Interquartile range for procalcitonin was 0.04–0.08 ng/ml (median 0.05 ng/ml); with this in mind, it is worth noting that a procalcitonin level of ≥0.06 ng/ml only provides a positive LR of 2.06.

In using LRs in the context of clinical practice, Bayes’ theorem is a very helpful tool to assist in the understanding of diagnostic processing. It is most clearly expressed in the form:

\[
\text{Posterior Odds} = \text{LR} \times \text{Prior Odds}
\]

This formula emphasises that the interpretation of the significance of any new information should depend on our
**The end of the road for the campaign against MMR**

‘If the MMR vaccine was not the cause of my son’s autism, then why has he got traces of measles virus in his bowels? This was the question put to me 5 years ago by one of the parents involved in the litigation against the manufacturers of the MMR vaccine. He was a passionate supporter of the campaign led by the former Royal Free researcher Andrew Wakefield who first suggested a link between MMR and autism. The claim, made in 2002 by a team led by Dublin pathologist John O’Leary, that measles virus RNA had been detected in gut biopsies of children with autism, appeared to provide powerful vindication for Wakefield’s hypothesis that a distinctive inflammatory bowel condition — dubbed ‘autistic enterocolitis’ — was the mediating link between MMR and autism.

Testimony in a US court last month by London-based molecular biologist Stephen Bustin (a world authority on PCR testing) exposed the unreliability of O’Leary’s findings. Although this is good news for parents, Bustin’s testimony was yet another blow for the anti-vaccine campaigners as Andrew Wakefield returns from his private clinic in Texas to face charges of professional misconduct at the General Medical Council. The hearings in the US mark the culmination of two parallel anti-vaccine campaigns. In the UK, parents of more than 1400 children were drawn into litigation against MMR, which collapsed in 2004 when the Legal Services Commission realised that, in the absence of scientific evidence, the claim had no chance of succeeding. Meanwhile in the US, campaigners blame the mercury-based preservative thiomersal in some vaccines for the apparent increase in the prevalence of autism. The facts that the prevalence of autism has continued to rise after the removal of thiomersal from vaccines and that MMR has never contained thiomersal have not deterred campaigners from trying to link mercury and MMR in the causation of autism, through a series of speculative and improbable pathways.

The court in Washington heard the first test case (of a total of 4800), that of 12-year-old Michelle Cedillo whose parents believe, partly on the strength of results from O’Leary’s lab, that the combination of vaccines containing thiomersal with MMR at 16 months rendered her autistic. Unfortunately for the anti-vaccine campaigners there was no real contest — in terms of personal expertise or scientific substance — between the expert witnesses put forward in support of the vaccine-autism theory and those challenging this hypothesis. The evidence of videos revealing Michelle’s autistic features long before she received MMR was particularly persuasive. In his investigation of the O’Leary lab, Stephen Bustin discovered problems at every step of the PCR process. His conclusions were categorical: ‘the assay used was not specific for measles and it was not properly carried out.’ The positive results were positive for DNA — confirming contamination, because ‘if it’s DNA it can’t be measles’ (measles is an RNA virus). For Bustin it was ‘a scientific certainty’ that the O’Leary lab had failed reliably to identify measles virus RNA in Michelle or any other child. Bustin’s devastating testimony effectively destroyed the only piece of positive evidence that has been produced in support of the MMR-autism thesis since it was launched nearly a decade ago.

Bustin’s revelations follow a series of studies, using the most rigorous techniques, which have failed to replicate O’Leary’s results, while other researchers have disputed the existence of ‘autistic enterocolitis’ as a distinctive disease entity. All these results are reassuring to parents of autistic children, whose anxieties have been needlessly provoked by the Wakefield campaign. Parents facing decisions about immunisation can also be reassured that the MMR autism scare has been shown to have no basis in science.

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**REFERENCES**

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