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LETTERS TO THE EDITOR

Outbreaks of hepatitis A associated with immigrants travelling to visit friends and relatives
**KEYWORDS**
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We have read with interest the article by Purcell et al.,¹ who reported a cluster of hepatitis A cases in South East England. The investigation of this cluster did not identify any common exposure. In other studies, one of the most frequent reported risk factors is travel to countries with high disease endemicity.² Immigrants often make trips that involve close contact with the local population and an increased risk of exposure to different diseases.² In the last decade, Catalonia has received a large amount of immigrants from low income countries.

Catalonia initiated a program of hepatitis A+B vaccination during 1998–1999 in preadolescents aged 11–12. This program has reduced exposure to the virus and has favoured the accumulation of a susceptible population not covered by the vaccination program.³

We made a descriptive epidemiological study to characterize index cases of hepatitis A outbreaks in Catalonia in 2001–2012 due to person-to-person transmission and to compare index cases in immigrants and indigenous people. Catalonia is an autonomous community in northwest Spain with a population of 7.5 million. The Statistical Institute of Catalonia (IDESCAT) estimates that 15% of the current population comes from other countries.

A hepatitis A outbreak was defined as ≥ 2 associated cases with at least one microbiologically confirmed by determination of IgM antibodies. The index case of the outbreak was defined as the first case with onset of symptoms and/or diagnosed (IgM antibodies) and which, according to the epidemiological methods used, most probably began the transmission. In Catalonia, all suspected epidemic outbreaks must be notified to the epidemiological surveillance units (ESU) whose staff confirmed the outbreak and wrote a report on clinical and epidemiological

characteristics. Index cases were identified by reviewing reports from each outbreak. Data on the index case was collected by ESU staff using a standardized questionnaire.

The variables of the index cases collected were age, sex, country of origin (in the case of children the parents' country of origin), the setting of the outbreak, visiting family, and men who have sex with men. Factors associated with immigrants were studied by calculating the odds ratio (OR) and its 95% confidence intervals (CI). To determine the association between each of the independent variables and immigrant index cases, the adjusted OR (aOR) were calculated using a multivariate unconditional logistic regression model.

Of the 211 index cases studied, 66.2% were male, 37.3% were aged 25–44 years, 33.5% 5–14 years and 16.4% <5 years; 25.6% (54/211) were immigrants. The most frequent countries of origin were Morocco (53.7%; 29/54), Pakistan (9.35; 5/54) and Romania (7.4%; 4/54). Most outbreaks occurred in the family (74.9%; 158/211), school (15.65; 33/211) or community (5.2%; 11/211). Most immigrants (81.5%; 44/54) had made a recent trip (30–60 days before disease onset) compared with only 5.1% (8/157) of indigenous people and, in most cases, the destination corresponded to the country of origin of the index case (Table 1).

The 211 index cases generated 984 secondary cases (mean of 4.7 cases per outbreak, SD = 13.7). Immigrant index cases generated 161 secondary cases (mean of 3 cases per outbreak, SD = 1.5), while indigenous persons generated 823 cases (mean of 5.2 cases, SD = 15.8).

Compared with index cases in indigenous persons, immigrant index cases had a higher proportion of women (OR = 2.2), children aged <5 years (OR = 12.0), persons aged 5–14 years (OR = 45.8) and a history of recent travel (OR = 81.9). Outbreaks occurred most frequently in schools (OR = 7.5) and the home (OR = 8.7) compared to other settings (Table 1).

The variables that maintained an association with immigrant index cases in the logistic regression model were age <5 years (aOR = 19.5), age 5–14 years (aOR = 7.3) and a history of recent travel (aOR = 98.4) (Table 2).

A high percentage of hepatitis A outbreaks were generated by immigrant index cases (25.6%), who were younger, caused outbreaks in the family and school settings and had mostly travelled recently to their countries of origin. These findings are consistent with several studies which highlight a greater risk of imported diseases in travellers visiting friends and relatives in their home countries.²

An immigrant making a recent trip was the most frequent risk factor (25.1%). This percentage is similar to those observed in other countries including Switzerland (27%),⁴ England (25%),⁵ Canada (30%),⁶ Italy (28%),⁷ and

Table 1 Factors associated with immigrant index cases of outbreaks of hepatitis A due to person-to-person transmission in Catalonia (n = 211).

Variables of the index cases of hepatitis A	Total n (%)	Type of index case		OR	95% CI
		Immigrant n (%)	Indigenous n (%)		
Total	211 (100)	54 (25.6)	157 (74.4)		
Age (years) ^a					
0–4	26 (15.5)	7 (26.9)	19 (73.1)	12.0	2.3–62.5
5–14	53 (33.5)	31 (68.5)	22 (41.5)	45.8	10.1–207.2
15–24	12 (7.6)	1 (8.3)	11 (91.7)	2.9	0.2–7.9
>24	67 (42.4)	2 (3.0)	65 (97.0)	1.0	Reference
Sex ^b					
Female	53 (33.8)	19 (35.5)	34 (64.2)	2.2	1.1–4.6
Male	104 (66.2)	21 (20.2)	83 (79.8)	1.0	Reference
Setting of the outbreak					
Family	157 (74.4)	43 (27.4)	114 (72.6)	7.5	1.0–57.9
School	33 (15.6)	10 (30.3)	23 (69.7)	8.7	1.0–74.0
Community/day care	21 (10.0)	1 (4.8)	20 (95.2)	1.0	Reference
Travel to another country					
Yes	52 (24.6)	44 (84.6)	8 (15.4)	81.9	30.4–220.2
No	159 (75.4)	10 (6.3)	149 (93.7)	1.0	Reference
Orientation					
MSM ^c	26 (12.3)	0 (0.0)	26 (100.0)	–	–
Other	185 (87.7)	54 (29.2)	131 (70.8)		

OR, odds ratio; CI, confidence interval.

^a The age was unknown in 53 cases.^b The sex was unknown in 54 cases.^c Men who have sex with men.**Table 2** Factors associated with immigrant index cases of outbreaks of hepatitis A due person-to-person transmission in Catalonia (n = 211) in the multivariate logistic regression model.

Variables of the index cases of hepatitis A	aOR	95% CI
Age (years)		
0–4	19.5	1.5–246.1
5–14	72.9	5.5–962.6
15–24	2.4	0.1–70.7
>24	1.0	Reference
Sex		
Male	2.7	0.6–12.6
Female	1.0	Reference
Setting of the outbreak		
Family	6.5	0.2–277.3
School	2.1	0.1–126.8
Community/day care	1.0	Reference
Travel to another country		
Yes	98.4	17.8–542.6
No	1.0	Reference
Orientation		
MSM ^a	2.4	–
Other	1.0	

aOR, odds ratio adjusted by the other variables in the table; CI, confidence interval.

^a Men who have sex with men.

Germany (43.6%).⁴ Immigrants' trips to their countries of origin generally involve visits outside the tourist circuits, longer stays and close relations with the local population.² This suggests that health systems should improve prevention measures in international travellers, and especially in this population group. Other studies have also indicated that immigrants are less likely to receive the HAV vaccine than other travellers.^{2,8,9} Adult immigrants may be immunized due to prior exposure to hepatitis A in their countries of origin, but children may lack immunity and are especially susceptible during these trips.^{8,9}

Catalonia introduced universal hepatitis A+B vaccination in children aged 11–12 years in the 1998–1999 school year.³ This explains why the 15–24 years age group, which overwhelmingly received the vaccine, presented a much lower proportion of cases than the >5 years and 5–14 years age groups.

The study has some limitations. Some of the index cases may have been erroneously catalogued due to the fact that the real index case was asymptomatic and therefore was not detected. There were missing data for some variables, such as age and sex, and the record of recent trips could have been recorded in more detail in immigrants. However, the same method and questionnaire was used in all cases and it is unlikely that different finding would have been made.

In conclusion, a high percentage of outbreaks of hepatitis A in Catalonia (25%) are generated by immigrants aged <15 years who become infected when travelling to their countries of origin to visit friends and family. We recommend that

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