

# A Social Network model for the development of vaccination strategies against meningitis C

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## Abstract

*Neisseria meningitidis* is a major cause of morbidity and mortality during childhood in industrialized countries and has been responsible for epidemics in Africa and in Asia. Approximately 2500 to 3500 cases of *N. meningitidis* infection occur annually in the United States, with a case rate of about 1 in 100000. Children younger than 5 years are at greatest risk, followed by teenagers of high school age. After the development of the the meningococcal serogroup C conjugate (MCC) vaccine at the end of 1999 in the United Kingdom, the bacteria has been partially controlled in developed countries. However, the vaccine only provides a high level of direct protection over a limited number of years and it is known that its effect disappears before puberty.

This situation poses a public health problem of paramount importance because the meningitis infection and serogroup C carriage is expected to be still similar to that of the period before the vaccination, specially in the adolescents population. Recently, a prevalence and carriage study has been performed by the Centro Superior de Investigación Salud Pública (CSISP) in the framework of a project which involves the IMM. We have used this data to statistically analyse the protection decay for the MCC vaccine. This data allows the implementation of a social network model for the propagation of the disease in the Valentian Community in a distributed computing environment.

With this model we are able to optimize an early puberty vaccination and other strategies to control the spread of the meningococcal C disease among the young population.

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