In order to estimate the size of the population of infants at risk for rotavirus infection in Egypt, and how changes in morbidity and mortality influence government fiscal transfers. Costs are expressed in Egyptian Pounds (EGP; € = 7EGP). The model is constructed using Egyptian life tables, rotavirus related and unrelated health care costs, economic earnings adjusted for age and social parameters. The model compares vaccinated and unvaccinated cohorts against rotavirus using discounted net tax revenues (gross taxes—transfers). RESULTS: Based on variations in rotavirus vaccine price, the model predicts health service savings mostly attributable to averting rotavirus treatment costs that could be achieved within 3-5 years and reaching EGP178 million obtained at year-5. The discounted net tax revenue between vaccinated and unvaccinated cohorts was EGP2.5 billion and EGP27.3 billion at year 25 and 50, respectively. Investing in rotavirus vaccination represented a 15% rate of return for government at year-50. Long-term government net tax revenues were insensitive to investment in health care programs. Investing in rotavirus vaccination could deliver early cost-offsets associated with reduced health care expenditure. It could increase future government net tax revenue attributed to lives saved.

RESULTS:

CONCLUSIONS:

Develop a mathematical model simulating the clinical and economic impact of different cervical cancer screening options for German females alongside HPV vaccination. METHODS: We developed a discrete event simulation (DES) model, describing the natural history of cervical cancer and genital warts for five categories of HPV types (HPV 16, 18, 45, 6, 11), other high risk and other low risk. To fit German epidemiological data, we manually calibrated model parameters for natural history to match a number of calibration targets including genital warts incidence by age, cervical cancer incidence and mortality by age, prevalence of HPV type by age, and distribution of HPV types by disease stage. The model also calibrates against prevalence of CIN by age as reported in previous HPV disease models. The fit of model outputs to calibration targets was represented by a calibration score computed using normalized residuals weighted by the quality of the available data (e.g., prioritizing epidemiological data over model results). Our model employs lognormal distributions for time to progression and two-piece exponential distributions for time to regression, enabling us to simulate the long separation in peak times between HPV infection, cervical cancer precursors and cancer incidence. RESULTS: Predicted type-specific HPV prevalence and disease incidence are close to epidemiological data. HPV prevalence differed from reported prevalence by ±1.55% for each 5 year age group for HPV 16, 18, and other high risk HPV. The model predicted genital warts incidence of 159 per 100,000 (target: 167), cervical cancer incidence of 17.7 per 100,000 (target: 13.5), cervical cancer mortality incidence of 4.3 per 100,000 (target: 4.1), and agreed well with incidence age distributions. CONCLUSIONS: We developed an individual-based, fully calibrated model that is ready for cost-effectiveness analysis of cervical cancer vaccination and screening strategies. Time-to-event distributions, an inherent feature of DES, facilitate realistic modelling of disease progression.