Incidence of tuberculosis among nurses and healthcare assistants in France

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Background
Health care workers (HCWs) are considered to be at higher risk of tuberculosis (TB) than the general population. However, a decreasing incidence in the general population as well as improvement in preventive measures in hospitals has reduced the risk for HCWs.

Aims
To quantify the actual incidence of TB in nurses and health care assistants in a low-incidence country.

Methods
We performed a retrospective study of 80 hospitals throughout France, employing 233,389 health care staff (physicians excluded). We calculated the number of pulmonary TB cases over 3 years (700,166 person-years) and the total number of staff members in each job category (nurses, health care assistants, administrative staff) in each hospital, to calculate the incidence.

Results
Overall, the incidence rate varied between 1.27 and 6/100,000 for administrative staff and nurses, respectively (non-significant difference). The incidence varied according to the geographical area. However, the incidence in nurses and health care assistants was not different from the general population (7.5/100,000).

Conclusions
In a low-incidence country, such as France, the implementation of measures to prevent occupational TB among HCWs has been effective. These preventive measures should be maintained but medical follow-up could be revised.

Key words
France; health care staff; incidence; tuberculosis.

Introduction
Several studies and reviews published in the last decade have shown that the risk of tuberculosis (TB) is two to three times higher for health care workers (HCWs) than the general population in the same age range, especially for nurses and health care assistants [1–5]. In the 1990s, the annual incidence of TB in HCWs in low-incidence countries was estimated to range between 40 and 134/100,000 (mean: 67/100,000) [5]. However, wide implementation of guidelines to prevent the transmission of TB in health care settings has led to a substantial decrease in the risk for HCWs [6]. To quantify this, we performed a study in the occupational health care departments of hospitals throughout France to assess the actual incidence rate of TB in health care staff.

Methods
In 2014, we sent a questionnaire to 226 occupational physicians (OPs) in 89 occupational health care departments in public hospitals in France, as reported earlier [7]. We requested the following data: the number of new cases of confirmed pulmonary TB among HCW (excepting physicians) and non-clinical workers in each hospital in the years 2010, 2011 and 2012; their job when they were diagnosed and the total number of staff members in each job category (nurses, health care assistants, administrative staff) in the hospital, to calculate incidence. Since the Paris area has a higher incidence of TB in its general population than any other region in France, we analysed the incidence of TB among hospital staff for the Paris area and other regions separately. We excluded physicians from the investigation and the number of cases of TB in this population was not used to compute the incidence rate.

Statistical analysis included Pearson χ² test with the α risk set at 5% and calculation of proportions with 95%
confidence intervals. All statistical analyses were conducted with the STATA software program, version 9.0 (StataCorp LP, College Station, TX, USA).

**Results**

We collected data from 80 hospitals, each of them employing between 566 and 11 799 workers (physicians excluded), making a total of 233 389 workers (75 339 in the Paris area), including 66 695 nurses, 56 098 health care assistants and 26 166 administrative staff (Tables 1 and 2). During the 3-year period, 28 new cases of TB were observed, 21 of them in nurses and health care assistants. The other cases were administrative staff ($n = 1$), a hospital stretcher-bearer ($n = 1$), cleaning staff ($n = 2$), mortuary staff ($n = 1$) and laboratory technicians ($n = 2$). The annual incidence varied between 0/100 000 for administrative staff outside of the Paris area, to 11.1/100 000 for health care assistants in the Paris area (Tables 1 and 2). Overall, the incidence rate of TB was 5.7/100 000 for nurses and health care assistants and 1.27/100 000 for administrative staff. The difference in incidence between nurses, health care assistants and administrative staff was not statistically significant.

**Discussion**

We observed a much lower incidence of pulmonary TB in nurses and health care assistants than previously reported. Although the incidence of TB was higher in nurses and health care assistants than in hospital administrative staff, the difference was not significant. Furthermore, the incidence was not higher than the incidence of TB in the general population in France, which was, on average, 7.5/100 000 in 2013 [8]. We observed a higher incidence of TB in HCWs in the Paris area, which is the region of France with the highest incidence of TB in the general population (14.7/100 000 in 2013) [8]. Therefore, HCWs in the Paris area have a higher risk of contamination outside of hospital. This was confirmed by the fact that the administrative staff of hospitals in this area had a higher incidence rate of TB than administrative staff in other parts of France, even if they were not exposed in their workplace. Although physicians are also at higher risk of infection, they were excluded from our study because it was nearly impossible to calculate incidence. As many physicians only work a few hours per week in hospital and spend the rest of their time in private practice, it is impossible to assess the actual number of days worked in hospital and to assess where (i.e. private practice or hospital) transmission of infection could have occurred.

One limitation of this study is underreporting. However, it is mandatory in France to report all cases of TB to the public health authorities and the OP has to perform contact tracing in the colleagues of cases of TB. Furthermore, infected HCW must attend a return to work visit with the OP prior to resuming work. We did not investigate private hospitals, since they are not part of the same occupational health system and we have no reliable data on them. However, in 2013, only 16% of nurses and health care assistants were employed in the private sector.

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<th>Table 1. Incidence of pulmonary TB among HCWs in the Paris area and in the rest of France</th>
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<td>Job category</td>
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Physicians excluded.

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<th>Table 2. Incidence of pulmonary TB among HCWs in France overall</th>
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<td>Job category</td>
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Physicians excluded.
Therefore, excluding the private sector was not likely to change our results. Although many studies have demonstrated that latent tuberculosis infection (LTBI) is more frequent in HCWs [4,5], we did not investigate LTBI in our report because diagnosis of LTBI is complex, especially in France where HCWs have multiple BCG vaccinations and because we have little reliable data on the incidence of LTBI in the general population. One reason for the lower incidence of active TB among HCWs could be that they benefit from serial follow-up screening, which is not the case for the general population. However, screening can also lead to increased diagnosis in HCWs with no symptoms of TB disease. The overall effect of screening on incidence is, therefore, difficult to assess.

In conclusion, the incidence of TB in nurses and health care assistants in France does not seem to be higher than in white-collar workers or in the general population. This probably reflects the effectiveness of measures implemented over the last decade to prevent the transmission of TB in the health care setting, as well as an overall decline of TB in the general population. In France, medical follow-up for nurses and health care assistants is still based on serial tuberculin skin test and chest radiographs [9]. This could be revised in view of the low incidence of TB.

Key points
- The incidence of pulmonary tuberculosis in nurses and health care assistants in France was 5.7/100,000.
- This is no different to the incidence in the general population or in hospital administrative staff.
- Medical follow-up of health care workers could be revised.

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Conflicts of interest
All authors report no conflict of interest relevant to this article.

References