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Estimation of measles susceptibility in population of Slovakia: The cohort model

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Recently, thanks to immunization, no cases of measles have been reported in Slovakia. Information on the immune status of the population is important to prevent possible re-emergence of the disease. However, the last nationwide immunological survey in Slovakia was carried out in 2002. This work estimates current (2014) measles susceptibility in individual age groups using mathematic modeling. The analysis is based on administrative data on vaccination coverage, the immunological survey from 2002 and demographic data on age structure of the Slovak population. The cohort model considered changes since 2002: new single dose vaccinated cohorts (born 2000-2012) and cohorts vaccinated with the second dose (born 1989-2002). In other cohorts, immunity naturally partially waned and the proportion of cohorts with more effective post-infection immunity (naturally infected) declined. In 2002, there were approximately 241,000 susceptible individuals (approximately 4.5% of the population) in Slovakia. Most of them, besides children aged below one year and yet not vaccinated, were aged 17-34. In 2014, there were approximately 383,000 susceptible individuals (approximately 7.1% of the population), mostly non-vaccinated children up to one year and adults aged 30-45 years. These adults constituted the most prevalent susceptible cohort. The increased proportion of susceptible population is partially attributable to natural waning of the immunity in vaccinated individuals without natural contact with the disease. Therefore, in a potential epidemic outbreak, alongside the unvaccinated, 30-45 year old individuals (cohort born 1969-1984) will be the most endangered. Although the mathematic modeling, due to its limitations, cannot fully substitute the immunological survey, the estimations can sufficiently identify the endangered population cohorts to adjust the vaccination policy appropriately.

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Biography

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