Saxony and, since 2011, Bremen, with a combined population just under 9 million. Established in 2003 after statutory notification for aseptic meningitis ended, MERIN offers free, broad laboratory diagnostics for hospitalized patients with aseptic meningitis, encephalitis, or polio-like symptoms, aiming to characterize circulating neurotropic pathogens and support polio surveillance.

Between 2003 and 2023, 13,813 patients (34,688 specimens) were investigated; 54.6% were male and 78.6% were younger than 15 years, with nearly three quarters of children under 10 and almost half under 5, reflecting the strong pediatric burden of central nervous system infections. Most patients were treated in pediatric wards. Cerebrospinal fluid made up 37.6% of specimens, blood/serum 33.8%, and stool 25.0%, with throat swabs and urine rarely submitted.

In 30.2% of patients, at least one causative pathogen was identified; in 69.8%, no pathogen was found, consistent with literature indicating that the etiology of many cases remains unexplained despite extensive testing. Among pathogen-positive patients (n=4,172), non-polio enteroviruses (NPEVs) predominated, accounting for 56.9% of diagnoses and occurring in 17.2% of all patients. *Borrelia burgdorferi sensu lato* (24.1% of pathogen-positive patients), adenovirus (6.9%), and varicella-zoster virus (4.6%) were also frequent, whereas herpes simplex virus was detected in only 1.2% of all investigated patients. Tick-borne encephalitis virus and measles virus were rare, in line with local epidemiology and vaccination.

NPEV subtyping was successful in 54.8% of NPEV infections. Most typable isolates belonged to enterovirus B; 27 genotypes were identified, with echovirus 30, echovirus 6, and coxsackievirus B5 being most common. The system captured known national echovirus 30 and echovirus 6 waves, demonstrating that MERIN mirrors broader German genotype circulation. Enterovirus C and D, including enterovirus D68, were rarely or not detected, and poliovirus was not found, supporting documentation of polio-free status.

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Annually, MERIN examined roughly 600 and 900 patients after scale-up, with peaks in 2008, 2011, 2013, and 2016. Pathogen detection proportions varied by year, with high yields in known outbreak years. A Poisson regression with harmonic terms showed clear summer seasonality in overall pathogens and NPEVs, with marked June–September peaks. During 2020–2021, both detected pathogens and NPEVs declined and seasonal patterns flattened, consistent with reduced circulation under COVID-19 non-pharmaceutical interventions, while submission numbers fell less, suggesting high physician acceptance of MERIN.

The authors acknowledge limitations including voluntary participation, lack of strict case definition, possible selection bias, incomplete clinical feedback, and dependence on the offered diagnostic panel, but conclude that MERIN provides timely individual diagnostics, delineates the spectrum and seasonality of central nervous system pathogens, and serves as an alternative polio surveillance approach in a polio-free setting.

## Comment

This long-term, laboratory-based surveillance effort is commendable for sustaining a robust platform over two decades in a disease area that is comparatively rare but often severe and life-altering, particularly for the predominantly pediatric patient population. By systematically characterizing meningitis, encephalitis, and polio-like diseases, the authors underscore that low incidence does not equate to low public health relevance when lifelong neurological sequelae are possible. An important added value of this work is that many documented pathogens are, in principle, vaccine-preventable, including mumps, tick-borne encephalitis, varicella, and adenovirus, while others such as *Borrelia burgdorferi* are active targets of vaccine development. For non-polio enteroviruses, the detailed subtype information generated here illustrates both the current diagnostic strength and the need for even more granular genotype-specific data as future vaccines or other targeted interventions are considered. Overall, this study deserves praise for linking high-quality clinical surveillance with clear implications for vaccination and pathogen-specific prevention strategies.

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