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Published in:
Vaccine

DOI:
[10.1016/j.vaccine.2018.11.081](https://doi.org/10.1016/j.vaccine.2018.11.081)

Publication date:
2019

Document Version
Author accepted manuscript

[Link to publication in ResearchOnline](#)

Citation for published version (Harvard):

Pollock, KG, Wallace, LA, Wrigglesworth, S, McMaster, D & Steedman, N 2019, 'HPV vaccine uptake in men who have sex with men in Scotland', *Vaccine*, vol. 37, no. 37, pp. 5513-5514.
<https://doi.org/10.1016/j.vaccine.2018.11.081>

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1 **HPV vaccine uptake in men who have sex with men in Scotland**

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11 **Keywords:** MSM; HPV; vaccine; sexual health

12

13 **Abstract**

14 Human papillomavirus (HPV) vaccines are currently utilised globally in national
15 immunisation programmes. In July 2017, a national HPV vaccine programme for men who
16 have sex with men (MSM) was initiated across Scotland with vaccine being offered in the
17 sexual health clinic setting. During the first year of this targeted vaccination programme,
18 there were 5,905 individuals who received at least one dose of HPV vaccine, representing
19 63.7% of eligible MSM attendees in this period. Vaccine uptake was relatively stable across
20 all age groups (range 49.8-55.5%). The vaccination programme appears to have dovetailed
21 well with pre-existing sexual health services and appears to be popular with MSM attending
22 the service. The MSM HPV vaccine programme is a robust adjunct to the national girls
23 programme but gender-neutral immunisation will reduce stigma and inequality in HPV-
24 driven disease.

25 **Introduction**

26 Since 2008, school-based uptake in Scotland of the HPV vaccines in girls aged 12–13 has
27 been impressive, with vaccine uptake sustained at levels approximating 90% (Sinka *et al.*
28 2014). We have recently reported on the effect of the bivalent vaccine on the prevalence of
29 HPV types in women immunised routinely at age 12 or 13 years who attended for screening
30 at age 20, where virtual abolition of HPV 16 and 18 infections was observed (Kavanagh *et al.*
31 2017). Indeed, the prevalence of virus (0.5%) was comparable in vaccinated and
32 unvaccinated women, demonstrating significant herd protection against the two most
33 prevalent oncogenic HPV types known to precipitate anogenital and oropharyngeal cancers
34 (Lin *et al.* 2017; Chaturvedi *et al.* 2013).

35 A HPV vaccination programme for men who have sex with men (MSM) aged up to and
36 including 45 years old who attend sexual health and/or HIV clinics commenced in Scotland
37 in July 2017 (CMO Directorate, 2017). The vaccine is administered irrespective of HPV
38 infection status. The programme was initiated by the Scottish Government based on advice
39 from the UK Joint Committee on Vaccination and Immunisation (JCVI, 2015), which
40 recognised that MSM receive little benefit from the national schools' HPV programme in
41 girls. Furthermore, HPV anogenital infection and related disease is disproportionately higher
42 in MSM who are significantly more likely than heterosexual men to develop anal cancer
43 (Piketty *et al.* 2012).

44 We present national vaccine uptake data for the first year of this selective immunisation
45 programme for MSM attending sexual health clinics in Scotland.

46

47 **Methods**

48 The National Sexual Health IT System (NaSH) is currently used by all eleven mainland
49 Scottish NHS board sexual health services (SHS) to record patient attendances. Denominator
50 numbers of MSM were identified as those who attended 81 sexual health services during the
51 first full year of the MSM HPV immunisation programme (1st July 2017 to 30th June 2018),
52 who were age \leq 45 years at the time of attendance, and where the patient sex was male and
53 gender of lifetime sexual partners was recorded as "men and woman" or "men only".
54 Immunisation status of these 'eligible MSM' was derived from prescription data on NaSH
55 during the same 12 month period, with three prescriptions (or doses) of Gardasil considered
56 'Complete' for adults and 2 doses for those under 15 years of age. Due to the flexibility in the
57 Gardasil summary of product characteristics (SPC), variable spacing options for the doses are
58 possible. This enables the administration of subsequent doses to be aligned with
59 recommended GUM re-attendance, routine investigations for HIV+ MSM, or other care.

60 Age of those vaccinated was based on the age at first prescription (i.e. when the patient first
61 started the HPV programme) and NHS board was based on the most recent appointment
62 location. Patients had to have a valid sexual health clinic appointment linked to their
63 prescription. This was required to consistently identify age and NHS board. Non-linking
64 records were excluded (43, 0.7%). Data were extracted in October 2018.

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70 **Results**

71 During the first year of this targeted opportunistic vaccination programme, there were 5,905
 72 individuals who received at least one dose of HPV vaccine. This represents a percentage first
 73 dose uptake of 63.7% of eligible MSM attendees in this period (table 1). Vaccine uptake was
 74 relatively stable across all age groups (range 49.8-55.5%). Few (447 of 5905, 7.6%) were
 75 aged under 20. In this time period, 3,367 MSM who attended sexual health services (36.3%)
 76 were eligible for HPV vaccination by age and lifetime sexual history but did not begin the
 77 programme.

78 **Table 1. Uptake of HPV vaccine in MSM within Scotland by age group (patient**
 79 **immunisation status was based on their most recent Gardasil prescription prescribed as**
 80 **at 30 June 2018).**

Age band (years)	Number of MSM attending Individuals	Immunisation Status			Percentage Uptake (%)		
		Complete	In Progress	Total	Complete	In Progress	Total
<20	708	54	393	447	7.6	55.5	63.1
20-24	2,443	242	1,330	1,572	9.9	54.4	64.3
25-29	2,403	297	1,221	1,518	12.4	50.8	63.2
30-34	1,597	223	801	1,024	14.0	50.2	64.1
35-39	1,163	161	579	740	13.8	49.8	63.6
40-45	958	117	487	604	12.2	50.8	63.0
Total	9,272	1,094	4,811	5,905	11.8	51.9	63.7

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83 Discussion

84 The implementation and roll-out of the HPV vaccination programme in MSM within
85 Scotland has been successful with a moderately high first dose uptake. The vaccination
86 programme, designed to be opportunistic, has been accommodated into pre-existing sexual
87 health services and is popular with MSM attending the service. Furthermore, the 1st dose
88 uptake of 64% correlates well with estimates used in cost-effectiveness models (Lin *et al*,
89 2017). The HPV programme commenced simultaneously with the offer of pre-exposure
90 prophylaxis (PrEP) to eligible HIV-negative individuals, which presented significant
91 logistical challenges for those delivering sexual health services. Limitations of this analysis
92 include the fact that NaSH is not currently used by the three Scottish Island Boards (Orkney,
93 Shetland & Western Isles), and not by some mainland HIV Services. Work is ongoing with
94 these services to determine numbers of those eligible for the HPV vaccine among the HIV
95 cohort and those vaccinated in non-NaSH using sexual health sites and in the prison setting,
96 though numbers are predicted to be small.

97 The first dose uptake of 64% in Scotland broadly compares with other devolved UK nations
98 where first dose uptake has been estimated to be 77% in specific areas of Wales (Knapper *et*
99 *al.* 2018), 65% in Northern Ireland (HSCNI PHA, 2017) and 46% in England, albeit the latter
100 figure was estimated through a pilot evaluation rather than national roll-out (PHE, 2018).
101 While the offer of vaccine through sexual health clinics appears to be well-received,
102 approximately 36% of eligible MSM attending sexual health clinics that are eligible for the
103 vaccine have not commenced it and these men presumably remain at risk of acquiring new
104 HPV infections. Given that 50% of MSM in Scotland are infected with a vaccine-specific
105 HPV, the importance of increased vaccine uptake in this at-risk population cannot be
106 understated (Cameron *et al.* 2018). Future analyses will detail the clinical impact of the
107 programme in both the short and longer term.

108 **Acknowledgements**

109 The authors thank all those who work across sexual health services within Scotland for their
110 efforts in delivering excellent service.

111

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