Group W invasive meningococcal disease (MenW IMD) has steadily increased in England since 2009.[1, 2] This increase has occurred in all regions and age groups, and is due to the rapid expansion of a single endemic hyper-virulent strain belonging to the sequence type 11 clonal complex (ST-11cc). MenW ST-11cc IMD is associated with more severe and atypical presentations compared to group B disease.[1] In response, the Joint Committee on Vaccination and Immunisation (JCVI) recommended the introduction of meningococcal ACWY (MenACWY) conjugate vaccine to the national immunisation programme in England.[1, 3] Public Health England (PHE) initiated this programme on the 26th June 2015. As a result, MenACWY vaccine replaced the existing time-limited 'freshers' programme from August 2015, and was substituted directly for MenC vaccine in the routine adolescent school programme for 14-15 year olds. Currently, a catch-up campaign is also being implemented to offer MenACWY vaccine to all 14-18 year olds.[3, 4]

The rationale for targeting the vaccine solely at older adolescent and young adults is that this group represents the main reservoir of meningococcal carriage.[5] Introduction of the MenC conjugate vaccine previously reduced carriage of MenC strains in this population[6, 7] and evidence suggests that the quadrivalent vaccine may have a similar effect on carriage of MenW strains.[8] Reduced carriage in this population should lead to other age groups being protected indirectly.[9]

In this study, we report MenACWY vaccine coverage in first year students arriving at the University of Nottingham (UoN) in September 2015. We also report the uptake of MenACWY vaccine offered to unvaccinated students via a campus-based mass vaccination campaign as part of a local initiative by the University of Nottingham Health Service (UNHS), in liaison with UoN, during the registration period.

Following approval by the Research Ethics Committee at the UoN, students were recruited to assess the uptake of MenACWY conjugate vaccination prior to arrival at the university. During registration (17-23rd September 2015), as part of standard clinical practice, interviews were conducted with each student by UNHS healthcare professionals and their vaccination history was confirmed and recorded on the UNHS registration database. Students who reported that they had not received MenACWY vaccine during the interview were offered immediate pro gratis vaccination with Menveo. Searches of the UNHS registration database (EMIS Web software; EMIS Health, Leeds, UK software) were later performed to determine vaccine coverage in the registered first year student population prior to arrival at the UoN and in a subgroup of international students. Uptake of MenACWY vaccine during registration was also assessed by UNHS database search and separately, to provide corroborative data, by a self-reported questionnaire from 134 students recruited post-registration on 28th and 29th September 2015 in two separate halls of residence on the main campus of the UoN.

During the registration period, 7049 first year students (aged 17-25 years) registered with the UNHS. On searching the UNHS database, 2160 (31%) of the 7049 registered students were recorded as having received MenACWY conjugate vaccine prior to arrival at the UoN. Of the remaining 4889 students who were eligible for vaccination, 2809 (57%) accepted the offer of vaccination and 2080 (43%) declined vaccination. Overall, following registration, MenACWY vaccine coverage in first year students at the UoN as assessed by UNHS database search increased from 31% to 71%. From the follow-up questionnaire post-registration on 28th and 29th September 2015, MenACWY vaccine coverage in 134 students was found to be 64% confirming the significant rise in coverage following the UNHS campaign. Students' self-reported vaccination status agreed with that in their health record.

In a subset of 804 international students aged 17-25 years, who registered with UNHS on 17th and 18th September 2015, only 7 (1%) confirmed they had already received the MenACWY vaccine prior to arrival. Of the remaining 797, 572 (72%) accepted and 225 (28%) declined vaccination. International students, compared to UK-based students, are less likely to have received MenACWY vaccine in their home country prior to arriving at university in UK. Nevertheless, uptake of MenACWY vaccine when offered was equally as good in this group. In the absence of a local mass vaccination campaign, it is likely that coverage would be particularly low in international students, placing them at risk of MenW disease.

The overall vaccine coverage of 31% in this population of first year students on arrival at the UoN is unsurprisingly low but did confirm that the national vaccination campaign was successful in reaching a proportion of prospective English university students. PHE have used a temporary general practice-based sentinel surveillance system to provide a provisional estimate of vaccination coverage for the first cohort offered MenACWY vaccine from August 2015. An evaluation at the end of January 2016 suggested that coverage was 33.7%[10], which is consistent with our findings. The slightly lower MenACWY vaccine coverage found in our student population is likely to be due to the inclusion of a proportion of international students who were much less likely to have received vaccination before arrival.

High rates of transmission of meningococcal strains occur in students during the first year of university attendance. As students also exhibit high mobility and wide geographical distribution, they represent a major vehicle for spread of meningococcal strains into communities throughout the UK. Targeting of this age group with the MenACWY vaccine has the potential to significantly perturb spread of the virulent MenW ST-11cc strain. If representative of coverage in this age group as a whole in England, ca. 30% MenACWY vaccine coverage may be too low to significantly reduce meningococcal carriage and transmission, accepting that the level of coverage needed to achieve such an effect is not

known. Consequently, a herd protection effect leading to a fall in MenW IMD may not be achieved in the short term. In contrast, the significant boost in coverage (from 31% to 71%) following the vaccine campaign at registration at the UoN demonstrates the importance of offering vaccination at enrolment in tertiary educational establishments and suggests that a more general implementation of this strategy may significantly improve vaccine coverage in this age group. As the cost of the MenACWY vaccine is funded centrally for first year university students as part of the national campaign, and an administration fee is also provided (currently £9.80 per vaccine administered), the campus-based mass vaccination campaign was essentially cost-neutral as advertising and the necessary facilities were arranged and provided in liaison with the host institution as part of the pastoral care for new students. The campus-based mass vaccination campaign delivered during the registration period, also provided significant logistical advantages compared with offering a large number of individual appointments for students to receive vaccination. However, a substantial proportion of unvaccinated students still declined vaccination (due to a lack of perceived need or benefit) suggesting that further advertising of the national campaign will be necessary to raise awareness and acceptance of the MenACWY vaccine in this demographic.

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