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Measles immunity and measles vaccine acceptance among healthcare workers in Paris, France

R. Freund [a], A. Krivine [b], V. Prévost [c], D. Cantin [d], E. Aslangul [e], M.-F. Avril [f], Y.-E. Claessens [g], F. Rozenberg [b], A. Casetta [h], M.-T. Baixench [h], V. Dumaine [i], O. Launay [a], P. Loulergue [a,*]

[a] *Université Paris-Descartes, Inserm, CIC BT505, Assistance Publique-Hôpitaux de Paris, CIC de Vaccinologie Cochin Pasteur, Paris, France*
[b] *Department of Virology, Groupe Hospitalier Cochin–Broca–Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*
[c] *Service de Gynécologie-Obstétrique, Groupe Hospitalier Cochin–Broca–Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*
[d] *Service d'Accueil des Urgences, Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*
[e] *Service de Médecine Interne, Hôtel-Dieu, AP-HP, Université Paris Descartes, Paris, France*
[f] *Service de Dermatologie, Groupe Hospitalier Cochin–Broca–Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*
[g] *Service d'Accueil des Urgences, Hôpital Cochin, AP-HP, Université Paris Descartes, Paris, France*
[h] *Equipe opérationnelle d'Hygiène, Groupe Hospitalier Cochin–Broca–Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*
[i] *Service d'Orthopédie, Groupe Hospitalier Cochin–Broca–Hôtel Dieu, AP-HP, Université Paris Descartes, Paris, France*

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SUMMARY

Background: In Europe, including France, a measles outbreak has been ongoing since 2008. Unprotected healthcare workers (HCWs) may contract and spread the infection to patients.

Aim: The objective of this study was to evaluate HCWs' measles immunity and vaccine acceptance in our setting.

Methods: In a survey-based study conducted in three university hospitals in Paris, 351 HCWs were included between April and June 2011. The following data were collected at enrolment: age, hospital unit, occupation, history of measles infection and vaccination, previous measles serology and acceptance of a measles vaccination in case of seronegativity. Sera were tested for the presence of specific anti-measles IgG antibodies using the CAPTIA® measles enzyme-linked immunosorbent assay.

Findings: The mean age of the participating HCWs was 36 years (range: 18–67) and 278 (79.2%) were female. In all, 104 four persons (29.6%) declared a history of measles, and 90 (25.6%) declared never having received a measles vaccination. Among the 351 HCWs included in the study, 322 (91.7%) were immunized against measles (IgG >90 mIU/mL). The risk factors for not being protected were age [18–29 years, adjusted odds ratio: 2.7 (95% confidence interval: 1.1–6.9) compared with ≥30 years], no history of measles infection

* Corresponding author. Address: CIC de Vaccinologie Cochin–Pasteur, Groupe Hospitalier Cochin–Hôtel Dieu–Broca, 27 rue du Faubourg Saint Jacques, 75014 Paris, France. Tel.: +33 1 5841 2860; fax: +33 1 5841 2910.
E-mail address: pierre.loulergue@cch.aphp.fr (P. Loulergue).

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or vaccination. The global acceptance rate for a measles vaccination, before knowing their results, was 78.6%.

Conclusion: In this cohort of HCWs, 8.3% were susceptible to measles; the group most represented were aged <30 years. Acceptance of the measles vaccine was high. A vaccination campaign in healthcare settings should target specifically healthcare students and junior HCWs.

Introduction

Measles is a highly contagious acute viral illness, with as many as 75–90% of susceptible contacts becoming infected.[1] It can lead to serious complications (e.g. pneumonia or encephalitis) and death. Persons at risk of developing severe forms of measles are children aged <1 year and immunocompromised patients.[1] Measles remains one of the leading causes of death among young children worldwide, despite the availability of a safe and effective vaccine since 1971.[2]

The World Health Organization (WHO) gives a very high priority to measles elimination.[3] Moreover, eliminating measles is a goal that all European countries are committed to meet by 2015.[4] However, in April 2011, the European Centre for Disease Prevention and Control reported a rapid increase of measles cases in 24 European countries, including France: 2817 cases in 2007; 4499 in 2008; 7175 in 2009; 30,367 in 2010.[5–7] The French outbreak has been ongoing since 2008 (40 declared cases in 2007; 604 in 2008; 1544 in 2009; 5075 in 2010), is currently the largest in Europe, and has not yet peaked.[2,8,9] Indeed, the number of reported cases from January to December 2011 in France was 15,000 including 16 cases of measles encephalitis, a complication that often results in permanent neurological sequelae, 650 cases of severe measles pneumonia, and six measles-related deaths.[9]

Vaccination is the only reliable protection against measles. Rates of measles seroconversion after vaccination are around 90% after a single dose and 99% after two doses.[10,11] WHO recommends ≥95% uptake of the first dose of a measles-containing vaccine for elimination of the infection in a population.[4] Indeed, in the USA measles has been almost eradicated since the late 1990s and likely in the rest of the Americas since the early 2000s by achieving >90% vaccine coverage.[12] Maintenance of high two-dose measles–mumps–rubella (MMR) vaccination coverage is therefore the most critical factor for sustaining elimination.

In France, the measles vaccine was introduced in a childhood immunization schedule in 1983. Current guidelines recommend two doses of a measles-containing vaccine: one at 12 months and the second between 13 and 24 months of age.[13] However, vaccine coverage by at least one dose, by the age of 2 years, remained at 83–87% between 1997 and 2005.[14] The latest statistics show a slight increase to 90% in 2007, though there are important variations across regions.[15] Unlike historical epidemics, a higher frequency in infants (9%) and in individuals aged ≥20 years (38%) has been noted in this measles outbreak.[16] Young adults born in the 1980s are the most at-risk persons, because they may not have been vaccinated or have acquired natural serological protection, justifying one catch-up dose for people born after 1980.[13]

In France, the percentage of hospitalized measles cases increased from 18% ($N = 110$) in 2008 to 27% ($N = 422$) in 2009 and to 34% ($N = 879$) in 2010.[8] In 2010, more than 50 probable nosocomial cases have been reported in France.[13] Young non-vaccinated adults, especially healthcare workers (HCWs), are at high risk of measles exposure. Indeed, HCWs had a 19-fold higher risk of developing measles than the general population.[17] Moreover, infected HCWs may in turn transmit measles virus to susceptible patients, co-workers, and family members. Hence, HCWs working in hospital units caring for high-risk patients are considered as a priority for vaccination, justifying one dose for HCWs without a history of measles born before 1980 and two doses for those born after 1980.[13]

HCWs are known to have a low acceptance rate for vaccination, especially for influenza.[18–20] Moreover, French HCWs are not sufficiently aware of the recommended occupational vaccines required, especially for measles.[21] To our knowledge, there are no published data on measles vaccine acceptance among HCWs.

The objectives of this study were to evaluate the seroprotection level against measles and to analyse determinants of measles vaccine acceptance in a population of HCWs.

Methods

Participants

The annual 2011 European Immunization Week, from 23 to 30 April 2011, gave us an opportunity to promote measles immunization among HCWs.[2] Between 27 April and 30 June 2011, all HCWs covering the most at-risk wards for transmission of measles virus (i.e. emergency department, internal medicine, dermatology, and maternity) in our hospital settings (Cochin, Hôtel-Dieu and Tarnier Hospitals, Paris, France) were invited to participate in the study. HCWs aged ≥18 years, speaking and understanding French, were eligible to participate.

Procedures

A leaflet explaining the reason for testing measles immunity and a standardized, anonymous, self-administered questionnaire recording: sex, date of birth, hospital unit, occupation, history of measles infection, history of measles vaccination (number of doses and dates) and acceptance of a measles vaccination in case of a lack of protection were distributed to the wards. Written informed consent was obtained from each participant before enrolment.

A 5 mL blood sample was taken from each participant to measure IgG antibody levels with the CAPTIA® anti-measles test (Trinity Biotech, Jamestown, NY, USA). Serology was declared positive when the IgG level was >90 mIU/mL, negative at <60 mIU/mL, and equivocal between 60 and 90 mIU/mL.

The hospital units were defined as maternity (i.e. maternity, neonatology, gynaecology), emergency department (i.e.