

## VAC.22 - Duration of immunogenicity after 17-DD yellow fever vaccine in adults and children

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**Introduction:** According to the WHO, one dose of the yellow fever vaccine (YFV) is sufficient to provide lifelong protection. Available scientific evidence to recommend against booster doses was inconclusive and WHO recommendations raised controversy. Recently, studies to estimate seropositivity rates (SP) and geometric mean titers (GMT) after vaccination of adults and children, with varied times of vaccination, have provided elements to revise the discontinuation of booster doses.

**Objective:** To analyze the results of studies about persistence of immunity after the 17DD-YFV, conducted in Brazilian adults and children.

**Methodology:** The review is based on cross-sectional studies designed to estimate and compare the SP and GMT (IU/mL) of neutralizing antibodies against YF obtained by plaque reduction neutralization test across categories of time after YF vaccination, age groups and vaccine schedules.

**Results:** A study in adults who had received one dose of YFV, showed SP and GMT decreasing with time since vaccination: 93% (88%–96%), 8.8 (7.0–10.9) in newly vaccinated; 94% (88%–97%), 3.0 (2.5–3.6) after 1-4 years; 83% (74%–90%), 2.2 (1.7–2.8) after 5–9 years; 76% (68%–83%), 1.7 (1.4–2.0) after 10–11 years; 85% (80%–90%), 2.1 (1.7–2.5), for  $\geq 12$  years.

For another study in adults who had received two or more doses of YFV, SP and GMT according to time since the second YFV were: 100% (96%–100%), 406.6\* for subgroup 30-45 days subgroup; 90% (83%–95%), 162.0\* for 1-5 year subgroup; 86% (77%–92%), 162.3 for 6-9 years subgroup and 86% (57%–98%), 160.4\* for 10+ years subgroup. \* $p < 0.001$ .

A study in children aged 9 months to 12 years, vaccinated with one dose of YFV in the first two years of life, categorized into six groups according to time since vaccination showed that SP and GMT decreased with time since vaccination: 86,7% (80.5%–91.4%), GMT 47.9 (38.3–59.9) for the 0-6-months group; 76,4% (68.5%–83.2%), GMT 33.2 (25.9–42.5) after 1 year; 71,3% (62.9%–78.7%), GMT 25.0 (20.0–31.2) after 2 years; 59,0% (49.7%–67.8%), GMT 14.8 (11.6–19.1) about 4 years after vaccination; 42,2% (33.8%–51.0%), GMT 8.6 (7.1–12.1) for 7 years group; 46,0% (37.1%–55.1%), GMT 20.2 (18.3–22.3) for approximately 10 years post-vaccination.

**Conclusion:** Available scientific evidence of waning immunity from yellow fever vaccination indicate the potential for primary and secondary vaccine failures, particularly in epidemic and epizootic situations. These studies support the need of booster doses of the YFV to maintain antibody levels consistent with protection, and indicate that a small proportion of individuals may need more than two doses. Nevertheless, scientific evidence on the need for booster doses of YFV needs to be reconciled with epidemiological (outbreaks and epizootics), logistic (vaccine availability) and programmatic (prioritizing primary vaccination to maximize vaccine coverage) aspects.

**Keywords:** Yellow fever vaccine; Immunogenicity; Vaccination policy