tion in Europe were based on this type of modeling analysis.[10] The models suggest that maintaining the proportion susceptible in each age group below these levels will be sufficient to achieve measles elimination.

The susceptibility targets provide the logical basis for the elimination strategy. Assessing compliance with these targets does not necessarily require comprehensive serological surveillance. In cohorts with little exposure to infection, the proportion remaining susceptible can be estimated from vaccine efficacy and coverage data. For example, if vaccine efficacy is 90%, 10% of children will remain unprotected after 1 dose of vaccine. If the second dose has similar efficacy in those who do not respond to the first dose, only 1% of children will remain unprotected after 2 doses of vaccine. The proportion of children protected can be assessed if the proportions of children who have received 0, 1, or 2 doses of vaccine are known (Table). If vaccine efficacy is 90%, the 5% susceptibility target cannot be achieved using a single dose of vaccine. Moreover, as the proportion unvaccinated increases from 0% to 4%, the proportion of the cohort that needs to be vaccinated twice to achieve the 5% susceptibility target increases from 56% to 96%. If more than 4% remain unvaccinated, the 5% susceptibility target cannot be achieved; attaining high coverage with one dose of vaccine remains a priority.

CONCLUSIONS

Models are not a substitute for effective surveillance, but they can help to make best use of available data and identify areas for improved data collection. They act as a focus for interpreting data from different sources to improve understanding of disease epidemiology. This may lead to an investigation of vaccination strategy options, yielding predictions for effectiveness and cost-effectiveness analyses. A quantitative understanding of the factors affecting disease transmission enables the setting of targets for vaccination programs and underpins disease elimination initiatives.

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Antibiotic Prophylaxis in Critically Ill Patients

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Investigators from the Mario Negri Institute for Pharmacological Research in Milan, Italy, conducted a meta-analysis to determine whether antibiotic prophylaxis reduces respiratory tract infections and overall mortality in unselected critically ill adult patients. The study used randomized, controlled trials from 1984 and 1996. Subjects were unselected critically ill adult patients: 5,727 patients for aggregate data meta-analysis and 4,343 for confirmatory meta-analysis with data from individual patients. The main outcomes measured were respiratory tract infections and total mortality. Two categories of eligible trials were defined: topical plus systemic antibiotics versus no treatment and topical preparation with or without a systemic antibiotic versus a systemic agent or placebo.

Estimates from aggregate-data meta-analysis of 16 trials (3361 patients) that tested combined treatment indicated a strong reduction in infection (odds ratio [OR], 0.35; 95% confidence interval [CI_{95}], 0.29-0.41) and total mortality (OR, 0.80; CI_{95}, 0.69-0.93). With this treatment, 5 and 23 patients would need to be treated to prevent 1 infection and 1 death, respectively. Similar analysis of 17 trials (2,366 patients) that tested only topical antibiotics indicated a clear reduction in infection (OR, 0.56; CI_{95}, 0.46-0.68) without a significant effect on total mortality (OR, 1.01; CI_{95}, 0.84-1.22). Analysis of data from individual patients yielded similar results. No significant differences in treatment effect by major subgroups of patients emerged from the analyses.

The authors concluded that this meta-analysis of 15 years of clinical research suggests that antibiotic prophylaxis with a combination of topical and systemic drugs can reduce respiratory tract infections and overall mortality in critically ill patients.

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