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SHORT COMMUNICATION

Immunisation coverage among adolescents in a Swiss juvenile correctional facility

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The risk of acquiring vaccine-preventable diseases is higher among incarcerated populations, compared to the general population. Factors associated with this are: history of social precarity/vulnerability, risky behaviours and the baseline prevalence of communicable diseases within these populations (1). Adolescents in juvenile correctional facilities are a particularly vulnerable population in regards to vaccine-preventable diseases. Therefore, vaccination is a key health promotion activity towards adolescent well-being and healthy development, especially for incarcerated youth (2). A juvenile corrections facility environment provides a vaccination window for an at-risk population whose access to healthcare is otherwise limited in the community. This study analysed immunisation data among incarcerated adolescents in Geneva, Switzerland. Our objectives were to examine vaccination coverage and compare these data to a community adolescent population in Geneva.

All adolescents admitted to the 'Clairière' for a consecutive duration of at least three months, between January 2009 and December 2011 were eligible for the study. The Clairière is a juvenile correctional facility for adolescents (ages 12–18 years) awaiting trial or sentenced to an educational placement in detention. All admits undergo an intake history and physical examination at entry. Immunisation records for participants were systematically retrieved by at least one of the following mechanisms: existing vaccination charts in the personal health record, communication with paediatrician and/or by serologic examination (with consent from the adolescent). Some information was also obtained from legal parental guardians, letter was automatically sent to all guardians asking about immunisation records/history.

Immunisation history for the study focused on the following vaccination dose completion: tetanus, diphtheria and pertussis (DTaP), polio (IPV) (for DTaP and IPV, between three and six doses according to age of initial immunisation), measles mumps rubella (MMR) two doses, hepatitis B (HBV) (two or three doses according to vaccination schedule) and Human papilloma virus (HPV)-three doses (3). For those individuals with multiple admissions into the juvenile correctional facility, vaccination history was computed as a tally of their cumulative entry examinations and considered here as a single data point. We also collected socio-demographic data (age, sex, place of origin).

The study was approved by the ethical research committee (CER 12-238-R) from the University Hospitals of Geneva. Informed consent was obtained from all individual participants included in the study.

We used the binomial proportions test and the Wilcoxon two-samples test to compare coverage between incarcerated youth and the general adolescent population. The significance level was set at $p < 0.05$. Statistical analysis was performed using Stata 10.

We compared these results to a sample of community-living adolescents in Geneva, using 2007 vaccine prevalence data from the youth health service/'Service santé Jeunesse' (SSJ) from 2007. Service santé Jeunesse conducted vaccination surveys among 16-year-old students enrolled at secondary schools in the Geneva canton. The SSJ survey methodology regarding students' immunisation history is described elsewhere (4).

For the 36-month study period, 116 eligible adolescents (93 boys and 23 girls) detained for at least 3 months were

enrolled in the study (100% participation rate). Mean age was 15.35 years (SD = 0.11). We can observe that fifty-five percent (63/116) of participants were Swiss, and 45% (53/116) were foreign-born (18 from Southern European countries, two from Eastern Europe, three from the American continents, four from Asia and five from Africa). Of the 116 participants, 36% (IC95%: 27.5–45.3) were vaccinated on schedule (against Tdap, Polio, MMR and HBV), in line with the recommendations from the Swiss Federal office of Public Health (3). Specific immunisation rates are shown in Table 1.

Compared to a community adolescent population in Geneva in 2007 (the SSJ study), these incarcerated adolescents had significantly lower immunisation rates for all vaccines ($p < 0.0001$), except for the HPV vaccine ($p = 0.71$) (Table 1). Furthermore, immunisation rates according to origin were mostly similar. However, Hepatitis B immunisation rates of Swiss-born adolescents (60.3%) were significantly higher than foreign-born adolescents (7.9%) ($p = 0.0001$). There was no statistically significant difference in vaccination rates according to sex (Table 2).

Eighty-nine vaccine injections were administered during detention; 32 adolescents became up-to-date on their vaccines during detention.

There are few studies that examine the vaccine status of adolescents in custodial detention. Similar to our findings, two surveys in North America showed a deficit in

vaccination coverage among incarcerated adolescents. A study from the United States showed that the baseline immunisation coverage of adolescents entering the juvenile justice system was lower than the general adolescent population (5). A Canadian study observed that 73% of adolescents under detention had incomplete immunisations according to Canadian National Advisory Committee on Immunizations; 49% were missing tetanus, diphtheria and acellular pertussis immunisations; 33%, meningococcus; 2%, measles, mumps and rubella; and 37% (55 of 148), hepatitis B. Routine vaccine evaluation and access to medical services in detention increased vaccine coverage from 27% to 65% in this juvenile population (2). Nevertheless the severity of this problem depends on region: a study in Spain showed that only 16.8% of adolescents admitted to a juvenile correctional facility were incompletely immunised (6).

One notable finding was that HBV and HPV immunisation rates were low in the study population (37% and 52%, respectively). This is of increased importance given that incarcerated adolescents have an elevated risk of sexually transmitted infections (7). Gaskin et al. have already demonstrated that immunisation programs in the juvenile justice setting increase coverage rates to levels that are comparable to an adolescent population in the community (5). Thus, vaccination programs for incarcerated adolescents should also focus on 'catch-up' vaccine boosters that prevent sexually transmitted infections.

In terms of limitations, the findings may not be readily generalisable to other settings and/or populations as the study took place at one detention facility in Geneva. It is also possible that vaccination history abstracted from medical records did not reflect true immunisation status. Nevertheless, subsequent efforts were made to systematically corroborate vaccine record information with communication with adolescents' parents and/or their primary care physicians. This study demonstrated significantly lower rates of vaccination coverage among Geneva's incarcerated adolescents, compared to a population of adolescents in the community. Medical service during detention is a health-promoting opportunity for these at-risk youth. Such services include screening examinations that review vaccination records and proactive vaccine administration

Table 1 Vaccine coverage rates for 2009–2011 Clairière adolescents versus 2007 SSJ Geneva study population

	Clairière N = 116			SSJ N = 912			p
	N	%	95 CI%	N	%	95 CI%	
Tdap	42	36.2	27.8–45.2	771	84.5	82.1–86.8	<0.0001
Polio	55	47.4	38.4–56.5	770	84.4	82.1–86.8	<0.0001
MMR	71	61.2	52.1–69.7	768	84.2	81.9–86.7	<0.0001
Hep B	43	37.0	28.6–46.1	561	61.5	58.3–64.6	<0.0001
HPV*	12/23	52.2	32.1–71.7	250/446	56.1	51.4–60.6	0.71

*Administered only to females.

SSJ = Service santé Jeunesse.

Table 2 Vaccine coverage across origin and sex, at Clairière custodial facility in 2009–2011

Vaccination schedule completed	Place of origin			Sex		
	Swiss-born n = 63	Foreign-born n = 53	p	Male n = 93	Female n = 23	p
'DTaP/Tdap'	26/63 (41.2%)	16/53 (30.1%)	0.21	31/93 (33.3%)	11/23 (47.8%)	0.19
Polio	31/63 (49.2%)	24/53 (45.2%)	0.67	41/93 (44.0%)	14/23 (60.8%)	0.15
MMR	39/63 (61.9%)	32/53 (60%)	0.86	57/93 (62.3%)	14/23 (60.8%)	0.97
Hep B	38/63 (60.3%)	5/53 (7.9%)	<0.001	32/93 (34.4%)	11/23 (47.8%)	0.23
HPV*	4/10 (40%)	8/13 (61.5%)	0.49	–	12/23 (52.1%)	
ALL Vaccines	23/63 (36.5%)	14/53 (26.4%)	0.52	31 (33.3%)	11/23 (47.8%)	0.19

*Administered only to females.

MMR = Measles mumps rubella.

('catch-up' the patient to the recommended national schedule). In the long-term, these public health measures not only protect this vulnerable population, but also the community at large.

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CONFLICTS OF INTEREST

The authors indicated they have no potential conflict of interest to disclose.

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