make the evidence-based recommendation to not prescribe chest x-rays or antibiotics to well vaccinated preschool children with mild disease, seem reasonable and could be generalised to other high-income countries.

Another reason to prescribe antibiotics is to avoid complications. The much higher prescription frequency in Turkish patients with upper respiratory tract infections than in the other participating European centres[1] could be explained in part by high incidence of rheumatic fever in Turkey.[7] In countries where rheumatic fever is rare, treating a sore throat with antibiotics aims to reduce the duration of symptoms by about 16 h overall, and the number to treat to avoid one suppurative complication such as otitis media is about 200.[8] The expected effect of immediate antibiotic treatment in children with acute otitis media is to reduce the duration of symptoms but the number to treat to avoid one complication of invasive disease is still unclear.[9]

In the era of emerging multidrug-resistant bacteria, safely and reasonably minimising antibiotic prescriptions for respiratory tract infections should rely on appropriate risk stratification of patients. Rules on clinical decision should be implemented that consider signs of sepsis, probability of bacterial infection (eventually with the help of point-of-care tests such as measuring procalcitonin and host response biomarkers or multiplex PCR),[10–13] and the expected benefit of treating a bacterial infection versus the potential harms.

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EL is the scientific director of a study aiming to validate a clinical decision rule using point-of-care procalcitonin testing to detect severe bacterial infection in children presenting with fever at emergency departments. This study has begun in Nov 1, 2018, and is funded by a public national grant PHRC-17-0354. CGLG is the main investigator in the same study.

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Maternal pertussis immunisation as the first infant dose

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We read with great interest the Article by Daan Barug and colleagues[1] on maternal pertussis immunisation combined with a delayed (at age 3 months instead of 2 months) and reduced (two doses instead of three doses) primary infant vaccination schedule, using acellular pertussis vaccines. The trial explores the possibility of adding maternal pertussis immunisation to the vaccination schedule as, in effect, a first infant dose, with a view of reducing the blunting effect of the infant immune response by maternal antibodies. When revising the infant schedule, the main concern is whether a decent enough coverage of maternal vaccination to protect all infants from birth can be achieved.

The effectiveness of the maternal pertussis immunisation strategy has already been shown;[2,3] however, infants' immune response to primary vaccination is blunted regardless of different infant vaccination

schedules.[4–6] Yet this blunting effect has generated no clear clinical consequences for protection.[7]

The main reason for delaying the first infant pertussis vaccine dose would therefore be to reduce this blunting effect. The results of Barug and colleagues[1] still confirm an interference effect when the first dose is delayed and primary vaccination doses are reduced, yet substantial antibody titres are achieved after the booster dose. The study confirms that the strategy proposed is feasible. This adapted infant vaccination schedule increases not only the infant humoral immune response, which is more robust at older age,[8] but would also reduce vaccine costs by replacing an infant dose with a maternal dose and cutting down the number of doses in the infant vaccination schedule. This strategy creates opportunities for the introduction of new vaccines without overloading national immunisation schedules. Therefore, this study[1] will not only be informative for countries that are considering adding a maternal vaccination dose to their schedule, but also for countries that have already implemented the strategy or want to add other vaccines to their national infant immunisation schedule (eg, varicella vaccine, meningococcal vaccine, or influenza vaccine).

Overall, infant vaccination schedules with two doses in early infancy followed by one booster dose are already implemented in several countries, such as France, Denmark, and Italy.[9] The control group in the present study has similar immune responses compared with the historical comparator, suggesting that the 2+1 schedule at the studied timepoints confers comparable humoral immune responses as a 3+1 schedule, whenever no maternal Tdap is administered.[9] In the control group, infants had low antibody concentrations by the time the first dose of the delayed schedule was administered at age 3 months.

In countries such as the USA, where pertussis is endemic, coverage of the recommended maternal pertussis immunisation has risen sharply in recent years, but remains at 49·1%.[10] In other high-income countries with a substantial burden of pertussis disease, such as Australia, the UK, and Belgium (Flanders), where national campaigns were organised with a good response of both health-care workers and the target population, coverage is as high as 70%.[11–13] Even in these countries, introduction of a delayed infant pertussis immunisation schedule would place neonates of unvaccinated women in a more vulnerable situation, and maternal coverage still needs to be higher to protect all babies from pertussis from the first day of their life. The authors[1] stress that individualised medicine might be necessary for prematurely born infants and infants of women who are not vaccinated, but this is not feasible in many public health settings.

Therefore, whenever coverage of maternal pertussis vaccination is expected not to be high enough, authorities should invest in additional research on alternative vaccination strategies or investigate the possible barriers to acceptance by health-care workers and the target population before introducing this combined maternal–infant vaccination schedule with delayed infant vaccination at the start of life.

The study by Barug and colleagues[1] only addresses vaccination schedules using acellular pertussis vaccines. The situation is completely different in low-income and middle-income countries when whole-cell pertussis vaccines are used. Blunting effects in relation to delayed schedules and reduction in the number of doses should therefore be even more cautiously monitored in those countries.

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Will dual Japanese encephalitis and measles-rubella vaccination hinder measles and rubella eradication?

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In *The Lancet Infectious Diseases*, Yan Li and colleagues[1] present a multicentre randomised controlled trial to assess whether live-attenuated Japanese encephalitis vaccine (LJEV) impairs measles and rubella antibody responses to coadministered measles-rubella vaccine. China's National Immunisation Programme has recommended dual LJEV and measles-rubella vaccination at 8 months of age since 2008 but there are no data on interference between these two vaccines. The major international effort to eliminate measles from all six WHO regions by 2020 requires high levels of vaccine coverage and herd immunity,[2] and thus interference with measles antibody responses would be problematic. The authors' demonstration of non-inferiority in prevalence of seroconversion for measles IgG antibodies (difference –0·8% [90% CI –2·6 to 1·1]) alleviates these concerns.

This finding is perhaps not surprising given that previous studies have shown that LJEV does not interfere with antibody responses to single measles vaccination.[3,4] One caveat is that many countries use the measles-mumps-rubella (MMR) vaccine rather than measles-rubella vaccine and indeed China's National Immunisation Advisory Committee has recently recommended using this vaccine rather than measles-rubella vaccine. A previous study confirmed absence of interference between the MMR vaccine and another Japanese encephalitis vaccine—the live-attenuated chimeric vaccine[5]—and one would predict that the MMR vaccine responses would be similarly unaffected by LJEV.

WHO recommends commencing measles vaccination at 9 months of age and considers additional doses before 9 months as supplementary.[6] The high measles seropositivity (almost 99%) achieved in both groups confirms that administering the first measles-containing vaccine (MCV) at 8 months of age is an acceptable strategy in this population, and can be considered the first dose of MCV rather than a supplementary dose.[6] Many countries have included rubella-containing vaccines in their childhood national immunisation programmes in an effort to eliminate the potentially devastating effects of rubella infection in pregnancy;[2] thus, non-interference with rubella antibody responses (difference 0·8% [90% CI –1·8 to 3·4]) is also an important finding in Li and colleagues' study.[1]

Japanese encephalitis is the leading cause of viral encephalitis in Asia, there is no effective treatment, and neurological sequelae and mortality are very high.[7] The widespread rollout of Japanese encephalitis vaccination in endemic countries is crucial for prevention. The effect of measles-rubella vaccine on LJEV antibody responses was not tested in this study; however, non-interference has been confirmed in previous studies.[8] This finding further supports administration of Japanese encephalitis vaccine and an MCV in a single visit, which offers the benefits of being more cost effective and likely to improve vaccination coverage against these important infections than if multiple visits are required. Reassuringly, in this study, active monitoring for adverse events following immunisation (AEFIs) did not detect any serious adverse events and there was no signal that the dual vaccinated infants had more AEFIs after being coadministered the two live vaccines than did infants who were administered measles-rubella vaccine alone.

The large cohort in Li and colleagues' study of 1093 infants from two provinces in China was well powered to assess their primary outcome. Cohort characteristics including infant gestational age, birth weight, infant sex, breastfeeding, maternal age, maternal measles and rubella infection, and vaccination history